



Is RaySafe's PTB traceability equivalent to NIST? Yes!

How Mutual Recognition Supports Equivalence and International Acceptance

The Global Measurement System Helps Ensure Accuracy and Equivalence

National Metrology Institutes (NMIs) like the Physikalisch-Technische Bundesanstalt (PTB) in Germany and the National Institute of Standards and Technology (NIST) in the US, play important roles in maintaining the International System of Units (SI) and facilitating global trade through mutual recognition agreements (MRAs). Specifying traceability towards the SI, rather than a specific NMI, is important for broader international acceptance.

National Metrological Institutes and Their Roles

Most countries have their own globally respected NMI, which is part of an international system that facilitates recognition of national measurement standards. They provide the foundation for accurate and reliable measurements in science, industry, and commerce by:

- **Realizing SI Units:** Develop and maintain national measurement standards that directly realize the SI units with the highest accuracy. For example, PTB maintains primary standards for the kilogram, meter, and second, while NIST maintains similar standards for the US.
- **Disseminating SI Units:** NMIs provide calibration services to industry and other users, helping to ensure traceability of measurements to the SI.



The RaySafe 452 is calibrated with traceability to PTB, an internationally recognized primary standard equivalent to NIST according to mutual recognition agreements used for international metrology. Both standards are traceable to the SI.

This is achieved through a chain of calibrations, linking measurements to national standards and ultimately to the SI.

- **Conducting Cutting-edge Metrological Research:** to help improve measurement techniques, develop new standards, and address emerging measurement challenges.



BIPM and CIPM: International Cooperation

The International Bureau of Weights and Measures (BIPM) and the International Committee for Weights and Measures (CIPM) play crucial roles in coordinating the global measurement system:

BIPM, located in Sèvres, France, acts as the central hub for international metrology, enabling collaboration between NMIs. It coordinates international comparisons of measurement standards and promotes the global uniformity of measurements.

CIPM, composed of metrology experts from member states, oversees the work of BIPM and makes recommendations on metrological matters. It also establishes procedures for the mutual recognition of national measurement standards.

Why Traceability to the SI

Traceability is a fundamental principle in metrology. Historically, many organizations specified traceability to their local NMI (e.g. NIST in the US). However, with the globalization of trade and the introduction of international standards like ISO 17025, traceability to the SI has become increasingly important to help ensure measurements are internationally recognized and accepted, regardless of where they are performed. Specifying traceability to the SI provides greater flexibility and resilience, allowing organizations to utilize calibration services from various recognized NMIs worldwide.

Mutual Recognition Arrangements State Equivalence

Mutual Recognition Arrangements (MRAs) are agreements between NMIs to recognize the equivalence of their national measurement standards and calibration certificates. NMIs participating in the CIPM MRA undergo rigorous peer assessments to demonstrate their technical competence and compliance with international standards. Once accepted, their calibration certificates are recognized by other signatory NMIs.

The CIPM MRA, signed by most industrialized nations, provides an international standard for measurements which helps ensure confidence in the accuracy and reliability, so measurements in one country can be accepted in another, thereby facilitating international trade, and eliminating the need for costly and time-consuming recalibrations when goods or services cross borders.

Our Conclusion

NMIs, along with the BIPM and CIPM, form a global infrastructure that helps ensure the accuracy and equivalence of measurements worldwide. Through traceability to the SI and the implementation of MRA, rather than a specific NMI, this system provides greater flexibility and helps ensure international acceptance of measurements which supports scientific progress, technological innovation, and international trade.

The RaySafe 452 survey meter is calibrated to PTB which is equivalent to NIST, all according to the mutual recognition agreements.

RaySafe

*We empower our everyday heroes
to focus only on protecting lives.*

Unfors RaySafe AB
Björklundabacken 10
436 57 Hovås, Sweden

For more information, contact us at:

+46 31 719 97 10
customerservice.se@raysafe.com
raysafe.com

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