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Nitrous Oxide

N₂O 44.01

Nitrogen oxide (N₂O).

Nitrogen oxide (N₂O) CAS RN®: 10024-97-2; UNII: K50XQU1029.

» Nitrous Oxide contains not less than 99.0 percent, by volume, of N₂O.

Packaging and storage—Preserve in cylinders.

[NOTE—The following tests are designed to reflect the quality of Nitrous Oxide in both the vapor and liquid phases that are present in previously unopened cylinders. Reduce the container pressure by means of a regulator. Withdraw the samples for the tests with the least possible release of Nitrous Oxide consistent with proper purging of the sampling apparatus. Measure the gases with a gas volume meter downstream from the detector tubes in order to minimize contamination or change of the specimens. Perform tests in the sequence in which they are listed.]

The various detector tubes called for in the respective tests are listed under *Reagents* in the section [Reagents, Indicators, and Solutions](#).

Identification—

A: With the container temperatures the same and maintained between 15° and 25°, concomitantly read the pressure of the Nitrous Oxide container and of a container of nitrous oxide certified standard (see under *Reagents* in the section [Reagents, Indicators, and Solutions](#)). [NOTE—Do not use the nitrous oxide certified standard if it has been depleted to less than half of its full capacity.] The pressure of the Nitrous Oxide container is within 50 psi of that of the nitrous oxide certified standard.

B: Pass 100 ± 5 mL released from the vapor phase of the contents of the Nitrous Oxide container through a carbon dioxide detector tube at the rate specified for the tube: no color change is observed (*distinction from carbon dioxide*).

C: Collect about 100 mL of the gas under test in a 100-mL tube fitted at the top with a stopcock. Open the stopcock, and quickly add a freshly prepared solution of 500 mg of pyrogallol in 2 mL of water and a freshly prepared solution of 12 g of potassium hydroxide in 8 mL of water. Immediately close the stopcock, and mix: the gas is not absorbed, and the solution does not become brown (*distinction from oxygen*).

Water—It meets the requirements of the test for *Water* under [Carbon Dioxide](#).

Limit of ammonia—Proceed with Nitrous Oxide as directed in the test for *Carbon monoxide*, except to use an ammonia detector tube: the indicator change corresponds to not more than 0.0025%.

Limit of nitric oxide—Pass 500 ± 50 mL, released from the vapor phase of the contents of the container, through a nitric oxide–nitrogen dioxide detector tube at the rate specified for the tube: the indicator change corresponds to not more than 1 ppm.

Carbon monoxide—Pass 1000 ± 50 mL, released from the vapor phase of the contents of the container, through a carbon monoxide detector tube at the rate specified for the tube: the indicator change corresponds to not more than 0.001%.

Nitrogen dioxide—Arrange a container so that when its valve is opened, a portion of the liquid phase of the contents is released through a piece of tubing of sufficient length to allow all of the liquid to vaporize during passage through it, and to prevent frost from reaching the inlet of the detector tube. Release into the tubing a flow of liquid sufficient to provide 550 mL of the vaporized sample plus any excess necessary to ensure adequate flushing of air from the system. Pass 550 ± 50 mL of this gas through a nitric oxide–nitrogen dioxide detector tube at the rate specified for the tube: the indicator change corresponds to not more than 1 ppm.

Halogens—Pass 1000 ± 50 mL, released from the vapor phase of the contents of the container, through a chlorine detector tube at the rate specified for the tube: the indicator change corresponds to not more than 1 ppm.

Carbon dioxide—Pass 1000 ± 50 mL, released from the vapor phase of the contents of the container, through a carbon dioxide detector tube at the rate specified for the tube: the indicator change corresponds to not more than 0.03%.

Air—Not more than 1.0% of air is present, determined as directed in the Assay.

Assay—Introduce a specimen of Nitrous Oxide taken from the liquid phase, as directed in the test for *Nitrogen dioxide*, into a gas chromatograph by means of a gas-sampling valve. Select the operating conditions of the gas chromatograph such that the peak response resulting from the following procedure corresponds to not less than 70% of the full-scale reading. Preferably, use an apparatus corresponding to the general type in which the column is 6 m in length and 4 mm in inside diameter and is packed with porous polymer beads, which permits complete separation of N₂ and O₂ from N₂O, although the N₂ and O₂ may not be separated from each other. Use industrial grade helium (99.99%) as the carrier gas, with a thermal-conductivity detector, and control the column temperature: the peak response produced by the

assay specimen exhibits a retention time corresponding to that produced by an air–helium certified standard (see under [Reagents](#) in the section [Reagents, Indicators, and Solutions](#)), and is equivalent to not more than 1.0% of air when compared to the peak response of the air–helium certified standard, indicating not less than 99.0%, by volume, of N₂O.

Auxiliary Information - Please [check for your question in the FAQs](#) before contacting USP.

Topic/Question	Contact	Expert Committee
NITROUS OXIDE	Documentary Standards Support	SM52020 Small Molecules 5
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM52020 Small Molecules 5

Chromatographic Database Information: [Chromatographic Database](#)

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