VSL
National Metrology Institute

The history of metrology

2000 BC

Local Standard Units

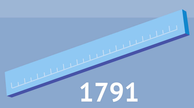
Throughout history, there has always been a need for standardization. The oldest known example of a standard unit is the Egyptian cubit—dating back to 2000 BC! However, these early efforts at standardizing measurements were always limited in scope and highly localized. Moreover, the units themselves were often inconsistent over time.

1789

The French Revolution

The rational, Enlightenment-driven thinking of the French Revolution ushered in a more systematic approach to measurements. And with their universal vision, revolutionary ideals were intended to transcend national borders.

1791



Defining the Metre

The French replaced older, local units of length with a single standard: the metre. At the time, the definition was quite different from today: one ten-millionth of the distance from the North Pole to the Equator, as measured along the meridian passing through Paris (based on measurements available at the time). The first physical standard for the metre was introduced in 1799—a platinum bar kept in Paris.

1795

The Metric System

After the introduction of the metre, other standard units were formalized in 1795: the are (for land area), the stère (for the volume of firewood), the liter (for the volume of liquids), the franc (for currency), and the gram (for mass).

1795 — 1875

Internationalization of the Metric System

The French standard units quickly gained favor in other countries. They made trade and the exchange of scientific knowledge much easier, and the Industrial Revolution benefited greatly from precision and standardized measurement.

1816

Standardization Law in the Netherlands

To introduce the metric system in the Netherlands, the Standardization Law (Ijkwet) was enacted. This marked the official end of units such as the gaarde, fathom, foot, mud, vat, last, and the ell. This was a significant improvement, as previously, units of measurement could vary greatly from city to city!

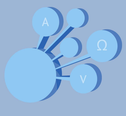
1875

The Metre Convention

As the metric system was embraced internationally, the desire to manage the system collectively grew. Seventeen countries signed the Metre Convention to ensure the global unity and ongoing improvement of the metric system. This also led to the establishment of the Bureau International des Poids et Mesures (BIPM) in Paris.

Standards can change. In 1889, the metre received a new physical standard for the first time. The original platinum bar was replaced with a new version that was less susceptible to wear and easier to reproduce for international use.

1921



Expansion of the Metre Convention

Initially, the Metre Convention was limited to standards for length and mass. However, in 1921 the scope was significantly expanded, thanks in part to the work of Italian physicist Giovanni Giorgi. New additions included the ampere, volt, and ohm.

1960

The SI System

Giorgi's work paved the way for the SI system, which is still the foundation of metrology today. The current SI system is built around seven base units, from which all other units can be derived.

Thanks to advances in atomic science, the 1967 definition is no longer defined by the Earth's rotation, but by how atoms oscillate.

1969

Dutch National Metrology Service

To consolidate all national measurement standards under one organization, the Dutch National Metrology Service (Dienst van het IJkwezen) was established in 1969. The service had a dual structure: a central laboratory on one side, and a collection of inspection services on the other.

Verification is a legal assessment and approval of instruments for certain applications. This is different from calibration, which determines (with a certain amount of uncertainty) the deviation of a measuring instrument, so it can be corrected if necessary.

1971

The Birth of VSL

The central metrology laboratory was renamed the Van Swinden Laboratory (VSL). The namesake, Professor Jean Henri van Swinden, was a mathematician and scientist who played a major role in defining the metric system and is known as the "godfather of the metre."

Since 1971, the noble has been used as the base unit for quantity of substance—a crucial development for chemistry!

1983

VSL Becomes Independent

In 1983, the definition of the metre changed yet again. Once again, the metre has nothing to do with the distance between the North Pole and the Equator, but with the speed of light. This was made possible by the emergence of laser interferometers.

Like many other government branches, VSL was privatized in the latter half of the 20th century. Well, "privatized"—until the early 21st century, the State remained the sole shareholder. Nonetheless, this independence laid the groundwork for our current range of services. Today, TNO is VSL's only shareholder.

2019

The SI 2.0

Science never stands still. As our understanding of the natural world deepens, our ability to measure becomes ever more precise. This means that standard units must evolve as well, as they did in 2019. Since then, for example, the kilogram has been defined using quantum mechanics!