



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 18, 2026 – 11:11 AM UTC

PDB ID : 1MDU / pdb_00001mdu
Title : Crystal structure of the chicken actin trimer complexed with human gelsolin segment 1 (GS-1)
Authors : Dawson, J.F.; Sablin, E.P.; Spudich, J.A.; Fletterick, R.J.
Deposited on : 2002-08-07
Resolution : 2.20 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

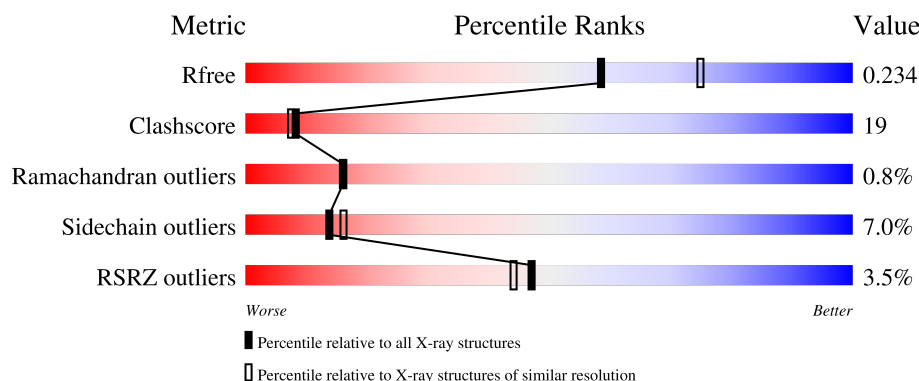
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

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	125	2% 72% 24% ..
1	D	125	% 74% 22% ..
2	B	377	2% 60% 30% 5% ..
2	E	377	6% 62% 28% 5% ..

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
4	TRS	A	472	-	X	-	-

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 8159 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 gelsolin precursor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	124	Total	C	N	O	S	0	0	0
			989	640	164	184	1			
1	D	123	Total	C	N	O	S	0	0	0
			982	635	163	183	1			

- Molecule 2 is a protein called a-actin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	361	Total	C	N	O	S	0	0	0
			2815	1784	472	541	18			
2	E	362	Total	C	N	O	S	0	0	0
			2825	1790	475	542	18			

There are 2 discrepancies between the modelled and reference sequences:

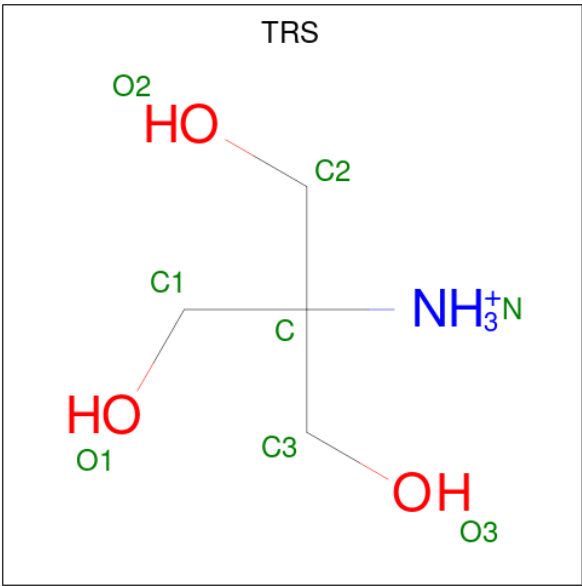
Chain	Residue	Modelled	Actual	Comment	Reference
B	75	HIC	HIS	modified residue	UNP P68139
E	75	HIC	HIS	modified residue	UNP P68139

- Molecule 3 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Ca	0	0
			2	2		
3	B	2	Total	Ca	0	0
			2	2		
3	D	2	Total	Ca	0	0
			2	2		
3	E	1	Total	Ca	0	0
			1	1		

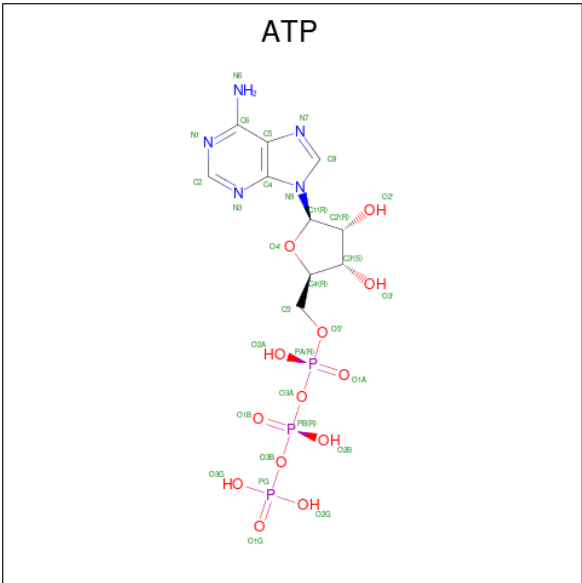
- Molecule 4 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: TRS)

(formula: C₄H₁₂NO₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			8	4	1	3		

- Molecule 5 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: C₁₀H₁₆N₅O₁₃P₃).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	B	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
5	E	1	Total	C	N	O	P	0	0
			31	10	5	13	3		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	67	Total 67	O 67	0	0
6	B	179	Total 179	O 179	0	0
6	D	64	Total 64	O 64	0	0
6	E	161	Total 161	O 161	0	0

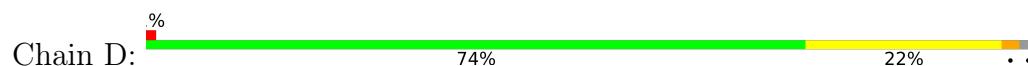
3 Residue-property plots

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.

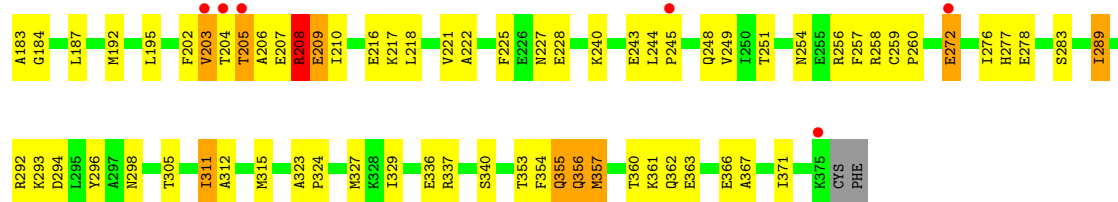
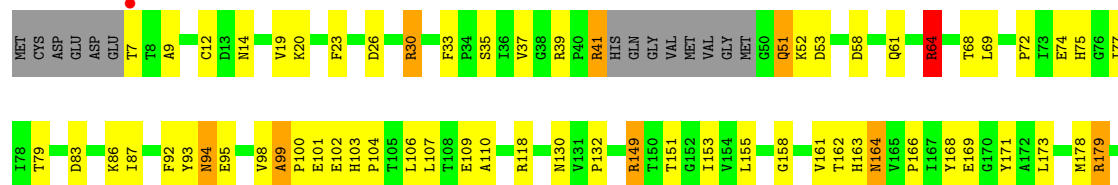
- Molecule 1: gelsolin precursor



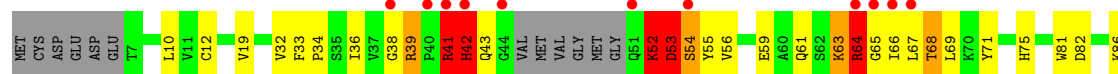
- Molecule 1: gelsolin precursor

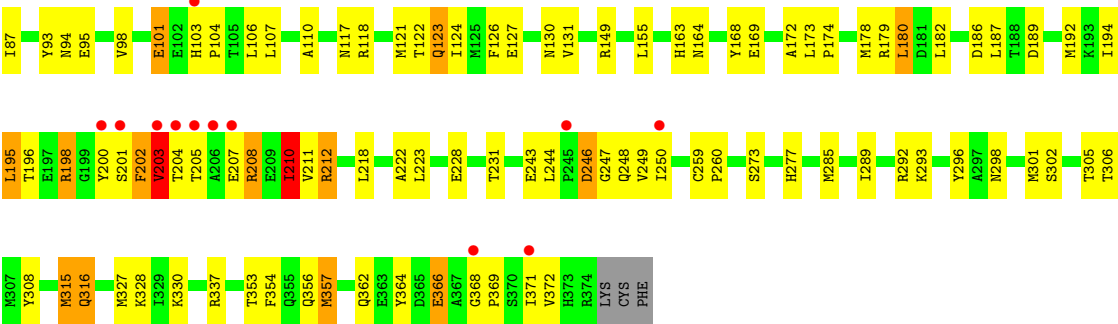


- Molecule 2: a-actin



- Molecule 2: a-actin





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	67.19Å 75.94Å 96.75Å 90.00° 91.87° 90.00°	Depositor
Resolution (Å)	25.00 – 2.20 25.00 – 2.20	Depositor EDS
% Data completeness (in resolution range)	91.4 (25.00-2.20) 91.4 (25.00-2.20)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.65 (at 2.19Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.193 , 0.233 0.194 , 0.234	Depositor DCC
R_{free} test set	2278 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	25.6	Xtriage
Anisotropy	0.611	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 58.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.034 for h,-k,-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	8159	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 12.62% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, CA, HIC, TRS

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	0.60	0/1015	1.00	1/1372 (0.1%)
1	D	0.56	0/1008	0.94	2/1362 (0.1%)
2	B	0.68	0/2862	1.11	17/3879 (0.4%)
2	E	0.74	0/2873	1.15	21/3894 (0.5%)
All	All	0.68	0/7758	1.09	41/10507 (0.4%)

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
2	B	0	2
2	E	0	6
All	All	0	8

There are no bond length outliers.

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	93	TYR	N-CA-C	7.77	119.83	111.36
2	E	93	TYR	N-CA-C	7.63	119.50	111.03
2	E	81	TRP	N-CA-C	6.72	119.62	111.82
2	B	64	ARG	CD-NE-CZ	-6.42	115.42	124.40
2	B	208	ARG	N-CA-C	-6.22	104.61	111.82
2	B	179	ARG	CD-NE-CZ	-6.13	115.82	124.40
2	E	306	THR	N-CA-C	-6.11	105.40	112.92
2	B	173	LEU	CA-C-N	5.90	126.05	119.32
2	B	173	LEU	C-N-CA	5.90	126.05	119.32
2	B	184	GLY	N-CA-C	5.88	119.76	112.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	273	SER	N-CA-C	5.87	118.48	110.55
2	B	225	PHE	N-CA-C	5.83	118.38	111.33
2	E	39	ARG	CA-C-N	5.75	127.03	119.84
2	E	39	ARG	C-N-CA	5.75	127.03	119.84
2	E	247	GLY	N-CA-C	-5.75	107.12	114.37
2	E	131	VAL	CA-C-N	5.69	125.05	118.85
2	E	131	VAL	C-N-CA	5.69	125.05	118.85
2	E	94	ASN	N-CA-C	5.66	118.65	111.69
2	B	164	ASN	O-C-N	-5.60	116.07	123.13
2	E	173	LEU	CA-C-N	5.55	126.78	119.84
2	E	173	LEU	C-N-CA	5.55	126.78	119.84
2	B	99	ALA	CA-C-N	5.49	124.94	119.24
2	B	99	ALA	C-N-CA	5.49	124.94	119.24
2	B	171	TYR	N-CA-C	5.46	118.30	109.40
2	B	58	ASP	O-C-N	-5.42	115.60	122.27
2	B	311	ILE	N-CA-C	5.40	116.03	110.36
1	A	14	GLU	N-CA-C	5.34	114.45	108.25
1	D	53	ARG	CD-NE-CZ	-5.30	116.98	124.40
2	B	110	ALA	CA-C-N	5.29	125.23	119.78
2	B	110	ALA	C-N-CA	5.29	125.23	119.78
2	E	243	GLU	CA-C-N	5.23	129.40	121.03
2	E	243	GLU	C-N-CA	5.23	129.40	121.03
2	B	272	GLU	O-C-N	-5.20	115.20	122.37
2	E	41	ARG	CD-NE-CZ	-5.12	117.23	124.40
2	E	42	HIS	O-C-N	5.10	129.37	122.59
2	E	110	ALA	CA-C-N	5.07	124.83	119.76
2	E	110	ALA	C-N-CA	5.07	124.83	119.76
1	D	59	TYR	N-CA-C	5.04	117.62	109.40
2	E	198	ARG	CD-NE-CZ	-5.03	117.36	124.40
2	E	208	ARG	CD-NE-CZ	-5.01	117.38	124.40
2	E	212	ARG	N-CA-C	-5.01	105.82	111.28

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	272	GLU	Mainchain
2	B	64	ARG	Sidechain
2	E	203	VAL	Peptide
2	E	210	ILE	Mainchain
2	E	285	MET	Mainchain
2	E	42	HIS	Peptide

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Mol	Chain	Res	Type	Group
2	E	54	SER	Mainchain
2	E	64	ARG	Sidechain

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	989	0	952	34	0
1	D	982	0	943	16	0
2	B	2815	0	2778	114	0
2	E	2825	0	2785	139	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	D	2	0	0	0	0
3	E	1	0	0	0	0
4	A	8	0	12	1	0
5	B	31	0	12	1	0
5	E	31	0	12	0	0
6	A	67	0	0	3	0
6	B	179	0	0	13	0
6	D	64	0	0	1	0
6	E	161	0	0	5	0
All	All	8159	0	7494	293	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 19.

All (293) 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)
2:E:196:THR:HG22	2:E:201:SER:CB	1.42	1.48
2:E:210:ILE:HD11	2:E:244:LEU:CD2	1.63	1.28
2:E:210:ILE:CD1	2:E:244:LEU:CD2	2.27	1.13
2:B:276:ILE:HD12	2:B:315:MET:HE1	1.27	1.12
2:E:244:LEU:HD11	2:E:250:ILE:HD11	1.11	1.10
2:E:207:GLU:HG2	2:E:211:VAL:HG23	1.25	1.09

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:244:LEU:HD11	2:E:250:ILE:CD1	1.86	1.06
2:E:196:THR:HG22	2:E:201:SER:HB2	1.11	1.06
2:E:196:THR:HG22	2:E:201:SER:HB3	1.33	1.05
2:E:202:PHE:HD1	2:E:202:PHE:O	1.37	1.03
2:E:196:THR:CG2	2:E:201:SER:CB	2.37	1.02
2:E:196:THR:CG2	2:E:201:SER:HB2	1.94	0.98
2:E:207:GLU:HA	2:E:210:ILE:HG22	1.43	0.97
2:E:38:GLY:O	2:E:54:SER:HB2	1.63	0.96
2:E:210:ILE:CD1	2:E:244:LEU:HD22	1.96	0.95
2:E:203:VAL:O	2:E:203:VAL:CG1	2.15	0.94
2:E:207:GLU:CA	2:E:210:ILE:HG22	1.98	0.94
2:E:244:LEU:CD1	2:E:250:ILE:HD11	1.96	0.93
2:E:207:GLU:HG2	2:E:211:VAL:CG2	1.99	0.91
2:B:258:ARG:HD2	6:B:458:HOH:O	1.69	0.91
2:E:202:PHE:HZ	2:E:244:LEU:HD12	1.37	0.89
1:A:6:PRO:HA	1:A:9:LEU:HD12	1.55	0.88
2:E:210:ILE:HD11	2:E:244:LEU:HD23	1.50	0.88
2:E:39:ARG:O	2:E:67:LEU:HD12	1.74	0.87
2:B:202:PHE:HB3	2:B:207:GLU:HB3	1.56	0.86
2:E:202:PHE:O	2:E:202:PHE:CD1	2.29	0.85
2:E:195:LEU:O	2:E:200:TYR:HB2	1.75	0.85
1:D:3:VAL:HG11	2:E:353:THR:HB	1.58	0.84
2:E:222:ALA:HB1	2:E:228:GLU:HG3	1.58	0.84
2:B:276:ILE:CD1	2:B:315:MET:HE1	2.06	0.84
2:B:227:ASN:HB3	6:B:512:HOH:O	1.75	0.84
2:E:36:ILE:HD11	2:E:71:TYR:CZ	2.12	0.83
2:B:206:ALA:O	2:B:210:ILE:HG12	1.78	0.83
2:E:207:GLU:HA	2:E:210:ILE:CG2	2.08	0.83
2:E:122:THR:OG1	2:E:372:VAL:HG11	1.78	0.82
2:E:210:ILE:HD12	2:E:244:LEU:HD22	1.61	0.82
1:A:118:LYS:H	1:A:118:LYS:HD2	1.45	0.81
2:E:201:SER:HA	2:E:207:GLU:OE1	1.82	0.80
2:E:210:ILE:HD11	2:E:244:LEU:HD21	1.59	0.80
2:E:68:THR:HG22	2:E:68:THR:O	1.81	0.79
2:E:118:ARG:HB3	2:E:118:ARG:HH11	1.47	0.79
2:B:276:ILE:HD12	2:B:315:MET:CE	2.12	0.78
2:B:61:GLN:HG2	6:B:558:HOH:O	1.85	0.77
2:B:130:ASN:HB3	6:B:495:HOH:O	1.84	0.77
2:E:202:PHE:HZ	2:E:244:LEU:CD1	1.97	0.77
2:B:72:PRO:HG2	2:B:87:ILE:HD11	1.67	0.76
2:E:203:VAL:O	2:E:203:VAL:HG12	1.84	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:50:VAL:HG23	1:A:58:GLN:HG3	1.66	0.76
2:E:207:GLU:O	2:E:210:ILE:HG22	1.85	0.76
2:E:210:ILE:CD1	2:E:244:LEU:HD21	2.12	0.75
2:E:222:ALA:CB	2:E:228:GLU:HG3	2.16	0.74
2:B:258:ARG:HD3	6:B:505:HOH:O	1.87	0.74
2:E:192:MET:O	2:E:196:THR:HG23	1.87	0.74
2:B:259:CYS:HB3	2:B:260:PRO:HD3	1.70	0.73
2:E:203:VAL:O	2:E:203:VAL:HG13	1.88	0.73
2:E:207:GLU:C	2:E:210:ILE:HG22	2.13	0.73
2:E:364:TYR:HA	2:E:371:ILE:HD11	1.71	0.73
2:B:12:CYS:HB3	2:B:107:LEU:HD23	1.71	0.73
2:E:354:PHE:HA	2:E:357:MET:HG3	1.71	0.73
1:D:37:ASP:HB3	1:D:117:LYS:HD2	1.71	0.72
1:A:50:VAL:CG2	1:A:58:GLN:HG3	2.20	0.71
2:E:210:ILE:HD12	2:E:244:LEU:CD2	2.15	0.71
2:B:204:THR:O	2:B:205:THR:OG1	2.08	0.70
2:E:118:ARG:HB3	2:E:118:ARG:NH1	2.06	0.70
2:E:201:SER:O	2:E:204:THR:HG22	1.92	0.70
2:E:36:ILE:HD11	2:E:71:TYR:CE1	2.26	0.70
2:E:202:PHE:CZ	2:E:244:LEU:CD1	2.74	0.70
2:B:74:GLU:HB2	2:B:79:THR:HG21	1.73	0.69
2:B:337:ARG:HA	2:B:340:SER:OG	1.91	0.69
2:E:52:LYS:HG3	2:E:53:ASP:OD1	1.93	0.68
2:E:66:ILE:HG22	2:E:66:ILE:O	1.94	0.68
2:B:99:ALA:O	2:B:102:GLU:HB2	1.93	0.68
1:A:111:LYS:H	1:A:111:LYS:HD2	1.58	0.68
1:A:2:VAL:HG11	2:B:353:THR:HB	1.76	0.68
2:B:203:VAL:HG23	6:B:582:HOH:O	1.94	0.67
2:B:354:PHE:HA	2:B:357:MET:HG3	1.77	0.66
1:A:2:VAL:HG11	2:B:353:THR:CG2	2.26	0.66
2:B:202:PHE:O	2:B:204:THR:HG23	1.96	0.66
2:B:202:PHE:HA	2:B:207:GLU:OE1	1.96	0.66
2:B:72:PRO:HG2	2:B:87:ILE:CD1	2.25	0.65
2:B:222:ALA:HB1	2:B:228:GLU:HG3	1.78	0.65
2:E:196:THR:CG2	2:E:201:SER:HB3	2.19	0.65
2:B:240:LYS:HG3	2:B:256:ARG:CZ	2.27	0.64
2:E:207:GLU:HG3	2:E:210:ILE:CG2	2.27	0.64
2:B:179:ARG:HD2	6:B:494:HOH:O	1.97	0.64
2:B:243:GLU:HG2	2:B:243:GLU:O	1.97	0.64
2:E:41:ARG:NH1	2:E:41:ARG:HB2	2.13	0.64
2:B:164:ASN:ND2	6:B:520:HOH:O	2.24	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:64:ARG:NH2	2:E:67:LEU:O	2.31	0.64
1:A:2:VAL:HG11	2:B:353:THR:HG22	1.80	0.63
1:A:2:VAL:HG11	2:B:353:THR:CB	2.29	0.63
2:E:53:ASP:CG	2:E:53:ASP:O	2.41	0.63
2:B:39:ARG:HH22	2:B:86:LYS:HE2	1.64	0.62
2:E:163:HIS:NE2	2:E:179:ARG:HD3	2.14	0.62
2:E:207:GLU:O	2:E:211:VAL:HG23	1.98	0.62
2:B:202:PHE:CB	2:B:207:GLU:HB3	2.30	0.61
2:E:246:ASP:HB3	2:E:248:GLN:HG2	1.83	0.61
2:B:192:MET:HE1	2:B:208:ARG:HG2	1.83	0.61
2:B:33:PHE:CE2	2:B:95:GLU:HG3	2.37	0.60
2:B:192:MET:HE1	2:B:208:ARG:HH11	1.67	0.60
2:E:189:ASP:OD1	2:E:208:ARG:NH2	2.34	0.60
2:B:240:LYS:HG3	2:B:256:ARG:NH1	2.16	0.60
2:E:149:ARG:HG2	6:E:432:HOH:O	2.00	0.60
2:E:202:PHE:HD1	2:E:202:PHE:C	2.06	0.60
2:B:243:GLU:CD	2:B:243:GLU:H	2.08	0.60
2:B:164:ASN:HB2	2:B:178:MET:HB2	1.84	0.59
2:E:293:LYS:HG2	2:E:327:MET:SD	2.42	0.59
2:B:74:GLU:HB2	2:B:79:THR:CG2	2.31	0.59
2:B:94:ASN:N	2:B:94:ASN:HD22	2.01	0.59
1:A:50:VAL:HG21	6:A:532:HOH:O	2.01	0.59
2:E:39:ARG:O	2:E:67:LEU:CD1	2.49	0.59
2:B:61:GLN:O	2:B:64:ARG:HG3	2.03	0.58
2:E:244:LEU:CD1	2:E:250:ILE:CD1	2.69	0.58
1:A:14:GLU:HB3	2:E:316:GLN:HE22	1.69	0.58
1:D:94:GLN:NE2	2:E:169:GLU:HB3	2.18	0.58
1:D:20:TRP:HB3	1:D:27:LEU:HD22	1.85	0.58
2:E:192:MET:HG3	2:E:211:VAL:HG11	1.85	0.57
2:B:221:VAL:HG21	2:B:311:ILE:HD13	1.86	0.57
2:E:289:ILE:HA	2:E:292:ARG:HG3	1.86	0.57
2:E:182:LEU:HA	2:E:186:ASP:OD2	2.04	0.57
2:E:277:HIS:CD2	2:E:277:HIS:H	2.23	0.57
2:E:118:ARG:HH11	2:E:118:ARG:CB	2.17	0.57
1:A:112:SER:HB3	2:E:231:THR:HG23	1.87	0.57
2:E:192:MET:HG2	2:E:211:VAL:HG21	1.87	0.56
2:B:19:VAL:HG23	2:B:35:SER:HB3	1.87	0.56
1:A:15:PRO:HG3	1:A:51:GLN:HB2	1.88	0.56
2:B:222:ALA:CB	2:B:228:GLU:HG3	2.36	0.56
2:E:202:PHE:CD1	2:E:202:PHE:C	2.78	0.56
1:A:85:ASP:OD1	1:A:90:GLY:HA2	2.05	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:39:ARG:NH2	2:B:86:LYS:HE2	2.21	0.55
2:B:26:ASP:OD2	2:B:30:ARG:NH1	2.40	0.55
1:A:2:VAL:HG12	1:A:2:VAL:O	2.07	0.55
2:E:36:ILE:HD11	2:E:71:TYR:CE2	2.41	0.55
2:B:202:PHE:O	2:B:203:VAL:C	2.50	0.54
2:E:207:GLU:CG	2:E:211:VAL:HG23	2.18	0.54
2:E:10:LEU:HG	2:E:103:HIS:HB3	1.88	0.54
2:E:61:GLN:C	2:E:63:LYS:N	2.65	0.54
2:E:164:ASN:HB2	2:E:178:MET:HB2	1.89	0.54
2:B:293:LYS:HG2	2:B:327:MET:SD	2.47	0.54
2:B:74:GLU:OE1	2:B:79:THR:HG21	2.07	0.54
2:E:82:ASP:O	2:E:86:LYS:HG3	2.08	0.54
2:B:204:THR:OG1	2:B:207:GLU:HB2	2.07	0.54
2:E:180:LEU:HD22	2:E:182:LEU:HB3	1.89	0.53
2:B:155:LEU:HD22	2:B:315:MET:HE3	1.89	0.53
1:D:38:PHE:HE1	1:D:114:LEU:HD22	1.73	0.53
2:E:149:ARG:HD3	2:E:298:ASN:OD1	2.08	0.53
1:A:23:GLU:HG2	1:A:121:VAL:HG21	1.90	0.53
2:E:56:VAL:HG13	2:E:87:ILE:HD13	1.90	0.53
2:E:202:PHE:O	2:E:203:VAL:HG12	2.08	0.53
2:B:9:ALA:HA	2:B:104:PRO:HD2	1.90	0.52
2:E:168:TYR:CE1	2:E:169:GLU:HG3	2.44	0.52
2:E:259:CYS:HB3	2:E:260:PRO:HD3	1.90	0.52
2:B:23:PHE:HE1	2:B:30:ARG:HD2	1.74	0.52
2:E:207:GLU:CG	2:E:210:ILE:CG2	2.88	0.51
2:B:149:ARG:HG2	6:B:415:HOH:O	2.09	0.51
2:E:202:PHE:CZ	2:E:244:LEU:HD12	2.28	0.51
2:B:202:PHE:CD1	2:B:202:PHE:N	2.78	0.51
2:B:277:HIS:H	2:B:277:HIS:CD2	2.28	0.51
2:B:109:GLU:CD	2:B:118:ARG:HE	2.18	0.50
2:E:172:ALA:O	2:E:174:PRO:HD3	2.10	0.50
2:B:192:MET:CE	2:B:208:ARG:HG2	2.41	0.50
2:E:296:TYR:CD2	2:E:327:MET:HG2	2.47	0.50
2:B:12:CYS:SG	2:B:14:ASN:ND2	2.80	0.50
2:E:187:LEU:HD23	2:E:308:TYR:OH	2.12	0.50
2:E:200:TYR:CE2	2:E:250:ILE:HG12	2.47	0.50
2:B:192:MET:HE1	2:B:208:ARG:NH1	2.27	0.50
2:B:296:TYR:CD2	2:B:327:MET:HG2	2.47	0.50
2:B:37:VAL:HG21	2:B:83:ASP:HB3	1.95	0.49
2:E:34:PRO:O	2:E:36:ILE:N	2.44	0.49
2:B:23:PHE:CE1	2:B:30:ARG:HD2	2.46	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:212:ARG:HG2	2:E:212:ARG:HH11	1.77	0.49
2:B:323:ALA:HB3	2:B:329:ILE:HD11	1.94	0.49
2:B:362:GLN:O	2:B:366:GLU:HG3	2.12	0.49
1:A:72:ASP:HB3	1:A:125:PHE:CE1	2.47	0.49
2:E:61:GLN:O	2:E:63:LYS:N	2.46	0.49
2:E:207:GLU:O	2:E:211:VAL:N	2.31	0.49
1:A:51:GLN:OE1	2:E:316:GLN:HG3	2.12	0.49
2:B:101:GLU:O	2:B:132:PRO:HD3	2.13	0.49
2:B:158:GLY:O	2:B:183:ALA:HB1	2.13	0.49
1:A:111:LYS:H	1:A:111:LYS:CD	2.24	0.48
1:D:111:LYS:HG3	1:D:112:SER:N	2.28	0.48
2:B:166:PRO:HG3	2:B:283:SER:OG	2.13	0.48
2:E:12:CYS:HB3	2:E:107:LEU:HD23	1.96	0.48
2:E:201:SER:HA	2:E:207:GLU:CD	2.37	0.48
2:B:151:THR:HG21	2:B:294:ASP:HB3	1.94	0.48
2:B:149:ARG:HD3	2:B:298:ASN:OD1	2.13	0.48
2:B:362:GLN:HB2	6:B:482:HOH:O	2.13	0.48
2:E:56:VAL:CG1	2:E:87:ILE:HD13	2.44	0.47
2:E:117:ASN:O	2:E:121:MET:HG3	2.14	0.47
2:E:52:LYS:O	2:E:52:LYS:CG	2.62	0.47
2:B:61:GLN:CD	6:B:558:HOH:O	2.57	0.47
2:E:302:SER:HA	2:E:337:ARG:HB2	1.96	0.47
2:E:55:TYR:HB3	2:E:59:GLU:HG2	1.95	0.47
1:D:19:ILE:HD12	1:D:35:TYR:CG	2.49	0.47
2:E:364:TYR:HE1	2:E:369:PRO:HG3	1.80	0.47
2:B:205:THR:O	2:B:209:GLU:HB2	2.16	0.46
2:E:61:GLN:C	2:E:63:LYS:H	2.22	0.46
1:A:21:ARG:NH1	1:A:121:VAL:HG23	2.30	0.46
2:B:244:LEU:HD12	2:B:248:GLN:HG2	1.96	0.46
1:D:72:ASP:HB3	1:D:125:PHE:CZ	2.51	0.46
2:E:362:GLN:O	2:E:366:GLU:HG2	2.15	0.46
2:B:151:THR:CG2	2:B:294:ASP:HB3	2.46	0.46
2:E:368:GLY:O	2:E:371:ILE:HG12	2.16	0.46
2:B:61:GLN:CG	6:B:558:HOH:O	2.54	0.46
2:B:210:ILE:HD11	2:B:245:PRO:HG3	1.97	0.46
2:E:293:LYS:NZ	6:E:548:HOH:O	2.47	0.46
2:B:64:ARG:HG2	2:B:69:LEU:HD11	1.97	0.46
1:A:39:PHE:HB3	1:A:119:GLY:O	2.16	0.46
2:E:10:LEU:HD11	2:E:98:VAL:HG11	1.97	0.46
1:A:118:LYS:H	1:A:118:LYS:CD	2.19	0.45
2:E:101:GLU:CD	2:E:101:GLU:H	2.23	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:301:MET:HE3	2:E:315:MET:HG2	1.97	0.45
2:E:33:PHE:CE2	2:E:95:GLU:HG3	2.52	0.45
2:E:64:ARG:HB2	2:E:69:LEU:HD11	1.97	0.45
2:E:198:ARG:HG3	2:E:198:ARG:O	2.16	0.45
2:B:305:THR:HG22	2:B:305:THR:O	2.15	0.45
2:E:41:ARG:O	2:E:42:HIS:O	2.34	0.45
1:D:85:ASP:OD1	1:D:90:GLY:HA2	2.17	0.45
2:E:305:THR:HG22	2:E:305:THR:O	2.16	0.45
1:A:91:ARG:HG3	1:A:91:ARG:HH11	1.82	0.45
2:B:355:GLN:HG2	2:B:356:GLN:N	2.31	0.44
1:A:39:PHE:HA	1:A:117:LYS:O	2.17	0.44
2:B:356:GLN:HE21	2:B:356:GLN:HB3	1.56	0.44
1:D:3:VAL:HG22	2:E:357:MET:SD	2.57	0.44
2:E:155:LEU:HD23	2:E:301:MET:HE2	1.99	0.44
2:B:64:ARG:HH11	2:B:64:ARG:HD2	1.61	0.44
2:B:106:LEU:HD23	2:B:106:LEU:C	2.43	0.44
2:B:323:ALA:HB1	2:B:324:PRO:CD	2.48	0.44
2:B:362:GLN:NE2	2:B:366:GLU:OE1	2.51	0.44
1:D:23:GLU:HG2	1:D:121:VAL:HG11	1.99	0.44
2:E:195:LEU:C	2:E:200:TYR:HB2	2.39	0.44
1:D:20:TRP:CB	1:D:27:LEU:HD22	2.48	0.43
2:E:200:TYR:O	2:E:201:SER:HB3	2.18	0.43
1:A:13:LYS:NZ	6:A:519:HOH:O	2.50	0.43
2:E:228:GLU:HG2	6:E:451:HOH:O	2.18	0.43
2:B:258:ARG:CD	6:B:505:HOH:O	2.55	0.43
2:E:101:GLU:HA	2:E:130:ASN:O	2.17	0.43
2:E:123:GLN:O	2:E:127:GLU:HB2	2.19	0.43
1:A:38:PHE:HE1	1:A:114:LEU:HD22	1.84	0.43
2:B:20:LYS:HD3	2:B:20:LYS:N	2.34	0.43
1:A:94:GLN:NE2	2:B:169:GLU:HB3	2.34	0.43
2:E:53:ASP:O	2:E:53:ASP:OD2	2.37	0.43
2:B:163:HIS:CD2	2:B:179:ARG:HG3	2.54	0.43
2:B:41:ARG:HB2	2:B:68:THR:OG1	2.19	0.42
2:B:216:GLU:HG2	5:B:400:ATP:C4	2.54	0.42
2:B:367:ALA:HB3	2:B:371:ILE:HG21	2.01	0.42
2:B:289:ILE:O	2:B:289:ILE:HG13	2.19	0.42
2:B:98:VAL:HB	2:B:103:HIS:CE1	2.54	0.42
2:E:195:LEU:HD12	2:E:195:LEU:HA	1.81	0.42
2:B:51:GLN:HG3	2:B:52:LYS:N	2.34	0.42
2:B:168:TYR:CE1	2:B:169:GLU:HG3	2.53	0.42
2:B:360:THR:OG1	2:B:363:GLU:HG3	2.18	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:207:GLU:CA	2:E:210:ILE:CG2	2.78	0.42
2:B:240:LYS:CG	2:B:256:ARG:NH1	2.81	0.42
2:E:207:GLU:CG	2:E:211:VAL:CG2	2.86	0.42
1:A:53:ARG:HH11	1:A:53:ARG:HG3	1.85	0.42
2:B:202:PHE:HB2	2:B:203:VAL:H	1.62	0.42
2:E:41:ARG:HB2	2:E:41:ARG:HH11	1.84	0.42
4:A:472:TRS:H32	6:E:454:HOH:O	2.18	0.42
2:B:357:MET:HE3	2:B:357:MET:HB3	1.90	0.42
2:E:64:ARG:CZ	2:E:67:LEU:O	2.68	0.42
2:B:92:PHE:CG	2:B:100:PRO:HG3	2.55	0.42
2:E:123:GLN:HG3	2:E:124:ILE:N	2.35	0.42
2:B:192:MET:CE	2:B:208:ARG:HH11	2.33	0.42
2:B:355:GLN:CG	2:B:356:GLN:N	2.82	0.42
1:D:98:VAL:O	1:D:99:GLN:C	2.63	0.42
1:A:53:ARG:HG3	1:A:53:ARG:NH1	2.36	0.41
2:B:222:ALA:HB1	2:B:228:GLU:CG	2.49	0.41
2:B:277:HIS:CE1	2:B:278:GLU:HG3	2.55	0.41
2:E:106:LEU:C	2:E:106:LEU:HD23	2.44	0.41
1:D:96:ARG:NH1	6:D:427:HOH:O	2.40	0.41
1:D:9:LEU:HD23	1:D:87:TYR:OH	2.21	0.41
2:E:293:LYS:HG3	6:E:463:HOH:O	2.20	0.41
1:A:41:GLY:HA2	1:A:68:GLU:HB2	2.03	0.41
2:B:161:VAL:HG22	2:B:162:THR:N	2.36	0.41
1:A:79:ILE:O	1:A:83:GLN:HG3	2.20	0.41
2:B:311:ILE:HG23	2:B:312:ALA:N	2.36	0.41
2:E:103:HIS:HA	2:E:104:PRO:HD3	1.93	0.41
2:B:19:VAL:C	2:B:20:LYS:HD3	2.45	0.41
2:B:100:PRO:HD2	2:B:101:GLU:OE1	2.20	0.41
2:B:254:ASN:HA	2:B:257:PHE:CE2	2.56	0.41
2:B:355:GLN:HE21	2:B:355:GLN:HB3	1.54	0.41
2:E:126:PHE:O	2:E:130:ASN:HA	2.20	0.41
6:A:534:HOH:O	2:E:223:LEU:HD23	2.19	0.41
2:B:153:ILE:O	2:B:153:ILE:HG23	2.21	0.41
2:E:369:PRO:O	2:E:372:VAL:HG22	2.21	0.41
1:A:38:PHE:CE1	1:A:114:LEU:HD22	2.57	0.40
2:B:51:GLN:OE1	2:B:53:ASP:HB2	2.21	0.40
2:E:19:VAL:O	2:E:32:VAL:HA	2.21	0.40
1:A:27:LEU:HD23	1:A:27:LEU:HA	1.91	0.40
1:A:121:VAL:HG12	1:A:122:ALA:N	2.37	0.40
1:D:37:ASP:OD1	1:D:115:LYS:HB3	2.22	0.40
2:E:194:ILE:HD13	2:E:194:ILE:HG21	1.84	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	122/125 (98%)	114 (93%)	8 (7%)	0	100	100
1	D	121/125 (97%)	117 (97%)	4 (3%)	0	100	100
2	B	356/377 (94%)	338 (95%)	17 (5%)	1 (0%)	36	42
2	E	357/377 (95%)	333 (93%)	17 (5%)	7 (2%)	6	4
All	All	956/1004 (95%)	902 (94%)	46 (5%)	8 (1%)	16	16

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	E	52	LYS
2	E	42	HIS
2	E	246	ASP
2	B	205	THR
2	E	101	GLU
2	E	53	ASP
2	E	65	GLY
2	E	203	VAL

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	102/103 (99%)	98 (96%)	4 (4%)	28	39
1	D	101/103 (98%)	94 (93%)	7 (7%)	14	16
2	B	303/319 (95%)	280 (92%)	23 (8%)	12	14
2	E	304/319 (95%)	281 (92%)	23 (8%)	12	14
All	All	810/844 (96%)	753 (93%)	57 (7%)	14	16

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

Mol	Chain	Res	Type
1	A	4	GLU
1	A	58	GLN
1	A	68	GLU
1	A	118	LYS
2	B	7	THR
2	B	30	ARG
2	B	41	ARG
2	B	51	GLN
2	B	77	ILE
2	B	94	ASN
2	B	149	ARG
2	B	187	LEU
2	B	195	LEU
2	B	203	VAL
2	B	208	ARG
2	B	209	GLU
2	B	217	LYS
2	B	218	LEU
2	B	249	VAL
2	B	251	THR
2	B	289	ILE
2	B	292	ARG
2	B	336	GLU
2	B	355	GLN
2	B	356	GLN
2	B	357	MET
2	B	361	LYS
1	D	27	LEU
1	D	32	THR
1	D	52	LEU
1	D	53	ARG
1	D	63	TYR
1	D	68	GLU

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Mol	Chain	Res	Type
1	D	115	LYS
2	E	41	ARG
2	E	43	GLN
2	E	52	LYS
2	E	53	ASP
2	E	63	LYS
2	E	64	ARG
2	E	68	THR
2	E	123	GLN
2	E	180	LEU
2	E	195	LEU
2	E	202	PHE
2	E	203	VAL
2	E	205	THR
2	E	210	ILE
2	E	218	LEU
2	E	249	VAL
2	E	315	MET
2	E	316	GLN
2	E	328	LYS
2	E	330	LYS
2	E	356	GLN
2	E	357	MET
2	E	366	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	71	GLN
1	A	83	GLN
2	B	14	ASN
2	B	61	GLN
2	B	94	ASN
2	B	103	HIS
2	B	175	HIS
2	B	277	HIS
2	B	355	GLN
2	B	356	GLN
1	D	51	GLN
1	D	67	ASN
1	D	71	GLN
1	D	94	GLN

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Mol	Chain	Res	Type
2	E	42	HIS
2	E	61	GLN
2	E	89	HIS
2	E	123	GLN
2	E	175	HIS
2	E	227	ASN
2	E	277	HIS
2	E	316	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues 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$
2	HIC	B	75	2	10,11,12	2.53	1 (10%)	9,14,16	4.39	4 (44%)
2	HIC	E	75	2	10,11,12	4.23	2 (20%)	9,14,16	3.60	3 (33%)

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	HIC	B	75	2	-	0/5/6/8	0/1/1/1
2	HIC	E	75	2	-	1/5/6/8	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	75	HIC	CZ-NE2	-13.03	1.13	1.46
2	B	75	HIC	CZ-NE2	-7.83	1.26	1.46
2	E	75	HIC	CD2-CG	2.08	1.40	1.36

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	75	HIC	NE2-CE1-ND1	-10.91	108.48	112.66
2	E	75	HIC	CZ-NE2-CD2	8.76	137.53	126.03
2	B	75	HIC	CD2-NE2-CE1	5.35	108.83	106.71
2	E	75	HIC	CZ-NE2-CE1	-4.75	115.51	126.71
2	B	75	HIC	CZ-NE2-CD2	-3.98	120.81	126.03
2	E	75	HIC	NE2-CE1-ND1	-3.58	111.29	112.66
2	B	75	HIC	CE1-ND1-CG	2.20	109.33	105.80

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	75	HIC	CA-CB-CG-CD2

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 7 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
4	TRS	A	472	-	7,7,7	1.21	1 (14%)	9,9,9	2.57	5 (55%)
5	ATP	B	400	3	32,33,33	2.17	9 (28%)	48,52,52	2.85	14 (29%)
5	ATP	E	400	3	32,33,33	2.07	7 (21%)	48,52,52	2.84	13 (27%)

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
4	TRS	A	472	-	-	7/9/9/9	-
5	ATP	B	400	3	-	1/22/38/38	0/3/3/3
5	ATP	E	400	3	-	1/22/38/38	0/3/3/3

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	400	ATP	PB-O3A	7.46	1.67	1.59
5	E	400	ATP	PB-O3A	7.42	1.67	1.59
5	E	400	ATP	C4-N3	5.29	1.44	1.34
5	B	400	ATP	C4-N3	5.02	1.43	1.34
5	B	400	ATP	O5'-C5'	-3.36	1.31	1.44
5	E	400	ATP	O5'-C5'	-3.11	1.32	1.44
5	B	400	ATP	PA-O5'	-2.75	1.48	1.59
5	E	400	ATP	PB-O2B	-2.58	1.43	1.55
5	B	400	ATP	PA-O1A	-2.32	1.42	1.50
5	E	400	ATP	PA-O1A	-2.31	1.42	1.50
5	E	400	ATP	PA-O5'	-2.31	1.50	1.59
5	B	400	ATP	PB-O2B	-2.26	1.44	1.55
4	A	472	TRS	C-N	-2.10	1.42	1.49
5	E	400	ATP	C5-C4	-2.10	1.35	1.39
5	B	400	ATP	C8-N7	-2.09	1.27	1.31
5	B	400	ATP	C4-N9	-2.08	1.33	1.37
5	B	400	ATP	C5-C4	-2.03	1.35	1.39

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	400	ATP	O5'-C5'-C4'	11.23	147.21	108.99
5	E	400	ATP	O5'-C5'-C4'	10.81	145.81	108.99
5	E	400	ATP	O3A-PB-O1B	-8.22	85.96	110.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	400	ATP	O3A-PB-O1B	-7.96	86.74	110.70
5	B	400	ATP	O5'-PA-O1A	-6.56	82.95	108.94
5	E	400	ATP	O5'-PA-O1A	-6.36	83.72	108.94
5	E	400	ATP	PA-O5'-C5'	5.50	152.85	121.35
5	B	400	ATP	PA-O5'-C5'	5.20	151.15	121.35
5	E	400	ATP	O2B-PB-O3B	5.15	121.19	107.27
5	B	400	ATP	O2B-PB-O3B	5.12	121.10	107.27
4	A	472	TRS	O1-C1-C	-4.20	99.17	110.88
5	B	400	ATP	O2A-PA-O3A	3.96	117.99	107.27
5	E	400	ATP	O2A-PA-O3A	3.86	117.69	107.27
5	B	400	ATP	O4'-C4'-C3'	3.41	111.92	105.15
4	A	472	TRS	C2-C-N	3.32	116.64	108.17
5	E	400	ATP	O3A-PA-O1A	3.31	120.67	110.70
4	A	472	TRS	C2-C-C1	-3.30	101.86	110.66
5	B	400	ATP	C5'-C4'-C3'	-3.27	103.43	115.21
5	E	400	ATP	O4'-C1'-N9	3.08	114.00	108.09
4	A	472	TRS	C3-C-N	3.00	115.82	108.17
5	E	400	ATP	O4'-C4'-C3'	2.88	110.87	105.15
5	B	400	ATP	O3A-PA-O1A	2.79	119.11	110.70
5	B	400	ATP	O4'-C1'-N9	2.79	113.44	108.09
5	E	400	ATP	C5'-C4'-C3'	-2.74	105.35	115.21
5	E	400	ATP	C1'-N9-C8	2.46	132.56	127.09
5	E	400	ATP	O2B-PB-O3A	-2.46	100.63	107.27
5	E	400	ATP	C4-N9-C1'	-2.37	121.09	126.63
5	B	400	ATP	C3'-C2'-C1'	2.32	105.85	101.46
5	B	400	ATP	C1'-N9-C8	2.23	132.03	127.09
5	B	400	ATP	C4-N9-C1'	-2.19	121.52	126.63
4	A	472	TRS	C1-C-N	-2.17	102.63	108.17
5	B	400	ATP	O2A-PA-O1A	2.17	122.54	112.44

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	472	TRS	C2-C-C1-O1
4	A	472	TRS	C3-C-C1-O1
4	A	472	TRS	N-C-C1-O1
4	A	472	TRS	C1-C-C3-O3
4	A	472	TRS	C2-C-C3-O3
5	B	400	ATP	PG-O3B-PB-O2B
5	E	400	ATP	PG-O3B-PB-O2B
4	A	472	TRS	N-C-C3-O3

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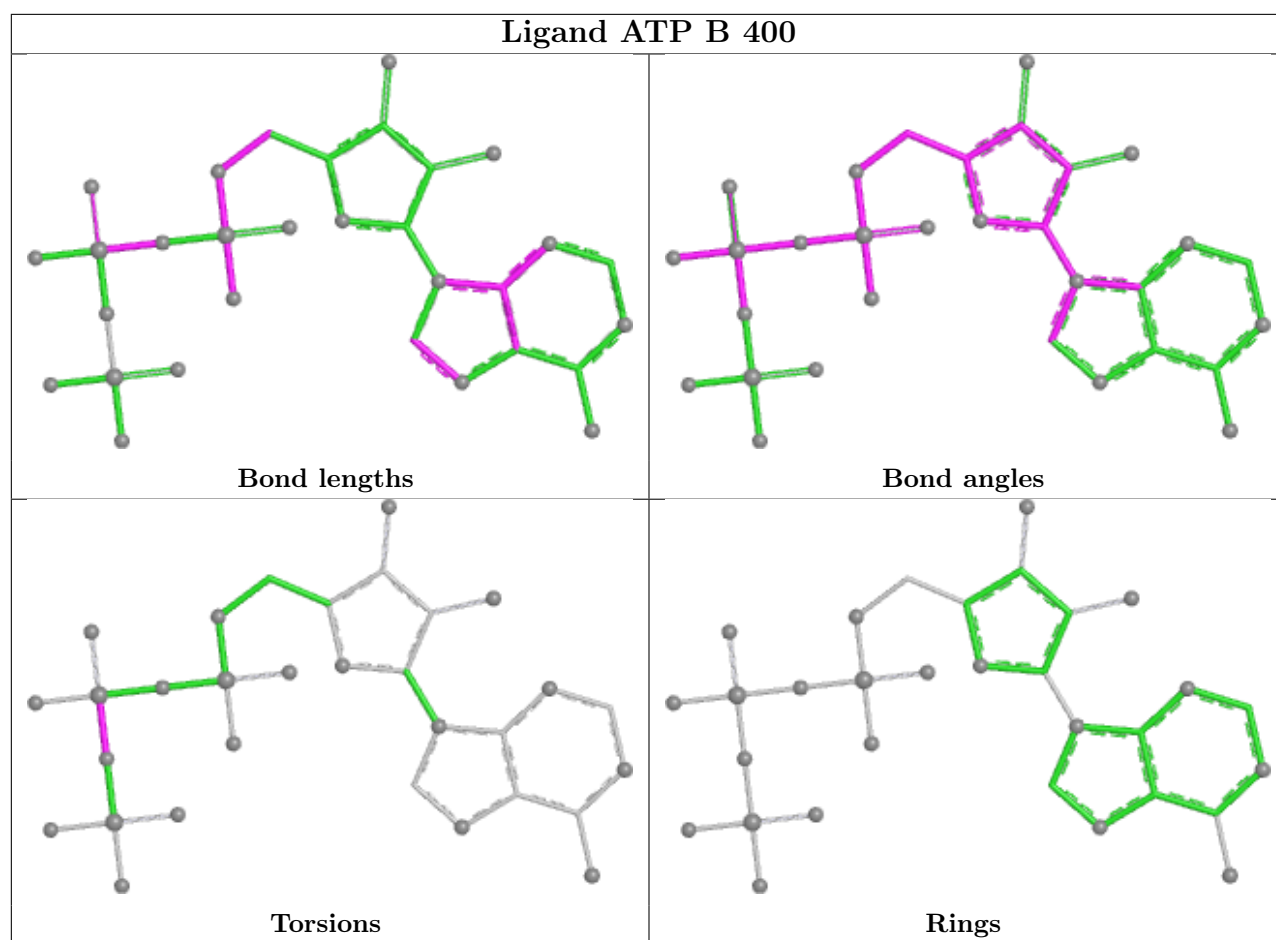
Mol	Chain	Res	Type	Atoms
4	A	472	TRS	N-C-C2-O2

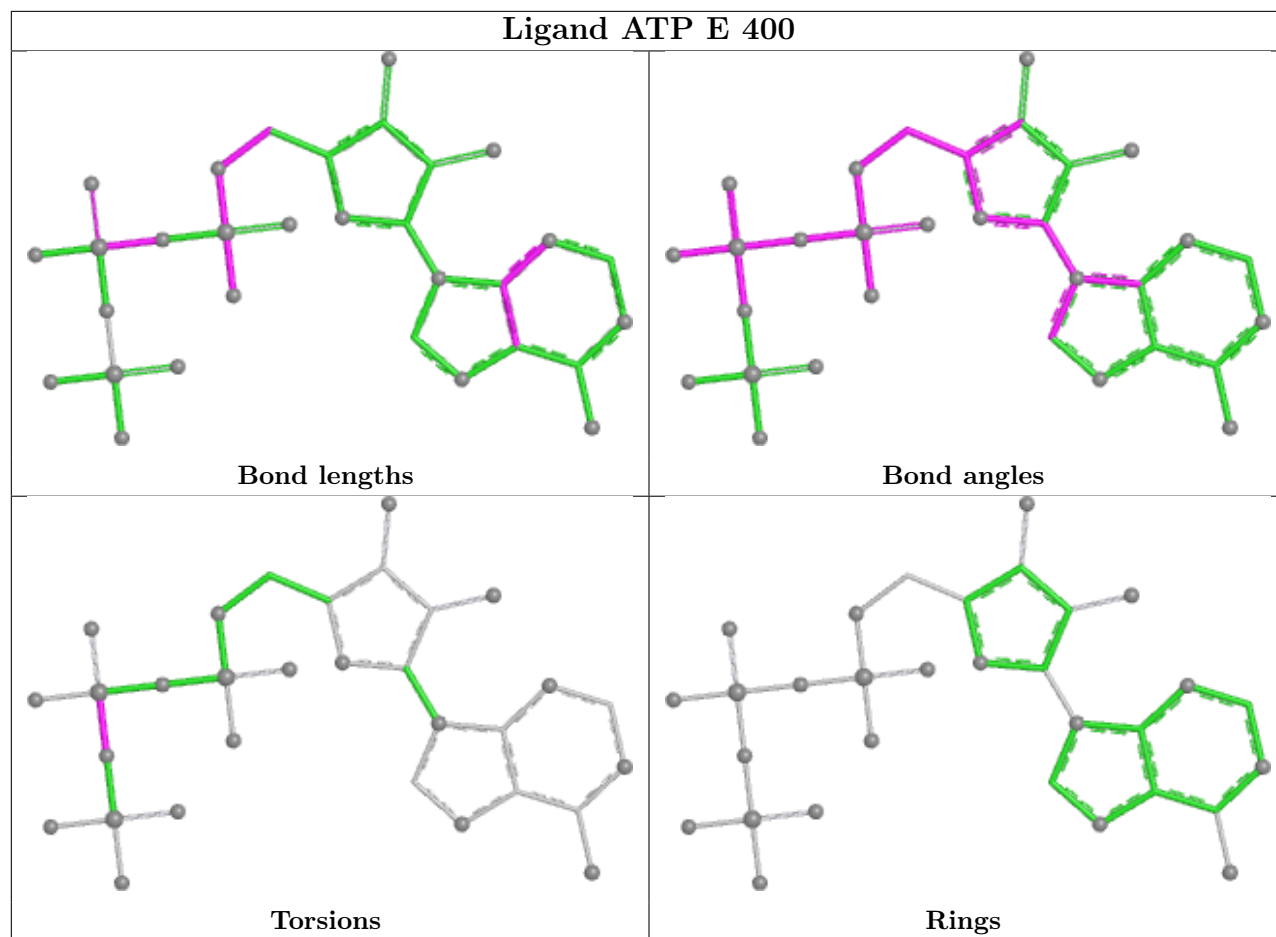
There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	472	TRS	1	0
5	B	400	ATP	1	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, 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	124/125 (99%)	0.05	3 (2%) 59 56	19, 37, 52, 60	0
1	D	123/125 (98%)	-0.16	1 (0%) 82 80	21, 34, 52, 60	0
2	B	360/377 (95%)	-0.04	7 (1%) 66 63	15, 32, 59, 60	0
2	E	361/377 (95%)	0.06	23 (6%) 25 22	14, 30, 60, 60	0
All	All	968/1004 (96%)	-0.01	34 (3%) 47 44	14, 32, 60, 60	0

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	2	VAL	5.4
1	A	3	VAL	5.4
2	E	204	THR	5.2
2	B	204	THR	5.0
2	E	201	SER	4.7
2	E	206	ALA	4.6
2	E	65	GLY	4.4
2	E	205	THR	4.3
2	E	207	GLU	4.2
2	B	205	THR	4.0
2	E	66	ILE	3.8
2	E	64	ARG	3.7
2	E	203	VAL	3.6
2	E	200	TYR	3.5
2	E	40	PRO	3.3
2	E	38	GLY	3.3
2	B	272	GLU	3.2
2	E	51	GLN	3.2
2	E	42	HIS	3.0
2	B	245	PRO	3.0
2	E	41	ARG	2.7

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Mol	Chain	Res	Type	RSRZ
2	E	44	GLY	2.7
2	E	245	PRO	2.5
1	D	3	VAL	2.4
2	B	375	LYS	2.4
2	B	7	THR	2.3
2	E	368	GLY	2.3
2	E	54	SER	2.3
2	E	371	ILE	2.2
2	B	203	VAL	2.2
2	E	250	ILE	2.1
2	E	103	HIS	2.1
1	A	4	GLU	2.0
2	E	67	LEU	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
2	HIC	E	75	11/12	0.93	0.08	24,31,42,45	0
2	HIC	B	75	11/12	0.94	0.09	22,31,47,48	0

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
4	TRS	A	472	8/8	0.69	0.16	54,60,60,60	0
3	CA	A	402	1/1	0.94	0.06	43,43,43,43	0
5	ATP	B	400	31/31	0.96	0.06	17,24,30,34	0

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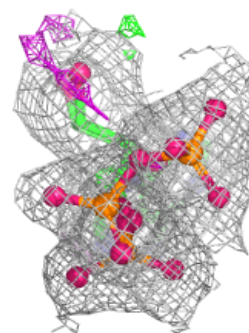
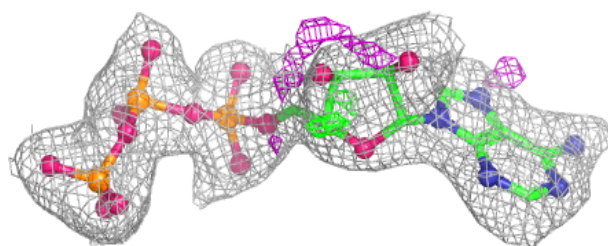
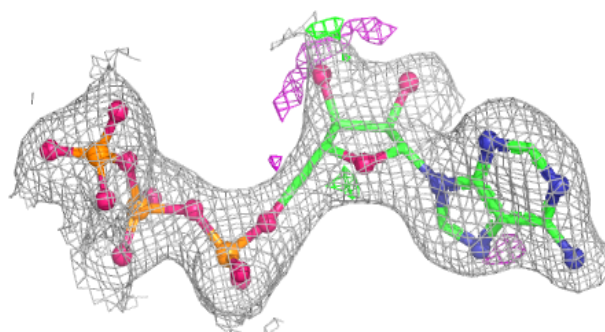
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	CA	B	404	1/1	0.97	0.06	50,50,50,50	0
5	ATP	E	400	31/31	0.97	0.06	17,24,28,29	0
3	CA	B	401	1/1	0.98	0.03	29,29,29,29	0
3	CA	E	401	1/1	0.99	0.04	29,29,29,29	0
3	CA	A	403	1/1	0.99	0.03	25,25,25,25	0
3	CA	D	402	1/1	0.99	0.03	36,36,36,36	0
3	CA	D	403	1/1	0.99	0.02	24,24,24,24	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.

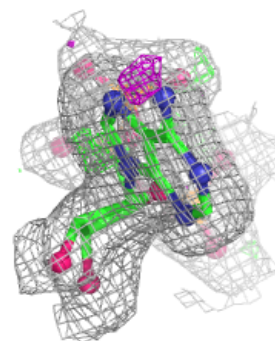
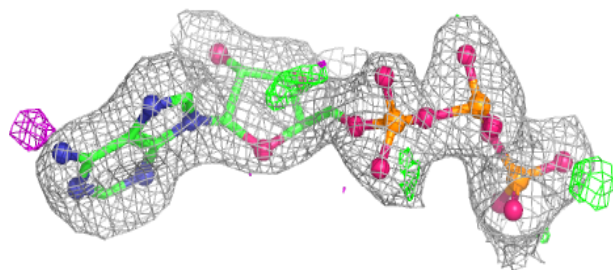
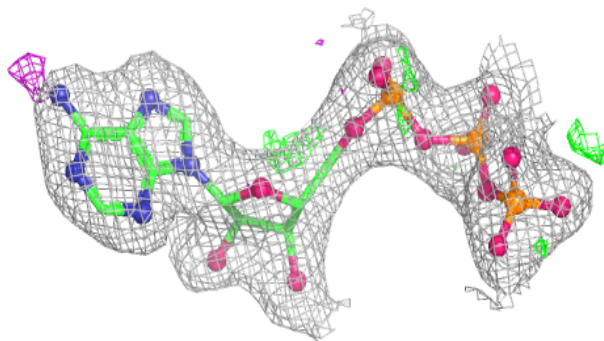
Electron density around ATP B 400:

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 ATP E 400:

$2mF_o - DF_c$ (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.