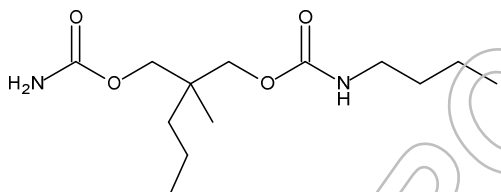




Certificate of Analysis

Reference Standard

Tybamate



Molecular Formula: $C_{13}H_{26}N_2O_4$
Molecular Weight: 274.36
CAS Number: 4268-36-4

Catalogue Number: MM1626.00
Lot Number: 42914
Long-term Storage: 2 to 8 °C, dark
Appearance: white solid
Melting Point (DSC): 55 °C
Assay 'as is': 98.3 %

Date of shipment: **2016-May-12**

This certificate is valid for one year from the date of shipment provided the substance is stored under the recommended conditions unopened in the original container.

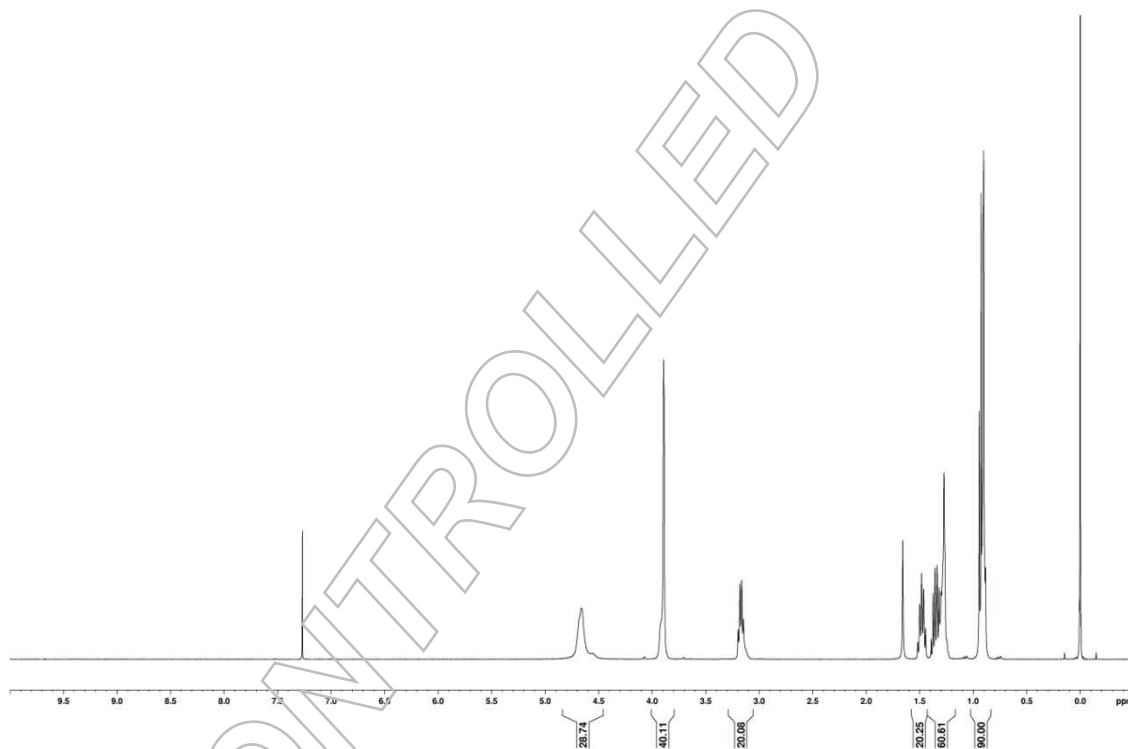


I. Identity

The identity of the reference substance was established by following analyses.

1a. ¹H-NMR Spectrum

Conditions: 400 MHz, CDCl₃

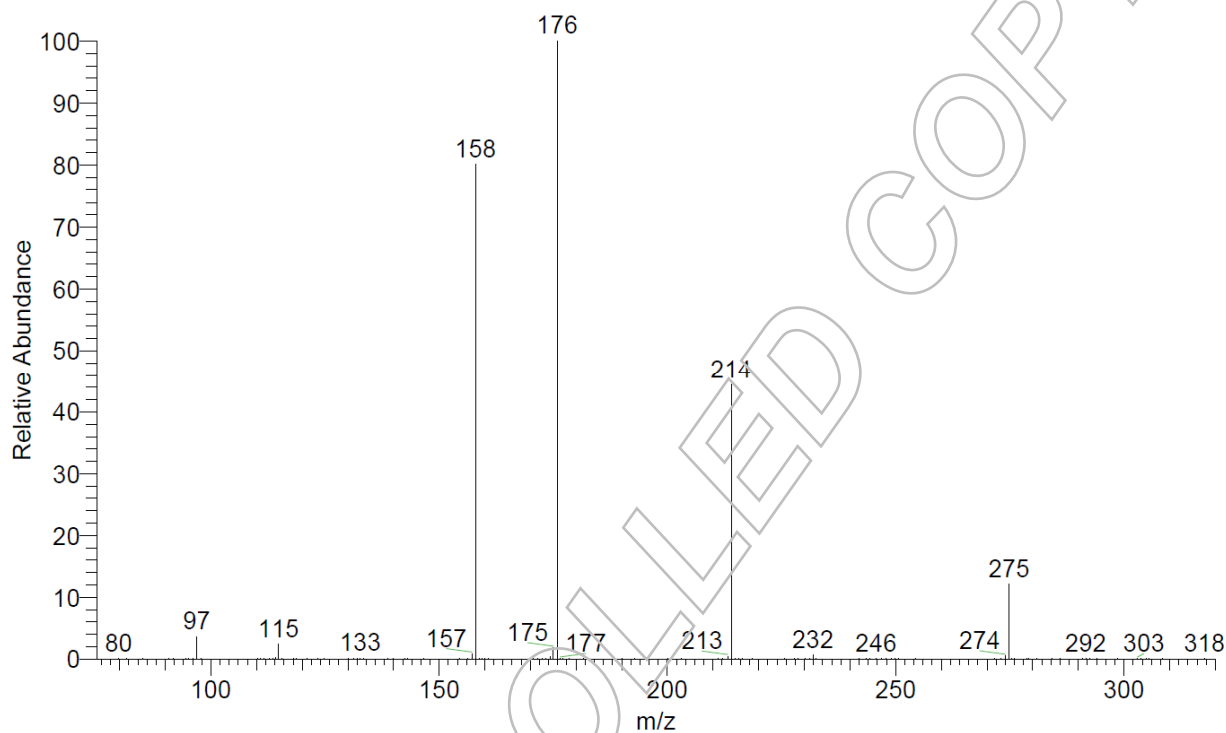


The structure is confirmed by the signals of the spectrum and their interpretation.



1b. Mass Spectrum

Method: 4.5 kV ESI+; vaporization temperature: 200 °C

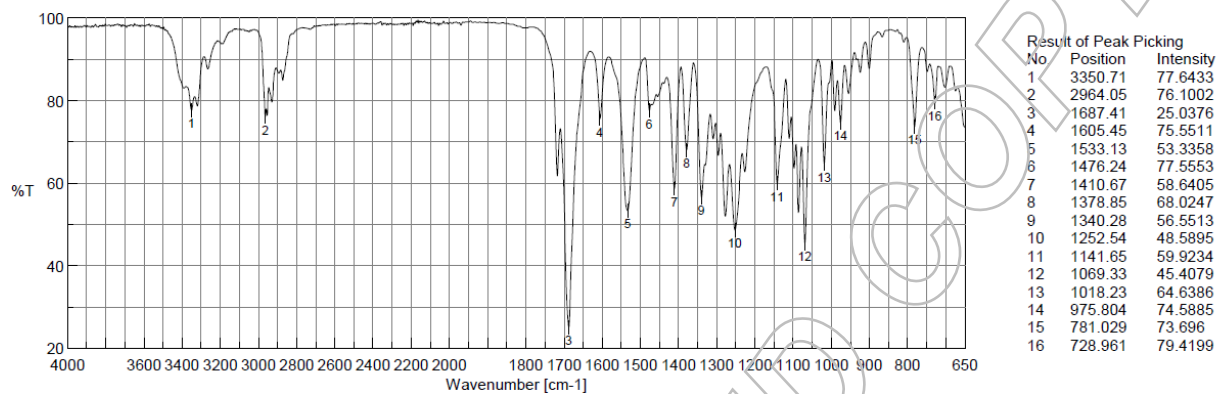


The signals of the mass spectrum and their interpretation are consistent with the structural formula.



Ic. IR Spectrum

Method: Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) Spectroscopy



The signals of the IR spectrum and their interpretation are consistent with the structural formula.

II. Purity

IIa. Water Content

Method: Karl Fischer titration

No significant amounts of water were detected (< 0.05 %).

IIb. Residual Solvents

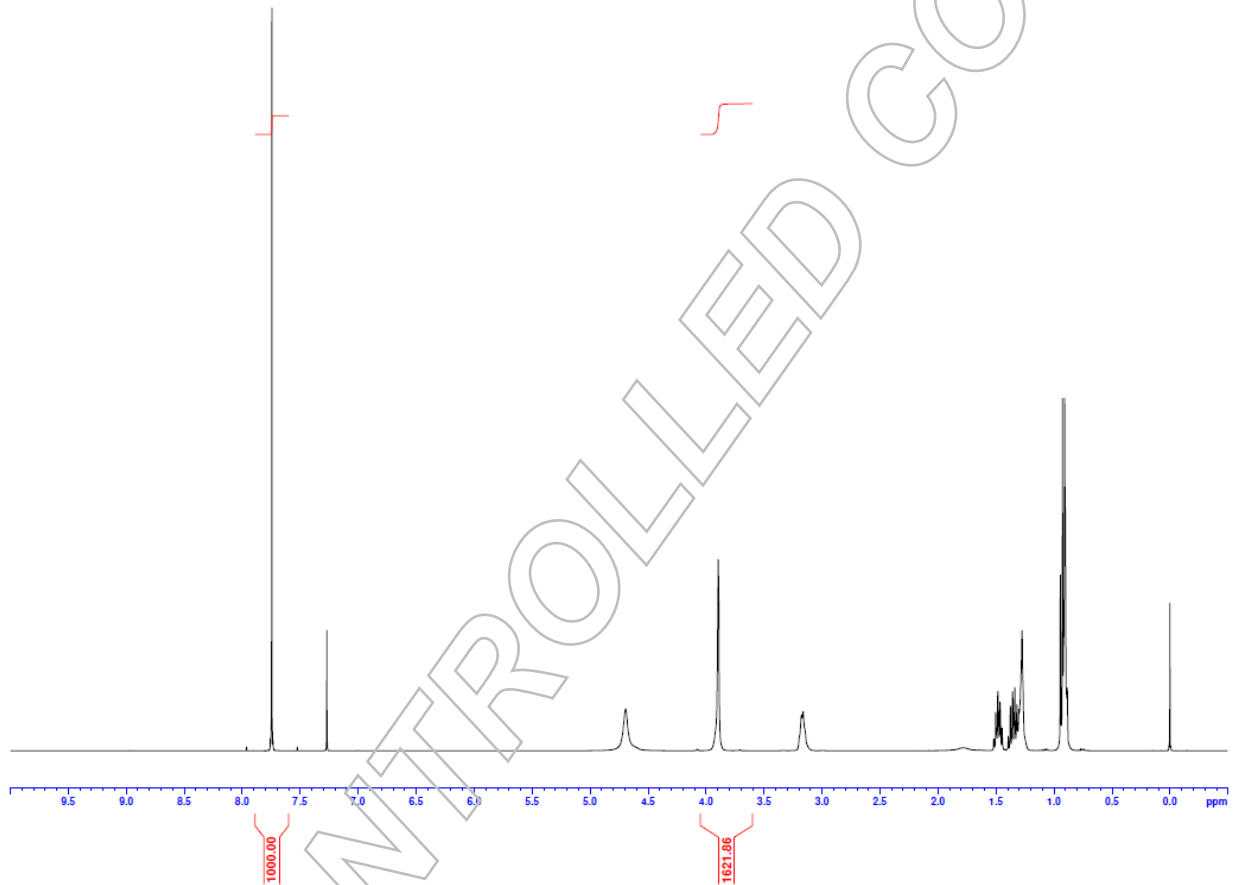
Method: ¹H-NMR

No significant amounts of residual solvents were detected (< 0.05 %).



III. Assay by Quantitative NMR Spectroscopy

The assay of the reference substance was established by quantitative NMR spectroscopy using CDCl_3 as the solvent and with 2,3,5,6-Tetrachloro-1-nitrobenzene (certified reference material, signal 7.60 - 7.89 ppm, 1 H) as internal standard.



Results:

Average	98.30 %
Number of results	n=6
Standard deviation	0.05 %



IV. Final Result

Water content	No significant amounts of water were detected (< 0.05 %) %
Residual solvents	No significant amounts of residual solvents were detected (< 0.05 %).
Assay Quantitative NMR Spectroscopy	98.30 %

The assay is assessed to be 98.3 % 'as is'

The assay 'as is' is equivalent to the assay based on the not anhydrous and not dried substance respectively.

Release Date:
Luckenwalde, 2015-08-25

Dr. Sabine Schröder
Product Release