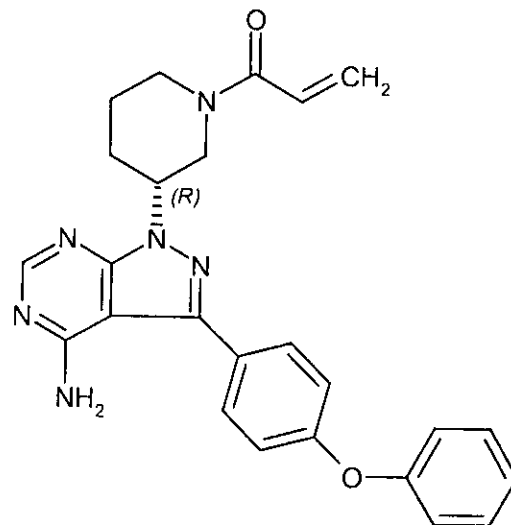


LC Laboratories®

CERTIFICATE OF ANALYSIS

Ibrutinib, Free Base, >99%

LC LABS CAT. NO. I-3311
FORMULA C₂₅H₂₄N₆O₂
M.W. 440.50
CAS NO. [936563-96-1]
STORAGE: Store at or below -20 °C***
SOLUBILITY: Soluble in DMSO at 200 mg/mL;
soluble in ethanol at 25 mg/mL
with slight warming.



ANALYTICAL DATA

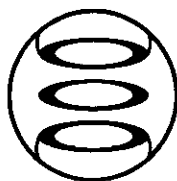
LOT NUMBER BRT-105
FORM Crystalline solid; granular or powder
COLOR White to off-white
HPLC PURITY >99% (see attached chromatogram)
TLC PURITY >99% (see attached chromatogram)
ELEMENTAL ANALYSIS For C₂₅H₂₄N₆O₂:

	<u>Calculated</u>	<u>Found</u>
C	68.17%	68.40%
H	5.49%	5.62%
N	19.08%	19.02%

***This product is stable at ambient temperature for several weeks during ordinary shipping and time spent in Customs or other delay. We recommend storage at -20 °C for long-term storage.

July 24, 2019

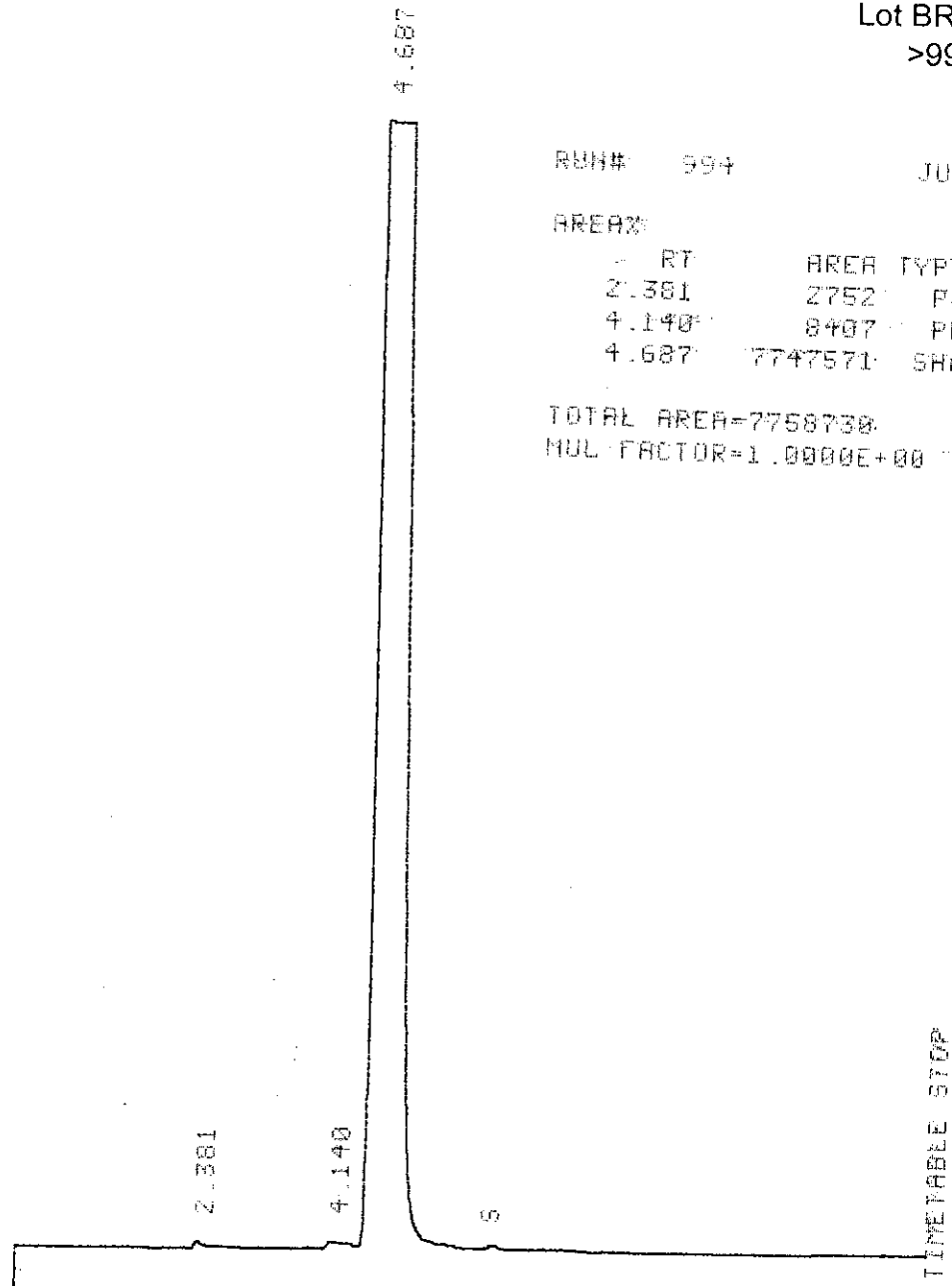
D:\COFA-BIZ\B-COFA\BRT105FL.WPD



LC Laboratories®

Cat. No. I-3311
Ibrutinib, Free Base
Lot BRT-105
>99%

*CAT. No. I-3311 IBRUTINIB, FREE BASE LOT No. BRT-105
* RUN# 994 JUL 21, 2019 13:53:14
START



RUN# 994 JUL 21, 2019 13:53:14

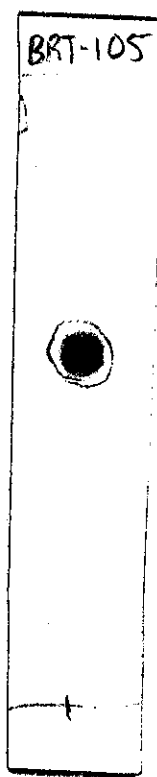
RT	AREA	TYPE	WIDTH	AREA%
2.381	2752	FB	.099	.03547
4.140	8407	PH	.287	.10836
4.687	7747571	SHB	.209	99.85616

TOTAL AREA=7758730
MUL FACTOR=1.0000E+00

HPLC: C₁₈ Column, 4.6 mm x 30 cm
Acetonitrile/Methanol/Water/Trifluoroacetic Acid 32/32/36/0.1
2 mL/min
UV₂₅₄ Detection



Cat. No. I-3311
Ibrutinib, Free Base
Lot BRT-105
>99%



- TLC: 60 Å silica gel plates with fluorescent indicator
- Develop with Chloroform/Methanol 90/10
- Visualize via UV fluorescence quenching
- Also visualize by exposure to iodine vapor