CSols Links for LIMS

The complete instrument integration package for analytical laboratories

CSols Links4LIMS™ is a compliant, configurable and easy to use instrument interfacing and integration software package that will give noticeable time savings and reduction in data processing errors. It provides an effective solution to address the fact that raw instrument results cannot usually be reported directly without further review, manipulation and validation.

Instrument-based techniques are used to perform the vast majority of analyses in laboratories. However, in order for a laboratory to maximize its (often considerable) investment in those instruments by effectively ensuring the reporting of quality laboratory results accurately (and quickly) to its customers, it must typically overcome two challenges:

- navigate / link to its own organization's IT system – where communication protocols and formats are rarely compatible between instruments and IT systems.
- implement the company's analytical techniques / Standard Operating Procedures (SOPs) / Quality Control (QC) procedures.

CSols Links4LIMS is an Instrument Integration or Direct Data Capture (DCC) system that overcomes the above challenges.

Links4LIMS is an easy to use software package that improves laboratory efficiency, delivers time savings and reduces errors in data processing, and provides an overall quality improvement in laboratory data management. It has a proven track record in many laboratories, linking to a range of LIMS (SampleManager, LabWorks, iSoft) and instruments (Agilent GC, LC and ICP's, Thermo iCAPs, X Series, LC and GC, Skalar and many more).

Links4LIMS can be configured to meet the requirements of your LIMS / instrument combinations.

CSols Links4LIMS moves and manipulates data files, enabling analysts to carry out their tasks quickly, efficiently and compliantly. Many actions are automated and keyboard and mouse interaction is kept to a bare minimum; there are no laborious manual data transfers that could lead to transcription errors. The spreadsheets style view of the data allows the analyst to quickly assess the quality of the data from

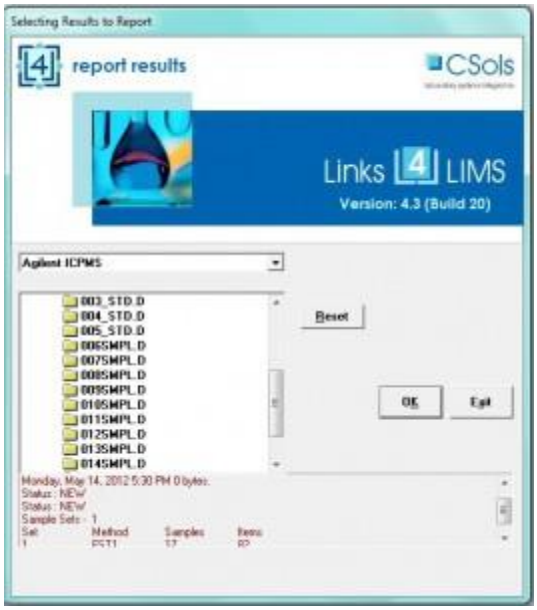
an instrument run and identify any issues that require investigation prior to submission. Results are NOT sent to the LIMS system without the authority of the analyst.

Links4LIMS : Features & Benefits

- time saving for all users e.g. for an ICPMS, several hours per instrument run
- easy to use – looks the same on all instrument types
- by linking instruments and LIMS, can work across the whole laboratory
- data presented in an easy to interpret format
- extracts sample data from the LIMS, sends instrument data to the LIMS, - removes ALL transcription errors from data transfer
- ensures SOP compliance in relation to data handling
- QC checking and other quality checks before reporting
- calculations are automated (including unit conversions, blank or drift corrections)
- configured for your lab to meet your requirements

Links4LIMS instrument interfacing and LIMS system integration software is accessed from the workstation via a graphical user interface and comprises:

- **SetUp Instrument** – Extracts Sample information from LIMS (or equivalent) and creates instrument sequence.
- **Report Results** – Reads and processes instrument results and displays in an easy to interpret format.



Setup Instrument

Extracts sample information from LIMS (or equivalent system) for outstanding analyses

	Sample Name	Qual	AS	Dil	Description	Fe	Cu	Al	Mn	Zn	Pb	Cr
1	2159771	t	1/ 40	1								
2	2170369	t	1/ 41	1								
3	2071529	t	1/ 42	1								
4	2180608	t	1/ 43	1	Metals QC - Standard metals suite ICPMS							
5	2172048	t	1/ 44	1								
6	2116545	t	1/ 45	1								
7	2158019	t	1/ 46	1								
8	2077483	t	1/ 47	1								
9	2077479	t	1/ 48	1								
10	2077480	t	1/ 49	1								
11	2077482	t	1/ 50	1								
12	2082463	t	1/ 51	1								
13	2161638	t	1/ 52	1								
14	2116546	t	1/ 53	1								
15	2075006	t	1/ 54	1								
16	2169556	t	1/ 55	1								
17	2158049	t	1/ 56	1								
18	2158089	t	1/ 57	1								
19	2161762	t	1/ 58	1								
20	2178633	t	1/ 59	1								
21	2156213	t	1/ 60	1								
22	2156210	t	1/ 61	1								
23	2156212	t	1/ 62	1								
24	2156214	t	1/ 63	1								
25	2156211	t	1/ 64	1								
26	2156215	t	1/ 65	1								
27	2161827	t	1/ 66	1								
28	2154414	t	1/ 67	1								
29	2180609	t	1/ 68	1	Metals QC - Standard metals suite ICPMS							
30	2161824	t	1/ 69	1								
31	2161822	t	1/ 70	1								
32	2161856	t	1/ 71	1								
33	2161874	t	1/ 72	1								

Creates an instrument pre-run list with relevant QCs inserted in the correct run positions and auto-sampler information (if required)

2553729/5	t	1/ 1	1	
2568100/2	t	1/ 2	1	
STD-QC2_1	t	1/ 3	1	Metals QC - Standard metals suite ICPMS
2501712/2	t	1/ 4	1	
2568323/2	t	1/ 5	1	

Can be edited by the analyst to: insert or delay samples or QCs, add dilution factors, volumes etc

Creates/sets up an instrument electronic run list which can be opened directly by the instrument software so that the instrument can be run without further manual interaction

Can be used in conjunction with bar codes or RFID tags

Report Results

Links LIMS

Data is presented from the instrument run in a spreadsheet view

	Sample Name	Qual	Dil	Na	Mg	Al	Phosphorus	SO4	K	Ca	Cr	Mn	Ni	Zn	Cu	Fe	Ag	Cd	Pb
1	LOD		1	0.202	2.345	26.779	-105.845	26.150	-0.315	3.252	3.029	8.889	5.308	11.073	9.926	22.324	0.195	2.972	2.979
2	2553729/5	t	20	363.233	192.040	<400.000	<200.000	2392.012	<20.000	587.986	<40.000	<200.000	<40.000	<240.000	<200.000	<200.000	<10.000	<20.000	<20.000
3	2568100/2	t	1	21.829	2.694	<20.000	1397.728	36.978	<1.000	13.209	<2.000	<10.000	<2.000	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
4	STD-QC2_1	t	1	19.300	5.030	201.100	201.100	24.500	12.100	24.000	53.600	52.000	21.100	463.200	199.700	208.500	8.800	5.100	26.300
5	2501712/2	t	1	13.727	2.567	89.362	1480.177	40.998	<1.000	18.164	<2.000	<10.000	<2.000	<12.000	<10.000	237.423	<0.500	<1.000	1.390
6	2568323/2	t	1	22.785	2.939	<20.000	1425.830	36.270	<1.000	14.090	<2.000	<10.000	<2.000	<12.000	11.183	<10.000	<0.500	<1.000	<1.000
7	2568253/2	t	1	18.361	2.997	<20.000	1495.140 Z	27.481	1.471	25.753	<2.000	<10.000	<2.000	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
8	2147283/2	t	1	<10.000	<1.000	80.048	1561.422	36.396	<1.000	15.426	<2.000	15.444	<2.000	<12.000	<10.000	255.936	<0.500	<1.000	<1.000
9	2147239/2	t	1	<10.000	<1.000	65.731	1398.823	35.019	<1.000	15.202	<2.000	<10.000	<2.000	<12.000	<10.000	124.106	<0.500	<1.000	<1.000
10	2147281/2	t	1	<10.000	<1.000	61.207	1428.979	35.047	<1.000	15.018	<2.000	15.266	<2.000	<12.000	<10.000	227.993	<0.500	<1.000	<1.000
11	2147240/2	t	1	<10.000	<1.000	51.121	1438.773	35.275	<1.000	15.062	<2.000	<10.000	<2.000	<12.000	<10.000	34.981	<0.500	<1.000	<1.000
12	2568540/2	t	1	<10.000	4.704	<20.000	1553.177	46.797	<1.000	34.358	<2.000	<10.000	<2.000	<12.000	<10.000	21.550	<0.500	<1.000	<1.000
13	2568544/2	t	1	<10.000	4.218	<20.000	1451.959	42.092	<1.000	31.425	<2.000	<10.000	4.001	53.342	58.207	11.040	<0.500	<1.000	7.274
14	2574995/1	t	1	13.532	15.029	814.981	615.844	28.225	1.792 R	65.825	<2.000	514.502	3.659	30.890	13.050	>1000.000	<0.500	<1.000	3.688
15	2326564/1	t	1	17.323	21.658	110.307	36.593	<20.000	4.203	25.434	2.984	408.308	6.132	38.817	<10.000	>1000.000 R	<0.500	<1.000	1.268
16	2568798/1	t	1	<10.000	4.928	<20.000	1572.823	49.219	<1.000	35.844	<2.000	<10.000	<2.000	<12.000	<10.000	13.117	<0.500	<1.000	<1.000
17	2568894/1	t	1	<10.000	<1.000	<20.000	>2000.000 R	35.683	<1.000	13.117	<2.000	<10.000	<2.000	13.938	<10.000	12.532	<0.500	<1.000	<1.000
18	2579548/1	t	1	19.125	5.243	<20.000	<10.000	28.755	<1.000	103.481	<2.000	<10.000	2.461	<12.000	60.519	<10.000	<0.500	<1.000	<1.000
19	2568836/1	t	1	21.533	2.819	<20.000	1418.296	31.739	<1.000	17.283	<2.000	<10.000	<2.000	38.812	<10.000	12.659	<0.500	<1.000	<1.000
20	2568781/1	t	1	<10.000	<1.000	115.764	<10.000	<20.000	<1.000	<5.000	<2.000	24.267	<2.000	<12.000	<10.000	297.773	<0.500	<1.000	<1.000
21	2568837/1	t	1	22.314	2.755	<20.000	1472.863	35.959	<1.000	16.978	<2.000	<10.000	<2.000	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
22	2501716/1	t	1	<10.000	<1.000	70.714	>2000.000 R	36.475	<1.000	11.509	<2.000	12.569	<2.000	34.974	<10.000	167.241	<0.500	<1.000	1.365
23	2501715/1	t	1	<10.000	<1.000	103.952	>2000.000 R	36.292	<1.000	12.881	<2.000	112.924	<2.000	37.863	<10.000	724.514	<0.500	<1.000	1.323
24	2568729/1	t	1	<10.000	<1.000	<20.000	1503.523	34.743	<1.000	13.651	<2.000	<10.000	<2.000	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
25	2568730/1	t	1	<10.000	<1.000	83.733	120.523	<20.000	<1.000	<5.000	<2.000	25.378	<2.000	<12.000	<10.000	174.263	<0.500	<1.000	<1.000
26	2568647/1	t	5	<50.000 Z	<5.000 Z	1201.200	<50.000 Z	<100.000 Z	48.800 Z	<25.000 Z	160.000	133.000 Z	<10.000 Z	<60.000 Z	<50.000 Z	572.843 Z	<2.500 Z	<5.000 Z	<5.000 Z
27	2568647/1	t	1	12.009	4.353	>1000.000 R	<10.000	21.961	53.500	11.433	>100.000 R	122.855	<2.000	<12.000	<10.000	572.843	<0.500	<1.000	<1.000
28	2568679/1	t	1	14.011	2.479	38.723	1074.080	51.085	<1.000	23.156	<2.000	<10.000	<2.000	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
29	2568767/1	t	1	<10.000	<1.000	<20.000	1531.849	34.228	<1.000	11.064	<2.000	<10.000	2.392	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
30	2578026/1	t	1	<10.000	1.260	<20.000	1909.266	43.795	<1.000	18.336	<2.000	<10.000	<2.000	<12.000	<10.000	13.589	<0.500	<1.000	<1.000
31	2568824/1	t	1	11.705	3.238	<20.000	<10.000	28.478	<1.000	133.632	<2.000	<10.000	<2.000	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
32	2568820/1	t	1	11.938	3.300	<20.000	<10.000	29.254	<1.000	134.560	<2.000	<10.000	<2.000	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
33	2568818/1	t	1	21.952	5.611	<20.000	<10.000	34.878	<1.000	165.779	<2.000	<10.000	<2.000	<12.000	216.511	<10.000	<0.500	<1.000	<1.000
34	2568816/1	t	1	13.771	12.204	<20.000	917.444	36.239	<1.000	57.005	<2.000	<10.000	<2.000	<12.000	31.898	27.605	<0.500	<1.000	<1.000
35	2539681/1	t	1	16.709	2.767	63.239	1150.335	56.061	<1.000	24.705	<2.000	20.496	<2.000	23.231	<10.000	20.308	<0.500	<1.000	<1.000
36	STD-QC2_1	t	1	18.000	5.030	201.100	201.100	24.500	12.100	24.000	53.700	52.000	21.100	506.500	199.700	208.500	8.800	5.100	26.300
37	2579559/1	t	1	14.606	23.079	<20.000	<10.000	39.878	2.088	74.708	<2.000	<10.000	<2.000	<12.000	<10.000	34.991	<0.500	<1.000	<1.000
38	2579558/1	t	1	14.460	21.990	<20.000	<10.000	38.428	1.874	72.129	<2.000	19.508	<2.000	<12.000	<10.000	192.496	<0.500	<1.000	<1.000
39	2568963/1	t	1	18.954	2.700	<20.000	1410.879	31.817	<1.000	13.485	<2.000	<10.000	<2.000	<12.000	<10.000	<10.000	<0.500	<1.000	<1.000
40	2521558/1	t	1	>100.000	<1.000	<20.000	<10.000	30.594	<1.000	<5.000	<2.000	<10.000	<2.000	19.229	33.234	<10.000	<0.500	<1.000	1.027
41	2569036/1	t	1	<10.000	2.929	>1000.000 R	<10.000	21.766	<1.000	17.720	<2.000	38.236	<2.000	<12.000	<10.000	91.503	<0.500	<1.000	<1.000
42	Drift		1	18.000	5.030	201.100	201.100	24.500	12.100	24.000	53.700	52.000	21.100	506.500	199.700	208.500	8.800	5.100	26.300

Links LIMS

Pre-configured, automated checks have already been performed; these include:

- **Data presentation**: Rounding to decimal places or significant figures (can be configured by determinand and be different for QC's)

13.53	15.0	815	615.844	28.225
17.32	21.7	110	36.593	18.706

- **Quality Control**: QC results checked against target values and flagged

35	2539681/1	t	1	16.709	2.767	63.239
36	STD-QC2_1	t	1	18.000	5.030	201.100
37	2579559/1	t	1	14.606	23.079	<20.000

- **Upper Limits or LOD** : Sample results compared with upper calibration level (out of range) or method Limit of Detection (reported as <)

16	2568798/1	t	1	<10.000	4.928	<20.000	1572.823
17	2568994/1	t	1	<10.000	<1.000	<20.000	>2000.000 R
18	2579548/1	t	1	19.125	5.243	<20.000	<10.000

- **Preset Limits and Targets**: Sample results compared with any pre-set limits or target values (eg regulatory limits) and flagged with coloured cell

12.6
113
0.563
25.4
133 Z
123

- **Unit conversions**
- **Blank or drift corrections**
- **Additional Calculations** : Cross measurement or sample calculations run

CALCULATED RESULT	
Equation - Pass 1	(BL Anthra * Final Vol / Init Vol)*1000/ % AR Anthra
Calculation- Pass 1	(33.35*1/1000)*1000/.777875

Facility to hold or rework samples

Electronically submit (one click) 'reportable' samples to LIMS once the analyst has reviewed the results

Links4LIMS : Special Features

Dilutions

Dilutions can be managed to match the instrument capabilities and the laboratory requirements. Multiple repeats of a sample, at different dilutions, can be added to the instrument sequence and **Links4LIMS** can automatically work out which is the best result (ie the result with the lowest dilution factor that is within the calibration range) and will send this result to your LIMS.

2568647/1	t	5	<50.000 Z	<5.000 Z	1201.200
2568647/1	t	1	12.009	4.353	>1000.000 R

Balances and Other Serial Instruments

Links4LIMS can be used in conjunction with serial instruments eg balances, pH meters etc. For analyses such as Suspended Solids (SS), Total Dissolved Solids (TDS), Dry Residues; **Links4LIMS** will take all the balance measurements made and carry out the calculations required – even blank correction.

Links4LIMS : Summary

Links4LIMS provides a powerful, yet easy to use Instrument Integration system, which can work with all types of instruments and LIMS systems.

The software is routinely used on hundreds of instrument types worldwide; it releases analysts from many time-consuming tasks: typically 1 hour can be saved for loading 150 samples, and 1 hour saved per 200 results reviewed and entered manually into LIMS.

Transcription errors are eliminated from the data entry process; this significantly improves the quality of results transferred to LIMS and reduces the possibility of incorrect results being sent to customers, or analysis being un-necessarily repeated.

Analysts have more time to eg ensure instruments are set-up correctly for analytical runs, conduct routine maintenance to help minimise instrument downtime, ensure that their work areas are up to date for external regulatory, quality or customer audits.

Further Information

For further information or a demonstration of Links for LIMS please contact CSols via our enquiry page , email us at links4lims@csols.com or contact us as below.

We look forward to showing you how **Links4LIMS** can improve your efficiency, reduce results processing time in your laboratory and meet traceability requirements for any client or regulatory external assessments.

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