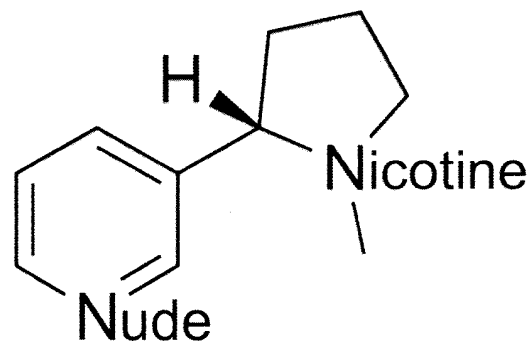


|                         |                          |
|-------------------------|--------------------------|
| <b>Product:</b>         | <b>Date of Analysis:</b> |
| Nicotine                | 7/8/14                   |
| CAS # 54-11-5           | <b>Lot Number:</b>       |
| Density – 1.01g/mL      | #A077                    |
| Molar Mass – 162.1g/mol |                          |



| Inspection Characteristic:                           | Specification:                            | Results:                 |
|--|---|--------------------------|
| Appearance   | Colorless viscous liquid                  | Colorless viscous liquid |
| Specific Optical Rotation                            | 140° to 152°                              | 149°                     |
| IR   | Conforms to Ph.Eur. Standard for nicotine | Conforms                 |
| UV   | $\lambda$ max = 257-261 nm                | $\lambda$ max = 259 nm   |
| Water (w/w%)   | 0.5 max                                   | 0.29                     |
| Ethanol (w/w%)                                       | 0.5 max                                   | 0.014                    |
| Hexanes (w/w%)                                       | 0.03 max                                  | 0.0013                   |
| Heavy metals   | 10ppm                                     | Conforms                 |
| Non-Aqueous Titration Assay (w/w%)                   | 99 min                                    | 99.97 min                |
| Sulfated Ash (w/w%)                                  | 0.1 max                                   | 0.02                     |
| Nicotine-trans-N-oxides, area %                      | 0.2 max                                   | Not detected             |
| Nicotine-cis-N-oxides, area %                        | 0.2 max                                   | Not detected             |
| Myosamines, area %                                   | 0.5 max                                   | Not detected             |
| Conitine, area %                                     | 0.2 max                                   | Not detected             |
| $\beta$ -nicotyrine, area %                          | 0.2 max                                   | Not detected             |
| Nornicotine, area %                                  | 0.5 max                                   | Not detected             |
| Anabasine, area %                                    | 0.3 max                                   | Not detected             |
| Anatabine, area %                                    | 0.3 max                                   | Not detected             |
| Any other unspecified impurity, area %               | 0.1 max                                   | 0.03                     |
| Total Nicotine-N-Oxides, area %                      | 0.3 max                                   | Not detected             |
| Total impurities (specified and unspecified), area % | 1.0 max                                   | 0.09                     |
| <b>Total Nicotine Content (Purity)</b>               | <b>99.0% min</b>                          | <b>99.93%</b>            |

|              |                                      |
|--------------|--------------------------------------|
| Conclusion:  | <b>Complies with USP37 standards</b> |
| Status:      | <b>Approved</b>                      |
| Prepared by: | J. Rubenstein                        |

*The nicotine in this product has been*

**GC/MS  
VERIFIED**

