



Corrosion Data Management Software Version 3.1.16

Metal Samples Corrosion Monitoring Systems

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Setup

This section will guide you through the process of installing the Corrosion Data Management Software on your PC. Before installation, make sure that you have read and accepted the License Agreement found in the back of this manual.

System Requirements

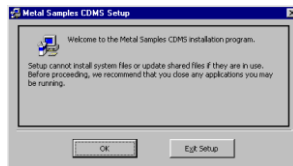
To run the Corrosion Data Management Software, you need a PC that meets the following requirements:

- Pentium® class processor
- Windows® XP, Vista, Windows 7, Windows 8, and Windows 10, 32- or 64-bit operating systems
- 16 MB of RAM
- 10 MB of available hard-disk space
- VGA monitor with 800 × 600 or greater resolution
- Mouse or pointing device recommended
- Available 9-pin RS-232 serial port or USB port for instrument download

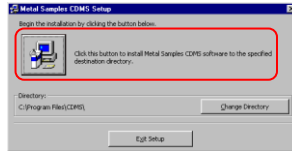
Installing The Software

To install the Corrosion Data Management Software:

1. Uninstall any previous installations of the software.
2. Browse to the folder or drive containing the installation package.
3. Select and run “setup.exe”. This will launch the installation program.



4. You may change the directory that will contain the software by clicking the *Change Directory* button. To install the software in the default directory, click the *Install* button.



5. After clicking the Install button, follow the on-screen prompts to complete the software installation.
6. If you are prompted regarding existing files, select the option to keep the newer file(s).

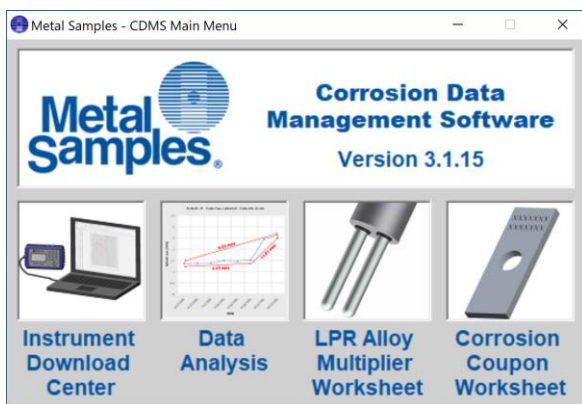
Uninstalling The Software

If it is necessary to uninstall the CDMS software, this can be done from the Windows control panel. The specific steps will depend on which version of Windows you have.

Introduction

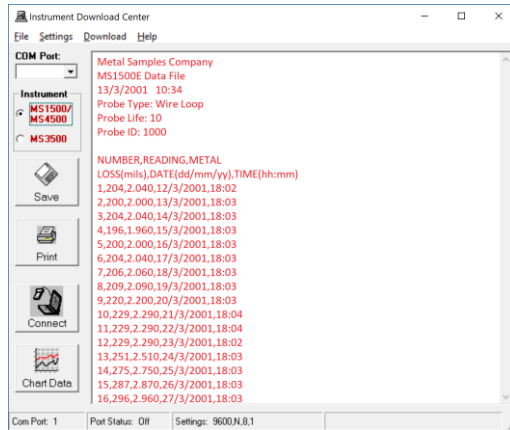
Metal Samples Corrosion Data Management Software (CDMS) is a collection of utilities designed to assist the corrosion analyst in gathering and analyzing corrosion data. It includes tools for downloading and charting data from Metal Samples data loggers, calculating LPR alloy multipliers for 2-electrode probes, and for calculating corrosion rate from corrosion coupons.

The Main Menu can be used to launch all of the utilities of the CDMS package. To close the program, click the EXIT button at the bottom of the Main Menu.



Instrument Download Center

The Instrument Download Center is a simple tool for retrieving data from Metal Samples ER and LPR data logger instruments.



To download data from an instrument:

- Connect the instrument to an available PC serial port (see the instrument manual)
- Run the Corrosion Data Management Software
- Open the Instrument Download Center
- Select the serial port and instrument
- Click the *Download* button
- Select the computer upload function on the instrument

Data will begin to transfer from the instrument to the PC, and will appear in the data window of the Instrument Download Center. If the data appears garbled, the wrong instrument type has been selected. Select another instrument type and try again. If data does not appear in the data window at all, verify that:

- The instrument is connected to a valid serial port
- All cables are securely connected
- The message “Port Status: On” appears in the status bar
- There are no errors on the instrument

Selecting A Serial Port

Use the *Serial Port* option box to select the port to which the instrument is connected.

Selecting An Instrument

Use the *Instrument* option box to select the model of Metal Samples instrument being downloaded. This sets the appropriate communication parameters, which will be displayed in the status bar at the bottom of the window (“9600,N,8,I” for an MS1500 or MS4500E, or “2400,N,8,I” for an MS3500).

Downloading Data

To toggle the selected port on and off, click the *Connect* button. Toggling the port on and off will also clear the data window.

Once a valid serial port and instrument have been selected, click the *Connect* button to turn the port on and enable the computer to receive data. If a valid serial port has been selected, the status bar at the bottom of the window will display the message “Port Status: On”. If an invalid serial port has been selected, an error message will appear, and the status bar will display the message “Port Status: Off”. If this happens, another serial port should be selected.

Saving Data

To save the data in the data window, click the *Save* button, or click *Save* in the *File* menu. The data is comma-delimited ASCII text. It can be saved to a standard text (.txt) file, or it can be saved to a comma-separated values (.csv) file, which greatly simplifies the process of importing the data into some spreadsheet programs such as Excel®.

Printing Data

To print the contents of the data window, click the *Print* button, or click *Print* in the *File* menu. A print dialog box will be displayed to allow printer selection and setup.

Charting Data

To chart the contents of the data window, click the *Chart Data* button, or click *Chart Data* in the *File* menu. If the data has not yet been saved, the user will be prompted to do so before the charting process begins. For more information on charting data, see the Data Analysis section.

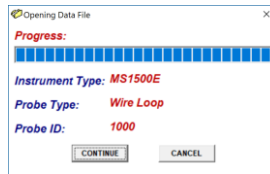
Data Analysis

The Data Analysis utility is a convenient tool for charting data from Metal Samples ER and LPR data logger instruments. The Data Analysis utility can be opened from the Main Menu, or it can be opened directly from the Instrument Download Center.

If the Data Analysis utility is opened from the Instrument Download Center, the contents of the data window will be loaded into the chart. However, if the Data Analysis utility is opened directly from the Main Menu, a valid data file must be loaded. The *Select File* box will open to allow selection of a data file.

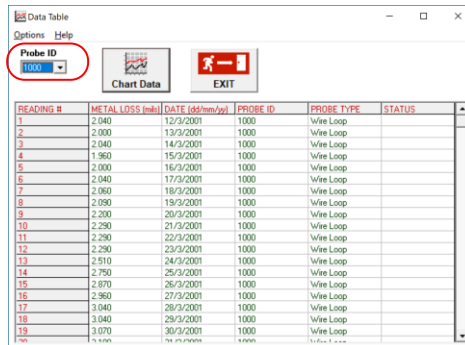
Loading A Data File

After selecting a data file (or clicking the *Chart Data* button from the Instrument Download Center) a status window will display the progress of the file being opened, along with the Instrument Type, Probe Type, and Probe ID for the data file.



Data Table

After a file has been successfully loaded, the data will be displayed in the Data Table for review. The *Probe ID* selection box allows the user to select which probe ID is displayed.



READING #	METAL LOSS (mil)	DATE (dd/mm/yy)	PROBE ID	PROBE TYPE	STATUS
1	2.040	12/3/2001	1000	Wire Loop	
2	2.000	13/3/2001	1000	Wire Loop	
3	2.040	14/3/2001	1000	Wire Loop	
4	1.960	15/3/2001	1000	Wire Loop	
5	2.000	16/3/2001	1000	Wire Loop	
6	2.040	17/3/2001	1000	Wire Loop	
7	2.080	18/3/2001	1000	Wire Loop	
8	2.090	19/3/2001	1000	Wire Loop	
9	2.200	20/3/2001	1000	Wire Loop	
10	2.290	21/3/2001	1000	Wire Loop	
11	2.290	22/3/2001	1000	Wire Loop	
12	2.290	23/3/2001	1000	Wire Loop	
13	2.510	24/3/2001	1000	Wire Loop	
14	2.750	25/3/2001	1000	Wire Loop	
15	2.870	26/3/2001	1000	Wire Loop	
16	2.960	27/3/2001	1000	Wire Loop	
17	3.040	28/3/2001	1000	Wire Loop	
18	3.040	29/3/2001	1000	Wire Loop	
19	3.070	30/3/2001	1000	Wire Loop	

By default, all data points will be included in the chart. However, data points can be turned off, or excluded, from the chart. If the

“Excluded” flag appears in the status column for a data point, that data point will not appear in the chart. To toggle the exclude/include status of a data point, double-click the data point, or select the data point and click *Exclude/Include* in the *Options* menu.

The data table allows the user to change the display units for Metal Loss and Corrosion Rate. Alternate display units are accessed through the Options menu as shown below.

The screenshot shows the 'Data Table' window with the 'Options' menu open. The 'Display Units' dropdown is set to 'mils'. The menu options are: 'Print' (Ctrl+P), 'milleimeters (mm)' (Ctrl+I), 'micrometers (um)' (Ctrl+M), and 'Exit' (Ctrl+X).

READING #	METAL LOSS (mils)	DATE (dd/mm/yy)	PROBE ID	PROBE TYPE	STATUS
1	2.040	12/3/2001	1000	Wire Loop	
2	2.000	13/3/2001	1000	Wire Loop	
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5	2.000	16/3/2001	1000	Wire Loop	
6	2.040	17/3/2001	1000	Wire Loop	
7	2.060	18/3/2001	1000	Wire Loop	
8	2.090	19/3/2001	1000	Wire Loop	
9	2.200	20/3/2001	1000	Wire Loop	
10	2.290	21/3/2001	1000	Wire Loop	
11	2.290	22/3/2001	1000	Wire Loop	
12	2.290	23/3/2001	1000	Wire Loop	
13	2.510	24/3/2001	1000	Wire Loop	
14	2.790	25/3/2001	1000	Wire Loop	
15	2.870	26/3/2001	1000	Wire Loop	
16	2.960	27/3/2001	1000	Wire Loop	
17	3.040	28/3/2001	1000	Wire Loop	
18	3.040	29/3/2001	1000	Wire Loop	
19	3.070	30/3/2001	1000	Wire Loop	
20	3.000	31/3/2001	1000	Wire Loop	

Printing Data

The data table can be printed by clicking *Print* in the *Options* menu. A print dialog box will be displayed to allow printer selection and setup.

Creating A Chart

To chart the selected data, click the *Chart Data* button, or select *Chart Data* from the *Options* menu. The chart will be displayed in a new window.



Printing A Chart

A chart can be printed using the *Print Chart* option in the *File* menu. A print dialog box will be displayed to allow printer selection and setup.

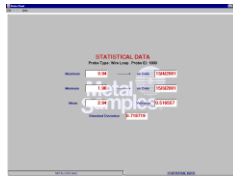
Exporting A Chart

A chart can be exported to other applications using the *Copy Chart* option in the *File* menu. This will copy both the chart and the raw data to the Windows® Clipboard. The chart can then be inserted into other applications using the *Paste* function. Note: In some applications, using the *Paste* function will insert the raw data instead of the chart. In this case, use the *Paste Special* function, then select *Picture* to insert the chart.

Chart Tools

- **Statistical Data**

The *Statistical Data* tab at the bottom of the Data Chart window will display a page with statistical information about the chart data. If the Statistical Data page is visible, this information can be printed by clicking *Print Statistical Data* in the *File* menu.



- **Finding A Data Points Value**

While viewing the chart, the value of any data point can be determined by simply clicking it. The value will be displayed in the charts tool-tip box (a small text box that is displayed near the mouse pointer). If the tool-tip box does not appear immediately after clicking the data point, hold the mouse pointer stationary over the chart background for a moment.

- **The Tools Menu**

The *Tools* menu contains a collection of utilities for viewing and manipulating the chart. The *Tools* menu can be accessed by clicking *Tools* on the menu bar, or by right-clicking anywhere on the chart.

- **Data Markers**

Show Data Markers toggles the data markers on and off.

- **Mean Value**
Show Mean Value toggles the mean value line on and off.
- **Trend Line**
Show Trend Line toggles the trend line on and off.
- **Title/Footnote Setup**
Title/Footnote Setup displays a window that allows the chart title and footnotes to be toggled on and off, and to be modified.
- **Plot Setup**
Plot Setup displays a window that allows configuration of Y-axis scaling, and of the chart type.

The Y-axis can be scaled to default values by checking the *Auto Scaling* option box. The Y-axis can be scaled to manual values by un-checking the *Auto Scaling* box, then entering the desired values in the *Minimum* and *Maximum* fields.

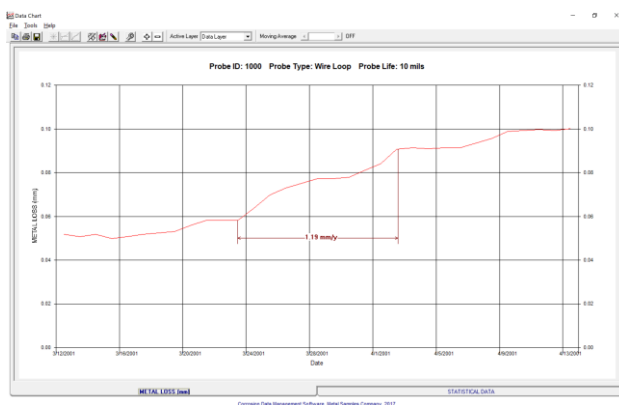
- **Data Series Color**
Double-clicking on the data series will open the *Data Series Color* selection box. This allows the user to select the brush color for the plot line. The default color for the plot line is Blue.
- **Zoom In**
Zoom In allows a region of the chart to be enlarged so that it may be viewed in greater detail. To enlarge a region of the chart, click on the two data points that define the left and right boundaries of the region.

In zoom mode, the mouse pointer will change to a cross-hair. When zoom mode ends, the mouse pointer will return to its normal state.

To cancel zoom mode, click *Cancel Zoom In* from the *Tools* menu, or simply press the *Esc* key.
- **Zoom Out**
Zoom Out restores the initial view of the chart, which displays the full data set.

- **Calculate Corrosion Rate**
If the chart contains ER data, the *Calculate Corrosion Rate* option will become available under the *Tools* menu. This option allows the corrosion rate to be calculated between any two data points on the chart. To calculate the corrosion rate click *Calculate Corrosion Rate*, then click two data points of interest.

Once the two points have been selected the user can move and place the corrosion rate marker wherever they like on the plot. To set the final location simply move the label as desired, and left-click to place it at that point.



The corrosion rate between those two data points will be displayed, along with extension lines to the two selected points. The user can place multiple corrosion rate values, and they can be placed above and below the data plot as needed.

Note, for the software to calculate a corrosion rate, the second point must have a higher value than the first, and must be on a later date (at least one day elapsed.)

In calculate mode, the mouse pointer will change to an arrow/question mark. When calculate mode ends, the mouse pointer will return to its normal state.

To cancel a calculation, click *Cancel Calculate* from the *Tools* menu, or simply press the *Esc* key.


- **Moving Average**

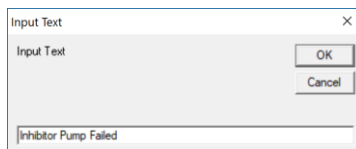
The tool bar offers a slider that allows the user to apply a moving average to the dataset. This is useful for smoothing noisy data. In the illustration below, a moving average of 4 data points has been applied, and the resulting average can be seen in green.

Corrosion rates can be calculated on the averaged data set as well as the original data set. However, it is important to note that both points used for a corrosion rate calculation must be from the same data set.



- **Annotation Labels**

Users can place annotations labels on the plot to mark important events and changes. To place a label click the *Add Annotation Label* button  on the toolbar. A dialog box will open that allows the desired text to be entered. Click OK, then place the text as desired.



Labels can be relocated by single-clicking them, and then relocating them as desired.

Label text can be edited by double-clicking them. This will open the text edit box, where the text can be edited. Click *OK* again to save changes, or click *Cancel* to discard changes.

Labels can be deleted by right-clicking them. The user will be prompted to confirm if they want to delete the label.

Once labels have been placed on the plot, an annotation layer is created. Use the *Active Layer* control to toggle between the annotation layer and the data layer, and to select and interact with items on each of those layers.



LPR Alloy Multiplier Worksheet

The LPR Alloy Multiplier Worksheet simplifies the process of calculating alloy multipliers for use with the 2-Electrode LPR system.

Alloy Composition

Select an Element: Percent(%)

Element	Percentage	Atomic Wt	Density	Valence
Cr (Chromium)	0.2700	51.996	7.190	3
Cu (Copper)	0.1000	63.546	8.960	1
Mg (Magnesium)	0.8000	24.305	1.738	2
Fe(Iron)	98.8300	55.847	7.860	2

Calculation Results

UNS/Description:

Density: g/cm³

Equivalent Weight: g

Alloy Multiplier:

Calculating An Alloy

To calculate an alloy multiplier, the alloy must be “built” by adding each of its elements to the *Alloy Composition* list. An element is added to the list by selecting it from the drop-down menu, entering its percentage in the *Percentage* field, then clicking the *Add* button. To add the remaining percentage to an element, select that element, then click the *Balance* button. If it is necessary to remove an element from the list, highlight that element in the list, then click the *Remove* button.

After all of the elements for an alloy have been entered, click the *Calculate* button to calculate the alloy multiplier. The *Alloy Multiplier* will be displayed in the *Calculation Results* box, along with the *Equivalent Weight* and *Density* for the alloy. If desired, an identification number or description can be entered into the *UNS/Description* field.

Saving A Worksheet

The *File* menu offers two options for saving a worksheet.

- **Add to Data File**

Add to Data File can be used to save data from multiple worksheets as entries in a data file, which can be opened by spreadsheet programs such as Excel® or Quattro Pro®. The *Save As* dialog box will be displayed to allow selection of a file name. If an existing file name is selected, the data from the worksheet will be saved as a new entry in that data file. If the file name specified does not exist, a new file will be created with that name, and the worksheet data will be saved as the first entry in the new file.

- **Save to Text File**

Save to Text File can be used to save an individual worksheet. The *Save As* dialog box will be displayed to allow selection of a file name and file location. The worksheet will be saved using the file name and location specified, and can be opened using any text editor or word processor.

Printing A Worksheet

A worksheet can be printed using the *Print* option in the *File* menu. A print dialog box will be displayed to allow printer selection and setup.

Corrosion Coupon Worksheet

The Corrosion Coupon Worksheet is a simple, step-by-step method for calculating metal loss and corrosion rate from corrosion coupons.

The screenshot shows a software window titled "Corrosion Coupon Worksheet" with a menu bar (File, Project, Help). The interface is divided into several sections:

- Coupon Configuration:** Includes fields for Coupon Type (dropdown menu with "Other" selected), Sequence # (0), Alloy (dropdown menu), Alloy Density (0.00 g/cm³), Shape (Rectangle), Number of Holes (0), Hole Diameter (0.000 in), Length (0.000 in), Width (0.000 in), and Thickness (0.0000 in).
- Exposure Data:** Includes Installation (Date: 23/5/2018, Time: 16:10) and Removal (Date: 23/5/2018, Time: 16:10).
- Weight:** Includes Initial (0.0 g) and Final (0.0 g) weight fields.
- Result:** Displays calculated values: Surface Area (0.00 sq in), Total Exposure (0.00 hours), Metal Loss (0 mils), and Corrosion Rate (0 mils per year (mpy)).
- Comments:** A text area for entering notes.
- Buttons:** Calculate, Print, and Clear buttons are located on the left side of the Result section.

Calculating Corrosion Rate

To calculate the corrosion rate of a coupon, enter the requested information in the *Coupon Configuration* and *Exposure Data* boxes, then click the *Calculate* button. The calculated *Surface Area*, *Total Exposure*, *Metal Loss*, and *Corrosion Rate* will be displayed in the *Results* box. Any comments or special information can be entered in the *Comments* field.

Many standard Metal Samples coupons are listed in the *Coupon Type* menu. When using one of these coupons, its dimensions can be entered automatically by selecting it from the list. If the coupon being calculated is not found in the list, select *Other*, then enter the coupon dimensions manually.

To reset the worksheet, click the *Clear* button, or click *Clear* in the *Project* menu.

Unit Selection

The measurement units for *Density*, *Dimensions*, *Metal Loss/Corrosion Rate*, and *Weight* can all be configured independently using the *Units* option in the *Project* menu.

Saving A Worksheet

The *File* menu offers three options for saving a worksheet.

- **Add To Data File**

Add to Data File can be used to save data from multiple worksheets as entries in a data file, which can be opened by spreadsheet programs such as Excel® or Quattro Pro®. The *Save As* dialog box will be displayed to allow selection of a file name. If an existing file name is selected, the data from the worksheet will be saved as a new entry in that data file. If the file name specified does not exist, a new file will be created with that name, and the worksheet data will be saved as the first entry in the new file.

- **Save To Text File**

Save to Text File can be used to save an individual worksheet as a text file. The *Save As* dialog box will be displayed to allow selection of a file name and file location. The worksheet will be saved using the file name and location specified, and can be opened using any standard text editor or word processor.

- **Start Batch Job**

Start Batch Job can be used to save a batch of coupons to a common data file. *Start Batch Job* is similar to *Add to Data File*, but unlike *Add to Data File*, each coupon is saved automatically upon calculation. For more information read the *Batch Jobs* topic below.

Printing A Worksheet

A worksheet can be printed using the *Print* button, or the *Print* option in the *File* menu. A print dialog box will be displayed to allow printer selection and setup.

Batch Jobs

Start Batch Job (under the *File* menu) allows you to begin a batch job for saving multiple coupons to a common data file. The *Save As* dialog box will be displayed to allow selection of a data file. If an existing file is selected, each coupon will be saved as a new entry in that data file. If the file specified does not already exist, a new file will be created with that name and the coupon data will be saved to the new file.

There are two batch job options that can be configured by the user. They are found under the *Project* menu.

- **Auto-Increment Sequence#**
When this option is selected, the sequence number will be automatically incremented after each calculation. This is useful when working with a batch of coupons that have consecutive sequence numbers.

When this option is selected, the cursor will return to the *Installation Date* field after each calculation. If *Auto-Increment Sequence#* is not selected, the cursor will return to the *Sequence#* field after each calculation. NOTE: *Auto-Increment Sequence#* will not work with alphanumeric sequence numbers.

- **Confirm Each Entry**
When this option is selected, the user will be prompted to confirm each calculation before it is added to the data file.

Support

While every effort has been made to ensure this software product is free from defects, problems may still occur during its use. If you do encounter a problem while using this product, follow these steps to resolve it.

1. Make sure your computer meets the *System Requirements* listed in the *Setup* section of this manual.
2. Visit the Metal Samples web site and search the FAQ's page (<http://www.alspi.com/cdmsfaq.htm>). Your problem, and a solution, may already be posted there.
3. Visit the Metal Samples web site to see if there is a software update available. Software updates, and a list of the problems they fix, will be posted at <http://www.alspi.com/cdmsupdate.htm>. If an update is available, follow the directions on the web page to download and install it.
4. If your problem has not been addressed on the FAQ's page, or in a software update, contact Metal Samples for additional support.

Warranty

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