



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 05:25 PM UTC

PDB ID : 3LOO / pdb\_00003loo  
Title : Crystal structure of Anopheles gambiae adenosine kinase in complex with P1, P4-di(adenosine-5) tetraphosphate  
Authors : Ho, M.-C.; Cassera, M.B.; Almo, S.C.; Schramm, V.L.  
Deposited on : 2010-02-04  
Resolution : 2.00 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4-5-2 with Phenix2.0  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtrriage (Phenix) : 2.0  
EDS : 3.0  
Buster-report : wwPDB partial adaption of 1.1.7 (2018)  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

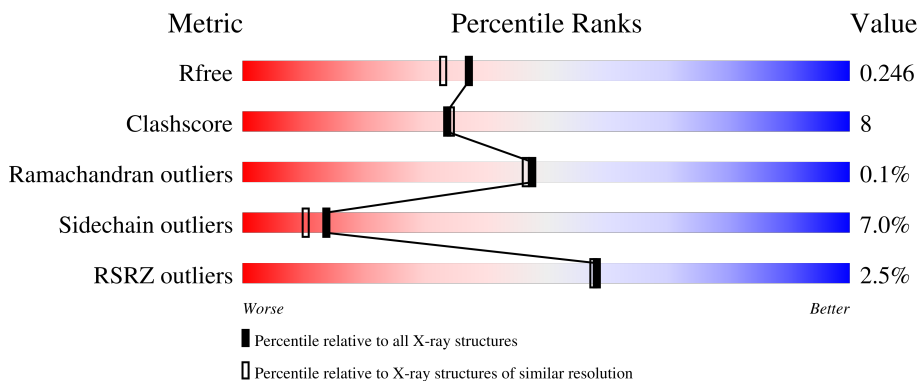
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	365	 79% 11% • 8%
1	B	365	 75% 16% • 7%
1	C	365	 71% 16% • 12%

## 2 Entry composition [i](#)

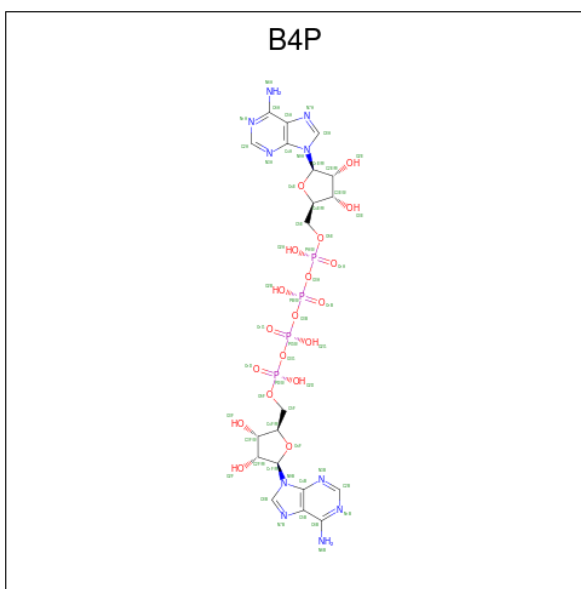
There are 5 unique types of molecules in this entry. The entry contains 8160 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called *Anopheles gambiae* adenosine kinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	335	Total 2601	C 1649	N 447	O 492	S 13	0	0	0
1	B	341	Total 2649	C 1678	N 454	O 503	S 14	0	0	0
1	C	321	Total 2503	C 1589	N 431	O 471	S 12	0	1	0

- Molecule 2 is BIS(ADENOSINE)-5'-TETRAPHOSPHATE (CCD ID: B4P) (formula:  $C_{20}H_{28}N_{10}O_{19}P_4$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	Total 53	C 20	N 10	O 19	P 4	0	0
2	B	1	Total 53	C 20	N 10	O 19	P 4	0	0
2	C	1	Total 53	C 20	N 10	O 19	P 4	0	0

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Mg 1 1	0	0
3	B	1	Total Mg 1 1	0	0
3	C	1	Total Mg 1 1	0	0

- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Cl 1 1	0	0
4	B	1	Total Cl 1 1	0	0
4	C	1	Total Cl 1 1	0	0

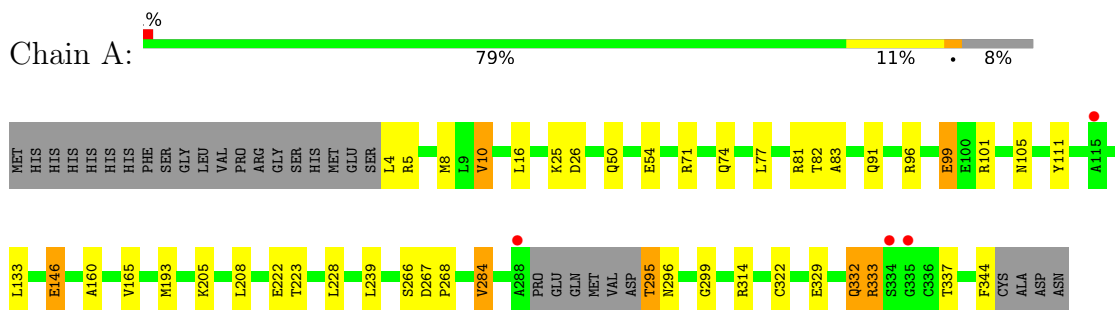
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	117	Total O 117 117	0	0
5	B	63	Total O 63 63	0	0
5	C	62	Total O 62 62	0	0

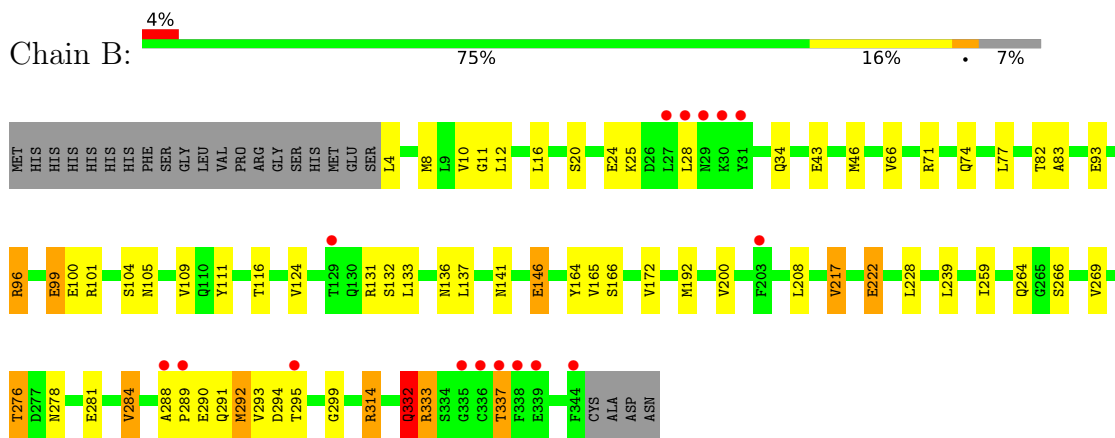
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

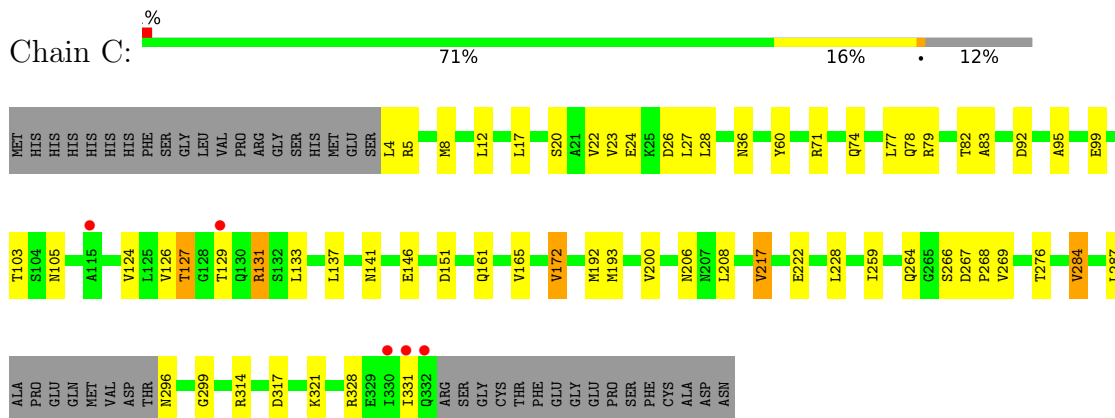
- Molecule 1: *Anopheles gambiae* adenosine kinase



- Molecule 1: *Anopheles gambiae* adenosine kinase



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## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	50.38Å 76.81Å 140.51Å 90.00° 92.12° 90.00°	Depositor
Resolution (Å)	20.00 – 2.00 20.00 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.6 (20.00-2.00) 99.8 (20.00-2.00)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.72 (at 1.99Å)	Xtrriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.198 , 0.248 0.200 , 0.246	Depositor DCC
$R_{free}$ test set	3667 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	32.4	Xtrriage
Anisotropy	0.043	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.39 , 39.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.022 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8160	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	39.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.60% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: B4P, CL, MG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.91	0/2649	0.96	0/3583
1	B	0.78	1/2699 (0.0%)	0.92	1/3653 (0.0%)
1	C	0.74	0/2551	0.92	3/3451 (0.1%)
All	All	0.81	1/7899 (0.0%)	0.93	4/10687 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	200	VAL	CA-CB	5.19	1.57	1.54

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	92	ASP	N-CA-C	6.14	116.67	108.38
1	C	200	VAL	CA-C-N	-5.40	113.47	119.19
1	C	200	VAL	C-N-CA	-5.40	113.47	119.19
1	B	276	THR	N-CA-C	-5.09	100.73	109.24

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2601	0	2571	40	0
1	B	2649	0	2615	44	0
1	C	2503	0	2487	38	0
2	A	53	0	24	1	0
2	B	53	0	24	1	0
2	C	53	0	24	2	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
5	A	117	0	0	6	0
5	B	63	0	0	1	0
5	C	62	0	0	2	0
All	All	8160	0	7745	121	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

All (121) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4:LEU:HD22	1:A:8:MET:HE1	1.15	1.14
1:B:8:MET:HE2	1:B:82:THR:HG23	1.28	1.08
1:B:333:ARG:HB2	1:B:337:THR:HG23	1.37	1.06
1:B:8:MET:HE2	1:B:82:THR:CG2	1.88	1.04
1:B:192:MET:HG2	1:B:217:VAL:HG13	1.39	1.02
1:A:4:LEU:CD2	1:A:8:MET:HE1	1.95	0.96
1:B:71:ARG:HE	1:B:105:ASN:HD22	1.13	0.91
1:B:71:ARG:HE	1:B:105:ASN:ND2	1.69	0.90
1:A:8:MET:HE2	1:A:82:THR:HG23	1.54	0.89
1:C:4:LEU:HD22	1:C:8:MET:HE1	1.52	0.89
1:A:71:ARG:HE	1:A:105:ASN:HD22	1.19	0.87
1:A:71:ARG:HE	1:A:105:ASN:ND2	1.74	0.85
1:C:71:ARG:HE	1:C:105:ASN:HD22	1.31	0.79
1:B:333:ARG:HG2	1:B:333:ARG:HH11	1.49	0.77
1:B:8:MET:CE	1:B:82:THR:CG2	2.65	0.75
1:A:146:GLU:HB2	5:A:440:HOH:O	1.87	0.73
1:C:24:GLU:HB2	1:C:26:ASP:OD2	1.89	0.73
1:C:74:GLN:HE21	1:C:83:ALA:H	1.37	0.72
1:B:314:ARG:NH1	5:B:377:HOH:O	2.20	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:71:ARG:HE	1:C:105:ASN:ND2	1.88	0.71
1:C:192:MET:HG2	1:C:217:VAL:HG13	1.69	0.71
1:A:4:LEU:HD22	1:A:8:MET:CE	2.08	0.71
1:A:74:GLN:NE2	1:A:83:ALA:H	1.88	0.70
1:C:4:LEU:CD2	1:C:8:MET:HE1	2.22	0.70
1:C:4:LEU:HD22	1:C:8:MET:CE	2.22	0.70
1:C:74:GLN:NE2	1:C:83:ALA:H	1.91	0.68
1:A:74:GLN:HE21	1:A:83:ALA:H	1.39	0.68
1:A:8:MET:HE2	1:A:82:THR:CG2	2.24	0.67
1:B:74:GLN:HE21	1:B:83:ALA:H	1.40	0.67
1:B:99:GLU:HG2	1:B:111:TYR:CE2	2.30	0.67
1:A:146:GLU:CB	5:A:440:HOH:O	2.41	0.67
1:A:81:ARG:NH1	5:A:431:HOH:O	2.15	0.64
1:B:74:GLN:NE2	1:B:83:ALA:H	1.96	0.64
1:A:99:GLU:HG2	1:A:111:TYR:CE2	2.33	0.63
1:C:28:LEU:HD11	1:C:127:THR:HG21	1.81	0.63
1:B:99:GLU:HG2	1:B:111:TYR:HE2	1.63	0.62
1:B:141:ASN:HA	1:B:172:VAL:HG22	1.79	0.62
1:A:8:MET:CE	1:A:82:THR:CG2	2.78	0.61
1:A:8:MET:CE	1:A:82:THR:HG23	2.28	0.60
1:B:217:VAL:HB	1:B:259:ILE:HG13	1.84	0.59
1:A:71:ARG:HH21	1:A:105:ASN:HD21	1.49	0.59
1:C:206[B]:ASN:ND2	5:C:384:HOH:O	2.37	0.58
1:C:264:GLN:HB2	1:C:267:ASP:HB2	1.86	0.57
1:A:228:LEU:C	1:A:228:LEU:HD23	2.30	0.57
1:C:141:ASN:HA	1:C:172:VAL:HG22	1.86	0.56
1:B:276:THR:HG22	1:B:278:ASN:H	1.71	0.55
1:B:333:ARG:HH11	1:B:333:ARG:CG	2.20	0.55
1:C:8:MET:HE2	1:C:82:THR:CG2	2.38	0.54
1:C:20:SER:HB3	1:C:124:VAL:HB	1.88	0.54
1:C:23:VAL:HG11	1:C:27:LEU:HD22	1.90	0.54
1:A:99:GLU:HG2	1:A:111:TYR:HE2	1.73	0.54
1:A:329:GLU:OE1	1:A:333:ARG:NH1	2.41	0.54
1:A:332:GLN:HB3	1:A:333:ARG:HG2	1.90	0.54
1:B:71:ARG:HH21	1:B:105:ASN:HD21	1.56	0.53
1:A:50:GLN:HE21	1:A:54:GLU:CD	2.15	0.53
1:C:217:VAL:HB	1:C:259:ILE:HG13	1.89	0.53
1:A:295:THR:HG23	1:A:296:ASN:N	2.24	0.52
1:B:20:SER:CB	1:B:124:VAL:HB	2.40	0.52
1:A:267:ASP:HB3	1:A:268:PRO:CD	2.40	0.52
1:C:131:ARG:NH2	1:C:296:ASN:HA	2.25	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:266:SER:O	1:C:284:VAL:HG22	2.09	0.51
1:A:101:ARG:NH1	5:A:365:HOH:O	2.26	0.51
1:C:5:ARG:NH2	1:C:161:GLN:HG2	2.26	0.50
1:A:96:ARG:NH2	1:B:281:GLU:OE2	2.44	0.50
1:B:12:LEU:HB2	1:B:165:VAL:HG22	1.93	0.50
1:C:228:LEU:C	1:C:228:LEU:HD23	2.37	0.49
1:B:289:PRO:HA	1:B:292:MET:HB2	1.93	0.49
1:C:287:LEU:HD11	1:C:328:ARG:HH21	1.77	0.49
1:B:146:GLU:H	1:B:146:GLU:CD	2.20	0.48
1:A:5:ARG:O	1:A:8:MET:HG3	2.14	0.48
1:B:66:VAL:HG23	1:B:166:SER:HB3	1.96	0.48
1:B:293:VAL:HB	1:B:332:GLN:O	2.14	0.47
1:C:95:ALA:O	1:C:99:GLU:HB2	2.14	0.47
1:B:96:ARG:HG3	1:B:96:ARG:HH11	1.79	0.47
1:C:314:ARG:NH1	5:C:376:HOH:O	2.47	0.47
1:A:295:THR:CG2	1:A:296:ASN:N	2.78	0.47
1:B:299:GLY:HA2	2:B:349:B4P:H51B	1.96	0.47
1:C:299:GLY:HA2	2:C:349:B4P:H51B	1.97	0.47
1:A:267:ASP:HB3	1:A:268:PRO:HD2	1.97	0.46
1:B:228:LEU:HD23	1:B:228:LEU:O	2.15	0.46
1:B:333:ARG:CB	1:B:337:THR:HG23	2.28	0.46
1:A:266:SER:O	1:A:284:VAL:HG13	2.16	0.46
1:A:74:GLN:HE21	1:A:83:ALA:N	2.12	0.46
1:B:288:ALA:N	1:B:291:GLN:HE21	2.15	0.45
1:C:20:SER:CB	1:C:124:VAL:HB	2.47	0.45
1:A:222:GLU:HG2	1:A:223:THR:N	2.31	0.45
1:C:74:GLN:HE21	1:C:83:ALA:N	2.12	0.45
1:B:74:GLN:HE22	1:B:82:THR:H	1.65	0.45
1:B:74:GLN:HE22	1:B:82:THR:N	2.15	0.45
1:C:17:LEU:HD11	1:C:60:TYR:HB3	1.98	0.45
1:B:222:GLU:HB2	1:B:239:LEU:HD11	1.99	0.45
1:C:267:ASP:HB3	1:C:268:PRO:CD	2.47	0.45
1:A:91:GLN:HG2	5:A:456:HOH:O	2.17	0.44
1:B:131:ARG:NH1	1:B:295:THR:H	2.14	0.44
1:B:11:GLY:HA2	1:B:164:TYR:O	2.18	0.44
1:A:165:VAL:O	1:A:193:MET:HA	2.17	0.44
1:A:10:VAL:CG1	1:A:160:ALA:HB2	2.49	0.43
1:A:322:CYS:HB2	1:A:344:PHE:CE2	2.53	0.43
1:C:36:ASN:HA	1:C:131:ARG:O	2.17	0.43
1:C:131:ARG:NH2	2:C:349:B4P:O1A	2.51	0.43
1:B:100:GLU:O	1:B:104:SER:HB2	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:22:VAL:HA	1:C:126:VAL:O	2.19	0.43
1:B:25:LYS:HA	1:B:28:LEU:HD12	2.02	0.42
1:B:266:SER:O	1:B:284:VAL:HG22	2.19	0.42
1:C:317:ASP:O	1:C:321:LYS:HG3	2.20	0.42
1:B:96:ARG:HH11	1:B:96:ARG:CG	2.33	0.42
1:A:222:GLU:HB2	1:A:239:LEU:HD11	2.01	0.42
1:B:46:MET:HE1	1:B:136:ASN:OD1	2.20	0.42
1:B:71:ARG:NE	1:B:105:ASN:ND2	2.52	0.42
1:C:222:GLU:OE2	1:C:264:GLN:HA	2.19	0.42
1:B:20:SER:HB2	1:B:124:VAL:HB	2.01	0.42
1:A:146:GLU:HB3	5:A:440:HOH:O	2.14	0.42
1:B:131:ARG:HH11	1:B:294:ASP:HA	1.86	0.41
1:C:331:ILE:O	1:C:331:ILE:CG2	2.69	0.41
1:C:77:LEU:O	1:C:78:GLN:C	2.63	0.41
1:A:299:GLY:HA2	2:A:349:B4P:H51B	2.03	0.41
1:C:5:ARG:HA	1:C:79:ARG:NH2	2.35	0.41
1:C:165:VAL:O	1:C:193:MET:HA	2.21	0.40
1:A:74:GLN:HE22	1:A:82:THR:N	2.18	0.40
1:A:26:ASP:OD2	1:A:26:ASP:N	2.55	0.40
1:B:132:SER:C	1:B:133:LEU:HD12	2.47	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	331/365 (91%)	323 (98%)	8 (2%)	0	100 100
1	B	339/365 (93%)	327 (96%)	11 (3%)	1 (0%)	36 35
1	C	318/365 (87%)	308 (97%)	10 (3%)	0	100 100
All	All	988/1095 (90%)	958 (97%)	29 (3%)	1 (0%)	48 46

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	332	GLN

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	273/300 (91%)	258 (94%)	15 (6%)	19	17
1	B	279/300 (93%)	252 (90%)	27 (10%)	8	5
1	C	263/300 (88%)	248 (94%)	15 (6%)	18	15
All	All	815/900 (91%)	758 (93%)	57 (7%)	14	10

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	VAL
1	A	16	LEU
1	A	25	LYS
1	A	77	LEU
1	A	99	GLU
1	A	133	LEU
1	A	146	GLU
1	A	205	LYS
1	A	208	LEU
1	A	284	VAL
1	A	295	THR
1	A	314	ARG
1	A	332	GLN
1	A	333	ARG
1	A	337	THR
1	B	4	LEU
1	B	10	VAL
1	B	16	LEU
1	B	24	GLU
1	B	34	GLN

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Mol	Chain	Res	Type
1	B	43	GLU
1	B	77	LEU
1	B	93	GLU
1	B	96	ARG
1	B	99	GLU
1	B	101	ARG
1	B	109	VAL
1	B	116	THR
1	B	137	LEU
1	B	146	GLU
1	B	208	LEU
1	B	217	VAL
1	B	222	GLU
1	B	264	GLN
1	B	269	VAL
1	B	284	VAL
1	B	290	GLU
1	B	292	MET
1	B	314	ARG
1	B	332	GLN
1	B	333	ARG
1	B	337	THR
1	C	12	LEU
1	C	103	THR
1	C	127	THR
1	C	129	THR
1	C	131	ARG
1	C	133	LEU
1	C	137	LEU
1	C	146	GLU
1	C	151	ASP
1	C	172	VAL
1	C	208	LEU
1	C	217	VAL
1	C	269	VAL
1	C	276	THR
1	C	284	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	50	GLN

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Mol	Chain	Res	Type
1	A	74	GLN
1	A	105	ASN
1	A	110	GLN
1	A	158	GLN
1	A	264	GLN
1	A	285	GLN
1	A	312	GLN
1	A	332	GLN
1	B	29	ASN
1	B	50	GLN
1	B	74	GLN
1	B	105	ASN
1	B	110	GLN
1	B	141	ASN
1	B	153	ASN
1	B	158	GLN
1	B	206	ASN
1	B	253	ASN
1	B	291	GLN
1	B	296	ASN
1	B	332	GLN
1	C	36	ASN
1	C	74	GLN
1	C	105	ASN
1	C	147	HIS
1	C	153	ASN
1	C	158	GLN
1	C	264	GLN
1	C	296	ASN
1	C	312	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 9 ligands modelled in this entry, 6 are monoatomic - leaving 3 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	B4P	A	349	3	58,58,58	1.46	6 (10%)	84,91,91	2.01	22 (26%)
2	B4P	B	349	3	58,58,58	1.64	10 (17%)	84,91,91	1.83	22 (26%)
2	B4P	C	349	3	58,58,58	1.45	7 (12%)	84,91,91	1.87	20 (23%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	B4P	A	349	3	-	6/38/70/70	0/6/6/6
2	B4P	B	349	3	-	9/38/70/70	0/6/6/6
2	B4P	C	349	3	-	7/38/70/70	0/6/6/6

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	349	B4P	PB-O3B	7.00	1.67	1.59
2	A	349	B4P	PB-O3B	6.72	1.66	1.59
2	C	349	B4P	C5B-C4B	5.67	1.49	1.39
2	C	349	B4P	PB-O3B	4.88	1.64	1.59
2	A	349	B4P	C5B-C4B	4.76	1.47	1.39
2	B	349	B4P	C5B-C4B	4.69	1.47	1.39
2	B	349	B4P	PG-O3B	4.23	1.64	1.59
2	C	349	B4P	PG-O3B	3.52	1.63	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	349	B4P	PG-O3G	3.47	1.63	1.59
2	A	349	B4P	C8A-N7A	2.76	1.37	1.31
2	B	349	B4P	C5A-N7A	-2.72	1.34	1.39
2	C	349	B4P	C8B-N7B	2.71	1.36	1.31
2	B	349	B4P	C8B-N7B	2.59	1.36	1.31
2	C	349	B4P	C8A-N7A	2.23	1.36	1.31
2	A	349	B4P	C8B-N7B	2.21	1.35	1.31
2	B	349	B4P	C4B-N9B	-2.13	1.33	1.37
2	B	349	B4P	C5B-N7B	-2.09	1.35	1.39
2	A	349	B4P	PD-O3G	2.09	1.61	1.59
2	C	349	B4P	C5B-N7B	-2.07	1.35	1.39
2	B	349	B4P	PD-O3G	2.07	1.61	1.59
2	C	349	B4P	PG-O3G	2.03	1.61	1.59
2	A	349	B4P	C5B-N7B	-2.03	1.35	1.39
2	B	349	B4P	C8A-N7A	2.01	1.35	1.31

All (64) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	349	B4P	C5B-C4B-N3B	-6.20	118.19	126.72
2	C	349	B4P	N3A-C2A-N1A	-5.59	120.12	128.58
2	C	349	B4P	C5B-C4B-N3B	-5.50	119.14	126.72
2	B	349	B4P	C5A-C4A-N3A	-5.08	119.72	126.72
2	A	349	B4P	N3A-C2A-N1A	-5.07	120.90	128.58
2	B	349	B4P	N3A-C2A-N1A	-4.87	121.20	128.58
2	A	349	B4P	N3B-C4B-N9B	4.77	135.29	127.17
2	A	349	B4P	C5A-C4A-N3A	-4.72	120.22	126.72
2	B	349	B4P	C5B-C4B-N3B	-4.67	120.29	126.72
2	A	349	B4P	N3B-C2B-N1B	-4.65	121.55	128.58
2	C	349	B4P	C5A-C4A-N3A	-4.35	120.72	126.72
2	A	349	B4P	N9A-C8A-N7A	-4.20	107.98	113.94
2	B	349	B4P	N3B-C2B-N1B	-4.18	122.25	128.58
2	C	349	B4P	N3B-C4B-N9B	4.07	134.08	127.17
2	C	349	B4P	C4B-C5B-N7B	-3.99	106.02	110.58
2	A	349	B4P	C4B-C5B-N7B	-3.99	106.02	110.58
2	C	349	B4P	N3B-C2B-N1B	-3.88	122.71	128.58
2	A	349	B4P	C4A-C5A-N7A	-3.70	106.36	110.58
2	B	349	B4P	N3B-C4B-N9B	3.69	133.44	127.17
2	A	349	B4P	C2B-N3B-C4B	3.67	120.79	111.83
2	B	349	B4P	C2A-N3A-C4A	3.59	120.60	111.83
2	A	349	B4P	C5A-N7A-C8A	3.54	109.02	103.45
2	A	349	B4P	C2A-N3A-C4A	3.47	120.32	111.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	349	B4P	N9A-C8A-N7A	-3.40	109.11	113.94
2	B	349	B4P	C4B-C5B-N7B	-3.39	106.70	110.58
2	C	349	B4P	N9A-C8A-N7A	-3.34	109.20	113.94
2	B	349	B4P	N3A-C4A-N9A	3.29	132.76	127.17
2	C	349	B4P	C2A-N3A-C4A	3.23	119.72	111.83
2	B	349	B4P	C4B-N9B-C8B	3.14	109.04	105.74
2	A	349	B4P	C5B-N7B-C8B	3.10	108.33	103.45
2	C	349	B4P	C2B-N3B-C4B	3.08	119.35	111.83
2	C	349	B4P	N3A-C4A-N9A	3.08	132.40	127.17
2	B	349	B4P	C2B-N3B-C4B	2.98	119.11	111.83
2	C	349	B4P	C4A-N9A-C8A	2.78	108.66	105.74
2	C	349	B4P	O2G-PG-O3G	-2.71	99.94	107.27
2	B	349	B4P	C5A-N7A-C8A	2.68	107.66	103.45
2	B	349	B4P	C4A-C5A-N7A	-2.54	107.67	110.58
2	A	349	B4P	N3A-C4A-N9A	2.54	131.48	127.17
2	B	349	B4P	C5E-C4E-C3E	-2.53	106.11	115.21
2	B	349	B4P	C5B-N7B-C8B	2.52	107.40	103.45
2	C	349	B4P	C5B-N7B-C8B	2.50	107.38	103.45
2	C	349	B4P	O4E-C1E-N9A	2.48	112.85	108.09
2	A	349	B4P	C4A-N9A-C8A	2.46	108.33	105.74
2	A	349	B4P	O2B-PB-O3B	2.44	113.86	107.27
2	A	349	B4P	C2F-C1F-N9B	-2.39	107.36	113.30
2	B	349	B4P	N9B-C8B-N7B	-2.36	110.59	113.94
2	B	349	B4P	O2B-PB-O3B	2.34	113.61	107.27
2	A	349	B4P	C5A-C4A-N9A	2.28	108.30	105.81
2	A	349	B4P	C4B-N9B-C8B	2.25	108.10	105.74
2	C	349	B4P	C2B-N1B-C6B	2.20	122.35	118.73
2	C	349	B4P	C4B-N9B-C8B	2.19	108.04	105.74
2	B	349	B4P	C4A-N9A-C8A	2.18	108.03	105.74
2	C	349	B4P	C5E-C4E-C3E	-2.18	107.36	115.21
2	B	349	B4P	C2B-N1B-C6B	2.15	122.26	118.73
2	A	349	B4P	O3E-C3E-C4E	-2.15	104.91	111.08
2	C	349	B4P	C2A-N1A-C6A	2.14	122.25	118.73
2	B	349	B4P	C6B-C5B-N7B	2.14	136.22	132.09
2	B	349	B4P	O3A-PA-O1A	-2.10	104.39	110.70
2	C	349	B4P	O3A-PB-O1B	-2.09	104.42	110.70
2	A	349	B4P	C5E-C4E-C3E	-2.07	107.75	115.21
2	A	349	B4P	N9B-C8B-N7B	-2.05	111.03	113.94
2	B	349	B4P	O2D-PD-O1D	2.03	121.87	112.44
2	A	349	B4P	O2B-PB-O3A	2.01	112.69	107.27
2	C	349	B4P	C6B-C5B-N7B	2.01	135.96	132.09

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	349	B4P	PB-O3A-PA-O5E
2	A	349	B4P	C5E-O5E-PA-O2A
2	A	349	B4P	C5E-O5E-PA-O3A
2	B	349	B4P	C5E-O5E-PA-O2A
2	B	349	B4P	C5E-O5E-PA-O3A
2	C	349	B4P	C5E-O5E-PA-O2A
2	C	349	B4P	C5E-O5E-PA-O3A
2	C	349	B4P	PB-O3A-PA-O1A
2	B	349	B4P	PB-O3A-PA-O5E
2	C	349	B4P	PB-O3A-PA-O5E
2	A	349	B4P	PG-O3B-PB-O2B
2	B	349	B4P	PG-O3B-PB-O2B
2	B	349	B4P	C3E-C4E-C5E-O5E
2	B	349	B4P	PG-O3B-PB-O1B
2	C	349	B4P	PG-O3B-PB-O2B
2	A	349	B4P	PG-O3B-PB-O1B
2	B	349	B4P	PB-O3A-PA-O1A
2	B	349	B4P	PD-O3G-PG-O2G
2	C	349	B4P	PG-O3B-PB-O1B
2	B	349	B4P	O4F-C4F-C5F-O5F
2	A	349	B4P	PD-O3G-PG-O2G
2	C	349	B4P	PB-O3B-PG-O1G

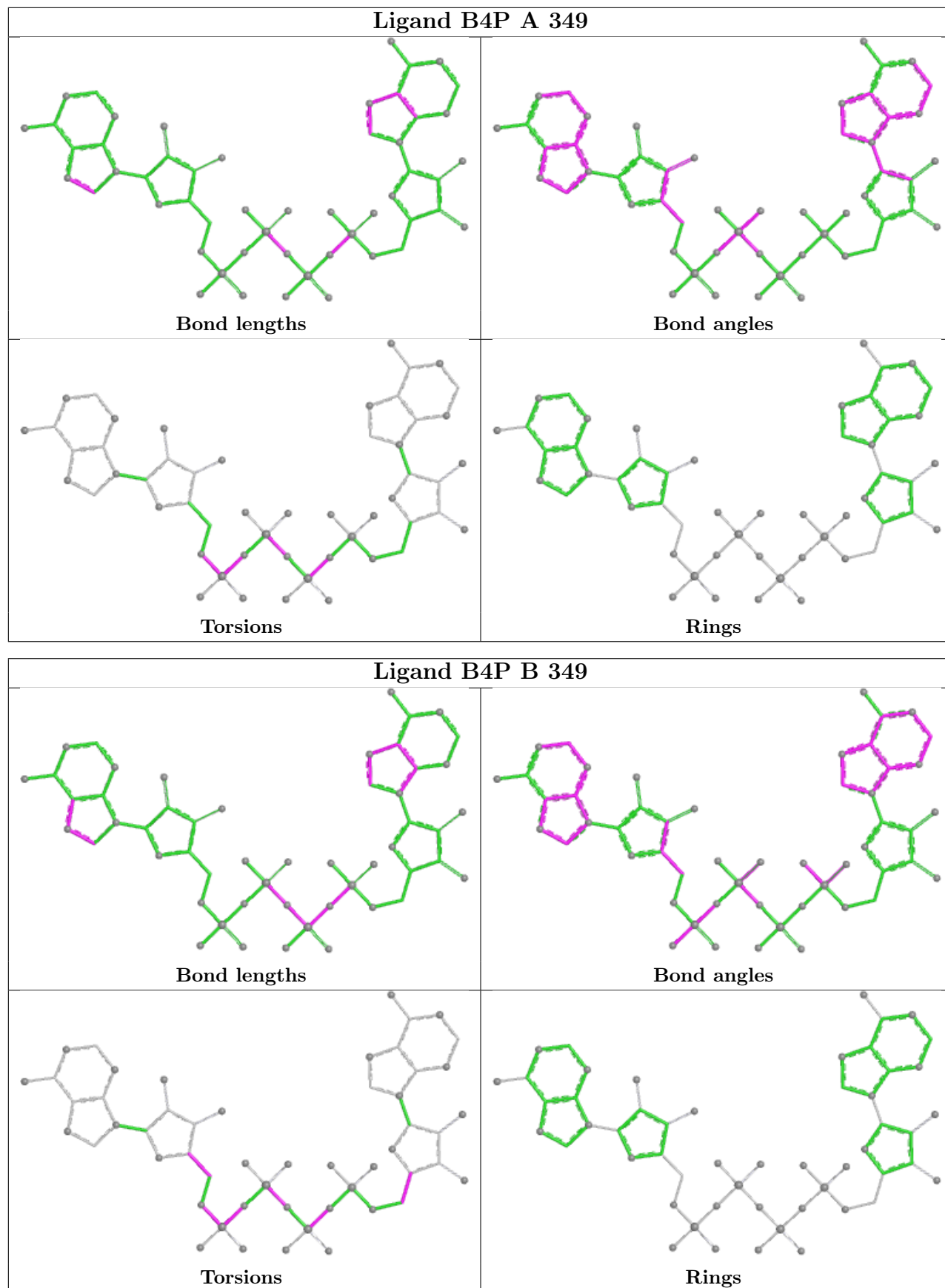
There are no ring outliers.

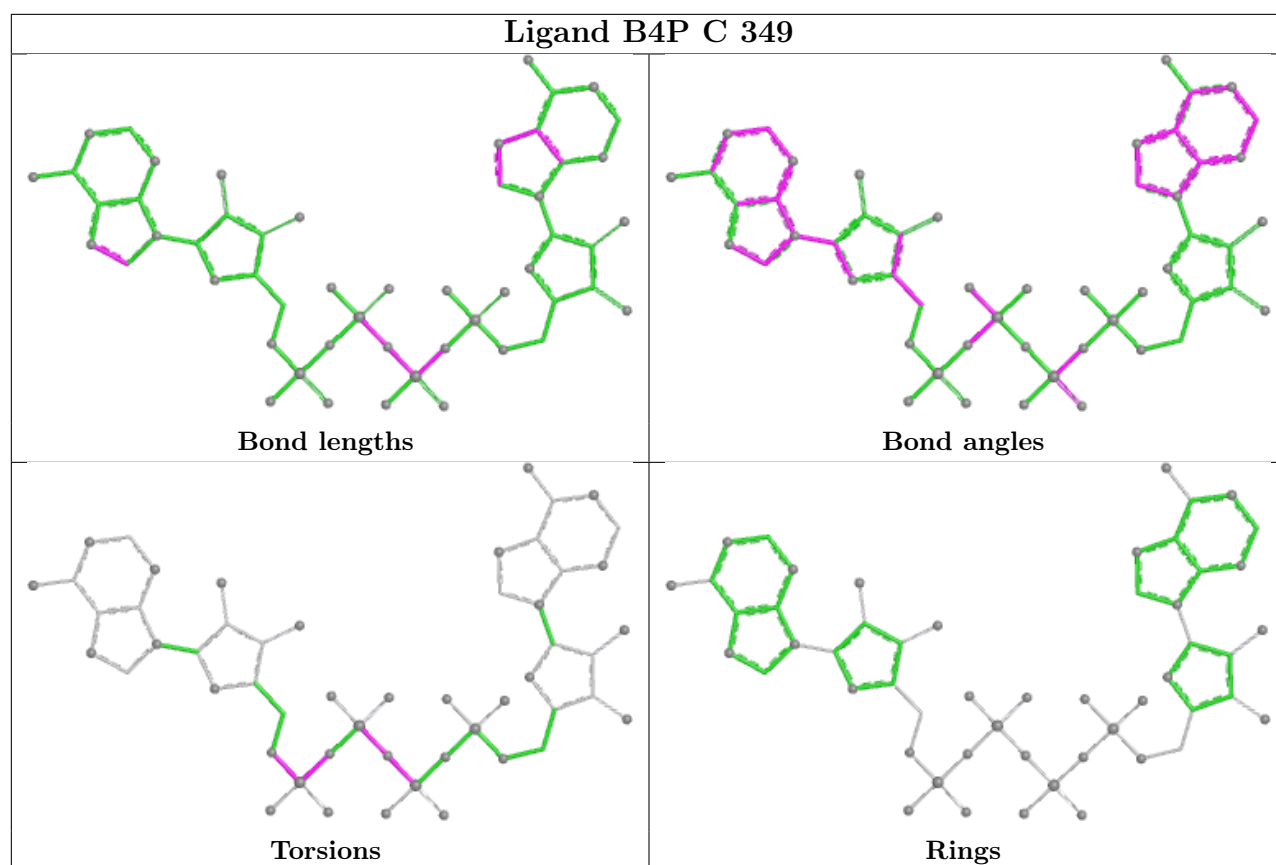
3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	349	B4P	1	0
2	B	349	B4P	1	0
2	C	349	B4P	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient

equivalents in the CSD to analyse the geometry.





## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [\(i\)](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ > 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q < 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	335/365 (91%)	-0.23	4 (1%) 76 76	20, 30, 52, 62	0
1	B	341/365 (93%)	0.19	16 (4%) 36 35	25, 40, 72, 79	0
1	C	321/365 (87%)	0.04	5 (1%) 70 70	22, 41, 60, 68	1 (0%)
All	All	997/1095 (91%)	-0.00	25 (2%) 58 58	20, 37, 62, 79	1 (0%)

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	336	CYS	5.6
1	B	337	THR	3.9
1	B	335	GLY	3.0
1	B	31	TYR	2.9
1	B	203	PHE	2.9
1	B	338	PHE	2.9
1	B	29	ASN	2.8
1	A	288	ALA	2.8
1	C	115	ALA	2.8
1	B	288	ALA	2.6
1	B	27	LEU	2.6
1	B	289	PRO	2.6
1	B	295	THR	2.5
1	A	115	ALA	2.5
1	B	30	LYS	2.4
1	C	330	ILE	2.4
1	B	344	PHE	2.3
1	B	129	THR	2.3
1	C	129	THR	2.3
1	B	28	LEU	2.3
1	A	335	GLY	2.1
1	A	334	SER	2.1
1	C	331	ILE	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	332	GLN	2.0
1	B	339	GLU	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 6.4 Ligands [i](#)

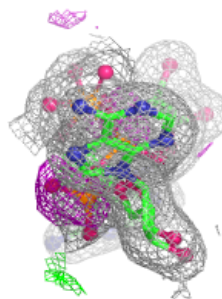
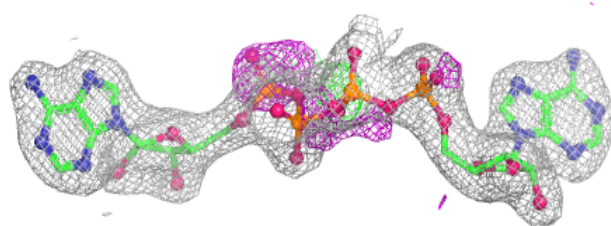
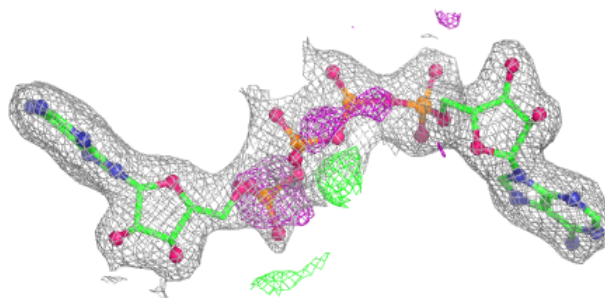
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	B4P	B	349	53/53	0.93	0.08	29,38,51,56	0
2	B4P	C	349	53/53	0.94	0.08	28,44,54,55	0
2	B4P	A	349	53/53	0.96	0.06	21,29,39,41	0
3	MG	B	350	1/1	0.98	0.04	37,37,37,37	0
3	MG	C	350	1/1	0.98	0.04	35,35,35,35	0
3	MG	A	350	1/1	0.99	0.03	28,28,28,28	0
4	CL	A	351	1/1	0.99	0.02	22,22,22,22	0
4	CL	B	351	1/1	0.99	0.04	30,30,30,30	0
4	CL	C	351	1/1	0.99	0.03	30,30,30,30	0

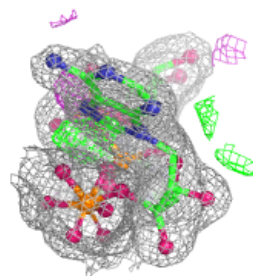
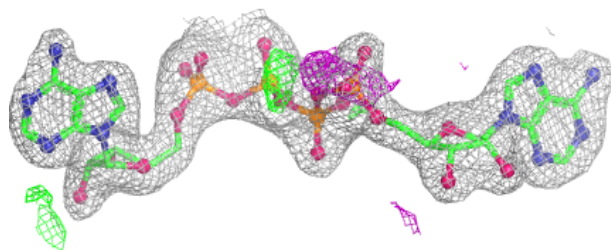
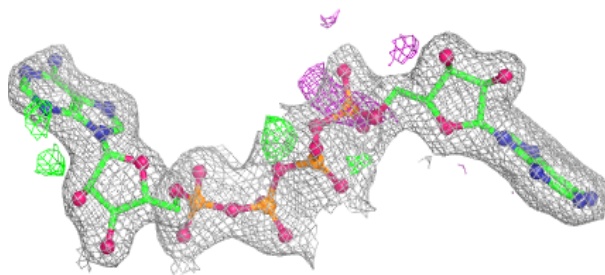
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

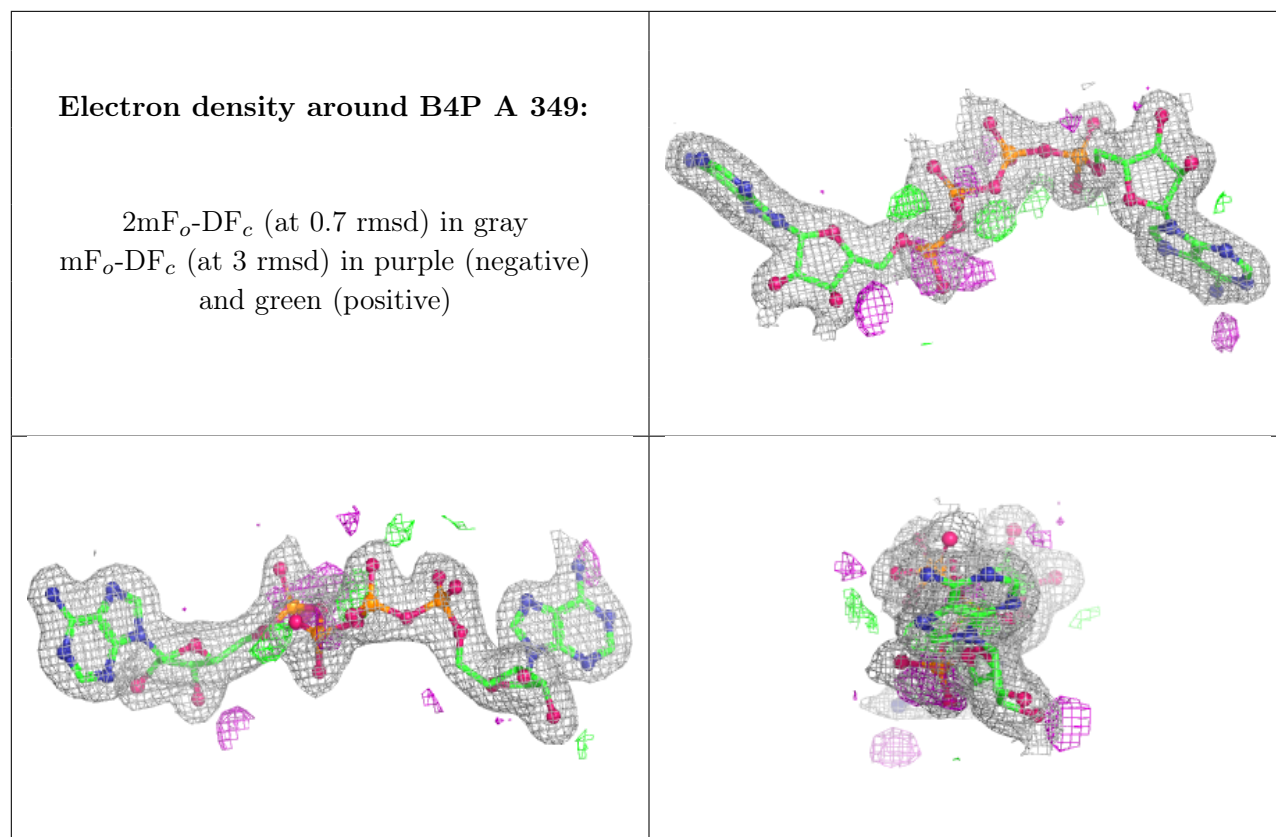
**Electron density around B4P B 349:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around B4P C 349:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





## 6.5 Other polymers [i](#)

There are no such residues in this entry.