



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 5, 2023 – 01:47 PM EDT

PDB ID : 3UNI
Title : Crystal Structure of Bovine Milk Xanthine Dehydrogenase with NADH Bound
Authors : Eger, B.T.; Okamoto, K.; Nishino, T.; Pai, E.F.
Deposited on : 2011-11-15
Resolution : 2.20 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35
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) : 2.35

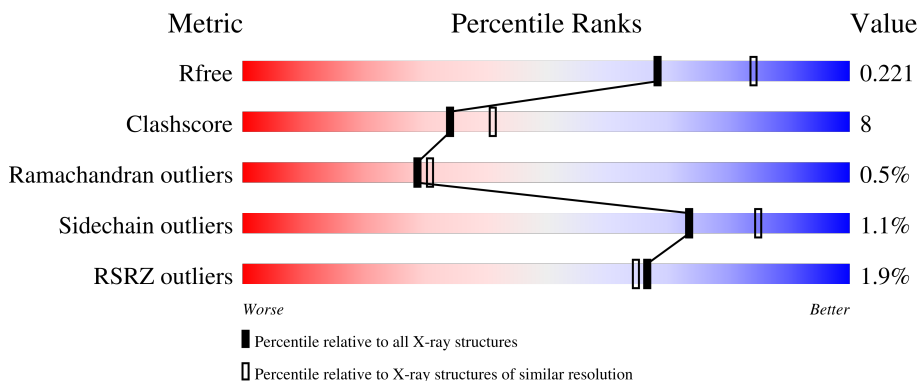
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

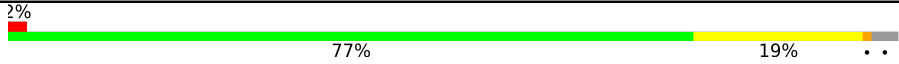
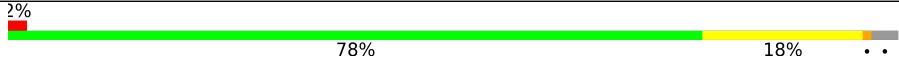
The reported resolution of this entry is 2.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1332	 2% 77% 19% ..
1	B	1332	 2% 78% 18% ..

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	MOS	A	1336	-	-	X	-
4	MOS	B	1336	-	-	X	-

2 Entry composition [i](#)

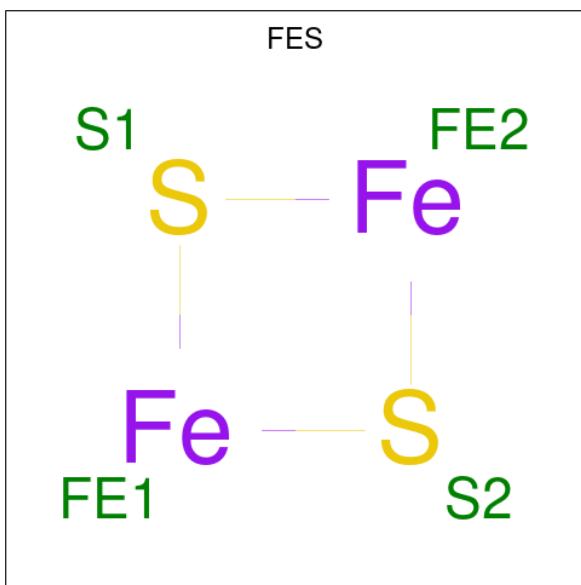
There are 11 unique types of molecules in this entry. The entry contains 21491 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Xanthine dehydrogenase/oxidase.

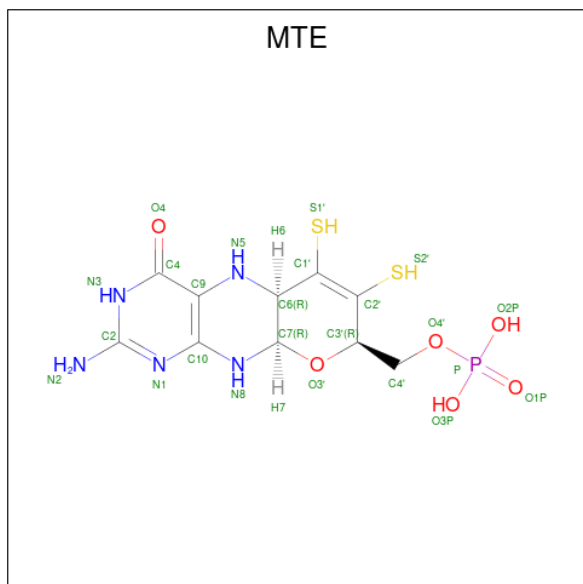
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	1289	10003	6360	1712	1871	60	0	0	0
1	B	1288	9998	6357	1711	1870	60	0	0	0

- Molecule 2 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe₂S₂).



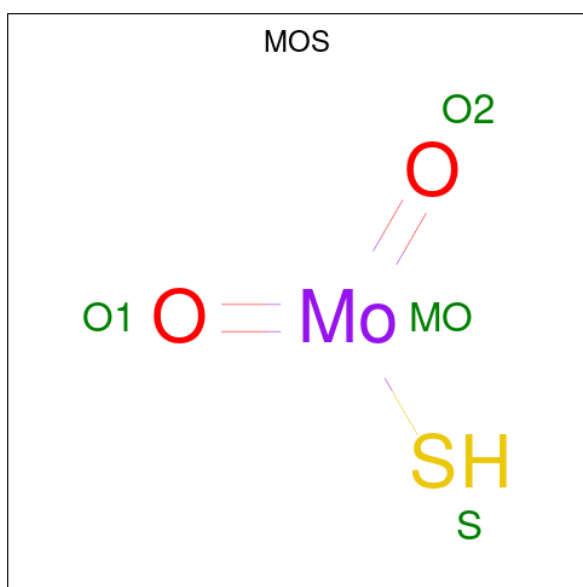
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Fe	S		
2	A	1	4	2	2	0	0
2	A	1	4	2	2	0	0
2	B	1	4	2	2	0	0
2	B	1	4	2	2	0	0

- Molecule 3 is PHOSPHONIC ACIDMONO-(2-AMINO-5,6-DIMERCAPTO-4-OXO-3,7,8A, 9,10,10A-HEXAHYDRO-4H-8-OXA-1,3,9,10-TETRAAZA-ANTHRACEN-7-YLMETHYL) ESTER (three-letter code: MTE) (formula: $C_{10}H_{14}N_5O_6PS_2$).



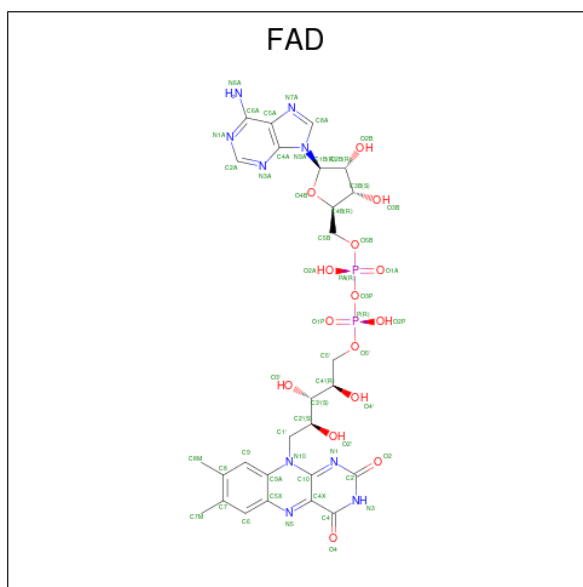
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	P			S
3	A	1	Total	C	N	O	P	S	0	0
			24	10	5	6	1	2		
3	B	1	Total	C	N	O	P	S	0	0
			24	10	5	6	1	2		

- Molecule 4 is DIOXOTHIOMOLYBDENUM(VI) ION (three-letter code: MOS) (formula: $HMoO_2S$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	Mo	O	S	0	0
			4	1	2	1		
4	B	1	Total	Mo	O	S	0	0
			4	1	2	1		

- Molecule 5 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



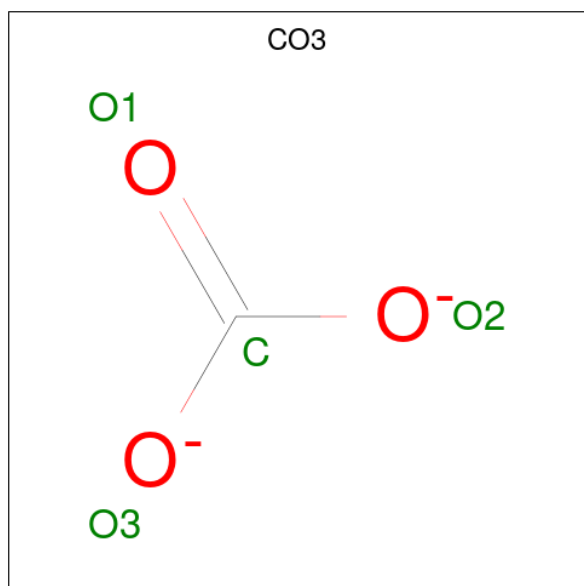
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
5	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 6 is 1,4-DIHYDRONICOTINAMIDE ADENINE DINUCLEOTIDE (three-letter code: NAI) (formula: $C_{21}H_{29}N_7O_{14}P_2$).

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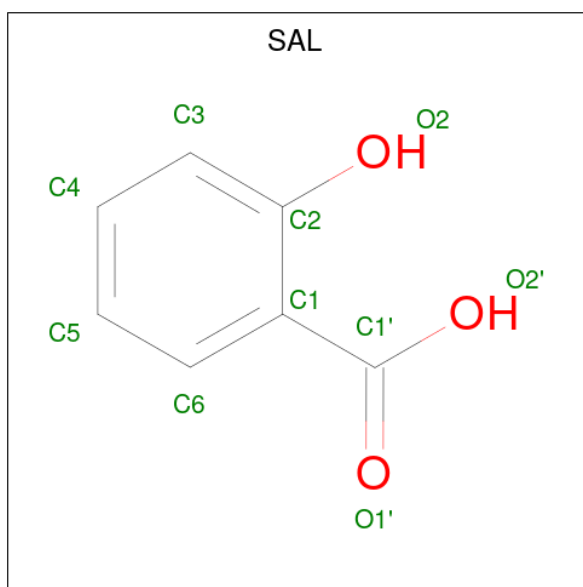
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			6	3	3		
7	A	1	Total	C	O	0	0
			6	3	3		
7	B	1	Total	C	O	0	0
			6	3	3		
7	B	1	Total	C	O	0	0
			6	3	3		
7	B	1	Total	C	O	0	0
			6	3	3		
7	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 8 is CARBONATE ION (three-letter code: CO3) (formula: CO₃).



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

- Molecule 9 is 2-HYDROXYBENZOIC ACID (three-letter code: SAL) (formula: C₇H₆O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total C O 10 7 3	0	0
9	B	1	Total C O 10 7 3	0	0

- Molecule 10 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	1	Total Ca 1 1	0	0
10	B	1	Total Ca 1 1	0	0

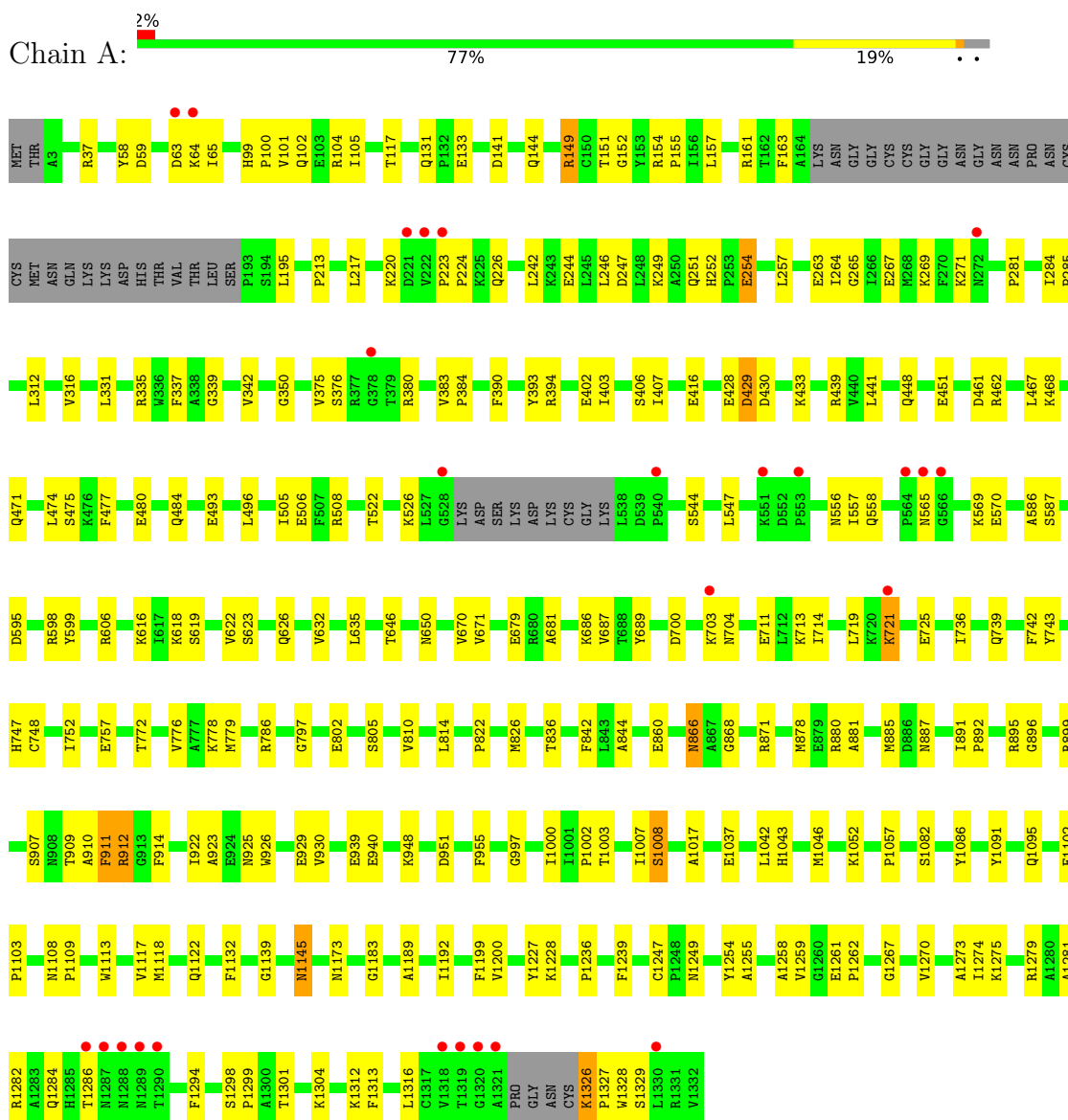
- Molecule 11 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
11	A	587	Total O 587 587	0	0
11	B	553	Total O 553 553	0	0

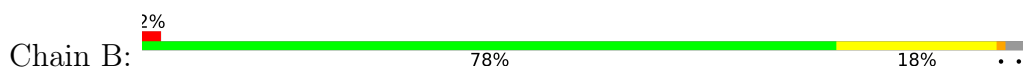
3 Residue-property plots

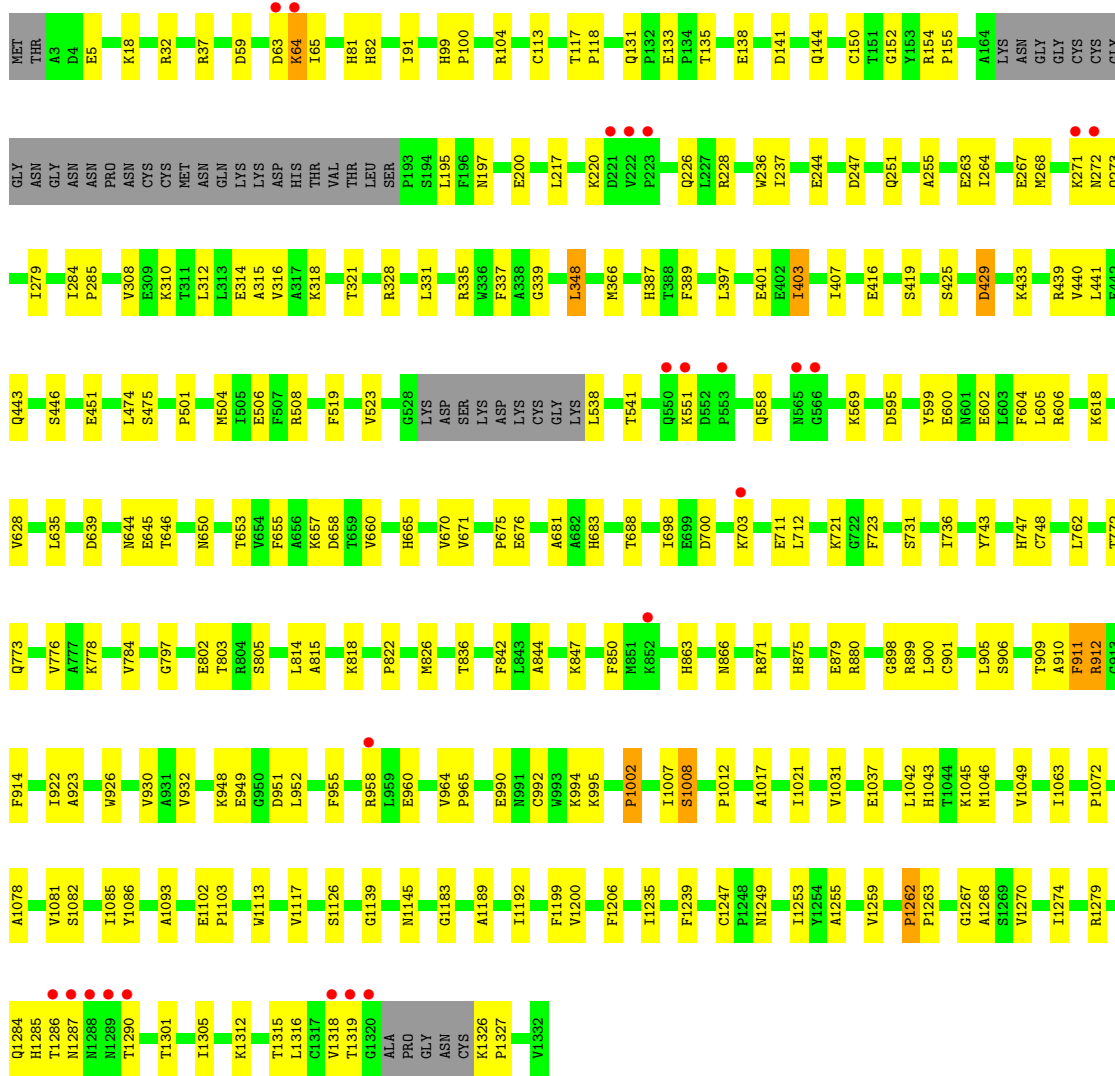
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Xanthine dehydrogenase/oxidase



- Molecule 1: Xanthine dehydrogenase/oxidase





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	100.04Å 146.70Å 107.02Å 90.00° 106.03° 90.00°	Depositor
Resolution (Å)	20.00 – 2.20 19.95 – 2.20	Depositor EDS
% Data completeness (in resolution range)	(Not available) (20.00-2.20) 95.9 (19.95-2.20)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.51 (at 2.19Å)	Xtrriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.198 , 0.240 0.181 , 0.221	Depositor DCC
R_{free} test set	2293 reflections (1.53%)	wwPDB-VP
Wilson B-factor (Å ²)	19.3	Xtrriage
Anisotropy	0.157	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.40 , 55.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	21491	wwPDB-VP
Average B, all atoms (Å ²)	24.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.12% 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: CO3, SAL, MTE, CA, MOS, FAD, NAI, GOL, FES

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	0.34	0/10221	0.61	1/13835 (0.0%)
1	B	0.33	0/10216	0.60	0/13828
All	All	0.34	0/20437	0.61	1/27663 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	151	THR	N-CA-C	5.26	125.20	111.00

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	10003	0	9999	173	0
1	B	9998	0	9994	168	0
2	A	8	0	0	0	0
2	B	8	0	0	0	0
3	A	24	0	10	1	0
3	B	24	0	10	1	0
4	A	4	0	0	2	0
4	B	4	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	53	0	31	3	0
5	B	53	0	31	3	0
6	A	44	0	27	0	0
6	B	44	0	27	1	0
7	A	24	0	32	0	0
7	B	30	0	40	1	0
8	A	4	0	0	0	0
8	B	4	0	0	0	0
9	A	10	0	4	1	0
9	B	10	0	4	0	0
10	A	1	0	0	0	0
10	B	1	0	0	0	0
11	A	587	0	0	4	0
11	B	553	0	0	5	0
All	All	21491	0	20209	340	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

All (340) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:955:PHE:HA	1:B:1145:ASN:HD21	1.28	0.97
1:A:131:GLN:HE21	1:A:133:GLU:H	1.11	0.96
1:B:1286:THR:HG22	1:B:1287:ASN:H	1.31	0.94
1:A:955:PHE:HA	1:A:1145:ASN:HD21	1.36	0.91
1:A:700:ASP:HA	1:A:703:LYS:HE3	1.53	0.89
1:A:1279:ARG:HG2	1:A:1294:PHE:HE2	1.37	0.85
1:A:506:GLU:CD	1:A:506:GLU:H	1.90	0.74
1:B:650:ASN:HD21	1:B:778:LYS:HE3	1.53	0.73
1:A:1118:MET:O	1:A:1122:GLN:HG2	1.90	0.72
1:B:131:GLN:HE21	1:B:133:GLU:H	1.38	0.71
1:A:1279:ARG:HG2	1:A:1294:PHE:CE2	2.25	0.71
1:A:556:ASN:C	1:A:557:ILE:HD12	2.15	0.67
1:B:1249:ASN:O	1:B:1255:ALA:HA	1.95	0.67
1:A:844:ALA:HB2	1:A:922:ILE:HD13	1.77	0.66
4:A:1336:MOS:O2	4:A:1336:MOS:MO	1.66	0.65
1:A:622:VAL:O	1:A:626:GLN:HG3	1.96	0.65
1:B:948:LYS:HG2	1:B:951:ASP:OD2	1.96	0.65
1:B:312:LEU:O	1:B:316:VAL:HG23	1.98	0.64
1:B:267:GLU:HA	1:B:271:LYS:HG2	1.80	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:1336:MOS:O2	4:B:1336:MOS:MO	1.68	0.64
1:B:639:ASP:HB3	1:B:818:LYS:HE3	1.81	0.63
1:A:131:GLN:HE21	1:A:133:GLU:N	1.91	0.63
1:A:1326:LYS:HA	1:A:1326:LYS:HE3	1.80	0.63
1:A:635:LEU:HD13	1:A:814:LEU:CD1	2.28	0.63
1:A:131:GLN:NE2	1:A:133:GLU:H	1.91	0.63
1:B:618:LYS:HE2	1:B:618:LYS:HA	1.79	0.63
1:A:1249:ASN:O	1:A:1255:ALA:HA	1.97	0.63
1:B:994:LYS:HE3	7:B:1342:GOL:O2	1.99	0.63
1:B:1286:THR:HG22	1:B:1287:ASN:N	2.09	0.63
1:A:1299:PRO:O	1:A:1304:LYS:HE2	1.98	0.62
1:A:441:LEU:HB3	1:A:451:GLU:HB2	1.81	0.61
1:A:152:GLY:HA2	1:A:1200:VAL:HG21	1.82	0.61
1:A:1316:LEU:HD23	1:A:1316:LEU:O	2.00	0.60
1:B:1315:THR:O	1:B:1318:VAL:HG22	2.01	0.60
1:A:58:TYR:CE2	1:A:220:LYS:HD2	2.36	0.60
1:A:939:GLU:HG2	1:A:940:GLU:N	2.17	0.59
1:B:64:LYS:HG2	1:B:65:ILE:N	2.16	0.59
1:A:598:ARG:O	1:B:600:GLU:HG2	2.02	0.59
1:A:375:VAL:HG12	1:A:380:ARG:HG3	1.83	0.59
1:A:141:ASP:O	1:A:144:GLN:HG3	2.03	0.59
1:B:1017:ALA:HB1	1:B:1086:TYR:CD2	2.38	0.59
1:B:712:LEU:HD21	1:B:879:GLU:HG2	1.85	0.58
1:B:264:ILE:O	1:B:268:MET:HG2	2.04	0.58
1:A:474:LEU:O	1:A:475:SER:HB2	2.04	0.58
1:B:1318:VAL:HG23	1:B:1319:THR:N	2.20	0.57
1:B:1279:ARG:HG3	1:B:1279:ARG:HH11	1.70	0.57
1:B:712:LEU:HD21	1:B:879:GLU:CG	2.33	0.57
1:B:932:VAL:HG13	1:B:1279:ARG:NH2	2.19	0.57
1:A:635:LEU:HD13	1:A:814:LEU:HD12	1.86	0.56
1:B:1262:PRO:HB2	1:B:1263:PRO:HD3	1.87	0.56
1:A:100:PRO:O	1:A:104:ARG:HG3	2.05	0.56
1:A:149:ARG:HG3	1:A:742:PHE:O	2.05	0.56
1:A:923:ALA:HA	1:A:926:TRP:NE1	2.21	0.56
1:A:713:LYS:HG2	1:A:714:ILE:N	2.19	0.56
1:B:37:ARG:HD3	1:B:595:ASP:O	2.06	0.56
1:A:719:LEU:HD13	1:A:860:GLU:OE2	2.06	0.55
1:B:433:LYS:HE2	1:B:504:MET:SD	2.47	0.55
1:B:618:LYS:HB2	1:B:688:THR:HG22	1.88	0.55
1:B:711:GLU:HA	1:B:899:ARG:HD2	1.89	0.55
1:B:747:HIS:CD2	1:B:836:THR:HG21	2.42	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:64:LYS:HG2	1:A:65:ILE:N	2.22	0.54
1:A:1279:ARG:HB3	1:A:1279:ARG:NH1	2.22	0.54
1:B:310:LYS:O	1:B:314:GLU:HG3	2.08	0.54
1:B:1102:GLU:HB3	1:B:1103:PRO:HD3	1.90	0.54
1:B:635:LEU:HD11	1:B:815:ALA:HA	1.88	0.54
1:A:599:TYR:HA	1:B:599:TYR:HA	1.88	0.53
1:A:157:LEU:O	1:A:161:ARG:HG3	2.08	0.53
1:A:195:LEU:HD22	1:A:1189:ALA:HA	1.90	0.53
1:A:508:ARG:HD3	11:A:1547:HOH:O	2.09	0.53
1:A:1082:SER:HB2	3:A:1335:MTE:O3P	2.08	0.53
1:A:1282:ARG:O	1:A:1286:THR:HB	2.09	0.53
1:A:461:ASP:OD1	1:A:462:ARG:HG2	2.08	0.53
1:A:217:LEU:O	1:A:220:LYS:HG2	2.08	0.53
1:A:748:CYS:HB2	1:A:826:MET:HG3	1.90	0.53
1:B:1316:LEU:O	1:B:1316:LEU:HD23	2.08	0.53
1:B:263:GLU:HB2	5:B:1337:FAD:H52A	1.91	0.52
1:B:655:PHE:HE1	1:B:814:LEU:HD23	1.74	0.52
1:A:247:ASP:HB3	1:A:251:GLN:NE2	2.24	0.52
1:A:739:GLN:HG2	1:A:911:PHE:CE1	2.44	0.52
1:B:995:LYS:NZ	1:B:1284:GLN:HE21	2.07	0.52
1:A:249:LYS:HD3	1:A:257:LEU:HD11	1.92	0.52
1:A:406:SER:C	1:A:407:ILE:HD12	2.29	0.52
1:A:407:ILE:HD12	1:A:407:ILE:N	2.24	0.52
1:B:419:SER:HB2	1:B:519:PHE:CD1	2.45	0.52
1:B:1007:ILE:O	1:B:1008:SER:CB	2.58	0.52
1:A:650:ASN:HD21	1:A:778:LYS:HE3	1.73	0.52
1:A:757:GLU:HB3	1:A:786:ARG:HE	1.75	0.52
1:A:448:GLN:HB2	1:A:477:PHE:CE2	2.44	0.51
1:A:264:ILE:HD11	5:A:1337:FAD:H3B	1.93	0.51
1:B:441:LEU:HB3	1:B:451:GLU:HB2	1.92	0.51
1:B:863:HIS:O	1:B:898:GLY:HA2	2.11	0.51
1:B:1270:VAL:O	1:B:1274:ILE:HG13	2.11	0.51
1:A:719:LEU:HD11	1:A:895:ARG:CB	2.40	0.51
1:A:948:LYS:HG2	1:A:951:ASP:OD2	2.10	0.51
1:B:443:GLN:HB2	1:B:446:SER:OG	2.10	0.51
1:B:197:ASN:HD22	1:B:200:GLU:HG3	1.75	0.51
1:B:425:SER:HB3	11:B:1525:HOH:O	2.09	0.51
1:B:1312:LYS:HG2	11:B:1856:HOH:O	2.11	0.50
1:A:814:LEU:C	1:A:814:LEU:HD13	2.32	0.50
1:A:911:PHE:O	1:A:912:ARG:C	2.49	0.50
1:B:312:LEU:HB2	1:B:331:LEU:HD21	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1279:ARG:NH2	1:B:1290:THR:O	2.45	0.50
1:A:144:GLN:HB2	1:A:339:GLY:HA2	1.94	0.50
1:B:416:GLU:OE1	1:B:439:ARG:HD2	2.12	0.50
1:A:390:PHE:HB3	11:A:1552:HOH:O	2.10	0.50
1:A:719:LEU:HD11	1:A:895:ARG:HB3	1.93	0.50
1:A:747:HIS:CD2	1:A:836:THR:HG21	2.47	0.50
1:A:1007:ILE:O	1:A:1008:SER:CB	2.60	0.50
1:A:1261:GLU:N	1:A:1262:PRO:CD	2.75	0.50
1:B:389:PHE:HA	1:B:397:LEU:HG	1.94	0.50
1:B:911:PHE:O	1:B:912:ARG:C	2.50	0.50
1:B:197:ASN:ND2	1:B:200:GLU:HG3	2.27	0.49
1:B:711:GLU:HA	1:B:899:ARG:CD	2.42	0.49
1:B:267:GLU:HA	1:B:271:LYS:CG	2.41	0.49
1:B:474:LEU:O	1:B:475:SER:HB2	2.13	0.49
1:B:569:LYS:NZ	1:B:569:LYS:HB3	2.28	0.49
1:A:1052:LYS:HD3	1:A:1254:TYR:CE1	2.48	0.49
1:B:698:ILE:HG23	1:B:901:CYS:SG	2.53	0.49
1:A:1326:LYS:HB3	1:A:1327:PRO:HD3	1.94	0.49
1:B:605:LEU:C	1:B:605:LEU:HD23	2.32	0.49
1:A:544:SER:HA	1:A:547:LEU:HD12	1.93	0.49
1:A:1017:ALA:HB1	1:A:1086:TYR:CD2	2.48	0.49
1:B:628:VAL:HG21	1:B:681:ALA:HA	1.93	0.49
1:B:871:ARG:HG3	1:B:871:ARG:HH11	1.78	0.48
1:B:308:VAL:HG21	1:B:348:LEU:HG	1.95	0.48
1:A:1037:GLU:HB2	1:A:1043:HIS:CD2	2.48	0.48
1:A:467:LEU:O	1:A:471:GLN:HB2	2.14	0.48
1:A:249:LYS:HD3	1:A:257:LEU:CD1	2.44	0.48
1:A:871:ARG:HH11	1:A:871:ARG:HG3	1.78	0.48
1:A:686:LYS:HD3	1:A:687:VAL:N	2.29	0.48
1:A:1091:TYR:O	1:A:1095:GLN:HG2	2.13	0.48
1:B:1007:ILE:HG22	1:B:1081:VAL:HG12	1.95	0.48
1:A:430:ASP:CG	1:A:1228:LYS:HE2	2.34	0.48
1:B:1082:SER:HB2	3:B:1335:MTE:O3P	2.14	0.48
1:B:676:GLU:H	1:B:676:GLU:CD	2.17	0.48
1:A:1279:ARG:HB3	1:A:1279:ARG:CZ	2.44	0.47
1:B:655:PHE:CE1	1:B:814:LEU:HD23	2.49	0.47
1:B:880:ARG:HD2	1:B:914:PHE:HB3	1.95	0.47
1:A:711:GLU:HB2	1:A:899:ARG:HD3	1.97	0.47
1:A:1183:GLY:HA2	1:A:1247:CYS:O	2.15	0.47
1:A:721:LYS:NZ	1:A:721:LYS:HB3	2.29	0.47
1:B:506:GLU:CD	1:B:506:GLU:H	2.17	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:508:ARG:HD3	11:B:1785:HOH:O	2.13	0.47
1:A:265:GLY:O	1:A:269:LYS:HB2	2.13	0.47
1:A:281:PRO:HB2	1:A:284:ILE:HD12	1.97	0.47
1:B:670:VAL:HG11	1:B:681:ALA:HB3	1.95	0.47
1:A:480:GLU:O	1:A:484:GLN:HG3	2.15	0.47
1:A:1102:GLU:HB3	1:A:1103:PRO:HD3	1.97	0.47
1:B:646:THR:O	1:B:650:ASN:HA	2.14	0.47
1:A:154:ARG:N	1:A:155:PRO:HD2	2.30	0.47
1:A:752:ILE:CD1	1:A:822:PRO:HB3	2.44	0.47
1:A:926:TRP:O	1:A:930:VAL:HG23	2.15	0.47
1:B:723:PHE:CZ	1:B:847:LYS:HE3	2.50	0.47
1:B:909:THR:OG1	1:B:910:ALA:N	2.47	0.47
1:A:267:GLU:O	1:A:271:LYS:HB2	2.15	0.47
1:A:880:ARG:HD2	1:A:914:PHE:HB3	1.96	0.47
1:B:955:PHE:HA	1:B:1145:ASN:ND2	2.12	0.47
1:B:1199:PHE:CE1	1:B:1267:GLY:HA2	2.50	0.47
1:B:335:ARG:HH21	1:B:551:LYS:NZ	2.13	0.47
1:B:1279:ARG:HG3	1:B:1279:ARG:NH1	2.28	0.47
1:B:604:PHE:CD2	1:B:675:PRO:HG3	2.51	0.46
1:B:644:ASN:O	1:B:653:THR:HA	2.16	0.46
1:A:1270:VAL:O	1:A:1274:ILE:HG13	2.16	0.46
1:B:773:GLN:HG2	1:B:784:VAL:HG13	1.97	0.46
1:A:263:GLU:HB3	5:A:1337:FAD:H52A	1.96	0.46
1:A:416:GLU:OE1	1:A:439:ARG:HD2	2.16	0.46
1:B:401:GLU:OE2	1:B:401:GLU:N	2.39	0.46
1:B:660:VAL:HA	1:B:665:HIS:ND1	2.31	0.46
1:B:949:GLU:OE2	1:B:960:GLU:HA	2.16	0.46
1:B:1017:ALA:HB2	1:B:1085:ILE:HD12	1.96	0.46
1:A:955:PHE:CA	1:A:1145:ASN:HD21	2.18	0.46
1:A:1326:LYS:HB3	1:A:1327:PRO:CD	2.46	0.46
1:A:99:HIS:CE1	1:A:101:VAL:HG23	2.51	0.46
1:B:1206:PHE:CE1	1:B:1268:ALA:HB2	2.51	0.46
1:B:772:THR:O	1:B:776:VAL:HG23	2.16	0.46
1:A:99:HIS:CE1	1:A:100:PRO:HD2	2.50	0.45
1:B:255:ALA:HB1	1:B:279:ILE:HG13	1.97	0.45
1:B:700:ASP:HA	1:B:703:LYS:NZ	2.32	0.45
1:A:242:LEU:O	1:A:246:LEU:HG	2.16	0.45
1:A:885:MET:SD	1:A:896:GLY:HA3	2.56	0.45
1:B:226:GLN:HB2	1:B:244:GLU:OE1	2.17	0.45
1:B:321:THR:O	1:B:328:ARG:NH2	2.49	0.45
1:A:342:VAL:HG23	11:A:1746:HOH:O	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:618:LYS:O	1:A:619:SER:HB3	2.17	0.45
1:B:135:THR:OG1	1:B:138:GLU:HG3	2.16	0.45
1:A:104:ARG:HD2	1:A:163:PHE:CE1	2.51	0.45
1:A:646:THR:O	1:A:650:ASN:HA	2.16	0.45
1:B:144:GLN:HB2	1:B:339:GLY:HA2	1.99	0.45
1:B:403:ILE:C	1:B:403:ILE:HD13	2.37	0.45
1:B:541:THR:HA	1:B:990:GLU:O	2.17	0.45
1:B:992:CYS:O	1:B:1285:HIS:HE1	2.00	0.45
1:A:1042:LEU:O	1:A:1046:MET:HG2	2.17	0.45
1:B:195:LEU:HD22	1:B:1189:ALA:HA	1.99	0.45
1:B:1301:THR:O	1:B:1305:ILE:HG13	2.16	0.45
1:A:725:GLU:O	1:A:725:GLU:HG2	2.16	0.44
1:A:1312:LYS:HE3	1:A:1313:PHE:CZ	2.52	0.44
1:B:141:ASP:O	1:B:144:GLN:HG3	2.17	0.44
1:B:1045:LYS:O	1:B:1049:VAL:HG23	2.17	0.44
1:A:312:LEU:O	1:A:316:VAL:HG23	2.17	0.44
1:A:997:GLY:HA3	1:A:1273:ALA:O	2.17	0.44
1:B:964:VAL:HB	1:B:965:PRO:HD3	1.98	0.44
1:B:995:LYS:HZ3	1:B:1284:GLN:HE21	1.65	0.44
1:A:506:GLU:CD	1:A:506:GLU:N	2.67	0.44
1:A:686:LYS:HD3	1:A:686:LYS:C	2.38	0.44
1:B:602:GLU:HG3	1:B:822:PRO:HB2	2.00	0.44
1:A:376:SER:HB3	1:A:402:GLU:HG2	1.99	0.44
1:A:703:LYS:NZ	1:A:704:ASN:HD21	2.16	0.44
1:B:154:ARG:HD2	1:B:154:ARG:C	2.38	0.44
1:B:440:VAL:HG13	1:B:440:VAL:O	2.17	0.44
1:B:1183:GLY:HA2	1:B:1247:CYS:O	2.18	0.44
1:B:1312:LYS:O	1:B:1316:LEU:HB2	2.18	0.44
1:B:875:HIS:HA	1:B:900:LEU:HD11	1.99	0.44
1:A:1108:ASN:N	1:A:1109:PRO:HD3	2.33	0.44
1:B:154:ARG:N	1:B:155:PRO:HD2	2.33	0.44
1:A:496:LEU:HB2	1:A:505:ILE:HG23	1.99	0.44
1:A:736:ILE:O	1:A:736:ILE:HG23	2.18	0.44
1:B:315:ALA:HA	1:B:318:LYS:NZ	2.31	0.44
1:B:657:LYS:O	1:B:658:ASP:HB2	2.18	0.44
1:B:923:ALA:HA	1:B:926:TRP:NE1	2.32	0.44
1:A:736:ILE:HG13	1:A:1298:SER:HB3	2.00	0.43
1:A:1000:ILE:HG23	1:A:1000:ILE:O	2.17	0.43
1:B:519:PHE:O	1:B:523:VAL:HG23	2.18	0.43
1:B:558:GLN:HB3	1:B:1192:ILE:HD13	2.00	0.43
1:A:154:ARG:C	1:A:154:ARG:HD2	2.38	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:736:ILE:CG2	1:A:842:PHE:HB2	2.48	0.43
1:A:779:MET:HG3	1:A:810:VAL:CG1	2.48	0.43
1:A:1281:ALA:O	1:A:1284:GLN:HB3	2.18	0.43
1:B:721:LYS:HD2	1:B:721:LYS:O	2.18	0.43
1:A:117:THR:CG2	1:A:586:ALA:HA	2.48	0.43
1:A:670:VAL:HG11	1:A:681:ALA:HB3	2.00	0.43
1:A:772:THR:O	1:A:776:VAL:HG23	2.19	0.43
1:A:226:GLN:HB2	1:A:244:GLU:OE1	2.18	0.43
1:A:383:VAL:HA	1:A:384:PRO:HD3	1.91	0.43
1:B:844:ALA:HB2	1:B:922:ILE:HD13	2.01	0.43
1:A:254:GLU:H	1:A:254:GLU:CD	2.21	0.43
1:B:645:GLU:HG2	1:B:650:ASN:HD22	1.84	0.43
1:A:616:LYS:O	1:A:689:TYR:HA	2.18	0.43
1:B:59:ASP:O	1:B:63:ASP:N	2.51	0.43
1:B:762:LEU:N	1:B:762:LEU:HD12	2.32	0.43
1:B:1037:GLU:HB2	1:B:1043:HIS:CD2	2.54	0.43
1:B:228:ARG:HG3	1:B:237:ILE:CD1	2.49	0.43
1:A:267:GLU:HA	1:A:271:LYS:HB2	1.99	0.43
1:B:113:CYS:HB3	1:B:150:CYS:SG	2.58	0.43
1:B:1008:SER:HA	1:B:1081:VAL:HG11	2.01	0.43
1:B:1253:ILE:O	1:B:1253:ILE:HG23	2.18	0.43
1:A:152:GLY:CA	1:A:1200:VAL:HG21	2.47	0.43
1:A:284:ILE:HA	1:A:285:PRO:HD3	1.88	0.43
1:A:522:THR:HG22	1:A:526:LYS:HE3	2.00	0.43
1:A:752:ILE:HD13	1:A:822:PRO:HB3	2.00	0.43
1:A:844:ALA:CB	1:A:922:ILE:HD13	2.47	0.43
1:B:731:SER:OG	1:B:847:LYS:HG3	2.19	0.43
1:B:1017:ALA:HB1	1:B:1086:TYR:CE2	2.54	0.43
1:B:802:GLU:HG2	1:B:803:THR:HG23	2.01	0.43
1:B:1113:TRP:O	1:B:1117:VAL:HG23	2.19	0.43
1:B:217:LEU:O	1:B:220:LYS:HG2	2.19	0.42
1:B:247:ASP:O	1:B:251:GLN:HG3	2.19	0.42
1:B:366:MET:CE	1:B:387:HIS:HA	2.49	0.42
1:B:736:ILE:CG2	1:B:842:PHE:HB2	2.49	0.42
1:A:312:LEU:HB2	1:A:331:LEU:HD21	2.00	0.42
1:B:1042:LEU:O	1:B:1046:MET:HG2	2.19	0.42
1:A:37:ARG:HD2	1:A:595:ASP:O	2.19	0.42
1:A:58:TYR:CZ	1:A:220:LYS:HD2	2.54	0.42
1:A:868:GLY:HA3	1:A:907:SER:HA	2.02	0.42
1:A:59:ASP:O	1:A:63:ASP:N	2.50	0.42
1:A:331:LEU:O	1:A:335:ARG:HG3	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:606:ARG:HG2	1:A:679:GLU:HA	2.00	0.42
1:A:1227:TYR:C	1:A:1228:LYS:HD2	2.39	0.42
1:B:850:PHE:CD2	1:B:850:PHE:N	2.87	0.42
1:B:1259:VAL:HG22	1:B:1259:VAL:O	2.18	0.42
1:B:331:LEU:O	1:B:335:ARG:HG3	2.20	0.42
1:B:1012:PRO:HB2	11:B:1817:HOH:O	2.18	0.42
1:A:878:MET:O	1:A:881:ALA:HB3	2.19	0.42
1:A:1132:PHE:CD1	1:B:1126:SER:HB2	2.55	0.42
1:B:747:HIS:ND1	1:B:805:SER:HA	2.35	0.42
1:A:102:GLN:NE2	1:A:587:SER:HA	2.35	0.42
1:A:909:THR:OG1	1:A:910:ALA:N	2.51	0.42
1:A:1007:ILE:HD12	1:A:1258:ALA:HB3	2.01	0.42
1:B:117:THR:HB	1:B:118:PRO:HD3	2.01	0.42
1:B:905:LEU:O	1:B:906:SER:C	2.56	0.42
1:B:1031:VAL:HB	1:B:1063:ILE:HG12	2.01	0.42
1:A:912:ARG:N	4:A:1336:MOS:S	2.93	0.42
1:A:1173:ASN:O	1:A:1236:PRO:HA	2.19	0.42
1:B:407:ILE:HD12	1:B:407:ILE:N	2.35	0.42
1:A:393:TYR:CE2	1:A:394:ARG:HD2	2.55	0.42
1:A:1275:LYS:O	1:A:1279:ARG:HG3	2.20	0.42
1:A:1299:PRO:HG2	1:A:1301:THR:HG23	2.02	0.42
1:A:223:PRO:HA	1:A:224:PRO:HD3	1.90	0.41
1:A:558:GLN:HB3	1:A:1192:ILE:HD13	2.02	0.41
1:B:712:LEU:HD21	1:B:879:GLU:HG3	2.02	0.41
1:B:952:LEU:HD23	1:B:958:ARG:HA	2.01	0.41
1:A:105:ILE:HA	11:A:1766:HOH:O	2.20	0.41
1:A:891:ILE:HA	1:A:892:PRO:HD2	1.87	0.41
1:A:1199:PHE:CE1	1:A:1267:GLY:HA2	2.55	0.41
1:B:748:CYS:HB2	1:B:826:MET:HG3	2.02	0.41
1:B:926:TRP:O	1:B:930:VAL:HG23	2.20	0.41
1:A:403:ILE:C	1:A:403:ILE:HD12	2.39	0.41
1:A:721:LYS:HD2	1:A:721:LYS:O	2.21	0.41
1:A:1328:TRP:CE3	1:A:1329:SER:HB3	2.55	0.41
1:B:131:GLN:HE21	1:B:133:GLU:N	2.13	0.41
1:B:429:ASP:OD1	5:B:1337:FAD:H6	2.20	0.41
1:A:802:GLU:OE1	9:A:1344:SAL:H3	2.20	0.41
1:A:866:ASN:C	1:A:866:ASN:HD22	2.23	0.41
1:B:91:ILE:O	1:B:99:HIS:HB2	2.20	0.41
1:B:1078:ALA:HB1	4:B:1336:MOS:O1	2.21	0.41
5:B:1337:FAD:HM73	11:B:1589:HOH:O	2.20	0.41
1:A:598:ARG:HG3	1:B:600:GLU:HG2	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:623:SER:HA	1:A:626:GLN:HE21	1.86	0.41
1:B:284:ILE:HA	1:B:285:PRO:HD3	1.91	0.41
1:A:252:HIS:HB3	1:A:254:GLU:OE2	2.21	0.41
1:B:5:GLU:OE2	1:B:18:LYS:HE2	2.21	0.41
1:B:152:GLY:HA2	1:B:1200:VAL:HG21	2.03	0.41
1:A:632:VAL:HB	1:A:671:VAL:O	2.21	0.41
1:B:236:TRP:CD1	1:B:236:TRP:C	2.93	0.41
1:B:272:ASN:CG	1:B:683:HIS:HE1	2.24	0.41
1:B:1326:LYS:CG	1:B:1327:PRO:HD2	2.50	0.41
1:A:468:LYS:HB2	1:A:493:GLU:OE2	2.21	0.41
1:A:899:ARG:HA	1:A:899:ARG:HD2	1.91	0.41
1:A:1113:TRP:O	1:A:1117:VAL:HG23	2.21	0.41
1:B:605:LEU:HD23	1:B:606:ARG:N	2.36	0.41
1:B:604:PHE:O	1:B:671:VAL:HA	2.20	0.41
1:B:1318:VAL:CG2	1:B:1319:THR:N	2.83	0.41
1:A:471:GLN:HA	1:A:471:GLN:NE2	2.36	0.40
1:B:100:PRO:O	1:B:104:ARG:HG3	2.22	0.40
1:B:1286:THR:CG2	1:B:1287:ASN:N	2.78	0.40
1:A:428:GLU:O	1:A:429:ASP:C	2.60	0.40
1:A:887:ASN:OD1	1:A:1003:THR:HA	2.21	0.40
1:B:81:HIS:O	1:B:82:HIS:HB2	2.21	0.40
1:A:433:LYS:HA	1:A:433:LYS:HD3	1.91	0.40
1:A:570:GLU:OE2	1:A:1057:PRO:HG3	2.21	0.40
1:A:747:HIS:ND1	1:A:805:SER:HA	2.37	0.40
1:A:1259:VAL:O	1:A:1259:VAL:HG22	2.20	0.40
1:B:64:LYS:CB	1:B:64:LYS:NZ	2.84	0.40
1:B:501:PRO:HD2	6:B:1338:NAI:C6A	2.51	0.40
1:A:350:GLY:C	5:A:1337:FAD:H5'1	2.42	0.40
1:A:925:ASN:O	1:A:929:GLU:HG3	2.21	0.40
1:B:32:ARG:NH2	1:B:676:GLU:OE2	2.54	0.40
1:B:271:LYS:HB2	1:B:273:GLN:HG2	2.02	0.40
1:B:152:GLY:O	1:B:1235:ILE:HG21	2.22	0.40
1:B:912:ARG:N	4:B:1336:MOS:S	2.95	0.40
1:B:1021:ILE:HD12	1:B:1093:ALA:HB3	2.03	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	1281/1332 (96%)	1229 (96%)	46 (4%)	6 (0%)	29	31
1	B	1280/1332 (96%)	1228 (96%)	46 (4%)	6 (0%)	29	31
All	All	2561/2664 (96%)	2457 (96%)	92 (4%)	12 (0%)	29	31

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1008	SER
1	B	1008	SER
1	A	429	ASP
1	A	912	ARG
1	B	429	ASP
1	B	912	ARG
1	B	1002	PRO
1	A	797	GLY
1	A	1139	GLY
1	B	1139	GLY
1	A	213	PRO
1	B	797	GLY

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	1092/1128 (97%)	1079 (99%)	13 (1%)	71	83

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	1092/1128 (97%)	1080 (99%)	12 (1%)	73	85
All	All	2184/2256 (97%)	2159 (99%)	25 (1%)	73	85

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	149	ARG
1	A	254	GLU
1	A	337	PHE
1	A	565	ASN
1	A	569	LYS
1	A	721	LYS
1	A	743	TYR
1	A	866	ASN
1	A	911	PHE
1	A	1002	PRO
1	A	1145	ASN
1	A	1239	PHE
1	A	1326	LYS
1	B	64	LYS
1	B	337	PHE
1	B	348	LEU
1	B	403	ILE
1	B	538	LEU
1	B	743	TYR
1	B	866	ASN
1	B	911	PHE
1	B	1002	PRO
1	B	1072	PRO
1	B	1239	PHE
1	B	1262	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (33) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	131	GLN
1	A	251	GLN
1	A	471	GLN
1	A	473	GLN
1	A	565	ASN
1	A	626	GLN

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Mol	Chain	Res	Type
1	A	650	ASN
1	A	704	ASN
1	A	866	ASN
1	A	875	HIS
1	A	1088	GLN
1	A	1145	ASN
1	A	1212	HIS
1	A	1284	GLN
1	A	1289	ASN
1	B	131	GLN
1	B	144	GLN
1	B	197	ASN
1	B	272	ASN
1	B	471	GLN
1	B	473	GLN
1	B	556	ASN
1	B	626	GLN
1	B	650	ASN
1	B	683	HIS
1	B	866	ASN
1	B	869	ASN
1	B	1088	GLN
1	B	1095	GLN
1	B	1108	ASN
1	B	1122	GLN
1	B	1145	ASN
1	B	1284	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 27 ligands modelled in this entry, 2 are monoatomic - leaving 25 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	SAL	A	1344	-	10,10,10	1.91	5 (50%)	13,13,13	2.03	4 (30%)
8	CO3	A	1343	-	2,3,3	0.22	0	2,3,3	0.19	0
7	GOL	B	1341	-	5,5,5	0.33	0	5,5,5	0.31	0
7	GOL	B	1339	-	5,5,5	0.34	0	5,5,5	0.20	0
7	GOL	A	1342	-	5,5,5	0.45	0	5,5,5	0.40	0
9	SAL	B	1345	-	10,10,10	1.92	5 (50%)	13,13,13	2.09	4 (30%)
7	GOL	B	1340	-	5,5,5	0.45	0	5,5,5	0.35	0
3	MTE	A	1335	4	21,26,26	2.56	6 (28%)	21,40,40	3.28	7 (33%)
2	FES	A	1334	1	0,4,4	-	-	-	-	-
2	FES	A	1333	1	0,4,4	-	-	-	-	-
5	FAD	A	1337	-	53,58,58	2.58	16 (30%)	68,89,89	2.03	18 (26%)
4	MOS	B	1336	3	0,3,3	-	-	-	-	-
7	GOL	B	1342	-	5,5,5	0.38	0	5,5,5	0.28	0
5	FAD	B	1337	-	53,58,58	2.54	17 (32%)	68,89,89	2.05	17 (25%)
2	FES	B	1334	1	0,4,4	-	-	-	-	-
2	FES	B	1333	1	0,4,4	-	-	-	-	-
6	NAI	A	1338	-	42,48,48	1.25	4 (9%)	47,73,73	1.42	4 (8%)
6	NAI	B	1338	-	42,48,48	1.29	5 (11%)	47,73,73	1.41	4 (8%)
3	MTE	B	1335	4	21,26,26	2.55	7 (33%)	21,40,40	3.19	8 (38%)
7	GOL	A	1341	-	5,5,5	0.40	0	5,5,5	0.36	0
7	GOL	B	1343	-	5,5,5	0.38	0	5,5,5	0.31	0
7	GOL	A	1340	-	5,5,5	0.25	0	5,5,5	0.14	0
7	GOL	A	1339	-	5,5,5	0.44	0	5,5,5	0.33	0
8	CO3	B	1344	-	2,3,3	0.21	0	2,3,3	0.06	0
4	MOS	A	1336	3	0,3,3	-	-	-	-	-

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	SAL	A	1344	-	-	0/4/4/4	0/1/1/1
7	GOL	B	1341	-	-	4/4/4/4	-
7	GOL	B	1339	-	-	0/4/4/4	-
9	SAL	B	1345	-	-	0/4/4/4	0/1/1/1
7	GOL	A	1342	-	-	2/4/4/4	-
7	GOL	B	1340	-	-	0/4/4/4	-
3	MTE	A	1335	4	-	1/6/34/34	0/3/3/3
2	FES	A	1334	1	-	-	0/1/1/1
5	FAD	A	1337	-	-	7/30/50/50	0/6/6/6
2	FES	A	1333	1	-	-	0/1/1/1
7	GOL	B	1342	-	-	2/4/4/4	-
5	FAD	B	1337	-	-	7/30/50/50	0/6/6/6
2	FES	B	1334	1	-	-	0/1/1/1
2	FES	B	1333	1	-	-	0/1/1/1
6	NAI	A	1338	-	-	7/25/72/72	0/5/5/5
6	NAI	B	1338	-	-	7/25/72/72	0/5/5/5
3	MTE	B	1335	4	-	1/6/34/34	0/3/3/3
7	GOL	A	1341	-	-	2/4/4/4	-
7	GOL	B	1343	-	-	0/4/4/4	-
7	GOL	A	1340	-	-	0/4/4/4	-
7	GOL	A	1339	-	-	3/4/4/4	-

All (65) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1337	FAD	O4B-C1B	7.97	1.52	1.41
5	B	1337	FAD	O4B-C1B	7.53	1.51	1.41
3	A	1335	MTE	O3'-C3'	6.28	1.52	1.43
3	B	1335	MTE	O3'-C3'	6.06	1.51	1.43
5	A	1337	FAD	C9A-N10	5.97	1.51	1.41
5	B	1337	FAD	C9A-N10	5.79	1.51	1.41
3	A	1335	MTE	C9-N5	5.54	1.49	1.38
3	B	1335	MTE	C9-N5	5.35	1.49	1.38
5	A	1337	FAD	C4A-N3A	5.30	1.43	1.35
5	B	1337	FAD	C9A-C5X	5.25	1.50	1.41
5	B	1337	FAD	C9-C9A	5.15	1.48	1.39
5	B	1337	FAD	C4A-N3A	5.14	1.42	1.35
5	A	1337	FAD	C9A-C5X	5.11	1.49	1.41
5	A	1337	FAD	C2A-N3A	4.74	1.39	1.32
5	A	1337	FAD	C9-C9A	4.72	1.47	1.39
5	B	1337	FAD	C2A-N3A	4.60	1.39	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	1338	NAI	C6N-C5N	4.42	1.41	1.33
5	A	1337	FAD	C2A-N1A	4.25	1.41	1.33
5	B	1337	FAD	C6-C5X	4.22	1.46	1.40
3	A	1335	MTE	O3'-C7	4.20	1.49	1.43
3	B	1335	MTE	O4-C4	4.18	1.35	1.24
3	A	1335	MTE	O4-C4	4.15	1.35	1.24
5	B	1337	FAD	C2A-N1A	4.13	1.41	1.33
6	A	1338	NAI	C6N-C5N	4.06	1.40	1.33
5	A	1337	FAD	O4B-C4B	4.05	1.54	1.45
5	A	1337	FAD	C4X-N5	4.05	1.38	1.30
5	B	1337	FAD	C4X-N5	3.97	1.38	1.30
3	B	1335	MTE	O3'-C7	3.93	1.49	1.43
5	A	1337	FAD	C6-C5X	3.92	1.46	1.40
5	B	1337	FAD	C8-C7	3.91	1.50	1.40
5	A	1337	FAD	C8-C7	3.82	1.50	1.40
5	B	1337	FAD	C10-N1	3.70	1.40	1.33
5	A	1337	FAD	C10-N1	3.68	1.40	1.33
5	B	1337	FAD	O4B-C4B	3.54	1.52	1.45
3	B	1335	MTE	C4-N3	3.12	1.38	1.33
9	A	1344	SAL	C1-C1'	-3.08	1.43	1.49
3	B	1335	MTE	C9-C10	3.06	1.47	1.41
6	A	1338	NAI	C4N-C5N	-3.04	1.41	1.48
3	A	1335	MTE	C9-C10	3.03	1.47	1.41
6	B	1338	NAI	C4N-C3N	2.98	1.55	1.49
3	A	1335	MTE	C4-N3	2.91	1.38	1.33
6	B	1338	NAI	C4N-C5N	-2.89	1.41	1.48
5	A	1337	FAD	C2-N3	2.87	1.45	1.39
6	A	1338	NAI	C4N-C3N	2.85	1.55	1.49
9	B	1345	SAL	C5-C6	2.83	1.44	1.38
5	B	1337	FAD	C2-N3	2.74	1.45	1.39
3	B	1335	MTE	C7-C6	2.71	1.55	1.53
9	A	1344	SAL	C5-C6	2.71	1.44	1.38
5	A	1337	FAD	C2B-C1B	-2.60	1.49	1.53
9	B	1345	SAL	C1-C1'	-2.55	1.44	1.49
9	B	1345	SAL	C6-C1	2.53	1.43	1.39
9	B	1345	SAL	C3-C2	2.46	1.43	1.39
9	A	1344	SAL	O2'-C1'	-2.44	1.23	1.30
9	A	1344	SAL	C6-C1	2.35	1.43	1.39
9	B	1345	SAL	O2'-C1'	-2.33	1.23	1.30
6	A	1338	NAI	O4B-C1B	2.31	1.44	1.41
5	B	1337	FAD	C4X-C10	2.30	1.51	1.44
5	A	1337	FAD	C5A-C4A	2.29	1.47	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1337	FAD	C5A-C4A	2.28	1.47	1.40
5	A	1337	FAD	C4X-C10	2.26	1.50	1.44
5	B	1337	FAD	C6-C7	2.24	1.42	1.39
9	A	1344	SAL	C3-C2	2.18	1.43	1.39
5	B	1337	FAD	C2B-C1B	-2.18	1.50	1.53
6	B	1338	NAI	C7N-C3N	2.14	1.53	1.48
6	B	1338	NAI	C6N-N1N	2.05	1.42	1.37

All (66) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1335	MTE	C4-C9-N5	9.85	127.39	119.12
3	B	1335	MTE	C4-C9-N5	9.17	126.82	119.12
5	A	1337	FAD	C9-C9A-N10	6.83	131.07	121.84
5	B	1337	FAD	C9-C9A-N10	6.77	130.99	121.84
5	B	1337	FAD	C5X-C9A-N10	-5.94	111.82	117.95
5	A	1337	FAD	C5X-C9A-N10	-5.74	112.03	117.95
3	B	1335	MTE	N1-C2-N3	-5.57	116.69	125.42
3	A	1335	MTE	N1-C2-N3	-5.48	116.82	125.42
6	B	1338	NAI	N3A-C2A-N1A	-5.17	120.60	128.68
6	A	1338	NAI	N3A-C2A-N1A	-5.09	120.72	128.68
3	A	1335	MTE	N2-C2-N3	5.05	125.10	117.25
3	A	1335	MTE	C2-N1-C10	4.93	125.60	114.54
3	B	1335	MTE	N2-C2-N3	4.93	124.92	117.25
3	B	1335	MTE	C2-N1-C10	4.88	125.48	114.54
5	B	1337	FAD	C4-C4X-N5	4.80	125.06	118.23
5	A	1337	FAD	C4-C4X-N5	4.69	124.91	118.23
6	B	1338	NAI	O4D-C1D-N1N	-4.67	98.92	108.06
5	A	1337	FAD	N3A-C2A-N1A	-4.62	121.45	128.68
6	A	1338	NAI	O4D-C1D-N1N	-4.55	99.16	108.06
5	B	1337	FAD	N3A-C2A-N1A	-4.54	121.58	128.68
3	A	1335	MTE	C2-N3-C4	4.34	122.82	115.93
3	B	1335	MTE	C2-N3-C4	4.30	122.77	115.93
9	B	1345	SAL	O2'-C1'-O1'	-4.07	114.33	123.35
5	B	1337	FAD	C10-N1-C2	4.00	124.91	116.90
5	A	1337	FAD	C10-N1-C2	4.00	124.90	116.90
9	A	1344	SAL	O2'-C1'-O1'	-3.86	114.77	123.35
3	A	1335	MTE	O3'-C7-C6	-3.83	106.41	108.96
3	B	1335	MTE	O3'-C7-C6	-3.70	106.50	108.96
5	B	1337	FAD	C8M-C8-C7	3.67	128.25	120.74
5	A	1337	FAD	C8M-C8-C7	3.58	128.08	120.74
9	B	1345	SAL	C3-C2-C1	3.38	123.52	119.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	A	1344	SAL	C3-C2-C1	3.37	123.51	119.89
5	B	1337	FAD	C9A-N10-C10	3.12	125.63	120.77
5	B	1337	FAD	C8M-C8-C9	-3.07	113.81	119.49
9	A	1344	SAL	C2-C1-C1'	3.04	123.28	120.03
9	B	1345	SAL	C2-C1-C1'	3.04	123.28	120.03
5	A	1337	FAD	C8M-C8-C9	-2.98	113.99	119.49
5	A	1337	FAD	C9A-N10-C10	2.85	125.21	120.77
6	A	1338	NAI	PN-O3-PA	-2.78	123.30	132.83
5	B	1337	FAD	C1'-N10-C9A	-2.73	115.95	120.51
6	B	1338	NAI	PN-O3-PA	-2.70	123.56	132.83
6	A	1338	NAI	C3N-C2N-N1N	-2.65	119.31	123.10
5	A	1337	FAD	C1'-N10-C9A	-2.64	116.12	120.51
9	B	1345	SAL	O2'-C1'-C1	2.59	122.75	115.31
5	B	1337	FAD	O3B-C3B-C4B	-2.55	103.67	111.05
5	A	1337	FAD	O3'-C3'-C4'	2.54	114.94	108.81
6	B	1338	NAI	C3N-C2N-N1N	-2.48	119.55	123.10
9	A	1344	SAL	O2'-C1'-C1	2.48	122.45	115.31
5	B	1337	FAD	O4-C4-C4X	-2.44	120.13	126.60
5	A	1337	FAD	C5X-N5-C4X	2.42	122.10	118.07
5	A	1337	FAD	O4-C4-C4X	-2.42	120.17	126.60
5	A	1337	FAD	O3B-C3B-C4B	-2.42	104.05	111.05
5	B	1337	FAD	O3'-C3'-C4'	2.40	114.62	108.81
3	B	1335	MTE	P-O4'-C4'	2.36	124.80	118.30
5	B	1337	FAD	C10-C4X-N5	-2.32	119.94	124.86
3	B	1335	MTE	C10-C9-C4	2.32	116.63	114.57
5	A	1337	FAD	C10-C4X-N5	-2.32	119.94	124.86
5	B	1337	FAD	C5X-N5-C4X	2.26	121.84	118.07
5	A	1337	FAD	C4A-C5A-N7A	2.25	111.75	109.40
5	B	1337	FAD	C4A-C5A-N7A	2.21	111.70	109.40
5	B	1337	FAD	C4X-C4-N3	2.18	118.72	113.19
5	A	1337	FAD	C4X-C4-N3	2.15	118.65	113.19
5	B	1337	FAD	O4B-C4B-C5B	-2.15	102.31	109.37
5	A	1337	FAD	P-O3P-PA	2.08	139.98	132.83
5	A	1337	FAD	C4'-C3'-C2'	-2.06	109.08	113.36
3	A	1335	MTE	C10-C9-C4	2.05	116.39	114.57

There are no chirality outliers.

All (43) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1337	FAD	N10-C1'-C2'-O2'
5	A	1337	FAD	N10-C1'-C2'-C3'

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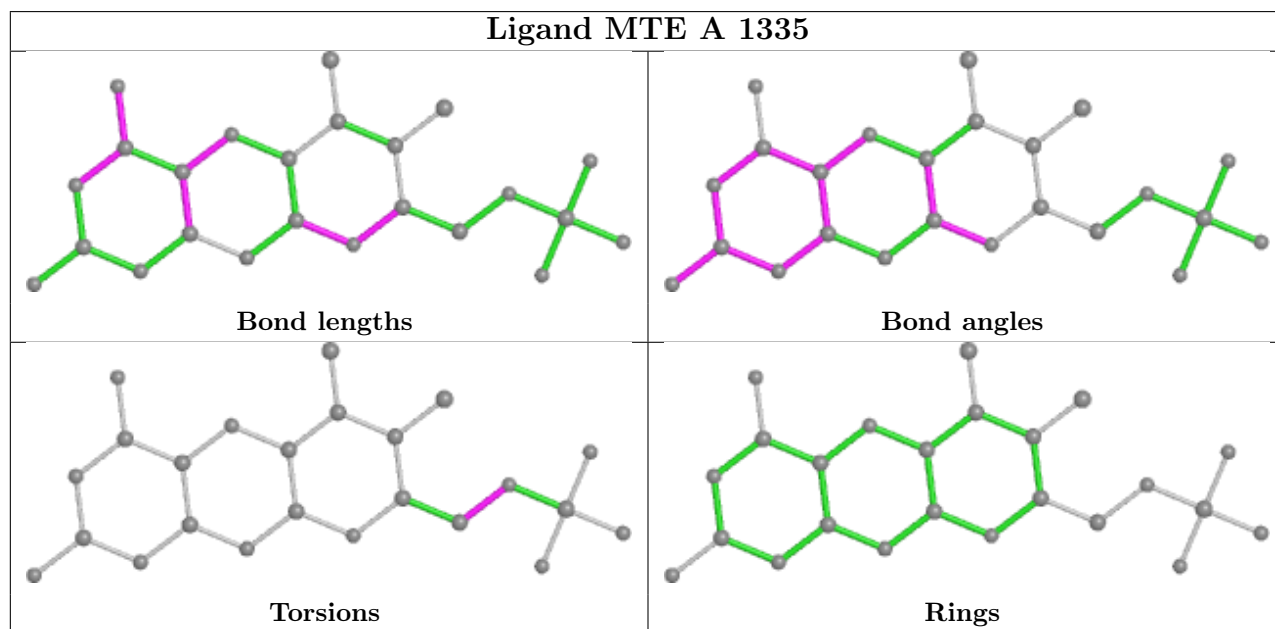
Mol	Chain	Res	Type	Atoms
5	B	1337	FAD	N10-C1'-C2'-O2'
5	B	1337	FAD	N10-C1'-C2'-C3'
7	A	1339	GOL	C1-C2-C3-O3
7	A	1341	GOL	O1-C1-C2-C3
7	B	1341	GOL	C1-C2-C3-O3
7	B	1342	GOL	C1-C2-C3-O3
5	A	1337	FAD	C2'-C3'-C4'-C5'
5	B	1337	FAD	C2'-C3'-C4'-C5'
6	A	1338	NAI	C2D-C1D-N1N-C6N
7	B	1342	GOL	O2-C2-C3-O3
5	A	1337	FAD	C2'-C3'-C4'-O4'
5	B	1337	FAD	C2'-C3'-C4'-O4'
3	A	1335	MTE	C3'-C4'-O4'-P
3	B	1335	MTE	C3'-C4'-O4'-P
5	A	1337	FAD	O3'-C3'-C4'-C5'
5	B	1337	FAD	O3'-C3'-C4'-C5'
6	B	1338	NAI	C2D-C1D-N1N-C6N
5	A	1337	FAD	O3'-C3'-C4'-O4'
5	B	1337	FAD	O3'-C3'-C4'-O4'
6	A	1338	NAI	C2D-C1D-N1N-C2N
6	B	1338	NAI	C2D-C1D-N1N-C2N
7	A	1339	GOL	O2-C2-C3-O3
7	A	1341	GOL	O1-C1-C2-O2
7	B	1341	GOL	O1-C1-C2-O2
7	B	1341	GOL	O2-C2-C3-O3
6	A	1338	NAI	PA-O3-PN-O5D
6	B	1338	NAI	PA-O3-PN-O5D
6	B	1338	NAI	O4D-C1D-N1N-C6N
7	A	1339	GOL	O1-C1-C2-O2
7	A	1342	GOL	O2-C2-C3-O3
7	A	1342	GOL	C1-C2-C3-O3
6	A	1338	NAI	O4D-C1D-N1N-C6N
6	A	1338	NAI	O4D-C1D-N1N-C2N
6	B	1338	NAI	O4D-C1D-N1N-C2N
5	B	1337	FAD	C2'-C1'-N10-C10
6	A	1338	NAI	O4D-C4D-C5D-O5D
6	B	1338	NAI	O4D-C4D-C5D-O5D
7	B	1341	GOL	O1-C1-C2-C3
6	A	1338	NAI	C2N-C3N-C7N-N7N
6	B	1338	NAI	C2N-C3N-C7N-N7N
5	A	1337	FAD	C2'-C1'-N10-C10

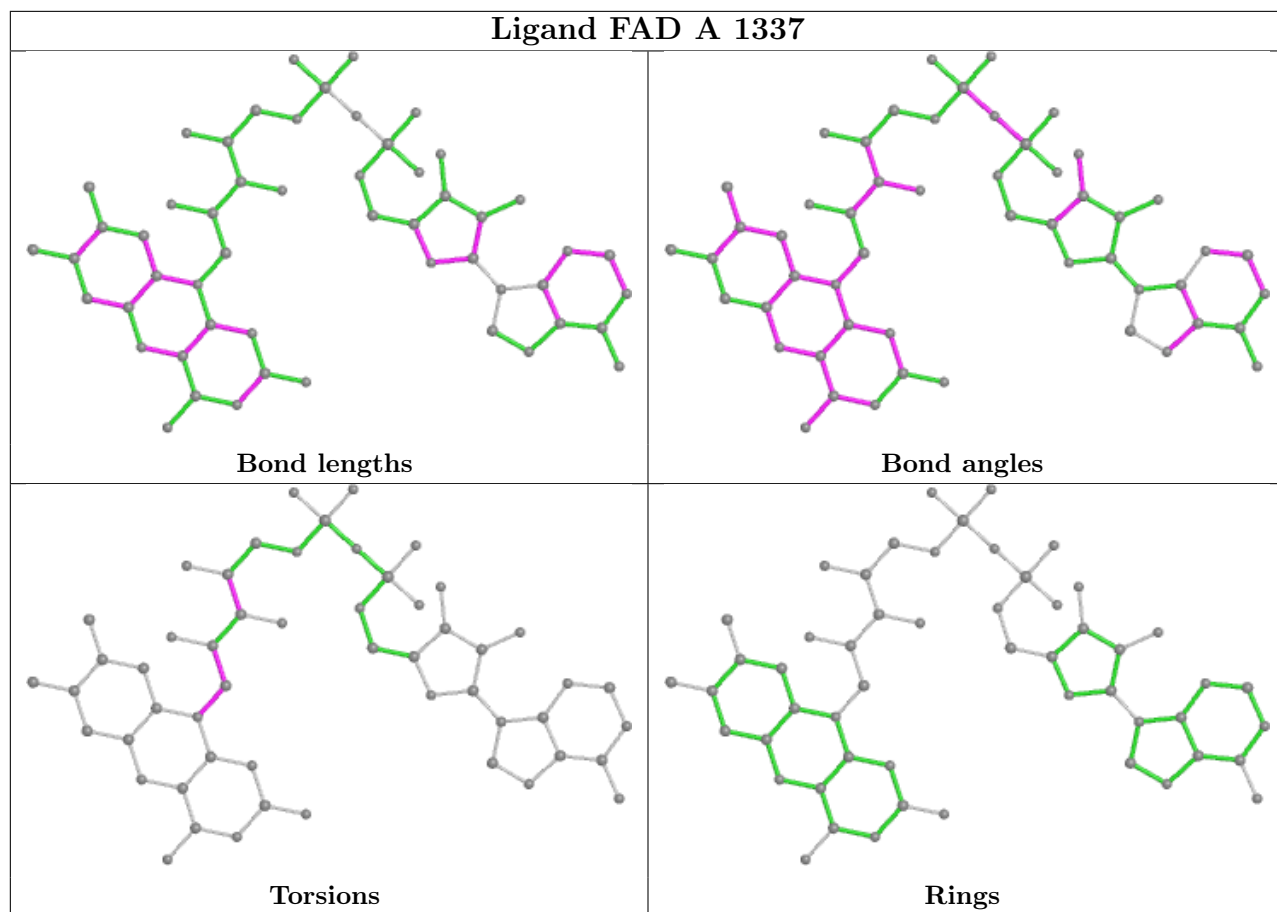
There are no ring outliers.

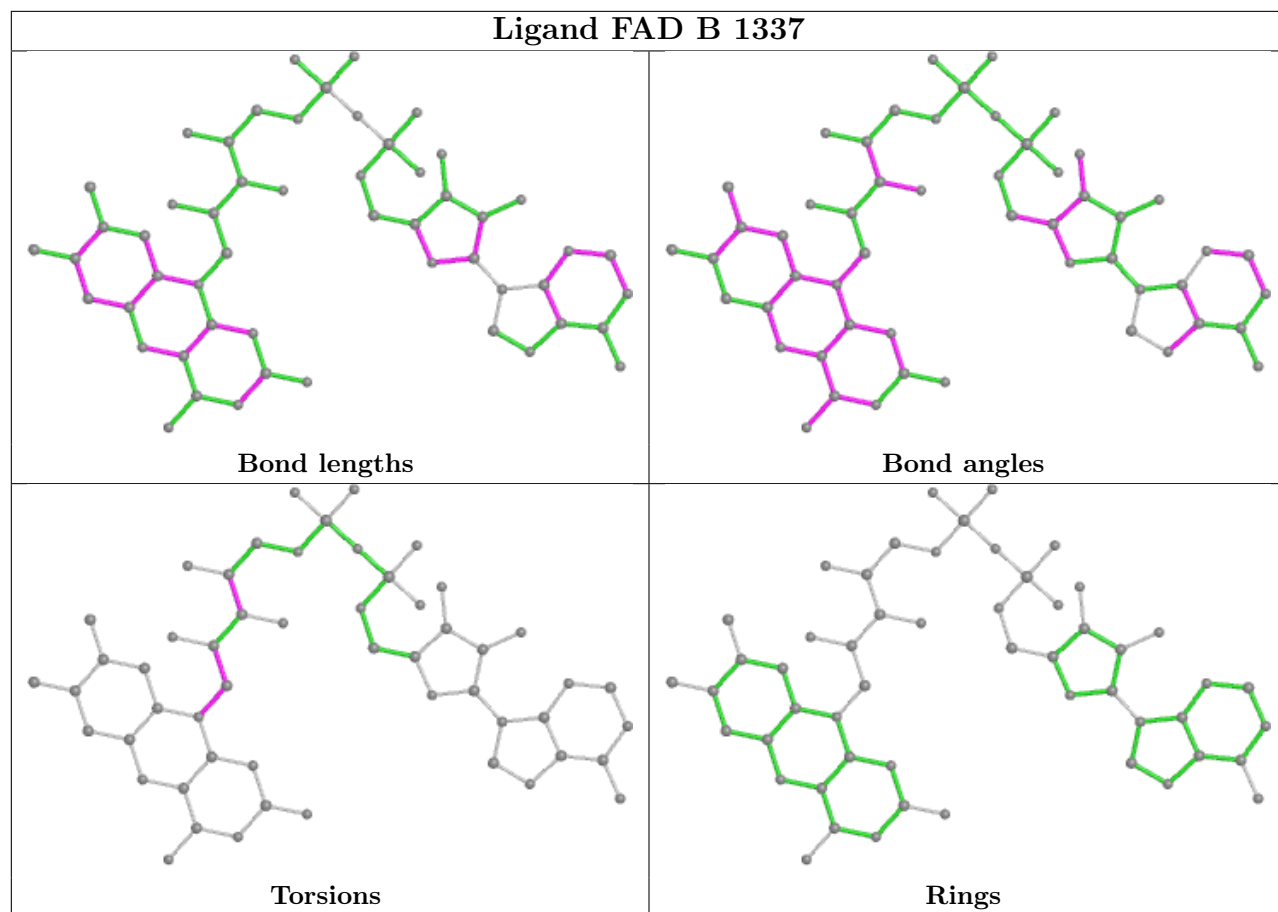
9 monomers are involved in 16 short contacts:

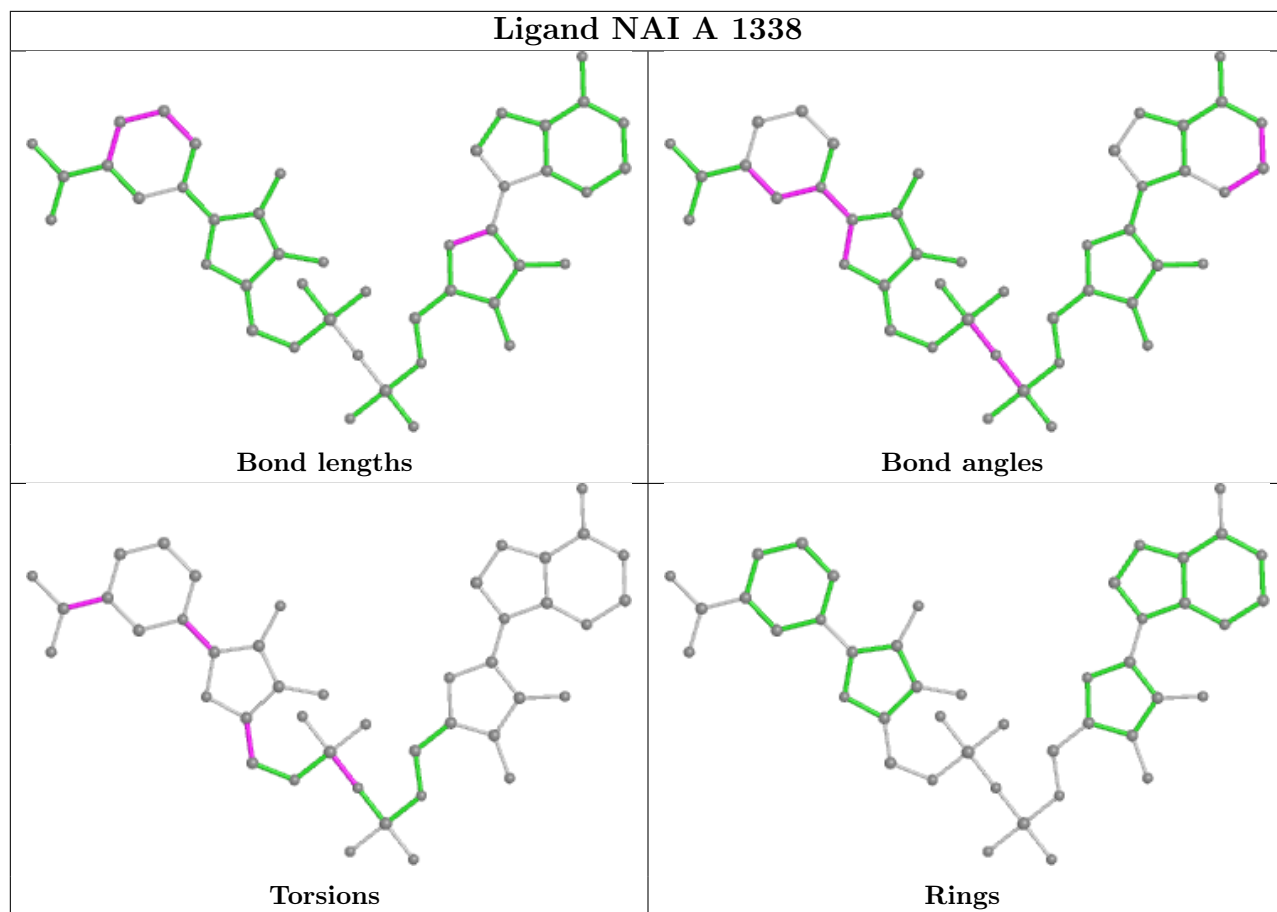
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	A	1344	SAL	1	0
3	A	1335	MTE	1	0
5	A	1337	FAD	3	0
4	B	1336	MOS	3	0
7	B	1342	GOL	1	0
5	B	1337	FAD	3	0
6	B	1338	NAI	1	0
3	B	1335	MTE	1	0
4	A	1336	MOS	2	0

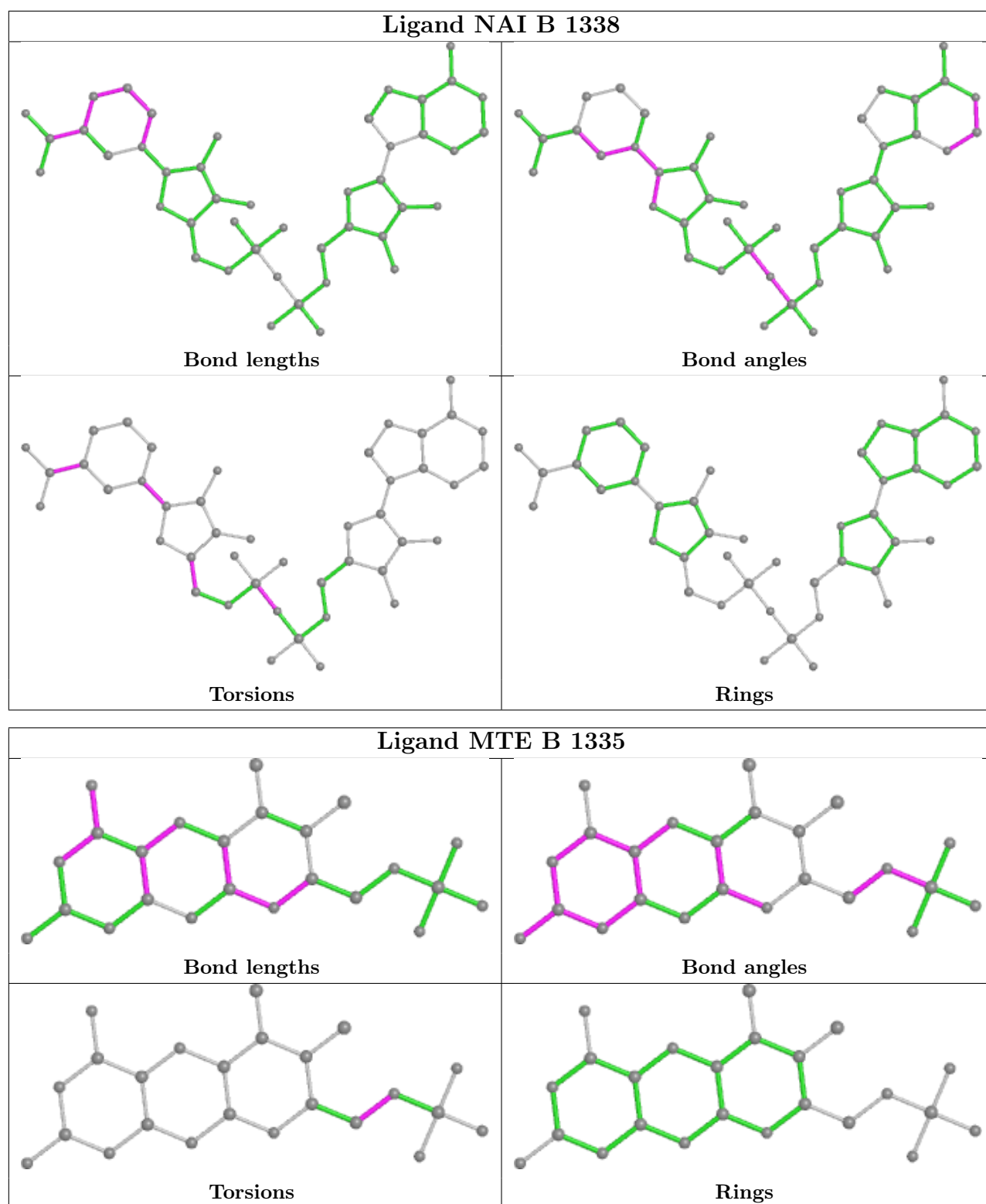
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

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	1289/1332 (96%)	-0.28	26 (2%) 65 63	7, 22, 40, 65	0
1	B	1288/1332 (96%)	-0.26	23 (1%) 68 66	7, 23, 39, 65	0
All	All	2577/2664 (96%)	-0.27	49 (1%) 66 65	7, 22, 40, 65	0

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	1288	ASN	7.7
1	A	1288	ASN	6.6
1	A	565	ASN	5.5
1	A	1286	THR	4.8
1	A	1320	GLY	4.6
1	B	223	PRO	4.5
1	B	1287	ASN	4.5
1	B	1286	THR	4.4
1	A	1290	THR	4.1
1	A	1321	ALA	3.8
1	A	1318	VAL	3.7
1	B	1290	THR	3.4
1	A	221	ASP	3.4
1	A	272	ASN	3.3
1	B	1318	VAL	3.1
1	A	378	GLY	3.0
1	A	1319	THR	2.9
1	A	223	PRO	2.9
1	B	1319	THR	2.8
1	B	566	GLY	2.7
1	A	553	PRO	2.6
1	B	852	LYS	2.6
1	B	1320	GLY	2.6
1	A	222	VAL	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	553	PRO	2.6
1	B	221	ASP	2.5
1	A	540	PRO	2.4
1	A	551	LYS	2.4
1	A	566	GLY	2.4
1	B	272	ASN	2.4
1	A	564	PRO	2.4
1	B	271	LYS	2.4
1	B	222	VAL	2.3
1	B	64	LYS	2.3
1	A	1289	ASN	2.3
1	B	565	ASN	2.2
1	B	1289	ASN	2.2
1	B	63	ASP	2.2
1	A	1287	ASN	2.1
1	A	703	LYS	2.1
1	A	721	LYS	2.1
1	B	551	LYS	2.1
1	B	550	GLN	2.1
1	A	528	GLY	2.1
1	A	1330	LEU	2.1
1	A	64	LYS	2.1
1	A	63	ASP	2.0
1	B	703	LYS	2.0
1	B	958	ARG	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 monosaccharides in this entry.

6.4 Ligands [i](#)

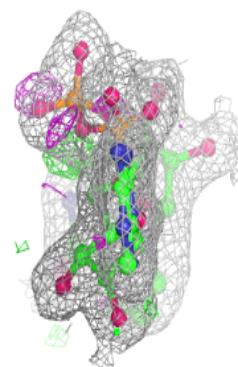
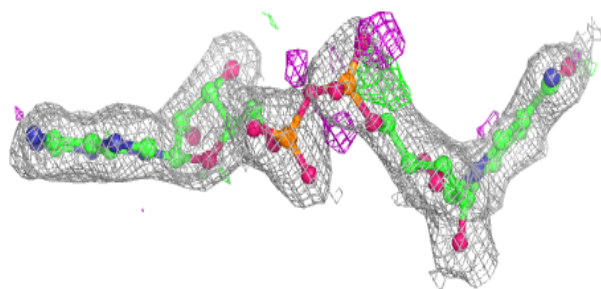
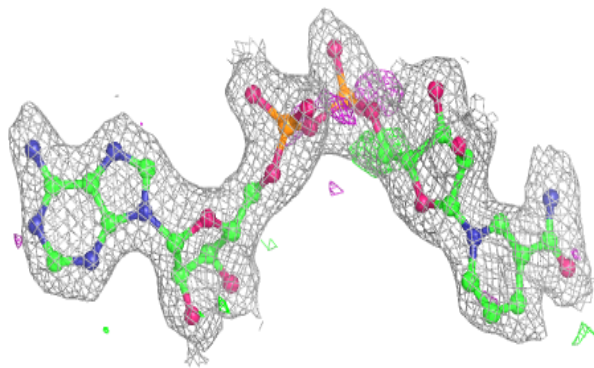
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
7	GOL	A	1339	6/6	0.91	0.15	37,38,40,40	0
6	NAI	B	1338	44/44	0.93	0.12	16,23,27,31	0
7	GOL	A	1340	6/6	0.93	0.14	25,26,28,28	0
7	GOL	A	1342	6/6	0.93	0.14	28,30,31,34	0
7	GOL	B	1339	6/6	0.93	0.13	22,23,25,25	0
7	GOL	B	1340	6/6	0.93	0.12	25,29,29,33	0
9	SAL	B	1345	10/10	0.93	0.11	26,27,29,29	0
7	GOL	B	1343	6/6	0.94	0.13	30,33,35,38	0
6	NAI	A	1338	44/44	0.94	0.11	18,24,30,33	0
7	GOL	B	1342	6/6	0.95	0.14	30,31,31,32	0
7	GOL	A	1341	6/6	0.96	0.13	18,20,21,25	0
5	FAD	A	1337	53/53	0.96	0.10	16,19,25,30	0
7	GOL	B	1341	6/6	0.96	0.10	16,16,18,19	0
9	SAL	A	1344	10/10	0.97	0.09	17,21,23,25	0
5	FAD	B	1337	53/53	0.97	0.10	16,20,24,26	0
8	CO3	A	1343	4/4	0.98	0.07	12,13,14,15	0
8	CO3	B	1344	4/4	0.98	0.07	12,13,14,16	0
3	MTE	B	1335	24/24	0.98	0.09	12,17,20,24	0
3	MTE	A	1335	24/24	0.98	0.09	9,15,20,24	0
2	FES	A	1333	4/4	0.99	0.05	12,13,13,13	0
2	FES	A	1334	4/4	0.99	0.04	14,15,16,17	0
4	MOS	B	1336	4/4	0.99	0.06	19,22,22,29	0
2	FES	B	1333	4/4	0.99	0.05	11,11,12,13	0
2	FES	B	1334	4/4	0.99	0.05	14,14,16,17	0
10	CA	B	1346	1/1	0.99	0.07	21,21,21,21	0
10	CA	A	1345	1/1	1.00	0.07	17,17,17,17	0
4	MOS	A	1336	4/4	1.00	0.07	17,19,23,28	0

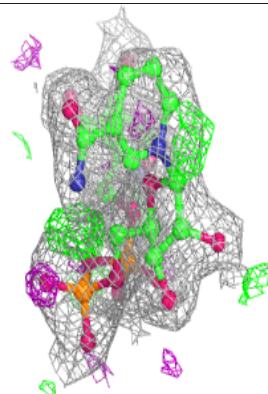
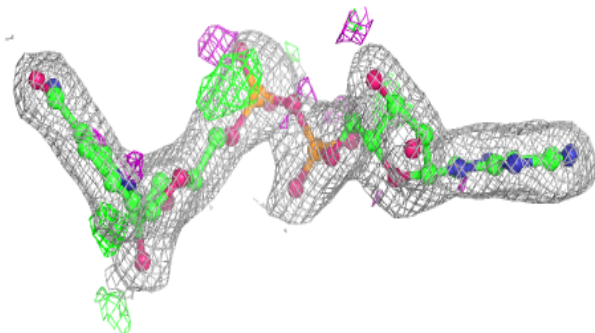
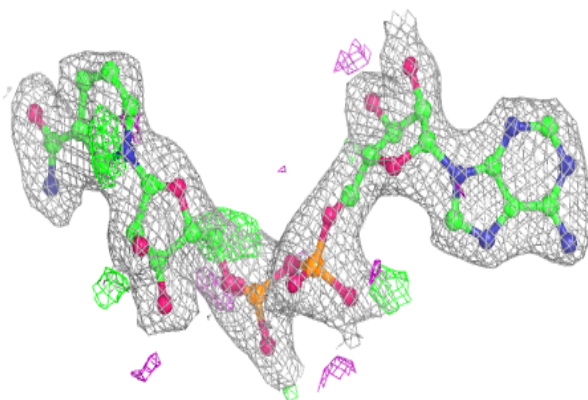
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around NAI B 1338:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

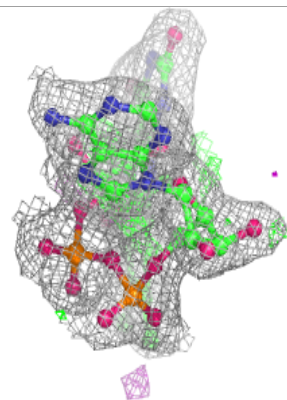
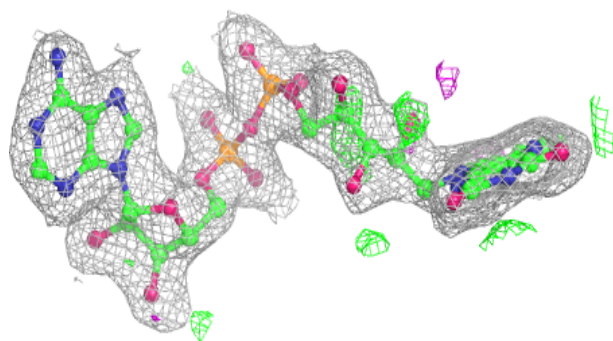
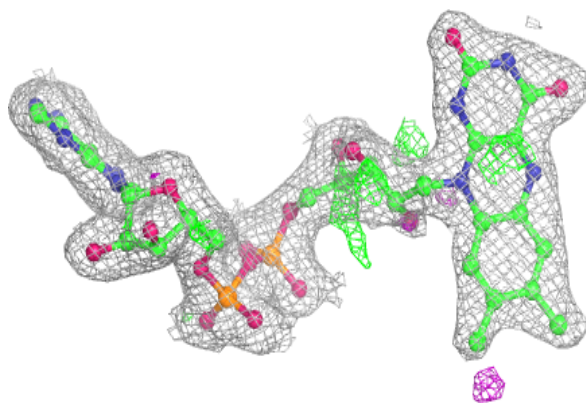
**Electron density around NAI A 1338:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

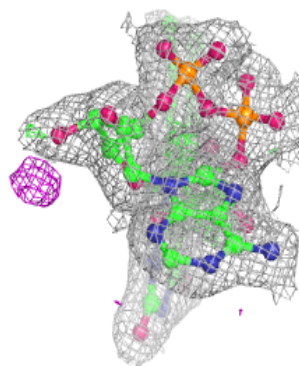
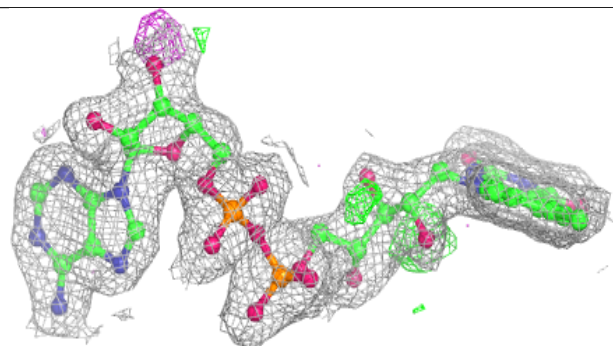
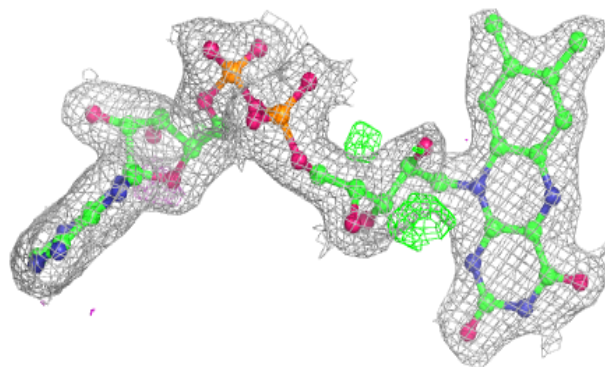


Electron density around FAD A 1337:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

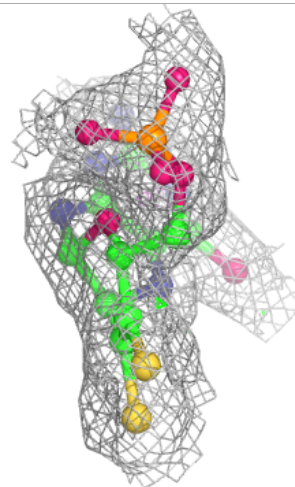
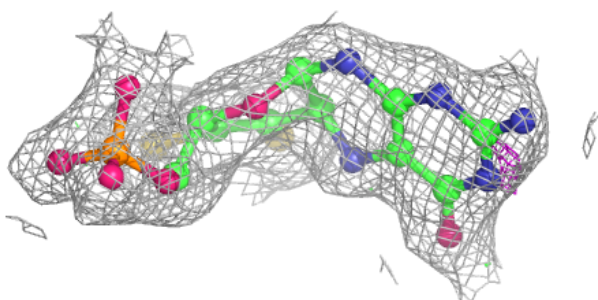
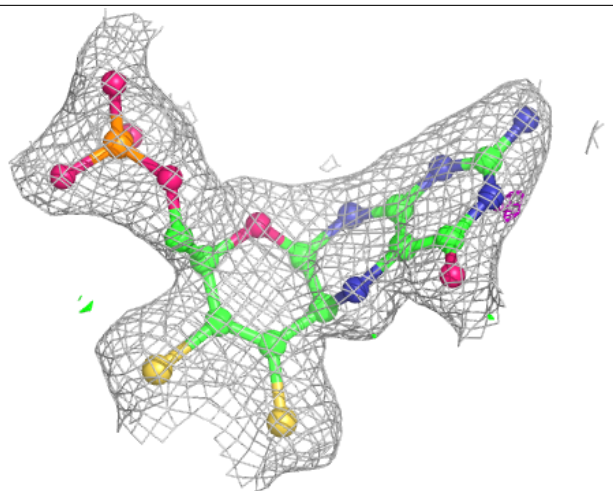
**Electron density around FAD B 1337:**

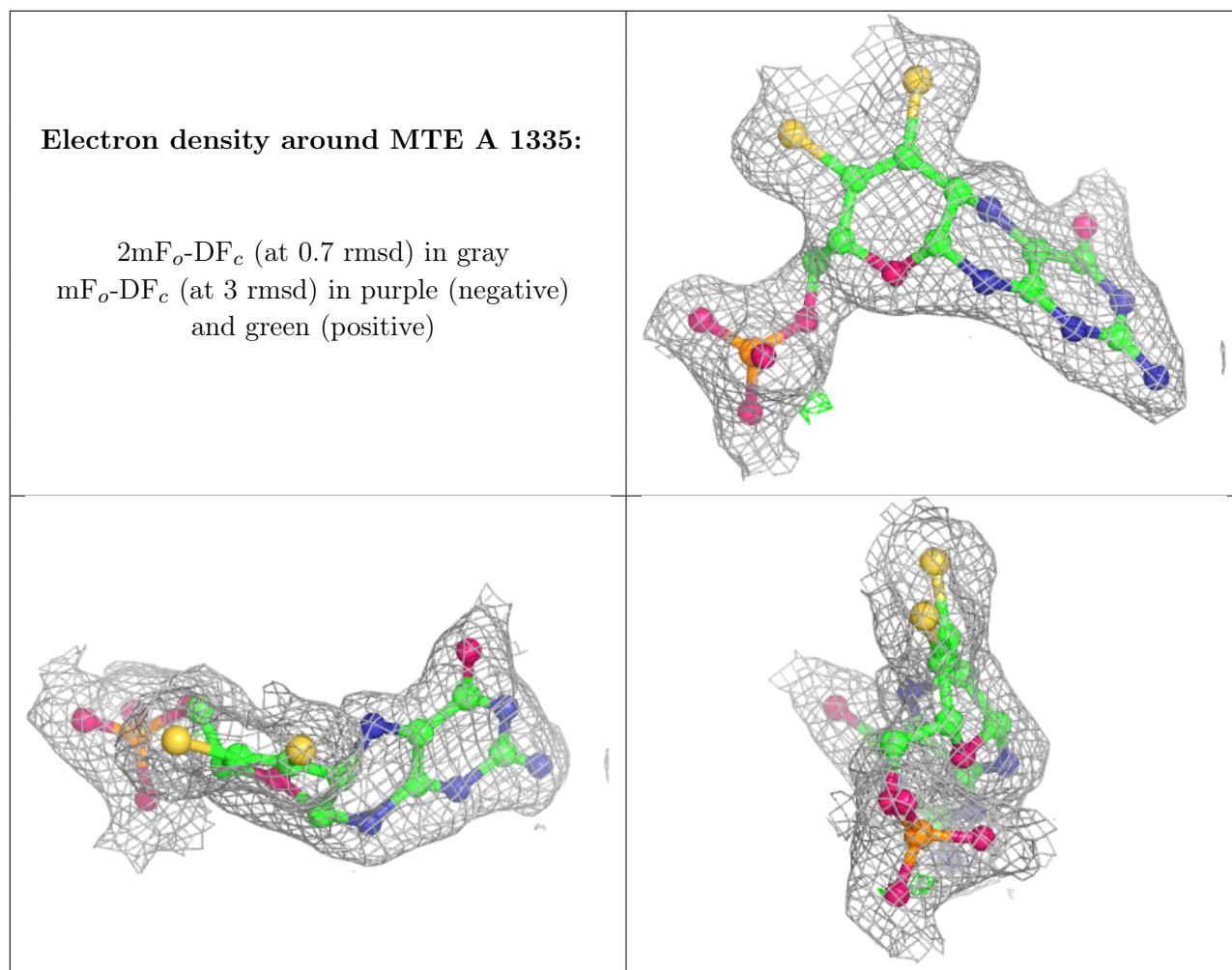
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around MTE B 1335:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





6.5 Other polymers [i](#)

There are no such residues in this entry.