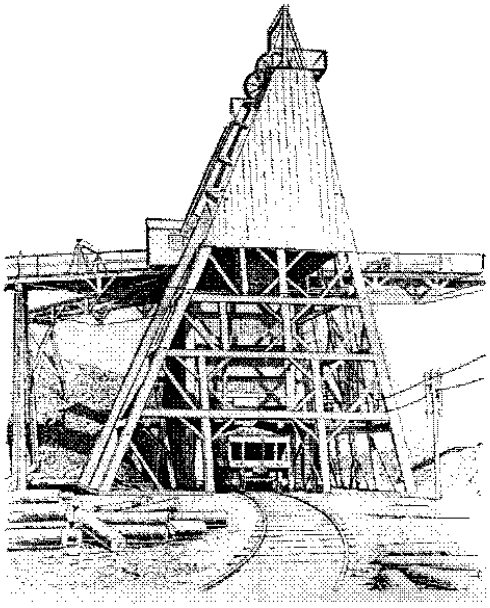
Contour3DMS



MinServ

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About Contour3DMS

Contour3DMS is a Windows program for drawing and plotting drill hole/contour maps. A wide variety of options allow the plans to be customized to your requirements. Designed for presenting and interpreting geological field data. Contour3DMS consists of 3 integrated modules built into one application. These 3 modules are:

1. Spreadsheet Module for entering and editing data
2. Drill Hole Plotting Module for drawing and plotting plans
3. Contour and 3D Surface Module

Contour3DMS Features

- Plot Drill Hole Plans, Contour Maps and 3D Surface Maps
- Import Wizard for Tab, Comma, Space, Semi-colon Delimited and Fixed Width Files.
- Builtin Spreadsheet for Entering and Editing Data
- Save and Print 3D and 2D Maps
- Mapping Symbol Font Supplied
- Use Additional Windows Fonts
- Auto or Manual Scales
- Drawing and Text Tools, Including Line, Box, Ellipse, Text, Symbol
- Choice of Colors, Labels, Symbols and Fonts
- Printing and Clipboard Support
- Free FTP Internet Updates

Getting Started

Contour3DMS requires a minimum system configuration for effective results. The system requirements are:

Windows XP, Vista, Windows 7
Net Framework 4.0 or Higher
Devices supported by Windows
Printer supported by Windows

For automatic installation, proceed as follows:

1. Start Windows and place CD into CD Drive
2. Go to the Run Option on the Start Menu Select the CD Drive
3. Install Net Framework 4 First
4. Open (CDROM)D:\Contour3DMS\Disk1\Setup.exe to Setup Contour3DMS
5. Setup will start. You should not have any problems, but if you do have problems, you may have to update with a service pack and Setup may not work correctly. Service packs are available from the Microsoft Windows Update Site.
6. After Setup has concluded, you will get a [App] Setup was Completed Successfully message.
7. To Start Contour3DMS, go to the Contour3DMS Menu and click on Contour3DMS.

Installation will now proceed. During installation, the user is prompted for a directory. If this is ignored, a new directory called Contour3DMS will be created. If a directory path is entered, a new directory with this name will be created. The user will be notified when installation is complete. A new Start Menu Item containing Contour3DMS and Contour3DMS Manual is created. Click on Contour3DMS to start the

program.

How To Use Contour3DMS

Contour3DMS has a standard windows interface. Before starting the exercise, Contour3DMS must be installed on the user's hard drive and opened ready to use. A sample data file called drillhole1.plt is provided for use with the tutorial exercise.

Getting To Know Contour3DMS

To load the drillhole1.plt data file, click the Open command button or select Open from the File Menu. The Open common dialog box will pop up. Select drillhole1.plt in the contour3dms/data directory.

Hint:
Use the toolbar as a short cut to access some options.

Plotting Data

Pull down the Plot Menu and select Plot Drill Holes. The Options Window will pop up. Accept the default values and click the Plot button. A map will appear on a new form. Select Tables from the Options Menu.

Entering Data

Select New from the File menu to start a new data file. Select Options menu and Insert Drill Hole Headings. Data is entered in each cell by simply typing the value and pressing <enter>. Use the scroll bars, arrow, page up and page down keys to navigate through the spreadsheet. To edit a cell, press <enter> for the cell you want to edit and use the backspace/delete/insert keys to edit the text. When finished editing press <enter> the new value will appear in the spreadsheet. Whole rows can be inserted and deleted using the Insert Row and Delete Row command buttons. Blank lines are not permitted between data. **Column headings are used for reading column data. Be sure a column heading exists for each column of data in the spreadsheet, beginning with column 1 and ending with the last column of data.**

Enter the following data:

ID#	Symbol	Color	X	Y	Depth
A32	1	1	20	55	42
C567	2	2	36	52	23
F62	3	3	56	37	78
B85	4	4	21	32	67

To edit a cell, go back to Row 2, Col 1 and press <enter>. Type A56 to replace A32 and press <enter>.

Hint:
Use the mouse to navigate through the spreadsheet. Click a cell to change the current cell or click on the scroll bars to display out of view data. To begin editing a cell, double click the mouse.

Plotting a Plan

Sample files are in the contour3dms/data directory. Open drillholes.plt into the spreadsheet. Select Plot Drill Holes from the Plot Menu. Accept the default options in the Drill Hole Options Window and click on Plot. A new Plot Window showing a drillhole plan is displayed. Lines, shapes, labels and symbols can be

added from the Edit Menu. If a z value has been entered into the spreadsheet, select Contour from the Options Menu to draw a contour map. Enter the contour options and plot the contour map. Select 3D Surface to display a 3D diagram of the gridded surface.

There are two geology fonts supplied, one named DrillSymbol and another named DHMS Lithology.

File Formats

They may specify drill hole ID#, name, symbol, color, easting (x), northing (y), data (z) values for all drill holes. Symbol and color values for each drill hole are entered under the corresponding headings.

The drill hole maps use Cartesian map coordinates, also known as UTM.

File Menu

The File Menu provides many standard file management options.

New Command

Begins a new spreadsheet.

Close Command

Closes the current spreadsheet

Open Command

Provides access to the Open common dialog box. Opens a new file. Select the directory and file and click OK. Clicking the Open command button can also open a file.

Import Command

Imports a text file. Select the type of file to import:

Space Delimited
Comma Delimited
Tab Delimited
Semi Colon Delimited
Fixed Width
Specify the number of lines to skip at the beginning of the file to avoid importation of file headings into the spreadsheet

Save Command

Saves a file to disk. The default filename is the current filename. The same result is obtained by clicking the Save command button.

Save As Command

Saves a file to disk in a directory and filename specified by the user. A Save As dialog box pops up for the user to enter filename and directory path information.

Print Spreadsheet Command

Prints the current spreadsheet. A Print dialog box pops up. Select Print to print the spreadsheet.

Print Setup Command

Specifies printer settings available to the user. A Print Setup dialog box pops up with several options to control the printer.

Exit Command

Quits the application.

Edit Menu

The Edit Menu provides access to several standard commands for editing the spreadsheet.

Copy Command

Copies selected text in the spreadsheet to the clipboard without deleting. Highlight the text to be copied by dragging the mouse or holding down the shift key and clicking cells. Select Copy to copy the selected text to the clipboard. Use Paste to paste text from the clipboard to the spreadsheet. Use Cut to remove highlighted text from the spreadsheet to the clipboard.

Cut Command

Copies selected text from the spreadsheet to the clipboard and clears the highlighted area in the spreadsheet. Highlight text to be cut by dragging the mouse or holding down the shift key and clicking cells. Select Cut from the edit menu to transfer selected text to the clipboard. Use Paste to retrieve cut text from the clipboard. Use Copy when you want to copy text to the clipboard without deleting the highlighted text.

Paste Command

Retrieves text from the clipboard and pastes it into selected cells. Highlight cells that are to receive the incoming text by dragging the mouse or holding down the shift key and clicking cells. Select Paste from the Edit menu to transfer text from the clipboard to the spreadsheet.. Any text that already exists in the highlighted cells will be replaced. If the number of selected cells are fewer than will hold the clipboard text, the rightmost text from the clipboard will be truncated to fit the selected cells. If the number of cells selected exceed the length of the clipboard text, the remaining cells will be cleared. Use Copy and Cut to send text to the clipboard.

Insert Row Command

Inserts an entire row into the spreadsheet.

Delete Row Command

Deletes an entire row from the spreadsheet.

Delete All Command

Deletes all selected rows from the spreadsheet.

Sort Menu

The Sort Menu allows the user to sort data in the spreadsheet according to any column #. A new window opens asking for a column to sort. Enter a column number and click on Sort to sort the data.

Search Menu

The Search Menu allows the user to find and replace user specified text.

Find Command

Finds a user specified search text in the spreadsheet. A pop up Find dialog box prompts the user for the search text. Enter the exact search text and click OK to proceed with the search.

Find Next Command

Repeats a search using the previous specified search text.

Replace Command

Finds a user specified search text and replaces it with a user specified replace text. A pop up dialog box prompts the user for search text (Find What) and replacement text (Replace With). The following options are available:

Find- find the first occurrence of specified text

Replace- replace the current text with the specified replace text

Replace All - replace all occurrences of the search text with the specified replace text.

Core Menu

Reports

Automatically loads a core report template for routine core descriptions. The reports can be used "as is" or customized to the users requirements. Reports can be saved or cut and pasted into spreadsheet applications for further formatting.

Report Templates Supplied:
Igneous Rocks
Pyroclastic Rocks
Metamorphic Rocks
Sedimentary Rocks
Limestones
Ore Minerals

Options Menu

Drill Hole Headings Command

Selects a Drill Hole Plot and places the appropriate column headings into the spreadsheet.

Colors Command

Provides access to the Colors dialog box for selecting the plotting colors. Select a number to place the corresponding code number in the spreadsheet.

Symbols Command

The Symbol command opens the symbol box to view the available symbols and their codes. Select a number to place the corresponding code number in the spreadsheet.

Define Cols Command

Sets the columns containing XYZ coordinates, symbols, colors and drill hole ID# for plotting.

Statistics Command

Calculates the maximum, minimum, median, mean and standard deviation of a group of samples. Enter the spreadsheet column number containing the data to be analyzed. Click on calculate to calculate statistics.

Format Command

Automatically formats numeric data in the spreadsheet. Specify the number of decimal points and click on format to format data.

Plot Menu

Plot Drill Holes Command

Plots the active spreadsheet data using the options set in the Options Window .

Drill Hole Options Window

The Drill Hole Options Window sets options to control the Drill Hole Plot.

Scale Type
Set Scale
Set Titles

Scale Type

Select Auto Scale or Manual Scale.

Set Scale

When manual scale is selected, enter the minimum and maximum values for the X and Y axes here.

Set Titles

Enter diagram, X axis and Y axis titles here.

Drill Hole Plot Window

The Drill Hole Plot Window displays the map on screen with several options and controls. The diagram can also be printed.

Axes Font
Borders
Box Draw
Color
Contour
Copy Diagram
Diagram Color
Ellipse
Export Diagram
Geology Symbols
Insert Text
Line Draw
Open Plan
Print Diagram
Save Plan As
Symbol
Symbol Legend
Tick Marks
Undo

Axes Font

To change the font of axes labels select Axes Font. A font dialog box is displayed. Select a font from the list and click OK

Borders

Selects a border style to plot around a plan, or section.

Box Draw

To draw a box, select box draw. The cursor will change to a cross hair. Position the cross hair where the box is to begin and drag the cursor by holding down the left mouse button. A dotted box is dragged with the mouse. Release the left mouse button when you have positioned the box correctly.

Color

Opens a Color Dialog Window to select a drawing color. All graphics are drawn in the selected color.

Contour Map

The Contouring Options Window sets options to setup gridding and contouring calculations and display. The gridding interpolation uses kriging or inverse distance. Kriging is a method for calculating a rectangular grid array from irregularly spaced data. Kriging recognizes geological structures are neither random or completely dependent on neighboring points. Use block kriging for large data sets.

Gridding Method

For Kriging, Select either classic or block kriging. Block kriging is faster for large data sets. Inverse distance gridding is also available.

Variogram Model

Select a variogram model to use for the calculation. Three types are available, linear, spherical and exponential. Only linear variogram is available with classic kriging.

Variogram Settings

Enter values for the nugget and sill. The default values are nugget = 1 and Sill = 3. If these values are used, a "best fit" variogram will be used.

Contour Settings

Data Range – The valid range for minimum and maximum contour values

Auto Calc – Automatically calculates the contours using the data range

Minimum Contour Value – The minimum value contour to plot

Maximum Contour Value – The maximum value contour to plot

Grid Size

Rows and Columns – Number of rows and columns to use in the grid calculation.

Contour Labels

Decimal Points - The number of decimal points to display on the contour labels

Contour Map Window

In the Contour Map Window, additional types of maps can be displayed, including 3d Isosurface, 3D Surface, Color Contour and Solid Fill Color Contour Maps. All the contour maps have legends and customized with drawing tools and other options. Grid statistics can be calculated for all contour maps.

Copy Diagram Command

Copies the current diagram to the clipboard for pasting into other applications.

Diagram Color

To change the diagram color select Diagram Color. A color dialog box is displayed. Select a color from the list and click OK.

Ellipse

To draw an ellipse, select Ellipse. The cursor will change to a cross hair. Position the cursor where you would like the ellipse to begin and drag the ellipse by holding down the left mouse button and moving the mouse. Release the left mouse button when the ellipse is positioned correctly

Export Diagram

The Export Diagram Dialog Box will pop up to export the log file to a file or clipboard. Select from one of the file formats. Select from bmp, wmf, jpg, gif, png, tiff, vml, svg, pdf, postscript, xaml, flex and html5 formats.

Geology Symbols

To add a geology (strike and dip) symbol, or other structural symbol, click on Geology Symbol in the Edit Menu. A new Window allows selection of the size and rotation (strike or dip) of the symbol. Rotated symbols will print with the map. There are two geology fonts supplied, one named DrillSymbol and another named DHMS Lithology.

Insert Text

To insert text select Insert Text. Position the cursor where you would like to insert text and click the left mouse button. Type the text to be inserted.

Line Draw

To draw a line, select Line Draw. Position the cursor where you would like the line to begin and drag the line by holding down the left mouse button and moving the mouse. Release the left mouse button when the line is positioned correctly.

Print Diagram

Prints the current diagram. Print Preview has many options, including margins, color and size, for formatting the printed diagram.

Open Plan

Opens a Drill Plan File that has previously been saved with Contour3DMS Drill Hole Window. Drill Plan Files are text files that have a *.pln extension. Contour3DMS Drill Plan Files use a proprietary file format. Opens only drawing and text items for the original plot (data file).

Save Plan

Saves a Drill Hole Plan that has been created with Contour3DMS Drill Plan Window. Drill Plan Files are text files that have a *.pln extension. Saves only drawing and text items for the current plot.

Scroll Axes

Activates scrolling of the X and Y axes. Right click the mouse, with the pointer over the axis and drag the axis scale.

Symbol, Add

To add a symbol from a symbol font family, select Symbol from the Edit Menu in the Plot Window. All symbol fonts currently on your PC are displayed in the fonts list. Select a symbol and click OK. Place the mouse pointer where the symbol should be inserted and click the mouse to insert the symbol., The symbols can be rotated by entering the amount of rotation.

Symbol Legend

Opens the Symbol Legend Window. To add symbol descriptions, type the description next to the desired symbol. Symbol descriptions can be printed selecting Print. The size of the symbol used on Drill Hole Plots can be changed by selecting a different symbol size.

Tick Marks

When Tick Marks is checked all tick marks are displayed and printed with the diagram.

Undo

Undo the previous drawing action.

Zoom

When zoom is selected true, hold down the right mouse key and drag the pointer from top left to bottom right to zoom the chart. Drag in the opposite direction to undo the zoom.

File Formats

The built in spreadsheet saves data files in tab delimited ASCII format. This format is used by Microsoft Excel and is compatible with most spreadsheets. To import a data file created with another application, save the file in tab delimited format (in Excel, these files have a .txt extension) , start Contour3DMS and open the data file. Contour3DMS will automatically load the file into the spreadsheet. To export a data file created with Contour3DMS, use any of the following methods:

1. Select tab delimited ASCII format in the other application. These files usually have a .txt extension. Open the file.

2. In Excel, the file created with Contour3DMS can simply be opened directly.

In many applications, the file can simply be opened directly.

The built in spreadsheet requires data to be in a specific format for plotting data. The first row in the spreadsheet is reserved for column headings. Any data placed in the first row will not be included in subsequent calculations. Imported data files will be displayed intact with all headings and data; however, to use Contour3DMS's features it is necessary to correctly define which columns contain drill hole ID#, symbol, color, easting (x), northing (y) and depth values. Use Define Columns from the Options Menu to assign columns correctly. The drill hole ID# is required for all rows to plot drill holes correctly. Additional data can be entered via the keyboard or using the clipboard.

The drill hole maps and cross sections use Cartesian map coordinates, also known as UTM.

Drill Hole Plots and Plans

They may specify drill hole ID#, name, symbol, color, easting (x), northing (y), top depth , bottom depth (z), thickness, elevation, bearing, inclination and data values for all drill holes. Symbol and color values for each drill hole are entered under the corresponding headings.

ID#	Name	Symbol	Color	X (easting)	Y (northing)	Top	Bottom
A1	Brenn	1	2	112	135	0	45

Diagrams created with Contour3DMS can be saved as bitmap files for exporting into paint programs, word processors and other applications. Diagrams can be saved in many different file formats. Diagrams can also be exported to pdf files using the pdf printer driver supplied. Select the dopdf printer in the printer settings to print a pdf file.

GeolBases

Geolbases is a set of geological databases to help retrieval of mineralogical and petrological data. Each database has its own unique graphical user interface so they can be used individually without having to change tables and report layouts. A database manager allows access to each database from Windows or the databases can be accessed from the database menu in Contour3DMS.

GeolBases Features

Printing and Clipboard Support

Each database has printing and clipboard support. Search results can be printed and information from the databases can be copied to the clipboard for use in other applications.

Getting Started

Geolbases requires a minimum system configuration. The system requirements are:

1. 1.Windows XP, Vista, 7
2. Net Framework 4.0 or higher
3. Access 2010 Runtime
4. 800x600 Display Resolution
5. Mouse
6. Printer supported by Windows

For automatic installation, proceed as follows:

1. Start Windows
2. Install Net Framework 4.0
3. Install Access 2010 Runtime
4. Open (CDDrive)D:\Geolbases\Disk1\setup.exe to start Setup

The WinRock Database

The WinRock Database for Windows is a petrographic database of igneous, metamorphic and sedimentary rocks. Each rocktype contains a petrographic summary consisting of Rock Name, Group, Family, Texture, Structure, Composition, Occurrence and Comments. The descriptions have been standardized using the usual petrographic terms. Searches can be carried out on individual or multiple fields using partial or complete key words. The composition field can be searched with up to three minerals simultaneously.

Using The WinRock Database

Click on The WinRock Database menu item or icon to start the program. The WinRock Database Window is displayed with a scrollable list of rock names and their descriptions. Records can be printed or copied to the clipboard.

To start a query click on the Query command button. The Search Window is displayed with a list of searchable fields. Enter search terms in the appropriate fields. The database has been standardized using the usual petrographic terms. These terms are listed under the appropriate fields in the Search

Window. It is recommended that searches are made using these terms; however, descriptions are not limited to these terms and any keyword can be used. Click on Search to start a search. A list of matches is displayed in The WinRock Database Window. Search results can be printed or copied to the clipboard. To list the entire database click on the Refresh command button.

The WinRock Database is editable. Enable editing by selecting Edit Database, then Enable. Once the edit mode is enabled, any changes made to the database will automatically be saved. Selecting Add New Record can enter a new record. A new record with empty fields is created.

Important: Blank and null entries are not allowed in the database. If no entry is desired under a specific property then enter "Empty" for that specific property. Default values for all properties are "Empty". This word is automatically added to new entries.

Bookmarks can be entered using the database ID property. Enable editing and enter a unique number/label into the ID field. This label is searchable with the Query/Search option. Useful for indexing samples or as simple reference bookmarks.

A set of sample images is included with the database. Further images can be added by selecting Add Image from the File Menu in Image Viewer Window. Images can be copied and pasted from the clipboard. Select Add Image to add an image. Close Image Viewer Window to save the image to the database.

There are three customizable project databases available for use. All functions work on these databases in the same way as for the Main Database. To select a project database go to Active Database on the Edit Menu and select a database.

List of Search Terms

Group
Igneous
Metamorphic
Sedimentary

Structure
Massive - No structure
Foliated - Planar alignment of platy minerals
Schistose - Discontinuous planar alignment of minerals
Flow - Changing alignment of minerals in a flow pattern
Banded - With bands of different composition or color
Bedded/Laminated - Divided into separate layers

Texture
Crystalline - All crystalline textures, with a grain size > 0.2mm (e.g. Granite, Gneiss)
Microcrystalline - Crystalline textures with a grain size < 0.2mm and > 0.01mm (e.g. Hornfels)
Cryptocrystalline - Crystalline textures with a grain size < 0.01mm (e.g. Agate)
Amorphous - Non crystalline, glassy (e.g. Obsidian)
Porphyritic - Large crystals (phenocrysts) in a fine-grained ground mass (e.g. Basalt)
Recrystallized - Textures produced by partial recrystallization (e.g. Meta-Basalt)
Inequigranular - Fine to macro - sized grains (e.g. Kimberlite)
Fragmental - Composed of mineral and/or rock fragments (e.g. pyroclastics)
Biogenic- Textures produced by organisms (e.g. Limestone - Boundstone)
Organic-Textures produced by organic material (e.g. coal)
Clastic - Textures produced by mechanically accumulated grains cemented together (e.g. Sandstone)
Chemical - Textures produced by chemical precipitation (e.g. Anhydrite)

Occurrence

Plutonic - A general term for any large scale intrusive rocks
Volcanic - Extrusive and associated intrusive rocks
Regional Metamorphic - Metamorphic rocks occurring over large areas
Contact Metamorphic - Adjacent to intrusions
Fault/Shear Zone - Planar zones of brittle and/or ductile deformation
Basin - Sedimentary rocks in a sedimentary basin.

MinServ Mineral Database

The MinServ Mineral Database is a reference database of over 3700 minerals. Mineral Name, Formula and Crystal System index each mineral. Nearly all registered mineral names are listed but group terms such as feldspar and apatite are not listed. The database can be searched for key words and substrings and the results printed and copied to the clipboard.

Using The Mineral Database

The Mineral Database has all entries listed in a table. Minerals can be scrolled up and down through the table. To find a specific property, it is a simple matter of entering a search term and selecting the field to be searched to find a specific mineral. The results can be printed or copied to the clipboard for use with other applications.

The Mineral Database is editable. Enable editing by selecting Edit Database, then Enable. Once the edit mode is enabled, any changes made to the database should be saved by using the Save Command or clicking on the Refresh Button. Selecting Add New Record can enter a new record. A new record with empty fields is created.

Important: Blank and null entries are not allowed in the database. If no entry is desired under a specific property then enter "Empty" for that specific property. Default values for all properties are "Empty". This word is automatically added to new entries.

Bookmarks can be entered using the database ID property. Enable editing and enter a unique number/label into the ID field. This label is searchable with the Query/Search option. Useful for indexing samples or as simple reference bookmarks.

There are three customizable project databases available for use. All functions work on these databases in the same way as for the Main Database. To select a project database, go to Active Database on the Edit Menu and select a database.

Mineral Properties Included

Mineral Name - The International Mineralogical Organization recognized mineral name

Formula - Enter part or whole formula i.e. Cu for formula containing copper

Crystal System - Enter crystal system
Isometric or cubic
Hexagonal or trigonal
Tetragonal
Orthorhombic
Monoclinic
Triclinic

MinServ Rock Forming Minerals Database

The MinServ Rock Forming Minerals Database is a reference database of all rock forming and accessory minerals. The database is divided into two sections: 1. Physical properties, listing all physical properties and 2. Optical properties, listing all optical properties visible with a polarizing microscope.

Using The Database

The Rock Forming Minerals Database is based around a standard mineral description report displayed as a form with a scrollable list of mineral names linked to each mineral property. Properties for each mineral are displayed as the names are selected from a scrollable list. Clicking on the Query button can search all properties. It is a simple matter of entering a search term and selecting the field to be searched to find a specific mineral. The results can be printed or copied to the clipboard for use with other applications.

The Rock Forming Minerals Database is editable. Enable editing by selecting Edit Optical Database, then Enable. Once the edit mode is enabled, any changes made to the database will automatically be saved. Selecting Add New Record can enter a new record. A new record with empty fields is created.

Important: Blank and null entries are not allowed in the database. If no entry is desired under a specific property then enter "Empty" for that specific property. Default values for all properties are "Empty". This word is automatically added to new entries.

Bookmarks can be entered using the database ID property. Enable editing and enter a unique number/label into the ID field. This label is searchable with the Query/Search option. Useful for indexing samples or as simple reference bookmarks.

A set of sample images is included with the database. Further images can be added by selecting Add Image from the File Menu in Image Viewer Window. Images can be copied and pasted from the clipboard. The image can also be added within Image Viewer using the menu. Close Image Viewer Window to save the image to the database.

There are three customizable project databases available for use. All functions work on these databases in the same way as for the Main Database. To select a project database, go to Active Database on the Edit Menu and select a database.

Recommended Search Terms:

Formula - Enter part or whole formula i.e. Cu for formula containing copper

Crystal System - Enter crystal system
Isometric or cubic
Hexagonal or trigonal
Tetragonal
Orthorhombic
Monoclinic
Triclinic

Group - Enter mineral group name
Quartz
Pyroxene
Feldspar
Garnet
Serpentine
Clay
Mica
Brittle Mica
Bauxite
Oxide
Amphibole
Feldspathoid
Zeolite
Silliminite
Calcite
Barite
Humite
Tourmaline
Epidote
Chlorite

Specific Gravity - the relative weight of a mineral as compared to water

Hardness - hardness of a mineral according to Moh's Hardness Scale

1 - Soft, i.e. Talc
2 - Copper
3 - Calcite
4 - Fluorite
5 - Medium i.e. Apatite
6 - Feldspar
7 - Glass or Quartz
8 - Topaz
9 - Corundum
10 - Hardest natural occurring mineral, Diamond

Streak - Color of a minerals powder when crushed. Determined by rubbing a mineral on a porcelain plate.
White - most common, feldspar, calcite, garnet
Black magnetite, uraninite
Green - hornblende, vesuvianite

Color - Natural color of a mineral
Black - Mica, Uraninite, Hematite

White - Plagioclase
Pink - Orthoclase
Green - Chlorite, Olivine

Opacity - The transparency of a mineral
Opaque - Does not transmit light
Translucent - Partially transmits light
Transparent - Fully transmits light

Luster - Appearance of a minerals surface
Pearly - Smooth, shiny, white surface, talc, calcite
Vitreous - Glass like, most transparent minerals are vitreous, quartz, garnet
Dull - Does not shine, talc, kaolinite
Adamantine - Brilliant shining surface, diamond
Soapy - Soapy feel, talc, chlorite
Greasy - Greasy feel, topaz, olivine
Silky - Like silk, antigorite, anthophyllite
Waxy - Wax like surface, quartz, serpentine,
Satin - Satin like surface, kaolinite
Submetallic - Shiny, opaque, metallic like surface, mica
Metallic - Shiny, metallic surface, pyrite
Splintery - In splinters, chlorite

Habit - A minerals external form
Cubic In cubes, pyrite, halite garnet
Polyhedrons/Octohedrons - Garnet, fluorite
Rhombohedral - Rhomb shaped, calcite, chiastolite
Prismatic - Rectangular, square outlines, very common, hornblende, epidote, augite, zircon, sphene
Hexagonal - Hexagonal or triangular outlines, tourmaline, beryl, topaz
Tabular - Thick, flat prismatic outlines, feldspar, biotite, chlorite, epidote, olivine
Columnar - Thin columns, often in aggregates, tourmaline, actinolite/tremolite, hornblende, diopside
Flakes/Plates/Scales - Mostly the fine, microcrystalline varieties. Mica, clay minerals, chlorite, sericite
Fibrous - In fibers, actinolite/tremolite, talc, serpentine, nephrite
Acicular - Fine, needle like crystals, tourmaline, rutile, mimetite (apatite)
Radiating - Outwardly radiating from a center, zeolite, tourmaline, gypsum
Spherulitic - A radiating acicular mass of crystals forming a circular shaped pattern. Common pattern in devitrified volcanic glass
Short - Short
Long - Long

Occurrence - The mode of occurrence and/or formation of a mineral
Veins - hydrothermal veins, quartz, calcite veins
Pegmatites - V.coarse grained veins of granites, feldspars, tourmaline, micas
Vesicular/Amygdaloidal - Cavities in volcanic rocks
Evaporites - Within sedimentary evaporite basins
Metamorphic (Contact) - Along contact zones of recrystallized rocks, hornfels, skarn
Metamorphic (Regional) - Metamorphic rocks occurring over a large area, gneiss
Igneous - Generally some form of magmatic intrusion, granite, gabbro
Sedimentary - Derived from pre-existing rocks and often laid down in layers, sandstone, shale
Sedimentary Limestones - Deposited in ocean basins due reef building or accumulation of carbonate grains (detrital or precipitation), limestone

Optical Mineralogy Database
Most of these properties are only discernible with a polarizing microscope, as used by geologists.

Relief - The visibility of a mineral in plane polarized light. Usually compared to adjacent minerals or the

cementing material used in the slide, such as balsam.

Birefringence - The interference color observable under crossed polars. Refer to a birefringence table to determine values

2V - The angle of the optical axis in biaxial minerals. Measured in an oriented crystal with a Bertrand lens under crossed polars and high power.

Optical Sign - Most minerals are either uniaxial, with a single optic axis or biaxial, with two optic axes i.e. quartz, calcite, tourmaline are uniaxial, olivine, augite, hornblende, feldspar are biaxial.

Refractive Index - The degree to which a crystal bends light, as it passes through a crystal. The RI varies according to the optical axes. Uniaxial minerals have two directions of RI: 1. Along the ordinary ray; and 2. Along the extraordinary ray.. Biaxial minerals have three directions of RI: 1. Nalpha, 2. Nbeta and 3. Ngamma.

Pleochroism - The variation in color as a mineral is rotated under plane polarized light. I.e. hornblende, biotite are strongly pleochroic

Extinction Angle - The type of extinction when a mineral is rotated under crossed polarized light.
Parallel - Parallel to cleavage or crystal outlines
Oblique - At an angle to cleavage or crystal outlines
Symmetrical - Symmetrical to crystal shape or cleavage, i.e. hornblende, hypersthene, dolomite

Cleavage - Cleavage outlines in thin section are often distinctive of a mineral.
Amphibole Cleavage - Two at 56" and 124" in cross section
Pyroxene Cleavage - Two at 83" and 97" in cross section
Mica Cleavage - Perfect in one direction
Chlorite Cleavage - Perfect in one direction
Cubic Cleavage - Halite, galena
Cleavage/Foliation Masses/Aggregates - Aggregates of planar minerals, such as chlorite and mica in one direction, parallel to cleavage.

Twinning - Twinned crystals are often observed in thin section and are distinctive of certain minerals
Polysynthetic Twinning Albite Law - Plagioclase feldspars almost always exhibit this. Used to determine Albite/Anorthite content
Simple Twinning, Amphibole - Hornblende often is twinned with two crystals sharing a common twin plane
Simple Twinning, Carlsbad - Very common in K-feldspars
Penetration Twinning - Where two crystals penetrate each other through the center, andalusite, staurolite, cordierite

MinServ Economic Database

The MinServ Commodity Database contains data on economic minerals and their uses. It has over 70 commodities and 200 economic minerals covering all major ore and industrial mineral commodities.

Using The Commodity Database

The Commodity Database has all entries indexed by commodity and displayed report style. Each mineral is listed in a scrollable table and linked to their respective physical properties. As a mineral is selected in the list, all physical properties for that mineral are displayed on the report form. A separate query form allows querying of all fields by keyword or substring. To perform a query, click on query and enter the search terms under the field to be searched. Leave fields not searched blank. Click on Search to perform the Search. A list of matches is shown in the main window. Scroll through the minerals to see each record that matches the query.

The Commodities Database is editable. Enable editing by selecting Edit Database, then Enable. Once the edit mode is enabled, any changes made to the database will automatically be saved. A new record can be entered by selecting Add New Record. A new record with empty fields is created.

Important: Blank and null entries are not allowed in the database. If no entry is desired under a specific property then enter "Empty" for that specific property. Default values for all properties are "Empty". This word is automatically added to new entries.

Bookmarks can be entered using the database ID property. Enable editing and enter a unique number/label into the ID field. This label is searchable with the Query/Search option. Useful for indexing samples or as simple reference bookmarks.

A set of sample images is included with the database. Further images can be added by selecting Add Image from the File Menu in Image Viewer Window. Images can be copied and pasted from the clipboard. The image can also be edited within Image Viewer using the menu. Close Image Viewer Window to save the image to the database.

There are three customizable project databases available for use. All functions work on these databases in the same way as for the Main Database. To select a project database, go to Active Database on the Edit Menu and select a database.

Recommended Search Terms:

Commodity - Enter a commodity
Aluminum
Feldspar
Garnet
Lithium
Uranium
Copper
Lead
Zinc
Nickel
Iron
Phosphate
Gold
Silver
Etc.

Formula - Enter part or whole formula i.e. Cu for formula containing copper

Crystal System - Enter crystal system
Isometric or cubic
Hexagonal or trigonal
Tetragonal
Orthorhombic
Monoclinic
Triclinic

Group - Enter mineral group name
Quartz
Pyroxene
Feldspar
Garnet
Serpentine
Clay
Mica
Brittle Mica
Bauxite
Oxide
Amphibole
Feldspathoid
Zeolite
Silliminite
Calcite
Barite
Humite
Tourmaline
Epidote
Chlorite

Specific Gravity - the relative weight of a mineral as compared to water

Hardness - hardness of a mineral according to Moh's Hardness Scale

1 - Soft, i.e. Talc
2 - Copper
3 - Calcite
4 - Fluorite
5 - Medium i.e. Apatite
6 - Feldspar
7 - Glass or Quartz
8 - Topaz
9 - Corundum
10 - Hardest natural occurring mineral, Diamond

Streak - Color of a minerals powder when crushed. Determined by rubbing a mineral on a porcelain plate.
White - most common, feldspar, calcite, garnet
Black magnetite, uraninite
Green - hornblende, vesuvianite

Color - Natural color of a mineral
Black - Mica, Uraninite, Hematite
White - Plagioclase
Pink - Orthoclase

Green - Chlorite, Olivine

Opacity - The transparency of a mineral
Opaque - Does not transmit light
Translucent - Partially transmits light
Transparent - Fully transmits light

Luster - Appearance of a minerals surface
Pearly - Smooth, shiny, white surface, talc, calcite
Vitreous - Glass like, most transparent minerals are vitreous, quartz, garnet
Dull - Does not shine, talc, kaolinite
Adamantine - Brilliant shining surface, diamond
Soapy - Soapy feel, talc, chlorite
Greasy - Greasy feel, topaz, olivine
Silky - Like silk, antigorite, anthophyllite
Waxy - Wax like surface, quartz, serpentine,
Satin - Satin like surface, kaolinite
Submetallic - Shiny, opaque, metallic like surface, mica
Metallic - Shiny, metallic surface, pyrite
Splintery - In splinters, chlorite

Habit - A minerals external form
Cubic In cubes, pyrite, halite garnet
Polyhedrons/Octohedrons - Garnet, fluorite
Rhombohedral - Rhomb shaped, calcite, chiastolite
Prismatic - Rectangular, square outlines, very common, hornblende, epidote, augite, zircon, sphene
Hexagonal - Hexagonal or triangular outlines, tourmaline, beryl, topaz
Tabular - Thick, flat prismatic outlines, feldspar, biotite, chlorite, epidote, olivine
Columnar - Thin columns, often in aggregates, tourmaline, actinolite/tremolite, hornblende, diopside
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Acicular - Fine, needle like crystals, tourmaline, rutile, mimetite (apatite)
Radiating - Outwardly radiating from a center, zeolite, tourmaline, gypsum
Spherulitic - A radiating acicular mass of crystals forming a circular shaped pattern. Common pattern in devitrified volcanic glass
Short - Short
Long - Long

Uses - The main uses for and applications for this commodity
Lithium - Greases, ceramics, production of aluminum
Garnet - Abrasives
Feldspar - Manufacture of porcelain
Lead - Pipes, batteries, radiation shielding
Copper - Alloyed for bronzes, brasses, electrical
Nickel - Steel making

Model - The mode of occurrence and/or formation of an economic mineral
Veins - hydrothermal veins, quartz, calcite veins
Pegmatites - V.coarse grained veins of granites, feldspars, tourmaline, micas
Vesicular/Amygdaloidal - Cavities in volcanic rocks
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Metamorphic (Regional) - Metamorphic rocks occurring over a large area, gneiss
Igneous - Generally some form of magmatic intrusion, granite, gabbro
Sedimentary - Derived from pre-existing rocks and often laid down in layers, sandstone, shale
Sedimentary Limestones - Deposited in ocean basins due reef building or accumulation of carbonate

grains (detrital or precipitation), limestone
Replacement - Hydrothermal replacement deposits

MinServ XRD Minerals Database

The MinServ XRD Minerals Database contains XRD data on all minerals. Over 3800 minerals with mineral name and three strongest d-spacings are listed.

Using The XRD Database

The XRD Database has all entries indexed by mineral name and d-spacing and is displayed in tabular format. The table can be browsed using scroll bars. To perform a query, enter the search terms in the search option boxes. Mineral name and d-spacing can be searched and d-spacing search limits can be entered or selected.

Important: Search limits must be entered for d-spacing searches. In most cases, a narrow search pattern will give the most accurate results. If the XRD peaks are uncertain, perform a wider search, by specifying a wider d-spacing range.

Click on Search to perform the search. A list of matches is shown in the main window. Scroll through the minerals to see each record that matches the query. The results may be printed. The database can be sorted according to mineral name or d-spacing from the Edit Menu and all data can be printed.

This database is editable. Enable editing by selecting Edit Database, then Enable. Once the edit mode is enabled, any changes made to the database should be saved by using the Save Command or clicking on the Refresh Button. A new record can be entered by selecting Add New Record. A new record with empty fields is created.

Important: Blank and null entries are not allowed in the database. If no entry is desired under a specific property then enter "Empty" for that specific property. Default values for all properties are "Empty". This word is automatically added to new entries.

There are three customizable project databases available for use. All functions work on these databases in the same way as for the Main Database. To select a project database, go to Active Database on the Edit Menu and select a database.

Backing Up Databases

The Mineral Databases are editable. Any changes to the databases are saved to the database; however, it is highly recommended, the databases are backed up periodically. The easiest way to do this is to copy the database files, *.mdb, to a backup folder of your choice using Windows Explorer or My Computer File Manager.

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