



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 7, 2026 – 03:34 AM UTC

PDB ID : 2W41 / pdb_00002w41
Title : Crystal structure of Plasmodium falciparum glycerol kinase with ADP
Authors : Schnick, C.; Polley, S.D.; Fivelman, Q.L.; Ranford-Cartwright, L.; Wilkinson, S.R.; Brannigan, J.A.; Wilkinson, A.J.; Baker, D.A.
Deposited on : 2008-11-18
Resolution : 2.41 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

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>.

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)
Xtriage (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

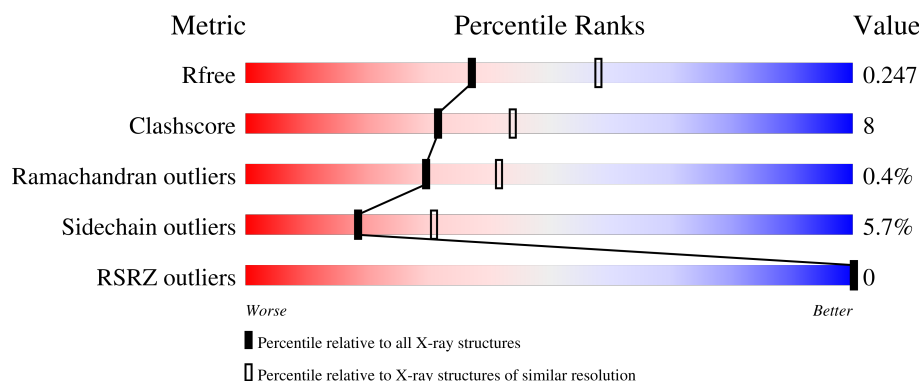
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.41 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	6062 (2.44-2.40)
Clashscore	190562	6562 (2.44-2.40)
Ramachandran outliers	187476	6481 (2.44-2.40)
Sidechain outliers	187428	6482 (2.44-2.40)
RSRZ outliers	180081	6066 (2.44-2.40)

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 ≥ 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	507	 78% 20% .
1	B	507	 78% 20% .

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	EDO	B	1511	-	-	X	-

2 Entry composition [i](#)

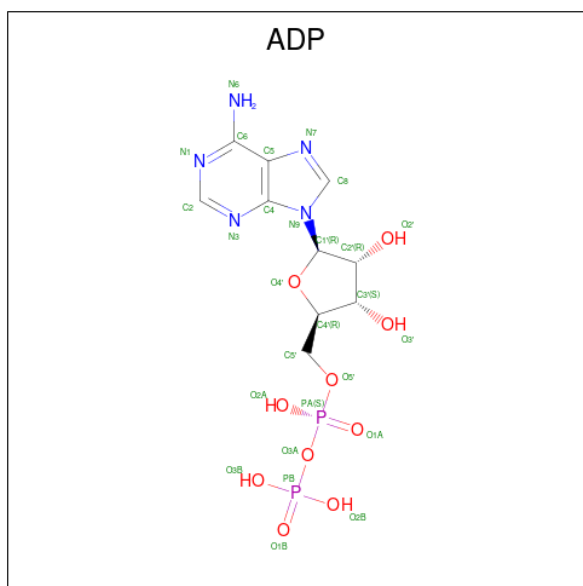
There are 4 unique types of molecules in this entry. The entry contains 8477 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 GLYCEROL KINASE, PUTATIVE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	506	Total	C	N	O	S	8	0	0
			4012	2551	665	771	25			
1	B	507	Total	C	N	O	S	12	0	0
			4020	2557	666	772	25			

- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 3 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	B	1	Total	C	O	0	0
			4	2	2		
3	B	1	Total	C	O	0	0
			4	2	2		
3	B	1	Total	C	O	0	0
			4	2	2		
3	B	1	Total	C	O	0	0
			4	2	2		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0

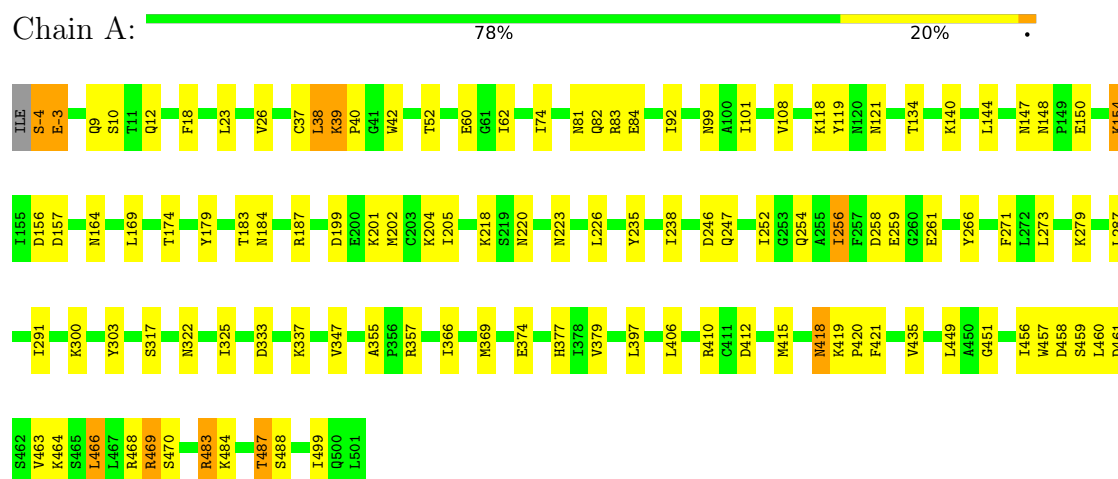
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	152	Total O 152 152	0	0
4	B	155	Total O 155 155	0	0

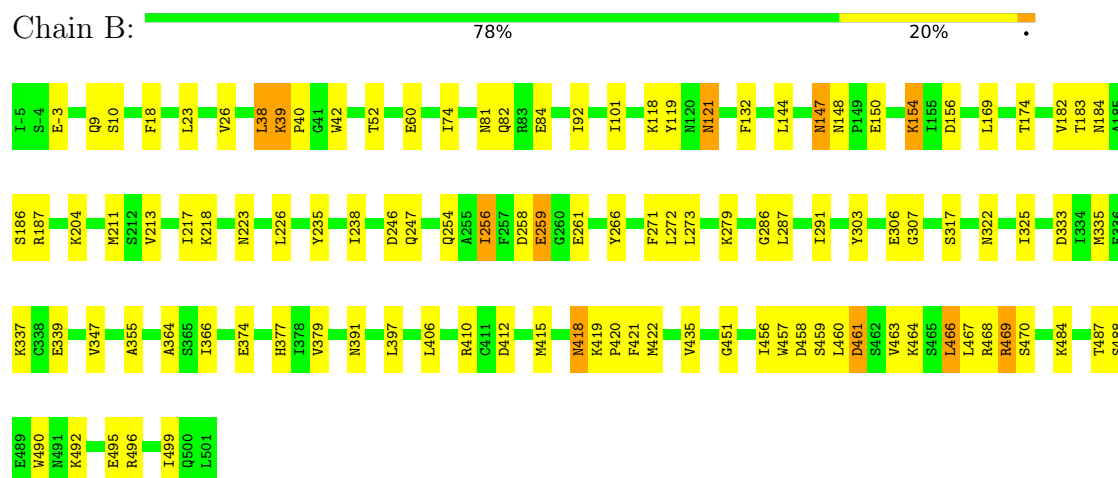
3 Residue-property plots

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: GLYCEROL KINASE, PUTATIVE



• Molecule 1: GLYCEROL KINASE, PUTATIVE



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	82.53Å 57.63Å 123.92Å 90.00° 89.75° 90.00°	Depositor
Resolution (Å)	124.03 – 2.41 123.92 – 2.41	Depositor EDS
% Data completeness (in resolution range)	91.3 (124.03-2.41) 91.0 (123.92-2.41)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.05 (at 2.39Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.197 , 0.258 0.189 , 0.247	Depositor DCC
R_{free} test set	2119 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å ²)	48.1	Xtriage
Anisotropy	0.046	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 38.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.480 for h,-k,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	8477	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.91% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: ADP, EDO

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	1.12	7/4087 (0.2%)	1.19	14/5530 (0.3%)
1	B	1.11	5/4095 (0.1%)	1.17	12/5541 (0.2%)
All	All	1.11	12/8182 (0.1%)	1.18	26/11071 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	279	LYS	CB-CG	-17.07	1.01	1.52
1	A	279	LYS	CB-CG	-15.67	1.05	1.52
1	B	156	ASP	CA-CB	-7.40	1.41	1.53
1	B	256	ILE	CA-CB	6.68	1.63	1.54
1	A	252	ILE	CA-CB	5.93	1.61	1.54
1	A	256	ILE	CA-CB	5.74	1.62	1.54
1	A	101	ILE	CA-CB	5.52	1.60	1.53
1	A	37	CYS	CA-C	5.52	1.58	1.53
1	B	101	ILE	CA-CB	5.47	1.60	1.53
1	A	156	ASP	CA-CB	-5.40	1.45	1.53
1	A	52	THR	CA-CB	5.29	1.61	1.53
1	B	52	THR	CA-CB	5.16	1.61	1.53

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	156	ASP	CB-CA-C	-10.50	94.40	110.88
1	A	156	ASP	N-CA-CB	9.87	124.32	110.01
1	B	279	LYS	CA-CB-CG	8.78	131.66	114.10
1	A	156	ASP	CA-CB-CG	-8.16	104.44	112.60
1	A	279	LYS	CA-CB-CG	7.79	129.67	114.10
1	B	156	ASP	N-CA-CB	7.62	121.06	110.01
1	A	-3	GLU	N-CA-C	6.84	121.62	113.28
1	B	347	VAL	CA-C-N	-6.76	114.82	121.65
1	B	347	VAL	C-N-CA	-6.76	114.82	121.65
1	A	483	ARG	NE-CZ-NH2	-6.70	113.17	119.20
1	A	300	LYS	N-CA-C	-6.45	101.63	109.83
1	B	246	ASP	N-CA-C	6.10	118.71	111.33
1	A	435	VAL	CG1-CB-CG2	-6.10	97.39	110.80
1	B	182	VAL	N-CA-C	5.96	116.70	110.62
1	A	347	VAL	CA-C-N	-5.81	114.07	121.91
1	A	347	VAL	C-N-CA	-5.81	114.07	121.91
1	A	148	ASN	CA-C-N	5.79	125.48	119.05
1	A	148	ASN	C-N-CA	5.79	125.48	119.05
1	B	467	LEU	N-CA-C	5.78	117.58	111.28
1	A	246	ASP	N-CA-C	5.78	118.04	111.11
1	B	148	ASN	CA-C-N	5.64	125.31	119.05
1	B	148	ASN	C-N-CA	5.64	125.31	119.05
1	B	435	VAL	CG1-CB-CG2	-5.61	98.45	110.80
1	B	156	ASP	CB-CA-C	-5.55	102.17	110.88
1	A	483	ARG	CD-NE-CZ	5.21	131.69	124.40
1	B	211	MET	N-CA-C	5.08	119.23	113.19

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	-4	SER	Peptide

5.2 Too-close contacts ⓘ

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	4012	0	4015	67	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	4020	0	4026	68	0
2	A	27	0	12	0	0
2	B	27	0	12	0	0
3	A	40	0	60	1	0
3	B	44	0	66	10	0
4	A	152	0	0	8	0
4	B	155	0	0	3	0
All	All	8477	0	8191	132	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 (132) 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:B:464:LYS:HB3	1:B:468:ARG:NH1	1.81	0.95
1:B:217:ILE:HD12	3:B:1512:EDO:H12	1.47	0.95
1:A:9:GLN:HE22	1:A:82:GLN:HE21	1.11	0.92
1:A:464:LYS:HB3	1:A:468:ARG:NH1	1.85	0.92
1:B:9:GLN:HE22	1:B:82:GLN:HE21	1.19	0.91
1:B:490:TRP:HD1	3:B:1511:EDO:H12	1.42	0.85
1:A:469:ARG:HH11	1:A:469:ARG:HG3	1.43	0.84
1:B:469:ARG:HH11	1:B:469:ARG:HG3	1.43	0.84
1:B:490:TRP:CD1	3:B:1511:EDO:H12	2.17	0.79
1:A:357:ARG:CG	4:A:2090:HOH:O	2.30	0.78
1:B:464:LYS:HD3	1:B:468:ARG:HH22	1.50	0.76
1:B:487:THR:HB	3:B:1511:EDO:H22	1.67	0.75
1:A:464:LYS:HD3	1:A:468:ARG:HH22	1.53	0.73
1:A:357:ARG:HG3	4:A:2090:HOH:O	1.89	0.72
1:A:374:GLU:H	1:A:377:HIS:HD2	1.34	0.72
1:A:9:GLN:NE2	1:A:82:GLN:HE21	1.86	0.71
1:B:469:ARG:HG3	1:B:469:ARG:NH1	2.03	0.71
1:A:469:ARG:HG3	1:A:469:ARG:NH1	2.05	0.70
3:B:1511:EDO:O1	4:B:2155:HOH:O	2.10	0.69
1:A:256:ILE:HD11	1:A:410:ARG:HG3	1.77	0.67
1:A:83:ARG:NH2	4:A:2024:HOH:O	2.28	0.66
1:B:374:GLU:H	1:B:377:HIS:HD2	1.43	0.65
1:B:256:ILE:HD11	1:B:410:ARG:HG3	1.80	0.64
1:B:287:LEU:HD21	1:B:355:ALA:HB3	1.79	0.63
1:A:287:LEU:HD21	1:A:355:ALA:HB3	1.80	0.62
1:B:235:TYR:HA	1:B:238:ILE:HD12	1.80	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:39:LYS:HD3	1:A:42:TRP:CE2	2.35	0.61
1:B:464:LYS:HB3	1:B:468:ARG:HH12	1.60	0.60
1:B:464:LYS:HD3	1:B:468:ARG:NH2	2.16	0.59
1:A:374:GLU:H	1:A:377:HIS:CD2	2.20	0.57
1:A:464:LYS:HD3	1:A:468:ARG:NH2	2.18	0.57
1:B:9:GLN:NE2	1:B:82:GLN:HE21	1.97	0.57
1:A:322:ASN:HD21	1:B:374:GLU:HA	1.69	0.56
1:B:258:ASP:O	1:B:261:GLU:HB2	2.05	0.56
1:B:287:LEU:HD21	1:B:355:ALA:CB	2.36	0.56
1:B:422:MET:HA	1:B:422:MET:HE2	1.88	0.56
1:B:39:LYS:HD3	1:B:42:TRP:CE2	2.40	0.56
1:B:259:GLU:HB3	3:B:1510:EDO:H22	1.89	0.55
1:A:84:GLU:HG3	1:A:187:ARG:HB3	1.90	0.54
1:A:287:LEU:HD21	1:A:355:ALA:CB	2.38	0.54
1:A:235:TYR:HA	1:A:238:ILE:HD12	1.89	0.53
1:B:287:LEU:HD13	1:B:397:LEU:HD21	1.89	0.53
1:A:218:LYS:NZ	1:A:223:ASN:O	2.42	0.53
1:B:291:ILE:HD13	1:B:303:TYR:CE1	2.42	0.53
1:A:469:ARG:HH11	1:A:469:ARG:CG	2.18	0.53
1:A:464:LYS:HB3	1:A:468:ARG:HH12	1.70	0.53
1:B:469:ARG:HH11	1:B:469:ARG:CG	2.17	0.53
1:A:374:GLU:HA	1:B:322:ASN:HD21	1.73	0.52
1:B:391:ASN:HD22	3:B:1511:EDO:C2	2.22	0.52
1:A:266:TYR:HB3	1:A:415:MET:HB2	1.91	0.52
1:A:-4:SER:HB3	1:A:-3:GLU:OE1	2.10	0.51
1:B:286:GLY:N	4:B:2074:HOH:O	2.22	0.51
1:B:39:LYS:HB2	1:B:40:PRO:CD	2.41	0.51
1:A:39:LYS:HB2	1:A:40:PRO:CD	2.41	0.51
1:A:466:LEU:O	1:A:469:ARG:HG2	2.11	0.51
1:A:374:GLU:N	1:A:377:HIS:HD2	2.06	0.51
1:B:374:GLU:H	1:B:377:HIS:CD2	2.26	0.50
1:A:418:ASN:HD22	1:A:418:ASN:C	2.19	0.50
1:A:81:ASN:HD21	1:A:184:ASN:HD21	1.57	0.50
1:B:84:GLU:HG3	1:B:187:ARG:HB3	1.92	0.50
1:B:418:ASN:ND2	1:B:421:PHE:H	2.09	0.50
1:B:183:THR:O	1:B:186:SER:OG	2.28	0.50
1:B:187:ARG:NH1	1:B:306:GLU:OE1	2.34	0.49
1:A:220:ASN:HB3	1:A:449:LEU:HD13	1.94	0.49
1:A:291:ILE:HD13	1:A:303:TYR:CE1	2.47	0.49
1:B:266:TYR:HB3	1:B:415:MET:HB2	1.94	0.49
1:A:174:THR:HG22	1:A:226:LEU:O	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:258:ASP:O	1:A:261:GLU:HB2	2.13	0.48
1:A:483:ARG:O	1:A:487:THR:HG23	2.13	0.48
1:A:179:TYR:CE1	1:A:218:LYS:HE3	2.49	0.48
1:A:118:LYS:HE2	1:A:119:TYR:CZ	2.49	0.47
1:A:419:LYS:N	1:A:420:PRO:HD2	2.30	0.47
1:A:460:LEU:O	1:A:463:VAL:HG22	2.15	0.47
1:B:147:ASN:HD22	1:B:147:ASN:N	2.12	0.47
1:B:335:MET:HB3	1:B:420:PRO:HB2	1.97	0.47
1:B:418:ASN:C	1:B:418:ASN:HD22	2.23	0.47
1:B:333:ASP:O	1:B:337:LYS:HG3	2.15	0.47
1:B:81:ASN:HD21	1:B:184:ASN:HD21	1.61	0.47
1:B:247:GLN:OE1	1:B:271:PHE:HE2	1.99	0.46
1:A:418:ASN:ND2	1:A:421:PHE:H	2.12	0.46
1:B:460:LEU:O	1:B:463:VAL:HG22	2.15	0.46
1:A:62:ILE:HD11	3:A:1506:EDO:O2	2.16	0.46
1:B:118:LYS:HE2	1:B:119:TYR:CZ	2.51	0.46
1:B:218:LYS:NZ	1:B:223:ASN:O	2.49	0.46
1:A:12:GLN:HG3	4:A:2002:HOH:O	2.15	0.46
1:B:254:GLN:NE2	1:B:412:ASP:OD1	2.49	0.46
1:B:121:ASN:HD21	1:B:132:PHE:H	1.64	0.46
1:A:154:LYS:HA	1:A:157:ASP:OD1	2.16	0.45
1:A:134:THR:O	1:A:140:LYS:HE3	2.17	0.45
1:A:247:GLN:HG3	4:A:2024:HOH:O	2.16	0.45
1:A:366:ILE:HD12	1:B:366:ILE:HD12	1.98	0.45
1:A:451:GLY:HA3	1:A:457:TRP:CZ3	2.51	0.45
1:B:150:GLU:O	1:B:154:LYS:HG3	2.16	0.45
1:B:466:LEU:O	1:B:469:ARG:HG2	2.17	0.45
1:B:391:ASN:ND2	3:B:1511:EDO:H21	2.31	0.45
1:A:325:ILE:HG23	1:A:379:VAL:HG21	1.98	0.45
1:B:287:LEU:HD22	1:B:307:GLY:HA2	1.98	0.45
1:A:23:LEU:HD12	1:A:466:LEU:HD13	1.99	0.44
1:B:374:GLU:N	1:B:377:HIS:HD2	2.11	0.44
1:A:357:ARG:HG2	4:A:2090:HOH:O	2.08	0.44
1:A:287:LEU:HD13	1:A:397:LEU:HD21	2.00	0.44
1:B:23:LEU:HD12	1:B:466:LEU:HD13	2.00	0.44
1:B:74:ILE:HD13	1:B:235:TYR:CE1	2.52	0.44
1:B:484:LYS:HE2	1:B:484:LYS:HB3	1.87	0.44
1:A:99:ASN:ND2	4:A:2028:HOH:O	2.50	0.44
1:A:164:ASN:HB3	4:A:2054:HOH:O	2.17	0.44
1:A:247:GLN:OE1	1:A:271:PHE:HE2	2.01	0.44
1:B:461:ASP:OD1	1:B:461:ASP:N	2.51	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:VAL:HG23	1:A:134:THR:HG22	2.01	0.43
1:B:121:ASN:HB2	4:B:2043:HOH:O	2.18	0.43
1:B:18:PHE:O	1:B:26:VAL:HG22	2.18	0.43
1:B:391:ASN:HD22	3:B:1511:EDO:H21	1.83	0.43
1:B:451:GLY:HA3	1:B:457:TRP:CZ3	2.53	0.43
1:B:174:THR:HG22	1:B:226:LEU:O	2.18	0.43
1:A:484:LYS:HE2	1:A:484:LYS:HB3	1.88	0.42
1:A:74:ILE:HD13	1:A:235:TYR:CE1	2.54	0.42
1:A:150:GLU:O	1:A:154:LYS:HG3	2.19	0.42
1:A:461:ASP:N	1:A:461:ASP:OD1	2.52	0.42
1:B:419:LYS:N	1:B:420:PRO:HD2	2.34	0.42
1:B:492:LYS:O	1:B:495:GLU:HB2	2.19	0.42
1:A:183:THR:O	1:A:187:ARG:HG2	2.20	0.42
1:A:369:MET:HB2	1:B:364:ALA:HB3	2.00	0.42
1:A:18:PHE:O	1:A:26:VAL:HG22	2.19	0.42
1:B:419:LYS:N	1:B:420:PRO:CD	2.83	0.42
1:A:256:ILE:HG22	1:A:256:ILE:O	2.20	0.42
1:A:254:GLN:NE2	1:A:412:ASP:OD1	2.53	0.42
1:B:256:ILE:HG22	1:B:256:ILE:O	2.21	0.41
1:B:496:ARG:HE	3:B:1507:EDO:H21	1.86	0.41
1:A:199:ASP:OD2	1:A:202:MET:HG2	2.21	0.40
1:A:201:LYS:O	1:A:205:ILE:HG13	2.21	0.40
1:B:325:ILE:HG23	1:B:379:VAL:HG21	2.03	0.40
1:A:333:ASP:O	1:A:337:LYS:HG3	2.21	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	504/507 (99%)	475 (94%)	27 (5%)	2 (0%)	30 42

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	505/507 (100%)	477 (94%)	26 (5%)	2 (0%)	30	42
All	All	1009/1014 (100%)	952 (94%)	53 (5%)	4 (0%)	30	42

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	38	LEU
1	A	459	SER
1	B	38	LEU
1	B	459	SER

5.3.2 Protein sidechains ⓘ

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	453/454 (100%)	429 (95%)	24 (5%)	20	34
1	B	454/454 (100%)	426 (94%)	28 (6%)	16	27
All	All	907/908 (100%)	855 (94%)	52 (6%)	18	31

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	SER
1	A	38	LEU
1	A	39	LYS
1	A	60	GLU
1	A	92	ILE
1	A	121	ASN
1	A	144	LEU
1	A	147	ASN
1	A	154	LYS
1	A	169	LEU
1	A	204	LYS
1	A	259	GLU

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Mol	Chain	Res	Type
1	A	273	LEU
1	A	317	SER
1	A	406	LEU
1	A	418	ASN
1	A	456	ILE
1	A	458	ASP
1	A	466	LEU
1	A	469	ARG
1	A	470	SER
1	A	487	THR
1	A	488	SER
1	A	499	ILE
1	B	-3	GLU
1	B	10	SER
1	B	38	LEU
1	B	39	LYS
1	B	60	GLU
1	B	92	ILE
1	B	121	ASN
1	B	144	LEU
1	B	147	ASN
1	B	154	LYS
1	B	169	LEU
1	B	204	LYS
1	B	213	VAL
1	B	259	GLU
1	B	272	LEU
1	B	273	LEU
1	B	317	SER
1	B	339	GLU
1	B	406	LEU
1	B	418	ASN
1	B	456	ILE
1	B	458	ASP
1	B	461	ASP
1	B	466	LEU
1	B	469	ARG
1	B	470	SER
1	B	488	SER
1	B	499	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	9	GLN
1	A	27	HIS
1	A	81	ASN
1	A	99	ASN
1	A	121	ASN
1	A	122	ASN
1	A	164	ASN
1	A	172	ASN
1	A	322	ASN
1	A	377	HIS
1	A	418	ASN
1	B	9	GLN
1	B	81	ASN
1	B	99	ASN
1	B	121	ASN
1	B	122	ASN
1	B	147	ASN
1	B	164	ASN
1	B	172	ASN
1	B	197	GLN
1	B	322	ASN
1	B	377	HIS
1	B	391	ASN
1	B	418	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

23 ligands are modelled in this entry.

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	$\# Z > 2$
3	EDO	B	1507	-	3,3,3	0.42	0	2,2,2	0.70	0
3	EDO	B	1503	-	3,3,3	0.69	0	2,2,2	0.31	0
3	EDO	A	1506	-	3,3,3	0.38	0	2,2,2	0.53	0
3	EDO	A	1511	-	3,3,3	0.73	0	2,2,2	0.59	0
3	EDO	A	1508	-	3,3,3	0.50	0	2,2,2	0.62	0
3	EDO	B	1508	-	3,3,3	0.38	0	2,2,2	0.66	0
3	EDO	B	1504	-	3,3,3	0.40	0	2,2,2	0.32	0
2	ADP	A	1502	-	28,29,29	1.76	6 (21%)	43,45,45	2.06	11 (25%)
3	EDO	B	1510	-	3,3,3	0.60	0	2,2,2	0.22	0
3	EDO	B	1512	-	3,3,3	0.36	0	2,2,2	0.66	0
3	EDO	A	1510	-	3,3,3	0.48	0	2,2,2	0.20	0
3	EDO	A	1507	-	3,3,3	0.36	0	2,2,2	0.48	0
3	EDO	B	1505	-	3,3,3	0.48	0	2,2,2	0.32	0
3	EDO	B	1513	-	3,3,3	0.49	0	2,2,2	0.41	0
2	ADP	B	1502	-	28,29,29	1.69	6 (21%)	43,45,45	1.98	7 (16%)
3	EDO	A	1503	-	3,3,3	0.43	0	2,2,2	0.44	0
3	EDO	A	1505	-	3,3,3	0.43	0	2,2,2	0.53	0
3	EDO	B	1506	-	3,3,3	0.68	0	2,2,2	0.20	0
3	EDO	A	1504	-	3,3,3	0.37	0	2,2,2	0.90	0
3	EDO	B	1511	-	3,3,3	0.55	0	2,2,2	0.50	0
3	EDO	A	1512	-	3,3,3	0.50	0	2,2,2	0.36	0
3	EDO	A	1509	-	3,3,3	0.58	0	2,2,2	0.27	0
3	EDO	B	1509	-	3,3,3	0.36	0	2,2,2	0.84	0

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
3	EDO	B	1507	-	-	0/1/1/1	-
3	EDO	B	1503	-	-	0/1/1/1	-
3	EDO	A	1506	-	-	1/1/1/1	-
3	EDO	A	1511	-	-	1/1/1/1	-
3	EDO	A	1508	-	-	1/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	B	1508	-	-	0/1/1/1	-
3	EDO	B	1504	-	-	1/1/1/1	-
2	ADP	A	1502	-	-	1/16/32/32	0/3/3/3
3	EDO	B	1510	-	-	0/1/1/1	-
3	EDO	B	1512	-	-	0/1/1/1	-
3	EDO	A	1510	-	-	0/1/1/1	-
3	EDO	A	1507	-	-	0/1/1/1	-
3	EDO	B	1505	-	-	0/1/1/1	-
3	EDO	B	1513	-	-	1/1/1/1	-
2	ADP	B	1502	-	-	1/16/32/32	0/3/3/3
3	EDO	A	1503	-	-	0/1/1/1	-
3	EDO	A	1505	-	-	1/1/1/1	-
3	EDO	B	1506	-	-	1/1/1/1	-
3	EDO	A	1504	-	-	1/1/1/1	-
3	EDO	B	1511	-	-	1/1/1/1	-
3	EDO	A	1512	-	-	1/1/1/1	-
3	EDO	A	1509	-	-	1/1/1/1	-
3	EDO	B	1509	-	-	1/1/1/1	-

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1502	ADP	C5-C4	5.07	1.48	1.39
2	A	1502	ADP	C5-C4	4.93	1.47	1.39
2	A	1502	ADP	PA-O3A	4.87	1.64	1.59
2	B	1502	ADP	PA-O3A	3.88	1.63	1.59
2	B	1502	ADP	C4-N3	2.94	1.39	1.34
2	B	1502	ADP	C5-C6	2.79	1.48	1.41
2	A	1502	ADP	C5-N7	-2.60	1.34	1.39
2	A	1502	ADP	C5-C6	2.50	1.48	1.41
2	B	1502	ADP	C8-N7	2.35	1.36	1.31
2	A	1502	ADP	C8-N7	2.31	1.36	1.31
2	B	1502	ADP	C5-N7	-2.29	1.34	1.39
2	A	1502	ADP	C4-N3	2.28	1.38	1.34

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1502	ADP	C5-C4-N3	-6.63	117.59	126.72
2	A	1502	ADP	C5-C4-N3	-6.57	117.67	126.72
2	A	1502	ADP	N3-C4-N9	5.88	137.16	127.17
2	B	1502	ADP	N3-C4-N9	5.64	136.76	127.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1502	ADP	C2-N3-C4	4.16	121.98	111.83
2	B	1502	ADP	N3-C2-N1	-4.11	122.37	128.58
2	A	1502	ADP	C2-N3-C4	3.80	121.12	111.83
2	A	1502	ADP	N3-C2-N1	-3.49	123.29	128.58
2	A	1502	ADP	C4-C5-N7	-3.08	107.06	110.58
2	B	1502	ADP	C4-C5-N7	-3.03	107.12	110.58
2	A	1502	ADP	C5-N7-C8	2.97	108.11	103.45
2	B	1502	ADP	C5-N7-C8	2.57	107.48	103.45
2	A	1502	ADP	C4-N9-C8	2.55	108.41	105.74
2	A	1502	ADP	O4'-C1'-C2'	-2.44	101.39	106.62
2	A	1502	ADP	O3'-C3'-C4'	-2.44	104.09	111.08
2	A	1502	ADP	N6-C6-N1	2.42	123.76	118.38
2	B	1502	ADP	C4-N9-C8	2.08	107.92	105.74
2	A	1502	ADP	C5-C6-N6	-2.05	118.21	123.29

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1502	ADP	C5'-O5'-PA-O3A
3	A	1504	EDO	O1-C1-C2-O2
3	A	1509	EDO	O1-C1-C2-O2
3	B	1509	EDO	O1-C1-C2-O2
3	A	1506	EDO	O1-C1-C2-O2
3	A	1511	EDO	O1-C1-C2-O2
3	A	1512	EDO	O1-C1-C2-O2
3	B	1513	EDO	O1-C1-C2-O2
2	A	1502	ADP	C5'-O5'-PA-O1A
3	B	1506	EDO	O1-C1-C2-O2
3	B	1511	EDO	O1-C1-C2-O2
3	A	1505	EDO	O1-C1-C2-O2
3	A	1508	EDO	O1-C1-C2-O2
3	B	1504	EDO	O1-C1-C2-O2

There are no ring outliers.

5 monomers are involved in 11 short contacts:

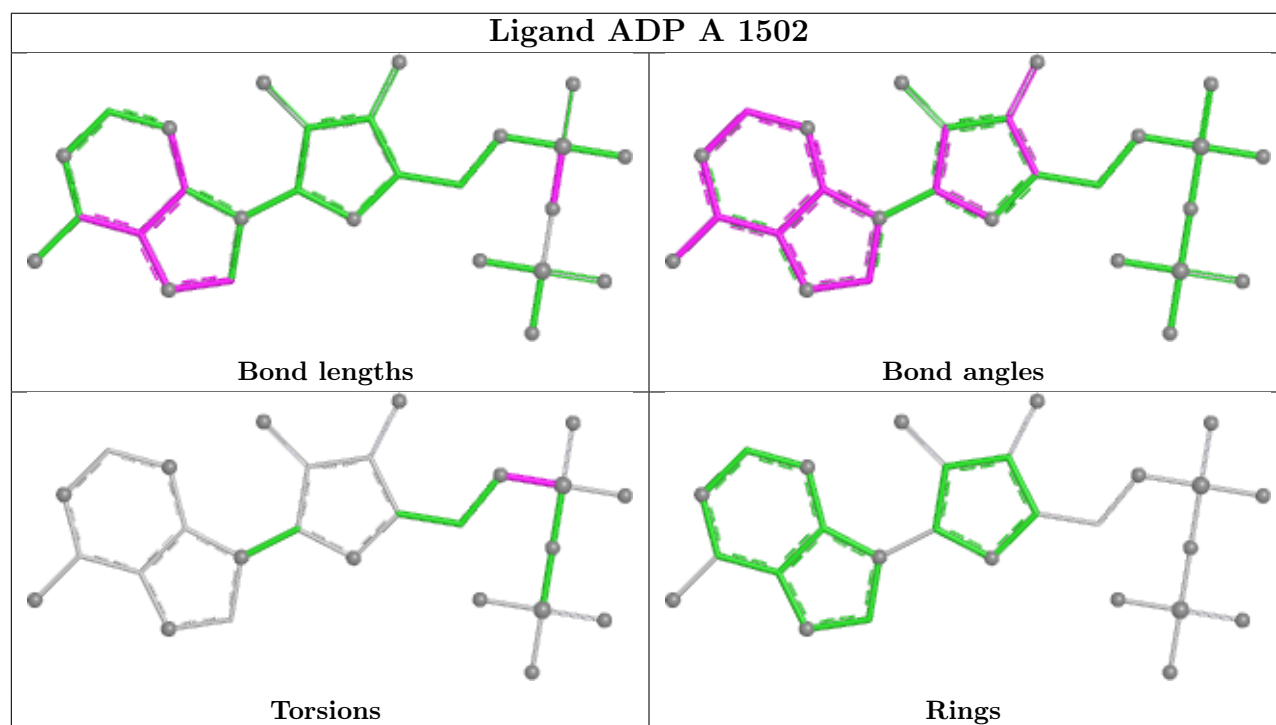
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	1507	EDO	1	0
3	A	1506	EDO	1	0
3	B	1510	EDO	1	0

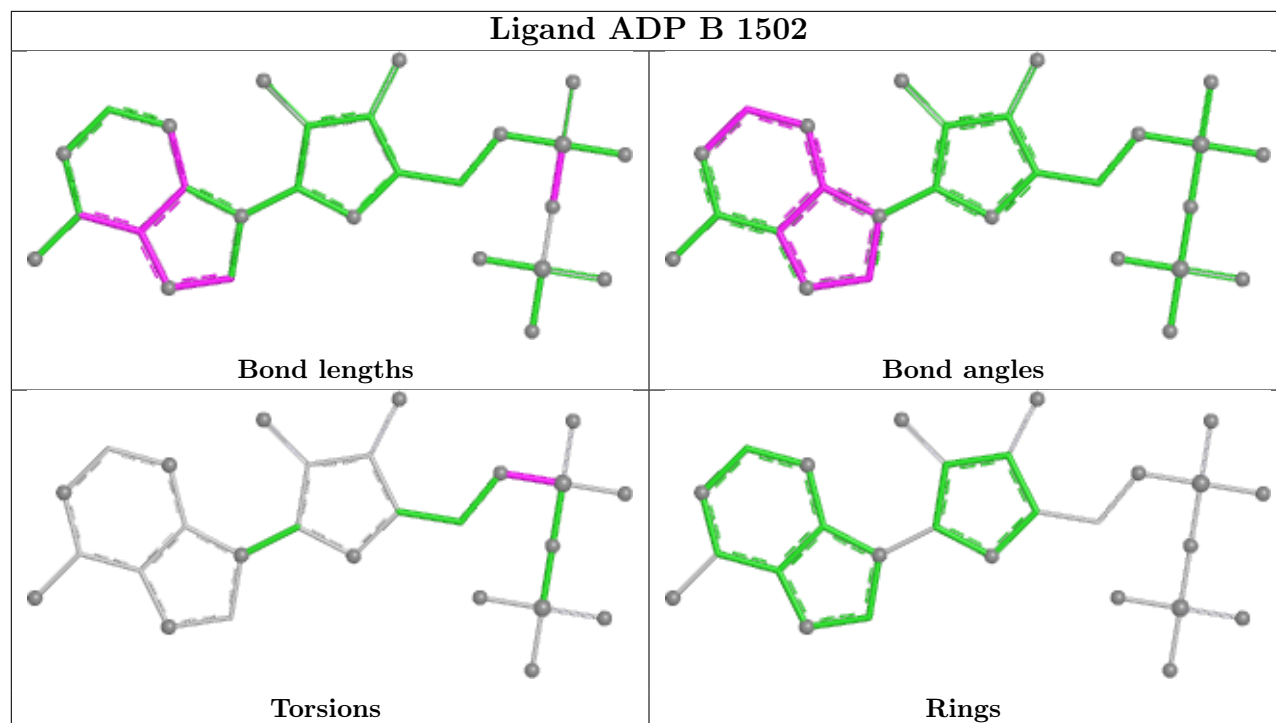
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	1512	EDO	1	0
3	B	1511	EDO	7	0

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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, 95th 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 ²)	Q<0.9
1	A	506/507 (99%)	-1.39	0 100 100	26, 44, 59, 66	2 (0%)
1	B	507/507 (100%)	-1.38	0 100 100	26, 44, 60, 66	4 (0%)
All	All	1013/1014 (99%)	-1.38	0 100 100	26, 44, 60, 66	6 (0%)

There are no RSRZ outliers to report.

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, 95th 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.

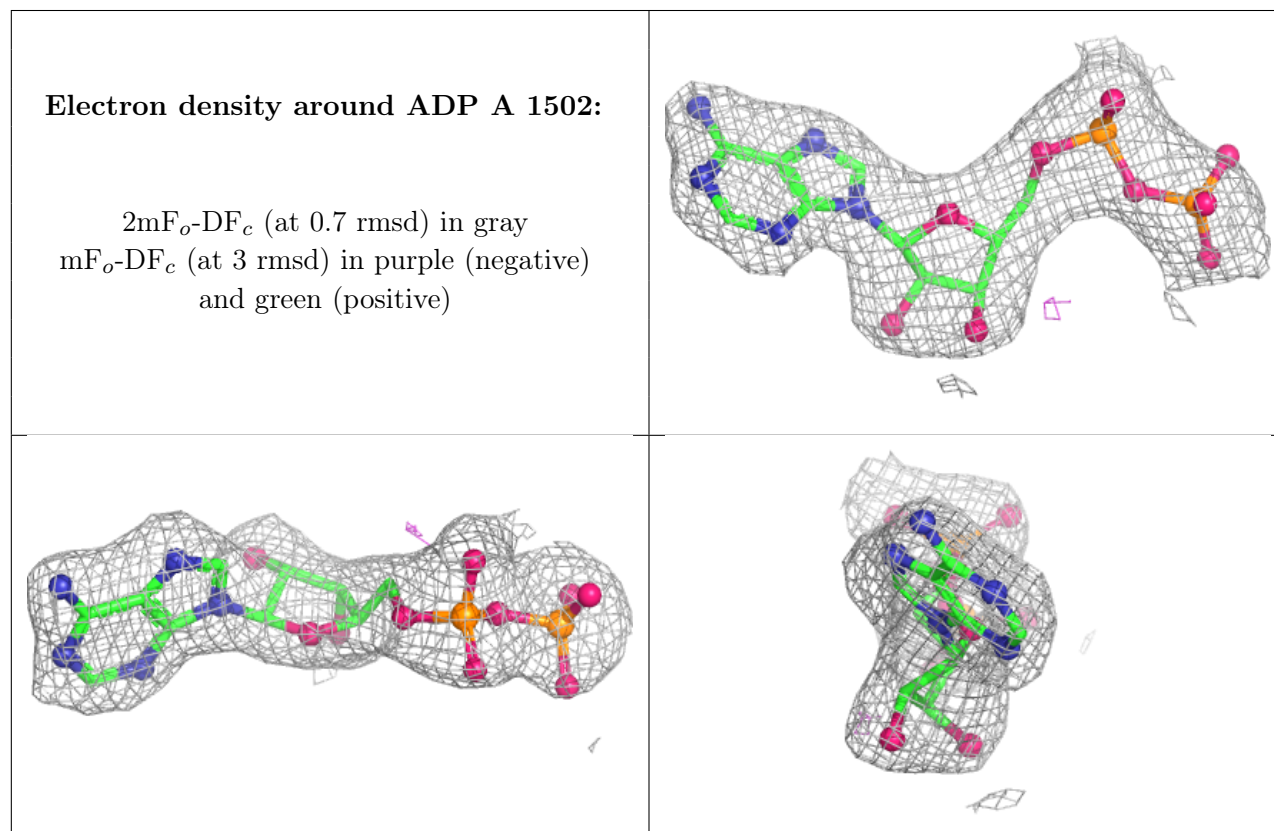
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	EDO	A	1509	4/4	0.96	0.10	61,63,64,65	0
3	EDO	A	1510	4/4	0.97	0.06	51,51,53,56	0
3	EDO	B	1506	4/4	0.97	0.07	54,58,60,60	0
3	EDO	B	1513	4/4	0.97	0.07	60,60,61,61	0
3	EDO	A	1511	4/4	0.98	0.06	50,50,52,54	0
3	EDO	A	1512	4/4	0.98	0.11	60,61,62,62	0
3	EDO	B	1503	4/4	0.98	0.09	52,52,53,54	0

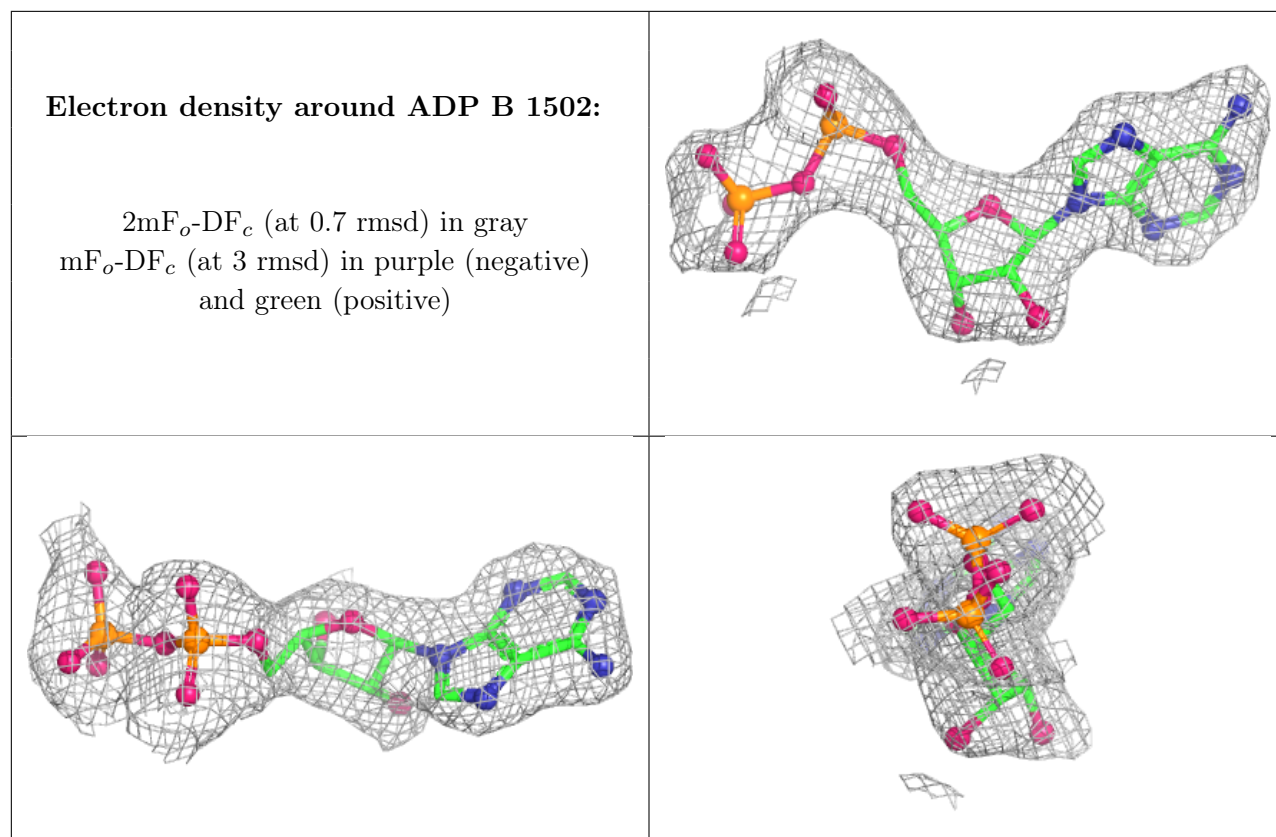
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	EDO	B	1504	4/4	0.98	0.05	38,41,42,47	0
3	EDO	B	1505	4/4	0.98	0.06	69,71,72,72	0
3	EDO	A	1504	4/4	0.98	0.05	40,40,42,45	0
3	EDO	B	1507	4/4	0.98	0.05	45,46,47,48	0
3	EDO	B	1508	4/4	0.98	0.08	53,55,57,59	0
3	EDO	B	1509	4/4	0.98	0.05	42,43,43,46	0
3	EDO	B	1510	4/4	0.98	0.08	65,68,69,71	0
3	EDO	A	1508	4/4	0.98	0.08	49,50,50,52	0
2	ADP	A	1502	27/27	0.99	0.03	45,50,71,73	0
3	EDO	A	1505	4/4	0.99	0.06	65,66,68,69	0
3	EDO	A	1506	4/4	0.99	0.06	63,64,65,66	0
3	EDO	A	1507	4/4	0.99	0.05	45,46,48,50	0
2	ADP	B	1502	27/27	0.99	0.03	46,49,74,75	0
3	EDO	B	1511	4/4	0.99	0.08	32,37,37,39	0
3	EDO	B	1512	4/4	0.99	0.04	41,42,43,43	0
3	EDO	A	1503	4/4	0.99	0.03	35,36,41,43	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.





6.5 Other polymers [i](#)

There are no such residues in this entry.