



Mikromol™

Antiviral Active
Pharmaceutical Ingredients
(APIs) and Impurities.



QUALITY ISO 17034 | ISO/IEC 17025
ISO 9001 | GMP

lgcstandards.com/mikromol



Antiviral API and Impurity Reference Standards

Superior characterization means results that you can trust

In the developed world, it is estimated that at least 60% of infective illnesses are caused by viruses, and only 15% by bacteria. Antiviral drugs are a class of pharmaceuticals used specifically to treat viral infections. Different viruses infect different cell types through a variety of pathways, and therefore each antiviral drug is specific to a particular virus.

This catalog is a collection of antiviral API's and their respective impurities organized by API family. Each product listing is hyper-linked to the LGC Standards web shop for easy access to current pricing and availability. These products can be used for either quantitative or qualitative purposes for analytical research and development, validation studies, routine stability monitoring, or routine quality control.



It's easy to order at:



lgcstandards.com/mikromol

Technical questions?
mikromol@lgcgroup.com

View your local office [here](#)

Formation of Omeprazole Sulphone by oxidative degradation of Omeprazole.
(Imp. D (EP): 5-Methoxy-2-[[[4-methoxy-3,5-dimethylpyridin-2-yl)methyl]sulphonyl]-1H-benzimidazole (Omeprazole Sulphone), MM0095.05)

Our quality enables your accuracy.

At Mikromol, we go beyond the standard. Each aspect of our offering – knowledge, competency, quality, scientific intellect and transparency – is at the core of everything we do. This is how we consistently and competently deliver high-quality, globally relevant pharmaceutical reference standards that you can trust.

What 'Mikromol quality' means to us:



Producing to the highest standard.

Mikromol reference standards are produced to the highest quality, with the majority of analytical measurements performed under our ISO/IEC 17025 scope of accreditation, as well as a leading range of products manufactured according to our ISO 17034 accreditation.

We use the most advanced analytical techniques to characterise our reference standards, so that you can rely on the scientific integrity of the data contained in your Certificate of Analysis.



Ensuring confidence from characterisation to implementation.

We use real-time stability testing and expiry date management to give you confidence in your Mikromol reference standards and ensure you receive your products as certified, ready for your analysis.



Safeguarding the integrity of your reference standards.

Our state-of-the-art global logistics and distribution centre has experienced supply chain and export departments. This ensures fast delivery of Mikromol products to our customers.



Understanding your analytical needs.

Through direct interactions with our customers and our expertise in the latest scientific and regulatory developments, we are able to quickly adapt our portfolio of reference standards to address your needs. We are committed to providing you with trusted solutions, today and tomorrow.



Providing expert support.

In LGC we combine experience with continuous training to ensure that the latest knowledge and skills are being applied to the production of Mikromol reference standards.

We are proud to connect with our customers across a global network, with dedicated local teams able to support your reference standard decisions and the implementation of our products in your analytical testing.



Our heritage, our vision, your guarantee.

Mikromol is built upon more than 25 years of history in planning, developing, producing, analysing, packaging and delivering high-quality reference standards to our customers around the world with speed and reliability.

Crystallisation of Metformin Hydrochloride after removal of Methanol from the reaction mixture. (Impurity Cyanoguanidine, MM0056.01)

How to read your Certificate of Analysis.

Every product you receive comes with a comprehensive, multi-page Certificate of Analysis (CoA).

Each CoA provides a full description of the material to which it relates, as well as a summary of the analyses undertaken during the characterisation process.

CoA Sections

General information | Additional product information | Assay | Purity | Identity | Stability and homogeneity | Revision table





Certificate of Analysis

ISO 17034

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Reference Standard
Product Name
Tramadol Hydrochloride
Product Code
MM0007.00-0250
CAS No.
36282-47-0
Mol. Weight
299.84
Mol. Formula
C₁₆H₁₉NO₂ · HCl
Lot Number
G1010777
Appearance
white solid
Melting Point (DSC)
181°C
Long-term Storage
2 to 8°C, dark

AND Enantiomer



HCl

3

Assay¹ "as is"
99.4%

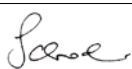
Uncertainty² U
0.6%

Intended Use: Use for identification and quantification. The assay is verified by a second testing method. Due to the homogeneity studies, the minimum amount of sample to be used is 10mg.

Date of shipment: **02 Sep 2019**

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

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Release by:	Date of Release:		
Dr. S. Schröder	Luckenwalde, 21 Aug 2019		Product Release

¹ Calibration and verification were carried out using standards traceable to SI-units. The value is expressed on an "as is" basis.

² The uncertainty "U" is the expanded uncertainty of the testing method for the assigned value estimated in accordance with the Guide to the Expression of Uncertainty in Measurement (GUM). It corresponds to a level of confidence of about 95%. Coverage factor k = 2.

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Organisation certified to ISO 9001 | DQS 102448 and GMP (EXCIPACT) RM
Production accredited to ISO 17034 | DAkkS D-RM-14176-01-00 | Test methods
for characterization are accredited to ISO/IEC 17025 | DAkkS D-PL-14176-01-00



Producer:
LGC GmbH
Louis-Pasteur-Str. 30
D-14943 Luckenwalde
Germany
www.lgcstandards.com

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General Information

- 1 Quality level
- 2 Product information
- 3 Assay value and uncertainty
 - For ISO 17025 and ISO 17034 certificates, determined by an accredited absolute method (qNMR and/or carbon titration)
 - For ISO 9001 certificates, determined in the majority of the cases by 100%-method (no uncertainty given for ISO 9001)
- 4 Intended use: For ISO 17034 products and products manufactured according to ISO 17025
- 5 Date of shipment (DOS) and validity of the product based on DOS
- 6 Release information
- 7 Information about accreditations and manufacturer

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How to read your Certificate of Analysis (continued).



Mikromol™

8 Important Product Information

This RM is intended for laboratory use only and is not suitable for human or animal consumption.

This RM conforms to the characteristics of a primary standard as described in the ICH guidelines. The values quoted in this Certificate of Analysis are the producer's best estimate of the true values within the stated uncertainties and based on the techniques described in this Certificate of Analysis. The production of this RM was undertaken in accordance with the requirements of ISO 17034. The identity is verified by data from international scientific literature.

9 Storage and Handling

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

10 Further content

Assigned value

Identity

Stability and homogeneity

Revision table

LGC GmbH, Louis-Pasteur-Str. 30,
MM0007.00-0250



Mikromol™

Assigned Value

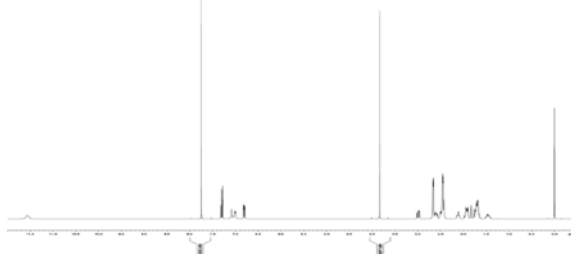
11 Assay "as is": 99.43%; U = 0.57%

The assay "as is" is assessed by quantitative NMR spectroscopy and is equivalent to the assay based on the not-anhydrous and not-dried substance. The assay is verified by 100% method (mass balance). The verifying result lies inside our acceptance criteria, i.e. less than 1.0 % difference to assay assigning technique.

For quantitative applications, use the assay as a calculation value on the "as is basis". The uncertainty of the assay can be used for estimation/calculation of measurement uncertainty.

Method 1: Value assigning technique - quantitative NMR spectroscopy	
Conditions	400 MHz, CDCl ₃
Internal Standard	2,3,5,6-Tetrachloro-1-nitrobenzene (certified reference material), signal 7.6 – 8.00 ppm, 1H
Results (mass fraction, n=6)	99.43%; U=0.57%

Quantitative NMR spectrum



Method 2: Value verifying technique - 100% method	
100% method (mass balance) with chromatographic purity by HPLC	
Result	99.86%

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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.

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MM0007.00-0250

Lot number 61010777

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Additional product information

- 8 Confirmation of primary standard status for standards manufactured according to ISO 17025 and ISO 17034
- 9 Storage and handling recommendations
- 10 Content of the CoA (varies depending on the product quality level)

Assay Section

- 11 Assay result and details about assay assigning technique. For ISO 17034 products and products manufactured according to ISO 17025 this will be an ISO 17025-accredited absolute method. For ISO 9001 products the assay will usually be assigned by mass balance calculated from the values given in the purity section
- 12 Details about the verifying assay for ISO 17034 products and products manufactured according to ISO 17025. This assay confirms the result of the absolute method and is assessed by a second, independent method, usually mass balance calculated from the values given in the purity section

How to read your Certificate of Analysis (continued).



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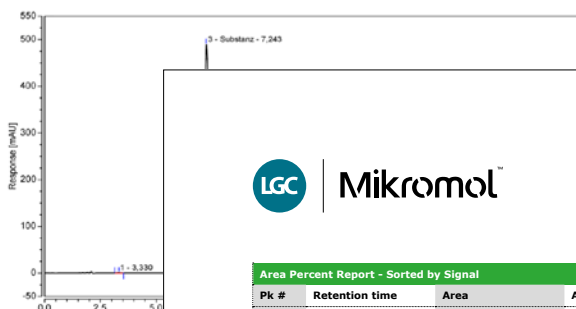
13

Purity

Purity by High Performance Liquid Chromatography (HPLC)

HPLC Conditions:	
Column	Hypersil Gold C18, 5µm, 150 x 4.6mm
Column temperature	40°C
Detector	DAD, 210nm
Injector	Auto 5µl; 0.1631mg/ml in Water/Acetonitrile 50/50 (v/v)
Flow rate	1.0ml/min,
Phase A	Water, 0.1% H ₃ PO ₄
Phase B	Acetonitrile, 0.1% H ₃ PO ₄
Gradient Program	0-9min A/B 85/15 9-12min A/B to 50/50 12-14min A/B to 85/15 14-24min A/B 85/15 (v/v)

HPLC chromatogram and peak table



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Area Percent Report - Sorted by Signal			
Pk #	Retention time	Area	Area%
1	3.330	0.056	0.04
2	5.817	0.050	0.04
3	7.243	127.580	99.92
Totals		127.686	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)	99.93%; U=0.19%
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Volatile content

Loss on drying	
Method	105 °C to constant mass, EP 8.7 (2.2.32)
Result (n=3)	0.07 %; SD = 0.01 %*

Inorganic residues

Method: Sulphated ash, EP 8.7, chapter 2.4.14*
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According to the available data, the presence of inorganic impurities in the reference substance other than those detectable by sulphated ash is highly unlikely. Inorganic residues can be excluded by results of the sulphated ash. Therefore, no assay correction was performed for inorganic impurities.

*not accredited testing method

Purity section

- 13 Organic purity is usually assessed by HPLC or GC. Conditions, chromatogram and area report are displayed
- 14 Volatile content: Water content is determined by Karl Fischer titration. Residual solvents are estimated by the use of ¹H-NMR or determined by GC/headspace techniques. Alternatively the combined volatile content is determined by LOD
- 15 Inorganic residues are excluded by either the results of elementary analysis or by sulphated ash for ISO 17034 products and products manufactured according to ISO 17025


How to read your Certificate of Analysis (continued).



Identity

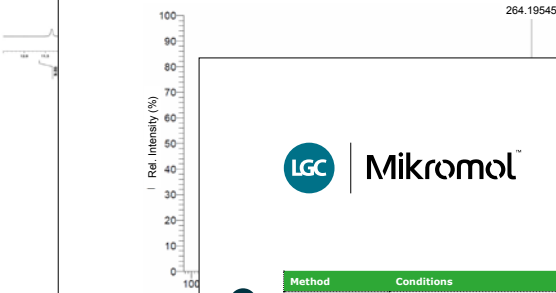
The identity is assessed by ISO/IEC 17025 accredited testing methods.


Method	Conditions	Result
¹ H-NMR	Conditions: 400 MHz, CDCl ₃	Structure confirmed



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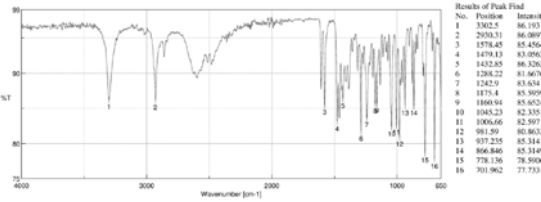
Method	Conditions	Result
MS	3.5 KV ESI+; capillary temperature 269 °C, Theoretical value: 264.19581	Structure confirmed





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



19 **Stability and Homogeneity**

Accelerated stability studies indicate no significant instability. The given validity period is based on this data. This is backed up by additional stability testing and historical data over the range of several years. RM quality is controlled by regularly performed quality control tests (re tests). Homogeneity assured by qualified process of preparation and verified by homogeneity testing.

20 **Revision table**

Revision	Date	Reason for Revision
00	20 Aug 2019	Release of the Certificate of Analysis - initial version

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

LGC GmbH, Louis-Pasteur-Str. 30, D-14943 Luckenwalde, Germany

MM0007.00-0250

Lot number G1010777

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Identity section

- 16** ¹H-NMR spectra
- 17** MS spectra
- 18** IR spectra

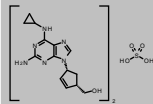
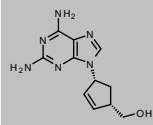
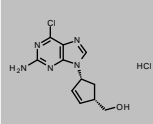
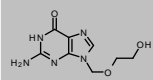
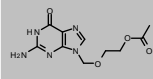
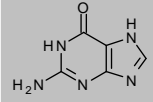
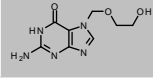
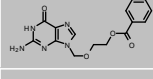
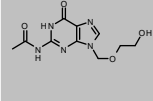
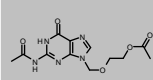
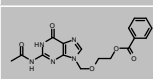
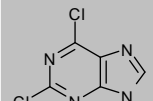
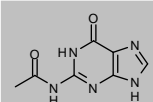
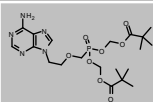
Stability and homogeneity

- 19** Stability and homogeneity statement: Included as mandatory information with ISO 17034 products only

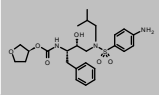
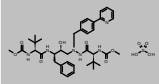
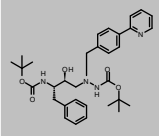
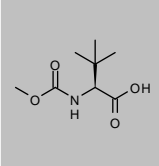
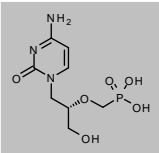
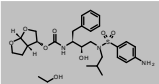
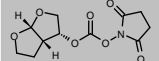
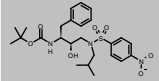
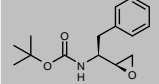
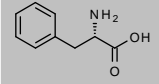
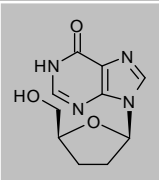
Revision table

- 20** Record of changes that have been made to the CoA

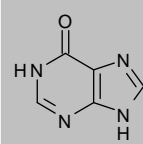
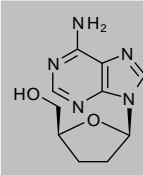
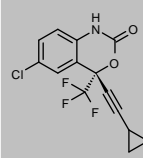
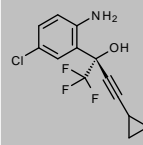
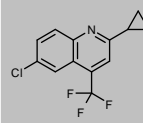
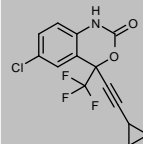
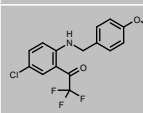
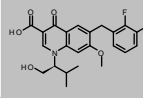
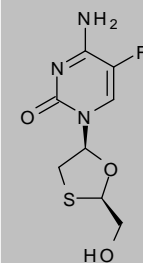
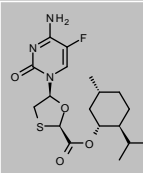
Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
Abacavir Sulfate					
MM3249.00	Abacavir Sulfate	188062-50-2	250mg		
MM3249.01	Impurity C (EP): [(1S,4R)-4-(2,6-Diamino-9H-purin-9-yl) cyclopent-2-enyl]methanol Related compound A (USP): [4-(2,6-diamino-9H-purin-9-yl) cyclopent-2-enyl]methanol	124752-25-6	100mg		
MM3249.02-0025	[(1S,4R)-4-(2-Amino-6-chloro-9H-purin-9-yl)cyclopent-2-enyl] methanol Hydrochloride Related compound C (USP): [(1S,4R)-4-(2-amino-6-chloro-9H-purin-9-yl)cyclopent-2-enyl]methanol	172015-79-1	25mg		
Aciclovir (Acyclovir)					
MM0061.00	♦ Aciclovir	59277-89-3	500mg		
MM0061.01	Impurity A (EP): 2-[(2-Amino-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]ethyl Acetate Related compound A (USP): 2-[(2-amino-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]ethyl acetate	102728-64-3	100mg		
MM0061.02	♦ Impurity B (EP): 2-Amino-1,7-dihydro-6H-purin-6-one (Guanine)	73-40-5	100mg		
MM0061.03	Impurity C (EP): 2-Amino-7-[(2-hydroxyethoxy)methyl]-1,7-dihydro-6H-purin-6-one	91702-61-3	100mg		
MM0061.04	♦ 2-[(2-Amino-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]ethyl Benzoate	59277-91-7	100mg		
MM0061.06	Impurity F (EP): N-[9-[(2-Hydroxyethoxy)methyl]-6-oxo-6,9-dihydro-1H-purin-2-yl]acetamide Related compound F (USP): N-[9-[(2-Hydroxyethoxy)methyl]-6-oxo-6,9-dihydro-1H-purin-2-yl]acetamide	110104-37-5	100mg		
MM0061.07	Impurity G (EP): 2-[(2-(Acetylamino)-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]ethyl Acetate Related compound G (USP): 2-[2-(Acetylamino)-6-oxo-1,6-dihydro-9H-purin-9-yl]methoxyethyl acetate	75128-73-3	100mg		
MM0061.08	2-[(2-(Acetylamino)-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]ethyl Benzoate	133186-23-9	100mg		
MM0061.10	2,6-Dichloropurine	5451-40-1	100mg		
MM0061.12	♦ N ² -Acetylguanine	19962-37-9	100mg		
Adefovir Dipivoxil					
MM3505.00	♦ Adefovir Dipivoxil	142340-99-6	250mg		

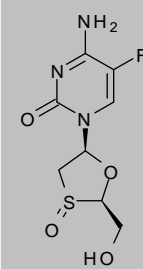
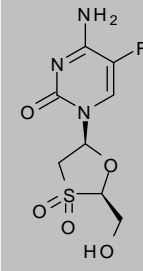
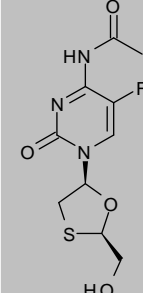
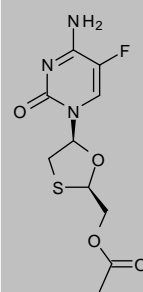
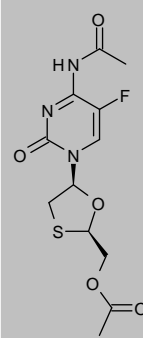
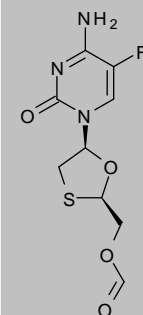
Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
Amprenavir					
MM3582.00	◆ Amprenavir	161814-49-9		100mg	
Atazanavir Sulfate					
MM3514.00	◆ Atazanavir Sulfate	229975-97-7		100mg	
MM3514.02	◆ Impurity J (EP): <i>tert</i> -Butyl 2-[(2 <i>S</i> ,3 <i>S</i>)-3-(<i>tert</i> -Butoxyformamido)-2-hydroxy-4-phenylbutyl]-2-[[4-(pyridin-2-yl)phenyl]methyl]hydrazine-1-carboxylate (<i>tert</i> -Butyl <i>N</i> -[(1 <i>S</i> ,2 <i>S</i>)-1-Benzyl-3-[(<i>tert</i> -butoxycarbonylamino)-[[4-(2-pyridyl)phenyl]methyl]amino]-2-hydroxy-propyl]carbamate)	198904-86-8		100mg	
MM3514.03-0025	◆ Impurity K (EP): (2 <i>S</i>)-2-(Methoxyformamido)-3,3-dimethylbutanoic Acid ((<i>S</i>)-2-(Methoxycarbonylamino)-3,3-dimethylbutanoic Acid) Related compound A (USP): (<i>S</i>)-2-[(Methoxycarbonyl)amino]-3,3-dimethylbutanoic acid	162537-11-3		25mg	
Cidofovir					
MM3558.00	◆ Cidofovir	113852-37-2		100mg	
Darunavir Ethanolate					
MM3624.00-0250	◆ Darunavir Ethanolate	635728-49-3		250mg	
MM3624.02-0025	◆ [(3 <i>R</i> ,3 <i>aS</i> ,6 <i>aR</i>)-Hexahydrofuro[2,3- <i>b</i>]furan-3-yl] (2,5-Dioxopyrrolidin-1-yl) Carbonate	253265-97-3		25mg	
MM3624.04-0025	◆ <i>tert</i> -Butyl <i>N</i> -[(1 <i>S</i> ,2 <i>R</i>)-1-Benzyl-2-hydroxy-3-[(2-methylpropyl)[(4-nitrophenyl)sulfonyl]amino]propyl]carbamate	191226-98-9		25mg	
MM3624.07-0025	◆ <i>tert</i> -Butyl <i>N</i> -[(1 <i>S</i>)-1-((2 <i>S</i>)-Oxiran-2-yl)-2-phenylethyl]carbamate	98737-29-2		25mg	
MM1560.00	‡ Phenylalanine (L-Phenylalanine)	63-91-2		250mg	
Didanosine					
MM1047.00	◆ Didanosine	69655-05-6		250mg	

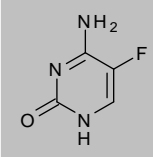
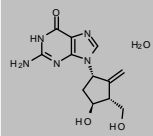
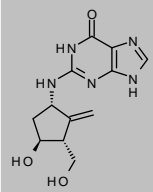
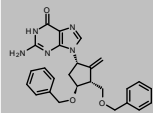
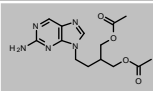
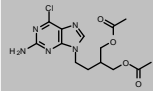
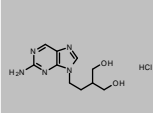
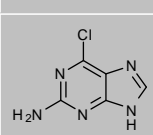
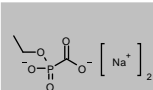
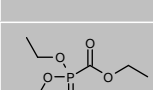
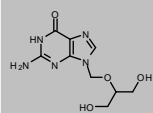
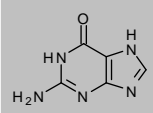
Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
MM1047.01	◆ Impurity A (EP): 1,7-Dihydro-6H-purin-6-one (Hypoxanthine) Related compound A (USP): Hypoxanthine	68-94-0		100mg	
MM1047.02	Impurity G (EP): 9-(2,3-Dideoxy-β-D-glycero-pentofuranosyl)-9H-purin-6-amine (2',3'-Dideoxyadenosine) Related compound B (USP): 2',3'-dideoxyadenosine	4097-22-7		100mg	
Efavirenz					
MM0919.00	◆ Efavirenz	154598-52-4		250mg	
MM0919.03	(S)-2-(2-Amino-5-chlorophenyl)-4-cyclopropyl-1,1,1-trifluorobut-3-yn-2-ol ◆ Related compound A (USP): (S)-2-(2-amino-5-chlorophenyl)-4-cyclopropyl-1,1,1-trifluorobut-3-yn-2-ol	209414-27-7		100mg	
MM0919.05	6-Chloro-2-cyclopropyl-4-(trifluoromethyl)quinoline ◆ Related compound C (USP): 6-chloro-2-cyclopropyl-4-(trifluoromethyl)quinoline	391860-73-4		100mg	
MM0919.06-0025	◆ Efavirenz Racemic	177530-93-7		25mg	
MM0919.07	◆ N-(4-Methoxybenzyl)-4-chloro-2-(trifluoroacetyl)aniline	173676-54-5		100mg	
Elvitegravir					
MM3372.00	◆ Elvitegravir	697761-98-1		100mg	
Emtricitabine					
MM1325.00	◆ Emtricitabine	143491-57-0		100mg	
MM1325.01	Emtricitabine L-Menthyl Ester ((2R,5S)-5-(4-Amino-5-fluoro-2-oxo-1(2H)-pyrimidinyl)-1,3-oxathiolane-2-carboxylic Acid (1R,2S,5R)-5-Methyl-2-(1-methylethyl)cyclohexyl Ester)	764659-72-5		100mg	

Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
MM1325.02	Emtricitabine Sulfoxide	152128-77-3		100mg	
MM1325.03	Emtricitabine Sulfone	1161846-23-6		100mg	
MM1325.04	N-Acylemtricitabine	n/a		100mg	
MM1325.05	O-Acylemtricitabine	145032-08-2		100mg	
MM1325.06	N,O-Diacylemtricitabine	n/a		100mg	
MM1325.09	O-Formylemtricitabine	n/a		100mg	

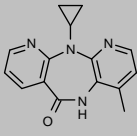
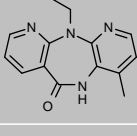
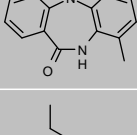
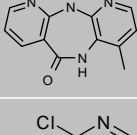
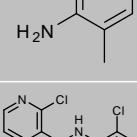
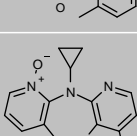
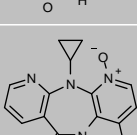
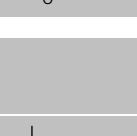
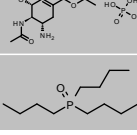
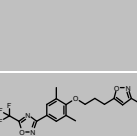
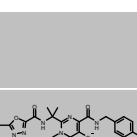

Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
MM0355.00	◆ Flucytosine	2022-85-7		250mg	
Entecavir Monohydrate					
MM3314.00	◆ Entecavir Monohydrate	209216-23-9		250mg	
MM3314.01	◆ Entecavir N ² -Isomer	n/a		5mg	
MM3314.02-0025	◆ 3',5'-Di-O-Benzylentecavir	142217-81-0		25mg	
Famciclovir					
MM0620.00	◆ Famciclovir	104227-87-4		250mg	
MM0620.01	◆ 9-[4-Acetoxy-3-(acetoxymethyl)butyl]-2-amino-6-chloropurine	97845-60-8		100mg	
MM0620.02	2-[2-(2-Amino-9H-purin-9-yl)ethyl]propane-1,3-diol Hydrochloride Related compound A (USP): 2-[2-(2-Amino-9H-purin-9-yl)ethyl]propane-1,3-diol	246021-75-0		100mg	
MM0620.20-0025	◆ 2-Amino-6-chloropurine Related compound F (USP): 2-Amino-6-chloropurine	10310-21-1		25mg	
Foscarnet Sodium Hexahydrate					
MM3500.01	Impurity B (EP) as Disodium Salt: Disodium (Ethoxyoxydophosphanyl)formate Related compound B (USP): (Ethoxyoxydophosphanyl) formic acid	55920-24-6		50mg	
MM3500.02	Impurity D (EP): Ethyl (Diethoxyphosphoryl)formate Related compound D (USP): O,O-diethyl ethoxycarbonylphosphonate	1474-78-8		100mg	
Ganciclovir					
MM0485.00	Ganciclovir	82410-32-0		100mg	
MM0061.02	◆ Impurity F (EP): 2-Amino-1,9-dihydro-6H-purin-6-one (Guanine)	73-40-5		100mg	

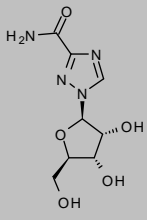
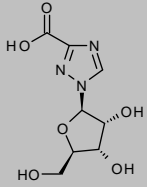
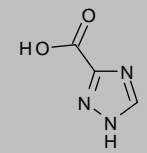
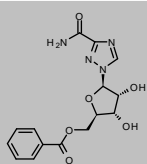
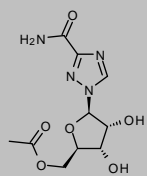
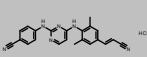
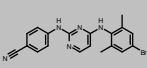
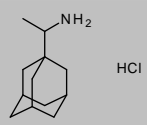
Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
MM0485.08	Impurity H (EP): 2-Amino-7-[[2-hydroxy-1-(hydroxy-methyl)ethoxy]methyl]-1,7-dihydro-6 <i>H</i> -purin-6-one (N-7 Isomer of Ganciclovir)	84222-50-4		50mg	
MM0485.09	Impurity I (EP): 2-[(2-Amino-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]propane-1,3-diyl Dipropionate (Ganciclovir Dipropionate)	86357-20-2		100mg	
MM0485.10	Impurity J (EP): 2-[2-(Propanoylamino)-6-oxo-1,6-dihydro-9H-purin-9-yl]methoxy]propane-1,3-diyl dipropionate (Ganciclovir Tripropionate)	177216-32-9		100mg	
MM0485.12	Ganciclovir Mono-O-acetate	88110-89-8		100mg	
MM0485.14-0025	◆ Ganciclovir Triacetate	86357-14-4		25mg	
Idoxuridine					
MM0791.00	◆ Idoxuridine	54-42-2		500mg	
Lamivudine					
MM0749.00-0250	‡ Lamivudine	134678-17-4		250mg	
MM0045.00-0250	‡ Impurity C (EP): Salicylic Acid	69-72-7		250mg	
MM0749.05-0025	◆ Impurity E (EP): 4-Aminopyrimidin-2(1H)-one (Cytosine)	71-30-7		25mg	
MM0593.03-0025	◆ Impurity F (EP): Pyrimidine-2,4(1H,3H)-dione (Uracil)	66-22-8		25mg	
Moroxydine Hydrochloride					
MM1749.00	◆ Moroxydine Hydrochloride	3160-91-6		250mg	

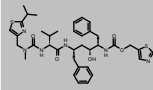
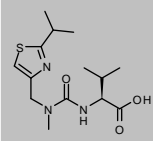
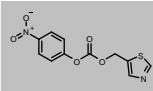
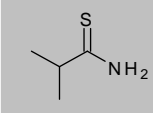
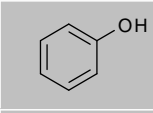
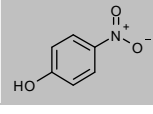
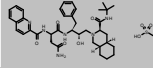
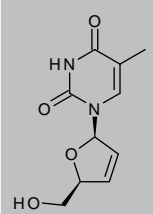
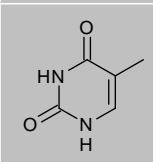
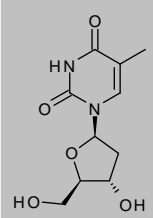
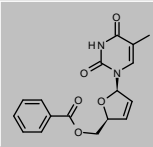
Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
Nevirapine					
MM1146.00-0250	‡ Nevirapine Anhydrous	129618-40-2		250mg	
MM1146.01	◆ Impurity A (EP): 11-Ethyl-4-methyl-5,11-dihydro-6H-dipyrido [3,2-b:2',3'-e][1,4]diazepin-6-one Related compound A (USP): 5,11-dihydro-6H-11-ethyl-4-methyl-dipyrido[3,2-b:2',3'-e][1,4]diazepin-6-one	133627-17-5		100mg	
MM1146.02	◆ Impurity B (EP): 4-Methyl-5,11-dihydro-6H-dipyrido[3,2-b:2',3'-e][1,4]diazepin-6-one Related compound B (USP): 5,11-Dihydro-4-methyl-6H-dipyrido[3,2-b:2',3'-e][1,4]diazepin-6-one	287980-84-1		100mg	
MM1146.03	◆ Impurity C (EP): 4-Methyl-11-propyl-5,11-dihydro-6H-dipyrido[3,2-b:2',3'-e][1,4]diazepin-6-one Related compound C (USP): 5,11-Dihydro-6H-11-propyl-4-methyl-dipyrido[3,2-b:2',3'-e][1,4]diazepin-6-one	287980-85-2		100mg	
MM1146.04	3-Amino-2-chloro-4-methylpyridine	133627-45-9		100mg	
MM1146.05	◆ 2-Chloro-N-(2-chloro-4-methyl-3-pyridinyl)-3-pyridinecarboxamide	133627-46-0		100mg	
MM1146.06	Nevirapine N10-Oxide	1027324-99-7		50mg	
MM1146.07	Nevirapine N1-Oxide	162255-73-4		100mg	
Oseltamivir Phosphate					
MM1239.00	‡ Oseltamivir Phosphate	204255-11-8		250mg	
MM1239.03	◆ Impurity H (EP): Tributylphosphane Oxide	814-29-9		100mg	
Pleconaril					
MM3562.00	◆ Pleconaril	153168-05-9		100mg	
Raltegravir Potassium					
MM3375.00	◆ Raltegravir Potassium	871038-72-1		100mg	

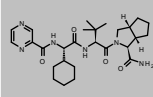
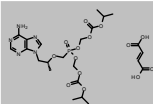
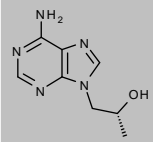
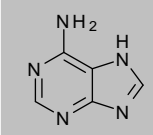
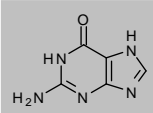
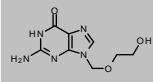
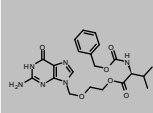
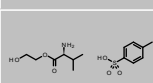
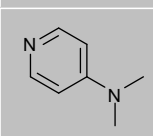
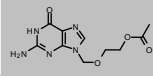
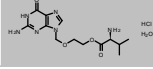
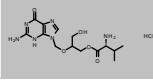
Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
Ribavirin					
MM0542.00	◆ Ribavirin	36791-04-5	250mg		
MM0542.01	◆ Impurity A (EP): 1-β-D-Ribofuranosyl-1H-1,2,4-triazole-3-carboxylic Acid Related compound A (USP): 1-beta-D-ribofuranosyl-1H-1,2,4-triazole-3-carboxylic acid	39925-19-4	100mg		
MM0542.03	◆ Impurity C (EP): 1H-1,2,4-Triazole-3-carboxylic Acid	4928-87-4	100mg		
MM0542.04	◆ Impurity D (EP): 1H-1,2,4-Triazole-3-carboxamide Related compound D (USP): 1H-1,2,4-triazole-3-carboxamide	3641-08-5	100mg		
MM0542.05	◆ 1-(5-O-Benzoyl-β-D-ribofuranosyl)-1H-1,2,4-triazole-3-carboxamide (5'-O-Benzoylribavirin)	58151-90-9	100mg		
MM0542.06	◆ Impurity F (EP): 1-(5-O-Acetyl-β-D-ribofuranosyl)-1H-1,2,4-triazole-3-carboxamide (5'-O-Acetylribavirin)	58151-87-4	100mg		
Rilpivirine Hydrochloride					
MM3376.00	◆ Rilpivirine Hydrochloride	700361-47-3	100mg		
MM3376.02-0025	◆ 4-[[4-[(4-Bromo-2,6-dimethylphenyl)amino]-2-pyrimidinyl]amino]benzonitrile	374067-85-3	25mg		
MM3376.06-0025	◆ 4-Aminobenzonitrile	873-74-5	25mg		
Rimantadine Hydrochloride					
MM0913.00	◆ Rimantadine Hydrochloride	1501-84-4	250mg		

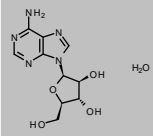
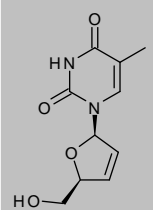
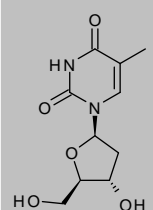
Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
Ritonavir					
MM1034.00	◆ Ritonavir	155213-67-5		100mg	
MM1034.01-0025	◆ Impurity A (EP): (2S)-3-Methyl-2-[[methyl[[2-(1-methylethyl)thiazol-4-yl]methyl]carbamoyl]amino]butanoic Acid	154212-61-0		25mg	
MM1034.23	4-Nitrophenyl Thiazol-5-ylmethyl Carbonate	144163-97-3		100mg	
MM1034.26	◆ 2-Methylpropanethioamide	13515-65-6		100mg	
MM0045.11	◆ Phenol	108-95-2		100mg	
MM0042.03	◆ 4-Nitrophenol	100-02-7		100mg	
Saquinavir Mesilate					
MM0402.00	Saquinavir Mesilate	149845-06-7		250mg	
Stavudine					
MM0534.00	◆ Stavudine	3056-17-5		100mg	
MM0534.01	◆ Impurity A (EP): 5-Methylpyrimidine-2,4(1H,3H)-dione (Thymine)	65-71-4		100mg	
MM0534.03	Impurity C (EP): 1-(2-Deoxy-β-D-erythro-pentofuranosyl)-5-methylpyrimidine-2,4(1H,3H)-dione (Thymidine)	50-89-5		100mg	
MM0534.04	◆ Impurity I (EP): 1-(5-O-Benzoyl-2,3-dideoxy-β-D-glycero-pent-2-enofuranosyl)-5-methylpyrimidine-2,4(1H,3H)-dione	122567-97-9		100mg	

Antiviral APIs and impurities

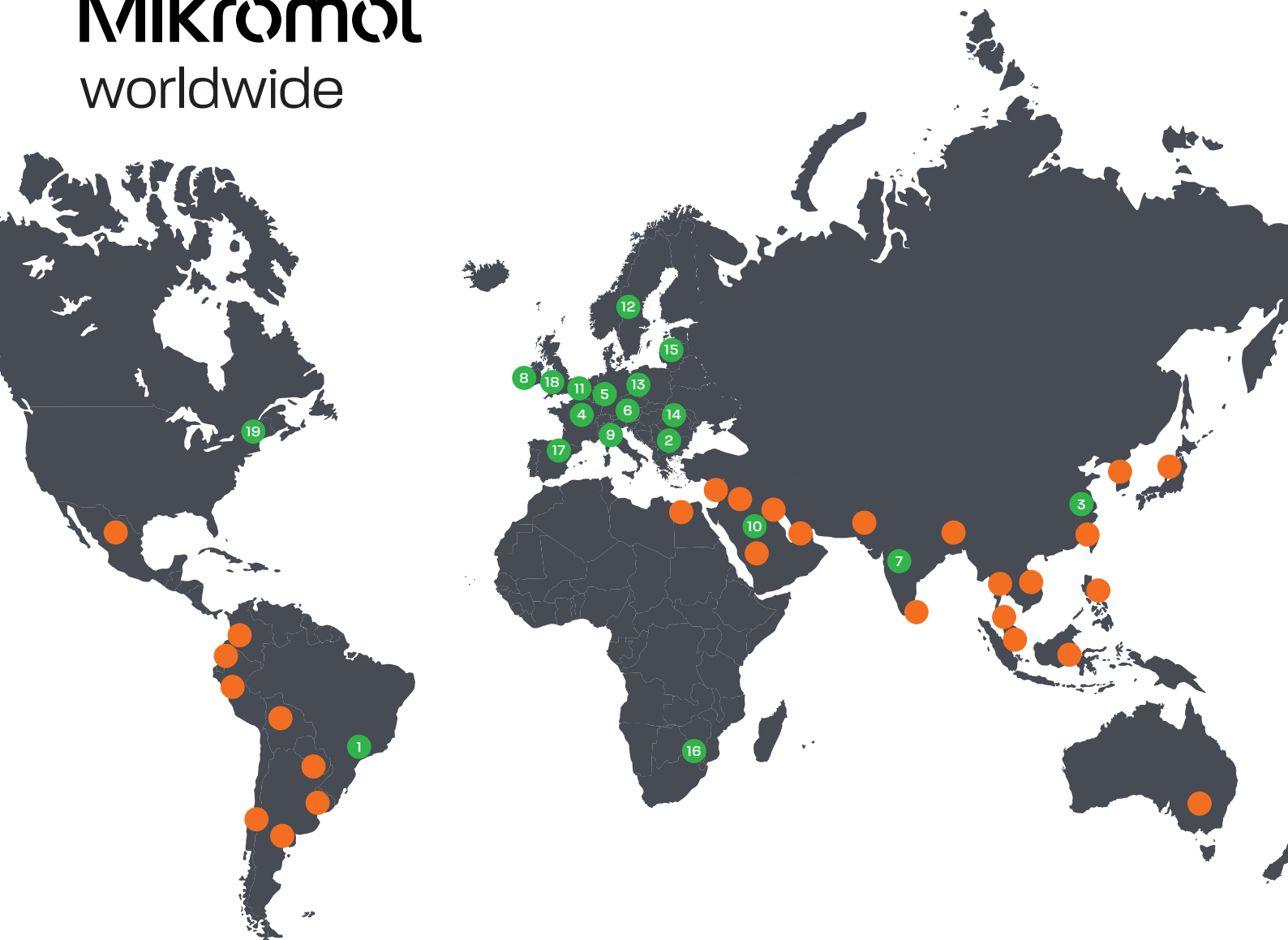
Product Code	Product	CAS No.	CS	Unit	
Telaprevir					
MM3379.02	(1S,3aR,6aS)-2-[(2S)-2-[[[(2S)-2-Cyclohexyl-2-[(2-pyrazinylcarbonyl)amino]acetyl]amino]-3,3-dimethyl-1-oxobutyl]octahydrocyclopenta[c]pyrrole-1-carboxamide	1616728-72-3		100mg	
Tenofovir Disoproxil Fumarate					
MM1329.00	◆ Tenofovir Disoproxil Fumarate	202138-50-9		100mg	
MM1329.02	◆ (R)-9-(2-Hydroxypropyl)adenine (Desphosphoryltenofovir)	14047-28-0		100mg	
MM1495.00	◆ Adenine	73-24-5		250mg	
Valaciclovir Hydrochloride, Anhydrous (Valacyclovir Hydrochloride)					
MM0061.02	◆ Impurity A (EP): 2-Amino-1,9-dihydro-6H-purin-6-one (Guanine)	73-40-5		100mg	
MM0061.00	◆ Impurity B (EP): 2-Amino-9-[(2-hydroxyethoxy)methyl]-1,9-dihydro-6H-purin-6-one (Aciclovir)	59277-89-3		500mg	
MM0619.05	Impurity E (EP): 2-[(2-Amino-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]ethyl N-[(Benzyloxy)carbonyl]-L-valinate Related compound E (USP): 2-[(2-amino-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]ethyl N-[(benzyloxy)carbonyl]-L-valinate	124832-31-1		100mg	
MM0619.19-0025	Impurity F (EP) as para-Toluenesulfonate: 2-Hydroxyethyl L-Valinate para-Toluenesulfonate Related compound F (USP): 2-hydroxyethyl valinate	86150-61-0		25mg	
MM0619.07	◆ Impurity G (EP): N,N-Dimethylpyridin-4-amine Related compound G (USP): N,N-dimethylpyridin-4-amine	1122-58-3		100mg	
MM0061.01	Impurity I (EP): 2-[(2-Amino-6-oxo-1,6-dihydro-9H-purin-9-yl)methoxy]ethyl Acetate	102728-64-3		100mg	
Valaciclovir Hydrochloride, Hydrated					
MM3012.00	◆ Valaciclovir Hydrochloride Monohydrate	521915-75-3		250mg	
Valganciclovir Hydrochloride					
MM3267.00-0250	◆ Valganciclovir Hydrochloride	175865-59-5		250mg	

Antiviral APIs and impurities

Product Code	Product	CAS No.	CS	Unit	
MM3267.02-0025	◆ 9-Methoxymethylguanine	1202645-50-8		25mg	
MM0485.12	Ganciclovir Mono-O-acetate	88110-89-8		100mg	
Vidarabine Monohydrate					
MM3639.00	Vidarabine Monohydrate	24356-66-9		250mg	
Zidovudine					
MM0534.00	◆ Impurity A (EP): 1-[(2R,5S)-5-(Hydroxymethyl)-2,5-dihydrofuran-2-yl]-5-methylpyrimidine-2,4(1H,3H)-dione (Stavudine)	3056-17-5		100mg	
MM0173.02	Impurity B (EP): 1-(3-Chloro-2,3-dideoxy-β-D-erythro-pentofuranosyl)-5-methylpyrimidine-2,4(1H,3H)-dione Related compound B (USP): 3'-chloro-3'-deoxythymidine	25526-94-7		100mg	
MM0534.01	◆ Impurity C (EP): 5-Methylpyrimidine-2,4(1H,3H)-dione (Thymine) Related compound C (USP): thymine	65-71-4		100mg	
MM0173.04	◆ Impurity D (EP): Triphenylmethanol	76-84-6		100mg	
MM0534.03	Impurity E (EP): 1-(2-Deoxy-β-D-erythro-pentofuranosyl)-5-methylpyrimidine-2,4(1H,3H)-dione (Thymidine) Related compound D (USP): [1-(2-Deoxy-beta-D-ribofuranosyl)]thymine	50-89-5		100mg	

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MikromolTM

Acetylation of 2,6-Dimethylaniline during the synthesis
of Lidocaine. (Impurity N-(2,6-Dimethylphenyl)
acetamide, MM0102.08)

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