Laboratory **REFERENCE GAS**

Instituto Português da Qualidade
PORTUGUESE INSTITUTE FOR QUALITY

LNM

FIELD OF ACTIVITY

Gravimetric Preparation Apparatus

Certification Equipment

Cylinders with special coating

The Reference Gas Laboratory is responsible for the production, development and maintenance of the gas mixtures national primary standards, handling to do:

- preparation and certification of reference gas mixtures (ISO 6142 and ISO 6143);
- calibrations;
- participation and coordination of interlaboratorial comparisons;
- to support the legal metrology.

SI UNIT

International System Base Unit of Amount of Substance:

mol

definition:

mol is the amount of substance of a system that contains so many elementary entities how many the atoms that exist in 0,012 kg of carbon 12.

When the unit mol is used, the entities that we are counting should be specified. Those entities can be atoms, molecules, ions, electrons, or other particles, or still specified groupings of particles.

Through several types of laboratories techniques it was possible to count the number of existent atoms in 0,012 kg of carbon 12. Such counting created the Avogadro constant that is represented by N_A (or L) [N_A = (6,022 140 857 (74) $\times$ 10^{23} mol^{-1}), according to "2014 CODATA Recommended Values"].

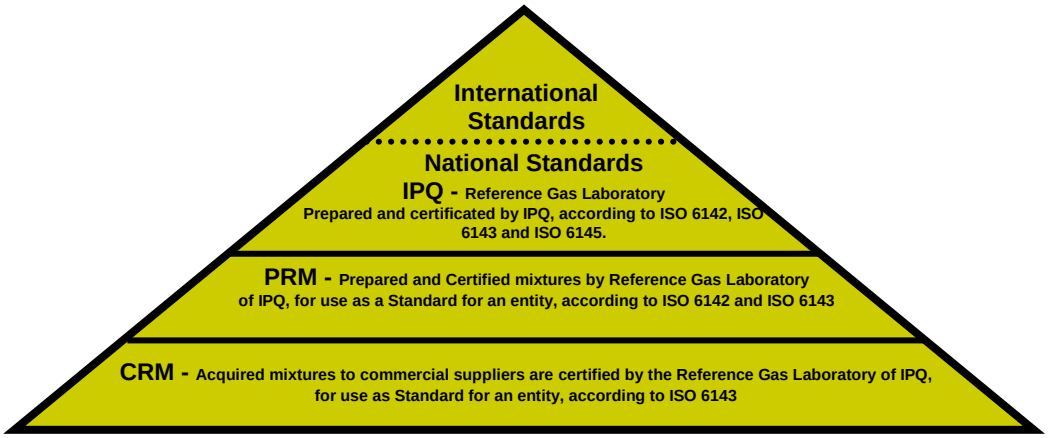
TRACEABILITY

Amount of Substance

The measurements traceability is done to national and international standards, guaranteed through the use of traceable equipment to the SI units and by the adoption of preparation and certification of gas mixtures methods in agreement with the applicable international standards.

The accuracy of the measurements made is proven through the participation in projects and in international comparisons, and it is demonstrated by the acceptance and inclusion in the Capacities of Measurement and Calibration (CMC) BIPM database for IPQ gas mixtures.

TRACEABILITY



AVALABLE SERVICES

Preparation and Certification of Reference Gas Mixtures:

COMPONEN T	RANGE (mol/mol)	RELATIVE UNCERTAINTY (%)	CMC
CO in N_2	(5 a 1000) µmol/mol (0,1 a 5) cmol/mol	(0,3 a 1,0) (0,5 a 0,9)	CIPM MRA
CO_2 in N_2	(300 a 1000) µmol/mol (0,1 a 20) cmol/mol	(0,2 a 0,5)	CIPM MRA
C_3H_8 in N_2	(20 a 1000) µmol/mol (0,1 a 5) cmol/mol	(1,0 a 2,0) (0,9 a 1,0)	CIPM MRA
C_2H_5OH in N_2	(80 a 750) µmol/mol	(0,7 to 2,0)	CIPM MRA
Automotive gases $CO+CO_2+C_3H_8$	Typical values of each component	(0,3 a 2,0)	CIPM MRA
Natural Gas*	Typical values of each component	2,0	CIPM MRA
O_2 em N_2	(0,5 a 30) cmol/mol	(0,4 a 2,0)	
NO em N_2	(25 a 1000) µmol/mol	(0,4 a 1,5)	CIPM MRA
NO_2 em N_2	(50 a 1000) µmol/mol	(1,0 a 2,0)	
SO_2 em N_2	(25 a 500) µmol/mol	(0,5 a 2,0)	CIPM MRA
H_2S em N_2	(5 a 150) µmol/mol	(0,7 a 5,0)	CIPM MRA
CH_4 em N_2	(0,1 a 4,5) cmol/mol	(0,3 a 0,8)	

* Certification only; 1nmol/mol = 1 ppb; 1µmol/mol = 1 ppm; 1cmol/mol = 1%

CONTACT

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