LabSpeed Applications Metals Analysis

Grade Library Database

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MatWeb™ 5000 Alloy database

Export MatWeb™ Grades to Grade Library

Alloy Verification

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LabSpeed Grade Library

Automatic Alloy Identification and Reporting

Topos Technologies

LabSpeed Grade Library

LabSpeed provides instant access to the data stored by various metals analytical instruments used in the laboratory or in the field, including Spark Optical Emission bench top spectrometers and XRF handheld analyzers.

A Grade limits database and support for alloy identification, verification and reporting may be installed as a special extension to LabSpeed. This extension is provided free to all LabSpeed users.
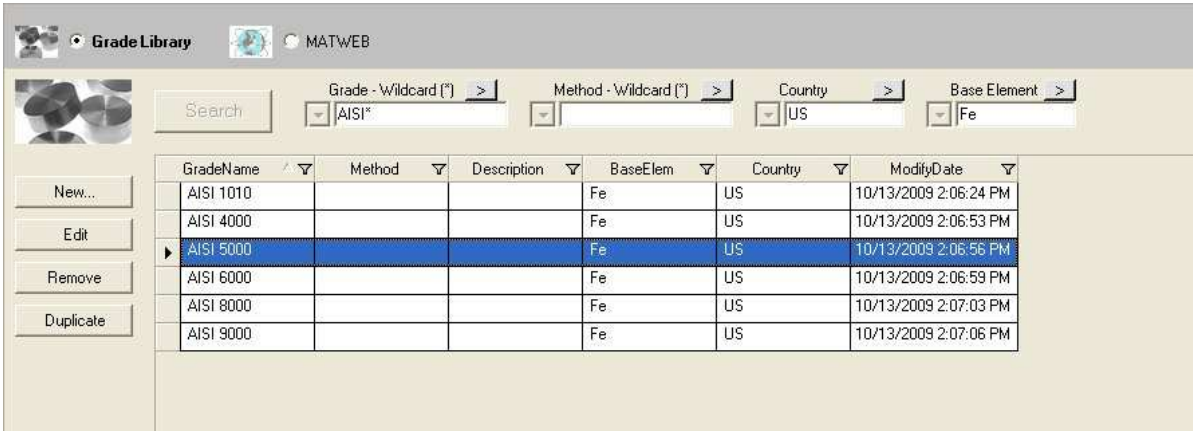
Key Grade Library Features include:

- Microsoft® Access™ Database (SQL Server support coming soon..)
- Full-featured Grade Library Editor for adding alloys and entering element grade concentration limits
- Wildcard alloy database search
- Reference colors for color-coding displayed pass/fail results
- Import grades from a MatWeb™ database of over 5000 alloys of known composition

Use LabSpeed To:

- Build your own Grade Library containing grades and grade compositions.
- Research Alloy compositions and properties
- Perform Interactive Grade matching on individual analyzed samples
- Perform one-click Grade matching on all selected samples
- Generate grade match reports for analyzed samples
- Export grade match results for analyzed samples
- Perform limit checking using any Grade in the Grade Library

Grade Library Editor

The LabSpeed Grade Library extension includes a full-featured editor for creating an individualized library of alloy grades and user-specified element compositions.

Grade Library Editor features

- o Search Grade Library for existing Grades using wildcards
- o Add a new Grade
- o Edit an existing Grade
- o Duplicate an existing Grade
- o Add Elements with inner and outer minimum and maximum percent concentrations
- o Search the MatWeb™ 5000+ alloy database and export selected grades to the Grade Library
- o View properties datasheet for selected MatWeb™ alloys (requires internet connection)

Alloy Identification and Verification

LabSpeed users can quickly perform interactive grade matching on selected elements from instrument sample analyses using a variety of matching options.   Matching options include the ability to expand the target ranges by a factor times the **standard deviation** of the analyzed result, or by a manual percentage. The quality of each element match in the sample is calculated and displayed with color-coding: green = match, red = no match, yellow = match outside the target range, but within the expanded target range. Matching Grades are displayed in order of overall average matching quality.

Alloy Identification Options

- o Select elements to match from the list of elements in the sample
- o Apply Multiple Search Options
    - o Match using Minimum and Maximum target values in the Grade Library
    - o Match using Inner Minimum and Inner Maximum target values in the Grade Library
    - o Match using Minimum and Maximum target values expanded by the analyzed element **standard deviation** times a user-entered factor
    - o Match using Minimum and Maximum target values expanded by a user-entered percentage amount
- o Filter results by base element and/or Country
- o Search the user's Grade Library, or search the MatWeb™ 5000+ alloy database directly
- o View the results in two forms
    - o Match Results with all limits information (shown above)
    - o Quality Results showing calculated qualities in spreadsheet style.(shown below)
- o Go to and immediately Search the Next or Previous Sample in the sample list using the same Search criteria
- o Optionally assign best quality matches to the sample information for reporting and exporting
- o Click once to run all samples in the sample list using the same Search criteria. Best matches are assigned to sample information for immediate reporting and exporting

Search Results: 4 Matching Grades

Match Quality ▽	GradeName	C	Cr	Fe	Mn	Ni	P	Si	S	N	Mo
7.9	316SS	1	10	0	10	10	10	10	10		10
6.7	301SS	10	0	0	10	0	10	10	10	10	
5.1	304SS	1	0	0	10	0	10	10	10		
5.1	AISI 4000	1	0	0	10	0	10	10	10		

Match Results Quality Results

Quality Results Display

Limit Checking Using the Grade Library

In LabSpeed, Limit Checking may be applied to any instrument result, such as average concentration, standard deviation or %RSD. Typically in LabSpeed, a Limit Check Table is created that contains low and high limit values and analysis results are checked against that table of limits.

The Grade Library contains defined limits for element concentrations and therefore may be used as a "super" limit-check table that can be referenced by a Research Grid or Table View to perform checking on a particular column of data. Results in a Table View may be color-coded to indicate Pass, Fail or Not Checked.

Steel Sample 11	3/25/2008 4:54:30 PM	AISI 4000	C	0.395064	0.0051	Pass
Steel Sample 11	3/25/2008 4:54:30 PM	AISI 4000	Si	0.256914	0.0049	Pass
Steel Sample 11	3/25/2008 4:54:30 PM	AISI 4000	Mn	0.910451	0.0124	Pass
Steel Sample 11	3/25/2008 4:54:30 PM	AISI 4000	P	0.009326	0.0002	Fail Low
Steel Sample 11	3/25/2008 4:54:30 PM	AISI 4000	S	0.037394	0.0008	Pass
Steel Sample 11	3/25/2008 4:54:30 PM	AISI 4000	Cr	0.960048	0.0096	Pass
Steel Sample 11	3/25/2008 4:54:30 PM	AISI 4000	Mo	0.173692	0.0004	Pass
Steel Sample 11	3/25/2008 4:54:30 PM	AISI 4000	Ni	0.030284	0.0006	Fail Low
				0.031304	0.0005	Not Checked
				0.002516	0.0001	Not Checked
				0.024337	0.0003	Not Checked
				0.001792	4.3E-05	Not Checked
				0.002746	7.7E-05	Not Checked
				0.002517	3.3E-05	Not Checked
				0.0002	6E-06	Not Checked
				0.000337	8E-06	Not Checked
				0.006441	9.5E-05	Not Checked
				0.000362	6E-06	Not Checked
				0.000402	1.3E-05	Not Checked
				0.000376	1.7E-05	Not Checked
				0.000208	5E-06	Not Checked
				0.004303	0.0002	Not Checked
				97.148986	0.2671	Pass

LabSpeed Sample Report
1/29/2010 3:57:06 PM

Grade Check

SampleName	Steel Sample 1	
Acquire Date	3/25/2008 3:11 PM	
Method	Fe-Steel	

Specification **AISI 4000**

Element	Average	Units	Min	Max	Status
C	0.1513	%	0.07	0.65	Pass
Si	< <0.0006	%	0.23	2	Fail Low
Mn	0.1739	%	0.55	0.88	Fail Low
P	0.0064	%	0.01	0.035	Fail Low
S	0.0167	%	0.01	0.05	Pass
Cr	0.0652	%	0.4	1.23	Fail Low
Mo	0.0225	%	0.12	0.25	Fail Low
Ni	0.0451	%	0.4	3.33	Fail Low
Al	0.2976	%			Not Checked
Co	0.0013	%			Not Checked
Cu	0.0302	%			Not Checked
Nb	< <0.0002	%			Not Checked
Ti	0.0009	%			Not Checked
V	< <0.0002	%			Not Checked
W	< <0.0002	%			Not Checked
Pb	0.0004	%			Not Checked
Sn	0.0048	%			Not Checked
Ca	0.0004	%			Not Checked
Sb	0.0017	%			Not Checked
B	0.0003	%		0.0018	Pass
Ag	0.0001	%			Not Checked
N	0.0018	%			Not Checked
Fe	99.1781	%	94	98	Fail High

MatWeb 5000+ Alloy Database

The MatWeb™ Alloy Database extension provides a database containing the compositions of approximately 5000 Alloys (US). The MatWeb™ database is licensed from Automation Creations, Inc in order to provide a fully populated alloy composition database to LabSpeed customers.

The alloys and elemental compositions in the MatWeb™ database represent published values from the manufactures of the alloy standards. The database may be searched using wildcards and up to 300 selected alloys may be exported to the LabSpeed Grade Library. If an internet connection is available, the alloy properties datasheet may be viewed for selected grades.

Reporting and Exporting Quality Results

The results of a Grade Match may be added to Reports and Tables for printing and exporting.

		LabSpeed Sample Report
	Grade Check	1/29/2010 11:01:00 AM

SampleName	Steel Sample 10	Grade Match 1	8.9	AISI 4130 Steel
Acquire Date	3/25/2008 4:49 PM	Grade Match 2	7.6	316SS
Method	Fe-Steel	Grade Match 3		
Specification	AISI 4000	Grade Match 4		

Element Name	Average	Units	Std Deviation	RSD
C	0.4129	%	0.0046	1.126
Si	0.2475	%	0.0035	1.4292
Mn	0.9146	%	0.0103	1.1301
P	0.0091	%	0.0002	2.1058
S	0.0313	%	0.0004	1.2541
Cr	0.9713	%	0.0096	0.9924
Mo	0.1827	%	0.004	2.2097
Ni	0.0307	%	0.0006	2.115
Al	0.0407	%	0.0004	1.0666
Co	0.0026	%	7.4E-05	2.8315
Cu	0.0246	%	0.0005	2.2228
Nb	0.0016	%	5.1E-05	3.1847
Ti	0.0027	%	2.6E-05	0.9714
V	0.0024	%	5.8E-05	2.4249
W	<0.0002	%	1E-06	0.4979
Pb	<0.0002	%	5E-06	2.4023
Sn	0.0066	%	0.0002	3.2843
Ca	0.0003	%	8E-06	2.6629
Sb	<0.0004	%	1.7E-05	4.2357
B	0.0002	%	7E-06	4.185
Ag	0.0002	%	5E-06	2.7333
N	0.0044	%	0.0002	3.9525
Fe	97.1127	%	0.4552	0.4687