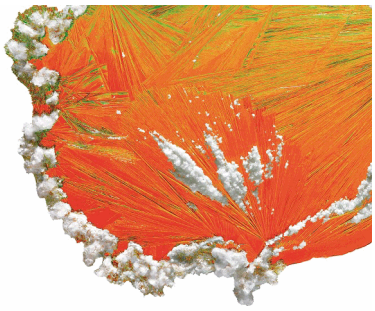
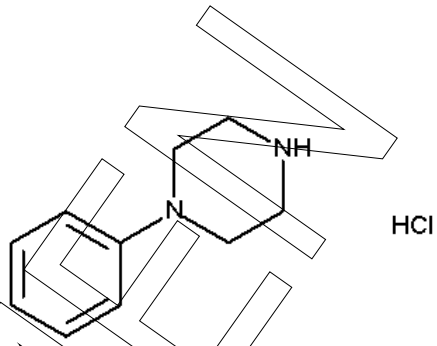


Certificate of Analysis

Reference Material

Product name

1-Phenylpiperazine Hydrochloride



Product code
MM1246.02-0025

Lot number
1192697

CAS number
2210-93-7

Appearance
off-white solid

Molecular weight
198.69

Melting point
241 °C (dec.)

Molecular formula
$C_{10}H_{14}N_2$ HCl

Long-term storage
2 to 8 °C, dark

Assay "as is"
98.5 %

Date of shipment: **11 Oct 2022**

Producer confirms that this reference material (RM) meets the specification detailed on this Certificate of Analysis for **two years** from the date of shipment, provided the substance is stored under the recommended conditions unopened in the original container.

Release by:	**Date of Release:**		
Dr. Sabine Schröder	Luckenwalde, 16 Nov 2021		Product Release

Product information

For laboratory use only. Not suitable for human or animal consumption.

Before usage of the RM, it should be allowed to warm to room temperature. No drying required, as the certified value is already corrected for the content of water and other volatile materials.

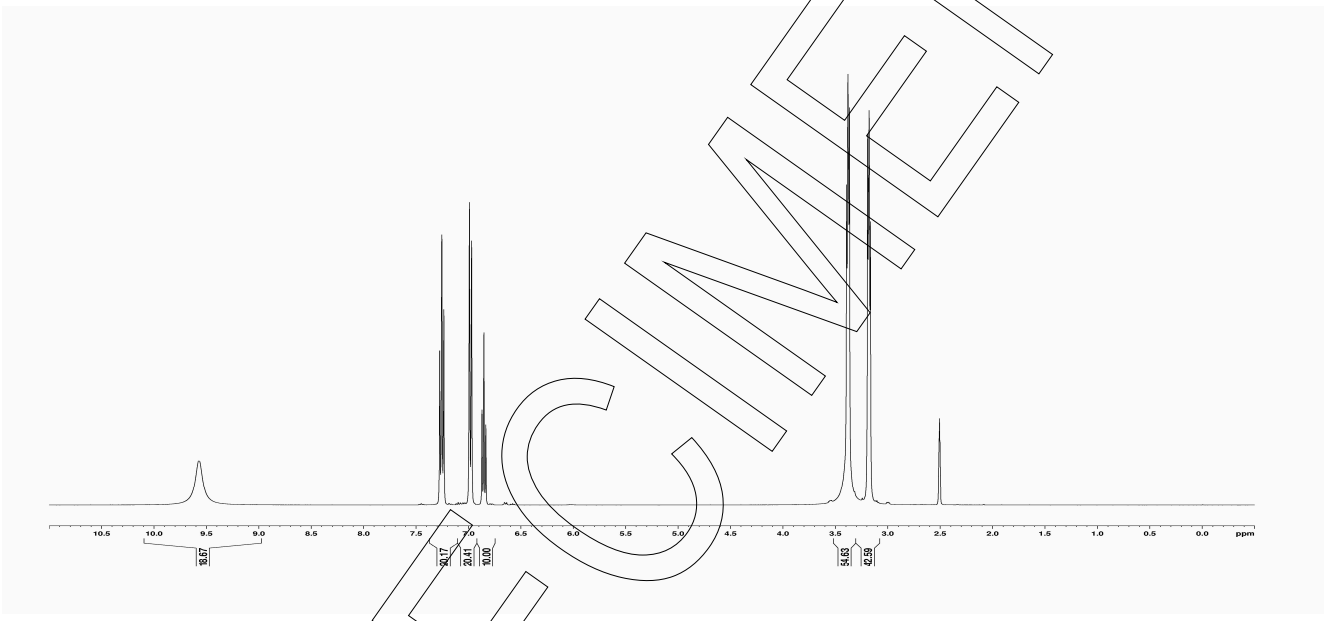
The product quality is controlled by regularly performed quality control tests (retests).

Further content

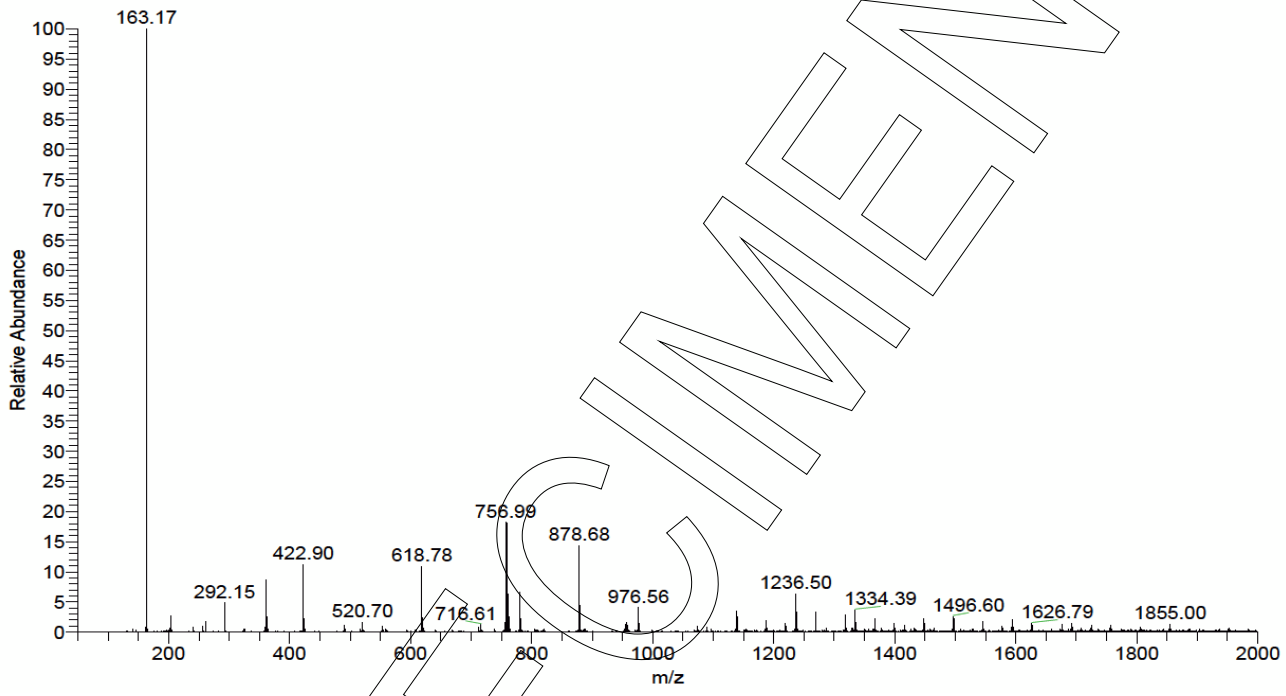
Identity

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

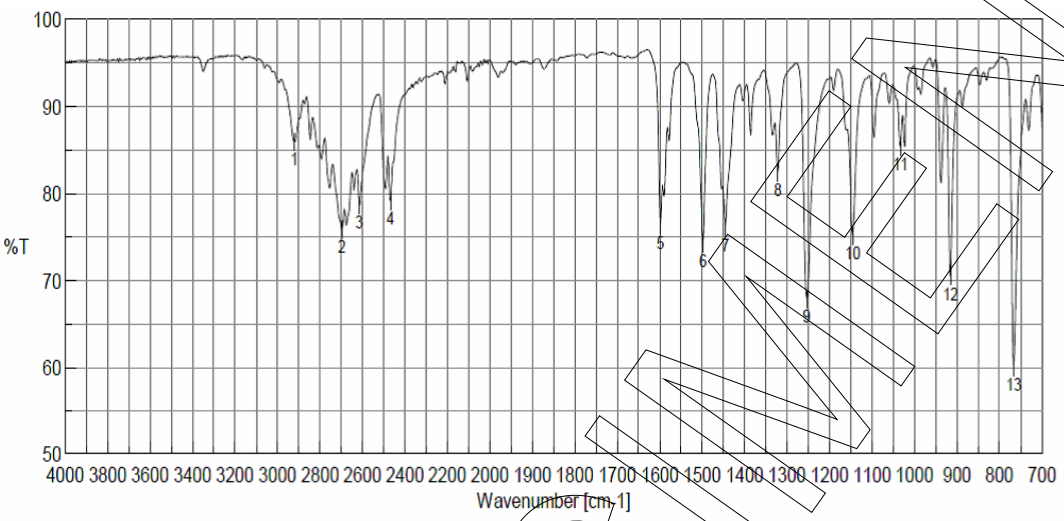
Method	Conditions	Result
^{1}H-NMR	400 MHz, DMSO-d_6	Structure confirmed



Method	Conditions	Result
MS	4.5 kV ESI+; vaporization temperature: 200 °C	Structure confirmed



Method	Conditions	Result
IR	Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) Spectroscopy	Structure confirmed



Result of Peak Picking

No.	Position	Intensity
1	2919.7	85.9112
2	2696	75.859
3	2614.04	78.5789
4	2468.44	79.0634
5	1598.7	76.258
6	1498.42	74.2436
7	1445.39	76.004
8	1321.96	82.3273
9	1253.5	67.8478
10	1145.51	75.0739
11	1033.66	85.3354
12	915.058	70.4203
13	766.566	59.9077

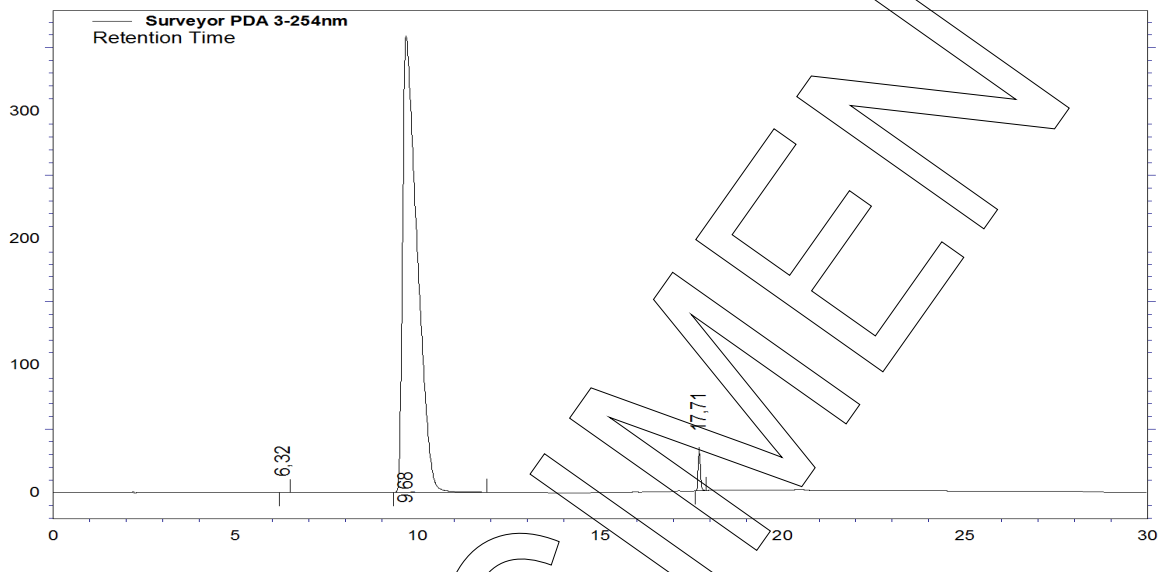
Assay

The assay of the reference material was assessed by following analyses.

Purity by High Performance Liquid Chromatography (HPLC)

HPLC Conditions:	
Column	Hypersil Gold C18; 5 µm, 150 x 4.6 mm
Column temperature	40 °C
Detector	DAD, 254 nm
Injector	Auto 5 µl; 0.422 mg/ml in Water
Flow rate	1.0 ml/min
Phase A	Water, 0.1 % H_3PO_4
Phase B	Acetonitrile, 0.1 % H_3PO_4
Gradient program	0-10 min A/B 95/5 10-15 min A/B to 60/40 15-20 min A/B 60/40 20-25 min A/B to 95/5 25-30 min A/B 95/5 (v/v)

HPLC chromatogram and peak table



Area percent report - sorted by signal				
Pk #	**Retention time**	**Area**	**Area %**	
1	6.32	860	0.01	
2	9.68	9875134	98.57	
3	17.71	142050	1.42	
Totals		**10018044**	**100.00**	

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 %. System peaks were ignored in calculation.

Result (n = 6)	98.57 %; SD < 0.01 %

Volatile content

Water content	
Method	Karl Fischer titration
Result (n = 3)	0.05 %; SD = 0.01 %

Residual solvents	
Method	^{1}H-NMR
Result (n = 1)	No significant amounts of residual solvents were detected (< 0.05 %).

Final result

Assay "as is": 98.52 %

The assay "as is" is assessed by 100% method (mass balance) and is equivalent to the assay based on the not anhydrous and not dried substance respectively.

The calculation of the 100% method follows the formula:

$$\text{Assay (\%)} = (100\ \% - \text{volatile contents (\%)}) \ * \ \frac{\text{Purity (\%)}}{100\ \%}$$

Volatile contents are considered as absolute contributions and purity is considered as relative contribution. Inorganic residues are excluded by additional tests.

Revision table

Revision	Date	Reason for revision
00	16 Nov 2021	Release of the Certificate of Analysis - initial version

Product warranties for the RM are set out in the terms and conditions of purchase.