

# MSC-LIMS™ *Insights*

The source for news and tips of interest to users of MSC-LIMS,  
an affordable laboratory information management system for small labs.

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## Welcome

Welcome to **MSC-LIMS *Insights***.

This newsletter will help current MSC-LIMS users get the most out of their software, and will complement the product literature and demo that prospective users can find on our web site at [www.msc-lims.com](http://www.msc-lims.com).



Join our mailing list for more information. Sign up at [www.msc-lims.com/lims/maillist.html](http://www.msc-lims.com/lims/maillist.html).

This newsletter is for and about MSC-LIMS users. We welcome your comments, and your suggestions for topics you would like to see addressed in upcoming issues. Please send your thoughts to [newsletter@msc-lims.com](mailto:newsletter@msc-lims.com). ▲

## Excel Interface Requires 32-Bit Microsoft Office

MSC-LIMS' integrated Excel interface is a popular feature widely used by most MSC-LIMS users. Whether you are importing analysis results or exporting LIMS data, MSC-LIMS communicates with Excel to accomplish these tasks. Since MSC-LIMS versions 4.x and 5.x install and use the 32-bit Access 2010 Runtime, the Excel interface requires a 32-bit version of Excel to work properly.

Until recently, Microsoft recommended users install the 32-bit version of Microsoft Office for compatibility and new Office installations defaulted to the 32-bit version. However, the installations of Office 2019 and Office 365 now install the 64-bit version by default. If you are upgrading Microsoft Office on any existing LIMS workstations or you are deploying any new workstations, be sure to install the 32-bit version. In cases where the workstation arrives with 64-bit Office already installed, you will need to uninstall then reinstall the 32-bit version. Note that both 32-bit Office and MSC-LIMS have always run without problem on 64-bit Windows systems. ▲

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## From the Developer

Now that new installations of Microsoft Office install their 64-bit versions by default, we recognize this causes compatibility problems with MSC-LIMS (see 'Excel Interface Requires 32-Bit Microsoft Office' in this issue). MSC-LIMS 6.0, which we expect to release in the first quarter of next year, will be a 64-bit application to address this problem. We'll have more information about what to expect in version 6.0 in the next issue of this newsletter.

Occasionally, a user will report that after exporting LIMS data they are manually editing the resulting Excel workbook to produce a final report. If you find yourself repeatedly editing such workbooks, please know that there is often a better way. Your Excel template's macros can likely be updated to automate what you have been doing manually. For example, after we learned one user was manually editing their CofA report to insert requirement name header rows like those found in the Sample Summary report; we created a new version of the 'CofA Example' template that includes the requirement rows (see File Library below).



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## Database Maintenance and Performance

Whether you are running MSC-LIMS version 4.x with its back end Access database or version 5.x with its SQL Server database, periodic database maintenance will help ensure optimum database performance.

### Version 4.x

The overall size of your LimsData database and the rate at which the database grows can affect system performance. You can improve database performance by periodically compacting your database.

We recommend you compact LimsData at least once a month but preferably once a week. In addition to minimizing the size of the LimsData database, compacting also rewrites the database's tables in primary key order, recreates indexes, and updates database statistics, all of which contribute to improved system performance.

Use the Compact LimsData option on the Admin menu in MSC-LIMS and follow the prompts to compact the database. Note that you need exclusive control of LimsData to compact. Use the View Current Users option on the Admin menu to ensure no others are logged on to the LIMS before compacting.

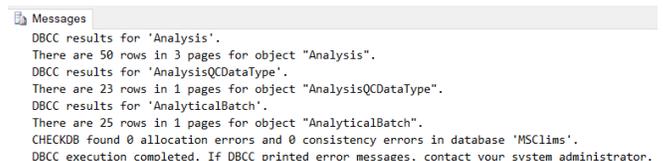
### Version 5.x

If you do not have the luxury of an IT department with database administrators overseeing your SQL Server database, there are a couple of maintenance tasks you

should perform periodically. First, in SQL Server Management Studio (SSMS) you can check the integrity of the database by executing the following script:

```
USE MSClims;  
DBCC CHECKDB;
```

Put the correct database name in the USE statement. The DBCC CHECKDB command will check the integrity of the entire database. The command will list lots of data and will end with a count of allocation and consistency errors. If all is well, both will list zero errors as shown below.



```
Messages  
DBCC results for 'Analysis'.  
There are 50 rows in 3 pages for object 'Analysis'.  
DBCC results for 'AnalysisQCDataType'.  
There are 23 rows in 1 pages for object 'AnalysisQCDataType'.  
DBCC results for 'AnalyticalBatch'.  
There are 25 rows in 1 pages for object 'AnalyticalBatch'.  
CHECKDB found 0 allocation errors and 0 consistency errors in database 'MSClims'.  
DBCC execution completed. If DBCC printed error messages, contact your system administrator.
```

Next, index fragmentation can have a significant impact on database performance. Periodically checking index fragmentation and rebuilding indexes when necessary will help maintain performance. In the [File Library](#) at [msc-lims.com](http://msc-lims.com) you will find two scripts you can use in SSMS for both tasks. In SSMS, use File | Open | File... or Ctrl+O then select the script

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file. Make sure you add the correct database name in the USE statement at the top of each script. Use Query | Execute, F5, or the Execute toolbar button to run the script.

Use the [IndexFragmentation](#) script to view the fragmentation percent in descending order for each index in the database. You will always see fragmentation on very small indexes, for example those with fewer than 10 fragments. The screen below shows significant fragmentation on several large indexes including those on the Sample and SampleAnalysis tables, the two largest tables in most MSC-LIMS databases.

TableName	IndexName	ColumnName	FillFact...	ActualFillFac...	PercentFrag...	Fragments	AvgFrag...
1 AnalyticalBatch	AnalyticalBatch\$Relation_937	AnalysisID	0	66.9	97.1	35	1.0
2 SampleAnalysis	SampleAnalysis\$Relation_21	AnalysisID	0	64.4	95.9	442	1.0
3 SampleAuditTrail	SampleAuditTrail\$SampleAuditTrailId3	Analyte	0	63.4	85.9	265	1.2
4 Sample	Sample\$Relation_20	LocationID	0	68.9	78.6	83	1.2
5 Sample	Sample\$Relation_919	CustomerID	0	70.3	75.2	78	1.3
6 QCData	QCData\$Relation_935	QCDataTypeID	0	81.2	71.7	94	1.4
7 SampleAnalysis	SampleAnalysis\$SampleAnalysisId7	AnalysisDate	0	73.0	88.3	318	1.5
8 SampleAnalysis	SampleAnalysis\$Relation_22	RequirementID	0	77.5	67.1	271	1.4
9 Analysis	Analysis\$Relation_1	MethodID	0	67.3	66.7	3	1.0
10 Analysis	Analysis\$Relation_2	PreservativeID	0	67.3	66.7	3	1.0
11 Analysis	Analysis\$Relation_3	ContainerTypeID	0	67.3	66.7	3	1.0
12 Analysis	Analysis\$Relation_4	UnitsID	0	67.3	66.7	3	1.0

A common practice is to rebuild indexes when fragmentation exceeds 40% on larger indexes with more than 10 fragments. While we can rebuild individual indexes or all indexes on a single table, it's easier and more practical to rebuild all indexes for a

## Speed Data Entry with Text Lists

If you frequently enter the same phrases, sentences, or other text or you want to standardize certain data entry in text fields, you will find MSC-LIMS' Text Lists feature helpful.

Pick lists, such as those for a sample's Project, Location, Customer, and Sample Type, automatically standardize and speed data entry since they require entering or selecting an item already in the list. However, regular text fields such as a sample's Description and Notes allow any data to be entered.

In the Setup menu, use the Text Lists option to organize and save any frequently entered text in a named list. Initially, the Text Lists screen will show three predefined but empty Conclusions, Notes, and Titles lists. Use these lists to add text frequently entered in these LIMS fields. The example below shows an added Symbols list with characters that are cumbersome to enter from the numeric keypad or by copying from Windows' Character Map accessory (available on the Tools menu in MSC-LIMS).

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database this size. Use the [IndexRebuildAll](#) script to rebuild all indexes in the designated database. The screen excerpt below shows the results of running the script.

```
ALTER INDEX ALL ON dbo.[ResultType] REBUILD;
ALTER INDEX ALL ON dbo.[Sample] REBUILD;
ALTER INDEX ALL ON dbo.[SampleAnalysis] REBUILD;
ALTER INDEX ALL ON dbo.[SampleAuditTrail] REBUILD;
ALTER INDEX ALL ON dbo.[SampleQuerySelect] REBUILD;
ALTER INDEX ALL ON dbo.[Sampler] REBUILD;
ALTER INDEX ALL ON dbo.[SampleStatus] REBUILD;
ALTER INDEX ALL ON dbo.[SampleType] REBUILD;
ALTER INDEX ALL ON dbo.[Schedule] REBUILD;
ALTER INDEX ALL ON dbo.[sysdiagrams] REBUILD;
ALTER INDEX ALL ON dbo.[SystemConfiguration] REBUILD;
ALTER INDEX ALL ON dbo.[Training] REBUILD;
ALTER INDEX ALL ON dbo.[Units] REBUILD;
ALTER INDEX ALL ON dbo.[Version] REBUILD;
[ok]
```

We recommend you always make a backup of the database before rebuilding indexes and rebuild at a time of low activity in the LIMS. Rebuilding indexes may take the index and its table offline while rebuilding. Rebuilding all indexes in most MSC-LIMS databases will take less than a minute to complete.



Use the New List field and the Create List button to add a new text list. The screen below shows an added Temperature list.

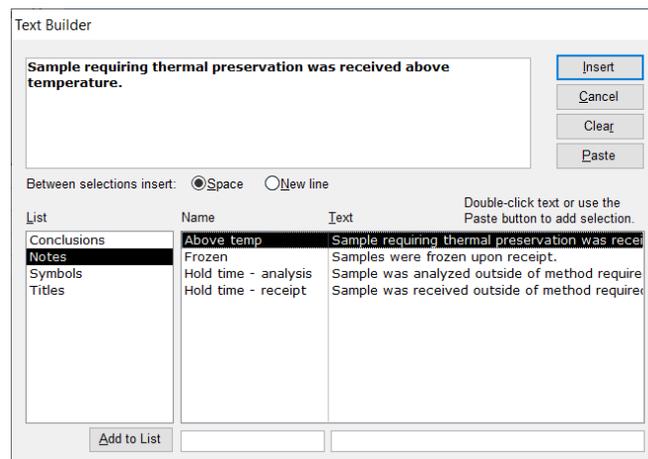
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Text Lists	
Name	Text
-1	-1°C
0	0°C
01	1°C
02	2°C
03	3°C
04	4°C
05	5°C
06	6°C
07	7°C
08	8°C
09	9°C
10	10°C

To add text from any text list to any LIMS field, open the Text Builder by right-clicking and selecting Text Builder from the popup menu or use the Ctrl+T keyboard shortcut. If the Text Builder is opened from a Conclusions, Notes, or Title field that list is automatically selected. Select any list to view its text entries. Double-click any list text or select and click the Paste button to add the text to the insert field. Any number of text entries can be added to the insert field separated by a space or a carriage return. Use the Insert button or the Enter key to close the Text

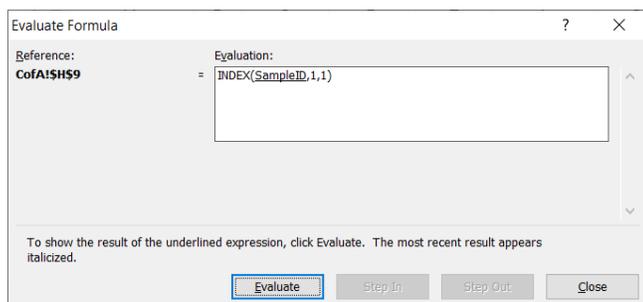
Builder and insert the text into the LIMS field. Note that members of the Admins (and Owners in version 5.x) security role can use the Add to List button in the Text Builder popup to add new items to the selected text list.



Explore the capabilities of Text Lists and the Text Builder and you are sure to find ways these tools will help speed repetitive data entry. 

## How to Evaluate Excel Formulas Incrementally

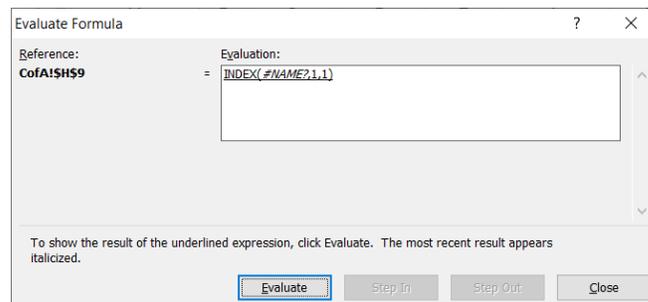
Whether you are trying to solve a cell's #NAME? or #VALUE! error or you just want to understand a lengthy cell formula, Excel's 'Evaluate Formula' feature is a very helpful tool. Let's look at a couple of examples.



The 'CofA Example.xltm' example template has the formula =INDEX(SampleID,1,1) in cell H9 on the CofA worksheet. That cell and others show the #NAME? error. If you don't already know why the error appears, select the 'Evaluate Formula' option in

the Formula Auditing group on Excel's Formulas tab and the formula will appear in the popup screen shown above.

The 'Evaluate Formula' screen is a handy tool to watch the sequential steps Excel uses to calculate the result of the formula. The underlined part of the formula shows the expression that will be calculated and replaced by its result when you click the Evaluate button.



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After clicking the Evaluate button, the screen above shows that the 'SampleID' name in the formula is causing the #NAME? error. That is expected in an MSC-LIMS export template because the named ranges are only created by the new workbook's macro after the LIMS data has been exported to Excel. The named ranges are created using the LIMS field names on row one of a worksheet containing LIMS data.

Let's look at a more complex example. The formula below appears in cell D16 of a workbook created by exporting the Sample Summary report to a template and the cell is displaying the #VALUE! error.

```
=IF(ISERROR(INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults) + 1)), "", INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults)))
```

Note that the template's 'Remove Infrastructure Sheets' option on the Settings worksheet has been disabled so all the infrastructure sheets and their LIMS data are available. When we use the 'Evaluate Formula' option the popup begins with the following in the Evaluation field.

```
IF(ISERROR(INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults) + 1)), "", INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults)))
```

After clicking the Evaluate button we can see that the AnalysisResultFormatted named range refers to cells AA2:AA6 on the AnalysisData worksheet as shown below.

```
IF(ISERROR(INDEX(AnalysisData!$AA$2:$AA$6, ROW() - ROW(OneAnalysisResults) + 1)), "", INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults)))
```

After several more clicks of the Evaluate button we can see that the results of the ROW() and ROW(OneAnalysisResults) expressions are both 16:

```
IF(ISERROR(INDEX(AnalysisData!$AA$2:$AA$6, 16 - 16 + 1)), "", INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults)))
```

A couple more evaluation steps and we see the result of the first INDEX expression has retrieved the value of 7.10 from the first cell in the AnalysisResultFormatted named range (i.e. cell AA2 on the AnalysisData sheet):

```
IF(ISERROR(INDEX(AnalysisData!$AA$2:$AA$6, 0 + 1)), "", INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults)))
```

```
IF(ISERROR("7.10", "", INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults)))
```

The result of the ISERROR expression is False:

```
IF(FALSE, "", INDEX(AnalysisResultFormatted, ROW() - ROW(OneAnalysisResults)))
```

The next two evaluation steps are about to reveal the problem:

```
IF(FALSE, #N/A, INDEX(AnalysisData!$AA$2:$AA$6, 16 - 16))
```

```
IF(FALSE, #N/A, INDEX(AnalysisData!$AA$2:$AA$6, 0))
```

We were expecting the second INDEX expression to retrieve the result from the first cell in the AnalysisResultFormatted named range just like the first INDEX expression in the formula. However, we can see in the evaluation step above we are asking for the 0<sup>th</sup> cell. That results in the #VALUE! error:

```
IF(FALSE, #N/A, AnalysisData!$AA$2:$AA$6)
```

```
#VALUE!
```

Incrementally evaluating our formula reveals that the second INDEX expression is missing the "+1" in "ROW() - ROW(OneAnalysisResults) + 1" like the first INDEX expression uses. Correcting that oversight solves this formula's problems.

Add Excel's 'Evaluate Formula' feature to your troubleshooting tools and you can learn how to create and troubleshoot more complex formulas. 

## Notes from Technical Support

### SQL Expression for Today's Samples

A user recently asked:

*Is there a way to build an expression that queries all the samples entered today? I have tried many different syntax, but I can't figure out how to put a variable as today's date.*

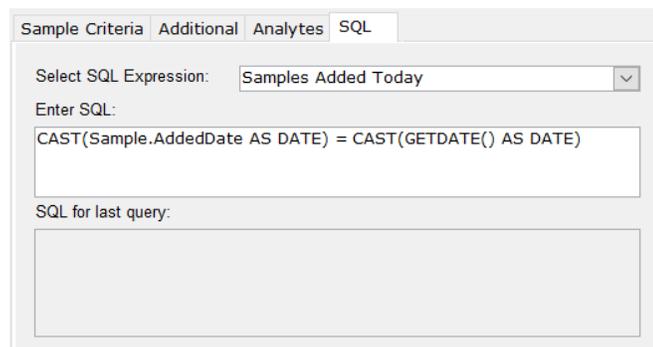
In MSC-LIMS 4.x, you can use the following SQL expression to query samples that were added today:

```
Int (Sample.AddedDate) = Date ()
```

In MSC-LIMS 5.x for SQL Server, use the following expression:

```
CAST (Sample.AddedDate AS DATE) =  
CAST (GETDATE () AS DATE)
```

Use the SQL Expressions screen on the Setup menu to add the new SQL expression with an appropriate name such as "Samples Added Today". To use the expression, simply select it from the list of SQL expressions on the SQL tab of the query controls.



Sample Criteria Additional Analytes SQL

Select SQL Expression: Samples Added Today

Enter SQL:  
CAST(Sample.AddedDate AS DATE) = CAST(GETDATE() AS DATE)

SQL for last query:



### Use the Ditto Keyboard Shortcut

A user recently wondered:

*Is there a way to get the Location to auto populate when setting up a project? Currently we have to select/enter the location for each analyte. Can it be set to where once the location is selected on the first analyte it auto populates for each additional analyte added to the project?*

You can use the "ditto" keyboard shortcut. On any LIMS screen where records are displayed in a list, use Ctrl+' (Ctrl and single quote) to insert the value from the same field in the record above. See "Common Keystrokes and Mouse Actions" in chapter three of the MSC-LIMS User's Guide for additional keyboard shortcuts. 

## For Customers Only

This section of *MSC-LIMS Insights* is devoted to current users of MSC-LIMS. Here we briefly introduce only the most recent additions to MSC-LIMS.com Customers Only pages. Use your login name and password to log on to the Customers Only section of our website.

### File Library

#### [CofA Example by Requirement.xltm](#)

Use this single-sample Certificate of Analysis example Excel export template to create your own CofAs that list analyses grouped by requirement similar to the Sample Summary report.

#### [IndexFragmentation.sql](#)

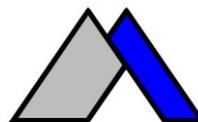
Use this SQL Server Management Studio script to view index fragmentation in your MSC-LIMS version 5.x database (see "Database Maintenance and Performance" above).

#### [IndexRebuildAll.sql](#)

Use this SQL Server Management Studio script to rebuild all indexes in your MSC-LIMS version 5.x database (see "Database Maintenance and Performance" above). 

## Contact Us

Questions, comments, suggestions?  
Reach us at:



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