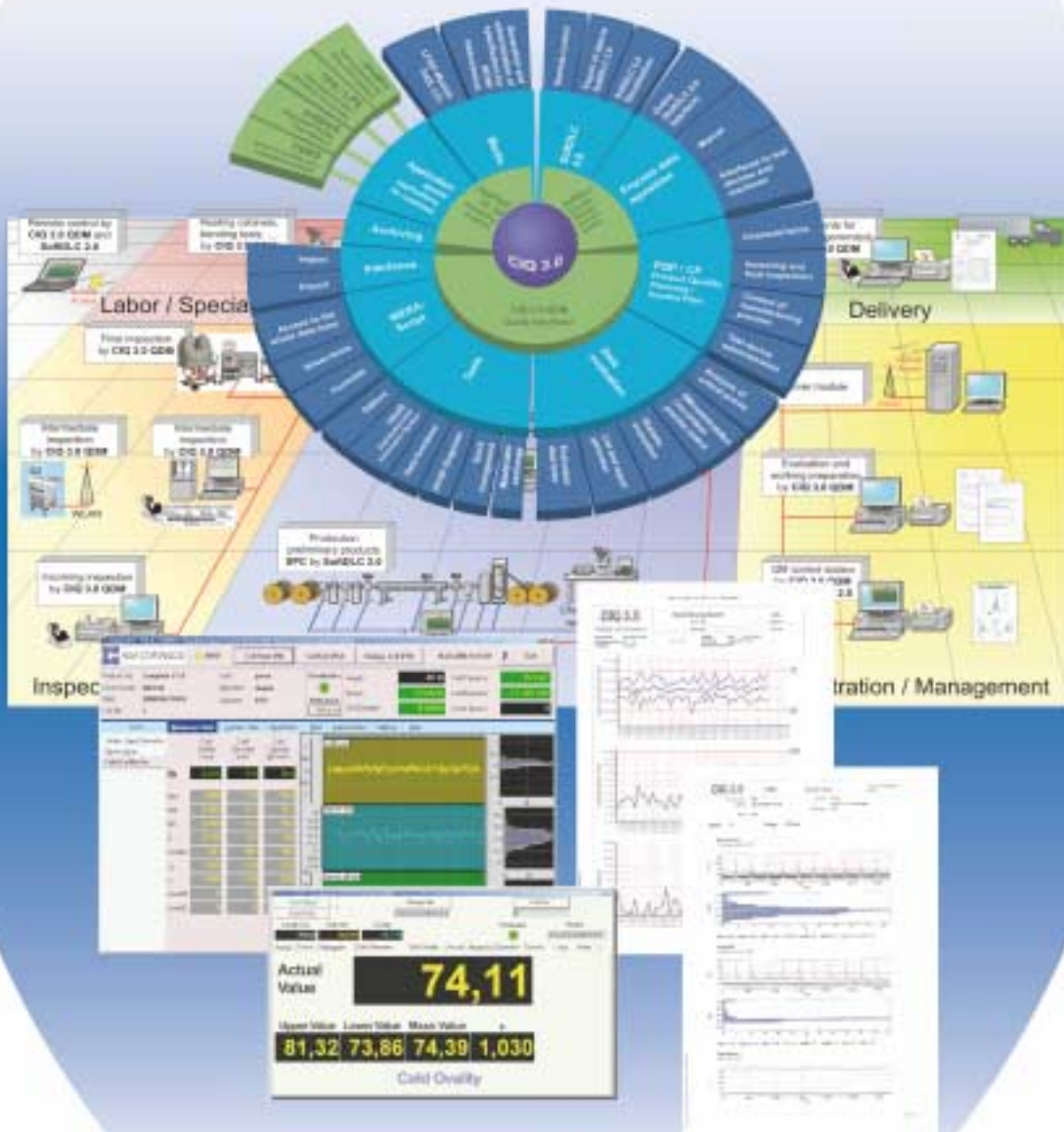


CIQ 3.0

Quality Management System

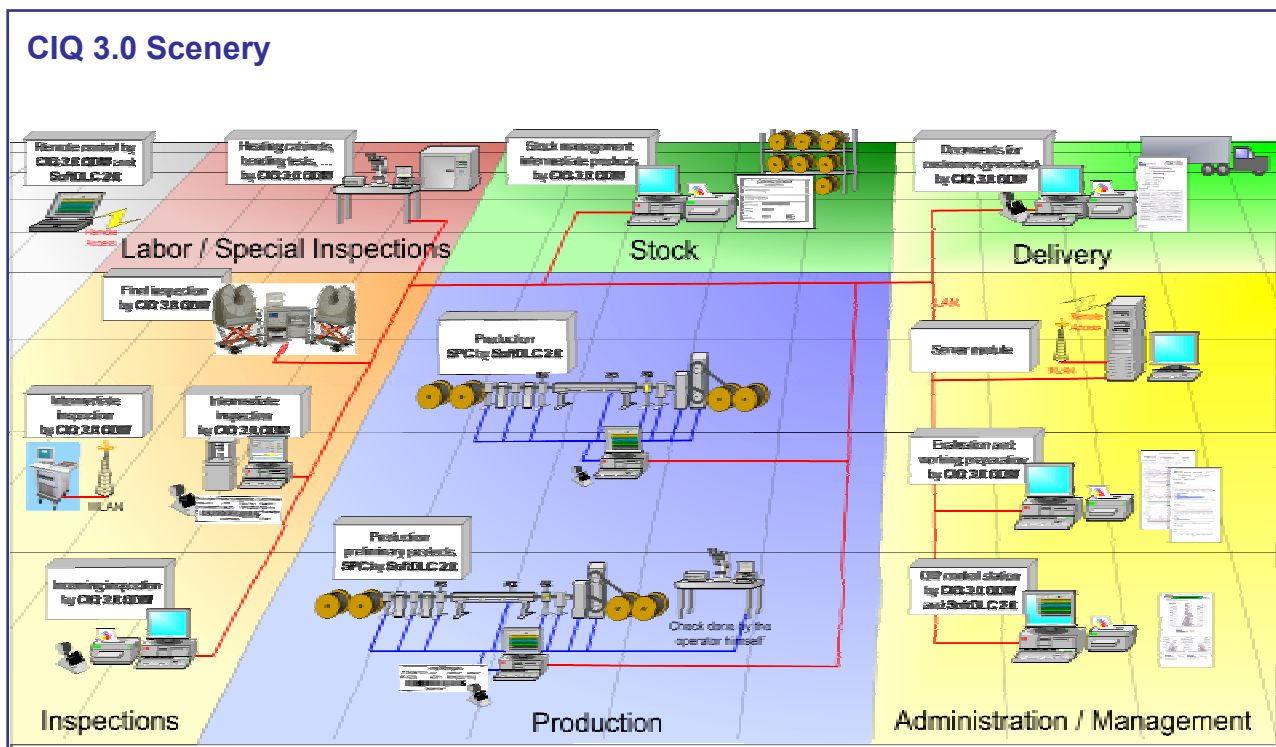


Measuring Data Acquisition and Visualization



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1 Functions

AESA CIQ 3.0 is the software solution for automating quality processes in the cable and wire industry. It provides quality assurance and data acquisition that is product-related, order-specific, cross-task and product accompanying.

The combination of process data acquisition, data networking, and quality assurance enhance product quality and reduce costs throughout the enterprise.

Automated processes lower the work load and costs involved in test planning and execution of tests. Moreover, direct access to stored data facilitates a near real time analysis, which was previously not practicable due to unreasonable costs - ranging from the quality control of individual products to overall defect cause and weak-point analysis.

Online process data acquisition enables the operator to respond quickly to provide optimal quality and efficient use of input materials.

With CIQ 3.0 you can monitor and log all stages of production – from intermediate to final testing and including inspection of incoming goods and delivery. Networking of existing systems facilitates immediate error detection and correction. By providing basic data for weak-point detection, the prerequisites for continued process improvement are met.

Thus, CIQ 3.0 is an indispensable tool for improving quality and productivity while simultaneously cutting costs.

Production

CIQ 3.0 may be used in all stages of production such as wire drawing, wire manufacturing, unit/layer stranding, armoring and sheath production.

The SoftDLC 2.0 add-on module enables continuous visualization, monitoring, and capture of measured values and operational data, as well as operator self-checks using the CIQ 3.0 QDM.

Intermediate and Final Testing

CIQ 3.0 acquires measured values for intermediate and final testing automatically or manually. Herefore it generates test orders with work instructions for the operators.

Inspection of incoming goods

CIQ 3.0 QDM checks received raw materials and semi-finished products.

Delivery

CIQ 3.0 QDM can generate all documents and labels required for the customer based on measured values and evaluations.

The system was developed together with leading cable manufacturers and optimally meets the special requirements of quality assurance in the cable industry.

2 CIQ 3.0 – Quality Management

The CIQ 3.0 QDM module forms the centerpiece of the quality management solution. It contains the essential functions of test planning, data acquisition and analysis, as well as archiving. It also provides a variety of tools and interfaces with other systems.

CIQ 3.0 accompanies (concurrently monitors) all manufacturing related processes such as machine setting data, process data acquisition, quality data acquisition, defect management, repairs, and management of testing equipment. Thus, complete traceability can be achieved.

The special requirements of the cable industry are taken into account, e.g. traceability, connection of various measuring devices, low and high frequency measurements, network capability and network communication.





3 Central Modules and Applications

SoftDLC 2.0 - Process Data Acquisition

The SoftDLC 2.0 DA module specializes in continuous, concurrent manufacturing process control by means of measured data acquisition (SPC-Statistical Process Control) and visualization.

It controls and records the process data of all existing measuring devices over the entire product length and visualizes the data in a common user interface custom-tailored to individual needs. Additional visualizations on all PCs across the network are possible.

As soon as a defect occurs or a limit is violated, SoftDLC 2.0 DA sets off a visual and audible alarm. Furthermore, messages can be sent by long-distance data transmission or as e-mails. This provides early defect detection and reduces rejects.

Continuous monitoring also reduces the extent of inspections, as significantly fewer intermediate and final checks are necessary.

The use of the CIQ core functions offers extensive possibilities of evaluation including the creation of reports and labels. See Chapter 11 for more details.

A thorough description of the module can be found in the SoftDLC 2.0 data sheet.

OptiTest XL 3.0 – Measuring Program

OptiTest XL 3.0 Professional is a standalone version of CIQ 3.0 QDM for AESa and MEA measuring equipment. See Chapter 12 for more details.

InQDaS – Integrated Quality Data System

The integrated quality data system (InQDaS) is available for defect, repair and delivery handling during intermediate and final testing.

Using InQDaS in the final upgrading stage of CIQ 3.0 is particularly attractive for customers who already use CIQ 3.0 intensively. See Chapter 13 for more details.

Special Applications

Additional special applications are available for:

- Type test and laboratory test systems (TPS /LPS),
- Defect management and evaluation (FEBS),
- Long-term tests with bending machines and drag chain systems (SKeMPS)
- Heating cabinet control

4 Test Plans and Test Orders

Test specifications and the test orders derived from them are the basis for specific and detailed tests, reports, and further evaluation steps. Standard test plans are available for usual testing procedures.

Extensible master data for processes, components, combinations and parameters are available for test plan creation or modification. All parameters, limit values, formulas, master data, reports, control charts etc. may be defined and altered by the user himself. Work instructions and drawings may be inserted for the operating personnel on the production line.

Likewise, labels and reports that belong to a test plan may be entered. Their output can be obtained – as necessary – automatically, either subsequent to an intermediate step, or after test completion.

Work and maintenance efforts can be reduced by using basic and product family test plans and through data transfer from ERP and cable construction systems.

CIQ 3.0 QDM offers two test plan creation options:

Standard Test Plan Creation

As standard, a test procedure that refers to a test plan for a specific product is created.

This format offers various possibilities for the arrangement of the test plan and test order.

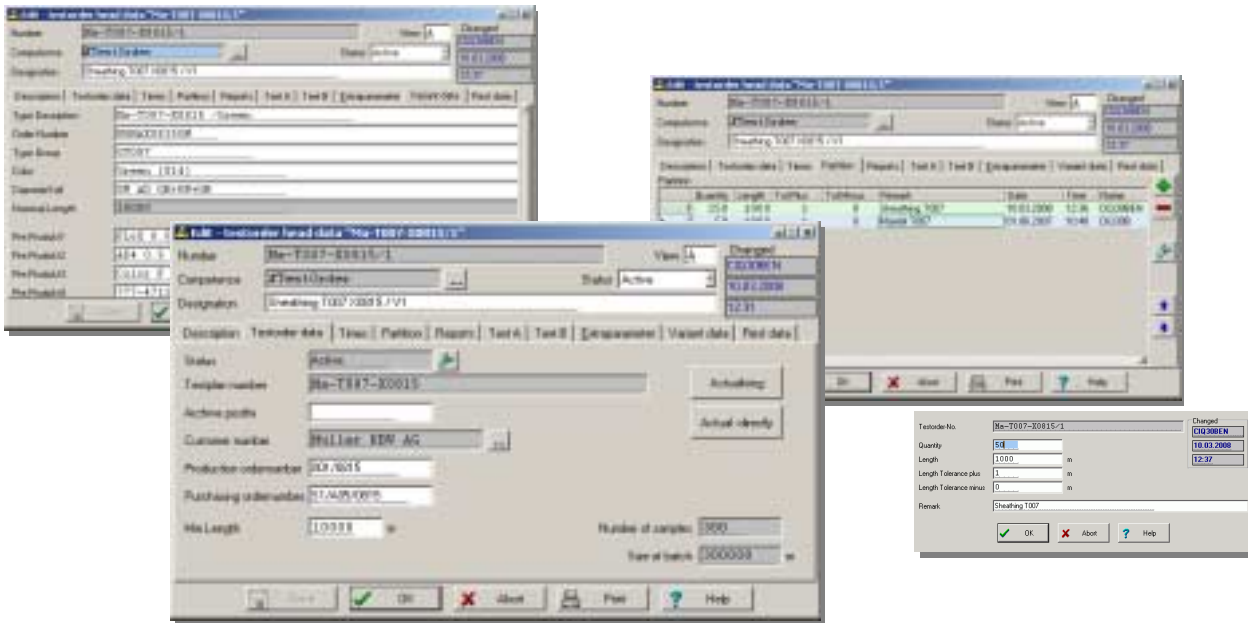
Automatic Testing Plan Creation

The add-on module Merlin offers a convenient way of “conjuring up” test plans for HF and LF measuring. Representation of the individual measuring blocks (e.g. HF Sweep, HF discrete frequency, LF quad, LCTL) and their parameters in a tree structure adds clarity. Measuring blocks can be freely added, removed, copied or moved, and parameters can be changed. This leads to high flexibility in test planning.



In general, only little input is required. However, standard values can be changed, as necessary.

Test plans are created by means of functional blocks and their defined data attributes. This add-on module was designed specifically for HF and LF measurements. With this and based on pre-defined attributes and limits, test specifications and test orders can be created in a fast and convenient manner.



Job-specific data may be entered during test order creation and processing. This includes, but is not limited to, special report formats, selection filters, layouts, and additional order data (variant data). The latter can also use data transmitted from another database or system.

When several similar production machines are used in one process step, test parameters and limit values can be individually specified for each machine.

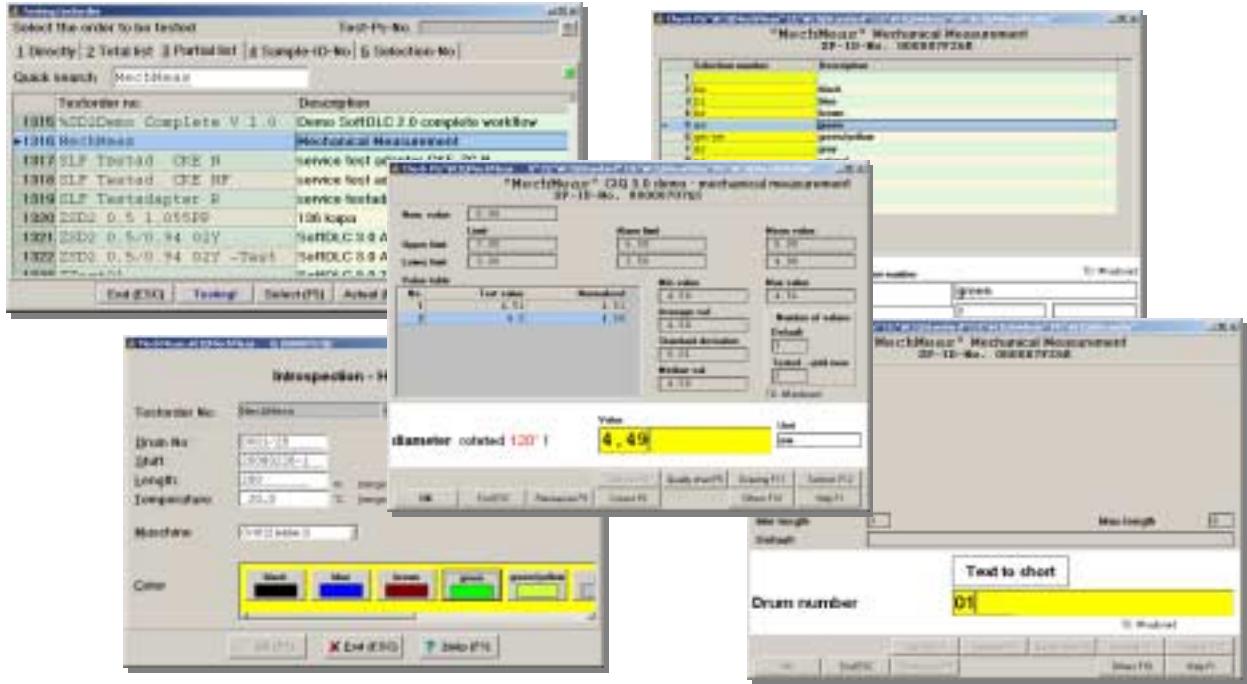


5 Testing with CIQ 3.0 QDM

When working on the test order, all relevant data such as the test order number, sampling ID number, number of values or limits, are continually displayed on screen masks. This also applies to masks that require keyboard entry – e.g. coil number or color. The user at the production line is also assisted by work instructions and drawings.

All data processing is done by the computers in the local network without requiring any external (expensive) computing time.

Test Order Screen Masks



Executing a test order created by the Merlin add-on module



6 Documentation

Reports

CIQ 3.0 QDM offers various report options such as:

- Test certificates for the customer
- Creating control charts
- Graphical representation of shift logs
- Graphical HF/LF evaluations
- Daily and weekly reports
- Product manufacturing cards
- Individual cable overviews
- User definable evaluations in graphic and tabular form.

The results may be printed, stored as PDF files, or sent as emails. It is also possible to create data files for Office products such as Microsoft Excel.



Labels

Coil label

Artikel	0,5/0,94 02Y		
Länge [m]	34530	Durchmesser [mm]	Int. Soll
Maschine	AS02	Mittelwert	0,94 0,94
Kommission		Maximum	0,96 0,96
Spule	6	Minimum	0,92 0,92
Farbe		Kapazität [pF/m]	Int. Soll
Signierung		Mittelwert	155,01 155,00
Datum	12.04.2006	Maximum	157,44 158,00
Uhrzeit	12:35	Minimum	152,00 152,00
Bediener	abc	Spark Tester	
		Sparkfehler	0
		Prüfspannung [kV]	1,50
Spule	i.o.		

Labeling for intermediate products

Prüfmuster Etikett für Wanddicke / Durchmesser

Probe vom	AG	Auftr.Nr.	Kabel-Nr.
(PA) Anfang	AD01	00112233	030-A
		Probenlänge	

1000051545

Fertigungsfreigabe

21.04.06/13:21	AG	Auftr.Nr.	Kabel-Nr.
#CIQ30	AD01	00112233	030

1000051545

7 Statistics and Evaluations

All data are available for evaluation at any time. Thus, all test data of a cable can be collectively evaluated and printed.

This includes process data (from the SoftDLC 2.0 module), measured values from LF/HF measurements, mechanical and electrical values, as well as administrative information on semi-finished and finished products.

Some examples of how to perform evaluations are:

- Sample list sorted by test order and production step
- Search with pre-defined filters or filters defined by the user (e.g. searching for the last 20 samples by cable number, date, certain characteristics)
- Free search through the data pool with user-specific search criteria
- Sample list configured specifically for or by the user

Search Selectiongroups

Number	St	Designation	Date
1			25.06.2004
2	#Archive	queries for archive	25.06.2004
3	#EmptySele	empty query	25.06.2004
4	#ProcessCy	standard queries for process cycle	25.06.2004
5	#ProdStep	standard queries for production step	13.10.2006
6	#ProductCo	standard queries for prod. control	25.06.2004
7	#Reports	queries for testing reports	
8	#SD2Suchen	SoftDLC 2.0 Suchen	
9	#Search	searching for samples	
10	#User	standard queries for user	
11	~ZSD2Suchen	SoftDLC 2.0 Suchen	

Search with pre-defined filters

Data stock search

Specific search criteria for procedures generated by the Merlin add-on module.

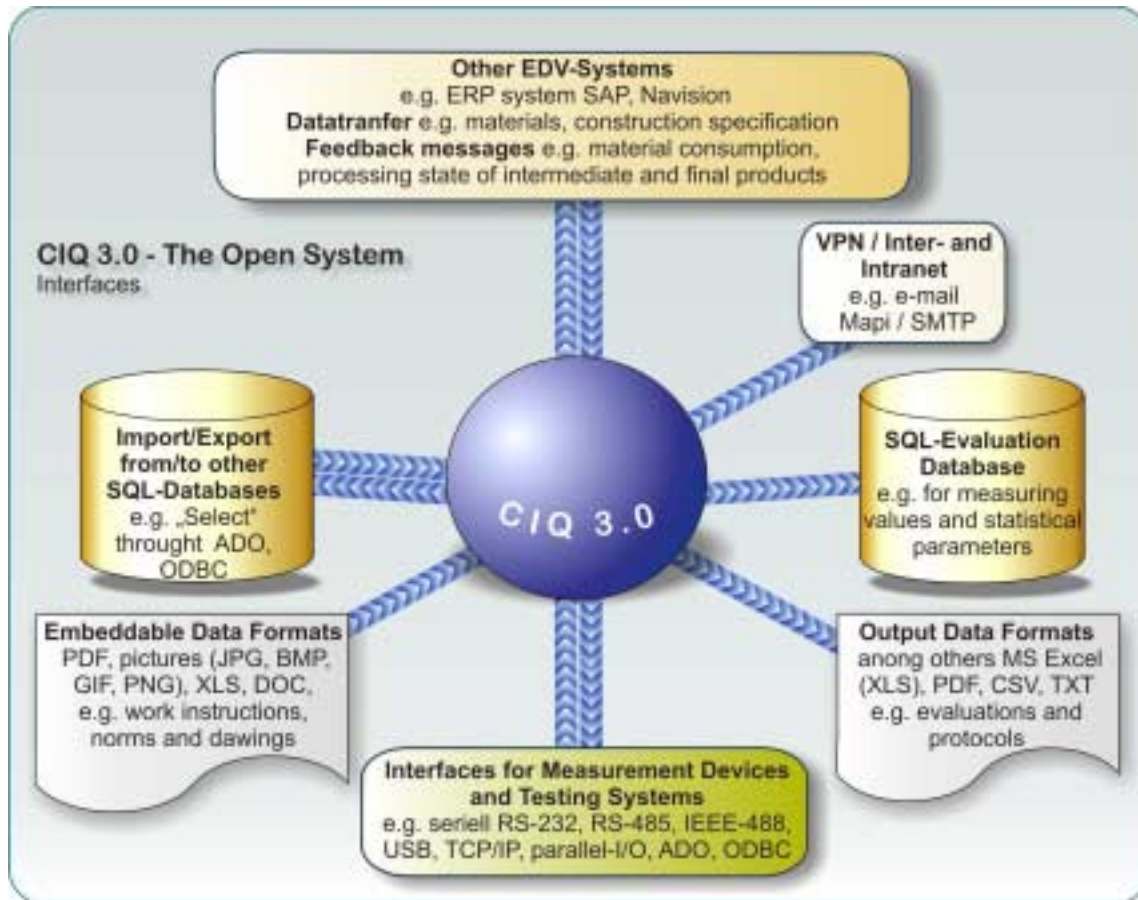
Filters and search criteria normally generate sample lists which facilitate multiple further actions. Examples are:

- Display and process measured values
- Print reports and labels
- Generate quality charts (statistics)
- Export data to other EDP systems

100% backward and forward traceability is feasible with appropriate filters. A defect in material, for example, can be traced to the relevant shipment. Vice versa, it is possible to determine other products that have been affected by the same material.

8 CIQ 3.0 – The Open System

CIQ 3.0 is a “open system” containing various open interfaces for data exchange.



Due to its wide range of different interfaces, CIQ 3.0 can be easily integrated into existing EDP structures. Its multiple interfaces include:

- **Measuring and inspection systems**
For connecting measuring and inspection systems the usual interfaces are available.
- **Other EDP systems**
At any manufacturing or testing stage, data can be exchanged with other EDP systems. These include e.g. material data and design values (tolerances). Vice versa, it is possible to send out feedback data, for example data about the production status of intermediate and final products or material consumption data.
- **Creation of outputs in different file formats**
Multiple reporting features enable the generation of e.g. reports and evaluations in different file formats for further processing by other programs.
- **Integration of existing documents and files**
Existing documents (work instructions, standards, drawings) can be integrated into and displayed by the system.
- **Import from and export to SQL databases**
CIQ 3.0 can retrieve data from (“Select” via ADO or ODBC) and send feedback data to (“Insert”, “Update”) various databases.
- **Communication via VPN / Internet and Intranet**
For example, alarm messages can be realized via e-mails. If Internet/VPN or RAS connections are available, all evaluation features of the CIQ 3.0 and the remote monitoring of manufacturing lines by the SoftDLC 2.0 are accessible from outside.

For data transmission, CIQ 3.0 QDM features flexible import and export functions. The user himself can define which data are exported or imported and in which form.



9 Connection of Measuring Equipment

CIQ 3.0 comes with a wide range of interfaces connecting with most of the common measuring devices as well as AESa and M.E.A. automatic measuring systems. This is a small extract from the complete list:

<p>Mechanical dimensions: Mitutoyo-Digimatic with adapter DMX-1 Sylvac (Vernier calliper) Werth projector with spindle 768186 Werth profile projector with digital display Digimy ZV4</p> <p>Diameter: Beta-Microscan LI800R / LaserMike</p> <p>Camera systems for cross section and wall thickness measurements: iVision (camera system Optistation) BMZ</p> <p>Scales: Classen 16821 Kern 572 / EW2200-2NM Mettler PM 4800 / PM 801 / AE 163 / PB 303 / PB 3002 Precisa 300 M Sartorius CP</p> <p>Adhesion tester: KMF ECAM 500</p> <p>Manual force measurement: Erichsen manual force gauge type 708</p> <p>Handheld systems: Metrologic MS 15</p>	<p>High-frequency measuring devices: Agilent (Hewlett Packard) Analyzer E5100A, E5061A, E5062A, HP4194, HP4195, HP8712C, HP8712, HP8714, HP8751, HP8752, HP8753, HP4263B, HP4396A Rhode & Schwarz Analyzer ZVRE, ZVRL, ZVBx, ZVL Wandel & Goltermann SPM19 / PSS19</p> <p>High-voltage testers: M.E.A. HV-T1 M.E.A. NFHV</p> <p>Low-frequency measuring equipment: M.E.A. KPA-5/1 5/2, ME5/ME6, RCK10/12, QT-1 AESa RCKE-2</p> <p>OTDR: Ando AQ-7140D</p> <p>Tensile testers: Houndsfield S-T-Series H5KT M.E.A. ZPM-1 (Elongation Tester) Zwick TMT 2.5 / TN1S TMT 2.5 / TN1S</p>	<p>Resistance and insulation measuring equipment: AESa Family 8130 (8134, 8135, 8136) Burster Resistomat 2302 / 2316 (milliohmmer) Fischer TO-3 cable (milli- and teraohmmeter) KTL (milliohmmer) Schütz MR 1014S / MR 300C / 270C / 1012L (milliohmmer) Sefelec DMG50 ISO/HV, M1500M, M1500P</p> <p>Complete systems: M.E.A. LTI-LF/ISO/HV LTI-LF/HV Rekamat LF Rekamat LF/HF KPA-HF100/04..KPA-HF1800/04 KPA-LHF100/04..KPA-LHF600/04 KPA-LHF100/25..KPA-LHF300/25 KPA-LHF100/32..KPA-LKF300/32 AESa VEGA Family (AESa 9500) HELIOS Family (AESa 9900) PHOENIX Family (AESa 9600) TIGRIS Family (AESa 9350)</p>
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This list does not claim to be complete. Please contact us for information about special device drivers, if your inspection equipment is not included in the above list.

Other device drivers can be added on request.

10 Product Development

When developing a new product it is helpful to use existing experience from a product that has already been manufactured in the past. Therefore CIQ 3.0 QDM enables access to older stored data (in current databases or archived data). These sets of stored data contain the test orders with the measured values and the corresponding test plans as well as other master data. Based on the available measured values it can be decided whether the product will still meet the new requirements. The test plans may be used as a basis for the development of a new product. With the cumulating experience, non-productive times and testing cycles as well as problems due to machine or production-related defects can be minimized.

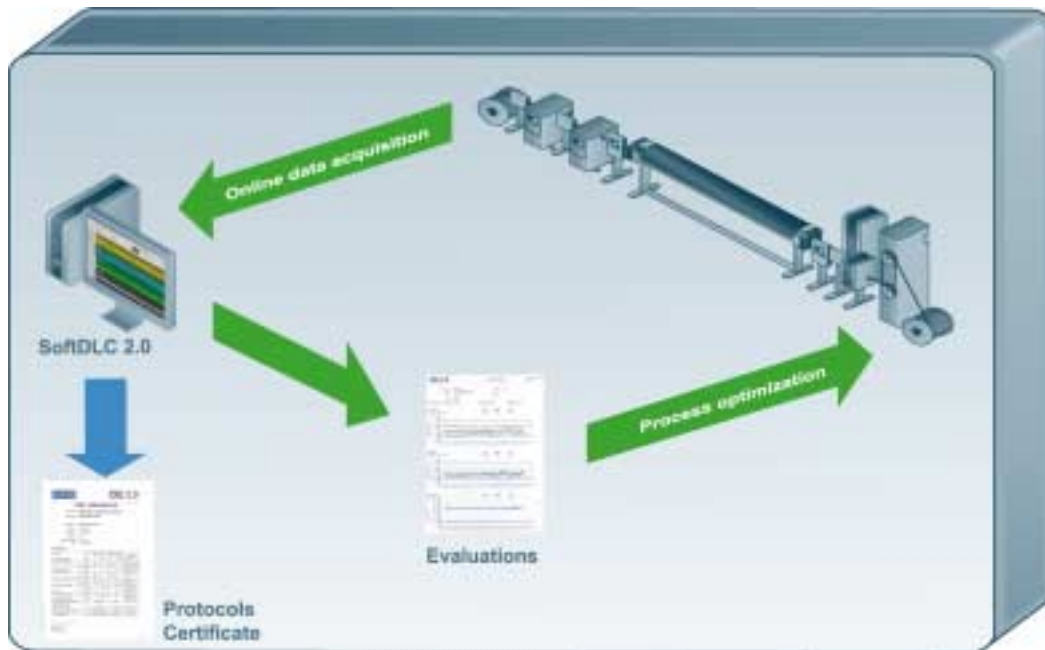
11 SoftDLC 2.0

The Soft DLC 2.0 module continuously captures all process data necessary for monitoring and logging product quality and visualizes these data during the running production process. By visualizing the measured values right at the production equipment and at the control station it is possible to identify trends at a very early stage during production and take corrective measures before defects occur. This ensures that only entirely flawless material leaves the factory.

In the event of an occurring defect or violation of tolerance limits by the measured data or operating data, SoftDLC 2.0 can immediately trigger different types of alarms. The earlier deviations are noticed and remedied, the fewer defects occur. This means: constant quality at reduced production costs.

The captured and archived data provide the basis for provable documentation of quality to the customers. SoftDLC 2.0 fulfils the requirements of statistical process control (SPC). It provides the basic data for the analysis of weak points and hence the prerequisites for permanent process improvement.

Linked with CIQ 3.0-QDM the program centrally stores the measured, operating and administrative data. Additionally the process data can be displayed on other computers within the network or relayed via long-distance data transmission.



Quality monitoring and control evaluations can be created in the form of reports, labels or certificates. It is also possible to transmit data to other EDP systems (for example, material management systems such as SAP), send them as e-mail messages, export them to SQL evaluation databases or store them in dedicated file formats (for example, XLS (Microsoft Excel) or as a PDF).

Together with CIQ 3.0-QDM, data (such as design data or tolerance values) can also be retrieved from other EDP systems (for example, SAP).

As the user interface of SoftDLC 2.0 and the system drivers can be adapted and configured to individual requirements, operation of the system is handy and extremely user-friendly. Help menus and instructions – configurable by the user - support the operating staff at the production line.



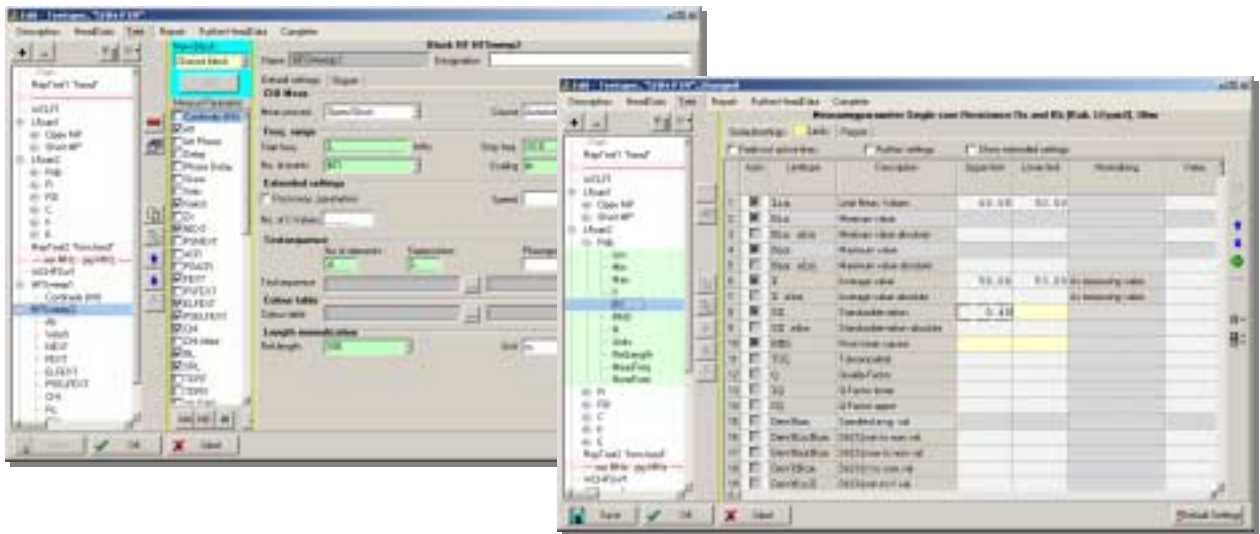
12 OptiTest XL 3.0 Professional

OptiTest XL 3.0 Professional is the comfortable measuring software for AESA and M.E.A. measuring devices.

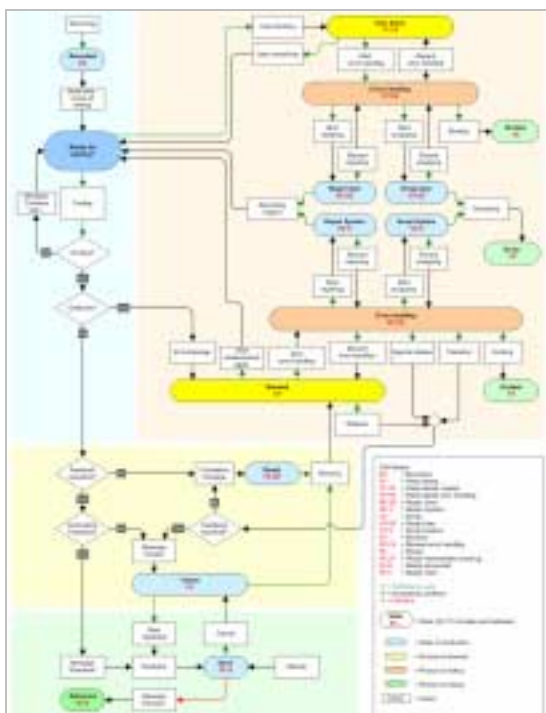
The core features of CIQ 3.0 comprise among others data evaluations as well as the connection of testing equipment and archiving functions.

A wide range of measurement modes are available, such as HF Sweep, HF Sweep(Alien), HF CKoax-50, HF Coax-75, HF fixed frequency, LF single cores, LF pairs, LF triple, LF quads, LCL, LCTL, TCL, TCTL, TI, AS, worst-case summaries for HF-Sweep / LF / HF discrete frequency, inductance and conductance.

Report generation is very easy. If set at default, a highly comprehensive report is generated, containing a limit case compilation with graphics and for each measuring block a separate summary with related graphics. It goes without saying that dedicated features for customized reports are also available.



13 InQDaS - Integrated Quality Data System



This optional module has been designed for the final inspection of a product. Building on the core functions of CIQ 3.0 QDM, it is possible to perform – on one product - several timely staggered tests per process step.

The module receives its tasks from the ERP system (e.g. SAP) and gives feedback about the testing status (partly inspected, blocked, to be scrapped, to be repaired, to be divided, inspection complete).

In the event of a defect, suitable measures are initiated by the system or the user (for example, defect messages in the defect acquisition and evaluation system; instructions for re-measuring, defect treatment or scrapping).

Individual labels and reports can be generated for each sample and production step. Total reports can be produced for a complete test order. Also broader, cross-task evaluations are possible.

14 Flexibility

A key feature of the CIQ 3.0 system is that it can be flexibly adapted to the conditions of the specific production lines. This flexibility is achieved through a series of tools comprising freely parameterizable software modules for customizing:

- test plans and test orders
- text in testing instructions
- reports for documentation purposes
- product labels and product documents
- statistical evaluations
- the data storage/archiving system
- process capability certificates
- screen masks
- the connection of measuring devices
- the individual adaptation to standards and specifications

To prevent unauthorized use, CIQ 3.0–QDM comprises comprehensive features for the administration of user privileges. Each user can be assigned individual access rights.

15 Tools

CIQ 3.0 QDM offers a wide range of different tools for most diverse tasks.

- Info Provides status information of the system in operation.
- Diagnosis Diagnosis of the communication (interfaces) with testing equipments.
- Editor File editor, e.g. for work instructions and formulas.
- TKE Screen mask editor.
- WEKAScript-Editor Editor for the testing of WEKAScript modules and expressions.
- Report generator Production of reports and labels.
- SuperSelection Expanded capabilities for data search.
- PDF generator Generates PDF files e.g. from reports.
- Special interfaces For communicating with testing equipment and other systems.
- DUSIS Distributed user information system
- Help Standard help and freely user definable help texts.

16 Archiving

CIQ 3.0 QDM includes functionalities for long-term storage of data, test plans and test orders within the system or on external storage media, such as CDs.

Data stored with older versions of CIQ 3.0 QDM can of course also be retrieved and evaluated by later versions. Some minor converting might be necessary.

Renewed data analyses in the event of complaints or as part of a product development process are possible at any time without much effort.



17 Systems Requirements

For use in a multi-PC environment, CIQ 3.0 is designed for client/server operation via TCP/IP or for direct access to the file server. Client/server operation requires the existence of a data server.

All workstation computers communicate via a single TCP/IP link with the data server. Generally any commercially available desktop PC using Windows 2000, Windows XP or Windows Vista can be used as a workstation computer. It is not necessary to upgrade existing workstation PCs to the latest state of the art.

18 Installation

The original installation and start-up of the system will be performed by AESa. New CIQ 3.0 software versions are offered on a regular basis and can be installed by the user. As the installation process is not complicated, on-site service by AESa is usually not required. However, if desired, AESa will take care of the installation. It goes without saying that all customer-specific configurations will remain unchanged.

Configurations incorporating data servers can be implemented such that new software versions will be installed exclusively on the server. All workstations within the network will be automatically updated when the program is started the next time.

CIQ 3.0 does not require any bulky external libraries. This largely prevents version problems caused by the installation of other programs.

19 Services

We offer you a wide ranging portfolio of services including:

- consultation
- specifications
- project management
- training
- integration
- turnkey projects
- turnkey planning and development of individual solutions
- service and support (e.g. support during running operation and software updates)

20 Service and Support

AESA offers optional service contracts. These provide the user the following benefits:

- Immediate use of the latest and interim program versions
- Provision of test licenses for testing and optimizing functionalities without affecting the “productive system”
- Up-to-the-minute documentations
- The latest help texts
- The latest standard report formats
- Troubleshooting support
- Preferential handling of upgrade requests in CIQ 3.0



AESA CORTAILLOD, Your Partner in Quality Assurance

AESA CORTAILLOD develops and supplies measurement systems for electrical and mechanical testing procedures as well as a quality assurance software for the cable industry.

Today's AESA evolved from two enterprises:

- The Swiss AESA, founded in 1978, has its origins in the field of laboratory cable measurement technology.
- Established in 1979 in Wipperfürth/Germany, M.E.A. Mauf und Rudow GmbH set new standards already in the 1990s with the development of the "CIQ 3.0" software solution, which made it possible for the first time to capture process and testing data in cable production across the various stages of the production chain and realize all-the-way-through quality assurance.

The joint product portfolio of the two companies today comprises automatic measuring systems for telecommunications, data and energy transmission cables. Apart from these, AESA develops special systems, for example for type approval and laboratory tests as well as monitoring of bending testers, drag chain systems and heating cabinets.

The company is headquartered in Colombier, Switzerland, and has two locations in Germany.

References

Products from the CIQ 3.0 family are in use at renowned companies throughout the world:

Nexans, Draka Transportation, Draka Comteq, Draka Industrial Cable, Leoni, Radio Frequency Systems, Twentsche Kabelfabriek, Bayka, Belden, Furukawa, Prysmian.

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