

**System Assessment Report**  
**Relating to Electronic Records and Electronic Signatures;**  
**Final Rule, 21 CFR Part 11**

**System: tiamo 1.3**

## 1 Procedures and Controls for Closed Systems

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
1.1	<a href="#">11.10 (a)</a>	Validation, IQ, OQ	Is the system validated?	O			<p>The operator is solely responsible for the validation of the system. The responsibility of the supplier lies in supplying systems which are capable of being validated. This is supported by the internal Metrohm quality control system which can be audited at any time.</p> <p>In this respect Metrohm offers a range of validation services: conformity certificates, prepared documentation for IQ and OQ, carrying out IQ and OQ at the operator's premises,...</p> <p>Standard methods for system validation are stored in the system.</p>
1.2	<a href="#">11.10 (a)</a>	Audit Trail, Change	Is it possible to discern invalid or altered records?	X			<p>All relevant operator entries are recorded in an automatically generated audit trail together with date, time with difference to UTC (Coordinated Universal Time) and user. This time is the client time. The administrator is responsible to assign the server time to the client system.</p> <p>In the report generator, the report can be defined in such a way that any altered results data (results) are indicated.</p> <p>For method alterations the altered version is saved in the database and a comment has to be entered. A version check is implemented for methods. This means that altered data of a method lead to a new entry (version) in the database.</p> <p>If the results data are changed (recalculation), all former versions are saved in the database and a comment has to be entered. A version check is implemented for determinations. This means that altered data lead to a new entry in the database.</p> <p>Invalid results can be recognized if limits have been defined. If these are infringed then it can be defined in the system if a message will be produced on the screen or on the report or will be sent by e-mail. Additionally it can be defined, of the determination should be cancelled.</p>

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
1.3	<a href="#">11.10 (b)</a>	Report, Printout, Electronic Record	Is the system capable of producing accurate and complete copies of electronic records on paper?	X			<p>Configurable reports can be printed out for determinations (results data). Alterations to the report configuration can be disabled for routine users.</p> <p>The automatic printout at the end of an analysis can be stipulated by system settings in the system. In this way it can be ensured that the operator of the system can reliably follow any alteration, overwriting or deletion of the data of a determination.</p> <p>Each printout is accompanied by a time stamp giving information about the time with difference to UTC (Coordinated Universal Time).</p>
1.4	<a href="#">11.10 (b)</a>	Report, Electronic Record, FDA	Is the system capable of producing accurate and complete copies of records in electronic form for inspection, review, and copying by the FDA?	X			<p>All data are stored as an encrypted XML-file.</p> <p>The automatic data export at the end of an analysis can be stipulated by system settings in the instrument. In this way it can be ensured that the operator of the system can reliably follow any alteration, overwriting or deletion of the data of a determination.</p>
1.5	<a href="#">11.10 (c)</a>	Electronic Record, Retention Period, Archiving	Are the records readily retrievable throughout their retention period?	O			<p>The operator is solely responsible for storage/archiving.</p> <p><i>tiamo</i> can be installed as a local server or as a client version. The system can permanently store the data in the <i>tiamo</i> database or by using an archiving system on the computer or on a network drive or on paper. The database has an automatic backup function.</p> <p>The data on the data carrier is encrypted and provided with a checksum. In this way it is protected against accidental and improper alteration. Alterations are recognized by the system. The contents can be read out at any time by the <i>tiamo</i> Software.</p> <p>The method used for archiving data together with the data to be archived must be defined by the operator. Interfaces for archiving (XML-files) are present in the system.</p>

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
1.6	<a href="#">11.10 (d)</a>	Login, Access Protection, Authorization User, Administrator	Is the system access limited to authorized individuals?	X			<p>The system is provided with a login system with an unlimited number of profiles (access rights / user groups). The access rights for the single user groups can freely be defined by the administrator.</p> <p>The persons responsible for the system (Administrators) must ensure that only authorized persons are assigned rights of access.</p> <p>All changes in the access rights are recorded in the audit trail.</p>
1.7	<a href="#">11.10 (e)</a>	Audit Trail, Electronic Record, Operator Entries	Is there a secure, computer generated , time stamped audit trail that records the date and time of operator entries and actions that create, modify, or delete electronic records?	X			<p>All relevant operator entries are recorded in an automatically generated audit trail together with date, time with difference to UTC and user.</p>
1.8	<a href="#">11.10 (e)</a>	Electronic Record, Overwriting data, Change	Upon making a change to an electronic record, is previously recorded information still available (i.e., not obscured by the change)?	X			<p>Yes, a new version is automatically created, if data is changed and saved.</p>
1.9	<a href="#">11.10 (e)</a>	Audit Trail, Retention Period	Is an electronic record's audit trail retrievable throughout the record's retention period?	X			<p>As long as the audit trail has not been deleted it persists. The disk space is the limiting factor here. The audit trail can only be deleted after it has been archived.</p> <p>The operator is solely responsible for storage of the archived audit trail.</p>
1.10	<a href="#">11.10 (e)</a>	Audit Trail, FDA, Inspection	Is the audit trail available for review and copying by the FDA?	X			<p>The audit trail can be exported as text file. Thus it is available in electronic form and on paper. Furthermore a protected audit trail can be generated in form of a PDF file.</p>
1.11	<a href="#">11.10 (f)</a>	Sequence of steps, Plausibility Check, Devices	If the sequence of system steps or events is important, is this enforced by the system (e.g., as would be the case in a process control system)?	X			<p>Plausibility checks are carried out by the system when a determination is started, for example, a check is made whether all the necessary instruments are present.</p> <p>The determination sequence is programmed in the method and must be strictly observed.</p> <p>The observation of the sequence is supported by the use of sample assignment table and automatic sample data request. Only those functions that can actually be carried out are accessible.</p>

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
1.12	<a href="#">11.10 (g)</a>	Login, Access Protection, Authorization, User, Administrator	Does the system ensure that only authorized individuals can use the system, electronically sign records, access the operation, or computer system input or output device, alter a record, or perform other operations?	X			<p>The user can be identified by the login function. (The person responsible for the system (Administrator) must ensure that only authorized persons are assigned rights of access.) The Administrator function can be clearly separated from user roles, see also 11.10 (d), No. 1.6.</p> <p>Methods and determinations can be signed and therefore can be electronically released. There are two signature levels. The system demands that the reviewing and the releasing person are not the same.</p>
1.13	<a href="#">11.10 (h)</a>	Balance, Connection, Terminals, Input data, Devices	<p>Does the system control validity of the connected devices?</p> <p><i>If it is a requirement of the system that input data or instructions can only come from certain input devices (e.g., terminals) does the system check the validity of the source of any data or instructions received? (Note: This applies where data or instructions can come from more than one device, and therefore the system must verify the integrity of its source, such as a network of weigh scales, or remote, radio controlled terminals).</i></p>	X			<p>During the IQ all the connected instruments are entered in the list of devices and subsequently checked.</p> <p>Metrohm instruments are recognized, their validity is checked and they are entered in the list of devices.</p> <p>Balance: the configuration of the balance is stored in the system. In order to check that the correct balance is actually connected the operator must carry out an IQ after a system installation or alteration. The obtained data is checked for the correct identification and the position of the weight in the character sequence. No further check of the contents is possible.</p> <p>Validation of the connected devices is carried out within the framework of the system validation (see also 11.10 (a), No. 1.1).</p>
1.14	<a href="#">11.10 (i)</a>	Training, Support, User, Administrator	Is there documented training, including on the job training for system users, developers, IT support staff?	O			<p>The operator is responsible for training.</p> <p>Metrohm offers standard training courses for all application sectors. Individual training courses can be specially arranged.</p> <p>Metrohm's product developers and service personnel receive further training at regular intervals.</p>
1.15	<a href="#">11.10 (j)</a>	Policy, Responsibility, Electronic Signature	Is there a written policy that makes individuals fully accountable and responsible for actions initiated under their electronic signatures?	O			<p>If an electronic signature is used then the operator must have a policy in which the equality of handwritten and electronic signatures is made clear.</p>

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
1.16	<a href="#">11.10 (k)</a>	Documentation, Distribution of Documentation, Access to Documentation, System Documentation, Logbook, Manuals	Is the distribution of, access to, and use of systems operation and maintenance documentation controlled?	O			The system has a comprehensive online help system that supports the user and the service personnel. Distribution of paper-based documentation is the responsibility of the operator.
1.17	<a href="#">11.10 (k)</a>	SOP, Documentation, Manuals, System Documentation, Audit Trail , Logbook	Is there a formal change control procedure for system documentation that maintains a time sequenced audit trail for those changes made by the pharmaceutical organization?	O			Supported by clear system assignment and version of the documentation. However, the operator must maintain a device logbook and note any alterations to the documentation and software. Forms for these documents are supplied by Metrohm.

## 2 Additional Procedures and Controls for Open Systems

run no.	Ref.	Topic	Question	Yes	No	partly	Comments
2.1	<a href="#">11.30</a>	Data, Encryption, Data Transfer	Can methods and determinations be sent securely to another system? Is data encrypted?	X			The data is stored as a file, encrypted and provided with a checksum. This means that the data is protected against unauthorized alteration. If an alteration is made then the data is unusable. If faulty data is transferred to a different system this will also be recognized.
2.2	<a href="#">11.30</a>	Electronic Signature	Are digital signatures used?	X			Methods and determinations can be signed and therefore electronically released. There are two signature levels. The system demands that the reviewing and the releasing person are not the same.

## 3 Signed Electronic Records

run no.	Ref.	Topic	Question	Yes	No	partly	Comments
3.1	<a href="#">11.50</a>	Electronic Signature	Do signed electronic records contain the following related information? - The printed name of signer - The date and time of signing - The meaning of the signing (such as approval, review, responsibility)	X			In case of methods and determinations all signatures contain the full name of the signer, date, time of signing and the reason for signing (from a selection list). Additionally, with the signature, a comment can be entered which is saved with the electronic signature. User data and the audit trail do not have to be signed and therefore are not signed.
3.2	<a href="#">11.50</a>	Electronic Signature	Is the above information shown on displayed and printed copies of the electronic record?	X			The report on the screen and on the printout contains complete signature data.
3.3	<a href="#">11.70</a>	Electronic Signature	Are signatures linked to their respective electronic records to ensure that they cannot be cut, copied, or otherwise transferred by ordinary means for the purpose of falsification?	X			The signature is inseparably linked to the method or determination. Therefore falsifying is impossible. The user information are completely assumed in the signature. By exposition of the signature, these information are always readable in plaintext.

## 4 Electronic Signature (General)

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
4.1	<a href="#">11.100 (a)</a>	Electronic Signature	Are electronic signatures unique to an individual?	X			Yes, by unique relation within the system between user name and individual. It must be assured, at operational level, that user names are only used once.
4.2	<a href="#">11.100 (a)</a>	Electronic Signature	Are electronic signatures ever reused by, or reassigned to, anyone else?	O			A used login name is assigned to a person. It must be assured, at operational level, that this login name is not assigned to another person. A reactivation is not concerned.
4.3	<a href="#">11.100 (a)</a>	Electronic Signature	Does the system allow the transfer of the authorization for electronic signatures?	O			Proxy persons have to be appointed by the administrator. Rules at operational level are required.
4.4	<a href="#">11.100 (b)</a>	Electronic Signature	Is the identity of an individual verified before an electronic signature is allocated?	O			By the course of the application it has to be assured, at operational level, that the person that applies is the correct person.

## 5 Electronic Signatures (Non-biometric)

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
5.1	<a href="#">11.200 (a) (1)(i)</a>	Electronic Signature	Is the signature made up of at least two components, such as an identification code and password, or an id card and password?	X			Yes.
5.2	<a href="#">11.200 (a) (1)(ii)</a>	Electronic Signature	When several signings are made during a continuous session, is the password executed at each signing? (Note: both components must be executed at the first signing of a session).	X			The password has to be entered with each signature.
5.3	<a href="#">11.200 (a) (1)(iii)</a>	Electronic Signature	If signings are not done in a continuous session, are both components of the electronic signature executed with each signing?	X			The identification code and the password has to be entered with each signature.
5.4	<a href="#">11.200 (a) (2)</a>	Electronic Signature	Are non-biometric signatures only used by their genuine owners?	O			The operator has to ensure that a user only uses his own signature.

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
5.5	<a href="#">11.200 (a) (3)</a>	Electronic Signature, Falsify Electronic Signature	Would an attempt to falsify an electronic signature require the collaboration of at least two individuals?	X			Yes.

## 6 Electronic Signatures (biometric)

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
6.1	<a href="#">11.200 (b)</a>	Electronic Signature, Biometric Electronic Signature	Has it been shown that biometric electronic signatures can be used only by their genuine owner?	N/A			No biometric electronic signature.

## 7 Controls for Identification Codes and Passwords

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
7.1	<a href="#">11.300 (a)</a>	Identification Code, Uniqueness, Password, Identification, Login, Access Protection	Are controls in place to maintain the uniqueness of each combined identification code and password, such that no individual can have the same combination of identification code and password?	X / O			<p>The system ensures that each identification code (user name) is only used once within the system; similarly a combination of identification code and password can only occur once. Name alterations must be organizationally managed by the operator!</p> <p>The system can be run as a client server system. So it is assured that the identification codes are identical in all clients. It is recommended that unambiguous identification codes (e.g. personnel number or initials) covering all systems are used throughout the whole organization.</p> <p>In general it is recommended that guidelines are drawn up for the whole organization in which the creation of user accounts and the use of passwords (length, period of validity,...) are defined.</p>

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
7.2	<a href="#">11.300 (b)</a>	Identification Code, Password, Validity, Identification, Login, Access Protection	Are procedures in place to ensure that the validity of identification codes is periodically checked?	O			The operator is responsible for checking the identification codes.
7.3	<a href="#">11.300 (b)</a>	Password, Validity, Password Expiry, Identification, Login, Access Protection	Do passwords periodically expire and need to be revised?	X			The period of validity for the password can be defined by the Administrator. Values between 30 and 90 days are advisable. A long period of validity represents a security risk. A period of validity which is too short means that the user must frequently remember a new password and may write it down. The system saves the password history and therefore a reuse of passwords is impossible.
7.4	<a href="#">11.300 (b)</a>	Identification Code, Password, Validity, Disable User Access, Identification, Login, Access Protection	Is there a procedure for recalling identification codes and passwords if a person leaves or is transferred?	O			The method must be defined by the operator. The Administrator can remove the corresponding user in the system. This user is still stored in the system in the group called "removed users" but without any access rights.
7.5	<a href="#">11.300 (c)</a>	Identification Code, Password, Validity, Disable User Access, Identification, Login, Access Protection, Loss of ID card	Is there a procedure for electronically disabling an identification code or password if it is potentially compromised or lost?	O			The method must be defined by the operator. The Administrator can remove the corresponding user in the system. This user is still stored in the system in the group called "removed users" but without any access rights.
7.6	<a href="#">11.300 (d)</a>	Unauthorized Use, Login, Access Protection	Is there a procedure for detecting attempts at unauthorized use and for informing security?	X			After n incorrect attempts (the number can be defined by the Administrator) a message is produced saying that the maximum number of unsuccessful login attempts has been reached and the user is disabled. A corresponding message can be sent by e-mail to the management.
7.7	<a href="#">11.300 (d)</a>	Unauthorized Use, Login, Access Protection	Is there a procedure for reporting repeated or serious attempts at unauthorized use to management?	O			A method for reporting such attempts to the management must be defined by the operator.  After n incorrect attempts a message is produced saying that the maximum number of login attempts has been reached and the user is disabled. A corresponding message can be sent by e-mail to the management.

run no.	Ref.	Topic	Question	Yes	No	part-ly	Comments
7.8	<a href="#">11.300 (c)</a>	Loss of ID card, ID card, Unauthorized Use, Access Protection	Is there a loss management procedure to be followed if a device for identification (e.g. ID card) is lost or stolen?	N/A			A hardware for identification is not provided.
7.9	<a href="#">11.300 (c)</a>	Loss of ID card, Electronically Disabling ID card, ID card, Unauthorized Use, Access Protection	Is there a procedure for electronically disabling a device if it is lost, or stolen, or potentially compromised?	N/A			A hardware for identification is not provided.
7.10	<a href="#">11.300 (c)</a>	ID card, Access Protection	Are there controls over the issuance of temporary and permanent replacements?	N/A			A hardware for identification is not provided.
7.11	<a href="#">11.300 (e)</a>	Testing of ID cards, ID card, Access Protection	Is there initial and periodic testing of tokens and cards?	N/A			A hardware for identification is not provided.
7.12	<a href="#">11.300 (e)</a>	Modification of ID cards, ID card, Unauthorized Use, Access Protection	Does this testing check that there have been no unauthorized alterations?	N/A			A hardware for identification is not provided.

O = The operator is responsible.

N/A = Not Applicable

A physical audit has been performed on the base of the Version tiemo 1.3 on the 02.03.2004. According to Metrohm Ltd., the implemented changes in the current version are not relevant regarding 21 CFR Part 11. Therefore, the initial physical audit has been renounced, this is scheduled for december 2008.

## 8 Indices

### Reference to the page number:

#### A

Access Protection .....	4, 5, 9, 10, 11
Access to Documentation.....	6
Administrator .....	4, 5
Archiving .....	3
Audit Trail .....	2, 4, 6
Authorization .....	4, 5

#### B

Balance .....	5
Biometric Electronic Signature .....	9

#### C

Change.....	2, 4
Connection .....	5

#### D

Data.....	7
Data Transfer .....	7
Devices .....	4, 5
Disable User Access .....	10
Distribution of Documentation .....	6
Documentation .....	6

#### E

Electronic Record .....	3, 4
Electronic Signature .....	5, 7, 8, 9
Electronically Disabling ID card .....	11
Encryption .....	7

#### F

Falsify Electronic Signature .....	9
FDA.....	3, 4

#### I

ID card .....	11
Identification.....	9, 10
Identification Code .....	9, 10
Input data .....	5
Inspection .....	4
IQ2 .....	

#### L

Logbook .....	6
Login .....	4, 5, 9, 10
Loss of ID card .....	10, 11

#### M

Manuals .....	6
Modification of ID cards .....	11

#### O

Operator Entries.....	4
OQ .....	2
Overwriting data .....	4

#### P

Password .....	9, 10
Password Expiry .....	10

Plausibility Check .....	4
Policy .....	5
Printout .....	3

#### R

Report.....	3
Responsibility .....	5
Retention Period.....	3, 4

#### S

Sequence of steps .....	4
SOP .....	6
Support.....	5
System Documentation .....	6

#### T

Terminals.....	5
Testing of ID cards .....	11
Training .....	5

#### U

Unauthorized Use.....	10, 11
Uniqueness.....	9
User.....	4, 5

#### V

Validation.....	2
Validity .....	10

**Reference to the run number of the entry:****A**

Access Protection .... 7.12 7.11 7.10 7.9 7.8 7.7 7.6  
7.5 7.4 7.3 7.2 7.1 1.12 1.6  
Access to Documentation..... 1.16  
Administrator ..... 1.14 1.12 1.6  
Archiving ..... 1.5  
Audit Trail ..... 1.17 1.10 1.9 1.7 1.2  
Authorization ..... 1.12 1.6

**B**

Balance ..... 1.13  
Biometric Electronic Signature ..... 6.1

**C**

Change..... 1.8 1.2  
Connection ..... 1.13

**D**

Data..... 2.1  
Data Transfer ..... 2.1  
Devices ..... 1.13 1.11  
Disable User Access ..... 7.5 7.4  
Distribution of Documentation ..... 1.16  
Documentation ..... 1.17 1.16

**E**

Electronic Record ..... 1.8 1.7 1.5 1.4 1.3  
Electronic Signature 6.1 5.5 5.4 5.3 5.2 5.1 4.4 4.3  
4.2 4.1 3.3 3.2 3.1 2.2 1.15  
Electronically Disabling ID card ..... 7.9

Encryption ..... 2.1

**F**

Falsify Electronic Signature ..... 5.5  
FDA..... 1.10 1.4

**I**

ID card ..... 7.12 7.11 7.10 7.9 7.8  
Identification..... 7.5 7.4 7.3 7.2 7.1  
Identification Code ..... 7.5 7.4 7.2 7.1  
Input data ..... 1.13  
Inspection ..... 1.10  
IQ1.1

**L**

Logbook ..... 1.17 1.16  
Login ..... 7.7 7.6 7.5 7.4 7.3 7.2 7.1 1.12 1.6  
Loss of ID card ..... 7.9 7.8 7.5

**M**

Manuals ..... 1.17 1.16  
Modification of ID cards ..... 7.12

**O**

Operator Entries..... 1.7  
OQ ..... 1.1  
Overwriting data ..... 1.8

**P**

Password ..... 7.5 7.4 7.3 7.2 7.1  
Password Expiry ..... 7.3

Plausibility Check ..... 1.11  
Policy ..... 1.15  
Printout ..... 1.3

**R**

Report ..... 1.4 1.3  
Responsibility ..... 1.15  
Retention Period ..... 1.9 1.5

**S**

Sequence of steps ..... 1.11  
SOP ..... 1.17  
Support ..... 1.14  
System Documentation ..... 1.17 1.16

**T**

Terminals ..... 1.13  
Testing of ID cards ..... 7.11  
Training ..... 1.14

**U**

Unauthorized Use ..... 7.12 7.9 7.8 7.7 7.6  
Uniqueness ..... 7.1  
User ..... 1.14 1.12 1.6

**V**

Validation ..... 1.1  
Validity ..... 7.5 7.4 7.3 7.2