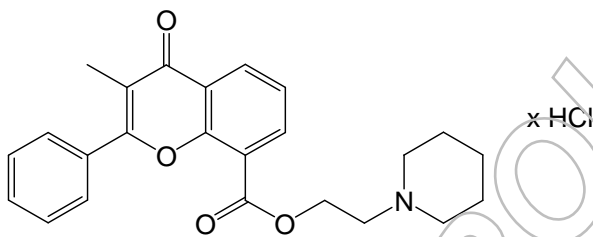




# Certificate of Analysis

## Reference Standard

Flavoxate Hydrochloride



Molecular Formula:  $C_{24}H_{25}NO_4 \cdot HCl$   
Molecular Weight: 427.92  
CAS Number: [ 3717-88-2 ]

Catalogue Number: MM0156.00  
Lot Number: 19381  
Long-term Storage: 2 to 8 °C, dark  
Appearance: white solid  
Melting Point: 235 °C (dec.)  
Assay 'as is': 99.95 %

Date of shipment: **2017-September-05**

This certificate is valid for two years from the date of shipment provided the substance is stored under the recommended conditions.



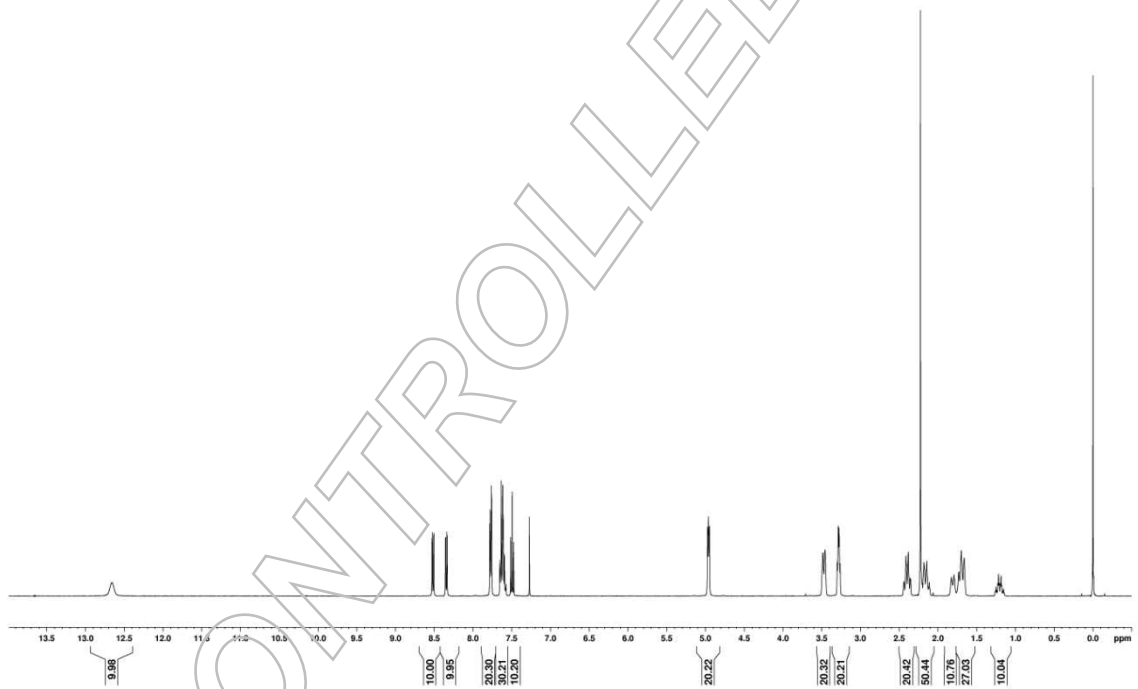
## I. Identity

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

### 1a. <sup>1</sup>H-NMR Spectrum

Conditions: 400 MHz, CDCl<sub>3</sub>

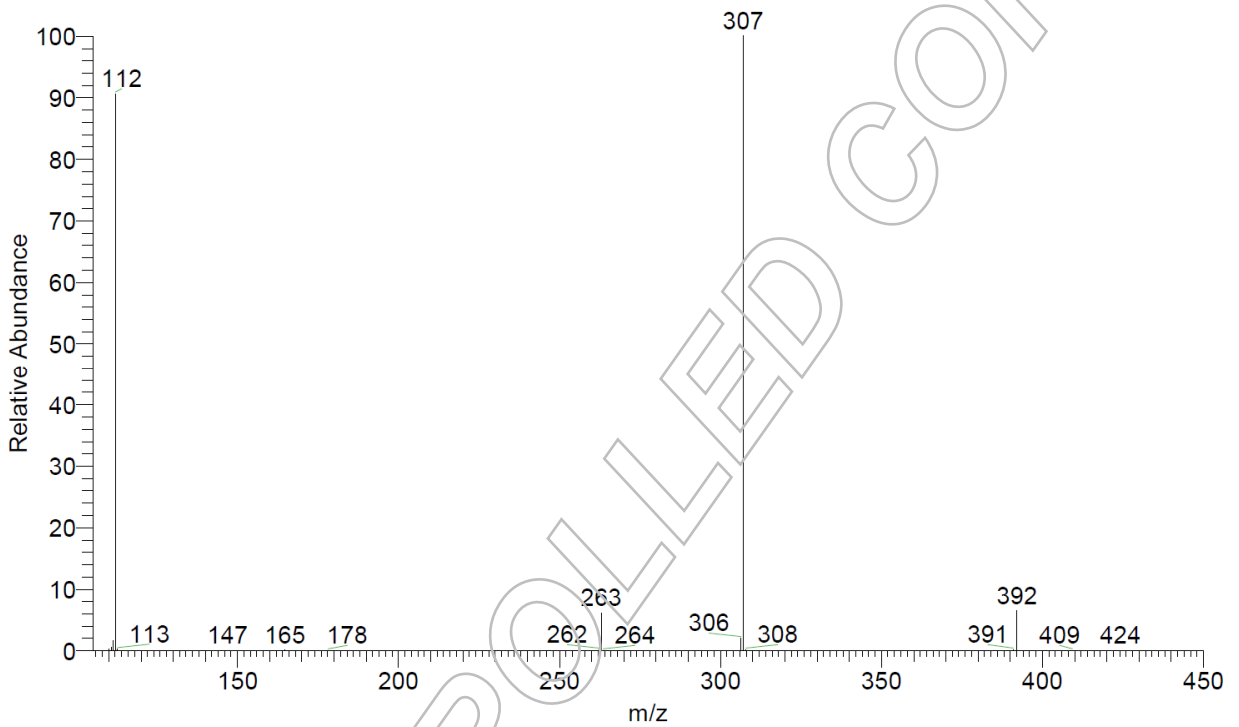
The structure is confirmed with the signals of the spectrum and their interpretation.





## Ib. Mass Spectrum

Method: 4.5 kV ESI; vaporization temperature: 200 °C, direct inlet



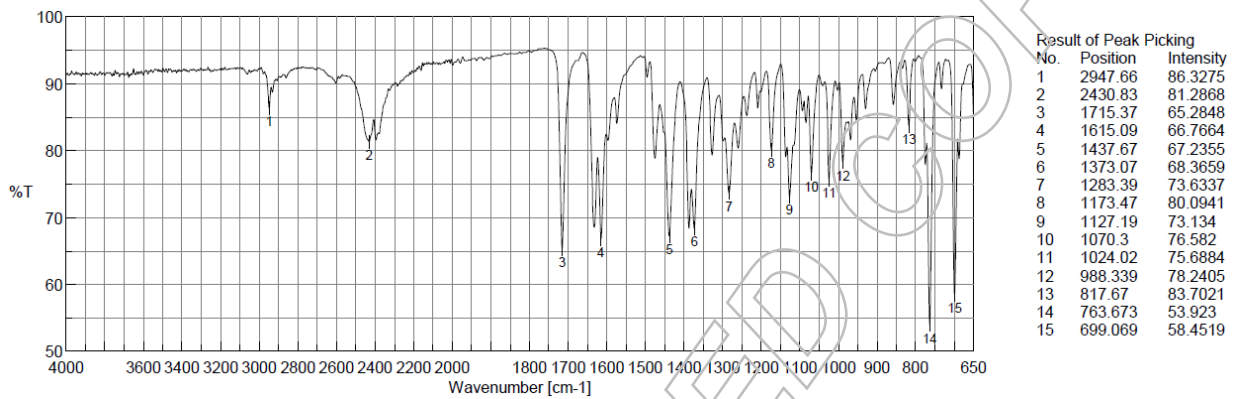
m/z	fragments (M = free base)
392	[ MH ]
307	[ M - C <sub>5</sub> H <sub>10</sub> N ]
263	[ C <sub>17</sub> H <sub>11</sub> O <sub>3</sub> ]
112	[ C <sub>7</sub> H <sub>14</sub> N ]

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

The purity of the reference substance was analysed by high performance liquid chromatography (HPLC).

### HPLC Conditions:

#### Column:

RP 60 Select B  
5 µm, 125 x 4 mm

#### Conditions:

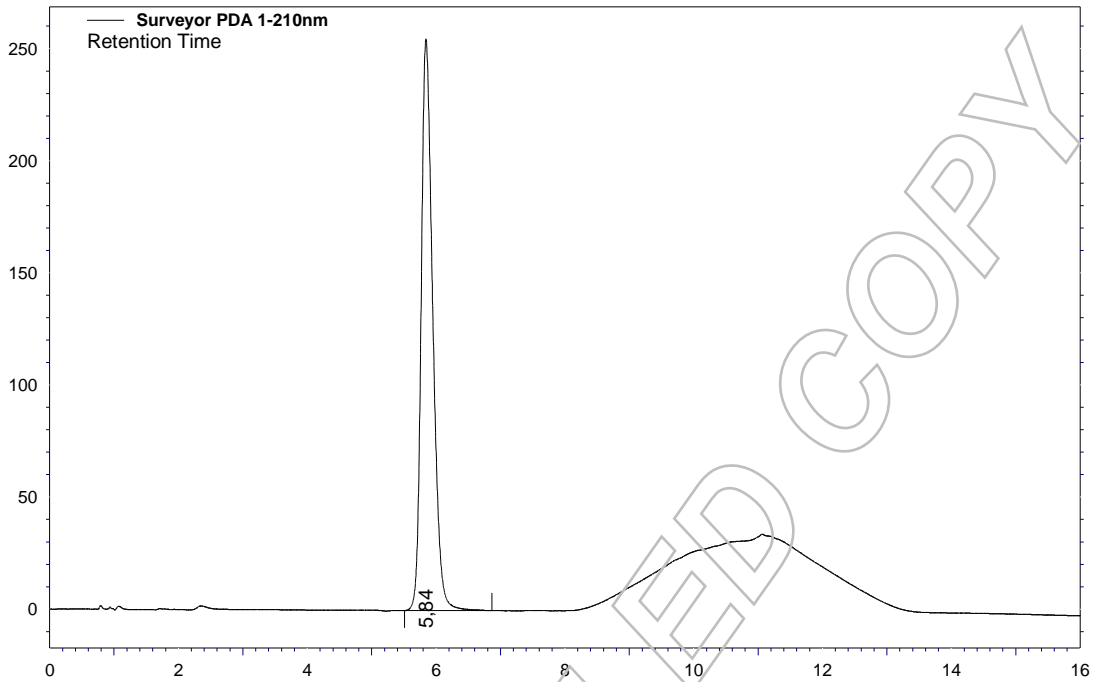
1.0 ml/min, 40 °C  
0 – 5 min Water/Acetonitrile 65/35  
6 – 9 min Water/Acetonitrile to 20/80  
9 – 11 min Water/Acetonitrile to 65/35  
11 – 16 min Water/Acetonitrile 65/35 (v/v);  
0.1 % H<sub>3</sub>PO<sub>4</sub>

#### Detector:

DAD  
210 nm

#### Injector:

Auto  
6 µl; 0.0338 mg/ml in  
Acetonitrile



**Area Percent Report - Sorted by Signal**

Pk #	Retention Time	Area	Area %
1	5.84	3186212	100.00
Totals		3186212	100.00

For the calculation the system peaks were ignored. The content of the analyte was determined as ratio of the peak area of the analyte and the cumulative areas of the purities, added up to 100 %.

**Results:**

Average 100 %  
Number of results n=3  
Standard deviation < 0.01 %

**III. Water Content**

Method: Karl Fischer titration

**Results:**

Average 0.05 %  
Number of results n=3  
Standard deviation < 0.01 %



#### IV. Residual Solvents

Method: <sup>1</sup>H-NMR

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

#### V. Assay by Elementary Analysis (Carbon Titration)

Method: percentage carbon found in relation to percentage carbon as calculated for molecular formula

##### Results:

Arithmetic mean (n=3) 99.99 % (mass fraction)

#### VI. Final Result

Total impurities (HPLC)	0.00 %
Water content	0.05 %
Residual solvents	n. d. (not detected)
Assay (100 % method) <sup>1</sup>	99.95 %

The assay is assessed to be 99.95 % 'as is'

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

Release Date: 2012-11-13

LGC GmbH

Dr. Sabine Schröder  
Product Release

<sup>1</sup> The calculation of the 100 % method follows the formula:

$$\text{Assay (\%)} = (100 \% - \text{KF} - \text{RES}) * \frac{\text{Purity HPLC (\%)}}{100 \%}$$

Water (KF) and Residual solvents (RES) are considered as absolute contributions, HPLC purity is considered as relative contribution.