



Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2020 – 11:10 pm BST

PDB ID : 3ZQ6
Title : ADP-ALF4 COMPLEX OF M. THERM. TRC40
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Deposited on : 2011-06-08
Resolution : 2.11 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

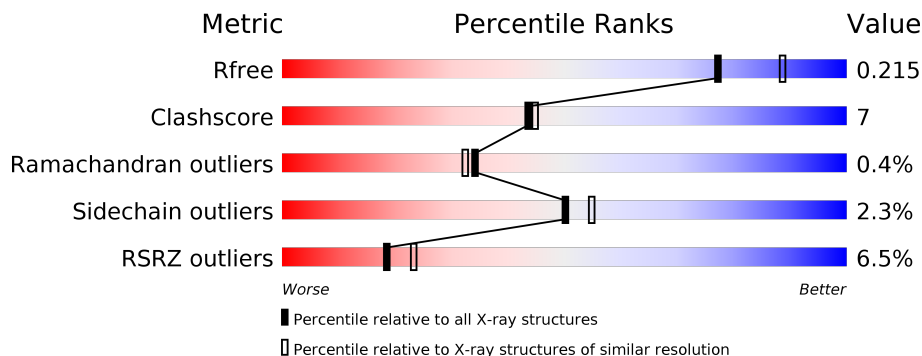
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.11 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}	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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 on 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	324	 3% 82% 9% • 7%
1	B	324	 5% 73% 15% • 11%
1	C	324	 4% 73% 14% 12%
1	D	324	 12% 75% 18% • 5%

2 Entry composition [i](#)

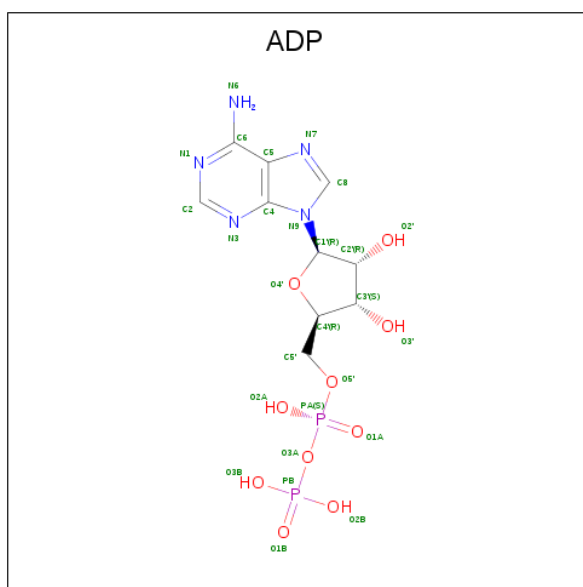
There are 7 unique types of molecules in this entry. The entry contains 9917 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 PUTATIVE ARSENICAL PUMP-DRIVING ATPASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	300	Total 2372	C 1501	N 395	O 461	S 15	0	0	0
1	B	288	Total 2274	C 1435	N 379	O 444	S 16	0	0	0
1	C	284	Total 2248	C 1417	N 375	O 442	S 14	0	0	0
1	D	307	Total 2429	C 1535	N 404	O 472	S 18	0	0	0

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



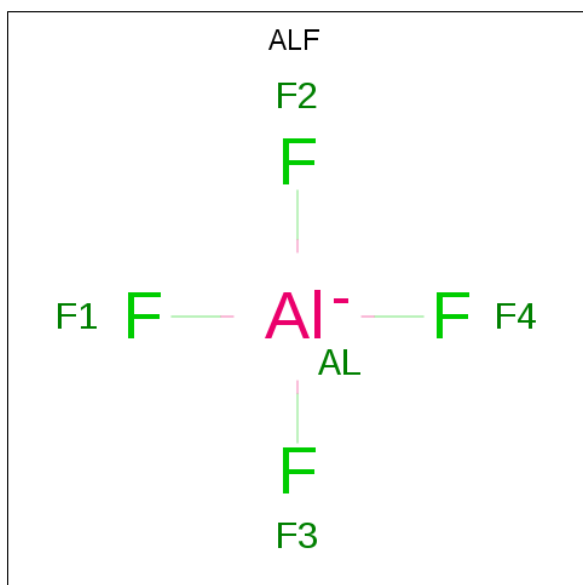
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
2	A	1	Total 27	C 10	N 5	O 10	P 2	0	0
2	B	1	Total 27	C 10	N 5	O 10	P 2	0	0

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

- Molecule 3 is TETRAFLUOROALUMINATE ION (three-letter code: ALF) (formula: AlF_4).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	
3	A	1	Total	Al	F	0	0
			5	1	4		
3	B	1	Total	Al	F	0	0
			5	1	4		
3	C	1	Total	Al	F	0	0
			5	1	4		
3	D	1	Total	Al	F	0	0
			5	1	4		

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	
4	B	1	Total	Mg	0	0
			1	1		
4	A	1	Total	Mg	0	0
			1	1		
4	D	1	Total	Mg	0	0
			1	1		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total Mg 1 1	0	0

- Molecule 5 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total K 1 1	0	0
5	A	1	Total K 1 1	0	0
5	D	1	Total K 1 1	0	0
5	C	1	Total K 1 1	0	0


- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

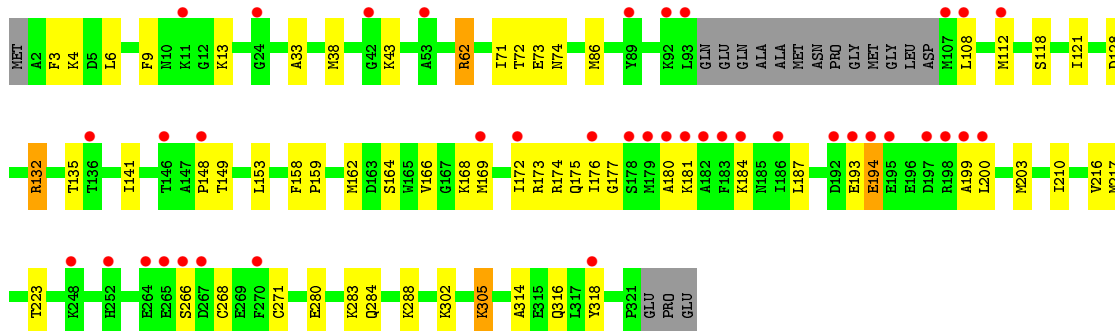
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total Zn 1 1	0	0
6	D	1	Total Zn 1 1	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	216	Total O 216 216	0	0
7	B	119	Total O 119 119	0	0
7	C	84	Total O 84 84	0	0
7	D	37	Total O 37 37	0	0

- Molecule 1: PUTATIVE ARSENICAL PUMP-DRIVING ATPASE

Chain D: 



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	206.95Å 49.77Å 147.36Å 90.00° 115.04° 90.00°	Depositor
Resolution (Å)	41.21 – 2.11 41.21 – 2.11	Depositor EDS
% Data completeness (in resolution range)	97.5 (41.21-2.11) 97.5 (41.21-2.11)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.33 (at 2.10Å)	Xtrriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.173 , 0.221 0.168 , 0.215	Depositor DCC
R_{free} test set	3883 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	30.7	Xtrriage
Anisotropy	0.474	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 57.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9917	wwPDB-VP
Average B, all atoms (Å ²)	49.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.30% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ALF, ZN, MG, K, ADP

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	0.55	1/2411 (0.0%)	0.62	0/3240
1	B	0.52	0/2309	0.61	0/3102
1	C	0.38	0/2283	0.53	0/3068
1	D	0.34	0/2468	0.51	0/3315
All	All	0.46	1/9471 (0.0%)	0.57	0/12725

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	271	CYS	CB-SG	-5.24	1.73	1.81

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2372	0	2379	26	0
1	B	2274	0	2278	33	0
1	C	2248	0	2243	32	0
1	D	2429	0	2435	43	0
2	A	27	0	12	0	0
2	B	27	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	27	0	12	0	0
2	D	27	0	12	0	0
3	A	5	0	0	0	0
3	B	5	0	0	0	0
3	C	5	0	0	0	0
3	D	5	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	1	0	0	0	0
6	D	1	0	0	0	0
7	A	216	0	0	5	0
7	B	119	0	0	3	0
7	C	84	0	0	2	0
7	D	37	0	0	2	0
All	All	9917	0	9383	126	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 7.

All (126) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:305:LYS:NZ	7:A:2040:HOH:O	1.99	0.95
1:A:264:GLU:O	1:A:266:SER:N	2.15	0.79
1:B:243:MET:SD	1:B:292:LYS:HE2	2.25	0.76
1:A:88:GLU:O	1:A:92:LYS:HG2	1.86	0.75
1:B:166:VAL:O	1:B:170:ILE:HG12	1.85	0.75
1:B:43:LYS:HE3	7:B:2032:HOH:O	1.87	0.75
1:D:217:MET:O	1:D:223:THR:OG1	2.04	0.75
1:A:266:SER:HB3	1:A:271:CYS:HB3	1.69	0.73
1:C:170:ILE:HA	1:C:203:MET:HE3	1.72	0.70
1:C:266:SER:HB3	1:C:271:CYS:HB3	1.75	0.69
1:D:38:MET:HG2	1:D:141:ILE:HG21	1.75	0.69
1:A:268:CYS:HB3	1:B:268:CYS:HB3	1.73	0.69
1:D:73:GLU:O	7:D:2007:HOH:O	2.12	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:148:PRO:HG2	1:D:148:PRO:HG2	1.75	0.68
1:D:172:ILE:HA	1:D:175:GLN:HG2	1.77	0.67
1:C:307:ILE:O	1:C:311:GLU:HG3	1.93	0.67
1:B:266:SER:HB2	1:B:271:CYS:SG	2.35	0.66
1:A:243:MET:O	1:A:247:GLU:HG2	1.95	0.66
1:D:86:MET:HE1	1:D:121:ILE:HD11	1.79	0.65
1:C:174:ARG:NH1	1:C:200:LEU:HD13	2.12	0.65
1:D:174:ARG:HH11	1:D:174:ARG:HG3	1.61	0.64
1:A:305:LYS:HE2	1:B:233:GLU:OE1	1.98	0.64
1:D:284:GLN:O	1:D:288:LYS:HG3	1.98	0.63
1:A:233:GLU:OE1	1:B:305:LYS:HE2	1.99	0.62
1:A:286:ARG:HD3	7:A:2180:HOH:O	2.00	0.61
1:D:71:ILE:HG22	1:D:72:THR:HG23	1.83	0.60
1:A:243:MET:HE1	1:A:253:ALA:HB3	1.83	0.59
1:B:160:GLU:HG2	1:B:214:ARG:NH1	2.17	0.59
1:A:283:LYS:HD3	7:A:2177:HOH:O	2.01	0.59
1:A:243:MET:HG3	1:A:289:PHE:HE1	1.67	0.59
1:B:136:THR:OG1	1:B:136:THR:O	2.16	0.59
1:C:266:SER:HB3	1:C:271:CYS:CB	2.32	0.58
1:C:268:CYS:HB3	1:D:268:CYS:HB3	1.86	0.57
1:A:93:LEU:O	1:A:93:LEU:HD12	2.05	0.57
1:C:308:GLU:O	1:C:312:LYS:HG3	2.06	0.56
1:C:159:PRO:HB3	1:C:214:ARG:HG2	1.88	0.55
1:B:307:ILE:O	1:B:311:GLU:HG3	2.06	0.55
1:B:62:ARG:HG2	1:B:62:ARG:HH11	1.70	0.55
1:C:168:LYS:O	1:C:172:ILE:HG12	2.08	0.54
1:A:73:GLU:HG3	7:A:2054:HOH:O	2.07	0.54
1:D:216:VAL:O	1:D:223:THR:HG23	2.08	0.54
1:D:177:GLY:O	1:D:181:LYS:HG3	2.08	0.54
1:B:265:GLU:HG2	1:B:266:SER:N	2.23	0.53
1:D:280:GLU:O	1:D:283:LYS:HG2	2.09	0.53
1:A:148:PRO:HG2	1:B:148:PRO:HG2	1.92	0.53
1:B:73:GLU:O	1:B:74:ASN:HB2	2.08	0.53
1:C:286:ARG:HD2	7:C:2067:HOH:O	2.08	0.52
1:B:265:GLU:HG2	1:B:266:SER:H	1.74	0.52
1:A:194:GLU:OE1	1:A:198:ARG:NH1	2.43	0.52
1:C:266:SER:HB3	1:C:271:CYS:SG	2.50	0.52
1:C:73:GLU:O	1:C:74:ASN:HB2	2.09	0.51
1:D:73:GLU:O	1:D:74:ASN:HB2	2.09	0.51
1:C:308:GLU:HG3	1:C:309:THR:N	2.25	0.51
1:B:106:ASP:HA	1:B:109:GLN:HB2	1.92	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:37:TRP:HB2	1:B:314:ALA:HB1	1.93	0.50
1:C:161:ILE:HD13	1:D:118:SER:OG	2.11	0.50
1:D:199:ALA:O	1:D:203:MET:HG3	2.12	0.50
1:D:174:ARG:NH1	1:D:174:ARG:HG3	2.26	0.49
1:C:162:MET:HB3	1:C:210:ILE:HD13	1.93	0.49
1:B:168:LYS:HG2	1:B:171:LYS:HZ1	1.78	0.49
1:C:199:ALA:O	1:C:203:MET:HG3	2.13	0.49
1:D:172:ILE:HG13	1:D:173:ARG:N	2.27	0.49
1:D:194:GLU:HA	1:D:194:GLU:OE1	2.13	0.49
1:B:162:MET:HB3	1:B:210:ILE:HD13	1.96	0.48
1:C:4:LYS:HD3	1:C:318:TYR:O	2.14	0.48
1:B:160:GLU:HG2	1:B:214:ARG:HH11	1.77	0.48
1:C:159:PRO:CB	1:C:214:ARG:HG2	2.44	0.48
1:D:4:LYS:HD3	1:D:318:TYR:O	2.13	0.48
7:C:2022:HOH:O	1:D:153:LEU:HD12	2.14	0.47
1:A:86:MET:HG3	1:A:116:SER:HB3	1.94	0.47
1:D:162:MET:O	1:D:166:VAL:HG23	2.14	0.47
1:D:166:VAL:HG21	1:D:210:ILE:HD12	1.97	0.47
1:D:173:ARG:HB3	1:D:200:LEU:HD21	1.97	0.47
1:D:316:GLN:HB2	7:D:2034:HOH:O	2.15	0.47
1:C:6:LEU:HD11	1:C:293:VAL:HB	1.97	0.46
1:A:243:MET:HB3	1:A:243:MET:HE2	1.65	0.46
1:C:158:PHE:N	1:C:159:PRO:CD	2.78	0.46
1:D:132:ARG:O	1:D:132:ARG:HG3	2.13	0.46
1:A:159:PRO:HG2	1:A:217:MET:CE	2.46	0.46
1:C:286:ARG:NH2	1:C:296:GLU:OE2	2.46	0.46
1:D:86:MET:CE	1:D:121:ILE:HD11	2.43	0.46
1:B:173:ARG:HB2	1:B:200:LEU:HD11	1.98	0.46
1:D:33:ALA:HB1	1:D:314:ALA:HB2	1.98	0.46
1:D:180:ALA:HA	1:D:187:LEU:HD12	1.97	0.45
1:D:169:MET:HE2	1:D:169:MET:HA	1.98	0.45
1:D:266:SER:HB3	1:D:271:CYS:SG	2.56	0.45
1:D:158:PHE:N	1:D:159:PRO:CD	2.79	0.45
1:A:265:GLU:O	1:A:265:GLU:HG3	2.15	0.45
1:B:159:PRO:HB2	1:B:214:ARG:HD3	1.97	0.45
1:A:115:ALA:C	1:A:117:MET:H	2.20	0.45
1:D:203:MET:HB3	1:D:203:MET:HE2	1.84	0.45
1:B:201:GLN:HG2	1:B:202:ASP:OD1	2.17	0.44
1:A:291:ASP:OD1	1:A:291:ASP:N	2.48	0.44
1:B:9:PHE:HZ	1:B:38:MET:SD	2.40	0.44
1:A:115:ALA:HB1	1:A:117:MET:HG2	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:321:PRO:O	1:B:322:GLU:HG3	2.17	0.44
1:D:164:SER:O	1:D:168:LYS:HG3	2.18	0.44
1:D:86:MET:HG3	1:D:112:MET:SD	2.57	0.44
1:C:138:GLU:HG3	1:C:139:TYR:CD2	2.53	0.44
1:C:291:ASP:OD2	1:C:292:LYS:HE3	2.18	0.44
1:D:217:MET:HA	1:D:223:THR:HG21	1.99	0.44
1:D:176:ILE:HD12	1:D:176:ILE:C	2.38	0.43
1:D:13:LYS:HD3	1:D:13:LYS:HA	1.81	0.43
1:A:302:LYS:HD2	7:A:2198:HOH:O	2.19	0.43
1:A:243:MET:HG3	1:A:289:PHE:CE1	2.49	0.43
1:B:57:SER:HB2	7:B:2031:HOH:O	2.18	0.42
1:C:248:LYS:HB3	1:C:249:TYR:CD1	2.55	0.42
1:D:62:ARG:HH11	1:D:62:ARG:HG2	1.84	0.42
1:B:157:SER:HB3	1:B:249:TYR:CZ	2.54	0.42
1:D:184:LYS:HB2	1:D:184:LYS:HE3	1.88	0.42
1:D:3:PHE:O	1:D:6:LEU:HD13	2.18	0.42
1:B:158:PHE:N	1:B:159:PRO:CD	2.83	0.42
1:C:248:LYS:HE3	1:C:248:LYS:HB2	1.75	0.42
1:B:244:LYS:O	1:B:247:GLU:HB2	2.20	0.42
1:B:168:LYS:HA	1:B:171:LYS:NZ	2.35	0.41
1:B:176:ILE:O	1:B:177:GLY:C	2.56	0.41
1:A:159:PRO:HG2	1:A:217:MET:HE3	2.02	0.41
1:B:243:MET:CG	1:B:292:LYS:HE2	2.49	0.41
1:C:275:ARG:O	1:C:279:GLN:HG2	2.21	0.41
1:C:132:ARG:O	1:C:136:THR:HG23	2.20	0.41
1:B:40:ARG:NH1	7:B:2022:HOH:O	2.49	0.41
1:D:9:PHE:CD2	1:D:43:LYS:HE2	2.56	0.41
1:C:158:PHE:N	1:C:159:PRO:HD2	2.35	0.41
1:C:52:PRO:HB3	1:C:122:ASP:OD2	2.20	0.40
1:C:233:GLU:HB2	1:D:305:LYS:HE3	2.03	0.40
1:C:86:MET:O	1:C:89:TYR:HB3	2.20	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	296/324 (91%)	290 (98%)	4 (1%)	2 (1%)	22	18
1	B	282/324 (87%)	268 (95%)	13 (5%)	1 (0%)	34	32
1	C	278/324 (86%)	273 (98%)	5 (2%)	0	100	100
1	D	303/324 (94%)	295 (97%)	6 (2%)	2 (1%)	22	18
All	All	1159/1296 (89%)	1126 (97%)	28 (2%)	5 (0%)	34	32

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	265	GLU
1	A	149	THR
1	B	137	ASP
1	D	149	THR
1	D	193	GLU

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	257/277 (93%)	251 (98%)	6 (2%)	50	55
1	B	248/277 (90%)	242 (98%)	6 (2%)	49	53
1	C	245/277 (88%)	242 (99%)	3 (1%)	71	77
1	D	264/277 (95%)	256 (97%)	8 (3%)	41	44
All	All	1014/1108 (92%)	991 (98%)	23 (2%)	50	55

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	90	GLN
1	A	175	GLN
1	A	194	GLU

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Mol	Chain	Res	Type
1	A	214	ARG
1	A	268	CYS
1	A	269	GLU
1	B	136	THR
1	B	161	ILE
1	B	162	MET
1	B	164	SER
1	B	202	ASP
1	B	206	THR
1	C	164	SER
1	C	192	ASP
1	C	308	GLU
1	D	62	ARG
1	D	108	LEU
1	D	128	ASP
1	D	132	ARG
1	D	135	THR
1	D	194	GLU
1	D	302	LYS
1	D	305	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 10 are monoatomic - leaving 8 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	ADP	C	401	3,4	24,29,29	1.23	3 (12%)	29,45,45	1.74	7 (24%)
2	ADP	B	401	3,4	24,29,29	1.13	2 (8%)	29,45,45	1.47	4 (13%)
3	ALF	D	402	2,5,4,7	0,4,4	0.00	-	-		
3	ALF	B	402	2,5,4,7	0,4,4	0.00	-	-		
2	ADP	D	401	3,4	24,29,29	1.39	4 (16%)	29,45,45	1.78	8 (27%)
2	ADP	A	401	3,4	24,29,29	1.36	4 (16%)	29,45,45	1.52	5 (17%)
3	ALF	C	402	2,5,4,7	0,4,4	0.00	-	-		
3	ALF	A	402	2,5,4,7	0,4,4	0.00	-	-		

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	ADP	C	401	3,4	-	0/12/32/32	0/3/3/3
2	ADP	D	401	3,4	-	0/12/32/32	0/3/3/3
2	ADP	A	401	3,4	-	0/12/32/32	0/3/3/3
2	ADP	B	401	3,4	-	0/12/32/32	0/3/3/3

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	401	ADP	O4'-C1'	3.18	1.45	1.41
2	A	401	ADP	O4'-C1'	2.75	1.44	1.41
2	B	401	ADP	O4'-C1'	2.63	1.44	1.41
2	A	401	ADP	C2-N3	2.60	1.36	1.32
2	A	401	ADP	PA-O2A	-2.59	1.43	1.55
2	C	401	ADP	O4'-C1'	2.49	1.44	1.41
2	D	401	ADP	PB-O3B	-2.47	1.45	1.54
2	C	401	ADP	PA-O2A	-2.29	1.44	1.55
2	C	401	ADP	PB-O3B	-2.26	1.46	1.54
2	D	401	ADP	PA-O2A	-2.26	1.44	1.55
2	B	401	ADP	PB-O3B	-2.21	1.46	1.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	401	ADP	PB-O3B	-2.14	1.46	1.54
2	D	401	ADP	PA-O1A	2.13	1.58	1.50

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	401	ADP	O3B-PB-O3A	4.77	120.65	104.64
2	C	401	ADP	O3B-PB-O3A	4.08	118.33	104.64
2	C	401	ADP	C1'-N9-C4	-3.74	120.06	126.64
2	A	401	ADP	PA-O3A-PB	3.58	145.12	132.83
2	D	401	ADP	PA-O3A-PB	3.53	144.93	132.83
2	B	401	ADP	PA-O3A-PB	3.36	144.34	132.83
2	C	401	ADP	PA-O3A-PB	3.19	143.79	132.83
2	D	401	ADP	O2B-PB-O3A	-3.06	94.38	104.64
2	A	401	ADP	O3B-PB-O1B	2.94	122.19	110.68
2	C	401	ADP	O2B-PB-O1B	-2.76	99.87	110.68
2	D	401	ADP	C1'-N9-C4	-2.63	122.03	126.64
2	B	401	ADP	O3B-PB-O3A	2.55	113.20	104.64
2	D	401	ADP	O3A-PB-O1B	-2.43	97.69	111.19
2	D	401	ADP	O3B-PB-O2B	2.40	116.82	107.64
2	D	401	ADP	C4-C5-N7	2.30	111.80	109.40
2	B	401	ADP	O3B-PB-O1B	2.24	119.44	110.68
2	A	401	ADP	O2B-PB-O3A	-2.18	97.33	104.64
2	A	401	ADP	O2A-PA-O5'	2.13	117.65	107.75
2	C	401	ADP	O2B-PB-O3A	-2.13	97.49	104.64
2	C	401	ADP	O3'-C3'-C4'	-2.12	104.91	111.05
2	A	401	ADP	O3B-PB-O3A	2.08	111.61	104.64
2	D	401	ADP	O3B-PB-O1B	2.07	118.80	110.68
2	B	401	ADP	C1'-N9-C4	-2.06	123.01	126.64
2	C	401	ADP	O2A-PA-O5'	2.04	117.21	107.75

There are no chirality outliers.

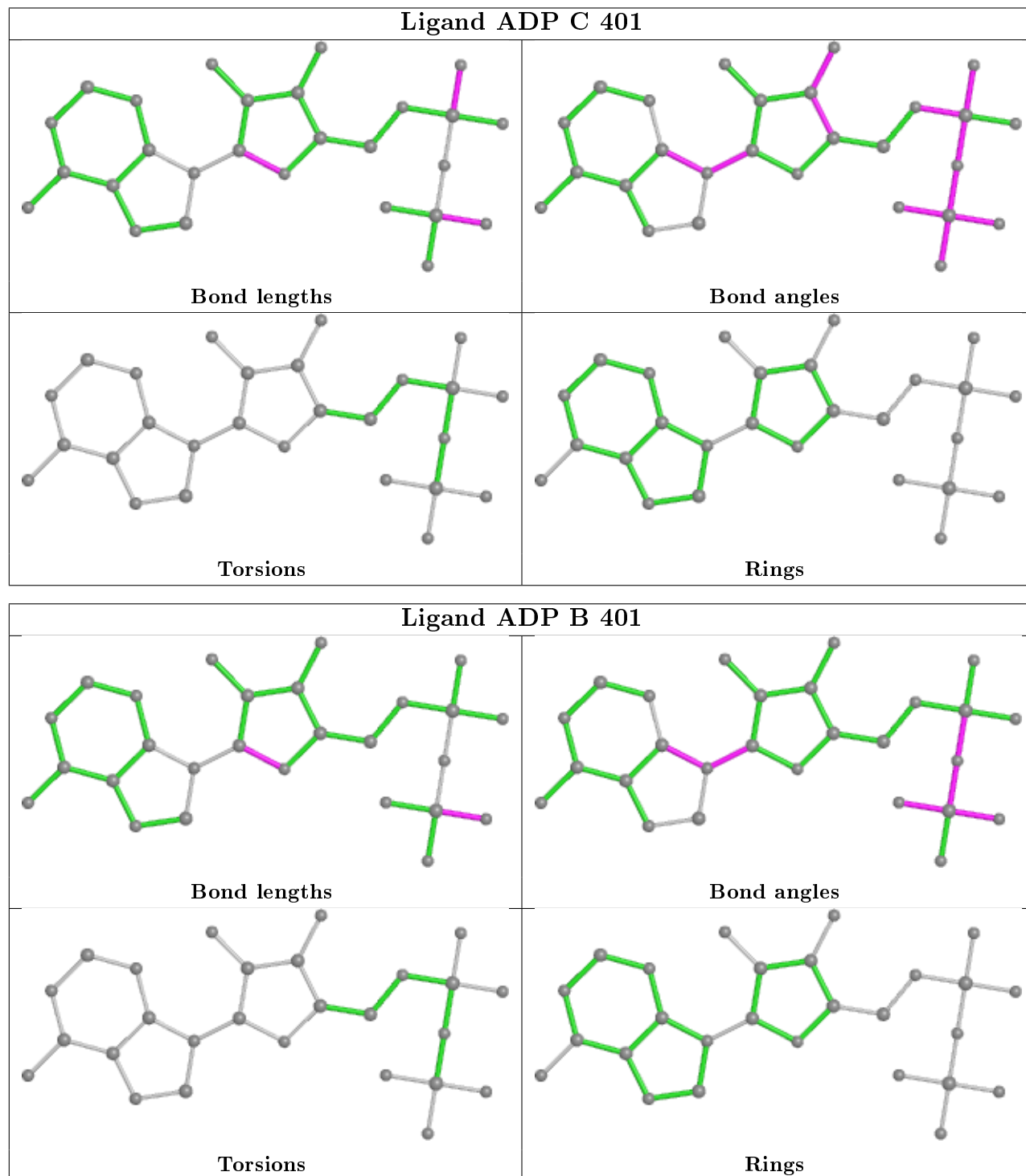
There are no torsion outliers.

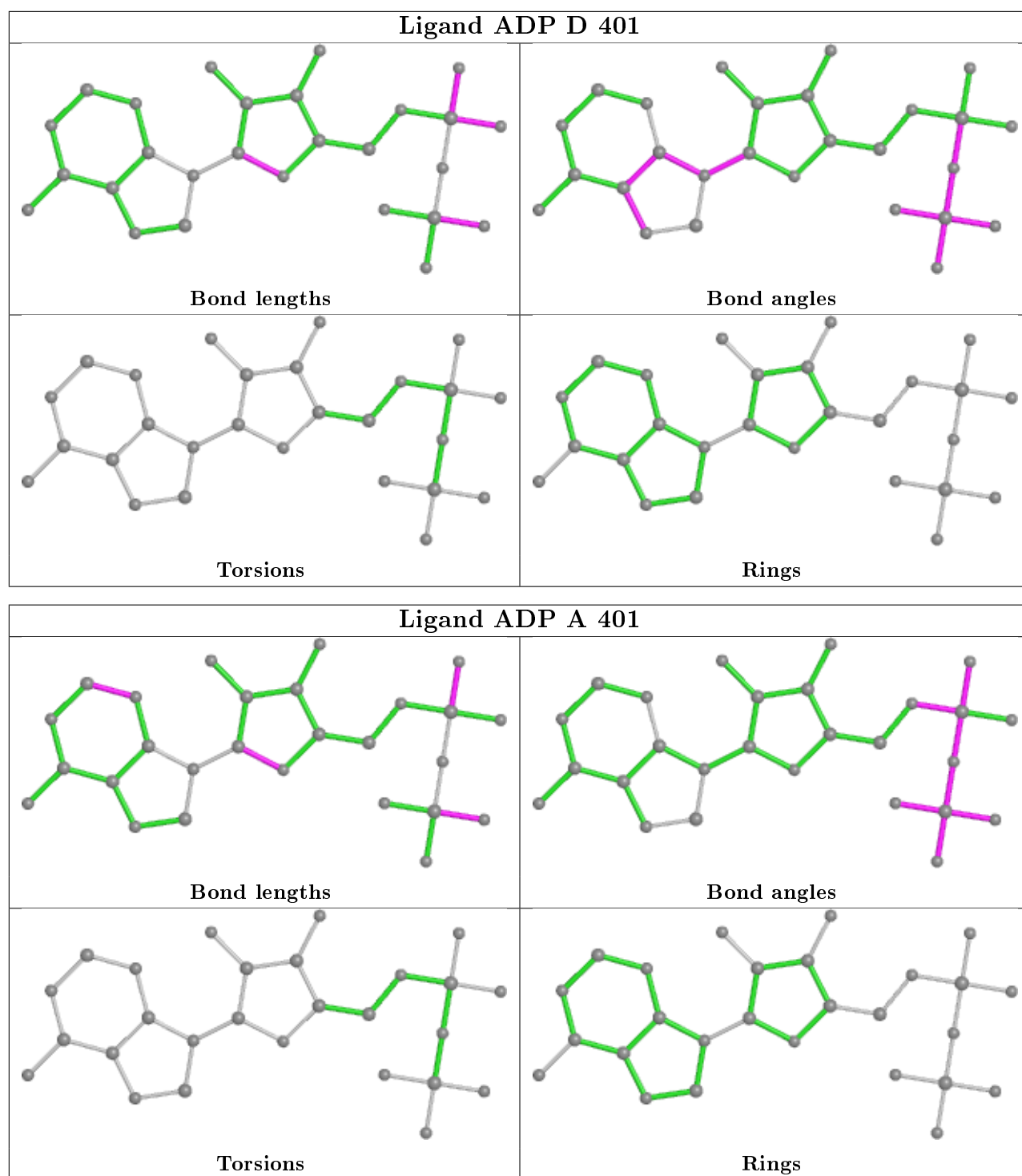
There are no ring outliers.

No monomer is involved in short contacts.

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

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	300/324 (92%)	-0.06	9 (3%) 50 56	13, 31, 74, 108	0
1	B	288/324 (88%)	0.26	15 (5%) 27 32	13, 35, 93, 128	0
1	C	284/324 (87%)	0.06	13 (4%) 32 38	27, 46, 97, 136	0
1	D	307/324 (94%)	0.60	40 (13%) 3 4	33, 62, 107, 145	0
All	All	1179/1296 (90%)	0.22	77 (6%) 18 23	13, 44, 98, 145	0

All (77) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	107	MET	9.4
1	B	108	LEU	5.9
1	B	200	LEU	4.9
1	D	194	GLU	4.6
1	B	201	GLN	4.4
1	A	89	TYR	4.3
1	D	181	LYS	4.1
1	D	93	LEU	4.0
1	D	197	ASP	4.0
1	B	202	ASP	3.9
1	A	92	LYS	3.9
1	D	198	ARG	3.9
1	D	112	MET	3.7
1	B	106	ASP	3.7
1	A	93	LEU	3.6
1	D	183	PHE	3.6
1	C	89	TYR	3.6
1	D	107	MET	3.5
1	B	111	GLN	3.3
1	D	11	LYS	3.3
1	B	176	ILE	3.3

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Mol	Chain	Res	Type	RSRZ
1	D	89	TYR	3.3
1	C	196	GLU	3.3
1	B	135	THR	3.2
1	D	266	SER	3.2
1	D	267	ASP	3.2
1	C	198	ARG	3.2
1	D	193	GLU	3.1
1	D	195	GLU	3.0
1	D	172	ILE	3.0
1	A	188	PRO	3.0
1	C	320	GLU	2.9
1	C	267	ASP	2.9
1	A	322	GLU	2.8
1	D	108	LEU	2.8
1	D	176	ILE	2.7
1	A	182	ALA	2.7
1	C	177	GLY	2.7
1	D	53	ALA	2.7
1	D	264	GLU	2.7
1	D	178	SER	2.7
1	C	195	GLU	2.6
1	D	318	TYR	2.6
1	D	42	GLY	2.6
1	D	182	ALA	2.5
1	B	89	TYR	2.5
1	B	172	ILE	2.5
1	D	179	MET	2.4
1	C	199	ALA	2.4
1	D	148	PRO	2.4
1	C	11	LYS	2.4
1	D	186	ILE	2.4
1	D	252	HIS	2.3
1	B	173	ARG	2.3
1	B	199	ALA	2.3
1	C	197	ASP	2.2
1	D	169	MET	2.2
1	A	2	ALA	2.2
1	D	136	THR	2.2
1	D	200	LEU	2.2
1	A	187	LEU	2.2
1	C	192	ASP	2.2
1	D	192	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	229	VAL	2.1
1	C	265	GLU	2.1
1	D	265	GLU	2.1
1	D	270	PHE	2.1
1	D	180	ALA	2.1
1	D	92	LYS	2.1
1	D	146	THR	2.0
1	D	199	ALA	2.0
1	D	184	LYS	2.0
1	D	248	LYS	2.0
1	B	228	VAL	2.0
1	D	24	GLY	2.0
1	C	165	TRP	2.0
1	A	186	ILE	2.0

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates 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.

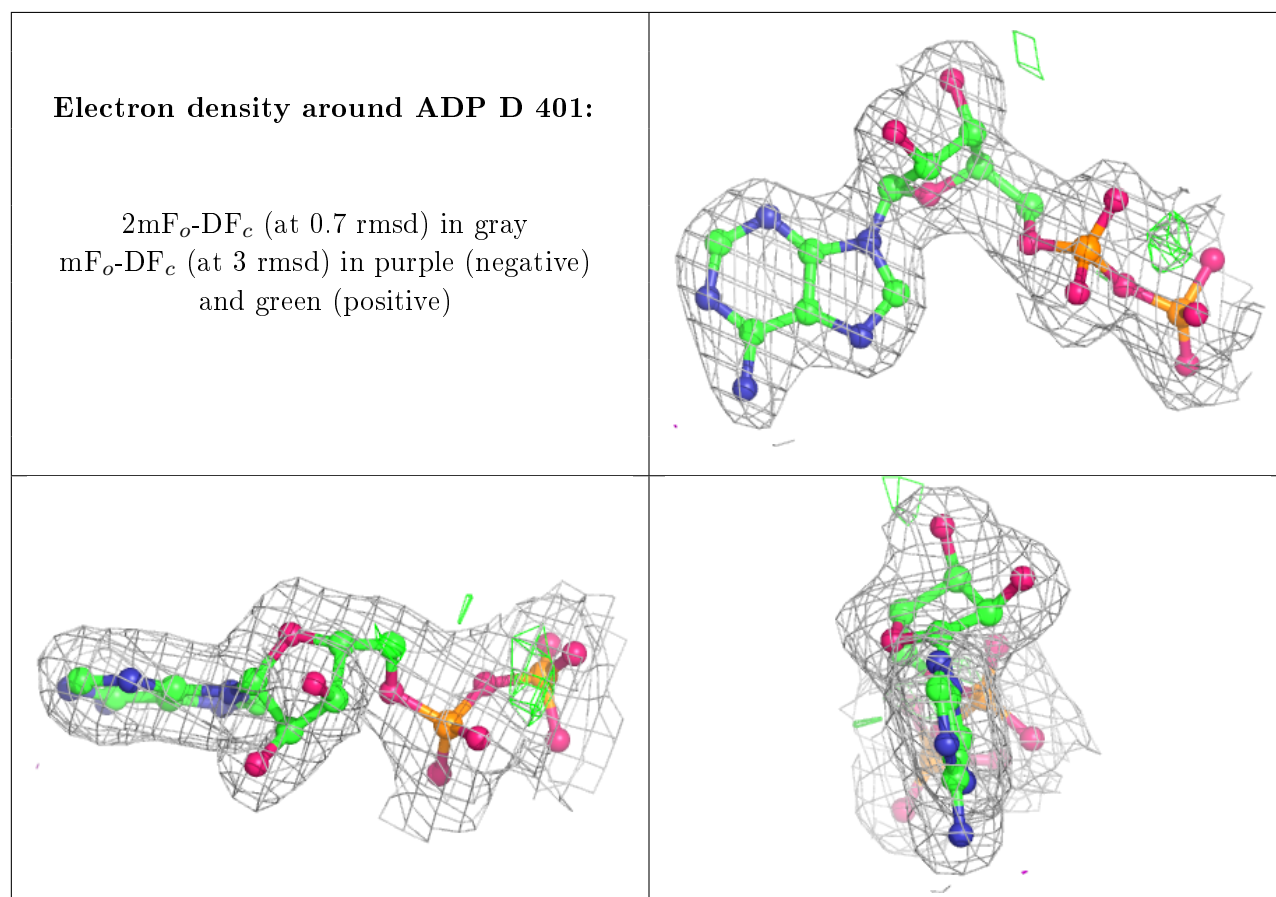
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	MG	D	403	1/1	0.95	0.15	33,33,33,33	0
6	ZN	D	1322	1/1	0.96	0.05	66,66,66,66	0
2	ADP	D	401	27/27	0.97	0.16	23,35,40,43	0
4	MG	C	403	1/1	0.98	0.13	31,31,31,31	0
5	K	C	404	1/1	0.99	0.13	40,40,40,40	0
3	ALF	B	402	5/5	0.99	0.19	17,18,19,20	0
2	ADP	B	401	27/27	0.99	0.16	11,16,21,23	0
4	MG	B	403	1/1	0.99	0.18	17,17,17,17	0
4	MG	A	403	1/1	0.99	0.16	17,17,17,17	0

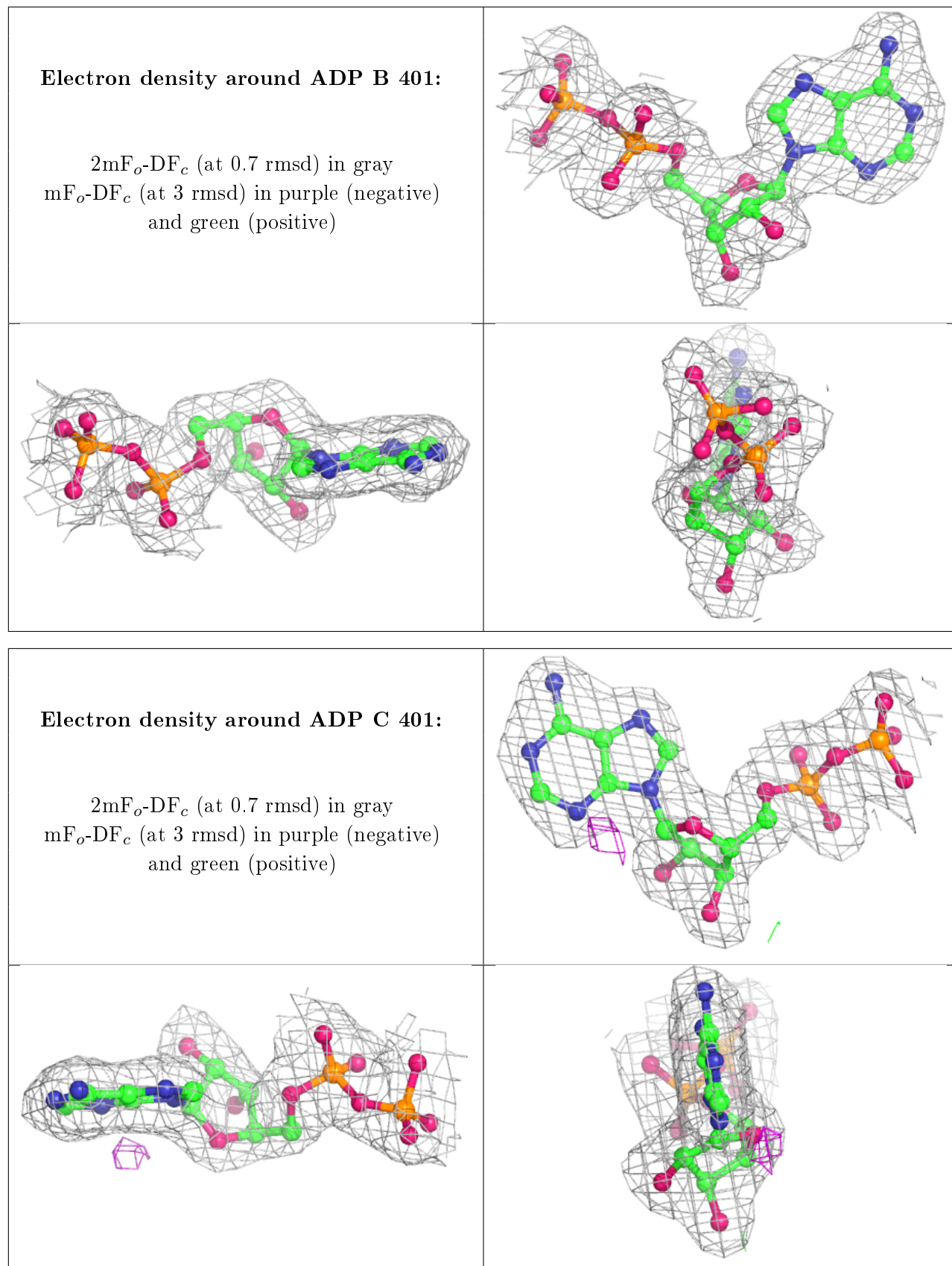
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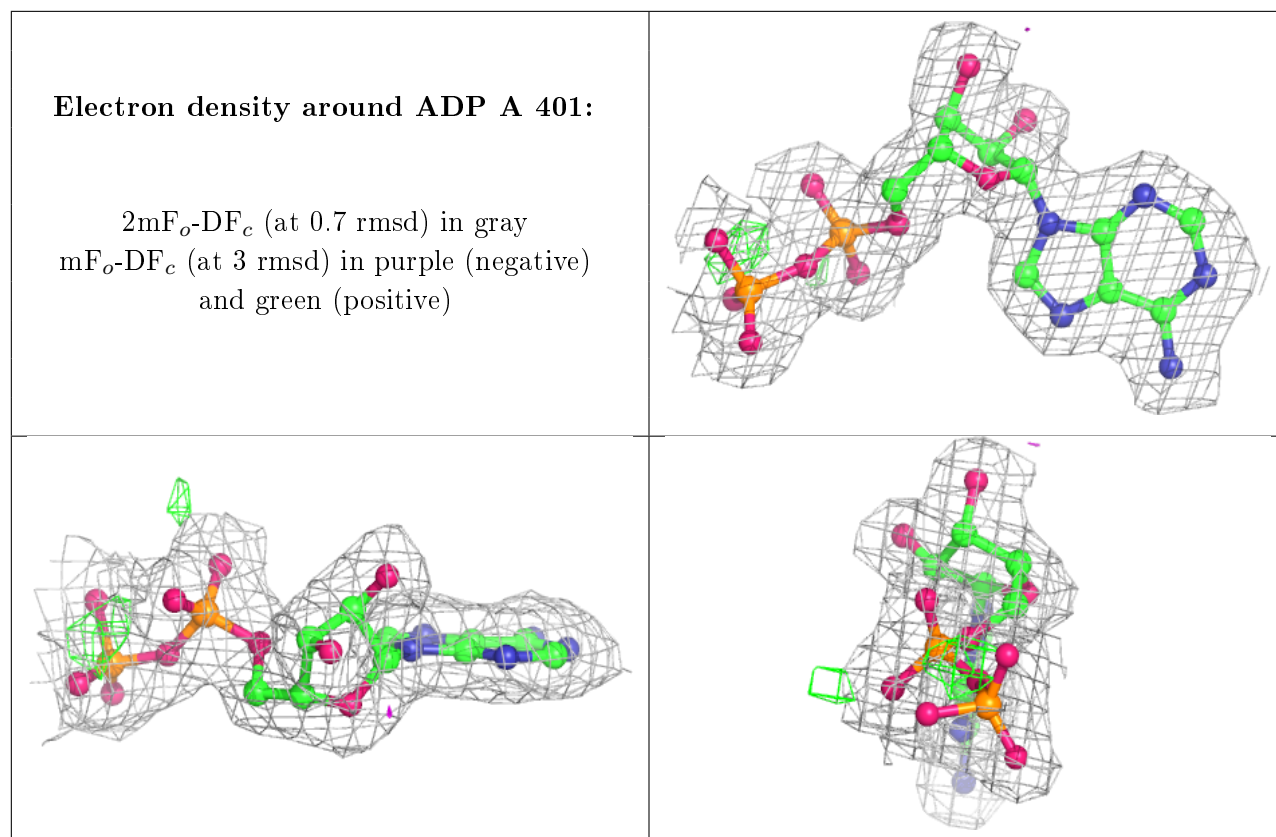
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	ADP	C	401	27/27	0.99	0.12	24,35,42,45	0
2	ADP	A	401	27/27	0.99	0.15	11,16,20,23	0
3	ALF	D	402	5/5	0.99	0.18	33,33,36,42	0
5	K	A	404	1/1	0.99	0.13	23,23,23,23	0
3	ALF	C	402	5/5	0.99	0.17	27,28,35,36	0
3	ALF	A	402	5/5	0.99	0.19	16,17,18,19	0
5	K	D	404	1/1	1.00	0.14	38,38,38,38	0
5	K	B	404	1/1	1.00	0.18	22,22,22,22	0
6	ZN	A	1323	1/1	1.00	0.03	49,49,49,49	0

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







6.5 Other polymers [i](#)

There are no such residues in this entry.