National Type Evaluation Program (NTEP)
2023 Software Sector Meeting Agenda

September 20th – 21st, 2023 / Milwaukee, WI
Day 1 in conjunction with the NTEP Measuring Sector

INTRODUCTION

The charge of the National Type Evaluation Program (NTEP) Software Sector is important in providing appropriate type evaluation criteria for software-based weighing or measuring device based on specifications, tolerances and technical requirements of *NIST Handbook 44* Section 1.10 General Code, Section 2 for weighing devices, Section 3 for liquid and vapor measuring devices, and Section 5 for taximeters, grain analyzers, and multiple dimension measuring devices. The sector's recommendations are presented to the NTEP Committee each January for approval and inclusion in *NCWM Publication 14 Technical Policy, Checklists, and Test Procedures* for national type evaluation.

The sector is also called upon occasionally for technical expertise in addressing difficult *NIST Handbook 44* issues on the agenda of the National Conference on Weights and Measures (NCWM) Specifications and Tolerances (S&T) Committee. Sector membership includes industry, NTEP laboratory representatives, technical advisors and the NTEP Administrator. Meetings are held annually, or as needed and are open to all NCWM members and other registered parties.

Suggested revisions are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be non-retroactive are printed in ***bold faced italics***.

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Table B
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
BIML	International Bureau of Legal Metrology	OIML	International Organization of Legal Metrology
CC	Certificate of Conformance	OWM	Office of Weights and Measures
EPO	Examination Procedure Outline	PDC	Professional Development Committee
NCWM	National Conference on Weights and Measures	S&T	Specifications and Tolerances Committee
NIST	National Institute of Standards and Technology	SMA	Scale Manufacturers Association
NTEP	National Type Evaluation Program	WELMEC	European Cooperation in Legal Metrology

Details of All Items
(In order by Reference Key)

WELCOME

Since the Software Sector meeting is a joint meeting with the Measuring Sector, some time will be allocated to meet and greet both new and familiar faces.

STATUS REPORTS – RELATED NCWM AND INTERNATIONAL ACTIVITY

Attendees of the 2023 NCWM Interim and Annual Meeting are asked to share any relevant comments or discussion that took place during the open hearings, or the NCWM standing committee working sessions or voting sessions. Results related to items on our Agenda will be of particular focus.

Dr. Katya Delak and Mr. Jan Konijnenburg from NIST OWM, will provide a synopsis of international activity that relates to the work of the sector. (See appendix B)

JOINT SESSION PROGRESS REPORT, ACTIVE ITEMS OF MUTUAL INTEREST

This is the third joint meeting of these groups. To make sure we make the most of the time a quick review of the agenda items from both Sectors will be held to identify those that require collaboration, so all participants have a solid foundation for discussion. As part of this review, items of importance or interest should be allocated more time during the joint session day.

CARRY-OVER ITEMS

1. Software Identification / Markings

Source:
NTEP Software Sector

Background:
See the 2022 Software Sector Meeting Summary for more background on this item.

The bulk of the work on this item resulted in the final, amended proposal for a modification to G-S.1. being accepted as a Voting item at the 2016 Interim meeting, which was adopted at the 2016 Annual Meeting The current G-S.1 reflects the Sector-recommended language. The non-retroactive date was 2021, so the current language is applicable to all devices placed into service as of this year.

The item remains on the agenda since there was additional discussion regarding a secondary goal - if we can alter G-S.1.e. sufficiently, we may be able to eliminate G-S.1.1. Darrell Flocken recommended that we begin working on this item prior to 2022 given that it may take some time for others to accept any changes we propose.

G-S.1.1. Location of Marking Information continues to use the terminology “Not-Built-For-Purpose”. We would prefer to reduce the usage of that term and “Built-For-Purpose” (or eliminate them altogether). Those categories continue to blur as time goes by. It was acknowledged that it is always more difficult to alter the general code.

Darrell Flocken recommends that we plan a review of the contents of HB44 to verify that it correctly reflects our understanding of the intent. From there, we can clarify matters within Pub. 14, potentially within a checklist. Then we can come back to determine whether any changes are needed to HB44. Jim Pettinato expressed concern that eliminating differences between Not-Built-For-Purpose and Built-For-Purpose will require significant modification, rather than a simple tweaking of G.S.1.

G-S.1.1. effectively provides exceptions to some of the requirements for hard marking of a limited class (software). Specifically, it provides an exception to the required marking of serial number. If G-S.1. had an exception added, similar to what is now in G-S.1.1., that may forge a path toward accomplishing what we hope to achieve.

While having the terms Built-For-Purpose and Not-Built-For-Purpose isn’t ideal, the changes that have already been made, implemented January 2022, have resulted in a huge improvement. Darrell Flocken confirmed that displaying CC numbers is becoming much more common. He sees them frequently in the field (e.g. grocery store scale software).

At the 2022 meeting, there weren’t any substantive objections to tabling this agenda item for later consideration. It seems at this time that the effort to make changes would possibly be contentious and may not provide any significant benefit, and we should continue to work on the Software Policy document as a priority.

2. Software Protection / Security

Source:
NTEP Software Sector

Background:
See the 2022 Software Sector Summary for additional background on this item.

The Sector continued to develop a proposed checklist for *NCWM Publication 14*. The numbering will still need to be added. This is based roughly on R 76 – 2 checklist and discussions beginning as early as the October 2007 NTEP Software Sector Meeting. The information requested by this checklist is currently voluntary, however, it is recommended that applicants comply with these requests or provide specific information as to why they may not be able to comply. Based on this information, the checklist may be amended to better fit with NTEP's need for information and the applicant's ability to comply.

The California, Maryland and Ohio laboratories agreed to use this check list on one of the next devices they have in the lab and report back to the sector on what the problems may be. In February 2011, the North Carolina laboratory was also given a copy of the check list to try.

The labs using this checklist on a trial basis indicated that there was some confusion as to versions/wording. There may be more than one version in circulation. The version shown in Appendix A of the Software Policy shall be used henceforth.

The bulk of the feedback to date has been that the checklist needs some guidance to complete. Once the Sector has satisfactorily included language within Pub. 14 to address this point, we will consider this agenda item finalized.

Jim Pettinato and Darrell Flocken both expressed the opinion that these recommendations and information regarding software separation do not constitute a marking requirement. G-S.1. already includes a marking requirement for a version / revision.

This wording or something similar has already been incorporated into Pub. 14's for the various sectors, prior to the creation of the Software Policy document. Eventually Darrell Flocken will have to go back and convince the other sectors to remove the redundant wordage from their Pub. 14s.

Some of the existing Publication 14 sections already have some language included that discusses software separation as an option, and how the software identifier should be tied to the software itself. The only Pub 14 that doesn't have redundant wordage is that of the Measuring Sector. Since we are working on expounding on these concepts and including them in the new Software Policy section of Publication 14, it may become redundant.

Once the Conference adopts the Software Policy document, we can review, modify and/or enhance the requirements for software security within that document moving forward. The language in other Publication 14 sections that will be redundant can be removed at their convenience.

3. NTEP Application for Software and Software-based Devices

Source:
NTEP Software Sector

Background:
See the 2022 NTEP Software Sector Meeting Summary for additional history on this agenda item.

The purpose of initiating this item was to identify issues, requirements and processes for type approving device applications, specifically for not-built-for-purpose software since it is now explicitly allowed. It was suggested that it may be useful to the labs to devise a separate submission form for software for these applications. What gets submitted? What requirements and mechanisms for submission should be available? Validation in the laboratories - all required subsystems shall be included to be able to simulate the system as installed.

Historically, requirements for software-only applications haven't been as high as requirements for software applications that include hardware. The number of software-only applications has increased dramatically over the last few years.

Darrell Flocken asked the NTEP lab evaluators in attendance what they need from the Software Sector to help them interpret the documentation they will receive from the manufacturers in response to this requirement.

There was discussion regarding methods of sealing, how field inspectors recognize software changes, as well as what requires reevaluation by NTEP. Feedback from the field is that there is interest in removing the acceptance of the "or higher" terminology from NTEP policy. The pushback on that is the cost, of course. There's also the issue that it typically results in delays in getting critical software updates to the field. Darrell Flocken said that a software bug fix doesn't necessarily require reevaluation; he used an example of fixing "keyboard tare" in a system that has a bug.

Darrell Flocken says that he needs a specific software application that identifies the critical parameters. Then he can work on the NTEP policy, and add options for cheaper modifications of the certificate pertaining to software upgrades. Currently the Grain Analyzer Sector has both Phase 1 (new equipment) and Phase 2 (parameter updates) reevaluations. There are also technical and nontechnical changes that have differently priced reevaluations. The latter is primarily a paperwork exercise.

The checklist covers some of this, but a list of particular software-specific sealable parameters would be better. Jim Pettinato pointed out that the list of sealable parameters is currently based upon the device type, not something solely isolated to software. Darrell Flocken receives a lot of questions regarding what is sealable in software.

Vere Miller pointed out that agile methodology and the push to produce software changes quickly makes any delay introduced based upon reevaluation undesirable to manufacturers.

Can VCAP address any of these issues? It analyzes procedures. If software changes meet ISO 9001, that indicates that the processes are consistent. This could become part of the VCAP audit. The next step would be review of the audit trail.

Pub 14 contains the technical policy and the checklist. The technical policy can include the information necessary to determine how to obtain a certificate and maintain it. Darrell Flocken suggested reviewing the Weighing Sector's technical policy as a sample of how to address this issue.

Darrell Flocken showed the Sector an example of the technical policy from Digital Electronic Scales. The very first section after the Amendments is the Technical Policy. Currently our Pub 14 is entitled "Software Technical Policy." It seems we should change our title. In the example they have a section on models to be considered and conformance parameters. It can include what they will look for and how it will be looked for. What will be evaluated? Later it has

a description of what the CC will apply to (e.g. all models having x, y, and z). We reviewed a Scale Application. Our application should indicate what hardware needs to be supplied by the manufacturer. It may make a lot of sense to test at the manufacturer's site because all the necessary hardware should be available.

Would a Software Application be an addendum or a separate application? What about a Software Revision Application, assuming there's a lesser fee for it? It seems like the basic application covers the majority of what needs to be addressed, so software could be a new table/addendum supplementing existing applications. The problem with this approach is manufacturers of software-only applications. They tend to be confused when they try to fill out the entire application. We may need to spend some time outside this meeting reviewing existing applications.

Since the NTEP staff has the best understanding of the need, they have taken on the task of developing the draft application for software-specific submissions for type approval. The application for Electronic Cash Registers (either with Scales or Dispensers) seems quite similar to what is needed, so it may be a good starting point.

4. Training of Field Inspectors

Source:
NTEP Software Sector

Background:
See the 2022 NTEP Software Sector meeting summary for more background on this item.

At the 2022 meeting, Jim Pettinato shared an updated training presentation. It was noted that additional examples of certificates with instructions to access the software identifier and audit trail would be welcome. Chris Senneff volunteered to send Darrell Flocken / Jim Pettinato his certificate.

Tina Butcher suggested recording a webinar.

It was noted that any additional information received regarding specific examples of the implementation of features to support field inspection in real-world devices, will be incorporated into the work-in-progress presentation. If possible, we will arrange to have representation at the NTEP lab meeting as well.

At the 2022 meeting, this issue was revisited and additional comments were heard. For example, it was reported that problems often occur in the field due to the instructions on the CC no longer working. POS's and taxi meters are often particularly problematic. Feedback from the field is that giving manufacturers options isn't the best way to handle this; preferably they should only have one acceptable way to do it – or limit the options to only hard-marking or continuously display. Unfortunately, there are often limitations to what the manufacturers can do, so a one-size-fits-all approach is a problem as well. Jan Konijnenburg pointed out that if the instructions on the CC to access the needed information has changed, then the instrument is no longer in compliance with the certificate.

Jim Pettinato asked for additional volunteers to provide examples of how their CC documents how to access the information a field inspector needs.

Darrell Flocken advised that, given the purview of this sector, we should limit our approach to giving the field inspectors the tools they need to walk up to, for example, a POS system and be able to figure out whether it's running the correct software.

This circles back around to enhancing the training presentation further, e.g. collecting more examples from existing certificates with instructions for viewing version numbers and accessing audit trails, so training can be developed with specific real-world examples. Eric Wechselberger provided an example during the meeting. Updating the training presentation to reflect best practice and current issues will be an ongoing effort.

5. New Publication 14 Section specific to Software

Background:
See the 2021 NTEP Software Sector meeting summary for additional background.

For the past several years, the Sector has been working toward completing a new section of Publication 14 entitled NTEP Software Technical Policy, containing the following sections:

See the NTEP Software Sector Technical Policy draft document as circulated with the Agenda for the full content.

Darrell Flocken said that he'll review our Pub. 14 in detail over the next month to identify elements that do not currently have support in HB44. Subsequent to that, Jim Pettinato can work on a draft to address those concerns. Jan Konijnenburg suggested that the Pub. 14 Sections have references to HB44.

It was pointed out that the title of the document should not include the word 'Administrative'. Instead we will use the title 'Software Technical Policy'. The draft document title and header needs to change to Software Technical Policy. We'll edit it offline since the document has some editing issues.

Section 3 requires training, so that the labs all have a common understanding of what is needs. Darrell Flocken isn't certain that the third bullet point may imply that the NTEP evaluators will be reading a flowchart in detail. He thinks the labs might not be ready for that, and the evaluation process doesn't go that deep for now. That doesn't mean that we should remove the bullet point since it's beneficial to have the submitters ensure that they've thought about the issues.

Patrick Tilley asked about remote software upgrades. Darrell Flocken replied that the software upgrade would need to be recorded in the audit trail as an event log entry. Jan Konijnenburg explained the OIML approach used in Europe and how different countries can handle it differently. Ron Peasley also pointed out that it's device-specific in Europe, dependent on risk category.

Teri Gulke will ask her company's marketing if they can provide additional examples of potential icons to use to access the version number.

Jim Pettinato will make the identified edits to the draft Software Technical Policy and circulate to the Sector for comments.

During the 2022 Software Sector meeting, the group reviewed the current draft, and decided that the boilerplate text that was copied from the Administrative Policy should be removed from our Pub 14 and replaced by a reference to that document.

When discussing additional content that should be added to our Pub 14, Darrell Flocken suggested we add information regarding what to consider when upgrading software. For example, we could add guidance for sealing methodology, security, and unauthorized modification. We may not need to go into detail on audit trails, for example, since that's already addressed by NIST documentation. We can also discuss facilitation of fraud.

If we're satisfied that we're at about 75% complete, Darrell Flocken will post our draft to the website to obtain feedback.

NIST documentation on audit trails is available, but currently only via CD-ROM. Jim Pettinato thinks Tina Butcher recently provided a training class on audit trails. It would be interesting to learn what materials she used.

For detailed examples to put into Pub 14 Section 6, reference D31 6.2.6.1.

The group allocated the 2nd day of the meeting to furthering the content of the draft Pub 14 Software Policy document, with the goal of finalizing the draft for adoption At the end of the 2022 meeting, it was the general opinion of all that we'd made sufficient progress to move the Policy document forward to adoption.

NEW ITEMS

6. Investigate how to best address third party software-based devices that may or may not have the potential to modify metrologically significant information prior to generating recorded representation

Source:
Dmitri Karimov, Liquid Controls

Background:
This item was submitted in 2023 for potential discussion at both the Measuring and Software Sector meetings.

Synopsis of submission:

- Third-party (often hand-held) electronic devices that interact with electronics registers
- These devices take the transaction data from the register and might modify this information prior to printing
- There is not clarity in Pub 14 how these devices are to be evaluated and what these devices are permitted and not permitted to do
- We have many requests from third party vendors to write software for such third-party devices and we are not sure what info we are allowed to pass on to them and if they can manipulate measurement data prior to printing

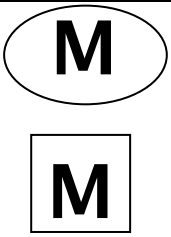
Discussion may revolve around specific examples of issues that have arisen, or concerns regarding the type approval or field verification of this type of software. What is the guideline for determining metrological significance?

7. Next Meeting

Background:
The sector is on a yearly schedule for NTEP Software Sector Meetings. Now that we've adopted a joint meeting system, the next Sector joint meeting will likely coincide with one of the remaining Sector meetings.

If we continue with our joint meetings, 2024 would be in conjunction with the Grain Analyzer sector.

Appendix A – Acceptable Menu Text/Icons for Weights Measures information

Permitted Menu Text examples	*Permitted Icon shape examples*	*Essential characteristics*
Information Info		Top level menu text or icon Icon text is a lower case “i” with block serifs Text color may be light or dark but must contrast with the background color Icon may have a circular border Activation of this menu text/icon may invoke a second level menu text/icon that recalls metrology information.
Help **?**		Top level menu text or icon Icon text is a question mark Text color may be light or dark but must contrast with the background color Icon may have a circular border Activation of this menu text/icon may invoke a second level menu text/icon that recalls metrology information.
Metrology Metrological Information		Top or second level menu text or icon Icon text is an upper case “M” Text color may be light or dark but must contrast with the background color Icon may have a circular, rectangular, or rounded rectangle border. If present, the activation of this menu text/icon must recall at a minimum the NTEP CC number.
NTEP Data N.T.E.P. Certificate		This one is debatable – what if the certificate is revoked? Does NTEP grant holders of CCs the right to display the logo on the device, or just in documentation?
Weights & Measures Info	W&M W/M	

Appendix B – NIST OWM Report on International Activity

2022 Software Sector Meeting Report

Status of OIML work on D31 (TC5/SC2/p4)
The second committee draft (2CD) of D31 has been issued for review. The comments period closes on October 25th. This follows the 2nd project group meeting, which took place in February.

The project (p4) is aimed at introducing sections that cover remote verification, the cases where artificial intelligence/machine learning or dynamic modules may be used by the software, and a new set of terms related to measurement-related data and metadata.

The new language on remote verification provides guidelines and cases where legal metrology software can be verified through a secure remote connection. This includes, for example, checking the identity, integrity and correctness of the software, and the examination of audit trails.

With regard to machine learning, the document makes allowances for changing of parameters used in legally relevant software, but dictates that there should be some indication that the software uses "dynamic modules", and that the measurement result was derived using these dynamic modules.

New terms introduced related to measurement data and metadata are included in an informative annex. While most of the terms are not used in the document, they are intended to clarify to readers the different associations between data used and collected during the measurement process and in the generation of the measurement result.

OIML Document D31 US National Working Group consists of Katya Delak, Jim Pettinato, Teri Gulke, Jan Konijnenburg, Joe Porthouse, and Todd Gray.

Digital NIST Project
NIST has kicked off a project aimed at the digitalization of calibration certificates and reference material certificates, such that they would be available in machine-readable formats (XML) to directly transfer calibration information to instruments. Human readable certificates would also be generated from these files.

The project is in the early stages and follows efforts in Europe that have already been initiated. A workshop is scheduled for September 28-29th. The first day will consist of plenary talks introducing the effort conceptually and setting the stage for working sessions the following day. The project needs stakeholder participation to succeed. Registration will be announced in the next few weeks, and interested parties are invited to attend.

OIML Digitalization Task Group
The OIML has initiated a Digitalization Task Group, which will aim at addressing the legal metrology aspects of digitalization. The vision of the project includes:

- Machine-readable certificates and reports;
- Machine-readable information that would also be available to interconnected devices relevant to the full range of activities relevant to quality infrastructure, including standardization, calibration, certification, market surveillance, accreditation, regulation;
- Common SI terminologies upon which interoperability is based;
- Use of digital twins for remote assessment of devices;
- Continuous quality and conformity assessment checks.

Early work may involve the development of a common understanding of topics and terms, outlining the role of metrology in digital transformation. The work will also be informed by ongoing work on smart standards taking place in IEC SG12.

Note that the IMEKO TC6 M4D Conference will take place 19-21 September. This conference will include a special session on the work of the OIML Digitalization Task Group.