

# National Metrology Centre (NMC)

Established in 1975, the National Metrology Centre (NMC) of the Agency for Science, Technology and Research (A\*STAR) serves as the custodian of the national measurement standards in Singapore. NMC is responsible for the establishment and maintenance of the nation's highest metrology reference standards traceable to the International System of Units (SI) established under the Metre Convention. NMC participates actively in international comparisons with other national metrology institutes and is a signatory of the International Committee for Weights and Measures Mutual Recognition Arrangement (CIPM MRA). NMC provides technical expertise and support in measurement and calibration technologies to the industry, research, government organisations and other end users.

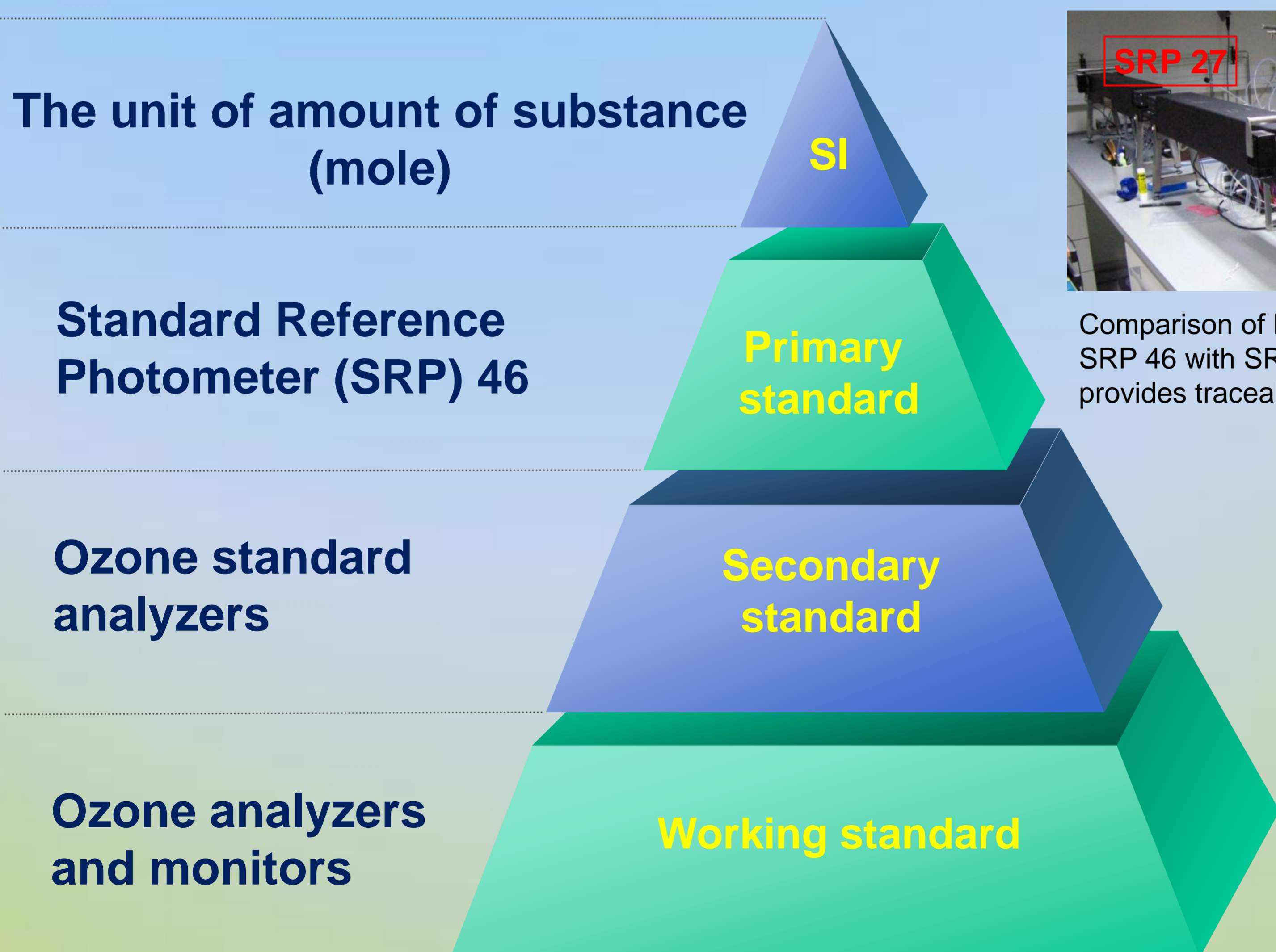
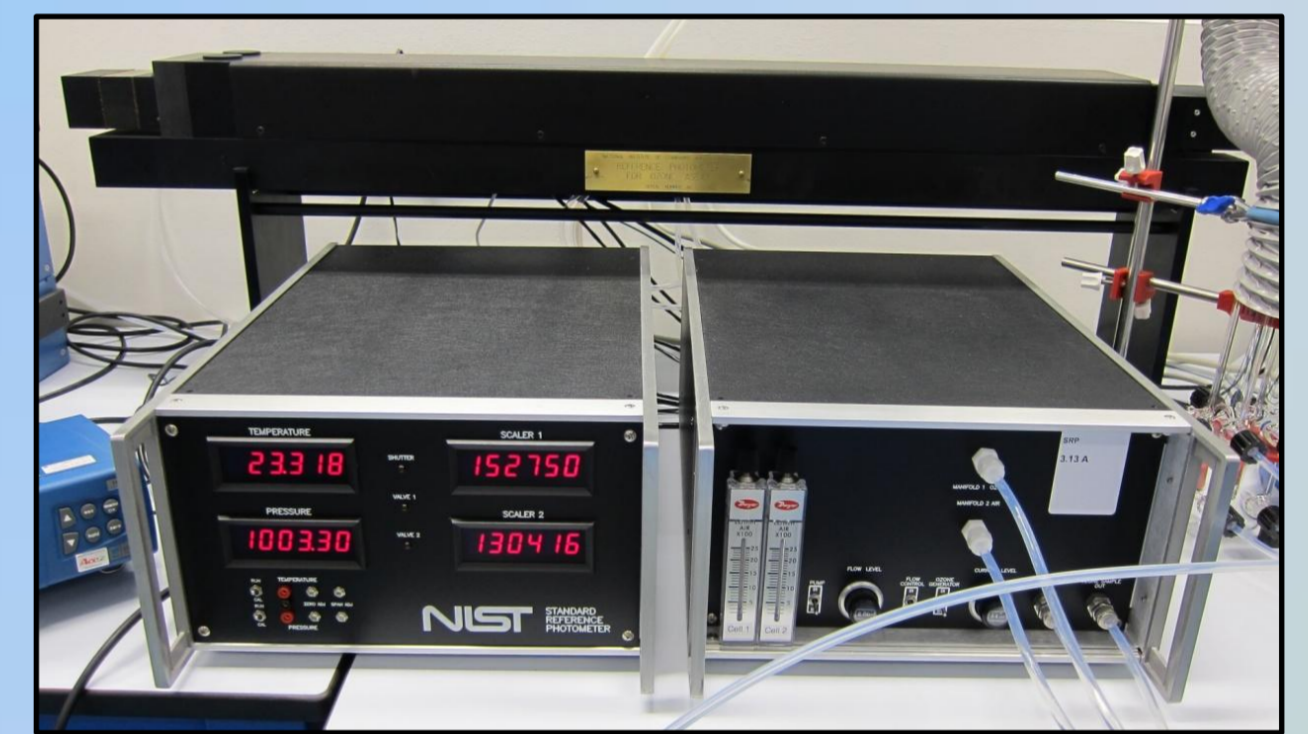
## Accurate and traceable ozone measurement

NMC has set up the gas metrology facility to provide reference standards for pollution gases such as carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>), and calibrating instruments for the measurement of ground level ozone (O<sub>3</sub>). The basic principle of ozone (O<sub>3</sub>) measurement is by measuring the absorption of ultraviolet (UV) radiation having wavelength of 254 nm. Similar to other gas analyzers, gas certified reference materials (CRMs) are required to assure the traceability of the measurement results of ozone analyzers. However, ozone is reactive and too unstable to be stored in a gas cylinder as CRM. To calibrate an ozone analyzer, ozone has to be produced and measured by the analyzer simultaneously.

Singapore's primary ozone standard is known as Standard Reference Photometer (SRP) 46. The SRP 46 has an ozone generator based on photolysis of oxygen (O<sub>2</sub>) contained in pure air using UV radiation at 185 nm, and is capable of producing ozone in the concentration range from 0 to 500 nmol/mol. The method of measurement is based on the absorption of UV radiation by ozone in the gas cells of the instrument using Beer-Lambert and ideal gas laws. To ensure traceability to the International System of Units (SI), the SRP 46 has been compared against the international reference ozone standard maintained at International Bureau of Weights and Measures (BIPM) under a key international comparison programme for ozone.

## Ozone analyzer calibration at NMC, A\*STAR

NMC provides accurate and traceable calibration on a wide range of ozone standard analyzers, analyzers and monitors with ozone generator (with/without ozone scrubber).



Comparison of NMC's Primary Ozone Standard SRP 46 with SRP 27 at the BIPM in France provides traceability in the measurement of ozone.

For more information on the calibration service, please contact:

Dr Teo Chin Chye, [teo\\_chin\\_chye@nmc.a-star.edu.sg](mailto:teo_chin_chye@nmc.a-star.edu.sg)

Dr Hou Li, [hou\\_li@nmc.a-star.edu.sg](mailto:hou_li@nmc.a-star.edu.sg)

Dr Liu Hui, [liu\\_hui@nmc.a-star.edu.sg](mailto:liu_hui@nmc.a-star.edu.sg)



National  
Metrology Centre

A \* STAR