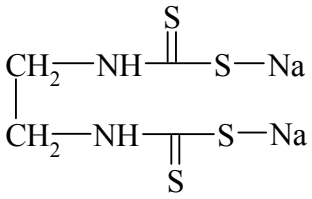
NABAM
21



ISO common name	Nabam
Chemical name	Disodium ethylenebis(dithiocarbamate) (IUPAC); disodium 1,2-ethanediylbis (carbamodithioate) (CA; *142-59-6*)
Empirical formula	$C_4H_6N_2Na_2S_4$
RMM	256.3
m.p.	Decomposes
Solubility	In water about 200 g/l; insoluble in common organic solvents
Description	White solid. The technical material is a buff to yellow powder
Stability	Decomposed by sunlight, moisture and heat. Stable as an aqueous solution
Formulations	Aqueous solutions

NABAM TECHNICAL
*21/TC/M/-

1 Sampling. Take at least 400 g. Use airtight containers. There should be no free air space between the sample and the container lid.

2 Identity tests.

2.1 CS_2 evolution. MT 153, CIPAC F, *p. 360*.

2.2 Identification of amines. MT 152, CIPAC F, *p. 357*.

2.3 Test for dithiocarbamate based on a primary amine

* CIPAC method 1964; revised 1967 and 1981. Prepared by the Dithiocarbamates Subcommittee of PAC; Chairman, H Crossley (The Murphy Chemical Co. Ltd.).

REAGENT

Mercury(II)chloride 0.2 mol/l

PROCEDURE Dissolve the sample (0.5 g) in water (10 ml), add the mercury(II)chloride solution (5 ml), and heat to about 80 °C. Nabam will give a pale yellow/orange precipitate which changes to black/brown on heating with an odour of isothiocyanates (Lachrymatory).

2.4 Melting point of oxidation product

REAGENTS

Hydrogen peroxide 28% w/w
Sulphuric acid concentrated
Oxidant mixture. Add hydrogen peroxide (25.2 g) and concentrated sulphuric acid (21 g) cautiously to water and then dilute to 500 ml with water.
Litmus

PROCEDURE Dissolve the sample (0.5 g) in water (20 ml) and add dropwise, and with shaking, sufficient of the oxidant to render the solution just acid to litmus. Filter off the precipitate, wash with water, air dry at about 50 °C, and determine its melting point by MT 2. The melting point of the nabam oxidation product is 160 to 190 °C. The wide range for the melting point is because of varying degrees of polymerisation of the products.

3 Nabam As for maneb technical **61**/TC/M/3 omitting the initial treatment with tetrasodium EDTA, and except:

(c) Calculation

$$\text{Nabam content} = \frac{128.2 \times N \times (t - b)}{w} \text{ g/kg}$$

$$\text{Nabam dihydrate content} = \frac{146.2 \times N \times (t - b)}{w} \text{ g/kg}$$

Repeatability r = 7 g/kg at 950 g/kg active ingredient content
Reproducibility R = 27 g/kg at 950 g/kg active ingredient content

NABAM AQUEOUS SOLUTIONS
*__21__/SL/M/-

1 Sampling. Take at least 500 ml.

2 Identity tests. As for nabam technical **21**/TC/M/2 except use for 2.1, 2.3 and 5 ml of sample and for 2.4 5 ml of sample diluted to 10 ml water.

3 Nabam

OUTLINE OF METHOD As for maneb technical **61**/TC/M/3.

REAGENTS As for maneb technical **61**/TC/M/3.

APPARATUS As for maneb technical **61**/TC/M/3 together with:

Volumetric flask 100 ml
Pipette 10 ml

PROCEDURE As for maneb technical **61**/TC/M/3 except replacing the sentence "Weigh (to the nearest 0.1 mg)..... reaction flask" by: Pipette 10 ml of the sample into a previously tared volumetric flask and reweigh to determine the mass of the sample (*w* g). Dilute to 100 ml with distilled water, and pipette 10 ml of this solution into the reaction flask.
Continue by **61**/TC/M/3*(b)* omitting the initial treatment with tetrasodium EDTA. 1 ml iodine, c(1/2 I2) = 0.1 mol/l ≡ 0.01282 g nabam
(c) Calculation

$$\text{Nabam content} = \frac{1282 \times N \times (t - b)}{w} \text{ g/kg}$$

Repeatability r = 6 g/kg at 230 g/kg active ingredient content
Reproducibility R = 12.2 g/kg at 230 g/kg active ingredient content

* CIPAC method 1964, revised 1981.