



Full wwPDB EM Validation Report ⓘ

Jul 9, 2025 – 12:29 PM JST

PDB ID : 8HAS / pdb_00008has
EMDB ID : EMD-34607
Title : NARROW LEAF 1-close from Japonica
Authors : Zhang, S.J.; He, Y.J.; Wang, N.; Zhang, W.J.; Liu, C.M.
Deposited on : 2022-10-26
Resolution : 2.89 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

EMDB validation analysis : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0rc1
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

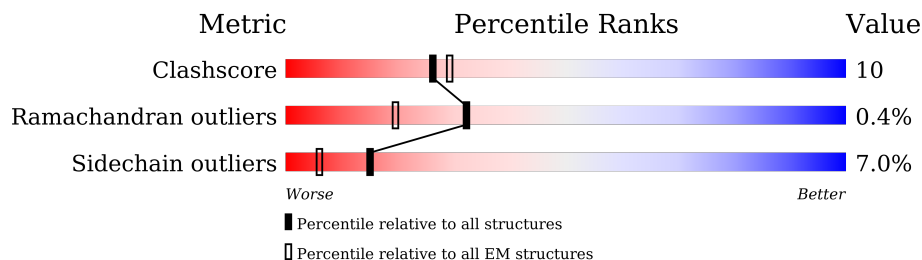
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.89 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)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	582	
1	B	582	
1	C	582	
1	D	582	
1	E	582	
1	F	582	

2 Entry composition [i](#)

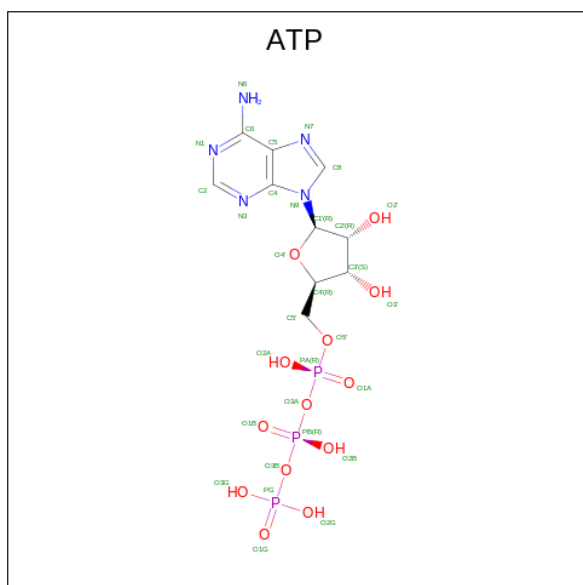
There are 2 unique types of molecules in this entry. The entry contains 16712 atoms, of which 72 are hydrogens and 0 are deuteriums.

In the tables below, 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 Protein NARROW LEAF 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	360	Total	C	N	O	S	0	0
			2766	1751	479	525	11		
1	B	357	Total	C	N	O	S	0	0
			2745	1738	475	521	11		
1	C	359	Total	C	N	O	S	0	0
			2757	1745	478	523	11		
1	D	358	Total	C	N	O	S	0	0
			2753	1744	475	523	11		
1	E	353	Total	C	N	O	S	0	0
			2714	1720	469	514	11		
1	F	354	Total	C	N	O	S	0	0
			2719	1723	471	514	11		

- Molecule 2 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).

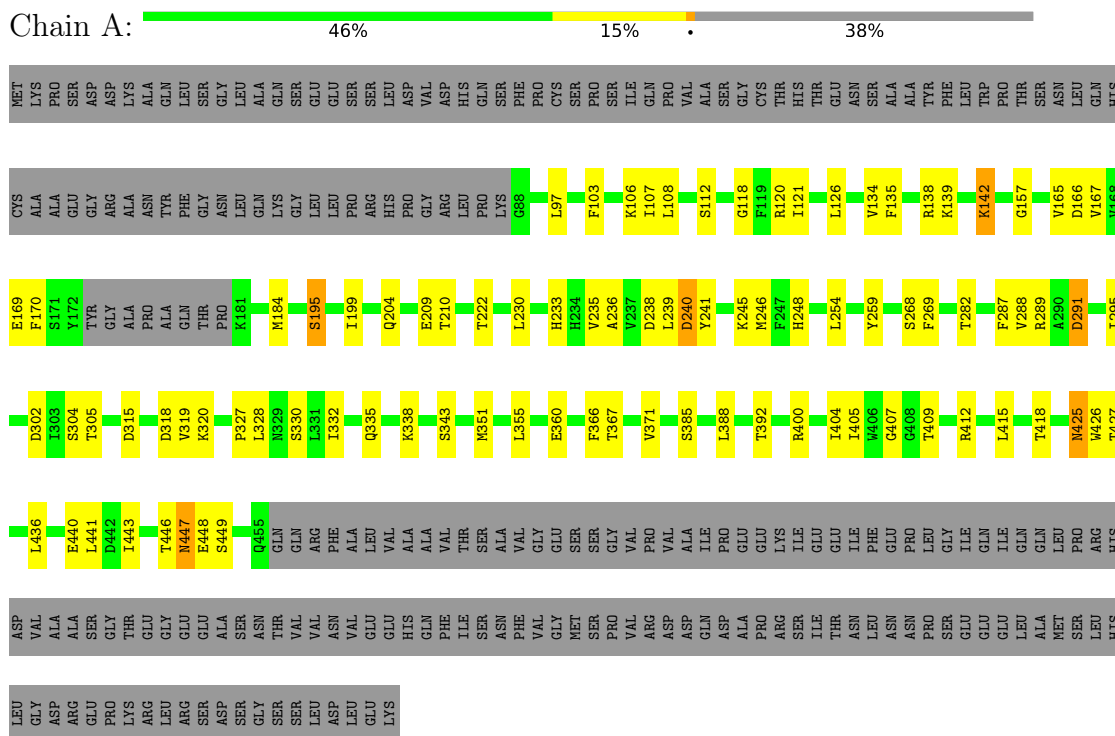


Mol	Chain	Residues	Atoms						AltConf
2	A	1	Total 43	C 10	H 12	N 5	O 13	P 3	0
2	B	1	Total 43	C 10	H 12	N 5	O 13	P 3	0
2	C	1	Total 43	C 10	H 12	N 5	O 13	P 3	0
2	D	1	Total 43	C 10	H 12	N 5	O 13	P 3	0
2	E	1	Total 43	C 10	H 12	N 5	O 13	P 3	0
2	F	1	Total 43	C 10	H 12	N 5	O 13	P 3	0

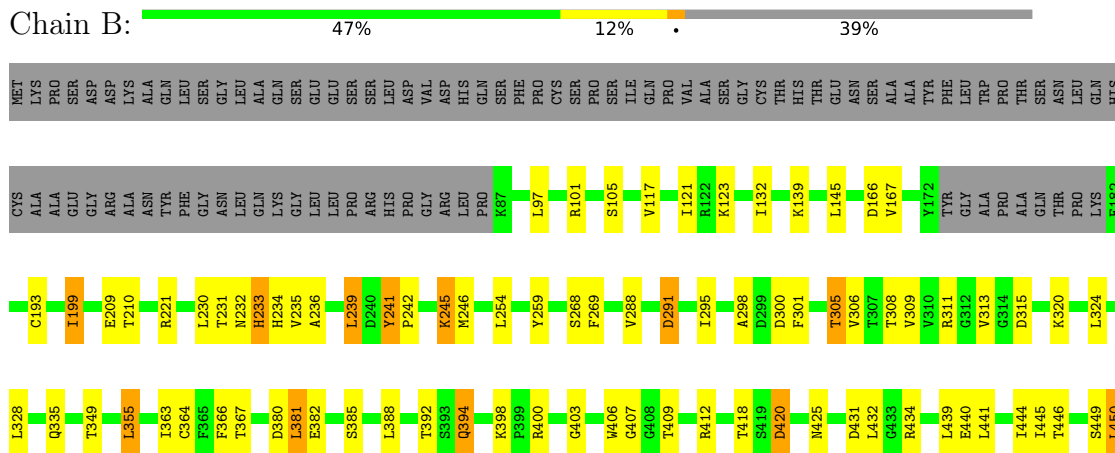
3 Residue-property plots

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. 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. 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: Protein NARROW LEAF 1



• Molecule 1: Protein NARROW LEAF 1







PRO
LYS
ARG
LEU
ARG
SER
ASP
SER
GLY
SER
SER
LEU
ASP
LEU
GLU
LYS

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, D3	Depositor
Number of particles used	670053	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION; CTF amplitude correction was performed following 3D reconstruction	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	22500	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor

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: ATP

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	0.29	1/2821 (0.0%)	0.57	2/3827 (0.1%)
1	B	0.28	1/2800 (0.0%)	0.58	3/3798 (0.1%)
1	C	0.30	1/2812 (0.0%)	0.62	7/3816 (0.2%)
1	D	0.22	0/2809	0.48	1/3812 (0.0%)
1	E	0.42	4/2769 (0.1%)	0.64	7/3758 (0.2%)
1	F	0.24	1/2774 (0.0%)	0.49	0/3764
All	All	0.30	8/16785 (0.0%)	0.57	20/22775 (0.1%)

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	C	0	2
1	F	0	1
All	All	0	3

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	142	LYS	CA-C	-8.49	1.44	1.53
1	E	122	ARG	C-O	-8.02	1.15	1.24
1	C	233	HIS	C-O	-6.13	1.16	1.24
1	F	233	HIS	C-O	-5.83	1.16	1.24
1	B	233	HIS	C-O	-5.75	1.16	1.24
1	E	142	LYS	CA-C	-5.59	1.45	1.52
1	E	235	VAL	CA-C	-5.45	1.47	1.52
1	E	241	TYR	CA-C	5.30	1.59	1.52

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	241	TYR	N-CA-C	-13.01	93.48	110.39
1	E	241	TYR	CA-C-N	11.08	133.69	119.84
1	E	241	TYR	C-N-CA	11.08	133.69	119.84
1	C	241	TYR	CA-C-N	10.19	132.58	119.84
1	C	241	TYR	C-N-CA	10.19	132.58	119.84
1	A	240	ASP	N-CA-C	9.87	125.41	111.30
1	E	235	VAL	N-CA-C	-9.72	103.95	112.12
1	E	235	VAL	CB-CA-C	-8.32	102.75	110.91
1	C	234	HIS	CA-C-N	5.98	128.60	121.84
1	C	234	HIS	C-N-CA	5.98	128.60	121.84
1	C	232	ASN	O-C-N	-5.94	115.67	123.16
1	B	313	VAL	N-CA-C	-5.90	107.75	113.53
1	E	241	TYR	CB-CA-C	5.78	121.55	110.17
1	C	232	ASN	CA-C-N	-5.75	111.11	120.72
1	C	232	ASN	C-N-CA	-5.75	111.11	120.72
1	E	238	ASP	CB-CA-C	-5.22	102.35	111.23
1	B	145	LEU	CA-C-N	-5.18	112.80	120.68
1	B	145	LEU	C-N-CA	-5.18	112.80	120.68
1	D	143	LYS	N-CA-C	-5.10	108.08	114.56
1	E	234	HIS	N-CA-C	-5.02	107.21	113.19

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	288	VAL	Peptide
1	C	439	LEU	Peptide
1	F	439	LEU	Peptide

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	2766	0	2741	54	0
1	B	2745	0	2719	54	0
1	C	2757	0	2730	62	0
1	D	2753	0	2720	53	0
1	E	2714	0	2689	67	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	2719	0	2696	46	0
2	A	31	12	12	0	0
2	B	31	12	12	3	0
2	C	31	12	12	2	0
2	D	31	12	12	2	0
2	E	31	12	12	1	0
2	F	31	12	12	2	0
All	All	16640	72	16367	327	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 10.

All (327) 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:E:238:ASP:HB2	1:E:244:GLN:NE2	1.80	0.96
1:C:234:HIS:CE1	1:C:291:ASP:OD2	2.25	0.88
1:C:414:ARG:H	1:C:425:ASN:HA	1.49	0.77
1:D:224:ASN:OD1	1:D:224:ASN:N	2.19	0.76
1:C:234:HIS:ND1	1:C:291:ASP:OD2	2.19	0.74
1:D:302:ASP:OD1	1:D:302:ASP:N	2.22	0.73
1:F:447:ASN:OD1	1:F:447:ASN:N	2.21	0.73
1:C:135:PHE:HB3	1:C:170:PHE:HB2	1.70	0.72
1:D:142:LYS:HE2	1:D:142:LYS:O	1.90	0.71
1:C:273:ASP:OD1	1:C:273:ASP:N	2.21	0.70
1:B:241:TYR:HD1	1:B:242:PRO:HD2	1.55	0.70
1:C:444:ILE:HG23	1:C:449:SER:HB2	1.74	0.70
1:B:234:HIS:HE1	1:B:291:ASP:OD2	1.74	0.70
1:A:291:ASP:OD1	1:A:291:ASP:N	2.24	0.70
1:F:204:GLN:HG3	1:F:341:ARG:HD2	1.74	0.69
1:A:106:LYS:HD2	1:A:107:ILE:HD12	1.74	0.68
1:B:241:TYR:CD1	1:B:242:PRO:HD2	2.28	0.68
1:F:302:ASP:OD1	1:F:302:ASP:N	2.23	0.67
1:C:142:LYS:HD2	1:C:142:LYS:O	1.93	0.67
1:B:291:ASP:OD1	1:B:291:ASP:N	2.25	0.67
1:E:95:LEU:HD23	1:E:324:LEU:HD23	1.76	0.67
1:F:291:ASP:OD1	1:F:291:ASP:N	2.28	0.67
1:F:300:ASP:OD1	1:F:300:ASP:N	2.26	0.66
1:E:273:ASP:OD1	1:E:273:ASP:N	2.29	0.65
1:A:385:SER:HB3	1:A:407:GLY:HA2	1.78	0.65
1:E:135:PHE:HB3	1:E:170:PHE:HB2	1.79	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:108:LEU:O	1:F:112:SER:OG	2.14	0.65
1:C:170:PHE:O	1:C:416:LYS:NZ	2.28	0.64
1:C:169:GLU:HG2	1:C:416:LYS:HD3	1.80	0.64
1:A:239:LEU:HD22	1:F:239:LEU:HB3	1.78	0.64
1:E:385:SER:HB3	1:E:407:GLY:HA3	1.79	0.64
1:E:238:ASP:O	1:E:240:ASP:N	2.31	0.64
1:B:234:HIS:CE1	1:B:291:ASP:OD2	2.50	0.63
1:A:447:ASN:OD1	1:A:447:ASN:N	2.19	0.63
1:B:242:PRO:HB3	1:E:269:PHE:HB2	1.79	0.63
1:E:246:MET:HG3	1:E:295:ILE:HG21	1.79	0.63
1:C:409:THR:HG21	1:C:428:SER:H	1.63	0.63
1:A:288:VAL:HG12	1:A:366:PHE:HB2	1.81	0.62
1:D:238:ASP:HB3	1:D:241:TYR:HB2	1.80	0.62
1:B:288:VAL:HG12	1:B:366:PHE:HB2	1.82	0.61
1:D:425:ASN:OD1	1:D:425:ASN:N	2.31	0.61
1:B:117:VAL:HG12	1:B:132:ILE:HG12	1.83	0.61
1:D:209:GLU:N	1:D:209:GLU:OE1	2.34	0.61
1:C:209:GLU:OE1	1:C:209:GLU:N	2.34	0.60
1:F:425:ASN:OD1	1:F:425:ASN:N	2.26	0.60
1:B:209:GLU:N	1:B:209:GLU:OE1	2.34	0.60
1:E:224:ASN:ND2	1:E:224:ASN:O	2.34	0.60
1:B:335:GLN:HB3	1:B:392:THR:HB	1.84	0.60
1:D:393:SER:OG	1:D:397:GLU:O	2.18	0.60
1:F:209:GLU:N	1:F:209:GLU:OE2	2.35	0.60
1:B:355:LEU:HD23	1:B:367:THR:HB	1.84	0.60
1:E:275:TRP:HA	1:E:438:ARG:HH21	1.67	0.59
1:F:439:LEU:O	1:F:441:LEU:HD22	2.03	0.59
1:C:209:GLU:HG2	1:C:210:THR:HG23	1.85	0.59
1:C:272:ASP:OD1	1:C:272:ASP:N	2.36	0.59
1:C:320:LYS:HB2	1:C:400:ARG:HE	1.68	0.59
1:C:384:ASP:O	1:C:387:SER:OG	2.20	0.59
1:A:118:GLY:HA2	1:A:332:ILE:HD13	1.84	0.59
1:E:199:ILE:HG12	1:E:306:VAL:HG22	1.83	0.59
1:E:404:ILE:HG13	1:E:432:LEU:HD13	1.84	0.59
1:A:142:LYS:O	1:A:142:LYS:HG3	2.02	0.59
1:B:305:THR:O	1:B:305:THR:OG1	2.17	0.58
1:D:149:GLN:N	1:D:149:GLN:OE1	2.33	0.58
1:E:240:ASP:O	1:E:241:TYR:HB2	2.03	0.58
1:A:97:LEU:HD11	1:A:328:LEU:HD11	1.85	0.58
1:A:269:PHE:HB3	1:A:287:PHE:HB3	1.85	0.58
1:C:212:GLY:HA3	1:C:235:VAL:HG11	1.85	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:209:GLU:N	1:E:209:GLU:OE1	2.36	0.58
1:D:218:VAL:HB	1:D:441:LEU:HB3	1.86	0.58
1:E:305:THR:O	1:E:305:THR:OG1	2.22	0.58
1:B:320:LYS:HB2	1:B:400:ARG:HE	1.67	0.58
1:E:288:VAL:HG12	1:E:288:VAL:O	2.04	0.57
1:B:444:ILE:HG23	1:B:449:SER:HB3	1.86	0.57
1:C:238:ASP:N	1:C:244:GLN:OE1	2.36	0.57
1:E:380:ASP:OD1	1:E:427:THR:OG1	2.21	0.57
1:D:209:GLU:HG2	1:D:210:THR:HG23	1.85	0.57
1:D:273:ASP:N	1:D:273:ASP:OD1	2.38	0.57
1:D:135:PHE:HB3	1:D:170:PHE:HB3	1.86	0.57
1:F:288:VAL:HG12	1:F:289:ARG:H	1.70	0.57
1:C:302:ASP:C	1:C:304:SER:H	2.13	0.56
1:C:124:GLY:HA2	1:C:417:LEU:HD21	1.86	0.56
1:D:204:GLN:NE2	1:D:249:PRO:O	2.39	0.56
1:E:269:PHE:CD2	1:E:289:ARG:HB3	2.41	0.56
1:A:409:THR:OG1	1:A:426:TRP:O	2.21	0.56
1:C:238:ASP:O	1:C:240:ASP:N	2.39	0.56
1:B:167:VAL:HG23	2:B:601:ATP:O1A	2.06	0.56
1:E:142:LYS:O	1:E:142:LYS:HG2	2.06	0.56
1:F:451:GLN:OE1	1:F:451:GLN:N	2.38	0.56
1:D:409:THR:HG21	1:D:428:SER:H	1.72	0.55
1:A:425:ASN:OD1	1:A:425:ASN:N	2.34	0.55
1:C:439:LEU:O	1:C:441:LEU:HG	2.07	0.55
1:C:336:VAL:HG12	1:C:391:LEU:HD23	1.88	0.55
1:A:195:SER:O	1:A:195:SER:OG	2.21	0.55
1:E:268:SER:OG	1:E:269:PHE:N	2.40	0.55
1:F:355:LEU:N	1:F:367:THR:O	2.40	0.55
1:B:409:THR:OG1	1:B:412:ARG:O	2.25	0.54
1:A:135:PHE:HB3	1:A:170:PHE:HB2	1.88	0.54
1:B:268:SER:OG	1:B:269:PHE:N	2.38	0.54
1:C:120:ARG:NH2	1:C:165:VAL:O	2.40	0.54
1:D:288:VAL:HG22	1:D:366:PHE:HB2	1.89	0.54
1:A:446:THR:HG23	1:A:448:GLU:H	1.73	0.54
1:D:436:LEU:HD11	1:D:443:ILE:HG12	1.90	0.54
1:A:120:ARG:NH2	1:A:165:VAL:O	2.41	0.53
1:A:139:LYS:HG3	1:A:169:GLU:HB2	1.88	0.53
1:C:305:THR:O	1:C:305:THR:OG1	2.21	0.53
1:C:393:SER:OG	1:C:397:GLU:O	2.20	0.53
1:B:363:ILE:HG21	1:E:241:TYR:OH	2.08	0.53
1:A:184:MET:SD	1:A:184:MET:N	2.81	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:240:ASP:O	1:C:241:TYR:HB2	2.09	0.53
1:C:425:ASN:OD1	1:C:425:ASN:N	2.29	0.53
1:F:363:ILE:HD12	1:F:363:ILE:H	1.74	0.53
1:A:335:GLN:HB3	1:A:392:THR:HB	1.90	0.53
1:D:238:ASP:H	1:D:244:GLN:HG3	1.73	0.53
1:E:237:VAL:HG13	1:E:239:LEU:HD13	1.91	0.53
1:A:204:GLN:O	1:A:248:HIS:ND1	2.39	0.53
1:D:390:ILE:HA	1:D:401:PRO:HA	1.91	0.53
1:F:246:MET:HG3	1:F:295:ILE:HD13	1.90	0.53
1:A:302:ASP:O	1:A:305:THR:HG22	2.10	0.52
1:B:363:ILE:HD12	1:B:363:ILE:H	1.74	0.52
1:C:288:VAL:O	1:C:288:VAL:HG23	2.10	0.52
1:C:319:VAL:HG23	1:C:443:ILE:HG13	1.91	0.52
1:D:436:LEU:HD22	1:D:441:LEU:HB2	1.91	0.52
1:E:236:ALA:HA	1:E:246:MET:HE1	1.91	0.52
1:B:300:ASP:OD1	1:B:300:ASP:N	2.38	0.52
1:E:233:HIS:HA	1:E:236:ALA:HB3	1.91	0.52
1:E:234:HIS:ND1	1:E:291:ASP:OD2	2.42	0.52
1:A:121:ILE:N	1:A:166:ASP:OD2	2.39	0.52
1:D:199:ILE:HG12	1:D:306:VAL:HG22	1.92	0.52
1:F:145:LEU:HD22	1:F:149:GLN:HB3	1.91	0.52
1:E:274:VAL:O	1:E:438:ARG:NH2	2.43	0.52
1:F:393:SER:OG	1:F:397:GLU:O	2.24	0.52
1:A:236:ALA:HA	1:A:246:MET:HE1	1.92	0.52
1:F:372:VAL:HG22	1:F:426:TRP:HB3	1.91	0.51
1:E:234:HIS:HE1	1:E:289:ARG:NH2	2.08	0.51
1:B:298:ALA:HB3	1:B:301:PHE:HB2	1.91	0.51
1:D:204:GLN:HG3	1:D:341:ARG:HD2	1.92	0.51
1:F:167:VAL:HG23	2:F:601:ATP:O1A	2.10	0.51
1:A:355:LEU:O	1:A:367:THR:N	2.32	0.51
1:E:434:ARG:O	1:E:438:ARG:HD3	2.11	0.51
1:D:250:LEU:HD11	1:F:138:ARG:HD3	1.92	0.50
1:E:302:ASP:C	1:E:304:SER:H	2.19	0.50
1:E:415:LEU:N	1:E:424:GLU:O	2.40	0.50
1:C:416:LYS:HG3	1:C:423:PRO:HB3	1.93	0.50
1:D:145:LEU:HD22	1:D:149:GLN:HG2	1.93	0.50
1:B:355:LEU:N	1:B:367:THR:O	2.44	0.50
1:D:305:THR:O	1:D:305:THR:OG1	2.26	0.50
1:F:117:VAL:HG12	1:F:132:ILE:HG12	1.93	0.50
1:D:113:LEU:HD12	1:D:172:TYR:HD1	1.75	0.49
1:B:291:ASP:OD2	1:B:406:TRP:NE1	2.36	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:262:ALA:O	1:E:296:PRO:HD2	2.12	0.49
1:C:388:LEU:HD23	1:C:404:ILE:HG22	1.93	0.49
1:E:245:LYS:HB3	1:E:259:TYR:HE1	1.77	0.49
1:C:327:PRO:O	1:C:330:SER:OG	2.28	0.49
1:B:245:LYS:HB3	1:B:259:TYR:HE1	1.78	0.49
1:F:120:ARG:NH2	1:F:165:VAL:O	2.45	0.49
1:E:238:ASP:O	1:E:239:LEU:C	2.53	0.49
1:A:138:ARG:NH1	1:B:193:CYS:O	2.33	0.49
1:D:385:SER:HB3	1:D:407:GLY:HA3	1.95	0.49
1:F:388:LEU:HD23	1:F:404:ILE:HG22	1.93	0.49
1:F:320:LYS:HB2	1:F:400:ARG:HE	1.78	0.48
1:E:355:LEU:N	1:E:367:THR:O	2.46	0.48
1:F:403:GLY:HA2	1:F:432:LEU:HB2	1.95	0.48
1:C:220:ARG:O	1:C:225:LYS:HG3	2.13	0.48
1:D:327:PRO:O	1:D:330:SER:OG	2.29	0.48
1:C:145:LEU:HD22	1:C:149:GLN:HB3	1.95	0.48
1:A:233:HIS:HA	1:A:236:ALA:HB3	1.96	0.48
1:C:234:HIS:HE1	1:C:291:ASP:OD2	1.88	0.48
1:F:146:ASN:OD1	1:F:149:GLN:HB2	2.13	0.48
1:F:236:ALA:HA	1:F:246:MET:HE1	1.96	0.48
1:E:335:GLN:HB3	1:E:392:THR:HB	1.97	0.47
1:A:239:LEU:HA	1:F:239:LEU:HD13	1.96	0.47
1:E:290:ALA:HB1	1:E:430:VAL:HG11	1.96	0.47
1:C:138:ARG:O	2:C:601:ATP:H2	1.97	0.47
1:A:436:LEU:HD22	1:A:441:LEU:HB2	1.95	0.47
1:D:315:ASP:HB3	1:D:398:LYS:HE2	1.96	0.47
1:E:97:LEU:HD13	1:E:117:VAL:HB	1.96	0.47
1:F:199:ILE:HG12	1:F:306:VAL:HG22	1.96	0.47
1:C:97:LEU:HD13	1:C:117:VAL:HB	1.97	0.47
1:D:196:ASP:OD2	1:D:311:ARG:NH1	2.48	0.47
1:C:140:VAL:O	2:C:601:ATP:H1'	2.15	0.47
1:C:171:SER:HB2	1:C:416:LYS:NZ	2.29	0.47
1:C:385:SER:HB3	1:C:407:GLY:HA2	1.97	0.47
1:E:327:PRO:O	1:E:330:SER:OG	2.23	0.47
1:F:140:VAL:O	2:F:601:ATP:H1'	2.14	0.47
1:F:170:PHE:HD2	1:F:415:LEU:HD12	1.79	0.47
1:E:275:TRP:CG	1:E:288:VAL:HG11	2.50	0.47
1:A:302:ASP:O	1:A:304:SER:N	2.48	0.47
1:E:233:HIS:C	1:E:235:VAL:H	2.23	0.47
1:E:384:ASP:OD1	1:E:384:ASP:N	2.48	0.47
1:B:239:LEU:HD13	1:E:239:LEU:HA	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:268:SER:OG	1:A:269:PHE:N	2.47	0.46
1:C:146:ASN:OD1	1:C:149:GLN:HB2	2.15	0.46
1:C:231:THR:OG1	1:C:232:ASN:N	2.48	0.46
1:C:438:ARG:HD3	1:C:438:ARG:N	2.30	0.46
1:D:317:GLY:N	1:D:399:PRO:O	2.42	0.46
1:E:388:LEU:HD23	1:E:390:ILE:HD11	1.98	0.46
1:D:140:VAL:O	2:D:601:ATP:H1'	2.14	0.46
1:D:120:ARG:NH2	1:D:165:VAL:O	2.49	0.46
1:D:320:LYS:HB3	1:D:402:ILE:HG22	1.98	0.46
1:E:360:GLU:OE2	1:E:360:GLU:N	2.39	0.46
1:F:437:ASP:O	1:F:440:GLU:HG2	2.15	0.46
1:A:338:LYS:NZ	1:A:343:SER:OG	2.48	0.46
1:E:444:ILE:HG23	1:E:449:SER:HB2	1.98	0.46
1:F:431:ASP:OD1	1:F:431:ASP:N	2.49	0.46
1:F:121:ILE:N	1:F:166:ASP:OD2	2.46	0.46
1:D:101:ARG:HB2	1:D:132:ILE:HD13	1.97	0.46
1:A:103:PHE:HD2	1:A:157:GLY:HA2	1.81	0.45
1:A:246:MET:HG3	1:A:295:ILE:HG21	1.99	0.45
1:A:388:LEU:HD23	1:A:404:ILE:HG22	1.97	0.45
1:B:239:LEU:HD22	1:E:239:LEU:HD12	1.98	0.45
1:B:418:THR:HG23	1:B:420:ASP:H	1.82	0.45
1:E:270:ILE:O	1:E:288:VAL:N	2.47	0.45
1:E:431:ASP:OD2	1:E:434:ARG:NH1	2.49	0.45
1:F:90:GLN:HB2	1:F:162:TRP:CZ2	2.51	0.45
1:D:272:ASP:OD1	1:D:273:ASP:N	2.49	0.45
1:E:320:LYS:HB2	1:E:400:ARG:HE	1.81	0.45
1:D:103:PHE:HD2	1:D:157:GLY:HA2	1.81	0.45
1:A:409:THR:HA	1:A:412:ARG:HG3	1.98	0.45
1:B:246:MET:HG3	1:B:295:ILE:HD13	1.98	0.45
1:C:241:TYR:OH	1:D:363:ILE:HG21	2.16	0.45
1:A:327:PRO:O	1:A:330:SER:OG	2.29	0.45
1:C:220:ARG:HD2	1:C:440:GLU:O	2.17	0.45
1:A:269:PHE:CD2	1:A:289:ARG:HB3	2.52	0.45
1:C:241:TYR:HD1	1:C:242:PRO:HD2	1.82	0.45
1:E:379:PHE:CE2	1:E:405:ILE:HD11	2.52	0.45
1:B:403:GLY:HA2	1:B:432:LEU:HB2	1.99	0.45
1:C:436:LEU:HD11	1:C:443:ILE:HG12	1.99	0.45
1:A:233:HIS:CD2	1:A:233:HIS:C	2.95	0.44
1:C:415:LEU:HD23	1:C:426:TRP:CD1	2.53	0.44
1:C:446:THR:HG23	1:C:448:GLU:H	1.82	0.44
1:B:233:HIS:C	1:B:235:VAL:N	2.74	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:315:ASP:HB3	1:B:398:LYS:HE2	1.99	0.44
1:E:143:LYS:HE2	1:E:143:LYS:HB2	1.81	0.44
1:E:220:ARG:HG3	1:E:225:LYS:HA	2.00	0.44
1:F:195:SER:O	1:F:195:SER:OG	2.31	0.44
1:D:355:LEU:O	1:D:367:THR:N	2.35	0.44
1:A:108:LEU:O	1:A:112:SER:OG	2.30	0.44
1:A:238:ASP:O	1:A:239:LEU:C	2.55	0.44
1:A:320:LYS:HB2	1:A:400:ARG:HE	1.83	0.44
1:B:431:ASP:OD1	1:B:431:ASP:N	2.51	0.44
1:C:323:ASP:HB3	1:C:326:CYS:SG	2.58	0.44
1:E:245:LYS:HB3	1:E:259:TYR:CE1	2.53	0.44
1:B:236:ALA:HA	1:B:246:MET:CE	2.48	0.43
1:B:309:VAL:HG12	1:B:311:ARG:H	1.82	0.43
1:C:133:LEU:HD23	1:C:166:ASP:HB3	2.00	0.43
1:D:121:ILE:N	1:D:166:ASP:OD2	2.41	0.43
1:D:336:VAL:HG12	1:D:391:LEU:HD23	1.99	0.43
1:C:302:ASP:O	1:C:304:SER:N	2.48	0.43
1:D:286:THR:O	1:D:286:THR:OG1	2.36	0.43
1:D:439:LEU:HD12	1:D:439:LEU:HA	1.89	0.43
1:B:121:ILE:N	1:B:166:ASP:OD2	2.36	0.43
1:C:269:PHE:HB3	1:C:287:PHE:HB3	2.01	0.43
1:B:306:VAL:HG23	1:B:450:LEU:HD11	2.00	0.43
1:D:323:ASP:HB3	1:D:326:CYS:SG	2.59	0.43
1:E:265:ARG:HG2	1:E:294:PHE:HB3	1.99	0.43
1:A:338:LYS:HG3	1:A:405:ILE:HD11	2.00	0.43
1:B:394:GLN:H	1:B:394:GLN:HG3	1.64	0.43
1:F:336:VAL:HG12	1:F:391:LEU:HD23	2.00	0.43
1:B:236:ALA:HA	1:B:246:MET:HE1	2.00	0.43
1:D:113:LEU:HD12	1:D:172:TYR:CD1	2.53	0.43
1:F:194:GLY:HA3	1:F:249:PRO:HG3	2.01	0.43
1:A:245:LYS:HB3	1:A:259:TYR:HE1	1.83	0.43
1:B:101:ARG:O	1:B:105:SER:OG	2.31	0.43
1:E:288:VAL:O	1:E:288:VAL:CG1	2.67	0.43
1:F:394:GLN:O	1:F:397:GLU:HG2	2.18	0.43
1:A:209:GLU:HG2	1:A:210:THR:HG23	1.99	0.42
1:A:415:LEU:HD23	1:A:426:TRP:CD1	2.54	0.42
1:F:170:PHE:HE1	1:F:172:TYR:CE1	2.37	0.42
1:A:126:LEU:HD21	1:A:351:MET:SD	2.59	0.42
1:B:239:LEU:HB3	1:E:239:LEU:HD12	2.00	0.42
1:B:308:THR:HG21	1:B:444:ILE:HG22	2.01	0.42
1:F:143:LYS:HE2	1:F:143:LYS:HB2	1.82	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:318:ASP:OD1	1:A:319:VAL:N	2.52	0.42
1:D:368:ASP:HB2	1:D:429:GLY:O	2.18	0.42
1:E:338:LYS:HE2	1:E:380:ASP:HB3	2.02	0.42
1:A:166:ASP:OD1	1:A:167:VAL:N	2.53	0.42
1:B:381:LEU:HD12	1:B:381:LEU:HA	1.87	0.42
1:E:135:PHE:HD1	1:E:168:VAL:HB	1.85	0.42
1:B:388:LEU:HD23	1:B:388:LEU:HA	1.90	0.42
1:C:204:GLN:O	1:C:248:HIS:ND1	2.41	0.42
1:C:413:GLY:HA2	1:C:426:TRP:CE2	2.53	0.42
1:C:420:ASP:OD1	1:C:420:ASP:O	2.38	0.42
1:A:436:LEU:HD11	1:A:443:ILE:HG12	2.01	0.42
1:D:134:VAL:N	1:D:166:ASP:O	2.45	0.42
1:A:355:LEU:N	1:A:367:THR:O	2.51	0.42
1:A:371:VAL:O	1:A:427:THR:N	2.51	0.42
1:E:379:PHE:HE2	1:E:405:ILE:HD11	1.84	0.42
1:E:141:HIS:ND1	1:E:142:LYS:N	2.67	0.42
1:C:436:LEU:O	1:C:440:GLU:HA	2.20	0.42
1:D:106:LYS:HE3	1:D:282:THR:HB	2.02	0.42
1:F:91:ALA:HB1	1:F:96:ASP:HB3	2.01	0.42
1:F:231:THR:OG1	1:F:232:ASN:N	2.53	0.42
1:E:139:LYS:NZ	2:E:601:ATP:O2G	2.53	0.41
1:E:226:GLN:HG2	1:E:227:VAL:N	2.35	0.41
1:F:324:LEU:HD13	1:F:434:ARG:HH22	1.84	0.41
1:A:222:THR:HG23	1:A:440:GLU:HG2	2.02	0.41
1:B:221:ARG:HE	1:B:440:GLU:HG3	1.85	0.41
1:E:241:TYR:HD1	1:E:241:TYR:HA	1.43	0.41
1:F:380:ASP:OD1	1:F:427:THR:OG1	2.37	0.41
1:D:234:HIS:ND1	1:D:291:ASP:OD2	2.44	0.41
1:B:324:LEU:HD13	1:B:434:ARG:NH2	2.36	0.41
1:C:225:LYS:NZ	1:C:456:GLN:OE1	2.35	0.41
1:B:209:GLU:HG2	1:B:210:THR:HG23	2.02	0.41
1:D:233:HIS:ND1	1:D:291:ASP:OD1	2.54	0.41
1:D:431:ASP:OD1	1:D:431:ASP:N	2.53	0.41
1:D:388:LEU:HD23	1:D:388:LEU:HA	1.95	0.41
1:F:220:ARG:NH1	1:F:264:GLU:OE2	2.54	0.41
1:A:233:HIS:ND1	1:A:291:ASP:HB3	2.36	0.41
1:A:360:GLU:H	1:A:360:GLU:CD	2.29	0.41
1:B:139:LYS:HA	2:B:601:ATP:C2	2.56	0.41
1:B:382:GLU:C	1:B:382:GLU:OE1	2.64	0.41
1:B:439:LEU:O	1:B:441:LEU:HG	2.21	0.41
1:C:380:ASP:OD1	1:C:409:THR:OG1	2.38	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:204:GLN:O	1:E:248:HIS:ND1	2.43	0.41
1:E:338:LYS:HE3	1:E:379:PHE:O	2.21	0.41
1:B:199:ILE:HG12	1:B:306:VAL:HG12	2.03	0.41
1:D:282:THR:HG22	1:D:282:THR:O	2.21	0.41
1:B:385:SER:HB3	1:B:407:GLY:HA2	2.03	0.40
1:E:231:THR:OG1	1:E:232:ASN:N	2.53	0.40
1:B:445:ILE:HD12	1:B:446:THR:HG23	2.02	0.40
1:C:390:ILE:HA	1:C:401:PRO:HA	2.04	0.40
1:E:238:ASP:HB2	1:E:244:GLN:HE22	1.75	0.40
1:B:231:THR:OG1	1:B:232:ASN:N	2.54	0.40
2:B:601:ATP:O2'	2:B:601:ATP:C8	2.70	0.40
1:C:225:LYS:HB2	1:C:225:LYS:HE3	1.83	0.40
1:C:388:LEU:HD23	1:C:388:LEU:HA	1.88	0.40
1:D:138:ARG:O	2:D:601:ATP:H2	2.04	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 PDB entries followed by that with respect to all EM entries.

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	356/582 (61%)	342 (96%)	14 (4%)	0	100	100
1	B	353/582 (61%)	343 (97%)	10 (3%)	0	100	100
1	C	355/582 (61%)	335 (94%)	16 (4%)	4 (1%)	12	37
1	D	354/582 (61%)	339 (96%)	15 (4%)	0	100	100
1	E	349/582 (60%)	330 (95%)	14 (4%)	5 (1%)	9	31
1	F	350/582 (60%)	336 (96%)	14 (4%)	0	100	100
All	All	2117/3492 (61%)	2025 (96%)	83 (4%)	9 (0%)	32	60

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	303	ILE
1	E	241	TYR
1	E	303	ILE
1	E	239	LEU
1	E	412	ARG
1	C	239	LEU
1	C	242	PRO
1	E	289	ARG
1	C	241	TYR

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 PDB entries followed by that with respect to all EM entries.

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	301/488 (62%)	287 (95%)	14 (5%)	22	55
1	B	299/488 (61%)	279 (93%)	20 (7%)	13	39
1	C	300/488 (62%)	281 (94%)	19 (6%)	15	42
1	D	299/488 (61%)	271 (91%)	28 (9%)	7	23
1	E	296/488 (61%)	271 (92%)	25 (8%)	9	28
1	F	296/488 (61%)	277 (94%)	19 (6%)	14	41
All	All	1791/2928 (61%)	1666 (93%)	125 (7%)	15	36

All (125) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	134	VAL
1	A	195	SER
1	A	199	ILE
1	A	230	LEU
1	A	235	VAL
1	A	240	ASP
1	A	254	LEU
1	A	282	THR
1	A	291	ASP
1	A	315	ASP

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Mol	Chain	Res	Type
1	A	418	THR
1	A	425	ASN
1	A	447	ASN
1	A	449	SER
1	B	97	LEU
1	B	123	LYS
1	B	199	ILE
1	B	230	LEU
1	B	239	LEU
1	B	241	TYR
1	B	245	LYS
1	B	254	LEU
1	B	291	ASP
1	B	305	THR
1	B	328	LEU
1	B	349	THR
1	B	355	LEU
1	B	364	CYS
1	B	380	ASP
1	B	381	LEU
1	B	394	GLN
1	B	420	ASP
1	B	425	ASN
1	B	450	LEU
1	C	105	SER
1	C	134	VAL
1	C	146	ASN
1	C	230	LEU
1	C	254	LEU
1	C	258	VAL
1	C	269	PHE
1	C	273	ASP
1	C	302	ASP
1	C	303	ILE
1	C	305	THR
1	C	308	THR
1	C	328	LEU
1	C	346	THR
1	C	387	SER
1	C	416	LYS
1	C	417	LEU
1	C	425	ASN

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Mol	Chain	Res	Type
1	C	454	VAL
1	D	95	LEU
1	D	108	LEU
1	D	113	LEU
1	D	142	LYS
1	D	173	TYR
1	D	199	ILE
1	D	224	ASN
1	D	230	LEU
1	D	235	VAL
1	D	240	ASP
1	D	254	LEU
1	D	258	VAL
1	D	271	THR
1	D	273	ASP
1	D	302	ASP
1	D	305	THR
1	D	308	THR
1	D	346	THR
1	D	347	THR
1	D	349	THR
1	D	371	VAL
1	D	377	GLN
1	D	380	ASP
1	D	387	SER
1	D	404	ILE
1	D	415	LEU
1	D	425	ASN
1	D	443	ILE
1	E	95	LEU
1	E	105	SER
1	E	154	ILE
1	E	170	PHE
1	E	199	ILE
1	E	226	GLN
1	E	230	LEU
1	E	232	ASN
1	E	239	LEU
1	E	240	ASP
1	E	241	TYR
1	E	254	LEU
1	E	273	ASP

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Mol	Chain	Res	Type
1	E	274	VAL
1	E	303	ILE
1	E	305	THR
1	E	308	THR
1	E	315	ASP
1	E	324	LEU
1	E	325	GLN
1	E	369	ILE
1	E	417	LEU
1	E	418	THR
1	E	427	THR
1	E	449	SER
1	F	123	LYS
1	F	199	ILE
1	F	217	ILE
1	F	230	LEU
1	F	235	VAL
1	F	239	LEU
1	F	241	TYR
1	F	254	LEU
1	F	282	THR
1	F	291	ASP
1	F	300	ASP
1	F	302	ASP
1	F	328	LEU
1	F	347	THR
1	F	367	THR
1	F	425	ASN
1	F	427	THR
1	F	443	ILE
1	F	447	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	204	GLN
1	A	358	ASN
1	B	234	HIS
1	B	243	ASN
1	B	325	GLN
1	C	233	HIS
1	C	335	GLN

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Mol	Chain	Res	Type
1	D	283	ASN
1	D	329	ASN
1	E	204	GLN
1	E	224	ASN
1	F	375	ASN
1	F	411	ASN

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](#)

6 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	$\# Z > 2$
2	ATP	F	601	-	26,33,33	2.47	15 (57%)	31,52,52	2.46	15 (48%)
2	ATP	A	601	-	26,33,33	2.52	15 (57%)	31,52,52	2.23	13 (41%)
2	ATP	C	601	-	26,33,33	2.48	16 (61%)	31,52,52	2.05	9 (29%)
2	ATP	D	601	-	26,33,33	2.47	16 (61%)	31,52,52	2.05	9 (29%)
2	ATP	B	601	-	26,33,33	2.72	15 (57%)	31,52,52	2.70	12 (38%)
2	ATP	E	601	-	26,33,33	2.52	15 (57%)	31,52,52	2.28	13 (41%)

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	ATP	F	601	-	-	7/18/38/38	0/3/3/3
2	ATP	A	601	-	-	5/18/38/38	0/3/3/3
2	ATP	C	601	-	-	8/18/38/38	0/3/3/3
2	ATP	D	601	-	-	8/18/38/38	0/3/3/3
2	ATP	B	601	-	-	6/18/38/38	0/3/3/3
2	ATP	E	601	-	-	7/18/38/38	0/3/3/3

All (92) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601	ATP	C2'-C1'	-5.39	1.45	1.53
2	E	601	ATP	PG-O3G	-4.51	1.37	1.54
2	A	601	ATP	PG-O2G	-4.50	1.37	1.54
2	B	601	ATP	C4-N3	-4.15	1.29	1.35
2	F	601	ATP	PG-O3G	-4.03	1.39	1.54
2	B	601	ATP	PG-O3G	-4.00	1.39	1.54
2	D	601	ATP	PG-O3G	-4.00	1.39	1.54
2	C	601	ATP	PG-O3G	-4.00	1.39	1.54
2	A	601	ATP	C4-N3	-3.99	1.30	1.35
2	E	601	ATP	C4-N3	-3.91	1.30	1.35
2	D	601	ATP	PA-O1A	-3.85	1.37	1.50
2	C	601	ATP	PA-O1A	-3.83	1.37	1.50
2	F	601	ATP	C4-N3	-3.76	1.30	1.35
2	B	601	ATP	C5-N7	-3.70	1.26	1.39
2	A	601	ATP	PA-O2A	-3.69	1.38	1.55
2	E	601	ATP	PA-O2A	-3.68	1.38	1.55
2	E	601	ATP	PA-O1A	-3.66	1.37	1.50
2	A	601	ATP	PA-O1A	-3.61	1.38	1.50
2	B	601	ATP	PA-O2A	-3.58	1.38	1.55
2	C	601	ATP	C4-N3	-3.57	1.30	1.35
2	D	601	ATP	C4-N3	-3.57	1.30	1.35
2	C	601	ATP	O4'-C1'	-3.52	1.36	1.41
2	C	601	ATP	C2'-C1'	-3.50	1.48	1.53
2	D	601	ATP	C2'-C1'	-3.44	1.48	1.53
2	D	601	ATP	O4'-C1'	-3.44	1.36	1.41
2	F	601	ATP	PA-O2A	-3.43	1.39	1.55
2	F	601	ATP	C2'-C1'	-3.42	1.48	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	601	ATP	PG-O2G	-3.40	1.41	1.54
2	A	601	ATP	PG-O3G	-3.39	1.41	1.54
2	F	601	ATP	PB-O1B	-3.37	1.39	1.50
2	D	601	ATP	C5-N7	-3.35	1.27	1.39
2	C	601	ATP	C5-N7	-3.33	1.27	1.39
2	B	601	ATP	PA-O1A	-3.33	1.39	1.50
2	B	601	ATP	PB-O1B	-3.32	1.39	1.50
2	F	601	ATP	PA-O1A	-3.30	1.39	1.50
2	B	601	ATP	PG-O2G	-3.28	1.42	1.54
2	F	601	ATP	PG-O2G	-3.27	1.42	1.54
2	B	601	ATP	O4'-C1'	-3.24	1.36	1.41
2	A	601	ATP	PB-O1B	-3.23	1.39	1.50
2	E	601	ATP	PB-O1B	-3.23	1.39	1.50
2	F	601	ATP	PG-O1G	-3.21	1.40	1.50
2	F	601	ATP	C5-N7	-3.20	1.28	1.39
2	B	601	ATP	PG-O1G	-3.20	1.40	1.50
2	F	601	ATP	PB-O2B	-3.19	1.40	1.55
2	B	601	ATP	PB-O2B	-3.19	1.40	1.55
2	A	601	ATP	C2-N1	-3.18	1.28	1.33
2	E	601	ATP	C2-N1	-3.17	1.28	1.33
2	A	601	ATP	PG-O1G	-3.14	1.40	1.50
2	E	601	ATP	PG-O1G	-3.11	1.40	1.50
2	E	601	ATP	O4'-C4'	-3.04	1.38	1.45
2	C	601	ATP	PG-O2G	-3.03	1.43	1.54
2	A	601	ATP	O4'-C4'	-3.02	1.38	1.45
2	D	601	ATP	PG-O2G	-3.01	1.43	1.54
2	C	601	ATP	PA-O2A	-2.99	1.41	1.55
2	D	601	ATP	PA-O2A	-2.98	1.41	1.55
2	C	601	ATP	PB-O2B	-2.96	1.41	1.55
2	D	601	ATP	PB-O2B	-2.96	1.41	1.55
2	D	601	ATP	O4'-C4'	-2.92	1.38	1.45
2	E	601	ATP	C5-N7	-2.89	1.29	1.39
2	A	601	ATP	C5-N7	-2.89	1.29	1.39
2	C	601	ATP	O4'-C4'	-2.88	1.38	1.45
2	B	601	ATP	C2'-C3'	-2.87	1.45	1.53
2	A	601	ATP	PB-O2B	-2.84	1.42	1.55
2	E	601	ATP	PB-O2B	-2.83	1.42	1.55
2	F	601	ATP	O4'-C4'	-2.80	1.38	1.45
2	C	601	ATP	PB-O1B	-2.79	1.41	1.50
2	D	601	ATP	PB-O1B	-2.78	1.41	1.50
2	E	601	ATP	C2'-C1'	-2.76	1.49	1.53
2	A	601	ATP	C2'-C1'	-2.74	1.49	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	ATP	O4'-C1'	-2.66	1.37	1.41
2	E	601	ATP	O4'-C1'	-2.66	1.37	1.41
2	F	601	ATP	C2'-C3'	-2.66	1.46	1.53
2	D	601	ATP	PG-O1G	-2.60	1.42	1.50
2	C	601	ATP	PG-O1G	-2.60	1.42	1.50
2	E	601	ATP	C2'-C3'	-2.53	1.46	1.53
2	A	601	ATP	C2'-C3'	-2.50	1.46	1.53
2	F	601	ATP	C2-N1	-2.44	1.29	1.33
2	C	601	ATP	C2-N1	-2.43	1.29	1.33
2	C	601	ATP	C2'-C3'	-2.41	1.46	1.53
2	D	601	ATP	C2-N1	-2.40	1.29	1.33
2	D	601	ATP	C2'-C3'	-2.38	1.46	1.53
2	C	601	ATP	C3'-C4'	-2.31	1.47	1.53
2	F	601	ATP	O4'-C1'	-2.31	1.37	1.41
2	D	601	ATP	C3'-C4'	-2.30	1.47	1.53
2	B	601	ATP	C3'-C4'	-2.23	1.47	1.53
2	B	601	ATP	C2-N1	-2.14	1.29	1.33
2	B	601	ATP	O4'-C4'	-2.11	1.40	1.45
2	F	601	ATP	C3'-C4'	-2.05	1.47	1.53
2	D	601	ATP	O5'-C5'	-2.03	1.37	1.44
2	C	601	ATP	O5'-C5'	-2.02	1.37	1.44
2	E	601	ATP	C3'-C4'	-2.01	1.47	1.53
2	A	601	ATP	C3'-C4'	-2.00	1.47	1.53

All (71) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	ATP	O4'-C1'-C2'	-10.13	92.11	106.93
2	F	601	ATP	O5'-PA-O1A	-6.53	83.54	109.07
2	B	601	ATP	O5'-PA-O1A	-5.82	86.33	109.07
2	D	601	ATP	O4'-C1'-C2'	-5.00	99.62	106.93
2	C	601	ATP	O4'-C1'-C2'	-4.96	99.67	106.93
2	F	601	ATP	O4'-C4'-C3'	-4.64	95.93	105.11
2	E	601	ATP	C4-C5-N7	-4.60	104.61	109.40
2	A	601	ATP	C4-C5-N7	-4.56	104.64	109.40
2	C	601	ATP	C4-C5-N7	-4.24	104.98	109.40
2	D	601	ATP	C4-C5-N7	-4.22	105.00	109.40
2	E	601	ATP	O4'-C4'-C3'	-4.22	96.77	105.11
2	F	601	ATP	C4-C5-N7	-4.19	105.03	109.40
2	A	601	ATP	O4'-C4'-C3'	-4.19	96.82	105.11
2	E	601	ATP	O5'-PA-O1A	-4.01	93.42	109.07
2	F	601	ATP	O4'-C1'-C2'	-3.88	101.25	106.93

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	ATP	O5'-C5'-C4'	3.80	122.05	108.99
2	E	601	ATP	O5'-C5'-C4'	3.78	122.00	108.99
2	C	601	ATP	C3'-C2'-C1'	3.78	106.66	100.98
2	D	601	ATP	C3'-C2'-C1'	3.76	106.64	100.98
2	A	601	ATP	O2G-PG-O3B	3.72	117.12	104.64
2	E	601	ATP	O3G-PG-O3B	3.71	117.07	104.64
2	D	601	ATP	N3-C2-N1	-3.43	123.31	128.68
2	B	601	ATP	N3-C2-N1	-3.40	123.36	128.68
2	C	601	ATP	N3-C2-N1	-3.40	123.36	128.68
2	F	601	ATP	O5'-C5'-C4'	3.39	120.65	108.99
2	F	601	ATP	N3-C2-N1	-3.31	123.50	128.68
2	E	601	ATP	O4'-C1'-C2'	-3.28	102.13	106.93
2	A	601	ATP	O4'-C1'-C2'	-3.27	102.15	106.93
2	F	601	ATP	O4'-C4'-C5'	3.17	119.81	109.37
2	B	601	ATP	O2G-PG-O3B	3.16	115.22	104.64
2	F	601	ATP	O2G-PG-O3B	3.15	115.21	104.64
2	C	601	ATP	O4'-C4'-C3'	-3.15	98.88	105.11
2	D	601	ATP	O4'-C4'-C3'	-3.13	98.92	105.11
2	A	601	ATP	N3-C2-N1	-3.12	123.80	128.68
2	E	601	ATP	N3-C2-N1	-3.09	123.84	128.68
2	A	601	ATP	O2A-PA-O5'	-3.08	93.45	107.75
2	B	601	ATP	O5'-C5'-C4'	2.93	119.08	108.99
2	A	601	ATP	O4'-C4'-C5'	2.81	118.61	109.37
2	E	601	ATP	O4'-C4'-C5'	2.81	118.61	109.37
2	F	601	ATP	O2'-C2'-C3'	-2.70	103.10	111.82
2	B	601	ATP	C5'-C4'-C3'	-2.60	105.43	115.18
2	A	601	ATP	O2'-C2'-C3'	-2.60	103.42	111.82
2	E	601	ATP	O2'-C2'-C3'	-2.58	103.47	111.82
2	F	601	ATP	PA-O3A-PB	-2.54	124.10	132.83
2	C	601	ATP	C2'-C3'-C4'	-2.50	97.79	102.64
2	D	601	ATP	C2'-C3'-C4'	-2.49	97.80	102.64
2	A	601	ATP	C2'-C3'-C4'	-2.49	97.80	102.64
2	E	601	ATP	C2'-C3'-C4'	-2.49	97.80	102.64
2	A	601	ATP	O3B-PG-O1G	-2.47	97.47	111.19
2	E	601	ATP	O3B-PG-O1G	-2.47	97.48	111.19
2	A	601	ATP	PA-O5'-C5'	-2.45	107.32	121.68
2	E	601	ATP	PA-O5'-C5'	-2.44	107.37	121.68
2	C	601	ATP	O2'-C2'-C3'	-2.43	103.96	111.82
2	C	601	ATP	O5'-C5'-C4'	2.42	117.33	108.99
2	D	601	ATP	O2'-C2'-C3'	-2.41	104.01	111.82
2	B	601	ATP	O2'-C2'-C1'	-2.41	101.96	110.85
2	D	601	ATP	O5'-C5'-C4'	2.39	117.20	108.99

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	ATP	PA-O3A-PB	-2.37	124.71	132.83
2	B	601	ATP	C2'-C3'-C4'	-2.36	98.06	102.64
2	D	601	ATP	O2B-PB-O1B	-2.34	100.70	112.24
2	C	601	ATP	O2B-PB-O1B	-2.33	100.74	112.24
2	F	601	ATP	C5'-C4'-C3'	-2.24	106.78	115.18
2	F	601	ATP	C2'-C3'-C4'	-2.24	98.29	102.64
2	A	601	ATP	PB-O3B-PG	2.16	140.25	132.83
2	E	601	ATP	PB-O3B-PG	2.14	140.16	132.83
2	F	601	ATP	O2G-PG-O1G	-2.12	102.38	110.68
2	B	601	ATP	O2G-PG-O1G	-2.11	102.43	110.68
2	B	601	ATP	C1'-N9-C4	2.04	130.23	126.64
2	B	601	ATP	C3'-C2'-C1'	2.04	104.05	100.98
2	F	601	ATP	C1'-N9-C4	2.02	130.19	126.64
2	F	601	ATP	O2A-PA-O1A	2.01	122.17	112.24

There are no chirality outliers.

All (41) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	ATP	PB-O3B-PG-O2G
2	B	601	ATP	C5'-O5'-PA-O1A
2	C	601	ATP	C5'-O5'-PA-O3A
2	D	601	ATP	C5'-O5'-PA-O3A
2	E	601	ATP	PB-O3B-PG-O3G
2	E	601	ATP	C5'-O5'-PA-O1A
2	F	601	ATP	C5'-O5'-PA-O1A
2	C	601	ATP	C3'-C4'-C5'-O5'
2	D	601	ATP	C3'-C4'-C5'-O5'
2	E	601	ATP	C3'-C4'-C5'-O5'
2	A	601	ATP	C3'-C4'-C5'-O5'
2	C	601	ATP	O4'-C4'-C5'-O5'
2	D	601	ATP	O4'-C4'-C5'-O5'
2	F	601	ATP	C3'-C4'-C5'-O5'
2	B	601	ATP	PB-O3A-PA-O1A
2	F	601	ATP	PB-O3A-PA-O1A
2	D	601	ATP	PB-O3A-PA-O5'
2	C	601	ATP	PB-O3B-PG-O1G
2	D	601	ATP	PB-O3B-PG-O1G
2	A	601	ATP	PB-O3A-PA-O1A
2	B	601	ATP	PB-O3A-PA-O2A
2	E	601	ATP	PB-O3A-PA-O2A
2	F	601	ATP	PB-O3A-PA-O2A

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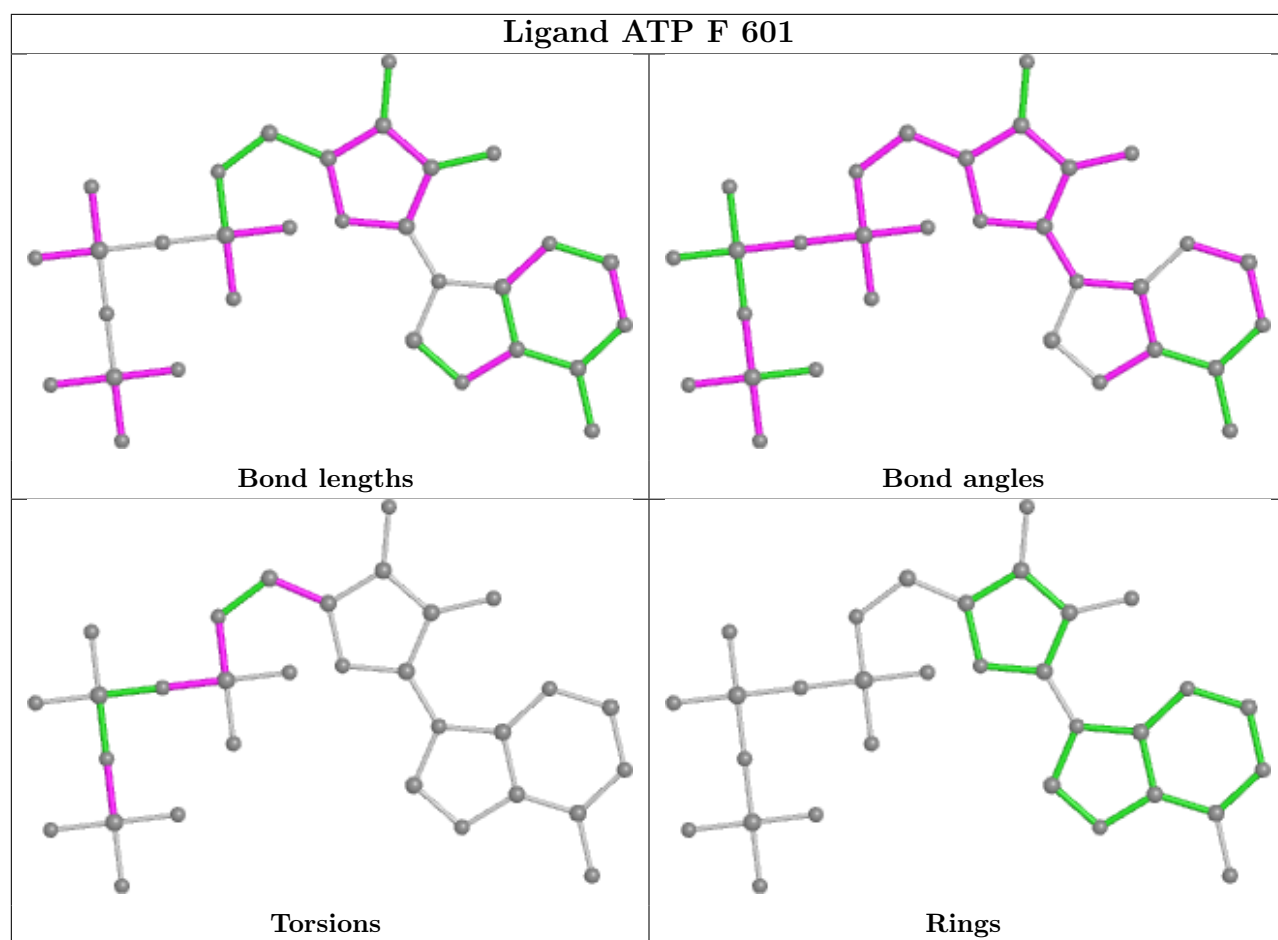
Mol	Chain	Res	Type	Atoms
2	A	601	ATP	PB-O3B-PG-O1G
2	E	601	ATP	PB-O3B-PG-O1G
2	C	601	ATP	PA-O3A-PB-O1B
2	D	601	ATP	PA-O3A-PB-O1B
2	C	601	ATP	PB-O3A-PA-O5'
2	B	601	ATP	PB-O3B-PG-O1G
2	F	601	ATP	PB-O3B-PG-O1G
2	B	601	ATP	PB-O3B-PG-O2G
2	B	601	ATP	PB-O3B-PG-O3G
2	C	601	ATP	PB-O3B-PG-O2G
2	C	601	ATP	PB-O3B-PG-O3G
2	D	601	ATP	PB-O3B-PG-O2G
2	D	601	ATP	PB-O3B-PG-O3G
2	F	601	ATP	PB-O3B-PG-O2G
2	F	601	ATP	PB-O3B-PG-O3G
2	A	601	ATP	O4'-C4'-C5'-O5'
2	E	601	ATP	O4'-C4'-C5'-O5'
2	E	601	ATP	PB-O3A-PA-O1A

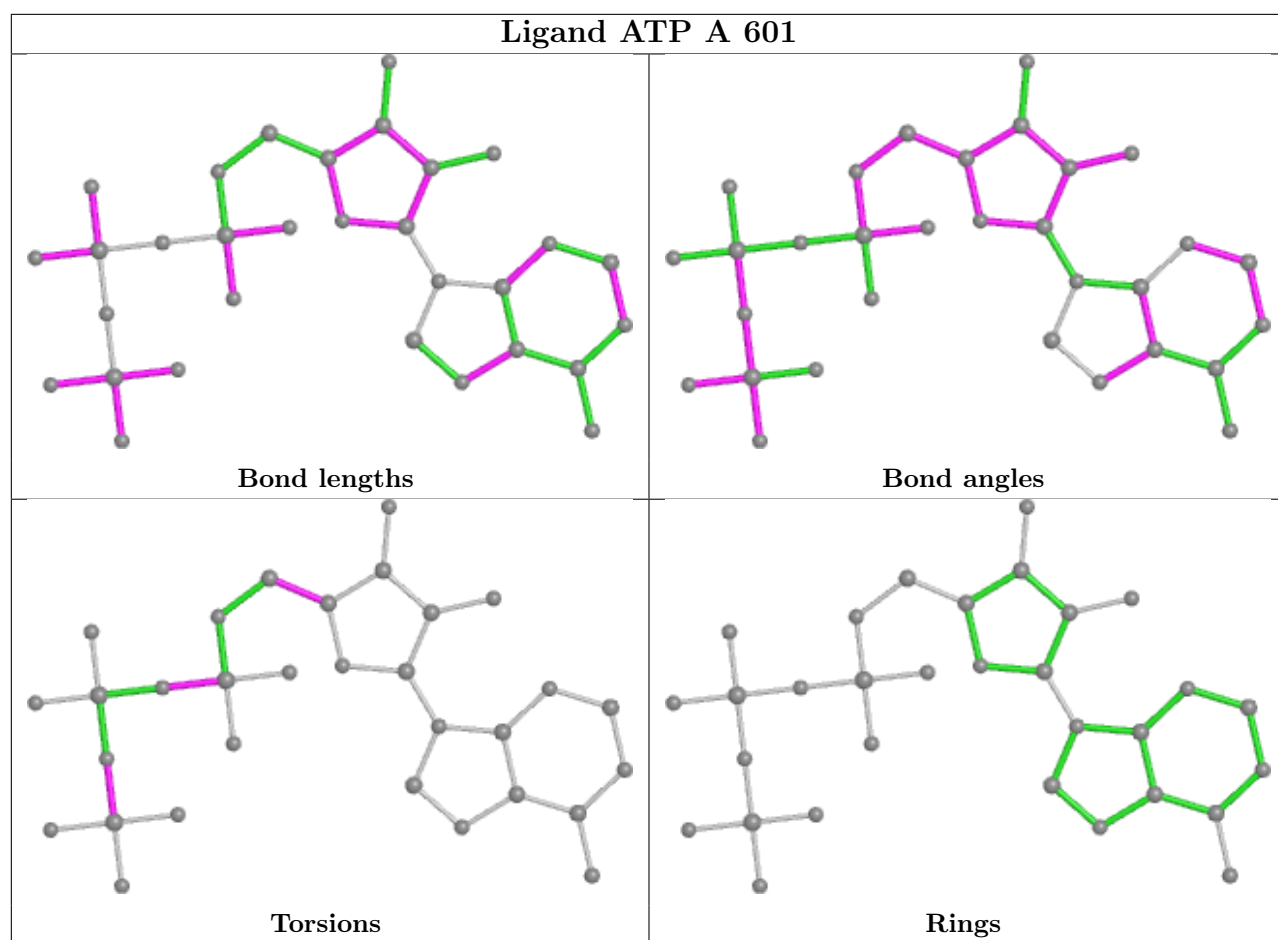
There are no ring outliers.

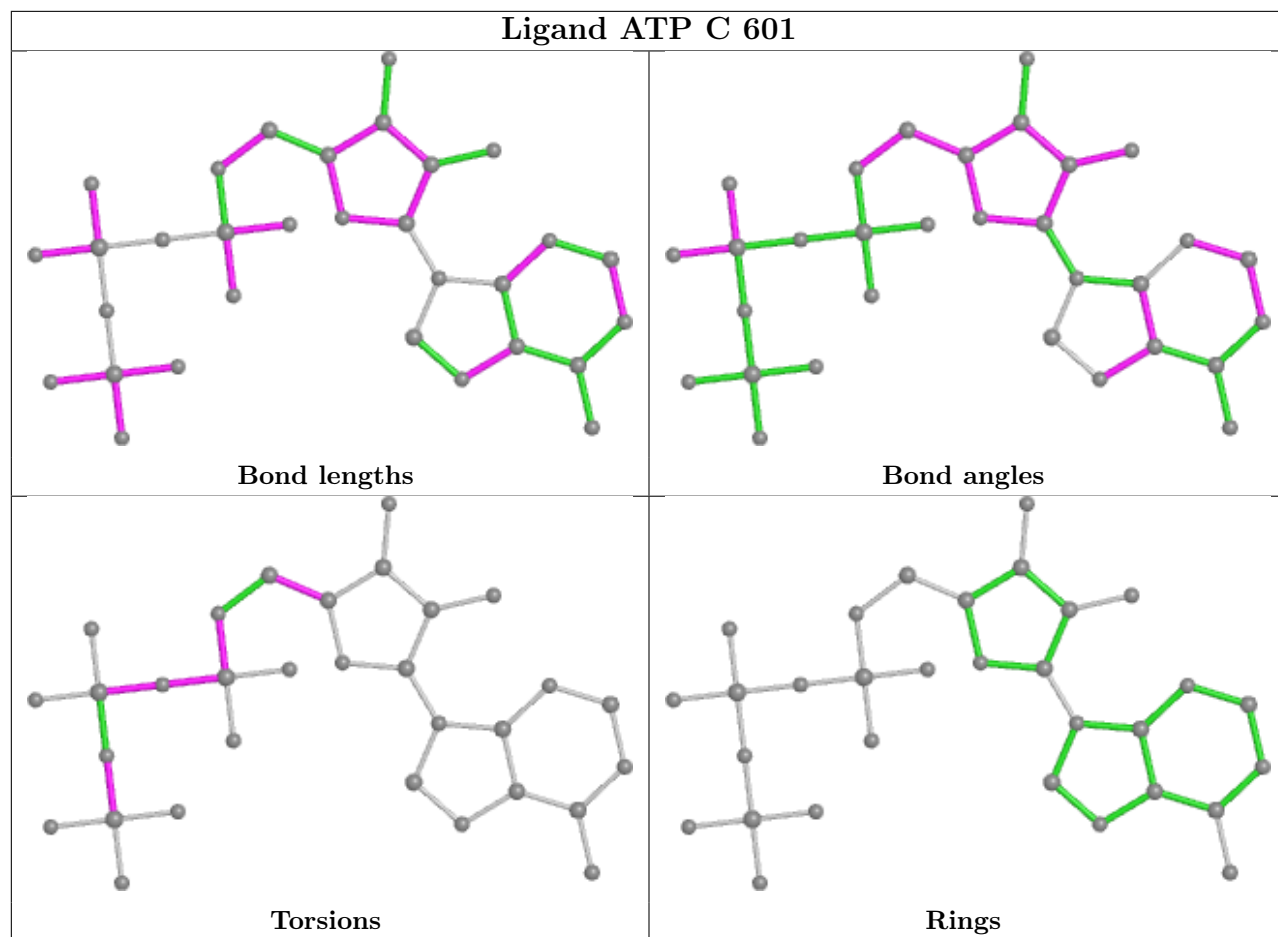
5 monomers are involved in 10 short contacts:

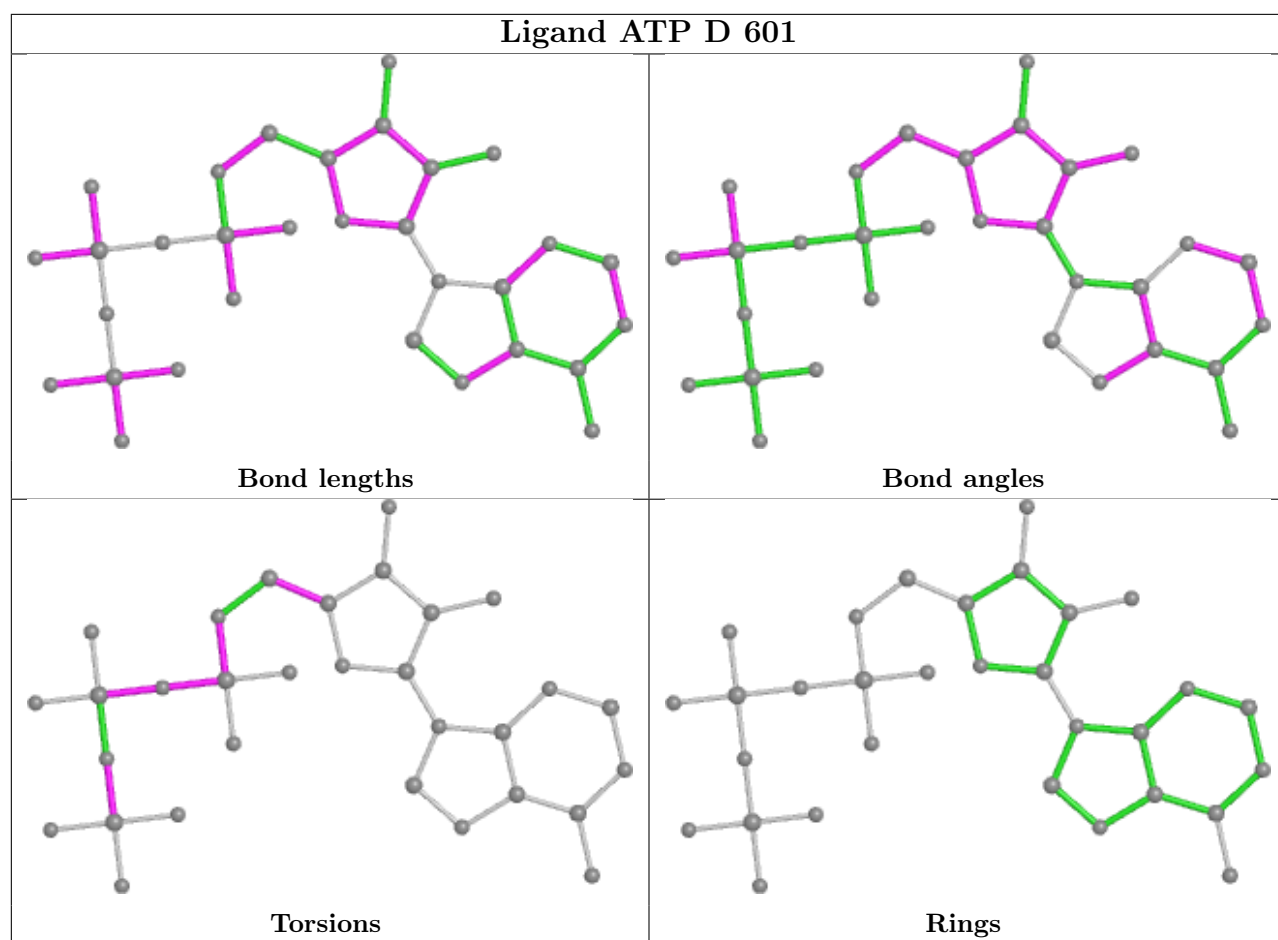
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	F	601	ATP	2	0
2	C	601	ATP	2	0
2	D	601	ATP	2	0
2	B	601	ATP	3	0
2	E	601	ATP	1	0

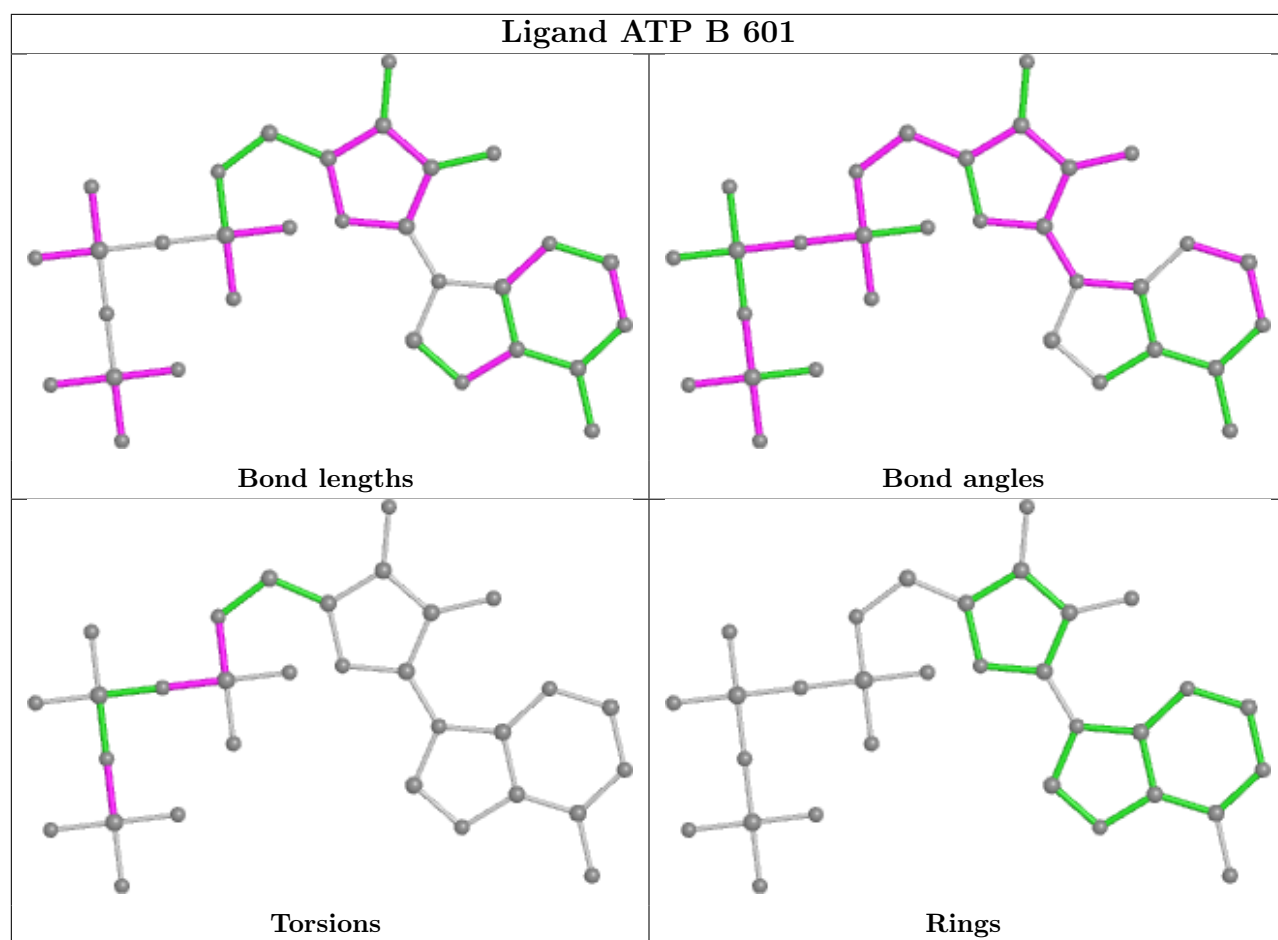
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

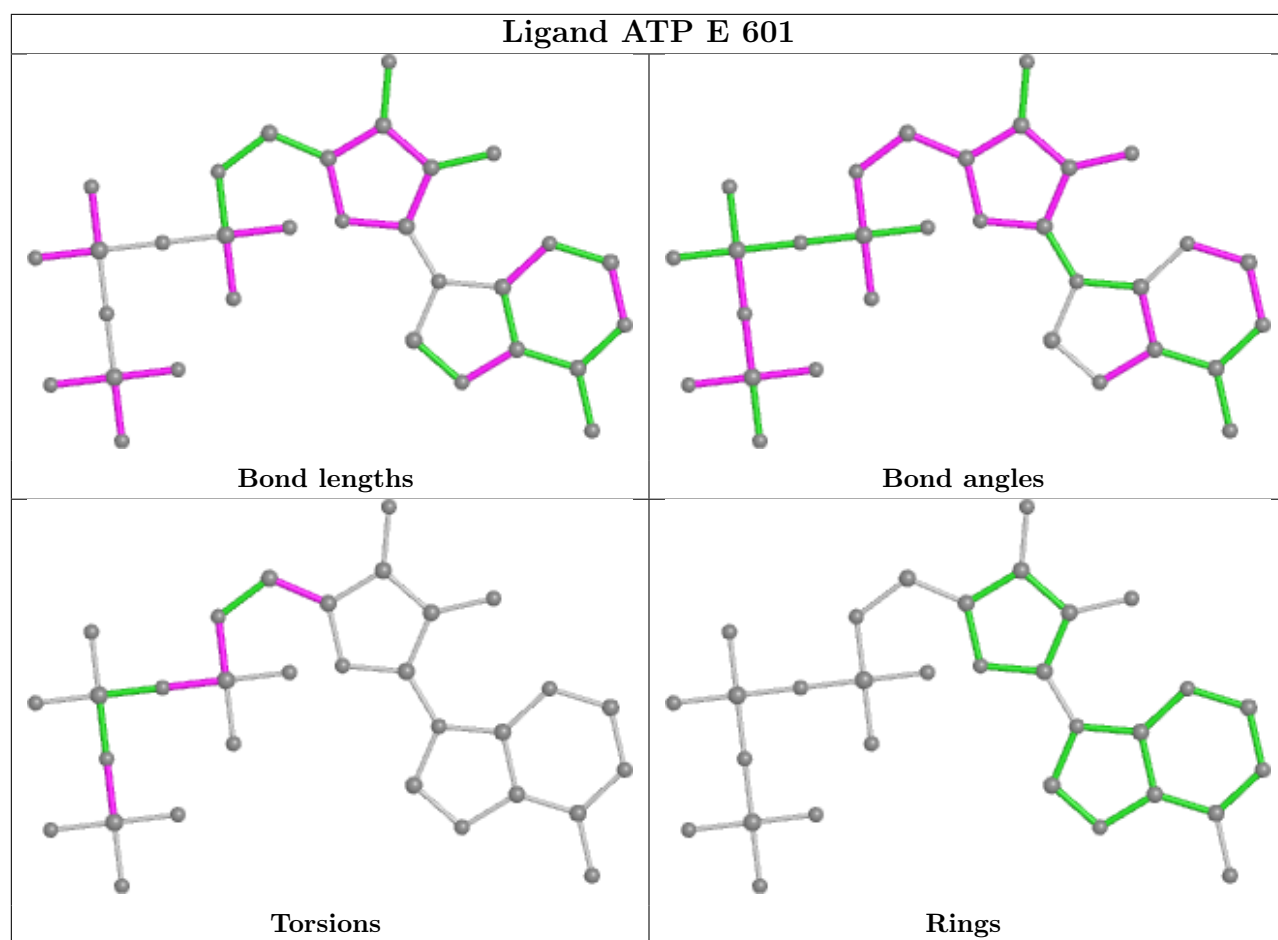












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.