

ISWM NEWS

AI AT THE WHEEL AND REDEFINING SAFETY IN TRUCKING



03 Coming Events	15 Event Photos - South Atlantic Meeting
04 President's Message	17 Essential Tips for Truck Drivers
05 New Members	21 Company News
07 AI & Service Management	26 How Low Can Temperature Go?
09 Taking care of Employees Beyond the Paycheck	28 Report from new ISWM S&T Committee
10 Digital Indicators for Electronic Scales	

ADVERTISER INDEX

Adam Equipment.....	12	Minebea.....	35
Anyload	28	Miracle Service/Nexent	06
Coti Global.....	08	National Scale Service	20
Intercomp	18	NCWM.....	25
Life & Safety Consultants, Inc.	03	Rice Lake	10
		Totalcomp, Inc.	23

International Society of Weighing & Measurement (or ISWM)

P.O. Box 296 • Danville, IL 61834 • United States

Ann Crowley

Executive Director

Work: 715-651-9123

Email: Ann@iswm.org



COMING EVENTS

Please visit [ISWM.org](https://iswm.org) (Home page for more details).

Please visit [ISWM.org](https://iswm.org) (home page for more details)

August 7, 2025

Central Northwest Great Lakes Meeting

Embassy Suites
7901 34th Ave South
Bloomington, Minnesota

October 3-4, 2025

South Atlantic Meeting

Beach Cove Resort
400 S. Ocean Blvd
N. Myrtle Beach, SC 29582

March 10-12, 2026

2026 Annual Conference

Doubletree By Hilton Hotel Sacramento
2001 Point West Way
Sacramento, CA 95815

March 9-11, 2027

2027 Annual Conference

Embassy Suites – Little Rock
11301 Financial Center Parkway
Little Rock, AK

Magazine Submittal Deadlines:

- ☐ **Winter:**
Editorial/Ads:
November 1, 2025

- ☐ The circle denotes the next available issue open for submissions.

2025 Advertising Contract is now on the website.
https://iswm.memberclicks.net/advertising_contract

NEW THIS YEAR: Classified Ads!
<https://iswm.memberclicks.net/classified>

For more information please contact:
staff@iswm.org

2025 Advertising Contract is now on the website.

https://iswm.memberclicks.net/advertising_contract

New this year: Classified Ads

<https://iswm.memberclicks.net/classified>

For more information please contact: staff@iswm.org

ISWM 2024/2025 Board of Directors

Executive Director

Ann Crowley

Administrative Assistant/Controller

Jennifer Fox

Executive Committee

President

Tammy Schmitz
Coast to Coast
Calibrations, Inc.

Vice President

Lloyd Holleman
Anyload, LLC

Past President

George Williamson
Greenville Scale
Company, Inc.

At-Large Members

Bill Ramey

Coti Global Sensors, Inc.

Tom Boughter

Maine Scale

Governors

Jim Perry Central Northwest

Alison Weiss Greater New York

Carlos Lares Ponce International

Jim O'Brien New England

Steve Dishon Potomac

Todd Fowler South Atlantic

John Hallak Western

International Society of Weighing & Measurement

No part of this newsletter may be reproduced, photocopied or copied without the express written permission of the *International Society of Weighing & Measurement* © 2023. Violations are subject to prosecution under federal copyright laws.

Mail goes to P.O. Box 296 • Danville, IL. 61834 • United States.

To contact Ann Crowley, call 715-651-9123 or email Ann@iswm.org.



PRESIDENT'S LETTER

By Tammy Schmitz

ISWM President 2024

July 1, 2025

Dear ISWM Members,

Hello everyone. I hope you are having a great year so far.

The 2026 annual Conference in Sacramento California March 10-12 planning is on its way. We have some exciting speakers that will be joining us. This year's theme will be:

Beyond Boundaries: Accelerating Scale Through AI, Advanced Tech, and Best-in-Class Operations

Look for information in this edition of the Magazine and in future months. If you have any suggestions or would like to join a committee for the 2026 Conference, contact staff@iswm.org.

I hope to see everyone in Sacramento, California on March 10-12 for the Conference. I know it will be a great time.

Thanks for the honor of being your President of the ISWM!

Tammy Schmitz | Coast to Coast Calibrations Inc
ISWM President 2024



NEW MEMBERS

Timothy Osborne

A2LA Workplace Training
5202 Presidents Ct, Ste 240
Frederick, Maryland 21703
PH 301-644-3209
Potomac

Tiffany Saucedo

Student

Nicole Spangler

Precision Solutions
2525 Tollgate Rd.
Quakertown, PA 18951
PH 215-536-4400
Potomac

Company Type

New_Member Name

Company Name

Street Address

City/Town, State Zip

Phone Number

newmemberemail@server.com

Chosen Division

Company Type

New_Member Name

Company Name

Street Address

City/Town, State Zip

Phone Number

newmemberemail@server.com

Chosen Division

Company Type

New_Member Name

Company Name

Street Address

City/Town

Phone Number

newmemberemail@server.com

Chosen Division

Company Type

New_Member Name

Company Name

Street Address

City/Town, State Zip

Phone Number

newmemberemail@server.com

Chosen Division

NOTE:

We have plenty of room for new members!
And you know who they should be -
so please encourage them to join today!

Point them to our website:
www.ISWM.org or have them contact
Ann Crowley at: Ann@iswm.org

CHANGE OF ADDRESS NOTIFICATION EFFECTIVE IMMEDIATELY

We are pleased to inform you of our updated mailing address. Please make a note of the new address for all future correspondence:

**ISWM
P.O. Box 296
Danville, IL 61834**

This change ensures that we can continue to serve you efficiently and maintain the highest standards of communication.

Thank you for updating your records accordingly.

Your Business Runs on Precision.

So Should Your Service Management.

No juggling paperwork or missing deadlines. Our integrated solution automates scheduling, inventory, service billing and certificate management—allowing you to focus on delivering top-tier service. Keep your technicians efficient, your clients satisfied, and your business fully compliant, all with one complete system.

Get the power of automation to ensure accuracy at every step, eliminate manual errors, and optimize efficiency. Precision drives your business—now let it elevate your service management.

Schedule your Demonstration Today.

GetCerts.com | 1-866-463-9368

MIRACLESERVICE
Weights and Measures Edition



AI & Service Management

by Richard Bertrand, Peninsula Manufacturing and Mark and Michael Hilton, Ninja Concepts

How many questions do you have to answer from new technicians before they become self-sufficient? Do you have days that you have plans to tackle a project and never touch it because of all the interruptions you had that day?

How much of the time do you rely on the manufacturer tech support? Does that affect your reputation because techs are always calling for tech support with all the different products in the weighing industry?

Are you working ON your business or are you working IN your business?

There may be a solution to all this by utilizing AI to develop system support! What are you currently using in your office to find all the tribal knowledge technicians need? Do you know where the documents exist? Or is there even a document on how to do what you need to do? If you do not have the knowledge, who does? What if everyone had the opportunity to access all the knowledge needed to do their jobs?

Today, if someone needs something they may google the information. If they



do not find it, someone else may. It is all in how the search is done. Many times, the tech is trying to find information while the customer is watching.

What the industry needs is a focused data set. Who would benefit from this? Employees would have the right tools

and timely knowledge to get their jobs done. Business owners would be able to focus on the business, not guiding technicians all day long. Employee retention could be improved and reduce overall training time. Manufacturing Tech support would benefit from reduced calls and more knowledgeable dealers.

Mark and Michael Hilton may have a solution for us. Ninja Concepts is a company that can help us narrow our AI assistance programs to a specific data group that would be provided by industry. The chat would use a small SLM (language module) that would talk in the language or accent spoken. Provide data spoken or written, supply drawings as needed pulled from the data source. Quicker response than a human can pull a manual and look up the information. The chat would list and ask questions to solve the problem.

ISWM is creating a committee to see how we can accomplish this goal.

Coti Global Sensors

Weighing Products Worldwide



Searching for a hard-to-find load cell?



We can help with that.

With years of knowledge and experience in the weighing industry, our team can help you cross-reference load cells, select the right parts for your application, and even repair load cells you already have.

**CONTACT
US TODAY**

866.762.2684
sales@cotiglobal.com
www.cotiglobal.com

Taking care of Employees Beyond the Paycheck

Stacy Moore, Michelli Weighing & Measurement



Employees come to work to get paid, however it is a balancing act to keep employees happy and motivated beyond the paycheck. Companies offer benefits, 401k's and time off, but the main idea is to keep employees feeling welcome and appreciated.

Companies need to create a culture. When you think of the time that you spend on a job, normally forty (40) hours a week, you may spend more time at work than you do with your family at home. All employees must balance their time – time outside of work, and time inside at work.

Companies need to invest in the employees. Make them an extended fam-

ily. How a company treats their people makes a difference and if done properly then employees and company will grow together. It is important to ask the employees about their day and listen to what they say.

When explaining a new job or task, show the person how to do the task. Welcome questions and be available to answer them. Some people want to learn, and others only want to fix the problem and go on.

Health and safety always come first. Make sure your employees are outfitted with the proper PPE to do their tasks. Train your employees with the proper safety procedures for the jobs they are doing that day. Monitor them in extreme hot and cold weather. Provide water, Gatorade, cooling towels etc.

Keep little things in the office that employees may need. Examples are Tylenol, tissues, or band aids. Keep snacks around for the busy and on-the-go employees or for those with blood sugar issues as well.

Realize that sometimes home life and work life do not align. The employer may try to work with the employee to work out the problem or help alleviate some of the stress. Sometimes, you cannot and other times just listening and trying to work something out will create better employee experiences.

Determine what communication method works best with each person. Some-

times people like texts, others want a phone call, and others want an email. Identify the best way to communicate with your team members and they will be more responsive.

As a manager, help the employees grow and find answers. Little things can be effective in employee retention. Create solutions for the employee, tell them they are doing a good job, and help them fix problems and learn from their mistakes. Make the workplace environment special for the employees. Take an interest in the employee's life.

Handwritten notes may mean more than a corporate email. Employees respond to being appreciated. A personal note may seem old fashioned, but people still appreciate the time it takes to sit down and write something more personal and meaningful.

Try creating a buddy system that rotates. Employees are to reach out to a coworker once a week by sharing a joke, recipe, anything that makes others feel part of the group. This helps employees get to know each other, especially if you have multiple offices in multiple states. You put a human behind the face on video or email.

Creating a caring culture at work helps the employee feel like they belong, that they are appreciated and this in turn creates a more positive, more productive, well-balanced company.

BATCHING / BLENDING / LIQUIDS
CAPACITY / RESOLUTION?
6,000 / 1 lb

SINGLE SPEED W/ 200 lb/SEC

8 INGREDIENTS

WT FORMULAS

High 2

MIXER?

DRUM CYCLE

TERSPACE

CONTROL TO EXIST

ET

RICE LAKE
WEIGHING SYSTEMS



1280 Screen Samples
Check Them Out!

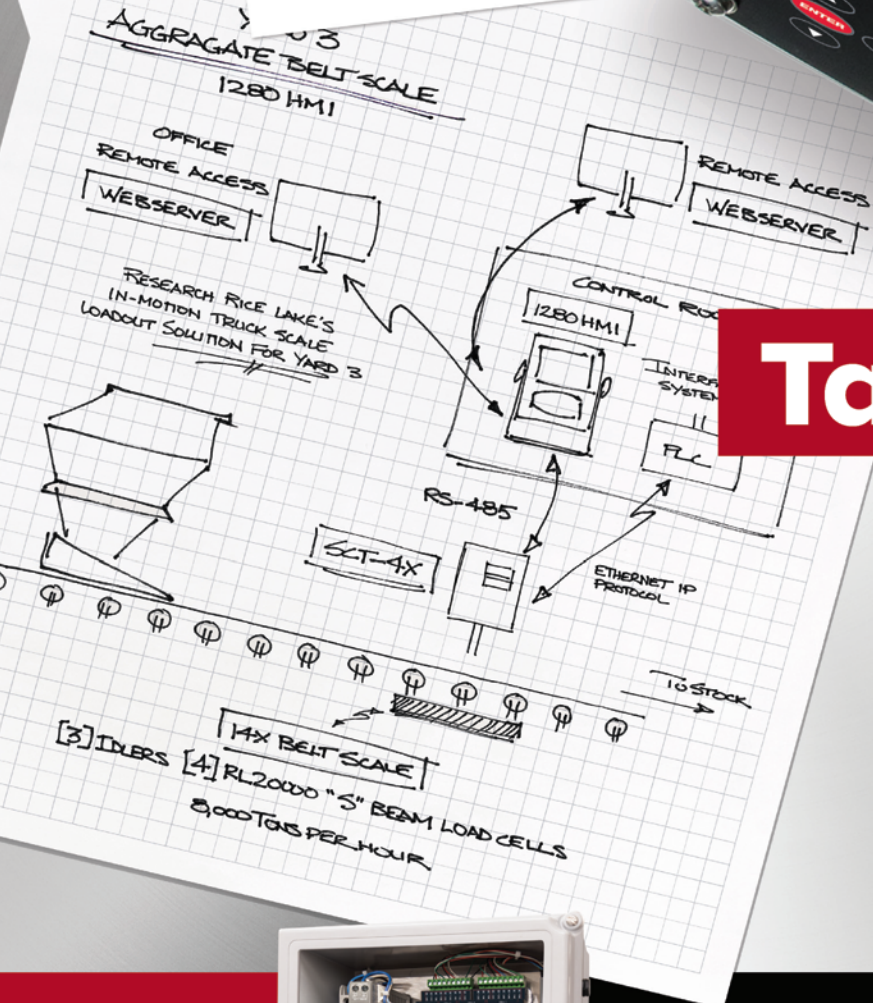
prodinfo@ricelake.com
230 West Coleman Street, Rice Lake, WI 54868 | USA
TEL: 715-234-9171 | FAX: 715-234-6967 | 800-472-6703
www.ricelake.com



Take Full Control

RICE LAKE
WEIGHING SYSTEMS

800-472-6703
www.ricelake.com



Rice Lake Weighing Systems' 1280 Enterprise™ Series indicator revolutionizes weighing operations with the ultimate combination of power and programmability. Increase efficiency with the 1280's highly customizable graphical user interface, built-in web server, systems integration and data tracking. Monitor processing operations, including vehicle and in-motion weighing.

Compatible with the 1280, the SCT-4XD is a high-speed digitizer, capable of reading two speed encoders and managing two totalizers. Manage up to four load cells of a belt scale with complete diagnostics, calibration and remote configuration.

Visit www.ricelake.com/fullcontrol or scan the QR code above for more information.

DIGITAL INDICATORS FOR ELECTRONIC SCALES... SOME IMPORTANT CONSIDERATIONS

Published under the auspices of the Electronic Sterring Committee, NSMA,
Reprinted from Nov. 1 1977 Weighing & Measurement.

Just as mechanical scales consist of three basic elements – load receiving element, steel-yard rod, and mechanical indicator (dial or beam) – so electronic scales consist of a load receiving element, an electrical transducer (load cell), and digital indicator. Mechanical scales have been employed for centuries and are basically well understood. That is not typically the case with electronic scales. Although electronic scales have existed over the past ten years, it is only in the past five years that they have become the popular choice, as technical advances in both load cells and digital electronics have reduced their cost and increased their reliability.

It is the purpose of this article to accent considerations of choice and application of the digital indicator portion of the electronic scale. Obviously, one cannot ignore the load cell portion as the indicator receives its input from that device. However, I shall limit my comments relative to load cell excitation and output signal level.

WHY NOT A DPM?

A question often asked about digital indicators to be applied as a readout from a load cell is, "Why can't we use a \$90 Digital Panel Meter?" Since our company manufactures several types of these meters, as well as digital indicators specifically intended for a load cell readout, it is fair to note there are several reasons

why one cannot use a Digital Panel Meter (DPM) as a load cell digitizer. These are as follows:

1. Sensitivity
2. Excitation
3. Resolution
4. Function
5. Ideal Zero
6. Digital Tare
7. Lb/kg conversion

When dealing with the output of a load cell and assuming resolution of 10,000 counts, the level of incoming signal that will cause a transition from one number to the next in the last digital of resolution (typically referred to as the LSD – Least Significant Digit) is 1 to 5 microvolts. Let me reiterate, 1 to 5 millionths of a volt. The maximum sensitivity of most DPM's is 100 microvolts per LSD, so it should be obvious that DPM's are not suited as load cell digitizers unless preceded by a highly stable amplifier that can provide gain factors in the area of 100 to 1.

Load cells, in simplest form, consist of strain gages assembled in a bridge configuration. They must receive a driving voltage to operate, normally 10 or 15V DC. In some older cells, 20V DC was required. This driving voltage is referred to as excitation voltage. It must be derived from a stable, regulated floating power supply.

In addition, since most load cells are 350-ohm devices, assuming a 15V DC ex-

citation voltage, and applying Ohms Law, 42mA of current is necessary to drive one load cell. As multiple load cells are typically employed, considerably higher current outputs are necessary – a capability non-existent in DPM's.

Resolution, that is, the exact number of active digits necessary will depend on the specific application. Generally, a digital display for an electronic scale should be at least 10,000 counts or, by past convention, four active digits – 9999. A three and one-half digit DOM with resolution of 1999 does not offer sufficient resolution for most electronic scales. One would have to choose the more expensive 4-1/2 digit with resolution of 19999 to attain what is considered to be "sufficient" resolution.

Regardless of basic resolution, there remains in many applications the necessity to add an additional digit, beyond the least significant active digit, which can only be zero. This is referred to as a "dummy zero." Such a digit is added when weights in higher increments than 1 are required. For example, with one 'dummy zero' and assuming the count by 1 mode, the weight resolution would be 10 lbs.

Though DPM's can, by choice, offer sufficient resolution, few can provide a "dummy zero" capability.

Relatively few digital indicators applied to scales are used strictly as a display of weight. Generally, some Tare (offset) capability actuated by thumbwheel, push-

button, or perhaps keyboard, is necessary. This is a necessary function when the dead weight of a container, or a truck in the extreme, must be subtracted to attain “Net” weight.

Beyond “tare,” probably the most important of additional functions are automatic metric conversion (avoirdupois to kilograms); motion detection (a new federal regulation for truck scales); and isolated BCD outputs to drive ticket printers.

While several panel meters do offer BCD outputs by choice of option, none to my knowledge offer “tare” or “Metric Conversion.”

While most DPM’s (including those indicators specifically designed as load cell digitizers) utilize the dual slope A/D conversion technique, some with an additional auto zero function, most DPM’s do not account for the inherent offset problem at “zero,” an inherent problem with dual slope converters. Since the operation

of this particular conversion technique is one of accumulating an input voltage over a fixed time interval and of converting it to a representative pulse train, offsets can occur at zero crossing point.

At this point, let me inject a brief description of an “ideal zero code,” defined in Federal NBS Handbook 44, and directly involved without discussion of A/D conversion techniques. Let us assume that a one-pound increment could be divided into ten 0.1 lb increments. Let us further assume that we have ten 0.1 lb test weights to apply to the scale. By basic definition of function, we can add up to 0.3 lb, and a transition cannot occur. The scale must still indicate zero. Within the range of 0.4 lb to 9.6 lb, a transition from 0 to 1 may occur, that is the scale must now read 1 lb.

To comply with the ideal zero code, the zero code of a dual slope A/D Converter must be offset or “biased.” A load cell digitizer so compensated, will, upon be-

ing turned on, and not being connected to a load receiving element which could create forward bias (deadload), indicate a negative value representative of the “bias” employed. Virtually, no DPM accounts for this problem.

YOU NEED A LOAD CELL DIGITIZER

Having attempted to answer why Digital Panel Meters are not suited as load cell digitizers, let us explore the typical features, set up, and application consideration of indicators specifically designed for the task.

Any loadcell digitizer will supply at least on level of excitation voltage, and in most, a choice of two, 10 or 15V DC is available. With older instruments, jumpers and perhaps precision resistors needed to be installed to attain the desired levels. More recent units provide selection by simple change of plug-in jumpers or in some cas-



Agile.
Precise.
Trusted.

Got a lot on your plate?
Don't let weighing add to it.

Trust **Adam Equipment** for a wide selection of highly accurate weighing equipment to tackle a variety of duties in food-related industries, including testing, processing, production and service.



Gladiator





Swift





Aqua® ABW-S





PTaM





Cruiser® CKT





PMB

Adam offers scales and balances with the options you need, including:
IP67 & IP68 protection • NSF certification • Stainless steel construction • Trade Approved

adamequipment.com

(203) 790-4774 • sales@adamequipment.com

es switch selection. The current level supplied is normally sufficient to drive at least 6 – 360-ohm load cells (260mA) and most can employ an additional external power supply where the number of load cells dictates higher current drive.

Deadload, typically the weight of the load receiving element is negated and the scale zeroed by changing appropriate resistors internal to the indicator, or by changing programmable switches which select an appropriate resistor network. This step is considered the “coarse” set up of deadload offset. Medium offset may be attained by a variable potentiometer, and the final “zeroing” adjustment is made by a fine zero control, recessed by NBS Regulation, but mounted on and accessible from the front panel.

Assuming that the scale can be zeroed as described, let us consider the matter of spanning the indicator or calibrating the scale. Calculating the basic sensitivity, which is the microvolt level of the LSD, involves the interaction and choice of the following:

1. Load Cell Sensitivity
2. Excitation Voltage
3. Full Scale Resolution

In addition to the above three factors, should the installation be one that is Handbook 44 compliant, one must be cognizant of Handbook 44, Paragraph 5.1.4 which states that “the zone of uncertainty on digital indicating scales shall be not greater than 0.3 the value of the minimum operating increment.” Stated perhaps in more workable terms, “the minimum value (sensitivity) of the LSD (graduation) shall be a 3 to 1 ratio to the internal noise of the indicator. For this reason, the noise specification of the indicator is significant. For example, if we assume a full scale resolution of 10,000 graduations (lb, kg, newtons, whatever) and a noise specification of the indicator of 0.65 to 0.7 microvolts peak to peak, it is not generally practical to calibrate the scale for a graduation (LSD) value below 2 microvolts.

The following example will help illustrate this contention. Assume the following factors:

1. A single load cell, 350 ohms with output of 3 mV/V (general typical specifications)
2. An excitation voltage of 15V DC
3. A full-scale resolution of 10,000 counts

Given these figures, we can calculate the basic sensitivity of the scale. First, we multiply 15V by 3mV/V to attain a full-scale output of 45 millivolts from the load cell. For calibration purposes we will change 45 millivolts to 45000 microvolts. Now we write the equation as follows:

$$\begin{aligned} 45,000 \text{ microvolts} &= 10,000 \text{ graduations} \\ 45,000/10,000 &= 4.5 \text{ microvolts/graduation} \end{aligned}$$

This calibration is well within the stated parameters of Handbook 44, assuming an internal noise specification of the indicator as noted earlier. Let us assume a different set of conditions as follows:

1. A single load cell, 350 ohms with 2 mV/V sensitivity
2. Excitation voltage of 10V DC
3. A Full-scale resolution of 10,000 counts.

$$\begin{aligned} 2 \text{ mV/V} \times 10\text{V} &= 20\text{mV} = 20,000 \text{ microvolts F.S. output} \\ 20,000 \text{ microvolts} &= 10,000 \text{ graduations} \\ 20,000/10,000 &= 2 \text{ microvolts/graduation} \end{aligned}$$

Should the indicator have an internal noise specification of the range stated above, a calibration of 2 microvolts per graduation barely satisfies the requirement of Handbook 44.

Having made the basic calculation of sensitivity as described, one either installs the proper calibration resistors internal to the indicator to properly “course” span the instrument or, as in many newer indicators, selects by insertion or removal of pluggable jumpers the appropriate sen-

sitivity range. Obviously, the range of span will be specified for the particular indicator, and we must be sure that the calculated sensitivity is within the stated specifications. Once the “Coarse” span has been established, additional trimming of medium and fine span controls will be necessary to exactly calibrate the scale. Typically, with the appropriate test weights in place on the load receiving element, the fine span is set by a precision, variable potentiometer.

In most, but not all indicators, span and zero are non-interactive. If these adjustments do interact, a second or third zero/span setting will be required to properly set up the scale. This non-interactive zero and span adjustment is an important feature.

Referring to my above calibration examples, a graduation calibration of 4.5 microvolts is more desirable than the 2 microvolts. The greater the signal to noise ratio (calibrated sensitivity per graduation to specified instrument noise), the better the overall stability of the indicator will be. A ratio of $4.5/.7 = 6.4$ is far better than $2/.7 = 2.8$. Due to a combination of errors associated with the combination of load cell and digital indicator, and even though the indicator is capable of greater resolution, the practical Handbook 44 approved resolution is in the area of 10,000 counts. Very few digital indicators have been so approved at greater resolution.

As to weighing function, most load cell digitizers provide by option some means of “tare” entry. The most popular are thumbwheel, or pushbutton “Tare.” In some instruments the two methods can be combined. In general, digital indicators provide 100 “Tare” capability, in the same number of graduations of offset as the full-scale resolution, though rarely is this ever necessary in actual application. A new approach is “Tare” entry by keyboard control and in some cases a separate display is provided for the “Tare” Value.

Though we as a country are moving slowly toward metric conversion, this option, where available, is popular in the

digital indicator. This is particularly true in meat packing and in the automotive industry which has adopted dual standards of weighing. This option, factory installed, or better yet, field installed as necessary, makes a true mathematic conversion from avoirdupois to kilograms. It is normally actuated by push button or toggle switch.

Virtually, all load cell digital indicators offer a buffered, isolated, parallel BCD output, a form compatible with interfacing to and driving digital ticket prints. Indicators supplied for readout from motor truck scales will need to be equipped with this feature. There are some technical ramifications here, as the output data, when ready for the print, must be held for a period sufficient for the printer to accept data and release the indicator.

Also, relating to motor truck scales and indicator/printer combinations, one must consider a feature call "motion detect." Paragraph 5.2.1.1 of Handbook 44 details specifically the established limits and that this feature became a necessity on scales used in direct sales as of January 1, 1977. Several newer indicators offer a "motion detect" option, implemented by either analogue or digital means.

Zero tracking, an available option in some indicators, is desirable to attain and hold scale zero regardless of external environment conditions. It may be offered in combination with automatic tare.

NBS HANDBOOK 44 AND OIML

We in the United States recognize NBS Handbook 44 and its revisions that occur from time to time to be the basic guideline for mechanical and electronic scales. I personally use the term guideline as it is subject to various interpretations by individual states. While Handbook 44 covers many performance parameters for scales, it is nowhere near as specific and in many cases restrictive as the OIML regulations which exist in other portions of the world. OIML (Office International

Metrology Legal) is a Paris-based international organization to which the United States belongs and in which they have major participation. OIML documents IR3 and IR28 document regulations and specification pertinent to scales. They are quite specific as regards environmental factors such as operational temperature range, temperature coefficients, power variation, full scale resolution and the like which influence accuracy and stability of electronic scales. These documents set forth a carefully established accuracy band for electronic scales, depending on full scale resolution.

One element of the OIML regulations pertains to setting zero, plus or minus 0.25 graduations around true ideal zero. To accomplish this in a digital indicator, the internal resolution must be 4 times the displayed resolution. Though few load cell digitizers, presently available, offer this feature, I believe is safe to predict that this requirement will be incorporated in Handbook 44 in the near future.

The National Bureau of Standards, Office of Weights and Measures, has an active OIML Committee under the direction of Otto Warnloff. As a treaty member of OIML, the United States has accepted the responsibility of harmonizing our existing and proposed standards with those of OIML and, through this committee, is actively participating in furthering the depth and scope of such standards.

I deem it essential that those of you in the weighing industry who are not familiar with OIML activities and standards lend support to this committee.

SOME CRYSTAL BALL GAZING

Is that the future of load cell digitizers? Certainly, you have all heard the new buzzword in the electronics industry, "microprocessor." A member of the industry recently equated this new term to equivalent popularity of the term "solid state" of five years ago, and I agree. Un-

doubtedly, this new "computer on a chip" technology will impact the design and function of load cell digitizers. There are indicators already available which are "microprocessor" based. The level of intelligence or capability varies considerably due to "software" programs or built-in instructions. We will see many functions presently accomplished by factory installed or lug-in circuit cards, implemented by "software" instructions. The address to the function will remain a switch, pushbutton, keyboard, or some other means of hardware address. Certainly, better cost/performance ratios will result.

Considerable price erosion can readily be observed as regards integrated circuits, microprocessors, memories, and other logic circuit components. Does this imply the advent of load cell digitizers with necessary features as described selling in the same price range as high resolution DPM's of today? I seriously doubt that this will occur.

Accept the fact that once the A/D Converter digitizes the incoming analog signal, any quantity of number-crunching or calculation techniques can readily be applied. The real basis for this type of indicator remains a highly stable, floating, noise immune, analog input front end circuit of sufficient capability to receive, amplify, and pass on signal levels in the area of several millionths of a volt to the A/D Converter. Technology advances in this area have been few. Techniques employed in this area determine success or failure in maintaining competence in the marketplace and supplying highly stable, reliable load cell digitizers.

About the author - Guy Wilson was Marketing Manager for Industrial Digitizing Systems, the product group within the Analogic Corporation, a company well known for its digital panel meters, scale electronics and digitizing modules and systems.

SOUTH ATLANTIC MEETING

HELD ON MAY 2-3, 2025, ORLANDO, FL



SOUTH ATLANTIC MEETING

HELD ON MAY 2-3, 2025, ORLANDO, FL



ESSENTIAL TIPS FOR TRUCK DRIVERS

YOUR GUIDE TO STAYING SAFE, EFFICIENT,
AND SUCCESSFUL ON THE ROAD

Truck driving is a demanding profession that requires skill, focus, and preparation. Whether you're a seasoned driver or new to the world of trucking, these tips will help you navigate the challenges of the road while maximizing safety, efficiency, and overall job satisfaction.

SAFETY FIRST

1. Regular vehicle inspections: Check tires, brakes, lights, and fluids before every trip.
2. Wear your seatbelt: Always buckle up, no exceptions.
3. Keep a safe distance: Maintain adequate space between your vehicle and others to allow for sudden stops.
4. Reverse with caution: Always check blind spots and use spotters when needed
5. Watch your speed: Follow speed limits and adjust for weather or road conditions.

PLANNING YOUR JOURNEY

6. Plan your route: Use GPS but always double-check with a reliable map
7. Monitor weather conditions: Avoid routes with severe weather when possible.
8. Schedule breaks: Take a 15-minute break every 2-3 hours to stay alert.
9. Know parking options: Plan for where you can safely park overnight or during breaks
10. Set realistic driving goals: Avoid overextending yourself; prioritize rest and safety.



Continued on page 19

THE EVOLUTION OF TRUCK SCALES: WEIGH-IN-MOTION



Whether it's bulk, container, or oversized loads, LS-WIM[®] scales provide superior efficiency and increased throughput.

Intercomp[®]

The Axle Weighing Specialist



Contact Intercomp to Discuss Weigh-In-Motion Solutions
intercompcompany.com • +1 763-476-2531 Worldwide



Continued from page 17

FUEL EFFICIENCY

- 11.** Minimize idling: Turn off the engine during long stops.
- 12.** Maintain a steady speed: Use cruise control on highways to conserve fuel
- 13.** Check tire pressure: Properly inflated tires improve fuel efficiency.
- 14.** Avoid sudden accelerations: Smooth driving reduces fuel consumption
- 15.** Lighten the load: Remove unnecessary items to reduce weight.

HEALTH AND WELLNESS

- 16.** Stay hydrated: Drink water throughout the day to maintain energy.
- 17.** Pack healthy snacks: Choose fruits, nuts, and protein-packed options.
- 18.** Stretch regularly: Avoid stiffness and improve circulation during breaks.
- 19.** Get quality sleep: Aim for 7-9 hours of rest in a comfortable and quiet space.
- 20.** Attend medical check-ups: Monitor blood pressure, vision, and overall health. Professionalism on the Road
- 21.** Communicate effectively: Use a CB radio or other tools to share vital information with other drivers.
- 22.** Be courteous: Allow merging traffic and avoid aggressive driving.
- 23.** Follow regulations: Stay updated on federal and state trucking rules
- 24.** Keep records: Maintain accurate logs of hours, fuel, and maintenance.
- 25.** Represent your company well: Maintain a positive attitude and professional demeanor

CARRY EMERGENCY SUPPLIES:

Include a first aid kit, flashlight, and basic tools.

- 26.** Know your truck: Familiarize yourself with emergency shut-offs and controls.
- 27.** Have a backup plan: Know alternate routes and contact information for assistance.



- 28.** Keep an emergency fund: Set aside money for unexpected expenses.
- 29.** Stay calm: In an emergency, focus on the solution rather than the problem

MAXIMIZING COMFORT

- 30.** Organize your cab: Keep your space clean and clutter-free.
- 31.** Invest in good seating: Use a comfortable and adjustable seat to avoid back pain.
- 32.** Block noise: Use earplugs or noise-canceling headphones for better rest.
- 33.** Adjust temperature: Keep your cab at a comfortable temperature during breaks.
- 34.** Personalize your space: Add small touches, like photos or a favorite blanket, to feel at home.





BUILDING SKILLS AND KNOWLEDGE

- 35.** Take driving courses: Enhance your skills with advanced training.
- 36.** Stay informed: Read industry magazines and news to stay updated.
- 37.** Network: Connect with other truck drivers to share tips and experiences.
- 38.** Practice patience: Develop tolerance for traffic and delays
- 39.** Learn basic mechanics: Understand minor repairs to avoid downtime

STAYING CONNECTED

- 40.** Use hands-free devices: Stay safe while making calls on the road.
- 41.** Check in regularly: Update family or your employer on your status.
- 42.** Embrace technology: Use apps for navigation, fuel stops, and load management.
- 43.** Join online communities: Participate in forums and groups for truckers
- 44.** Respect privacy: Balance staying connected with taking time for yourself.

By incorporating these tips into your daily routines, you'll not only enhance your safety and efficiency but also enjoy a more rewarding and sustainable career as a truck driver. Happy driving!

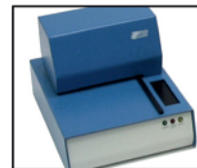


Need Quality Repairs ?

Reliable, expert repairs for ...



Indicators



Printers



Scales



Moisture Analyzers



Lab Balances

- **Most brands**
- **Low flat rates**
- **Fast turnaround**
- **Quantity discounts**
- **Circuit boards or units**



NATIONAL SCALE SERVICE LLC

1-800-722-5339
www.nationalscale.com

464 Kenwood Ct. Suite F Santa Rosa, CA 95407



COMPANY NEWS

SCALE WAREHOUSE AND MORE/SCALETRADER.NET

Scale Dealers Continue to Liquidate Their Used Truck Scales and Test Equipment at ScaleTrader.net!

In the competitive and specialized world of industrial weighing equipment, scale dealers often face the challenge of offloading used truck scales and surplus testing equipment and other inventory. Whether it's trade-in equipment, overstock, or items removed from customer sites, finding the right buyer can be difficult. That's where ScaleTrader.net comes in—a dedicated platform designed to streamline the resale process for scale dealers nationwide.



A Marketplace Built for the Scale Industry

Unlike generic equipment marketplaces, ScaleTrader.net is tailored specifically for the weighing and measurement industry. This niche focus means listings reach a targeted audience of buyers who are actively searching for used scales, test trucks, test carts, test weights and other items. Scale dealers benefit from increased visibility without the noise of unrelated categories.

Easy Listing Process

Creating a listing on ScaleTrader.net is simple—we do it for you! Listings are optimized for search and categorized for easy browsing, helping buyers find the exact equipment they need faster.

Attracting the Right Buyers

ScaleTrader.net is widely recognized in the weighing industry, frequently visited

by scale service companies, contractors, municipalities, and end-users. Whether you're selling a 70-foot truck scale or a spare test weight, your listing is placed in front of serious, qualified buyers who understand the value of used equipment.

Cost-Effective Sales Channel

Unlike auction sites or large equipment marketplaces that take a significant cut of the sale, ScaleTrader.net offers low-cost listing options with no hidden fees. Dealers keep more of their profit while still reaching a national network of potential customers.

Support and Exposure

In addition to marketplace listings, ScaleTrader.net actively promotes equipment through its email network, social media, and industry partners. This added exposure gives listings a wider reach and increases the chances of a faster sale. For high-value or specialized equipment, concierge-style support is also available to assist with pricing strategy and buyer communication.

Helping Dealers Focus on Core Business

By providing an efficient platform for liquidating used and surplus inventory, ScaleTrader.net allows scale dealers to focus on what they do best—servicing clients, installing new systems, and growing their business. The hassle of finding buyers for used equipment is replaced with a streamlined, professional sales process.

Scale dealers looking to turn idle equipment into cash, reduce warehouse clutter, and connect with real buyers can rely on ScaleTrader.net to get the job done.

MIRACLE SERVICE Introducing Measurement Uncertainty in Miracle Service eForms

Miracle Service, the complete scale dealer management software, now includes an enhanced feature to streamline calibration workflows. The latest update intro-

duces automated Measurement Uncertainty (MU) calculations directly within Miracle Service eForms—saving time and boosting accuracy when handling calibration data.

Users can incorporate MU calculations using standard formulas and account for multiple uncertainty sources, delivering higher precision and confidence in calibration results.

Key Benefits for Scale Dealers:

1. **Greater Accuracy:** Ensure MU calculations meet industry standards and customer expectations.
2. **Improved Workflow:** Embedded calculations reduce manual effort and the potential for errors.
3. **Stronger Trust:** Detailed calibration certificates with MU values enhance credibility and customer satisfaction.

To activate this feature, contact your Miracle Service representative at 1-866-463-9368 or visit www.GetCerts.com to learn more about Miracle Service's field service management software with integrated calibration and certificate management.

INTERCOMP

Portable Wheel/Axle Scales for Vacuum Trucks - Avoid Overloaded Vac Trucks with Portable Truck Scales

One of the primary challenges associated with utility vacuum trucks is their susceptibility to weight fluctuations during operation. As these trucks perform tasks like debris suction and material transportation, their load capacity can vary significantly. Exceeding the legal weight limits compromises road safety, as it affects the vehicle's braking capabilities, stability, and maneuverability. Overloaded utility vac trucks pose a threat to both the operators and other road users, increasing the risk of accidents.



COMPANY NEWS



Intercomp's portable truck scales offer a practical solution to this weight-related dilemma. These scales are designed to be easily transported and can be set up at various locations, allowing utility vac truck operators to monitor their weight compliance on the go. Intercomp's portable truck scales utilize robust, proven strain gauge technology that actively compensates for temperature, resulting in fast, stable, and repeatable weighing.

Intercomp's LP600™ low-profile truck scales are trusted by heavy-haul operators and weight enforcement officials throughout the world to provide accurate and repeatable results. With a scale weigh pad that accommodates single, super-single, and dual tire axles, LP600™ portable truck scales provide a low-profile design for convenient vehicle approach and positioning. LP600™ scales can be bundled with roll-up ramps and levelers into the LP600-15T™ portable roll-over axle scale system. They are ideal for customers weighing heavy vehicles on unimproved surfaces and can be transported in the trunk of a vehicle and set up by one or two people in under fifteen minutes.

LS630-WIM™ Scale Systems combine the timesaving qualities of Weigh-In-Motion with the convenience of portable scales. By collecting weights as trucks drive over the scale without stopping, portable WIM scales increase the efficiency and throughput of weighing operations. With an LS630-WIM™ portable scale solution, vac truck operators can easily verify individual axle/wheel and GVW for proper axle and gross load dis-

tribution, from both a compliance and safety standpoint.

Intercomp portable scales communicate with a variety of remote indicators via RFX® Wireless Weighing. These indicators can automatically total axle weights to determine GVW, while also providing the ability to save weight records or print weigh tickets.

The importance of adhering to weight restrictions extends beyond safety concerns. Legal repercussions for exceeding weight limits can result in hefty fines, damage to road infrastructure, and operational disruptions. Excessive weight contributes to higher fuel consumption, leading to increased carbon emissions and reduced fuel efficiency. By prioritizing weight compliance, companies can enhance safety, avoid legal consequences, and contribute to a more sustainable and responsible operation of utility vac trucks in various industries.

MINEBEA INTEC

New PR 6003 mounting kit for load cells from Minebea Intec: Silo weighing made easy

With the PR 6003 mounting kit, Minebea Intec once again underlines its claim to produce leading technologies in silo weighing. The PR 6003 mounting kit impresses with its fast commissioning and combines maximum accuracy with maximum safety in a compact system. The PR 6003 mounting kit has been specially developed for demanding applications in industrial silo weighing. It is available to order now.

Whether wind loads, earthquakes, or vibrations: The PR 6003 mounting kit guarantees reliable measurements under the toughest conditions. With a nominal load range of 500 kg to 75 tons, the system offers exceptional bandwidth and flexibility. Depending on the environmental conditions, there is a choice between mild steel or stainless steel for additional protection against corrosion. "Our goal was to cre-

ate a product that is not only technically impressive, but also makes everyday life easier for our customers," explains Yannick Salzmann, Product Manager at Minebea Intec.

Maximum safety through certified quality

The PR 6003 mounting kit scores points with permissible horizontal forces of up to 82 kN and an anti-lift device that can withstand forces of up to 120 kN. Minebea Intec also supports its customers with a "wind and earthquake calculation tool" to optimize the design of silo structures.

Quick to install, durable and reliable

Thanks to sophisticated features, installing PR 6003 is particularly easy: The dummy function allows installation without a load cell to prevent damage to the load cell. With the optional jack-up tool, the silo can be lifted without an external lifting tool to remove the safety plates. The compact design with a weight of less than 20 kg enables installation by just one person. Once installed, the system is extremely durable and maintenance-free. "The new PR 6003 mounting kit is the logical further development of our tried-and-tested PR 6001," emphasizes Yannick Salzmann. "It offers more performance at a more attractive price."

The PR 6003 mounting kit is now available to order. For more information on the PR 6003 mounting kit and the comprehensive Engineering Support and consulting services, please visit www.minebea-intec.com.

RICE LAKE WEIGHING SYSTEMS

New SCT-4XD Captures Belt Scale Weights with Speed and Accuracy

Rice Lake, Wis.—Rice Lake Weighing Systems recently launched the SCT-4XD belt scale digitizer, an efficient solution for bulk material processing featuring the latest software and features.

The SCT-4XD's IP66 enclosure protects electronics for maximum durability in extreme outdoor environments. Strong



COMPANY NEWS

supply circuit protection ensures the SCT-4XD lasts for years of use.



Compatible with Master™ belt scale systems, BulkSlide flow meters or other processing solutions, the SCT-4XD is a great fit for new or existing facilities. It can be paired with Rice Lake's 1280 indicator for online access so operators can configure or calibrate remotely.

Bulk material operations often run 24/7, and the SCT-4XD is built to manage complex facilities with long runtimes and multiple scales. The SCT-4XD has four load cell inputs so operators can monitor weighing solutions in one place. View individual millivolt signals and track load cell performance to notice when preventative maintenance is necessary, instead of encountering sudden malfunctions that shut down facilities.

Learn more about how the SCT-4XD can manage load cells in applications.

Rice Lake Weighing Systems has been manufacturing and distributing weight-related products since 1946. Today, Rice Lake Weighing Systems is a global leader in the weighing industry, providing innovative weighing, measuring and process control systems.

NCWM NEWS:

We held our Open House and ribbon-cutting ceremony in June at our new headquarters and NTEP lab. It was a significant day for our association, and we were thrilled to showcase our new space to our

members and community. Our 110th Annual Meeting took place in Reno, Nevada, in July. We enjoyed a highly successful and productive meeting with strong participation from members from across the country (and world!). The new standards, which were voted upon at that meeting, will take effect on January 1, 2026. We hope you will join us in January for our 2026 Interim Meeting in Mobile, Alabama. If you happen to find yourself in Lincoln, Nebraska, please stop by to see our new home!



ADAM EQUIPMENT

Adam Equipment Welcomes Colin Maher as its New Chief Executive Officer/Group Managing Director

MILTON KEYNES, UK, 1 July 2025 — Adam Equipment Co. Ltd., a leading global designer and manufacturer of high-quality, precision scales, balances, and accessories, has announced the appointment of Colin Maher as its new Chief Executive Officer/Group Managing Director.

"I am delighted to be joining Adam Equipment at such a pivotal moment in the company's long and successful history," Maher said. "With its strong global team ethos, I look forward to helping take the company to the next level through product innovation, an expanded product range and a continued focus on customer excellence."

Maher joins Adam on 28 July, bringing a wealth of experience in the weighing industry.

Most recently, Maher was Managing Director for the UK and Ireland for transportation manufacturer Schmitz Cargo-bull, following previous roles in industrial weighing technology with Minebea Intec and Avery Weigh-Tronix.



**SCALES & COMPONENTS
IN STOCK, READY-TO-SHIP**

Totalcomp, Inc.

Scales & Components

the weigh you want... today!

1-800-631-0347

Web site: www.totalcomp.com

E-mail: sales@totalcomp.com



His career began with an apprenticeship and Higher National Certificate in Electronic Engineering. Starting as a service technician at Avery Weigh-Tronix, his roles in the weighing industry have included Systems Support Engineer, Product Manager for Inspection and Country Manager before becoming Minebea In-tec's Director for North America, the UK and Ireland.

Looking ahead, Maher said, "I'm really excited for this next chapter in my career. The experience and knowledge I've gained over the 35 years in the weighing industry has set me up well to help lead Adam Equipment forward, and I can't wait to get started with the team."

As CEO, Maher will oversee Adam Equipment's worldwide operations, which include its Milton Keynes headquarters in the UK, branches in the United States, Germany, South Africa, Australia, and China, alongside its manufacturing facility in China.

Maher succeeds Richard Storey, who served as Adam's CEO / Managing Director from May 2019 — when the company was acquired by Indutrade — until his recent retirement.

Earlier this year, Storey announced his intention to retire from the business to Indutrade's board of directors. Looking back on his tenure leading Adam, he reflected that, "it has been a privilege to work with a great group of colleagues, customers and suppliers, but also my father, Alan, who set up the company, and my brothers, as we grew the company to what it is today."

"I wish Colin and the management team all the very best for the future as they continue the journey forward," Storey said. "Having worked for Adam for over 32 years, I felt the time was right for the business and me personally to step away, but not before we had built a platform for the future and I'm looking forward to seeing the exciting steps forward that the company will take."

ANYLOAD

Introducing act1 conditioning transmitter precision signal conversion for industrial automation

ANYLOAD is proud to introduce the ACT1 Load Cell Conditioning Transmitter, a robust and compact solution designed to convert analog load cell signals into standardized analog outputs. Engineered for seamless integration into PLC systems and industrial process control environments, the ACT1 facilitates accurate and reliable weight measurements across various applications.

Seamless Integration and Reliability:

Designed with both functionality and durability in mind, the ACT1 offers a reliable interface between load cells and control systems. Its robust construction and versatile output options make it a valuable component in achieving efficient and accurate weight measurement in various industrial applications.

Key Features:

- **Analog Output Options:** Supports 0–10 V, 0–5 V, ± 10 V, ± 5 V, 0–20 mA, and 4–20 mA outputs, ensuring compatibility with diverse control systems.
- **High-Resolution A/D Conversion:** Equipped with a 24-bit A/D converter, providing precise signal processing for accurate weight measurements.
- **DIN Rail Mounting:** Compact design allows for easy installation within control panels, saving valuable space in industrial settings.
- **User-Friendly Interface:** Features a six-digit red LED display and four-button keypad for straightforward calibration and operation.
- **Digital Communication:** Includes RS485 port supporting Modbus RTU and ASCII protocols, facilitating integration with various digital systems.
- **Input Flexibility:** Accepts input from one load cell, accommodating a range of weighing applications.

Application: The ACT1 is ideal for industries requiring precise weight measurements and signal conditioning, including:

- **Powder and Bulk Material Handling:** Ensures accurate weight data in hoppers, silos, and batching systems.
- **Chemical and Pharmaceutical Processing:** Provides reliable measurements for sensitive formulations and processes.
- **Food and Beverage Production:** Maintains consistency and quality control in ingredient mixing and packaging.
- **Manufacturing and Automation:** Integrates seamlessly into automated systems for real-time weight monitoring and control.

DIVISION NEWS:

The South Atlantic division held their meeting on May 3, 2025. There was a social hour by the pool on Friday, and the meeting was held on Saturday. Approximately 20 attendees were present.

Stacy Moore, Michelli Weighing, presented on "Taking care of Employees Beyond the Paycheck" and Richard Bertrand organized a presentation on AI Service Manager. Michael and Mark Hilton from Ninja Concepts presented a concept of what an AI assisted Service manager might be.

Elections were held and the new slate of officers are:

Todd Fowler = Governor
Tyler McGee = Chairman
Stacy Moore = Vice Chair
Brad Brown = Program Chair
Richard Bertrand = Sergeant in Arms
Vicki Allman = Treasure Secretary

Minutes, Treasurer and Governor's reports were presented.



COMPANY NEWS

OBITUARY:



February 22, 1954 – June 3, 2025

Michael “Mike” Anthony Bordino, 71, of Indian Land, SC, passed away peacefully on June 3, 2025, at Novant Presbyterian Hospital.

Born on February 22, 1954, in Richmond Hill, New York, Mike was known for his warmth, humor, and his gift for storytelling. He could share a tale on just about anything, often leaving those around him laughing, reflecting, or both. His stories and his presence will be deeply missed by all who knew him.

Mike had a love of sports, especially football, and there was not a DIY project that he wouldn't tackle. A nostalgic at heart, he loved old-time shows and classic movies, often quoting iconic lines with uncanny

accuracy, leaving behind a legacy of laughter, love, and memorable moments.

Mike dedicated over 27 years of his professional life to Rice Lake Weighing Systems, where he was a respected and tenured employee until his retirement in 2023. His dedication and work ethic left a lasting impact on colleagues and friends alike.

NCWM

National Council on Weights and Measures

RSA TECHNICAL EXAMS

1

Contact your state authorities to find out if your state is participating.

2

Agents will take proctored RSA exams and apply with participating states for registration.

3

Agents will spend more time servicing clients with the freedom to cross state lines. States will get exclusive access to our online database to confirm test results.



EXAM OFFERINGS:

EVSE

Large Capacity Weighing Systems

LPG and Anhydrous Ammonia Liquid Metering Systems

NIST Handbook 44 and 130

Retail Motor Fuel Dispensers

Small Capacity Weighing Systems

Vehicle-Tank Meters

LEARN MORE:



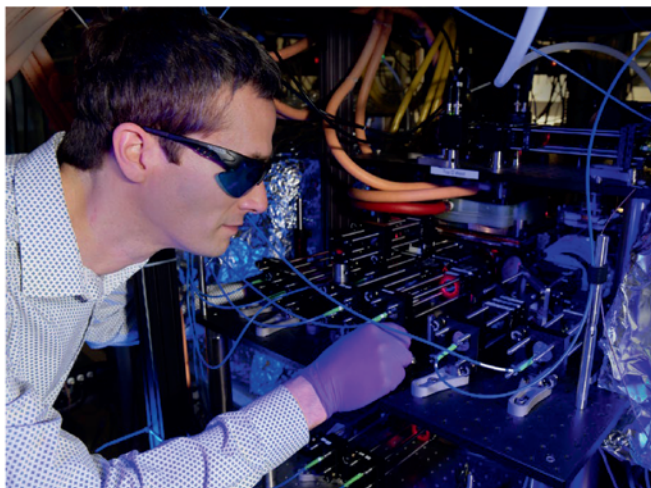
[NCWM.COM/RSA-EXAMS](https://www.ncwm.com/rsa-exams)





How Low Can Temperature Go? Lord Kelvin and the Science of Absolute Zero

June 26, 2024, By: Stephen Eckel



In Stephen Eckel's lab at NIST, he gets to work with some of the coldest stuff in the universe.

Credit: NIST

Lord Kelvin and the Early Science of Temperature

Lord Kelvin, or William Thomson, worked in what was then the emerging field of thermodynamics — transforming heat into dynamical motion. He did this both as a student at the University of Cambridge and as a young professor at the University of Glasgow. Together with his close collaborator, James Joule, he researched

On his 200th birthday today, we remember Lord Kelvin's many contributions to science, including calculating the coldest possible temperature — known as absolute zero.

To understand how they reached this conclusion, consider a gas in a balloon. If you cooled the balloon, the gas inside would exert less pressure against the balloon itself and against the atmosphere outside it, causing the balloon's volume to shrink.

Don't believe me? Inflate a balloon and stick it in your freezer. When you pull it out, you can feel the balloon expand. Now extrapolate: How cold would you have to make the balloon to make its volume go to

Temperature is probably the second most measured physical quantity in our modern world — after time.

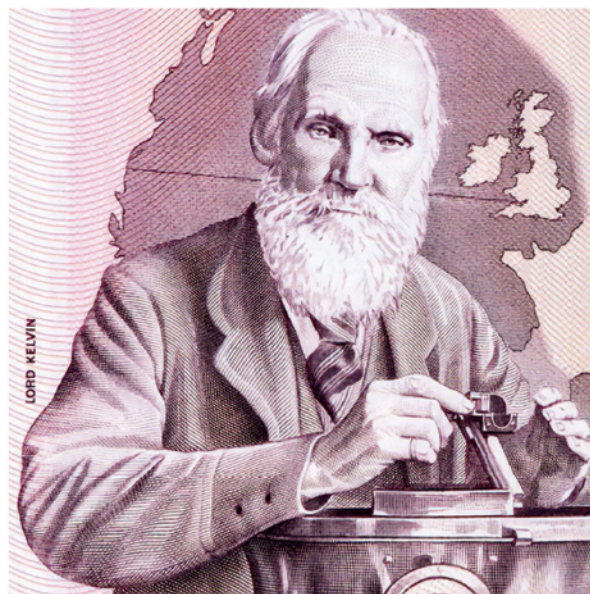
When I wake up in the morning, the first thing I usually check is the time (to see if I should go back to sleep), but the second thing I check is the temperature outside (so that I know how to dress).

Temperature is such a common measurement that we sometimes forget how important it is. From dairy farming to rocketry, from climate science to weather prediction, so many things require an accurate knowledge of temperature.

The metric (SI) unit for temperature is called the kelvin, after Lord Kelvin, whose 200th birthday we celebrate today.

all sorts of problems in thermodynamics, including temperature scales.

At the time, the scientifically accepted scale for temperature was the Celsius scale, with zero temperature being the freezing point of water and 100 degrees being the boiling point of water. But after studying how gases changed volume and pressure in response to changing temperature, Thomson, Joule and other scientists realized that there was an absolute coldest temperature that could be reached.



Credit: Prachaya Roekdeethaweesab/Shutterstock

zero (ignoring the fact that the gas inside will eventually condense into a liquid)? That must be the coldest possible temperature because the balloon cannot have a negative volume.

In 1848, Lord Kelvin used similar reasoning to accurately calculate the absolute coldest temperature as negative 273.15 Celsius (or negative 459.67 degrees Fahrenheit). It would be roughly another decade before scientists like Lord Kelvin and Ludwig Boltzmann understood that at absolute zero, the molecules in the gas stop moving.

Since 2019, all three of these scientists have been immortalized in the SI. The kelvin is our SI unit of temperature, defined through the Boltzmann constant, which relates temperature to energy, the SI unit of which is the joule.

Today, atomic physicists like myself use a technique partly pioneered at NIST called laser cooling, which uses lasers to cool clouds of between 100,000 and 1 billion atoms to temperatures of about 100 microkelvin. This temperature is 1/10,000th of a degree Celsius above absolute zero.

And we measure these ultracold temperatures in a way that would not be surprising to Lord Kelvin (although making such cold gases might be!).

We measure the average speed of the atoms in the gas. Researchers at NIST use such laser-cooled atoms for all sorts of applications, from atomic clocks to vacuum standards.

Vacuum Standard

Laser cooling atoms to near absolute zero only works inside a chamber where almost all the air has been removed by a pump to isolate the atoms from the surrounding environment. Such vacuum chambers are common and are used in industries such as semiconductor manufacturing.

Most of the components in your cell-phone have been in and out of at least one vacuum chamber. The core components, like the central processing unit, have probably been through a chamber that has produced some of the best vacuums on Earth. For every trillion gas molecules that started in the chamber, all were removed but one. Such exquisite vacuums are required because leftover gas molecules can both contaminate the chip and scatter the ultraviolet light that is used to imprint the designed circuit. This can cause the chip to be ruined.

Amazingly, the current best way to measure such pure vacuums is by using what is effectively a vacuum tube. But now, the laser-cooled atoms in my lab may be the best sensor of ultralow vacuum pressures on Earth.

After the sensor atoms are cooled to near absolute zero, we hold the sensor atoms in a “trap” that is made entirely of magnetic fields. This trap is very weak, only able to hold onto the ultracold sensor atoms. The vacuum sensor works because if a cold sensor atom is struck by a leftover gas molecule, it will almost always be ejected from the weak trap. The rate at which this process occurs depends on the number of gas molecules the pump has left behind. Thus, determining the number of leftover gas molecules just involves counting the number of sensor atoms that remain after some time.



Credit: L. Kauffman/NIST

This “cold-atom vacuum standard (CAVS)” is a new way of measuring vacuum pressure, which NIST has played a crucial role in developing. We anticipate it being used to measure ultrapure vacuums in semiconductor manufacturing, quantum computers and other big science experiments, such as an experiment detecting collisions of extremely distant black holes, known as the Laser Interferometer Gravitational Wave Observatory (LIGO).

Having a standard like the CAVS that always gives the correct vacuum pressure reading will help these applications build better vacuum chambers, diagnose problems and increase both reliability and productivity.

The CAVS is the only experiment that I am aware of that needs to measure two very different temperatures at the same

continued on page 34

Report from new ISWM S&T Committee

The International Society of Weighing & Measurement (ISWM) has recently created a new committee to review and respond to change in Handbook 44. Our organization consists of scale dealers, manufacturers and anyone involved in weighing and measuring.

Items that we considered in our recent meeting:

G-S.5.6. Recorded Representations. – Insofar as they are appropriate, the requirements for indicating and recording elements shall also apply to recorded representations. All recorded values shall be presented digitally. In applications where recorded representations are required by a specific code, the customer may be given the option of not receiving the recorded representation. Recorded representations referenced in specific codes shall be made available to the customer in hard copy form, unless otherwise specified by the customer. For systems equipped with the capability of issuing an electronic receipt, ticket, or other recorded representation, the customer may be given the option to receive any required information electronically (e.g., via cell phone, computer, unique and dynamic quick response QR code, etc.) in lieu of or in addition to a hard copy.

(Amended 1975, 2014, and 2023, and 20XX)

RESPONSE from ISWM:

1. Utilizing a QR code does not provide an advantage to the consumer. Does not seem to meet the criteria of what is displayed is printed.; nor is it clear and legible.
2. What happens if the QR code does not work?
3. Does testing the QR code become part of the inspector and/or scale dealer's test procedure?
4. QR code is a trade-mark name for a barcode. Should we have instead a scannable barcode, more generic term for 2-D barcode.





www.anyload.com / 1-855-269-5623

A1A-D25C

DIGITAL AMPLIFIER



FLEXIBLE
TERMINAL



CONTROL AND
LOGGING FEATURE



PC SOFTWARE FOR
EASY CONFIGURATION

DGB-D

DIGIBOARD — DIGITAL AMPLIFIER



FIXED
TERMINAL



EMBEDDED INSIDE
LOAD CELL



PLC-COMPATIBLE
DIGITAL OUTPUT

S.1.16. Marking of Weight Indications.

- (a) *A single display used only for gross indications need not be designated. The display may be designated by the term “gross.”*
- (b) *A single display used for both gross and net values shall be designated “net” when displaying the net value while a tare mechanism or preset tare mechanism is in operation. The display may be designated “gross” when no tare mechanism is in operation, or when the gross weight is temporarily indicated while a tare mechanism is in operation.*
- (c) *If an instrument simultaneously displays two or more of the net, gross, or tare indications, each display shall be designated by the appropriate term “net,” “gross,” or “tare.”*
- (d) *However, it is permitted to replace the terms net, gross, and tare with the appropriate designations “N” for net, “G” for gross and “T” for tare displayed to the right of the weight values, e.g., 4.48 lb N, 4.52 lb G, or 0.04 lb T.*

[Nonretroactive as of January 1, 20XX]

(Added 20XX)

S.1.17. Printing of Weighing Results.

- (e) *Gross weights may be printed without any designation. For a designation by the symbol, only “G” is permitted.*
- (f) *If only net weight is printed without corresponding gross or tare values, it may be printed without any designation. A symbol for designation shall be “N”.*
- (g) *Gross, net, or tare weights determined by a multiple range instrument or by a multi-interval instrument need not be marked by a special designation referring to the (partial) weighing range. (see also S.1.2.1.)*
- (h) *If net weights are printed together with the corresponding gross and/or tare weights, the net and tare weights shall at least be identified by the corresponding symbols “N” and “T”. If the gross weight is identified, the symbol “G” shall be used.*
- (i) *However, it is permitted to replace “G”, “N” and “T” by complete words in English.*

[Nonretroactive as of January 1, 20XX]

(Added 20XX)

S.1.18. Mathematical Agreement of Net, Gross and Tare Values. *When a device simultaneously indicates (or records) net, gross and tare indications, the values shall be in mathematical agreement based on the formula $\text{Net Weight} = \text{Gross Weight} - \text{Tare Weight}$ whenever one of the three values is calculated from two measured weight values, e.g., calculated Net = weighed Gross – weighed Tare. Mathematical agreement is not required, due to potential rounding errors, when all three values are independently measured.*

[Nonretroactive as of January 1, 20XX]

(Added 20XX)

Amend the following paragraphs.

T.1.1. General. – **The tolerances applicable to devices not marked with an accuracy class shall have the tolerances applied. The tolerances herein prescribed shall be applied to errors of underregistration and errors of overregistration** as specified in Table T.1.1. Tolerances for Unmarked Scales. **The tolerances apply to errors in gross weight indication starting at gross load zero. The tolerances also apply errors in net weight indication starting at net load zero. In both cases, the starting zero shall be accurate to $\frac{1}{4}e$ before addition of the test load.**

Note: When Table T.1.1. refers to T.N. sections it shall be accepted that the scale division d on the unmarked scale always equals the verification scale interval e .

(Amended 1990, and 2024, and 202X)

T.N.2. Tolerance Application.

T.N.2.1. General. – **The tolerance values are positive (+) and negative (–) with the weighing device adjusted to zero at no load. When tare is in use, the tolerance values are applied from the tare zero reference (zero net weight indication); the tolerance values apply to the net weight indication for any possible tare load using certified test loads. The tolerances herein prescribed shall be applied to errors of underregistration and errors of overregistration. The tolerances apply to errors in gross weight indication starting at gross load zero. The tolerances also apply errors in net weight indication starting at net load zero. In both cases, the starting zero shall be accurate to $\frac{1}{4}e$ before addition of the test load.**

(Amended 2008 and 202X)

Previous Status:

2024: New Proposal

Item Development:

ISWM no issue.

UR.3.1.X. Required Minimum Loads for Cannabis Products.

- (a) **The use of italicized text in the references to “Cannabis” is only to denote its proper taxonomic term; the italicized font does not designate a “nonretroactive” status as is the convention used throughout NIST Handbook 44.**
- (b) **The recommended minimum loads specified in Table 8 shall be considered required minimum loads for scales used to weigh Cannabis and Cannabis-containing products.**
- (c) **Scales used for commercial purposes to buy or sell all Cannabis products or the production of Cannabis products that have a total weight of 3 ounces or less shall be a Class II scale, be traceable to a National Type Evaluation Program Certificate of Conformance, and have a verification scale interval of not greater than 0.01 g. A scale with a higher accuracy class than that specified as “typical” in Table 7a. Typical Class or Type of Device for Weighing Applications may be used.**

(Added 20XX)

Previous Action:

2024: Assigned to the Cannabis Task Group
 2023: Assigned to the Cannabis Task Group
 2022: Assigned to the Cannabis Task Group

The submitter requested that this item be a Developing Item.

- (c) Scales used for commercial purposes to buy or sell all Cannabis products or the production of Cannabis products that have a total net weight of 3 ounces or less shall be a Class II scale with a National Type Evaluation Program Certificate of Conformance, and have a verification scale interval of not greater than 0.01 g. A scale with a higher accuracy class than that specified as “typical” in Table 7a. Typical Class or Type of Device for Weighing Applications may be used.

ISWM does not have a problem

SCL-25.4 V S.1.2.2.2. Class III, III L, and IIII Scales. and S.1.2.2.2.2. Weight Classifiers.

Source:

NCWM National Type Evaluation Program Weighing Sector

Purpose:

Specify that e is equal to d for weight classifiers.

Item under Consideration:

Amend Handbook 44 Scales Code and Appendix D. Definitions as follows:

S.1.2.2.2. Class III, III L, and IIII Scales. – The value of “e” is specified by the manufacturer as marked on the device. Except for dynamic monorail scales and weight classifiers, “e” must be equal to “d.”

(Added 1999) (Amended 2024) (Amended 20XX)

S.1.2.2.2.2. Weight Classifiers. – On a weight classifier, such as a postal or shipping scale that rounds up and is marked for special use, the value of “e” shall be equal to or less than “d”.

(Added 2024) (Amended 20XX)

Table S.6.3.b. Notes for Table S.6.3.a. Marking Requirements	
1. ...	
2. ...	
3. ...	
4. Exceptions to Note 3 regarding marking of “e” and “d”.	
(a) For an ungraduated scale such as an equal arm scale where the scale graduations do not represent a fixed weight quantity, the nominal capacity shall be shown together with the verification scale interval “e” (e.g. capacity 1,000 g e = 0.1 g, or Max 1,000 g e = 0.1 g). These devices have no “d”.	
(a) For a scale where e does not equal d, such as a scale equipped with an auxiliary indication or a weight classifier marked for special use, the nominal capacity shall be shown together with the verification scale interval “e,” and the scale division “d” (e.g., capacity 1,000 g e = 0.1 g d = 0.01 g, or Max 1,000 g e = 0.1 g d = 0.01 g).	
[Nonretroactive as of January 1, 1986]	
(Amended 2024 and 20XX)	
Notes 5 through 28 remain unchanged but have been removed for the sake of efficiency.	

Appendix D

weight classifier. – A digital scale that rounds weight values up to the next scale division verification scale interval. These scales usually have a verification scale interval that is smaller than the displayed scale division (d): [2.20]

(Added 1987) (Amended 2024 and 20XX)

Previous Status:

2025: New Proposal

ISWM all good

SCL-25.1 I S.5.2., S.6., and UR.3.1.

Source:

NIST Office of Weights and Measure

Part 1 and 2. Amendment of S.5.2 Parameters for Accuracy Class

Restructure S.5.2 and add new specification:

S.5.2. Parameters for Accuracy Class. – *The accuracy class of a weighing device is designated by the manufacturer and shall comply with parameters shown in Table 3.*

[Nonretroactive as of January 1, 1986]

- (a) *The accuracy class of a weighing device is designated by the manufacturer and shall comply with the parameters shown in Table 3.*

[Nonretroactive as of January 1, 1986]

(Amended 20XX)

(b) The minimum capacity of a scale is specified in Table S.5.2. Minimum Capacity and is based on the accuracy class and verification scale interval.

(Added 20XX)

Table S.5.2. Minimum Capacity		
Class	Value of Verification Scale Interval e	Minimum Capacity in scale divisions d (See notes)
I	equal to or greater than 0.001 g	100
II	0.001 g to 0.05 g, inclusive	20
III	equal to or greater than 0.1 g	50
III L	All	20
III L	All	50
III L	All	10

The displayed scale division d is not always equal to the verification scale division e. To ensure the correct values are used, refer to the required markings on the device (also see notes 3 and 4 in Table S.6.3.b.).

For an ungraduated device, the scale division d shall be replaced with the verification scale interval e in the last column.

The minimum capacity is 5 e for a weight classifier marked in accordance with a statement identifying its use for special applications.

(Added 20XX)

Part 3. Amendment of S.6 Marking Requirements

Amend Table S.6.3.a. as follows:

Table S.6.3.a. Marking Requirements					
To Be Marked With	Weighing Equipment				
	Weighing, Load-Receiving, and Indicating Element in Same Housing or Covered on the Same CC1	Indicating Element not Permanently Attached to Weighing and Load-Receiving Element or Covered by a Separate CC	Weighing and Load-Receiving Element Not Permanently Attached to Indicating Element or Covered by a Separate CC	Load Cell with CC (11)	Other Equipment or Device (10)
Manufacturer's ID (1)	X	X	X	X	X
Model Designation and Prefix (1)	X	X	X	X	X
Serial Number and Prefix (2)	X	X	X	X	X (16)
Certificate of Conformance Number (CC) (23)	X	X	X	X	X (23)
Accuracy Class (17)	X	X (8)	X (19)	X	
Nominal Capacity (3)(18)(20)	X	X	X		
Value of Scale Division, "d" (3)(4)	X	X			
Value of Verification Scale Division, "e" (3)(4)	X	X			
Minimum Capacity (29)	X	X			
Temperature Limits (5)	X	X	X	X	

Other rows of the table are not included in this proposal for brevity.

(Added 1990) (Amended 1992, 1999, 2000, 2001, 2002, 2004, and 2025 and 202X)

Amend Table S.6.3.b as follows:

Table S.6.3.b. Notes for Table S.6.3.a. Marking Requirements
<p>29. The device shall be marked with the minimum capacity, which shall be prefaced by the terms "Minimum Capacity", "Min. Capacity", "Min. Cap.", or "Min."</p> <p>[Nonretroactive as of January 1, 20XX]</p> <p>(Added 20XX)</p>

The other notes in the table are omitted for brevity in this proposal.

Part 4. Amendment of UR.3.1

Amend UR.3.1. as follows:

UR.3.1 Recommended minimum load - A recommended minimum load is specified in Table 8. Recommended Minimum Load A minimum load equal to the scale's minimum capacity as specified in Table S.5.2. is recommended since the use of a device to weigh light loads is likely to result in relatively large errors.

(Amended 20XX)

Table 8. Recommended Minimum Load		
Class	Value of Scale Division (d or e*)	Recommended Minimum Load (d or e*)
I	equal to or greater than 0.001 g	100
H	0.001 g to 0.05 g, inclusive	20
=	equal to or greater than 0.1 g	50
HH	All**	20
HH-L	All	50
HHH	All	10

*For Class I and H devices equipped with auxiliary reading means (i.e., a rider, a vernier, or a least significant decimal differentiated by size, shape or color), the value of the verification scale division "e" is the value of the scale division immediately preceding the auxiliary means. For Class HH and HHH devices the value of "e" is specified by the manufacturer as marked on the device; "e" must be less than or equal to "d."

**A minimum load of 10 d is recommended for a weight classifier marked in accordance with a statement identifying its use for special applications.

(Amended 1990)

Previous Status:

2025: New Proposal

ISWM does not have a problem

SCL-25.2 V Table S.6.3.a. Marking Requirements and Definitions

Source:

NIST Office of Weights and Measures

Purpose:

Bring the definition of emin in alignment with the recent changes that clarified references to the verification scale interval and the scale division and update the terms that describe emin in Table S.6.3.a.

Item under Consideration:

Amend the Handbook 44, Section 2.20. Scales Code as follows:

Table S.6.3.a. Marking Requirements					
To Be Marked With	Weighing Equipment				
	Weighing, Load-Receiving, and Indicating Element in Same Housing or Covered on the Same CC1	Indicating Element not Permanently Attached to Weighing and Load-Receiving Element or Covered by a Separate CC	Weighing and Load-Receiving Element Not Permanently Attached to Indicating Element or Covered by a Separate CC	Load Cell with CC (11)	Other Equipment or Device (10)
Minimum Verification Scale DivisionInterval(emin)			X (19)		

(Added 1990) (Amended 1992, 1999, 2000, 2001, 2002, 2004, 2024, and 20XX)

Many rows of the table are not included in this proposal for brevity.

And,

Amend the Handbook 44 Definitions as follows

e^{\min} (minimum verification scale division). – The smallest scale division for which a weighing element complies with the applicable requirements. [2.20, 2.21, 2.24]

(Added 1997) (Amended 20XX)

And add a new definition of emin that replaces the term "division" with "interval," which will apply only to Section 2.20. Scales Code as follows:

e_{\min} (minimum verification scale interval). – The smallest verification scale interval for which a weighing element complies with the applicable requirements. [2.20]

(Added 1997) (Amended 20XX)

Previous Status:

2025: New Proposal

NEWMA 2024 Annual Meeting: Mr. Michael Peeler (NJ) commented that this item appears to be housekeeping item and recommends a voting status.

ISWM not an issue.

SCL-25.3 D UR.3.14. Zero-Balance Recorded Weight for Forklift Scales

Source:

Pennsylvania Bureau of Ride and Measurement Standards

Purpose:

Add a provision to the User Requirements for medium capacity forklift scales to record zero reading immediately prior to weighing.

Item under Consideration:

Amend the Handbook 44, Section 2.20. Scales Code as follows:

UR.3.14. Zero-Balance Recorded Weight for Forklift Scales. – If a scale is utilized in onboard weighing with a forklift in absence of the customer witnessing, the scale shall indicate and record a zero-balance condition immediately prior to recording the weight of the load.

(Added 20XX)

Previous Status:

2025: New Proposal

ISWM: what does record mean? Is this display a zero-balance condition or is this record like print or audit trail? Zero balance or within the motion band for printer?

SCL-25.5 V T.N.2.4. Multi-Interval and Multi-Range (Variable Division-Value) Scales.

Source:

NIST Office of Weights and Measures

Purpose:

Replace the term “scale division” with the term “verification scale interval” in paragraph T.N.2.4. Multi-Interval and Multiple Range (Variable Division-Value) Scales.

Item under Consideration:

Amend the Handbook 44, Section 2.20. Scales Code as follows:

T.N.2.4. Multi-Interval and Multiple Range (Variable Division-Value) Scales. – For multi-interval and multiple range scales, the tolerance values are based on the value of the verification scale division interval of the range in use.

(Amended 20XX)

Previous Status:

2024: New Proposal

The ISWM agrees with this item

Thank you for considering our input to the committee. We are currently getting the ISWM input S&T Committee started and getting organized. It is our hope that we will have a representative at the NCWM meeting.

The NCWM Committee has reviewed and added our response to their agenda.



continued from page 27

time: the sensor atom temperature of around 100 microkelvin (very cold!) and the temperature of the leftover gas in the vacuum chamber, near room temperature at 300 kelvin.

I think Lord Kelvin would be amazed to learn that two very different temperatures could exist at the same time, and both need to be measured for a single experiment to work.

This statue of Lord Kelvin in Glasgow, Scotland, was adorned with a traffic cone, as other statues have been. It's believed to be a nod to the Scottish sense of humor.

Thermometers

Another interesting research pursuit here at NIST is trying to use atoms or molecules to build a thermometer that actually measures temperature.

You may be wondering what I mean. After all, you probably have multiple thermometers in and around your home, and they all give you some number in either Fahrenheit or Celsius. But the truth is they all measure some other physical quantity — like the resistance of a platinum wire or the voltage generated between two dissimilar metals — that depends on temperature.

For these devices to read out a temperature in Fahrenheit or Celsius, they must be calibrated. NIST does such calibrations, and it's more likely than not that the calibration for the thermometer in your home's thermostat can be traced through a complicated set of steps all the way back to NIST.

But we may be able to make this whole calibration process simpler by making thermometers that directly measure temperature, using techniques that Lord Kelvin would appreciate.

For example, my colleague Daniel Barker and I are working on using lasers to measure the distribution of velocities of a gas of rubidium atoms at room temperature and above. This technique, called Doppler thermometry, gets at the very heart of how Lord Kelvin understood temperature.

Together with my colleague Eric Norrgard, I am also working on two projects trying to create a new type of infrared thermometer using atoms and molecules. If these efforts are successful, calibrating our thermometers could get much easier, and it may further other scientific advancements as well.

Keeping It (Very) Cool in the Lab

I came to NIST as a postdoctoral researcher in 2012 after finishing my graduate work at Yale University.

As a postdoc, I worked with some of the coldest stuff in the universe: Bose-Einstein condensates (BECs). Like the CAVS, BECs are also made of laser-cooled atoms, but they have been cooled even further to less than 100 billionths (!) of a degree above absolute zero.

After my postdoc, I decided to stay at NIST and try to use my experience with ultracold atoms and lasers to realize practical and useful standards, like the CAVS.

I gain a great sense of pride when I see what appear to be glowing balls of ultracold atoms — which are certainly fun to play with — used to solve real-world measurement problems. I suspect that Lord Kelvin may have felt the same sense of pride to see his measurements and theories regarding thermodynamics (which were probably also fun to work on) be applied to make more efficient steam engines.

Happy Birthday, Lord Kelvin

Lord Kelvin didn't just calculate absolute zero. After his early work in establishing absolute temperature scales, he was instrumental in laying the first telegraph cables across the Atlantic Ocean. Lord Kelvin also invented a machine that predicted tides and a compass that helped the Royal Navy navigate the seas. While my research is not quite that varied, one of the ways I mix up my work is by working at both room temperature and temperatures near absolute zero.

One of the key things I have learned is that measuring temperature, as Lord Kelvin understood it, is almost always harder than you might think. While the ideas are straightforward, making them work in practice is the real challenge.

And this fact makes it even more impressive that Lord Kelvin accurately predicted the temperature of absolute zero ... in 1848.

On his 200th birthday, I'll take a moment to appreciate that.

About the author

Stephen Eckel



Stephen Eckel is a physicist in the Sensor Science Division. His research focuses on using atoms, both at room temperature and ultracold, to probe thermodynamic quantities like pressure and temperature in calibration-free ways. He earned his Ph.D. at Yale University in 2012 and came to NIST as a postdoctoral researcher working with Bose-Einstein condensates. When not in the lab working with atoms and lasers, you will most likely find him tending to his garden or driving antique Stanley Steam cars.

Minebea intec

The true measure



Hygienic Design

Become
a selected
Partner



The brand you can trust

High performance weighing products and solutions

As a Minebea Intec Partner you'll have access to a varied portfolio of high performance weighing products and software that enables you to improve the accuracy, reliability, profitability and efficiency of your customer's production processes. With dedicated personnel to take your call and support you throughout your Partner journey, we're committed to making the partnership a great success.



For more detailed information,
please contact us directly by mail

info-us@minebea-intec.com

Minebea Intec USA, Inc.
Suite 1 // 1180 Lincoln Ave.
Holbrook, NY 11741
Phone 866.963.8587 ext. 8623 Office
Mobile 631.921.9344

www.minebea-intec.com

ISWM Committees

- Communication
- Training
- Dealer Survey
- AI
- S&T
- Conference

Join and help us grow!



ISWM 2026 Conference
Doubletree by Hilton,
Sacramento, CA

March 10-12, 2026