

Knowledge Manager LIMS

IndustrialIT: Quality Information Management for the Cement Industry



ABB

LIMS for the Cement Industry

Attain Best-In-Class manufacturing operations. Move towards optimum plant performance by improving your plant operations, process efficiency and product quality.



Benefits:

- **Unique, online and seamless integration of quality information in overall business processes**
- **Packed solution based on standard methods**
- **Quality optimization, tracking and management means less man power needed**

«Control and improve your **product quality**»

The Knowledge Manager LIMS solution

Today's economic environment requires cement manufacturers to make continuous improvements in process and quality control. The ultimate target is to produce intermediate and end-products that meet specifications with lowest possible costs.

Knowledge Manager (KM) Laboratory Information Management System (LIMS) covers all laboratory tasks for the entire process and issues compliance certificates. Naturally its fully integrated with enterprise-wide process and production monitoring, downtime support and maintenance management.

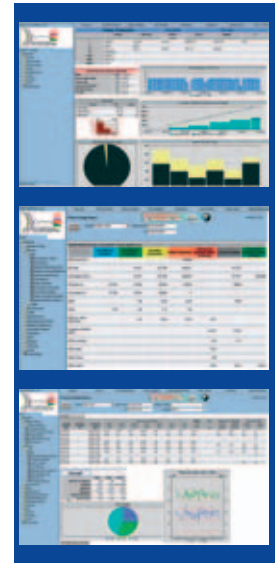
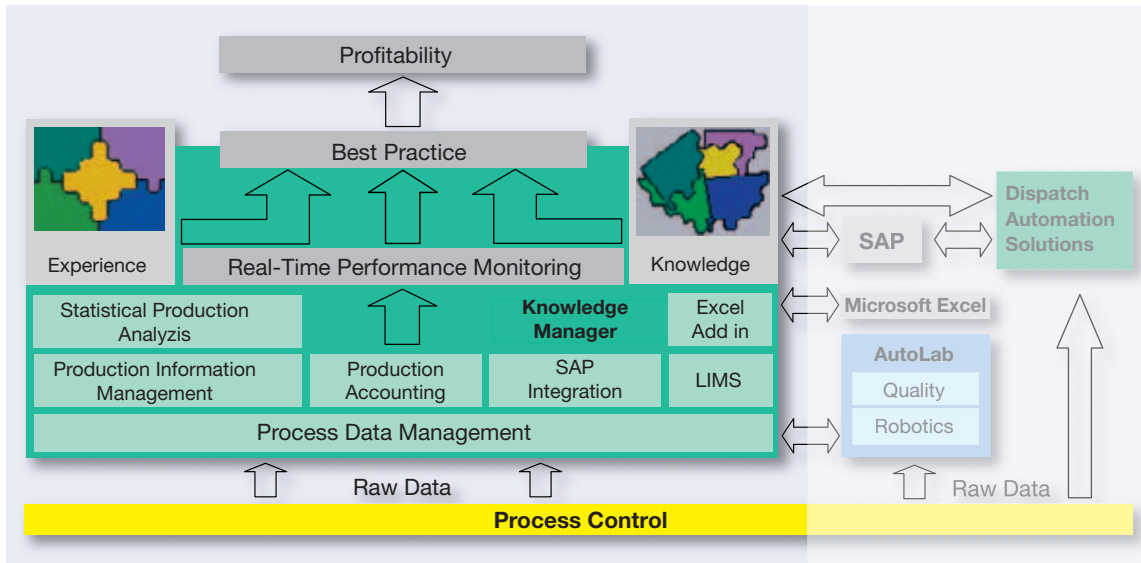
KM LIMS provides an advanced means to document the quality information, make it easily accessible and transparent. It provides plant personnel with timely quality information on the process, thus increasing actionable knowledge. KM LIMS provides the foundation for direct process management and quality control, for day-to-day management decisions in production and marketing. It is designed to enhance process improvements and to provide a firm basis for your further production and long term developments.

Dedicated and suited to the cement industry

KM LIMS for the cement industry is part of ABB's Knowledge Based Solution Suite and is designed to manage the quality information according to good lab practices. This management covers all the tasks at a cement plant from the routine quality controls to the final product quality controls and compliance certificates. Its fully integrated with enterprise-wide process and production management system, providing true key performance indicators including process and quality components.

Since KM LIMS is dedicated to the cement industry, it is simpler to use, containing features specific to the cement industry and not the unnecessary complicated features of generic LIMS packages. For example, there is already a proven and predefined workflow for cement analysis built into the system. Other cement-suited functions include automatic and manual data acquisition, data validation, data consolidation, long-term storage, calculations, sample logging procedures, sample status reports, work lists, standard and compliance reporting features, easy-to-use trending and graphing plus options for MS Excel and statistical analysis applications.

Total Production and Quality Integration



«Integrate quality & enterprise-wide production»

LIMS integrated in Knowledge Manager

Current information technology has raised the sophistication level of each software component for different analyzing instruments. However, how deploying software in the laboratory will assist the production personnel in meeting production and quality targets is not always clear and so the full benefit of the investment is not achieved. This is because the software is normally designed for a single purpose, and that is to control the analyzer and store only those measurements without sophisticated integration capabilities.

LIMS, integrated in the production management system as is the case with the ABB Knowledge Manager solution, is the only practical way to interweave the results of the plant's total population of sensor reports with the dynamics of the physical process.

Quality data stored centrally can be used throughout the organization with LIMS

Although KM LIMS can be used standalone, the biggest benefits are achieved when it is:

- Integrated with Knowledge Manager
- In a collaborative lab management configuration
- As part of our optimization suite, with Economic Process Optimization (EPO), Raw Mix Preparation (RMP), and Expert Optimizer (EO).

Multi-level authorization scheme

A multi-level user authorization scheme is applied for accessing, modifying and deleting sample records. The overall user access management is integrated into the local platform network. This means that Knowledge Manager LIMS users automatically receive assigned rights as they log in to the office computer environment; there's no need for a separate log in. Multiple users doing different tests and analyzes are able to work with the same sample records.

Exception-based procedural actions such as manual corrections of results, validation overrides and sample data removal are accurately logged to provide complete history and traceability.

Example of benefit:

Proof of performance and compliance

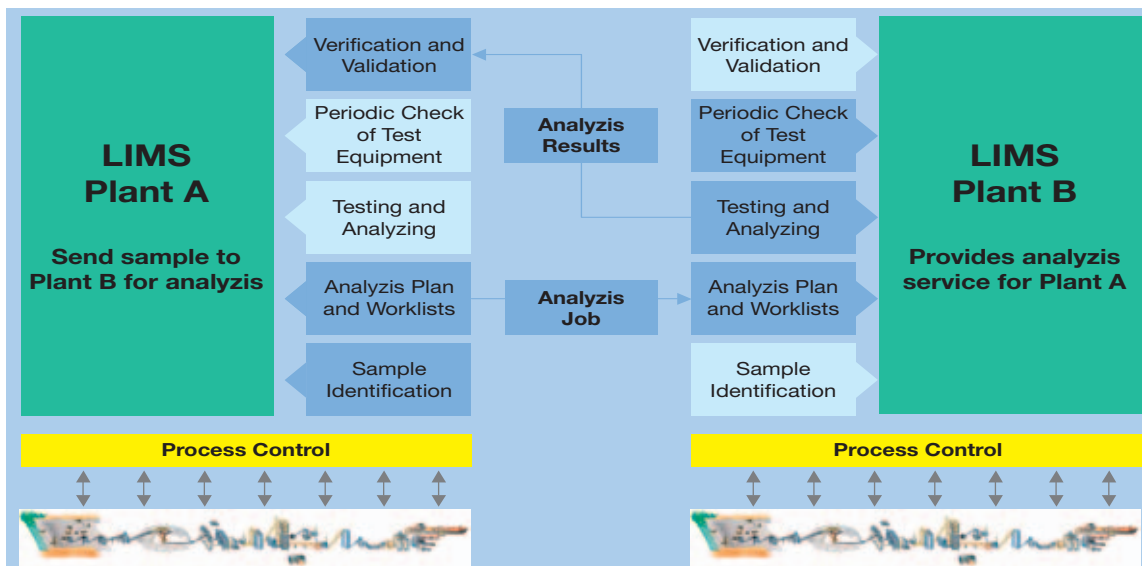
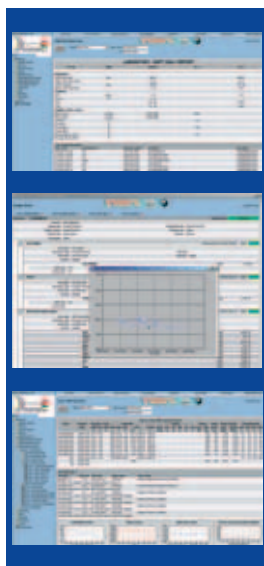
Combined processing and logging of data from the burning process, chemical composition of fuels, materials and stack emissions are legislative requirements in most countries that permit burning of waste fuels. Only an integrated production and quality management system can be an efficient information source.

In today's economic environment, quality requirements have become tied to each practical aspect of running a production facility.

Our LIMS is tightly integrated with Knowledge Manager, providing production and lab data on the same page.

Unlike in other LIMS solutions, by using the same platform as Knowledge Manager's process and production historian, almost no integration effort is required.

Laboratory Information Management...



The coordination of information management and laboratory tasks makes LIMS a reliable backbone for the day-to-day running of a professional laboratory.

Benefit from unique, seamless and full integration of plant information.

«Rationalize your laboratory assets»

Collaborative laboratory management

Recent industry trends have been for mergers and acquisitions of companies and plants. This has resulted in specific companies owning multiple plants in a region or country. A natural management question is: can the assets and resources in close proximity be rationalized?

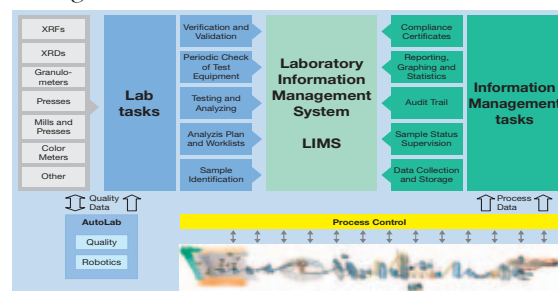
The sharing of common laboratory functions and equipment is becoming everyday practice. Expensive instruments (e.g. mass spectrometers, chromatographs) are often installed only in one laboratory and perform analysis services for multiple production plants. The plants are usually geographically separated, probably widespread, and may even have their own independent LIMS server, depending on the balance between the economic and topology decisions.

For example, when a sample is registered in one plant and sent to another plant for certain analyses, collaboration between the two LIMS systems is required. The workflow can be executed in the lab from one plant, while the information need is mainly in the other plant. Knowledge Manager LIMS fully supports such sharing of analysis equipment between several production and lab facilities and between LIMS systems.

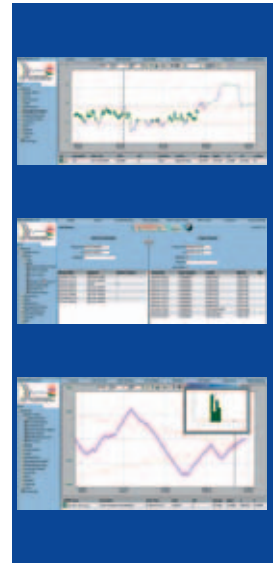
Flexible implementation of integrated Knowledge Manager LIMS systems for inter-plant collaboration is an enabler for the optimization of quality control functions across production plants. Online collaboration with other laboratories in a multi-facility is one of the key indispensable strategies for a modern LIMS system for the cement industry providing a major cost saving.

Quality management system

Sample management is the key to the setup of the Knowledge Manager LIMS. Samples can be divided into sub-samples for backup and a series of predefined tests and analyzes. Samples can be logged automatically from the control system, according to a time scheme or entered manually. Sample validation, history, approval procedures, test plans, work lists, scheduling of equipment's periodical checks, audit trail, reporting, and compliance certificates are lab and information management tasks inherent to Knowledge Manager LIMS.



...and more

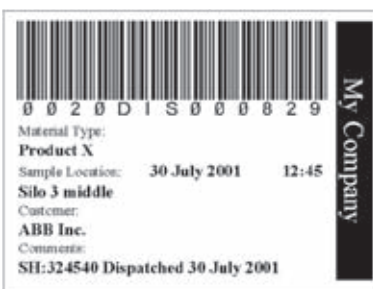


«Process quality information **consistently**»

Bar code support

Bar code labelling can be used to speed up the sample identification process and simultaneously reduce errors in sample identification e.g. cement strength tests.

Bar code labels can be printed at sample registration. When entering test results, a bar code reader can then be used as data input device parallel to the computer keyboard. Scanning of the label automatically opens the correct sample detail report. If the bar code label is illegible, then it is always possible to manually type in the sample ID.



Job rebook

The job rebook report is particularly useful for mapping automatic results from equipment that do not deliver the sample IDs, using drag and drop action.

This is just another one of many tools to ensure consistency of analysis performance.

SPC (Statistical Process Control) includes powerful graphical tools such as:

- Control charts (X-chart, EWMA, CuSum) for continuous monitoring of process or quality variables, enabling early detection of changes in the process average
- Histograms with process capability indices for readable statistics of runtime quality measurements
- Multivariable X-Y graphs
- Cross correlation calculation with time lag compensation

Sample validation and approval

The system supports three different specification limits for the manual or automatically entered test results: internal limits (as per internal QA procedures), customer limits (as per delivery contract), specification limits (as per relevant standards e.g. ASTM, EN, etc).

The quality manager can approve the sample results, or overrule the automatic validation against the limits. This overruling requires a comment and is stored, for auditing purposes, in the approval information field.

Ensure consistency of analysis performance.

Optimize laboratory practices.

Continuously monitor process or quality variables.

Approve or overrule automatic validation.

LIMS Quality Reporting



Increase your knowledge and provide your plant personnel with timely, quality, visual information, summarized or detailed.

Visualize and better understand the relationship between process conditions and quality results.

«Quality information at your fingertips»

LIMS reporting

The Knowledge Manager LIMS provides you with an advanced means of documenting quality information and makes it easily accessible in a transparent way. It provides operations with timely quality information on the process, thus increasing actionable knowledge. It presents the combined process and quality values via standard and compliance reporting features that include analysis, test and compliance reports, easy-to-use trending and graphing plus options for Excel and statistical analysis applications.

Process and quality values combined on one page, cement strength reports, conformity reports and quality certificates are some examples of reports which allow you to better understand the relationships between process conditions and quality results.

You can visualize all these and more with the help of color coded outliers, distribution graphs and histograms, predefined or configured for your proven laboratory practices.

Reports are user-configurable for maximum flexibility, with a toolbox of preconfigured elements via drag and drop. And you have the capability to schedule your distribution of these reports, be it to a printer or an email address. A list of typical reports follows.

Analysis/test reports

Statistics:

- AVG, MIN, MAX, STD, Number of samples
- Colour-coded outliers
- Number of outliers
- Cement strength reports

Quality reports

Statistics:

- AVG, MIN, MAX, STD, Number of samples
- Colour-coded outliers
- Number of outliers

Compliance reports

- Test accumulated
- Distribution graphs
- Normative requirements
- Colour-coded outliers

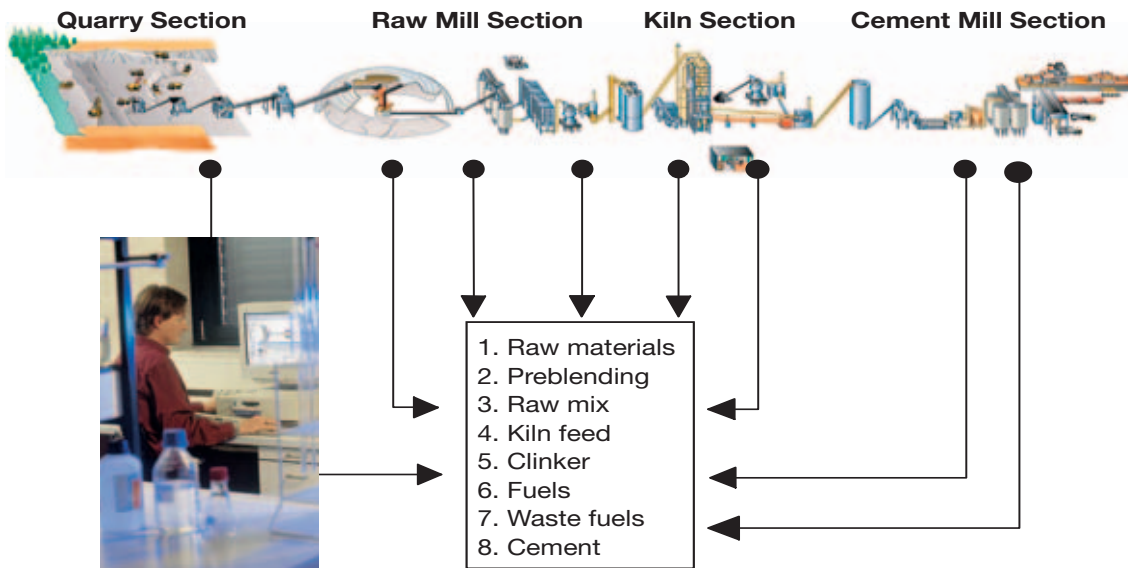
Graphical presentations and charts

- Standard quality chart
- Charts with specification limits (auto control)
- Moving average charts
- Conformity charts

SPC (Statistical Process Control)

- Trends and charts
- Library of functions for calculations
- X-charts (Shewhart)
- EWMA charts
- CUSUM charts
- Histograms
- X-Y charts with automatic time delay compensation

LIMS Work Flow and Interfaces



«**Proven, automatic** laboratory workflow»

The Knowledge Manager LIMS solution is designed to manage process quality information according to proven laboratory practices, including:

Automatic or manual sample registration

- Automatic or manual
- Customer specific sample ID
- Material group/name/location

Sample scheduling/worklist

- Workplace specific joblist
- Work in progress
- Sample removal
- Automatic equipment setup download
- Automatic analysis/test data retrieval

Manual entry forms

- Standard entry forms
- Customised specific entry forms
- Entry validation

Sample status list

- Completion of tests
- Validation status
- 3-level spec conformity visualization
- Approval of tests
- Case-specific commenting

Sample survey sheet, sample detail

- Consolidation of sample data
- Analysis/test reports
- Quick charts
- Case specific commenting
- Photographs or external quality document linking

Analyzer interfaces

Bi-directional interfacing to test equipment and analyzers allows automatic and error-free result retrieval. The download of sample and job-specific equipment setup parameters before starting the job is done automatically. Automatic scheduling further optimizes work processes.

- X-RAY analyzers – ARL, Philips, Oxford – Siemens/Brucker
- Granulometers – Sympatec, Malvern & Cilas
- Presses – Walter & Bai, Toni Technik
- POLAB system and equipment – POLAB AMT/AOT
- Autec sample preparation
- LECO
- Dr Lang color meter
- Yvon-Jobin ICP spectrometer
- Scales
- Atomic absorption analyzers
- Organic carbon analyzers
- Carbon & sulfur determinators
- Ultra violet analyzers
- ... and as required

Generic interfaces

XML, ASCII, standard FTP

ERP interfaces

Knowledge Manager SAP Connector
PPPI, PM, SD/MM and QM modules



As a part of ABB's Knowledge Based Solution portfolio, LIMS can be interfaced to lab test equipment and analyzers for automatic data collection.

The standard interfaces include, but are not limited to, a variety of standard lab equipment found in typical cement labs.

Our SAP interface provides online integration of process, production and quality information in the overall business process.

ABB Knowledge Manager LIMS

Knowledge Manager LIMS is your productized solution for quality from ABB. Be up and running quickly with this customizable solution. Get fast ROI with world wide support from ABB's local experts. Only Knowledge Manager LIMS brings you the perfect blend between off the shelf and inclusion of your specific needs, enabling you to roll out the

benefits across all your plants, quickly, time and time again. More than 500 systems installed worldwide are using ABB knowledge-based solutions for information management and process optimization. A world leader in process specific Collaborative Production Management – ABB, always at the forefront of developing cutting-edge technology.



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