



Full wwPDB EM Validation Report ⓘ

Dec 28, 2024 – 10:57 AM EST

PDB ID : 6Y00
EMDB ID : EMD-10862
Title : Cryo-EM structure of Tetrahymena thermophila mitochondrial ATP synthase
- F1/peripheral stalk
Authors : Kock Flygaard, R.; Muhleip, A.; Amunts, A.
Deposited on : 2020-04-14
Resolution : 2.90 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 : 2022.3.0, CSD as543be (2022)
MolProbity : 4.02b-467
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) : 2.40

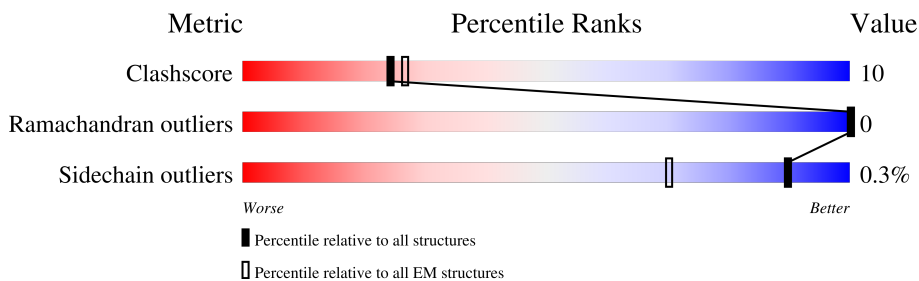
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.90 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	G1	219	66% 20% 14%
2	g1	299	30% 70%
3	A1	546	74% 20% 6%
3	B1	546	69% 25% 6%
3	C1	546	73% 21% 6%
4	D1	497	72% 22% 5%
4	E1	497	74% 21% 5%
4	F1	497	70% 25% 6%
5	i1	108	33% 67%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
6	s	145	 21% 79%
7	b	381	 54% 46%
8	d	234	 44% 56%

2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 55840 atoms, of which 28162 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 Oligomycin sensitivity-conferring protein (OSCP).

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	G1	188	3000	942	1515	252	287	4	0	0

- Molecule 2 is a protein called ATP synthase subunit gamma.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	g1	90	1420	419	743	123	128	7	0	0

- Molecule 3 is a protein called ATP synthase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
3	C1	513	7980	2481	4058	685	739	17	0	0
3	B1	511	7934	2469	4030	681	737	17	0	0
3	A1	512	7946	2472	4037	682	738	17	0	0

- Molecule 4 is a protein called ATP synthase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
4	D1	470	7135	2243	3581	612	688	11	0	0
4	F1	469	7112	2237	3567	610	687	11	0	0
4	E1	470	7135	2243	3581	612	688	11	0	0

- Molecule 5 is a protein called Inhibitor of F1 (IF1).

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
5	i1	36	638	197	320	58	62	1	0	0

- Molecule 6 is a protein called ATPTT13.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
6	s	31	486	152	245	42	45	2	0	0

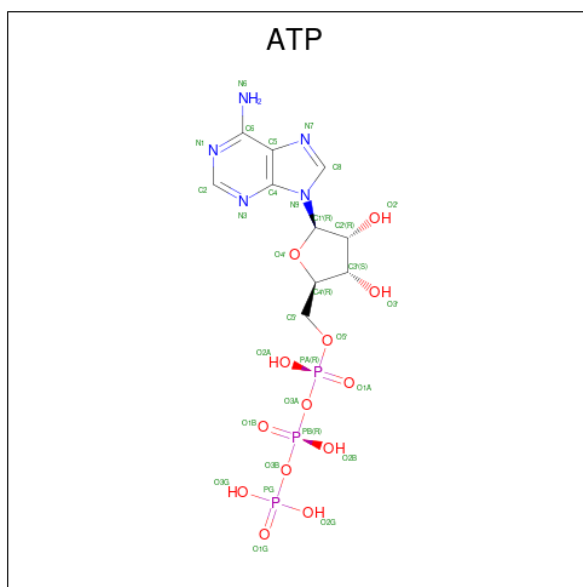
- Molecule 7 is a protein called subunit b.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
7	b	205	3227	999	1626	281	319	2	0	0

- Molecule 8 is a protein called subunit d.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
8	d	103	1615	508	799	135	172	1	0	0

- Molecule 9 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
9	C1	1	43	10	12	5	13	3	0

Continued on next page...

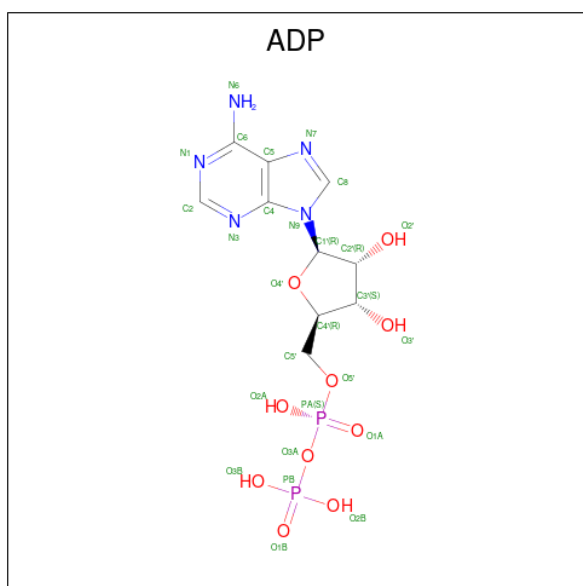
Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	
9	B1	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
9	A1	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	

- Molecule 10 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
10	C1	1	Total	Mg	0
			1	1	
10	D1	1	Total	Mg	0
			1	1	
10	B1	1	Total	Mg	0
			1	1	
10	A1	1	Total	Mg	0
			1	1	
10	E1	1	Total	Mg	0
			1	1	

- Molecule 11 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: C₁₀H₁₅N₅O₁₀P₂).



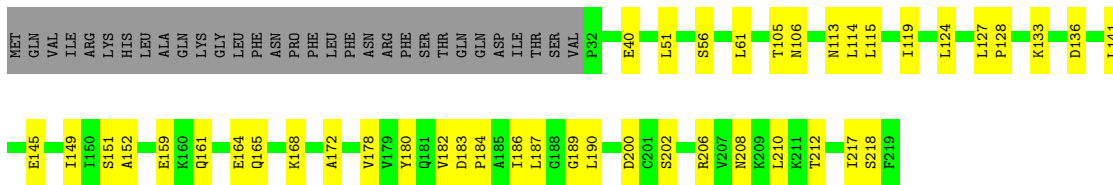
Mol	Chain	Residues	Atoms					AltConf	
11	D1	1	Total	C	H	N	O	P	0
			39	10	12	5	10	2	
11	E1	1	Total	C	H	N	O	P	0
			39	10	12	5	10	2	

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.

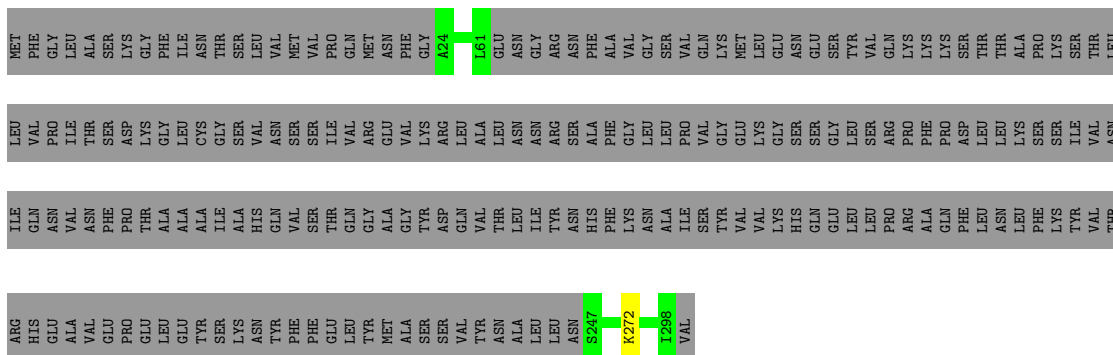
- Molecule 1: Oligomycin sensitivity-conferring protein (OSCP)

Chain G1: 



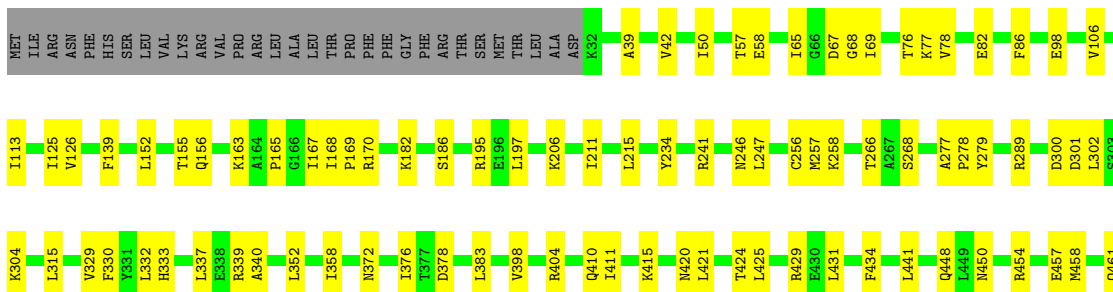
- Molecule 2: ATP synthase subunit gamma

Chain g1: 



- Molecule 3: ATP synthase subunit alpha

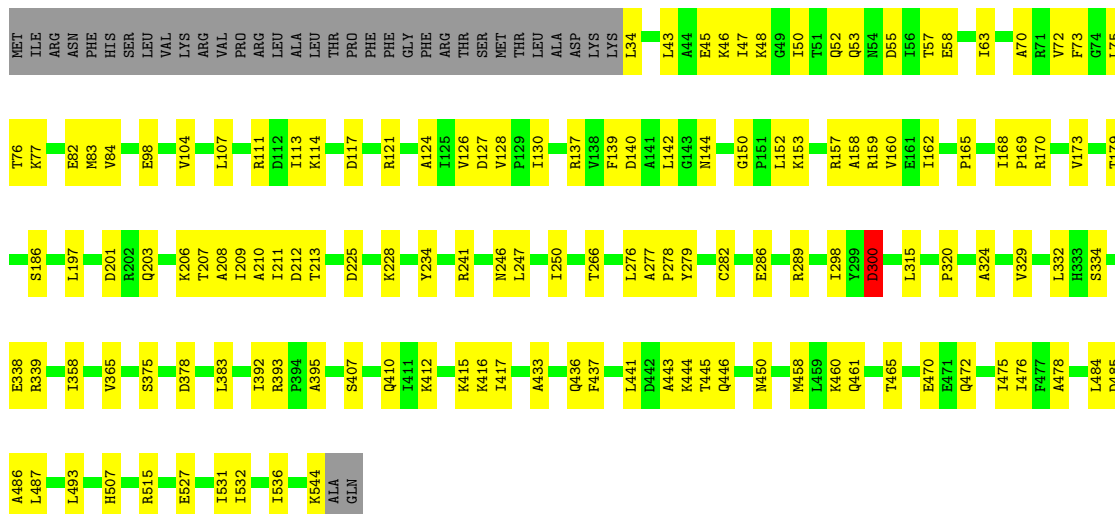
Chain C1: 





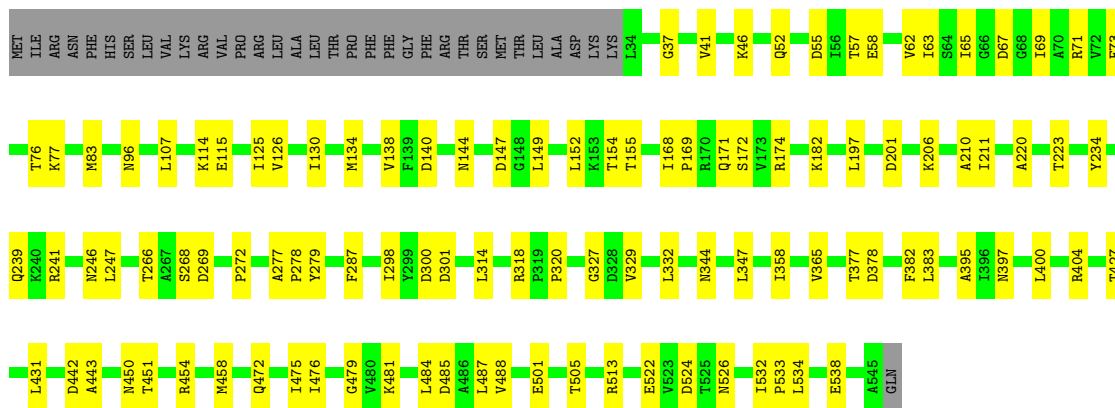
- Molecule 3: ATP synthase subunit alpha

Chain B1: 69% 25% 6%



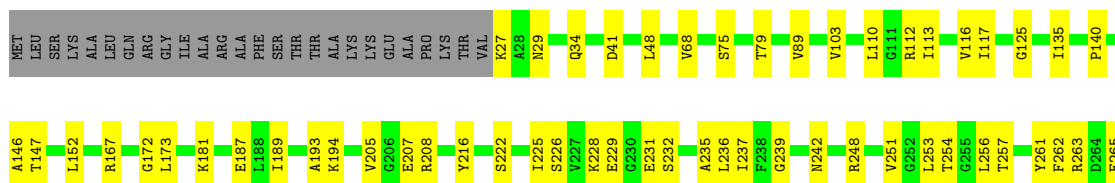
- Molecule 3: ATP synthase subunit alpha

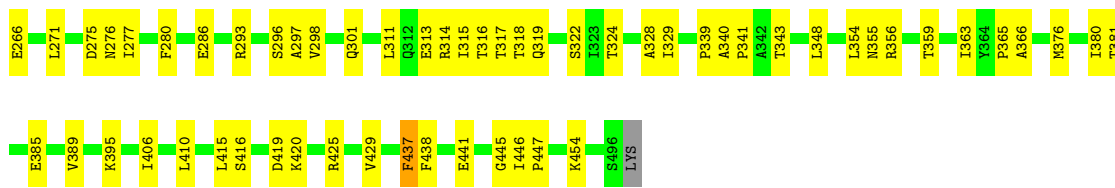
Chain A1: 74% 20% 6%



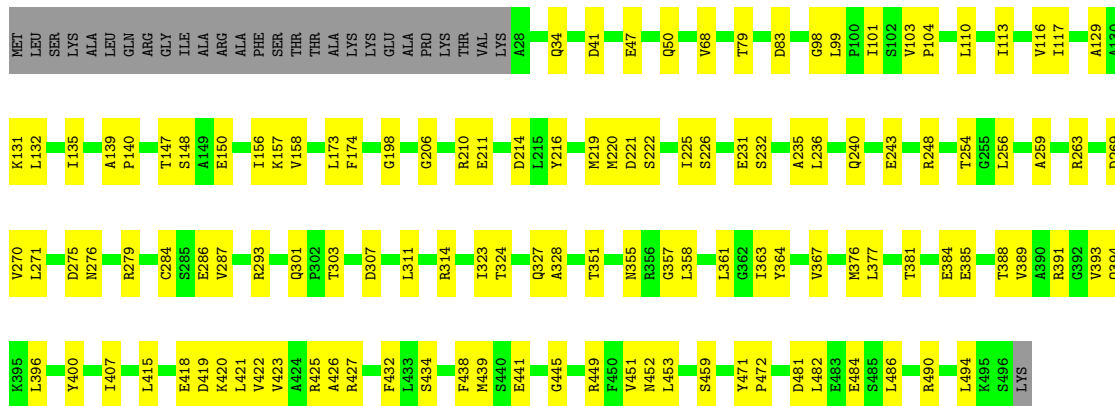
- Molecule 4: ATP synthase subunit beta

Chain D1: 72% 22% 5%

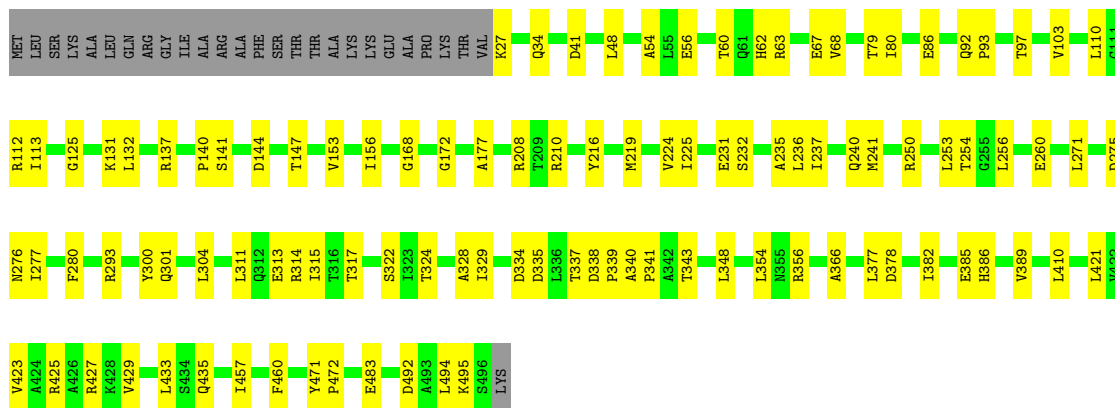




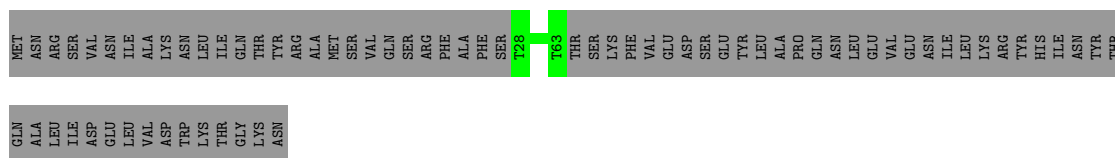
• Molecule 4: ATP synthase subunit beta



• Molecule 4: ATP synthase subunit beta



• Molecule 5: Inhibitor of F1 (IF1)



• Molecule 6: ATPPTT13

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	61157	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	30.9	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	165000	Depositor
Image detector	GATAN K2 QUANTUM (4k 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: ADP, ATP, MG

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	G1	0.30	0/1507	0.42	0/2027
2	g1	0.30	0/676	0.42	0/893
3	A1	0.38	0/3961	0.46	0/5346
3	B1	0.37	0/3956	0.45	0/5339
3	C1	0.38	0/3974	0.46	0/5361
4	D1	0.39	0/3613	0.46	0/4900
4	E1	0.39	0/3613	0.46	0/4900
4	F1	0.36	0/3604	0.45	0/4889
5	i1	0.32	0/321	0.44	0/425
6	s	0.25	0/243	0.41	0/326
7	b	0.25	0/1617	0.40	0/2178
8	d	0.26	0/828	0.41	0/1119
All	All	0.36	0/27913	0.45	0/37703

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
3	B1	0	1
4	D1	0	1
4	E1	0	1
4	F1	0	1
All	All	0	4

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	B1	300	ASP	Peptide
4	D1	275	ASP	Peptide
4	E1	275	ASP	Peptide
4	F1	364	TYR	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	G1	1485	1515	1515	36	0
2	g1	677	743	743	0	0
3	A1	3909	4037	4037	76	0
3	B1	3904	4030	4029	92	0
3	C1	3922	4058	4058	76	0
4	D1	3554	3581	3581	76	0
4	E1	3554	3581	3581	73	0
4	F1	3545	3567	3567	91	0
5	i1	318	320	320	0	0
6	s	241	245	245	0	0
7	b	1601	1626	1626	0	0
8	d	816	799	799	0	0
9	A1	31	12	12	1	0
9	B1	31	12	12	4	0
9	C1	31	12	12	0	0
10	A1	1	0	0	0	0
10	B1	1	0	0	0	0
10	C1	1	0	0	0	0
10	D1	1	0	0	0	0
10	E1	1	0	0	0	0
11	D1	27	12	12	1	0
11	E1	27	12	12	0	0
All	All	27678	28162	28161	495	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 (495) 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)
4:F1:256:LEU:HD22	4:F1:311:LEU:HD12	1.51	0.92
4:D1:205:VAL:HG12	4:D1:251:VAL:HG13	1.53	0.91
4:E1:137:ARG:NH1	4:E1:260:GLU:OE1	2.04	0.90
1:G1:40:GLU:OE1	1:G1:133:LYS:NZ	2.05	0.90
3:B1:210:ALA:HB1	3:B1:298:ILE:HD13	1.52	0.89
3:C1:234:TYR:OH	3:C1:300:ASP:OD2	1.92	0.86
4:D1:181:LYS:NZ	11:D1:900:ADP:O2B	2.09	0.86
3:B1:234:TYR:OH	3:B1:300:ASP:OD2	1.96	0.84
3:C1:454:ARG:NH2	3:C1:487:LEU:O	2.13	0.82
3:B1:159:ARG:NH2	4:E1:86:GLU:OE1	2.13	0.81
4:E1:483:GLU:N	4:E1:483:GLU:OE2	2.14	0.81
3:A1:114:LYS:NZ	4:E1:48:LEU:O	2.15	0.80
4:E1:177:ALA:O	4:E1:356:ARG:NH2	2.15	0.80
4:D1:415:LEU:O	4:D1:420:LYS:NZ	2.16	0.79
3:C1:39:ALA:HB3	3:C1:42:VAL:HG12	1.65	0.78
3:C1:487:LEU:HD21	3:C1:536:ILE:HG23	1.65	0.78
4:F1:415:LEU:O	4:F1:420:LYS:NZ	2.17	0.77
4:D1:27:LYS:NZ	4:D1:29:ASN:OD1	2.15	0.76
4:D1:248:ARG:NH2	4:D1:286:GLU:OE1	2.20	0.74
3:B1:77:LYS:O	3:B1:121:ARG:NH1	2.21	0.74
3:B1:207:THR:N	9:B1:900:ATP:O2B	2.20	0.74
4:F1:355:ASN:HB3	4:F1:358:LEU:HD23	1.69	0.74
3:B1:82:GLU:OE2	3:B1:124:ALA:N	2.20	0.74
1:G1:164:GLU:OE2	1:G1:180:TYR:OH	2.07	0.73
4:D1:48:LEU:HD21	4:D1:75:SER:HA	1.70	0.73
1:G1:168:LYS:O	1:G1:172:ALA:N	2.23	0.71
3:C1:517:SER:OG	3:C1:519:ASP:OD1	2.06	0.71
3:A1:171:GLN:OE1	3:A1:174:ARG:NH2	2.22	0.71
4:D1:385:GLU:O	4:D1:389:VAL:HG23	1.90	0.71
4:F1:150:GLU:N	4:F1:150:GLU:OE1	2.23	0.71
3:A1:210:ALA:HB1	3:A1:298:ILE:HD13	1.71	0.71
3:C1:289:ARG:NH1	3:C1:339:ARG:O	2.24	0.70
3:B1:170:ARG:NH2	3:B1:338:GLU:O	2.24	0.70
4:F1:206:GLY:O	4:F1:279:ARG:NE	2.24	0.70
3:C1:156:GLN:N	3:C1:156:GLN:OE1	2.25	0.70
3:C1:241:ARG:NH1	4:D1:140:PRO:O	2.23	0.70
3:B1:165:PRO:O	3:B1:170:ARG:NH1	2.24	0.70
3:A1:522:GLU:O	3:A1:526:ASN:ND2	2.24	0.70
4:E1:317:THR:HG23	4:E1:322:SER:HA	1.75	0.69
3:B1:407:SER:OG	3:B1:415:LYS:NZ	2.19	0.69
3:B1:289:ARG:NH1	3:B1:339:ARG:O	2.26	0.69
4:E1:231:GLU:O	4:E1:232:SER:OG	2.10	0.68

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A1:454:ARG:NH2	3:A1:487:LEU:O	2.26	0.68
4:F1:275:ASP:OD2	4:F1:279:ARG:NH2	2.26	0.68
4:F1:256:LEU:HD21	4:F1:314:ARG:HB2	1.76	0.67
4:D1:68:VAL:HA	4:D1:79:THR:HG22	1.77	0.67
4:E1:54:ALA:O	4:E1:97:THR:OG1	2.10	0.67
3:B1:139:PHE:HE1	3:B1:152:LEU:HD13	1.60	0.67
3:A1:378:ASP:O	3:A1:404:ARG:NH1	2.28	0.67
3:C1:195:ARG:NH1	3:C1:376:ILE:O	2.29	0.66
4:D1:253:LEU:HD23	4:D1:311:LEU:HD13	1.75	0.66
3:B1:375:SER:O	4:E1:208:ARG:NH2	2.28	0.66
4:F1:481:ASP:OD1	4:F1:482:LEU:N	2.28	0.66
4:F1:231:GLU:O	4:F1:232:SER:OG	2.12	0.66
4:E1:335:ASP:OD1	4:E1:337:THR:OG1	2.09	0.66
1:G1:152:ALA:HB2	1:G1:186:ILE:O	1.95	0.65
4:D1:416:SER:OG	4:D1:419:ASP:OD1	2.14	0.64
3:B1:208:ALA:N	9:B1:900:ATP:O2A	2.30	0.64
4:F1:452:ASN:OD1	4:F1:453:LEU:N	2.30	0.64
4:E1:382:ILE:HD12	4:E1:386:HIS:ND1	2.13	0.64
1:G1:105:THR:HG22	1:G1:106:ASN:H	1.63	0.64
3:B1:378:ASP:OD2	4:E1:210:ARG:NE	2.30	0.64
4:E1:253:LEU:HD23	4:E1:311:LEU:HD13	1.77	0.64
3:B1:57:THR:HG23	3:B1:58:GLU:HG2	1.80	0.63
4:F1:389:VAL:O	4:F1:393:VAL:HG23	1.98	0.63
3:C1:67:ASP:OD1	4:D1:293:ARG:NH2	2.30	0.63
3:C1:68:GLY:O	3:C1:106:VAL:HG12	1.99	0.63
3:B1:446:GLN:O	3:B1:450:ASN:ND2	2.30	0.63
4:F1:210:ARG:NH2	4:F1:211:GLU:OE2	2.31	0.63
4:F1:363:ILE:HG23	4:F1:434:SER:HB3	1.80	0.63
4:F1:68:VAL:HA	4:F1:79:THR:HG22	1.81	0.63
3:C1:139:PHE:HE1	3:C1:152:LEU:HD22	1.63	0.63
1:G1:164:GLU:OE1	1:G1:178:VAL:HG21	1.98	0.63
4:F1:376:MET:HG3	4:F1:381:THR:HG21	1.80	0.62
3:A1:182:LYS:NZ	3:A1:458:MET:O	2.28	0.62
4:E1:334:ASP:OD2	4:E1:356:ARG:NH1	2.32	0.62
4:D1:205:VAL:CG1	4:D1:251:VAL:HG13	2.29	0.62
3:B1:279:TYR:OH	3:B1:332:LEU:HD12	2.00	0.62
3:B1:162:ILE:HD11	3:B1:286:GLU:OE1	2.01	0.61
3:A1:206:LYS:NZ	9:A1:900:ATP:O2B	2.27	0.61
4:D1:339:PRO:O	4:D1:343:THR:HG23	2.00	0.61
4:E1:112:ARG:NH2	4:E1:125:GLY:O	2.28	0.60
4:D1:152:LEU:HD13	4:D1:167:ARG:HG2	1.83	0.60

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E1:377:LEU:HD12	4:E1:382:ILE:HD11	1.83	0.60
3:C1:186:SER:O	3:C1:410:GLN:NE2	2.35	0.59
4:D1:231:GLU:O	4:D1:232:SER:OG	2.11	0.59
3:B1:127:ASP:OD1	3:B1:157:ARG:NH1	2.35	0.59
3:C1:241:ARG:HG2	3:C1:266:THR:HG21	1.85	0.59
4:D1:112:ARG:NH2	4:D1:125:GLY:O	2.34	0.59
3:B1:107:LEU:HD13	3:B1:142:LEU:HD21	1.85	0.59
4:E1:68:VAL:HA	4:E1:79:THR:HG22	1.83	0.59
4:F1:98:GLY:C	4:F1:99:LEU:HD12	2.23	0.59
4:E1:225:ILE:HA	4:E1:232:SER:HA	1.83	0.59
3:A1:201:ASP:O	3:A1:206:LYS:NZ	2.36	0.58
3:C1:279:TYR:OH	3:C1:332:LEU:HD12	2.03	0.58
3:C1:139:PHE:CE1	3:C1:152:LEU:HD22	2.38	0.58
4:E1:300:TYR:OH	4:E1:338:ASP:OD2	2.16	0.58
3:B1:279:TYR:OH	3:B1:332:LEU:O	2.21	0.58
3:B1:186:SER:O	3:B1:410:GLN:NE2	2.37	0.58
3:A1:487:LEU:H	3:A1:487:LEU:HD23	1.69	0.57
4:E1:235:ALA:C	4:E1:236:LEU:HD12	2.24	0.57
4:D1:454:LYS:H	4:D1:454:LYS:HD2	1.70	0.57
3:A1:211:ILE:HD11	3:A1:247:LEU:HD11	1.87	0.57
4:F1:174:PHE:HE2	4:F1:351:THR:HG1	1.53	0.57
4:F1:441:GLU:O	4:F1:445:GLY:N	2.36	0.57
3:C1:257:MET:O	3:C1:258:LYS:HG2	2.05	0.56
3:C1:501:GLU:O	3:C1:505:THR:HG23	2.04	0.56
3:B1:140:ASP:OD1	3:B1:144:ASN:N	2.36	0.56
3:B1:63:ILE:HD11	3:B1:73:PHE:HB2	1.86	0.56
3:A1:67:ASP:OD2	4:E1:293:ARG:NH2	2.38	0.56
4:E1:172:GLY:HA3	4:E1:348:LEU:HD13	1.87	0.56
1:G1:151:SER:O	1:G1:182:VAL:HG12	2.05	0.56
3:B1:209:ILE:O	3:B1:213:THR:HG23	2.05	0.56
3:B1:470:GLU:OE2	3:B1:515:ARG:NH2	2.38	0.56
4:F1:301:GLN:OE1	4:F1:301:GLN:N	2.30	0.56
3:B1:461:GLN:NE2	3:B1:465:THR:O	2.37	0.56
4:F1:421:LEU:HD21	4:F1:425:ARG:NH1	2.21	0.56
3:A1:138:VAL:N	3:A1:147:ASP:OD2	2.36	0.56
4:D1:256:LEU:HD13	4:D1:315:ILE:HG12	1.86	0.55
3:A1:513:ARG:NH1	3:A1:524:ASP:OD1	2.36	0.55
4:E1:34:GLN:NE2	4:E1:41:ASP:OD2	2.37	0.55
3:B1:179:THR:HB	3:B1:213:THR:HG22	1.88	0.55
4:D1:239:GLY:HA3	4:D1:251:VAL:HG11	1.89	0.55
3:C1:86:PHE:HB3	3:C1:113:ILE:HG21	1.87	0.55

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F1:103:VAL:HG11	4:F1:254:THR:HG23	1.86	0.55
3:A1:58:GLU:OE2	3:A1:76:THR:N	2.40	0.55
4:D1:376:MET:HG3	4:D1:381:THR:HG21	1.89	0.55
4:F1:135:ILE:HD12	4:F1:254:THR:HA	1.86	0.55
4:F1:385:GLU:O	4:F1:389:VAL:HG23	2.06	0.55
4:D1:205:VAL:HG12	4:D1:251:VAL:CG1	2.32	0.55
4:E1:67:GLU:OE2	4:E1:250:ARG:NH1	2.40	0.55
4:D1:406:ILE:HD11	4:D1:410:LEU:HD12	1.87	0.54
3:B1:441:LEU:HD13	3:B1:445:THR:HG21	1.88	0.54
3:B1:486:ALA:O	3:B1:544:LYS:N	2.33	0.54
3:A1:246:ASN:OD1	4:E1:147:THR:HG22	2.06	0.54
4:D1:441:GLU:O	4:D1:445:GLY:N	2.38	0.54
3:B1:485:ASP:OD1	3:B1:486:ALA:N	2.41	0.54
4:D1:235:ALA:C	4:D1:236:LEU:HD12	2.28	0.54
3:B1:52:GLN:HG2	3:B1:53:GLN:H	1.73	0.54
4:F1:235:ALA:C	4:F1:236:LEU:HD12	2.28	0.54
4:F1:303:THR:OG1	4:F1:307:ASP:OD2	2.18	0.54
3:B1:139:PHE:CE1	3:B1:152:LEU:HD13	2.42	0.54
3:A1:206:LYS:HG2	3:A1:383:LEU:HD12	1.89	0.54
3:C1:163:LYS:NZ	4:F1:83:ASP:OD2	2.26	0.54
4:D1:266:GLU:N	4:D1:266:GLU:OE1	2.41	0.54
3:A1:239:GLN:NE2	3:A1:300:ASP:OD2	2.41	0.54
4:E1:236:LEU:O	4:E1:237:ILE:HD13	2.08	0.53
3:C1:532:ILE:HB	3:C1:533:PRO:HD3	1.90	0.53
4:D1:256:LEU:HD21	4:D1:314:ARG:HB2	1.90	0.53
4:F1:219:MET:O	4:F1:220:MET:HB2	2.08	0.53
4:F1:400:TYR:HE1	4:F1:423:VAL:HG13	1.74	0.53
3:A1:241:ARG:HG2	3:A1:266:THR:HG21	1.91	0.53
1:G1:56:SER:HB2	1:G1:61:LEU:HD11	1.89	0.53
3:B1:34:LEU:HD12	3:B1:34:LEU:O	2.09	0.53
3:B1:527:GLU:O	3:B1:531:ILE:HG22	2.09	0.53
1:G1:141:LEU:O	1:G1:141:LEU:HD13	2.08	0.53
4:E1:80:ILE:N	4:E1:80:ILE:HD12	2.24	0.53
4:E1:110:LEU:HB3	4:E1:232:SER:O	2.09	0.53
1:G1:182:VAL:HG23	1:G1:182:VAL:O	2.09	0.52
3:B1:392:ILE:HG22	3:B1:392:ILE:O	2.09	0.52
4:D1:236:LEU:O	4:D1:237:ILE:HD13	2.09	0.52
3:C1:302:LEU:HD13	3:C1:302:LEU:O	2.09	0.52
3:B1:159:ARG:NH1	3:B1:162:ILE:HG22	2.24	0.52
4:E1:156:ILE:HA	4:E1:435:GLN:OE1	2.09	0.52
4:D1:208:ARG:NH2	3:A1:377:THR:O	2.42	0.52

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D1:317:THR:HG23	4:D1:322:SER:HA	1.92	0.52
4:D1:172:GLY:HA3	4:D1:348:LEU:HD13	1.91	0.52
4:F1:449:ARG:NH2	4:F1:484:GLU:OE2	2.43	0.52
3:C1:543:LEU:N	3:C1:543:LEU:HD23	2.25	0.52
3:C1:69:ILE:HD12	3:C1:315:LEU:CB	2.40	0.52
4:D1:189:ILE:O	4:D1:193:ALA:HB3	2.11	0.51
4:F1:376:MET:CG	4:F1:381:THR:HG21	2.39	0.51
3:C1:206:LYS:HG2	3:C1:383:LEU:HD12	1.91	0.51
3:A1:532:ILE:HB	3:A1:533:PRO:HD3	1.91	0.51
3:C1:481:LYS:HE2	3:C1:481:LYS:HA	1.93	0.51
3:A1:241:ARG:CG	3:A1:266:THR:HG21	2.40	0.51
3:C1:113:ILE:HD12	3:C1:113:ILE:O	2.10	0.51
3:A1:266:THR:N	3:A1:269:ASP:OD2	2.43	0.51
4:D1:298:VAL:HG12	4:D1:298:VAL:O	2.11	0.51
3:B1:50:ILE:HD12	3:B1:50:ILE:O	2.11	0.51
4:D1:89:VAL:CG2	3:A1:77:LYS:HA	2.41	0.51
3:B1:383:LEU:HA	3:B1:395:ALA:O	2.11	0.50
3:B1:211:ILE:HD11	3:B1:247:LEU:HD11	1.93	0.50
3:A1:220:ALA:O	3:A1:223:THR:O	2.29	0.50
4:E1:113:ILE:HD11	4:E1:216:TYR:CD1	2.47	0.50
4:E1:271:LEU:HD23	4:E1:324:THR:HB	1.93	0.50
1:G1:183:ASP:N	1:G1:184:PRO:HD3	2.27	0.50
3:C1:65:ILE:HD13	3:C1:113:ILE:CD1	2.42	0.50
4:F1:34:GLN:HG2	4:F1:41:ASP:HB2	1.93	0.50
3:A1:37:GLY:O	3:A1:41:VAL:HG23	2.12	0.50
3:C1:98:GLU:HA	4:F1:34:GLN:HB2	1.92	0.50
3:C1:50:ILE:HG23	3:C1:50:ILE:O	2.11	0.50
1:G1:217:ILE:O	1:G1:218:SER:OG	2.22	0.49
4:E1:27:LYS:HD3	4:E1:27:LYS:O	2.12	0.49
4:E1:301:GLN:OE1	4:E1:301:GLN:N	2.31	0.49
4:E1:329:ILE:HD12	4:E1:329:ILE:N	2.27	0.49
3:B1:114:LYS:NZ	4:F1:47:GLU:OE2	2.40	0.49
3:A1:83:MET:SD	3:A1:126:VAL:HG12	2.52	0.49
3:C1:165:PRO:O	3:C1:170:ARG:NH1	2.45	0.49
3:C1:211:ILE:HD11	3:C1:247:LEU:HD21	1.94	0.49
4:F1:275:ASP:O	4:F1:276:ASN:C	2.51	0.49
3:B1:416:LYS:H	3:B1:416:LYS:HD2	1.77	0.49
3:B1:433:ALA:O	3:B1:436:GLN:NE2	2.44	0.49
4:F1:225:ILE:HA	4:F1:232:SER:HA	1.94	0.49
4:F1:256:LEU:HD22	4:F1:311:LEU:CD1	2.34	0.49
4:F1:259:ALA:HB1	4:F1:270:VAL:HG11	1.94	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F1:400:TYR:CE1	4:F1:423:VAL:HG13	2.48	0.49
1:G1:184:PRO:HB2	1:G1:186:ILE:HG12	1.94	0.48
3:B1:111:ARG:O	4:F1:50:GLN:NE2	2.38	0.48
1:G1:51:LEU:HD22	1:G1:114:LEU:HD22	1.95	0.48
3:B1:197:LEU:HD11	3:B1:358:ILE:CG1	2.43	0.48
4:F1:256:LEU:HD21	4:F1:314:ARG:CB	2.43	0.48
3:A1:134:MET:SD	3:A1:152:LEU:HD21	2.53	0.48
1:G1:113:ASN:N	1:G1:113:ASN:HD22	2.12	0.48
1:G1:149:ILE:CG2	1:G1:190:LEU:HD12	2.44	0.48
3:B1:50:ILE:HD12	3:B1:52:GLN:H	1.79	0.48
4:E1:256:LEU:HD21	4:E1:314:ARG:HB2	1.94	0.48
1:G1:149:ILE:HD12	1:G1:149:ILE:N	2.29	0.48
4:D1:116:VAL:HG23	4:D1:251:VAL:HA	1.95	0.48
3:A1:314:LEU:HD21	3:A1:320:PRO:HB3	1.95	0.48
4:E1:276:ASN:HA	4:E1:328:ALA:O	2.13	0.48
4:D1:356:ARG:O	4:D1:359:THR:OG1	2.25	0.48
3:B1:76:THR:HG22	3:B1:77:LYS:N	2.28	0.48
3:B1:173:VAL:O	3:B1:173:VAL:HG23	2.14	0.48
3:B1:392:ILE:HA	3:B1:460:LYS:HD3	1.96	0.48
4:F1:421:LEU:C	4:F1:421:LEU:HD23	2.34	0.48
3:C1:490:SER:O	3:C1:494:LYS:NZ	2.47	0.48
3:B1:412:LYS:HA	3:B1:415:LYS:HD3	1.96	0.48
1:G1:119:ILE:CD1	1:G1:124:LEU:HD22	2.44	0.47
4:F1:198:GLY:HA3	4:F1:269:ASP:O	2.14	0.47
1:G1:127:LEU:N	1:G1:128:PRO:HD2	2.30	0.47
3:C1:197:LEU:HD11	3:C1:358:ILE:CG1	2.44	0.47
4:D1:226:SER:H	4:D1:232:SER:HB3	1.79	0.47
4:F1:103:VAL:CG1	4:F1:135:ILE:HD11	2.44	0.47
1:G1:189:GLY:HA3	1:G1:202:SER:HA	1.96	0.47
3:C1:69:ILE:HD12	3:C1:315:LEU:HB3	1.96	0.47
3:C1:329:VAL:O	3:C1:332:LEU:HB3	2.14	0.47
3:B1:153:LYS:HG3	3:B1:153:LYS:O	2.15	0.47
3:A1:241:ARG:NH1	4:E1:140:PRO:O	2.46	0.47
4:F1:418:GLU:O	4:F1:422:VAL:HG23	2.14	0.47
3:A1:365:VAL:HG11	3:A1:382:PHE:HE2	1.79	0.47
3:C1:182:LYS:NZ	3:C1:458:MET:O	2.37	0.47
3:B1:83:MET:HE2	3:B1:126:VAL:HG23	1.97	0.47
4:F1:243:GLU:O	4:F1:248:ARG:NH1	2.48	0.47
4:E1:492:ASP:O	4:E1:495:LYS:HG2	2.15	0.47
4:D1:263:ARG:NH1	4:D1:316:THR:O	2.48	0.47
3:B1:407:SER:HG	3:B1:415:LYS:HZ2	1.54	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A1:197:LEU:HD11	3:A1:358:ILE:CG1	2.44	0.47
4:E1:240:GLN:OE1	4:E1:240:GLN:HA	2.15	0.47
3:A1:63:ILE:N	3:A1:71:ARG:O	2.46	0.47
4:F1:377:LEU:HD23	4:F1:377:LEU:O	2.15	0.47
3:A1:62:VAL:HG23	3:A1:62:VAL:O	2.15	0.47
4:E1:304:LEU:HD23	4:E1:304:LEU:C	2.35	0.47
1:G1:151:SER:HB2	1:G1:190:LEU:HD13	1.97	0.46
3:C1:491:GLU:OE2	3:C1:542:LYS:N	2.47	0.46
3:A1:279:TYR:OH	3:A1:332:LEU:HD12	2.15	0.46
1:G1:217:ILE:HG23	3:A1:46:LYS:HD2	1.98	0.46
3:A1:277:ALA:HB3	3:A1:278:PRO:HD3	1.96	0.46
3:C1:58:GLU:HG2	3:C1:58:GLU:O	2.15	0.46
4:F1:391:ARG:NH1	4:F1:394:GLN:OE1	2.49	0.46
3:A1:130:ILE:HD12	3:A1:287:PHE:HB2	1.98	0.46
3:C1:211:ILE:CD1	3:C1:247:LEU:HD21	2.46	0.46
3:C1:340:ALA:HB1	3:C1:352:LEU:O	2.15	0.46
3:B1:45:GLU:HA	3:B1:48:LYS:HE2	1.97	0.46
4:F1:419:ASP:O	4:F1:423:VAL:HG23	2.15	0.46
3:A1:458:MET:SD	3:A1:475:ILE:HG22	2.55	0.46
4:E1:103:VAL:HG11	4:E1:254:THR:HG23	1.96	0.46
3:C1:215:LEU:HA	3:C1:256:CYS:SG	2.56	0.46
3:B1:478:ALA:HB2	3:B1:532:ILE:HD13	1.98	0.46
3:A1:479:GLY:HA2	3:A1:484:LEU:HD12	1.98	0.46
3:A1:481:LYS:HE2	3:A1:481:LYS:HA	1.98	0.46
1:G1:161:GLN:NE2	1:G1:165:GLN:OE1	2.48	0.46
3:C1:421:LEU:O	3:C1:425:LEU:HD23	2.16	0.45
4:D1:276:ASN:HA	4:D1:328:ALA:O	2.16	0.45
4:F1:139:ALA:HB1	4:F1:140:PRO:HD2	1.96	0.45
4:E1:92:GLN:HG3	4:E1:93:PRO:HD2	1.98	0.45
3:B1:72:VAL:HG12	3:B1:73:PHE:N	2.32	0.45
3:B1:334:SER:HB2	4:E1:241:MET:HB3	1.97	0.45
3:B1:487:LEU:HD21	3:B1:536:ILE:HG23	1.99	0.45
4:F1:219:MET:HB3	4:F1:225:ILE:HG12	1.98	0.45
3:A1:197:LEU:HD11	3:A1:358:ILE:HG12	1.98	0.45
4:E1:339:PRO:O	4:E1:343:THR:HG23	2.16	0.45
3:C1:76:THR:HG22	3:C1:77:LYS:H	1.81	0.45
3:A1:234:TYR:OH	3:A1:300:ASP:OD2	2.28	0.45
4:F1:101:ILE:O	4:F1:135:ILE:HG12	2.16	0.45
3:B1:203:GLN:HA	9:B1:900:ATP:O1B	2.17	0.45
4:F1:222:SER:HB2	4:F1:439:MET:HE3	1.98	0.45
3:C1:434:PHE:HB3	3:C1:441:LEU:HD11	1.98	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A1:300:ASP:O	3:A1:301:ASP:C	2.54	0.45
3:C1:461:GLN:NE2	3:C1:465:THR:O	2.49	0.45
4:D1:103:VAL:HG11	4:D1:254:THR:HG23	1.98	0.45
4:D1:187:GLU:HG2	4:D1:437:PHE:CD1	2.51	0.45
3:C1:167:ILE:HD11	4:F1:240:GLN:NE2	2.32	0.45
4:F1:156:ILE:HD12	4:F1:156:ILE:N	2.32	0.45
3:A1:96:ASN:OD1	3:A1:318:ARG:NH2	2.40	0.45
4:E1:328:ALA:C	4:E1:329:ILE:HD12	2.37	0.45
4:D1:262:PHE:O	4:D1:266:GLU:O	2.35	0.45
3:B1:443:ALA:O	3:B1:444:LYS:HB3	2.17	0.45
4:E1:256:LEU:HD13	4:E1:315:ILE:HG12	1.97	0.45
1:G1:165:GLN:HA	1:G1:165:GLN:NE2	2.32	0.44
1:G1:206:ARG:O	1:G1:210:LEU:HD13	2.17	0.44
3:C1:510:LEU:HD21	3:C1:524:ASP:HB3	1.98	0.44
4:E1:131:LYS:C	4:E1:132:LEU:HD12	2.38	0.44
3:C1:125:ILE:HG22	3:C1:126:VAL:N	2.33	0.44
3:C1:195:ARG:HD3	3:C1:337:LEU:O	2.17	0.44
4:E1:67:GLU:OE2	4:E1:250:ARG:NE	2.50	0.44
3:A1:62:VAL:HG23	3:A1:115:GLU:HA	1.99	0.44
3:A1:107:LEU:HD23	3:A1:272:PRO:HB2	1.99	0.44
3:A1:450:ASN:O	3:A1:454:ARG:HG2	2.17	0.44
1:G1:200:ASP:OD1	1:G1:202:SER:OG	2.29	0.44
4:F1:423:VAL:O	4:F1:427:ARG:HG3	2.17	0.44
3:B1:76:THR:HG22	3:B1:77:LYS:H	1.83	0.44
4:F1:147:THR:O	4:F1:148:SER:OG	2.32	0.44
3:A1:472:GLN:O	3:A1:476:ILE:HG12	2.18	0.44
4:E1:253:LEU:CD2	4:E1:311:LEU:HD13	2.48	0.44
4:E1:410:LEU:HD12	4:E1:410:LEU:O	2.16	0.44
4:D1:271:LEU:HD23	4:D1:324:THR:HB	2.00	0.44
3:B1:43:LEU:O	3:B1:47:ILE:HG12	2.17	0.44
3:B1:507:HIS:NE2	3:B1:531:ILE:HD12	2.32	0.44
4:F1:418:GLU:OE1	4:F1:418:GLU:N	2.37	0.44
4:E1:354:LEU:HA	4:E1:366:ALA:O	2.18	0.44
1:G1:159:GLU:OE1	1:G1:159:GLU:HA	2.18	0.44
3:C1:431:LEU:HD11	3:C1:448:GLN:OE1	2.17	0.44
4:D1:225:ILE:HA	4:D1:232:SER:HA	2.00	0.44
3:B1:458:MET:SD	3:B1:475:ILE:HG22	2.57	0.44
4:F1:158:VAL:HG11	4:F1:367:VAL:HG21	1.99	0.44
4:F1:494:LEU:C	4:F1:494:LEU:HD23	2.38	0.44
4:E1:219:MET:HG3	4:E1:224:VAL:HB	1.99	0.44
1:G1:115:LEU:O	1:G1:119:ILE:HG12	2.17	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E1:153:VAL:HG23	4:E1:153:VAL:O	2.18	0.44
1:G1:145:GLU:N	1:G1:145:GLU:OE1	2.51	0.44
4:D1:301:GLN:OE1	4:D1:301:GLN:N	2.34	0.44
4:D1:329:ILE:N	4:D1:329:ILE:HD12	2.33	0.44
4:F1:240:GLN:HA	4:F1:240:GLN:OE1	2.18	0.44
4:F1:471:TYR:HB3	4:F1:472:PRO:HD2	2.00	0.44
1:G1:164:GLU:OE1	1:G1:164:GLU:HA	2.18	0.43
3:B1:130:ILE:HD13	3:B1:158:ALA:HB2	2.00	0.43
4:F1:276:ASN:HD21	4:F1:279:ARG:CZ	2.31	0.43
3:A1:442:ASP:OD1	3:A1:443:ALA:N	2.50	0.43
3:B1:472:GLN:O	3:B1:476:ILE:HG13	2.18	0.43
3:A1:140:ASP:OD1	3:A1:144:ASN:N	2.51	0.43
4:E1:494:LEU:C	4:E1:494:LEU:HD23	2.39	0.43
3:C1:155:THR:HB	3:C1:156:GLN:OE1	2.18	0.43
4:D1:194:LYS:HD3	4:D1:222:SER:OG	2.18	0.43
3:B1:417:ILE:CG2	3:B1:476:ILE:HG22	2.48	0.43
4:E1:385:GLU:O	4:E1:389:VAL:HG23	2.18	0.43
4:E1:423:VAL:O	4:E1:427:ARG:HG2	2.18	0.43
4:D1:113:ILE:HD11	4:D1:216:TYR:CD1	2.54	0.43
4:D1:228:LYS:HD3	4:D1:229:GLU:O	2.19	0.43
3:B1:365:VAL:HG12	3:B1:365:VAL:O	2.18	0.43
3:A1:427:THR:O	3:A1:431:LEU:HD13	2.18	0.43
3:C1:76:THR:HG22	3:C1:77:LYS:N	2.33	0.43
4:D1:146:ALA:HB2	4:D1:319:GLN:CD	2.38	0.43
4:D1:380:ILE:N	4:D1:380:ILE:HD12	2.34	0.43
3:B1:277:ALA:HB3	3:B1:278:PRO:HD3	2.00	0.43
3:A1:125:ILE:HG22	3:A1:126:VAL:N	2.33	0.43
4:E1:425:ARG:O	4:E1:429:VAL:HG23	2.18	0.43
3:C1:475:ILE:HD13	3:C1:500:LEU:HD21	2.00	0.43
4:D1:354:LEU:HA	4:D1:366:ALA:O	2.18	0.43
3:B1:329:VAL:O	3:B1:332:LEU:HB3	2.19	0.43
4:F1:226:SER:H	4:F1:232:SER:HB3	1.83	0.43
3:A1:83:MET:HG2	3:A1:126:VAL:HG12	2.01	0.43
3:A1:55:ASP:O	3:A1:57:THR:HG23	2.18	0.43
3:C1:534:LEU:HD23	3:C1:534:LEU:C	2.39	0.43
4:D1:242:ASN:N	4:D1:242:ASN:OD1	2.51	0.43
3:A1:344:ASN:OD1	3:A1:347:LEU:HD13	2.19	0.43
3:B1:75:LEU:HD21	3:B1:84:VAL:HG11	2.01	0.43
4:F1:110:LEU:HB3	4:F1:232:SER:O	2.18	0.43
3:B1:436:GLN:HG2	3:B1:437:PHE:CD1	2.54	0.42
3:A1:378:ASP:O	3:A1:404:ARG:HD3	2.19	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C1:277:ALA:HB3	3:C1:278:PRO:HD3	2.01	0.42
4:D1:446:ILE:HG13	4:D1:447:PRO:HD2	2.00	0.42
4:F1:486:LEU:O	4:F1:490:ARG:HG3	2.19	0.42
3:A1:147:ASP:HB3	3:A1:149:LEU:HG	2.00	0.42
4:E1:277:ILE:O	4:E1:280:PHE:HB3	2.18	0.42
3:C1:168:ILE:HB	3:C1:169:PRO:HD3	2.01	0.42
3:C1:420:ASN:O	3:C1:424:THR:HG23	2.19	0.42
3:C1:457:GLU:O	3:C1:493:LEU:HD21	2.20	0.42
4:D1:355:ASN:O	4:D1:366:ALA:HB1	2.18	0.42
3:B1:46:LYS:O	3:B1:50:ILE:HG13	2.19	0.42
3:B1:246:ASN:O	3:B1:250:ILE:HD13	2.20	0.42
4:F1:104:PRO:HB2	4:F1:129:ALA:HB2	2.00	0.42
4:F1:113:ILE:HD11	4:F1:216:TYR:CD1	2.54	0.42
3:A1:63:ILE:HD11	3:A1:73:PHE:HB2	2.02	0.42
4:E1:378:ASP:O	4:E1:382:ILE:HG12	2.19	0.42
3:C1:268:SER:HB3	4:D1:313:GLU:HG3	2.01	0.42
4:D1:395:LYS:NZ	4:D1:395:LYS:HB3	2.34	0.42
4:F1:131:LYS:C	4:F1:132:LEU:HD12	2.40	0.42
4:F1:459:SER:OG	4:F1:482:LEU:HB2	2.19	0.42
3:A1:58:GLU:OE2	3:A1:76:THR:HG22	2.19	0.42
1:G1:189:GLY:C	1:G1:190:LEU:HD22	2.39	0.42
3:C1:454:ARG:HH22	3:C1:488:VAL:HA	1.85	0.42
3:C1:534:LEU:HD23	3:C1:534:LEU:O	2.18	0.42
3:A1:83:MET:CG	3:A1:126:VAL:HG12	2.49	0.42
3:A1:454:ARG:HH22	3:A1:488:VAL:HA	1.84	0.42
4:E1:60:THR:HG23	4:E1:92:GLN:HE22	1.84	0.42
1:G1:187:LEU:N	1:G1:187:LEU:HD12	2.34	0.42
4:D1:340:ALA:HB3	4:D1:341:PRO:CD	2.50	0.42
3:B1:55:ASP:CG	3:B1:57:THR:HG22	2.39	0.42
3:B1:98:GLU:HA	4:E1:34:GLN:HB2	2.01	0.42
4:E1:340:ALA:HB3	4:E1:341:PRO:CD	2.50	0.42
3:B1:201:ASP:O	3:B1:206:LYS:NZ	2.51	0.42
4:F1:116:VAL:HG13	4:F1:117:ILE:HG23	2.02	0.42
4:F1:157:LYS:HG2	4:F1:451:VAL:HG11	2.01	0.42
4:F1:270:VAL:HG12	4:F1:271:LEU:N	2.35	0.42
4:F1:396:LEU:CD2	4:F1:426:ALA:HB2	2.49	0.42
3:A1:383:LEU:HA	3:A1:395:ALA:O	2.19	0.42
1:G1:208:ASN:O	1:G1:212:THR:HG23	2.20	0.42
3:C1:301:ASP:HB3	3:C1:304:LYS:HG3	2.02	0.42
3:C1:378:ASP:O	3:C1:404:ARG:HG2	2.19	0.42
4:D1:135:ILE:HA	4:D1:257:THR:OG1	2.20	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F1:438:PHE:O	4:F1:441:GLU:HG2	2.20	0.42
3:C1:329:VAL:HG13	3:C1:330:PHE:N	2.35	0.42
3:C1:411:ILE:O	3:C1:415:LYS:HG3	2.20	0.42
3:B1:484:LEU:HD12	3:B1:484:LEU:N	2.34	0.42
4:E1:56:GLU:OE2	4:E1:63:ARG:NH2	2.52	0.42
4:E1:141:SER:OG	4:E1:144:ASP:OD1	2.19	0.42
4:E1:421:LEU:HD23	4:E1:421:LEU:C	2.40	0.42
3:B1:179:THR:CB	3:B1:213:THR:HG22	2.49	0.41
4:F1:271:LEU:HD12	4:F1:324:THR:O	2.20	0.41
3:A1:65:ILE:HD12	3:A1:69:ILE:O	2.19	0.41
3:C1:65:ILE:HD13	3:C1:113:ILE:HD12	2.02	0.41
4:F1:132:LEU:HD12	4:F1:132:LEU:N	2.34	0.41
3:A1:397:ASN:ND2	3:A1:400:LEU:HD23	2.35	0.41
3:C1:302:LEU:HD11	3:C1:333:HIS:NE2	2.34	0.41
4:D1:110:LEU:HB3	4:D1:232:SER:O	2.20	0.41
4:D1:318:THR:OG1	4:D1:319:GLN:N	2.53	0.41
4:D1:363:ILE:N	4:D1:363:ILE:HD12	2.35	0.41
3:B1:393:ARG:HD3	9:B1:900:ATP:C4	2.56	0.41
4:F1:157:LYS:NZ	4:F1:432:PHE:O	2.42	0.41
4:E1:421:LEU:HD23	4:E1:421:LEU:O	2.20	0.41
1:G1:127:LEU:HD13	1:G1:127:LEU:C	2.41	0.41
4:D1:236:LEU:HD12	4:D1:236:LEU:N	2.36	0.41
3:B1:168:ILE:N	3:B1:169:PRO:CD	2.84	0.41
4:F1:284:CYS:O	4:F1:287:VAL:HG22	2.21	0.41
4:D1:172:GLY:C	4:D1:173:LEU:HD12	2.41	0.41
3:A1:168:ILE:HB	3:A1:169:PRO:HD3	2.02	0.41
4:D1:34:GLN:HB3	4:D1:41:ASP:HB2	2.03	0.41
4:D1:261:TYR:CE1	4:D1:265:GLU:HG3	2.56	0.41
3:B1:315:LEU:CD2	4:F1:293:ARG:HD3	2.51	0.41
3:B1:320:PRO:HB2	3:B1:324:ALA:HA	2.02	0.41
4:F1:103:VAL:HG13	4:F1:135:ILE:HD11	2.02	0.41
1:G1:206:ARG:HD2	3:A1:52:GLN:OE1	2.20	0.41
3:C1:472:GLN:O	3:C1:476:ILE:HG12	2.21	0.41
3:C1:526:ASN:O	3:C1:530:THR:HG23	2.20	0.41
4:F1:407:ILE:CG2	4:F1:415:LEU:HD11	2.50	0.41
3:A1:534:LEU:O	3:A1:538:GLU:HG2	2.20	0.41
3:B1:160:VAL:HG11	3:B1:276:LEU:HD11	2.02	0.41
3:B1:241:ARG:HE	3:B1:266:THR:HG21	1.86	0.41
3:A1:451:THR:OG1	3:A1:485:ASP:OD2	2.27	0.41
1:G1:105:THR:HG22	1:G1:106:ASN:N	2.32	0.41
3:C1:246:ASN:OD1	4:D1:147:THR:HG21	2.20	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C1:372:ASN:O	3:C1:376:ILE:HG13	2.21	0.41
4:D1:365:PRO:HD3	4:D1:437:PHE:CZ	2.55	0.41
4:D1:425:ARG:O	4:D1:429:VAL:HG23	2.21	0.41
3:B1:113:ILE:HG22	3:B1:114:LYS:N	2.36	0.41
3:B1:137:ARG:NH2	3:B1:150:GLY:O	2.37	0.41
3:B1:493:LEU:N	3:B1:493:LEU:HD12	2.36	0.41
4:F1:263:ARG:HD3	4:F1:323:ILE:HG13	2.02	0.41
4:F1:357:GLY:O	4:F1:361:LEU:HD13	2.21	0.41
3:A1:154:THR:HG22	3:A1:155:THR:N	2.36	0.41
4:E1:132:LEU:HD12	4:E1:132:LEU:N	2.35	0.41
4:E1:168:GLY:O	4:E1:317:THR:OG1	2.29	0.41
3:C1:78:VAL:HG23	3:C1:82:GLU:OE1	2.21	0.41
3:C1:398:VAL:HG23	3:C1:429:ARG:NH1	2.36	0.41
3:C1:450:ASN:O	3:C1:454:ARG:HG2	2.21	0.41
4:D1:286:GLU:HG2	3:A1:327:GLY:O	2.21	0.41
4:D1:438:PHE:O	4:D1:441:GLU:HG3	2.20	0.41
4:F1:173:LEU:C	4:F1:173:LEU:HD23	2.41	0.41
4:F1:248:ARG:NH2	4:F1:286:GLU:OE1	2.53	0.41
4:F1:276:ASN:HA	4:F1:328:ALA:HB3	2.03	0.41
3:A1:501:GLU:O	3:A1:505:THR:HG23	2.21	0.41
4:E1:386:HIS:CD2	4:E1:457:ILE:HD11	2.56	0.41
4:E1:433:LEU:HD23	4:E1:460:PHE:HZ	1.86	0.41
4:D1:116:VAL:HG13	4:D1:117:ILE:HG23	2.02	0.40
3:B1:128:VAL:HG12	3:B1:142:LEU:O	2.21	0.40
4:F1:276:ASN:HD21	4:F1:279:ARG:NH1	2.19	0.40
3:A1:171:GLN:HG2	3:A1:172:SER:N	2.36	0.40
4:E1:471:TYR:HB3	4:E1:472:PRO:HD2	2.03	0.40
4:D1:207:GLU:HA	4:D1:207:GLU:OE1	2.20	0.40
4:D1:277:ILE:O	4:D1:280:PHE:HB3	2.21	0.40
3:C1:57:THR:O	3:C1:58:GLU:HB3	2.22	0.40
4:D1:296:SER:OG	4:D1:297:ALA:N	2.52	0.40
3:B1:282:CYS:O	3:B1:286:GLU:HG3	2.22	0.40
4:F1:396:LEU:O	4:F1:396:LEU:HD23	2.21	0.40
3:A1:268:SER:HB3	4:E1:313:GLU:HG3	2.04	0.40
3:B1:225:ASP:OD2	3:B1:228:LYS:HD3	2.22	0.40
4:F1:259:ALA:CB	4:F1:270:VAL:HG11	2.52	0.40
4:F1:377:LEU:HD23	4:F1:377:LEU:C	2.42	0.40
4:F1:384:GLU:O	4:F1:388:THR:HG23	2.21	0.40
3:A1:138:VAL:HB	3:A1:147:ASP:OD1	2.21	0.40
4:E1:62:HIS:O	4:E1:63:ARG:C	2.59	0.40
4:D1:313:GLU:OE1	4:D1:313:GLU:HA	2.21	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B1:70:ALA:HB3	3:B1:104:VAL:HG13	2.04	0.40
3:A1:329:VAL:O	3:A1:332:LEU:HB3	2.22	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	G1	186/219 (85%)	171 (92%)	15 (8%)	0	100	100
2	g1	86/299 (29%)	84 (98%)	2 (2%)	0	100	100
3	A1	510/546 (93%)	501 (98%)	9 (2%)	0	100	100
3	B1	509/546 (93%)	495 (97%)	14 (3%)	0	100	100
3	C1	511/546 (94%)	496 (97%)	15 (3%)	0	100	100
4	D1	468/497 (94%)	453 (97%)	15 (3%)	0	100	100
4	E1	468/497 (94%)	449 (96%)	19 (4%)	0	100	100
4	F1	467/497 (94%)	444 (95%)	23 (5%)	0	100	100
5	i1	34/108 (32%)	34 (100%)	0	0	100	100
6	s	29/145 (20%)	28 (97%)	1 (3%)	0	100	100
7	b	201/381 (53%)	192 (96%)	9 (4%)	0	100	100
8	d	101/234 (43%)	92 (91%)	9 (9%)	0	100	100
All	All	3570/4515 (79%)	3439 (96%)	131 (4%)	0	100	100

There are no Ramachandran outliers to report.

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 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	G1	166/195 (85%)	165 (99%)	1 (1%)	84	95
2	g1	73/254 (29%)	72 (99%)	1 (1%)	62	86
3	A1	422/453 (93%)	422 (100%)	0	100	100
3	B1	422/453 (93%)	419 (99%)	3 (1%)	81	94
3	C1	424/453 (94%)	424 (100%)	0	100	100
4	D1	381/402 (95%)	380 (100%)	1 (0%)	91	97
4	E1	381/402 (95%)	381 (100%)	0	100	100
4	F1	380/402 (94%)	377 (99%)	3 (1%)	79	93
5	i1	35/101 (35%)	35 (100%)	0	100	100
6	s	26/131 (20%)	26 (100%)	0	100	100
7	b	173/331 (52%)	173 (100%)	0	100	100
8	d	95/206 (46%)	95 (100%)	0	100	100
All	All	2978/3783 (79%)	2969 (100%)	9 (0%)	90	97

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G1	136	ASP
2	g1	272	LYS
4	D1	437	PHE
3	B1	117	ASP
3	B1	212	ASP
3	B1	300	ASP
4	F1	214	ASP
4	F1	221	ASP
4	F1	327	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	G1	113	ASN
4	E1	276	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](#)

Of 10 ligands modelled in this entry, 5 are monoatomic - leaving 5 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$
9	ATP	C1	900	10	28,33,33	3.75	8 (28%)	34,52,52	2.31	5 (14%)
9	ATP	A1	900	10	28,33,33	3.70	8 (28%)	34,52,52	2.43	5 (14%)
11	ADP	E1	900	3,10	24,29,29	3.92	9 (37%)	29,45,45	3.78	6 (20%)
9	ATP	B1	900	3,10,4	28,33,33	3.73	8 (28%)	34,52,52	2.43	6 (17%)
11	ADP	D1	900	10	24,29,29	3.94	8 (33%)	29,45,45	3.66	6 (20%)

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
9	ATP	C1	900	10	-	6/18/38/38	0/3/3/3
9	ATP	A1	900	10	-	6/18/38/38	0/3/3/3
11	ADP	E1	900	3,10	-	2/12/32/32	0/3/3/3
9	ATP	B1	900	3,10,4	-	5/18/38/38	0/3/3/3
11	ADP	D1	900	10	-	4/12/32/32	0/3/3/3

All (41) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	C1	900	ATP	O4'-C1'	11.88	1.56	1.40
9	A1	900	ATP	O4'-C1'	11.77	1.56	1.40
9	B1	900	ATP	O4'-C1'	11.67	1.56	1.40
11	D1	900	ADP	C2'-C3'	-10.96	1.23	1.53
11	E1	900	ADP	C2'-C3'	-10.77	1.24	1.53
9	C1	900	ATP	C3'-C4'	-9.62	1.28	1.53
9	B1	900	ATP	C3'-C4'	-9.62	1.28	1.53
9	A1	900	ATP	C3'-C4'	-9.51	1.28	1.53
11	D1	900	ADP	O4'-C1'	8.52	1.52	1.40
11	E1	900	ADP	O4'-C1'	8.47	1.52	1.40
11	D1	900	ADP	C1'-N9	-6.88	1.32	1.49
11	E1	900	ADP	C1'-N9	-6.84	1.33	1.49
11	E1	900	ADP	O4'-C4'	-6.61	1.30	1.45
11	D1	900	ADP	O4'-C4'	-6.28	1.31	1.45
11	D1	900	ADP	C3'-C4'	5.79	1.67	1.53
9	C1	900	ATP	PA-O3A	5.59	1.65	1.59
9	C1	900	ATP	PB-O3A	5.57	1.65	1.59
9	B1	900	ATP	PB-O3A	5.56	1.65	1.59
11	E1	900	ADP	C3'-C4'	5.46	1.66	1.53
9	B1	900	ATP	PA-O3A	5.30	1.65	1.59
9	A1	900	ATP	PA-O3A	5.25	1.65	1.59
9	B1	900	ATP	PB-O3B	5.18	1.65	1.59
9	A1	900	ATP	PB-O3A	5.16	1.65	1.59
9	C1	900	ATP	PB-O3B	4.81	1.64	1.59
9	A1	900	ATP	PB-O3B	4.75	1.64	1.59
9	B1	900	ATP	C2'-C3'	4.64	1.65	1.53
9	A1	900	ATP	C2'-C3'	4.60	1.65	1.53
9	A1	900	ATP	O4'-C4'	4.57	1.55	1.45
9	C1	900	ATP	C2'-C3'	4.46	1.65	1.53
9	B1	900	ATP	O4'-C4'	4.44	1.54	1.45
9	C1	900	ATP	O4'-C4'	4.39	1.54	1.45
11	E1	900	ADP	PA-O3A	4.27	1.64	1.59
11	D1	900	ADP	PA-O3A	4.05	1.63	1.59

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	D1	900	ADP	O2'-C2'	3.57	1.51	1.43
11	E1	900	ADP	O2'-C2'	3.57	1.51	1.43
9	B1	900	ATP	C6-N6	3.15	1.45	1.34
9	A1	900	ATP	C6-N6	3.14	1.45	1.34
11	E1	900	ADP	C6-N6	3.14	1.45	1.34
11	D1	900	ADP	C6-N6	3.12	1.45	1.34
9	C1	900	ATP	C6-N6	3.11	1.45	1.34
11	E1	900	ADP	C2-N3	2.02	1.35	1.32

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	D1	900	ADP	C1'-N9-C4	14.19	151.57	126.64
11	E1	900	ADP	C1'-N9-C4	13.73	150.76	126.64
11	D1	900	ADP	C5-C6-N6	7.63	131.94	120.31
11	E1	900	ADP	C4'-O4'-C1'	-7.44	103.11	109.92
9	B1	900	ATP	C5-C6-N6	7.32	131.46	120.31
11	E1	900	ADP	C5-C6-N6	7.31	131.45	120.31
9	A1	900	ATP	C5-C6-N6	7.24	131.34	120.31
9	C1	900	ATP	C5-C6-N6	7.07	131.09	120.31
11	D1	900	ADP	N3-C2-N1	-6.36	120.04	128.67
11	E1	900	ADP	N3-C2-N1	-6.34	120.06	128.67
9	A1	900	ATP	C4'-O4'-C1'	-6.27	104.19	109.92
9	C1	900	ATP	N3-C2-N1	-6.24	120.21	128.67
9	A1	900	ATP	N3-C2-N1	-6.24	120.21	128.67
9	B1	900	ATP	N3-C2-N1	-6.21	120.25	128.67
11	E1	900	ADP	O4'-C1'-N9	6.12	116.86	108.75
9	B1	900	ATP	C1'-N9-C4	5.63	136.53	126.64
9	C1	900	ATP	C4'-O4'-C1'	-5.41	104.97	109.92
9	A1	900	ATP	C1'-N9-C4	5.39	136.12	126.64
11	D1	900	ADP	O4'-C1'-N9	5.04	115.43	108.75
9	C1	900	ATP	C1'-N9-C4	4.99	135.42	126.64
9	B1	900	ATP	C4'-O4'-C1'	-4.93	105.41	109.92
11	D1	900	ADP	N6-C6-N1	-4.83	108.01	118.33
9	B1	900	ATP	N6-C6-N1	-4.72	108.26	118.33
9	A1	900	ATP	N6-C6-N1	-4.66	108.37	118.33
11	E1	900	ADP	N6-C6-N1	-4.60	108.50	118.33
9	C1	900	ATP	N6-C6-N1	-4.58	108.55	118.33
11	D1	900	ADP	C4'-O4'-C1'	-4.27	106.01	109.92
9	B1	900	ATP	C2'-C3'-C4'	3.02	108.45	102.61

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	C1	900	ATP	C5'-O5'-PA-O2A
9	C1	900	ATP	C5'-O5'-PA-O3A
9	A1	900	ATP	C5'-O5'-PA-O2A
9	A1	900	ATP	C5'-O5'-PA-O3A
11	D1	900	ADP	C5'-O5'-PA-O1A
11	D1	900	ADP	C5'-O5'-PA-O3A
9	A1	900	ATP	O4'-C4'-C5'-O5'
9	A1	900	ATP	C3'-C4'-C5'-O5'
11	E1	900	ADP	PA-O3A-PB-O2B
9	C1	900	ATP	C3'-C4'-C5'-O5'
9	C1	900	ATP	O4'-C4'-C5'-O5'
9	B1	900	ATP	C5'-O5'-PA-O1A
9	B1	900	ATP	C5'-O5'-PA-O2A
9	B1	900	ATP	C5'-O5'-PA-O3A
9	C1	900	ATP	PB-O3A-PA-O2A
9	B1	900	ATP	PB-O3A-PA-O1A
9	A1	900	ATP	PB-O3A-PA-O1A
11	D1	900	ADP	PB-O3A-PA-O2A
11	E1	900	ADP	PA-O3A-PB-O3B
9	C1	900	ATP	PB-O3A-PA-O1A
9	B1	900	ATP	PB-O3A-PA-O2A
11	D1	900	ADP	PB-O3A-PA-O1A
9	A1	900	ATP	PB-O3A-PA-O2A

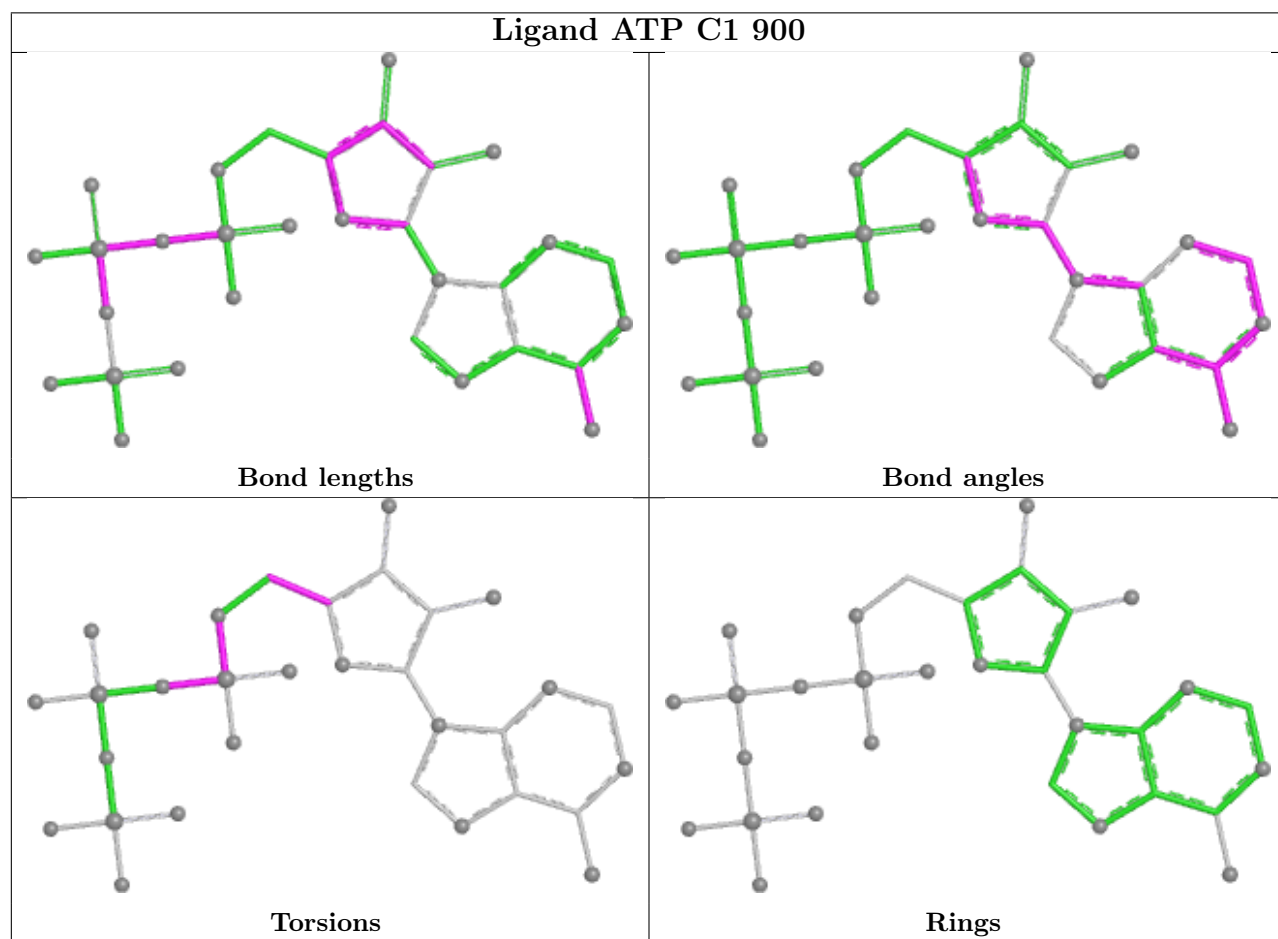
There are no ring outliers.

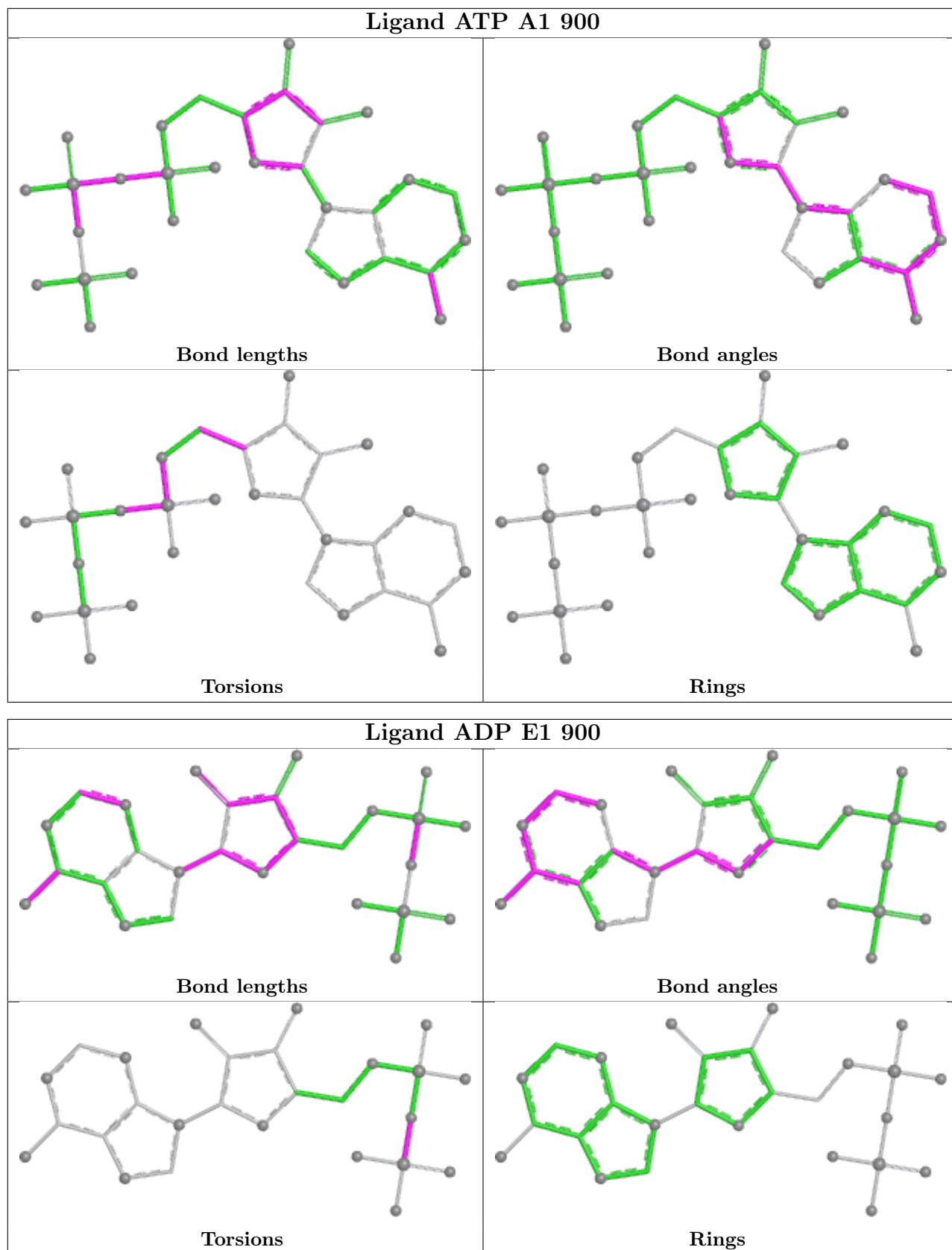
3 monomers are involved in 6 short contacts:

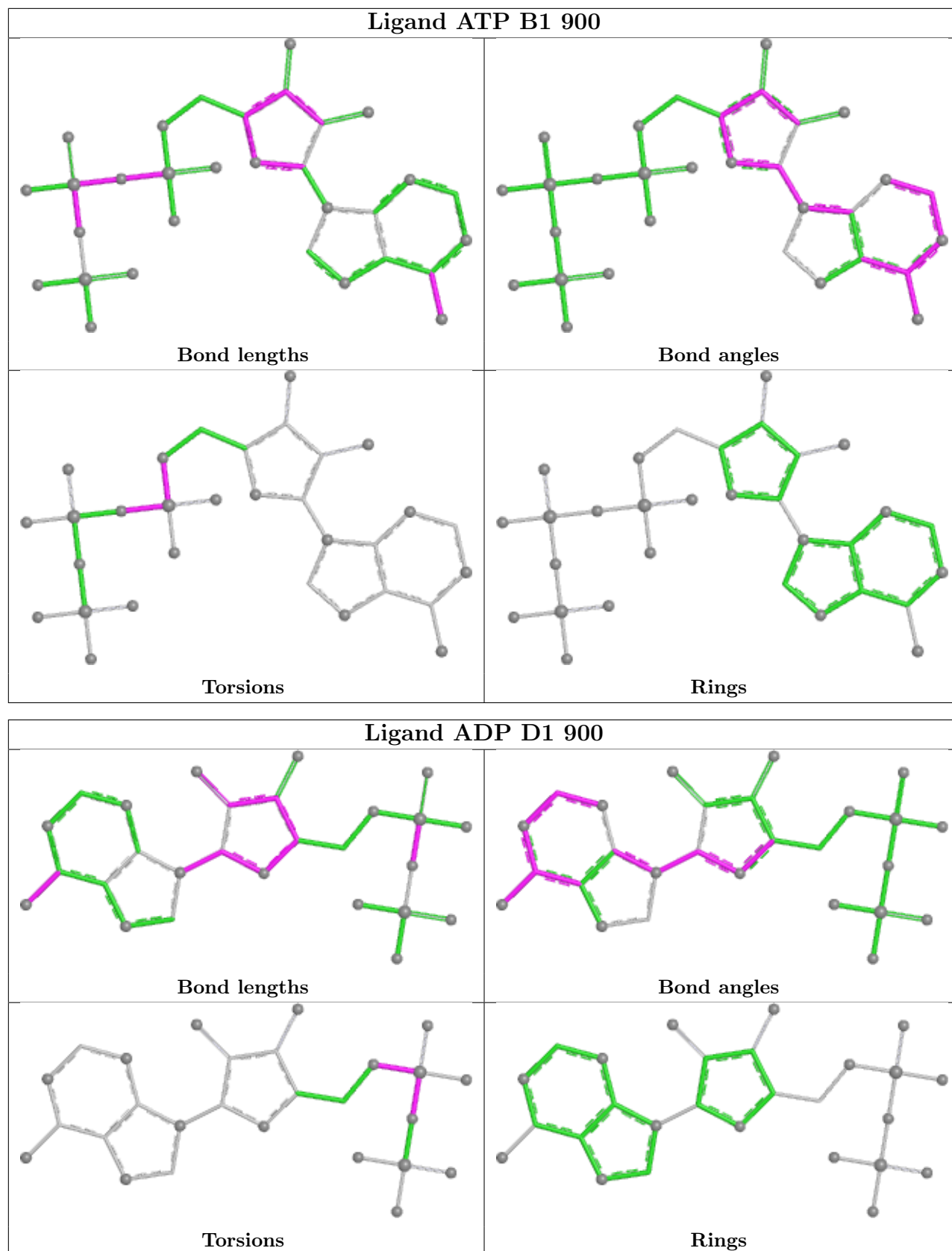
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	A1	900	ATP	1	0
9	B1	900	ATP	4	0
11	D1	900	ADP	1	0

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.