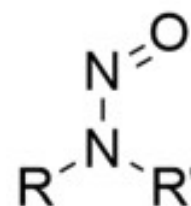


Analytical Standards of Nitrosamines

for Pharmaceutical, Food, and Water Environment Analysis

Introduction

Nitrosamines are compounds of the chemical structure where hydrogen of the amine nitrogen is substituted with a nitroso group. And these are known to be carcinogenic. Nitrosamine are often detected as impurities during the manufacturing process of a drug product. Recently, nitrosamines were detected in some sartan and ranitidine drug products, and these products were recalled. In response to this event, in September 2019, the EMA (European Medicines Agency) requested the marketing authorization holders to evaluate the risk of the presence of nitrosamine impurities in their drugs and take appropriate risk mitigation measures.



Product List

+ N-Nitrosodimethylamine Standard

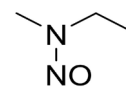
- » for Gas Chromatography
- » Abbrev. NDMA
- » CAS RN® 62-75-9



Wako Code 147-03781

+ N-Nitrosomethylethylamine Standard

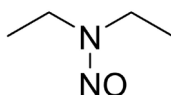
- » for Chromatography
- » Abbrev. NEMA, NMEA
- » CAS RN® 10595-95-6



Wako Code 140-10001

+ N-Nitrosodiethylamine Standard

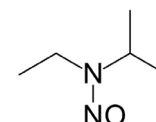
- » for Chromatography
- » Abbrev. NDEA
- » CAS RN® 55-18-5



Wako Code 141-09921

+ N-Nitrosoethylisopropylamine Standard

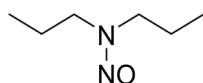
- » for Chromatography
- » Abbrev. EIPNA, NEIPA
- » CAS RN® 16339-04-1



Wako Code 142-09951

+ N-Nitrosodi-n-propylamine Standard

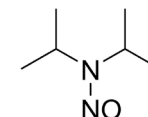
- » for Chromatography
- » Abbrev. NDPA
- » CAS RN® 621-64-7



Wako Code 140-09991

+ N-Nitrosodiisopropylamine Standard

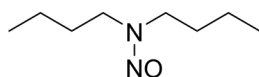
- » for Chromatography
- » Abbrev. DIPNA, NDIPA
- » CAS RN® 601-77-4



Wako Code 145-09941

+ N-Nitrosodi-n-butylamine Standard

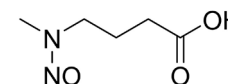
- » for Chromatography
- » Abbrev. NDPA
- » CAS RN® 924-16-3



Wako Code 149-09961

+ N-Nitrosomethylaminobutyric Acid Standard

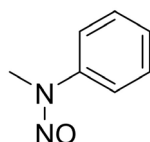
- » for Chromatography
- » Abbrev. NMBA
- » CAS RN® 61445-55-4



Wako Code 146-09971

+ N-Nitrosomethylphenylamine Standard

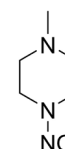
- » for Chromatography
- » Abbrev. NMPA
- » CAS RN® 614-00-6



Wako Code 148-09931

+ N-Nitroso-N'-methylpiperazine Standard

- » for Chromatography
- » Abbrev. MeNP
- » CAS RN® 16339-07-4

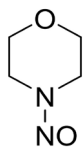


Wako Code 143-09981

+ N-Nitrosomorpholine Standard

- » for Chromatography
- » Abbrev. NMOR
- » CAS RN® 59-89-2

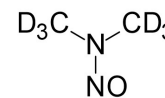
Wako Code 141-10031



+ N-Nitrosodimethylamine-d₆ Standard

- » for Chromatography
- » Abbrev. NDMA-d₆
- » CAS RN® 17829-05-9

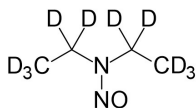
Wako Code 144-10021



+ N-Nitrosodiethylamine-d₁₀ Standard

- » for Chromatography
- » Abbrev. NDEA-d₁₀
- » CAS RN® 1219794-54-3

Wako Code 147-10011



Regulatory Trends in Each Country

Nitrosoamine	Abbreviation	FDA	USP	EMA	Ph. Eur.
<i>N</i> -Nitrosodi- <i>n</i> -butylamine	NDBA	✓	✓	✓	✓
<i>N</i> -Nitrosodiethylamine	NDEA	✓	✓	✓	✓
<i>N</i> -Nitrosodiisopropylamine	DIPNA, NDIPA	✓	✓	✓	✓
<i>N</i> -Nitrosodimethylamine	NDMA	✓	✓	✓	✓
<i>N</i> -Nitrosodi- <i>n</i> -propylamine	NDPA				✓
<i>N</i> -Nitrosoethylisopropylamine	EIPNA, NEIPA	✓	✓	✓	✓
<i>N</i> -Nitrosomethylaminobutyric Acid	NMBA	✓	✓	✓	✓
<i>N</i> -Nitrosomethylphenylamine	NMPA		✓	✓	
<i>N</i> -Nitroso- <i>N'</i> -methylpiperazine	MeNP			✓	
<i>N</i> -Nitrosomorpholine	NMOR			✓	
<i>N</i> -Nitrosomethylethylamine	NEMA				IS
<i>N</i> -Nitrosodiethylamine-d ₁₀	NDEA-d ₁₀				IS
<i>N</i> -Nitrosodimethylamine-d ₆	NDMA-d ₆		IS		
<i>N</i> -Nitrosodimethylamine- ¹³ C ₂ -d ₆	NDMA- ¹³ C ₂ -d ₆		IS		

IS: Internal Standard

Analytical Methods of USP and Ph. Eur

+ Ph. Eur. 10.6 2.4.42 N-Nitrosamine impurities in active substance (As of June 2021)

		Analyte	Internal Standard
Procedure A	LC/MS/MS	NDMA, NDEA, NMBA	NDEA-d ₁₀
Procedure B	GC/MS	NDMA, NDEA	NEMA
Procedure C	GC/MS/MS	NDMA, NDEA, NDBA, DIPNA, EIPNA, NDPA	NEMA

+ USP <1469> N-Nitrosamine Impurities (As of June 2021)

		Analyte	Internal Standard
Procedure 1	LC/HRMS	NDMA, NDEA, NDIPA, NEIPA, NMBA, NDBA, NMPA	
Procedure 2	GC/MS	NDMA, NDEA, NDIPA, NEIPA	NDMA-d ₆
Procedure 3	LC/MS/MS	NDMA, NDEA, NDIPA, NEIPA, NMBA, NDBA	
Procedure 4	GC/MS/MS	NDMA, NDEA, NDIPA, NEIPA, NDBA, NMPA	NDMA- ¹³ C ₂ -d ₆

* The regulated components and analytical methods are based on the information available as of June 2021. For details, see the website of each pharmacopoeia.

* Please check our website for details. Pharma Manufacturing & QC > QC Test > Analytical Standards of Nitrosamines <https://labchem-wako.fujifilm.com/us/category/02128.html>



Ordering Information

Wako Code	Product name	Storage condition	Package size
147-03781	<i>N</i> -Nitrosodimethylamine Standard	Keep at 2-10 °C	1 g
140-10001	<i>N</i> -Nitrosomethylethylamine Standard	Keep at -20 °C	50 mg
141-09921	<i>N</i> -Nitrosodiethylamine Standard	Keep at -20 °C	100 mg
142-09951	<i>N</i> -Nitrosoethylisopropylamine Standard	Keep at -20 °C	50 mg
140-09991	<i>N</i> -Nitrosodi- <i>n</i> -propylamine Standard	Keep at -20 °C	100 mg
145-09941	<i>N</i> -Nitrosodiisopropylamine Standard	Keep at -20 °C	50 mg
149-09961	<i>N</i> -Nitrosodi- <i>n</i> -butylamine Standard	Keep at -20 °C	100 mg
146-09971	<i>N</i> -Nitrosomethylaminobutyric Acid Standard	Keep at -20 °C	50 mg
148-09931	<i>N</i> -Nitrosomethylphenylamine Standard	Keep at -20 °C	50 mg
143-09981	<i>N</i> -Nitroso- <i>N'</i> -methylpiperazine Standard	Keep at -20 °C	50 mg
141-10031	<i>N</i> -Nitrosomorpholine Standard	Keep at -20 °C	100 mg
144-10021	<i>N</i> -Nitrosodimethylamine- d_6 Standard	Keep at -20 °C	100 mg
147-10011	<i>N</i> -Nitrosodiethylamine- d_{10} Standard	Keep at -20 °C	50 mg

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