Full wwPDB X-ray Structure Validation Report (i)

Sep 4, 2023 – 11:02 PM EDT

PDB ID	:	3UNA
Title	:	Crystal Structure of Bovine Milk Xanthine Dehydrogenase with NAD Bound
Authors	:	Eger, B.T.; Okamoto, K.; Nishino, T.; Pai, E.F.
Deposited on	:	2011-11-15
Resolution	:	1.90 Å(reported)

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

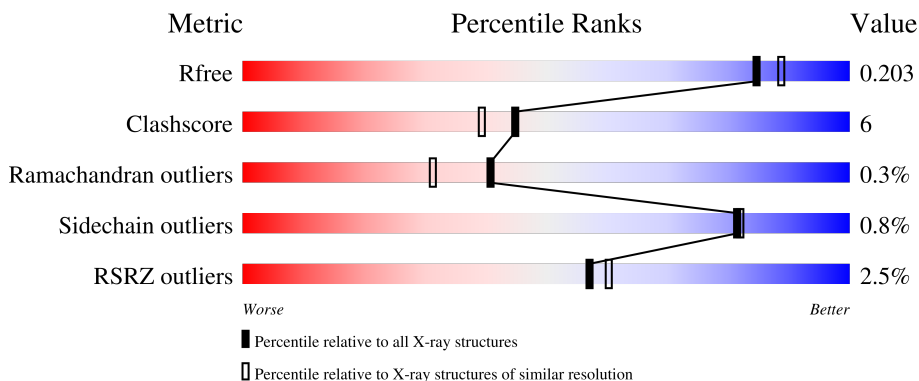|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & 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:
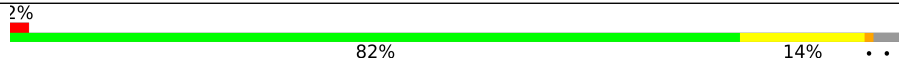*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 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	Percentile Ranks	Value
Rfree		0.203
Clashscore		6
Ramachandran outliers		0.3%
Sidechain outliers		0.8%
RSRZ outliers		2.5%

Worse   *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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 <=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% ▨ 82% ... 14% .
1	B	1332	2% ▨ 82% ... 14% ..

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:

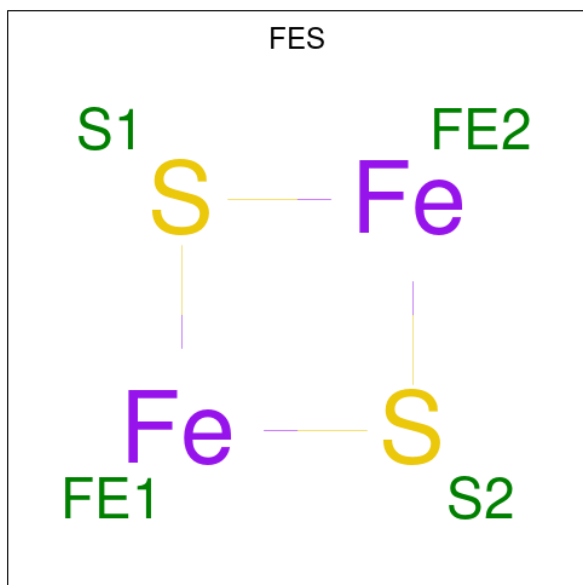| Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	MOS	A	1336	-	-	X	-
4	MOS	B	1336	-	-	X	-

2 Entry composition ⓘ

There are 11 unique types of molecules in this entry. The entry contains 21905 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
1	A	1286	Total	C	N	O	S	0	7	0
			10036	6378	1717	1877	64			
1	B	1289	Total	C	N	O	S	0	4	0
			10035	6378	1717	1876	64			

- Molecule 2 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).

FES

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

- 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: $C_{10}H_{14}N_5O_6PS_2$).
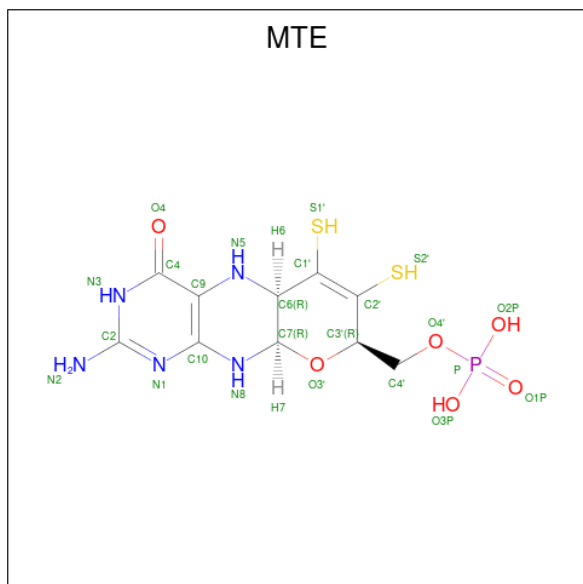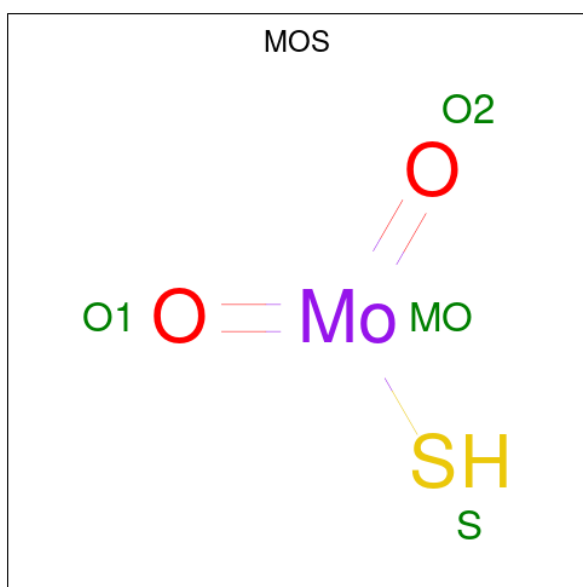

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	S	0	0
			24	10	5	6	1	2		
3	B	1	Total	C	N	O	P	S	0	0
			24	10	5	6	1	2		

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

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

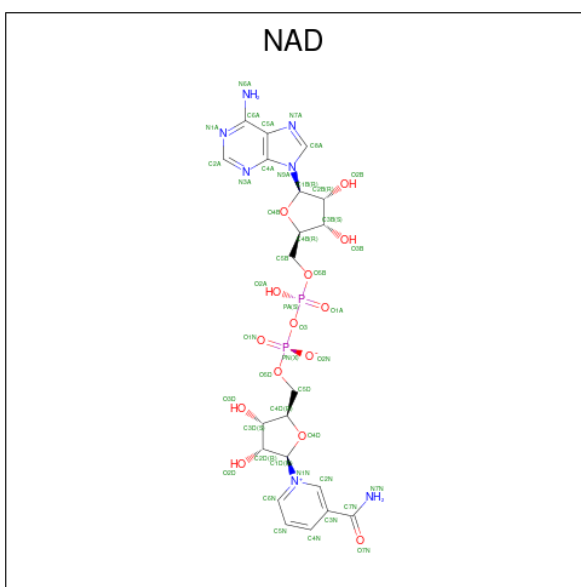- Molecule 5 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).
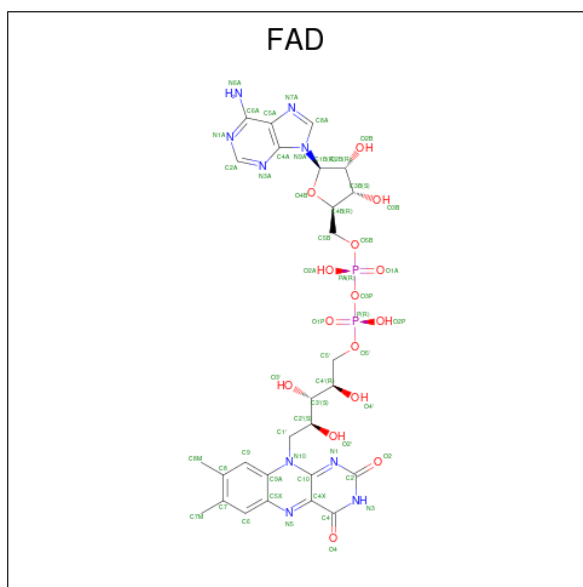
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total 53	C 27	N 9	O 15	P 2	0	0
5	B	1	Total 53	C 27	N 9	O 15	P 2	0	0

- Molecule 6 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$).
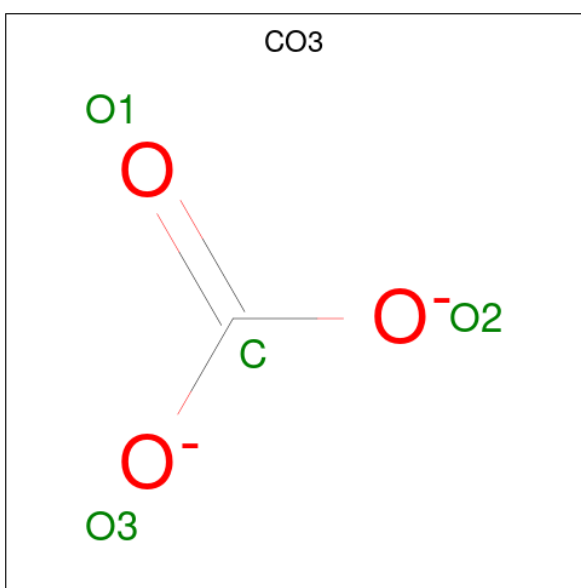
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	N	O	P	0	0
			23	10	5	7	1		
6	B	1	Total	C	N	O	P	0	0
			23	10	5	7	1		

• Molecule 7 is CARBONATE ION (three-letter code: CO3) (formula: CO_3).

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

- Molecule 8 is 2-HYDROXYBENZOIC ACID (three-letter code: SAL) (formula: $C_7H_6O_3$).

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

- Molecule 9 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

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

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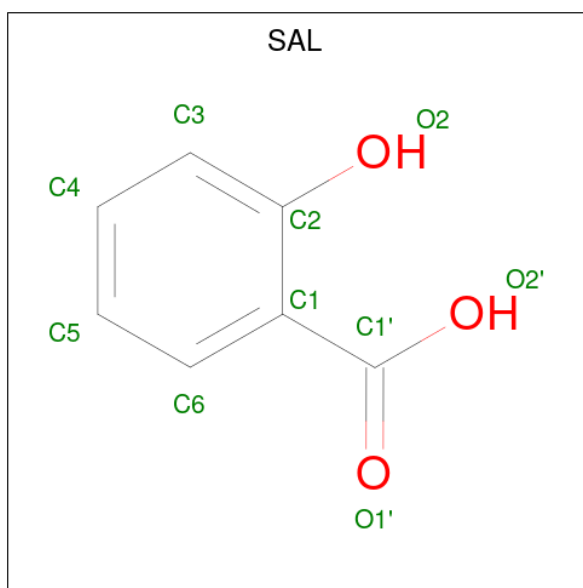
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	A	1	Total 6	C 3	O 3	0	0
9	A	1	Total 6	C 3	O 3	0	0
9	A	1	Total 6	C 3	O 3	0	0
9	A	1	Total 6	C 3	O 3	0	0
9	A	1	Total 6	C 3	O 3	0	0
9	A	1	Total 6	C 3	O 3	0	0
9	A	1	Total 6	C 3	O 3	0	0
9	B	1	Total 6	C 3	O 3	0	0
9	B	1	Total 6	C 3	O 3	0	0
9	B	1	Total 6	C 3	O 3	0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

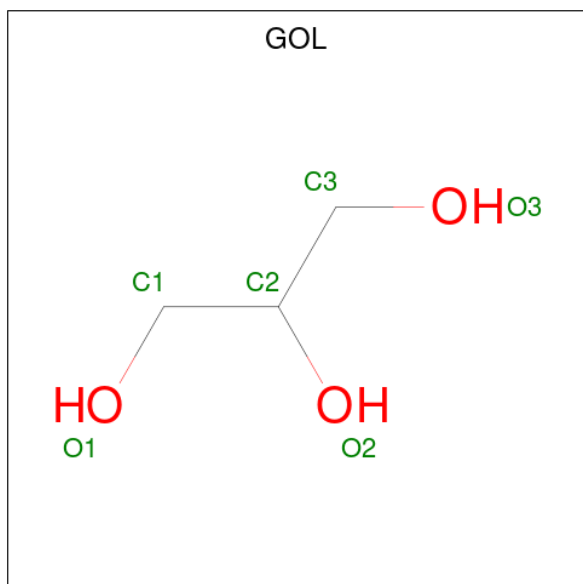- Molecule 10 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	758	Total 758	O 758	0	0
11	B	744	Total 744	O 744	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
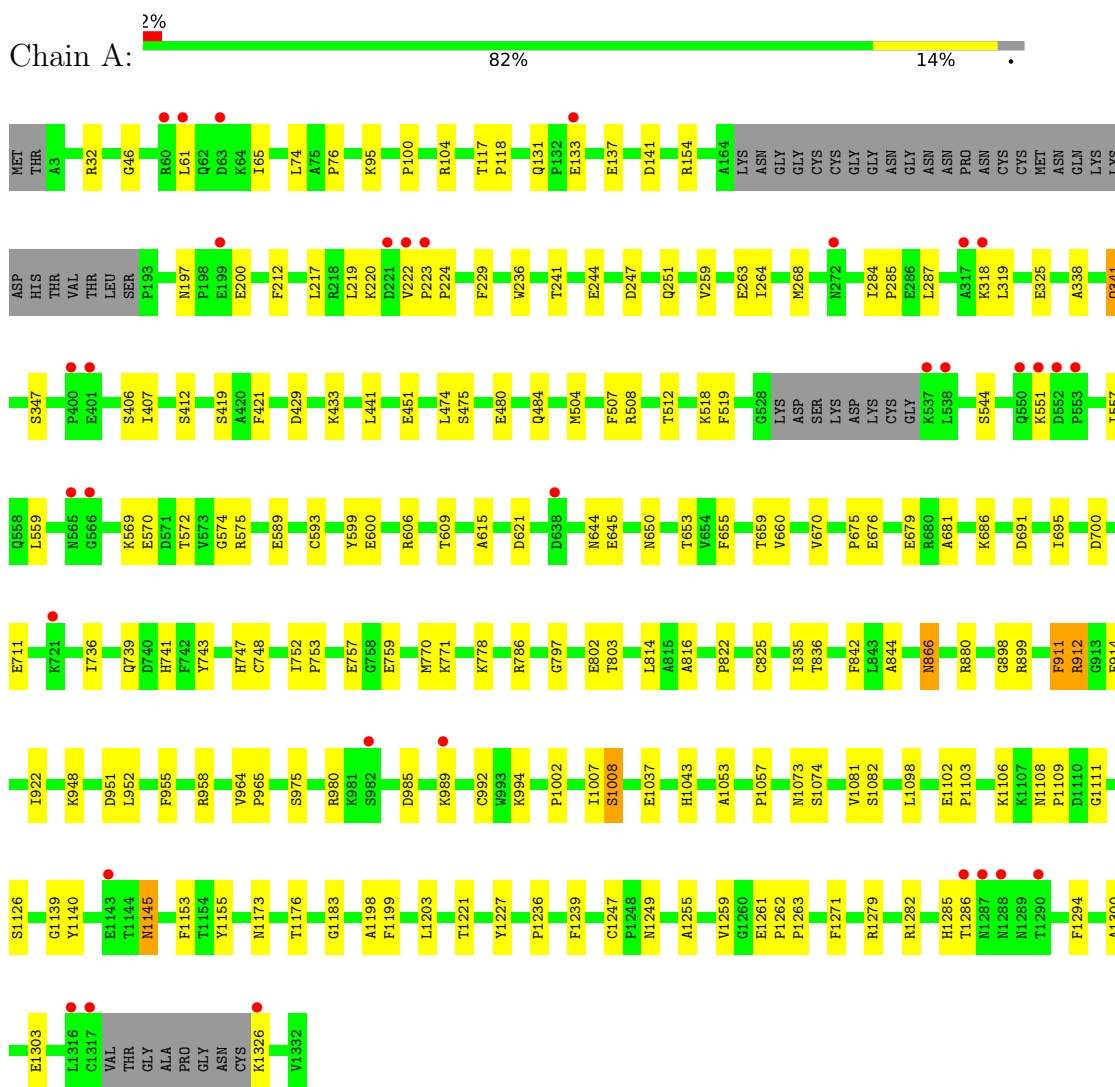
• Molecule 1: Xanthine dehydrogenase/oxidase
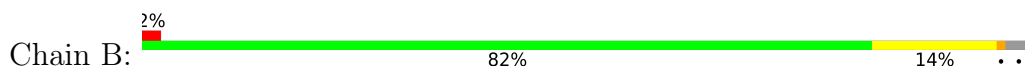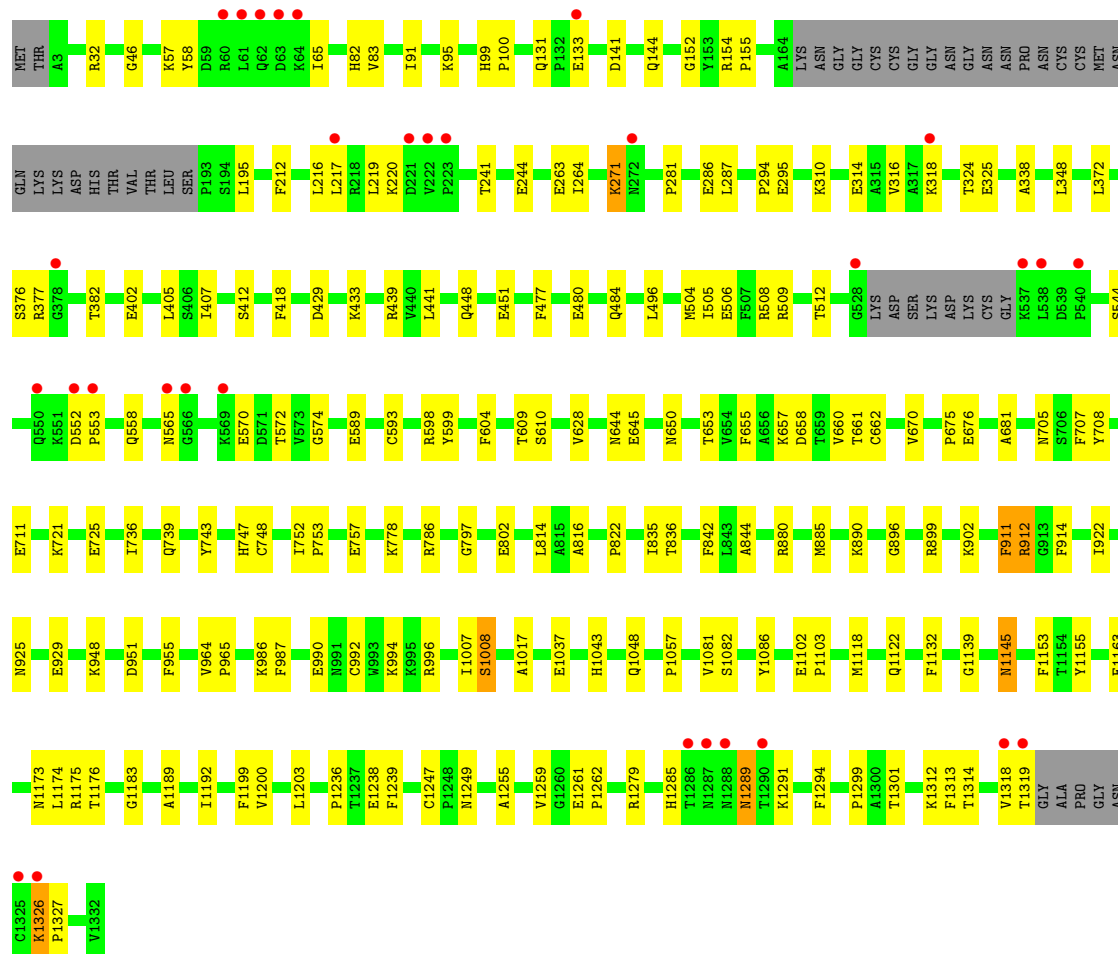
4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	166.03Å 123.18Å 147.62Å 90.00° 91.02° 90.00°	Depositor
Resolution (Å)	20.00 – 1.90 19.95 – 1.90	Depositor EDS
% Data completeness (in resolution range)	96.0 (20.00-1.90) 96.0 (19.95-1.90)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.44 (at 1.90Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.181 , 0.214 0.172 , 0.203	Depositor DCC
R_{free} test set	2305 reflections (0.99%)	wwPDB-VP
Wilson B-factor (Å^2)	16.4	Xtriage
Anisotropy	0.401	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.40 , 52.4	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.015 for -h,-k,l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	21905	wwPDB-VP
Average B, all atoms (Å^2)	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.09% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: CO3, MTE, SAL, MOS, NAD, FAD, FES, GOL, CA

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	0.31	0/10254	0.61	0/13876
1	B	0.31	0/10253	0.61	0/13876
All	All	0.31	0/20507	0.61	0/27752

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	10036	0	10027	128	0
1	B	10035	0	10029	131	0
2	A	8	0	0	1	0
2	B	8	0	0	1	0
3	A	24	0	10	2	0
3	B	24	0	10	2	0
4	A	4	0	0	4	0
4	B	4	0	0	4	0
5	A	53	0	31	2	0
5	B	53	0	31	2	0
6	A	23	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	23	0	12	0	0
7	A	4	0	0	0	0
7	B	4	0	0	0	0
8	A	10	0	4	1	0
8	B	10	0	4	1	0
9	A	48	0	64	2	0
9	B	30	0	40	1	0
10	A	1	0	0	0	0
10	B	1	0	0	0	0
11	A	758	0	0	3	0
11	B	744	0	0	1	0
All	All	21905	0	20274	264	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 6.

All (264) 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:955:PHE:HA	1:A:1145:ASN:HD21	1.28	0.95
1:A:341:GLN:H	1:A:341:GLN:HE21	1.09	0.92
1:B:131:GLN:HE21	1:B:133:GLU:H	1.16	0.90
1:B:955:PHE:HA	1:B:1145:ASN:HD21	1.38	0.87
1:A:645:GLU:HG2	1:A:650:ASN:HD22	1.38	0.85
1:A:131:GLN:HE21	1:A:133:GLU:H	1.25	0.84
1:A:650:ASN:HD21	1:A:778:LYS:HE3	1.42	0.84
1:A:948:LYS:HG2	1:A:951:ASP:OD2	1.85	0.76
1:A:518:LYS:HE2	11:A:2094:HOH:O	1.84	0.76
1:B:1279:ARG:HG2	1:B:1294:PHE:HE2	1.52	0.74
1:A:341:GLN:H	1:A:341:GLN:NE2	1.83	0.74
1:B:1326:LYS:H	1:B:1326:LYS:HD3	1.53	0.72
1:B:650:ASN:HD21	1:B:778:LYS:HE3	1.53	0.71
1:B:645:GLU:HG2	1:B:650:ASN:HD22	1.58	0.69
1:A:341:GLN:HE21	1:A:341:GLN:N	1.90	0.66
1:A:1221:THR:HG22	1:A:1227:TYR:HB2	1.78	0.65
4:B:1336:MOS:O2	4:B:1336:MOS:MO	1.67	0.65
4:A:1336:MOS:O2	4:A:1336:MOS:MO	1.67	0.64
1:B:948:LYS:HG2	1:B:951:ASP:OD2	1.97	0.63
1:B:241:THR:OG1	1:B:244:GLU:HG3	1.98	0.63
1:A:753:PRO:HD3	1:A:816:ALA:HB1	1.80	0.62
1:B:131:GLN:HE21	1:B:133:GLU:N	1.94	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:985:ASP:O	1:A:989:LYS:HG3	2.00	0.61
4:B:1336:MOS:MO	4:B:1336:MOS:S	2.11	0.61
1:A:1279:ARG:HG2	1:A:1294:PHE:HE2	1.65	0.61
1:A:217:LEU:O	1:A:220:LYS:HG2	2.01	0.60
1:A:433:LYS:HE2	1:A:504:MET:SD	2.40	0.60
1:A:621:ASP:HB3	1:A:686:LYS:HE2	1.84	0.60
4:A:1336:MOS:MO	4:A:1336:MOS:S	2.11	0.60
1:A:264:ILE:HD11	5:A:1337:FAD:H3B	1.82	0.60
1:B:880:ARG:HD2	1:B:914:PHE:HB3	1.84	0.59
1:B:1249:ASN:O	1:B:1255:ALA:HA	2.03	0.59
1:B:32:ARG:HH12	1:B:676:GLU:CD	2.06	0.58
1:A:318:LYS:HE2	1:A:319:LEU:HD21	1.84	0.58
1:B:131:GLN:NE2	1:B:133:GLU:H	1.94	0.58
1:A:557:ILE:HG22	1:A:559:LEU:CD1	2.33	0.58
1:B:552:ASP:HB3	1:B:553:PRO:HD2	1.86	0.58
1:B:281:PRO:HB2	1:B:287:LEU:HD12	1.85	0.58
1:A:441:LEU:HB3	1:A:451:GLU:HB2	1.86	0.57
1:A:880:ARG:HD2	1:A:914:PHE:HB3	1.86	0.57
1:A:241:THR:OG1	1:A:244:GLU:HG3	2.05	0.57
1:A:593:CYS:HB3	1:A:748[B]:CYS:SG	2.44	0.57
1:A:559:LEU:HD13	11:A:1476:HOH:O	2.05	0.56
1:B:711:GLU:HA	1:B:899:ARG:HD2	1.87	0.56
1:B:1175:ARG:HG3	1:B:1238:GLU:HG2	1.86	0.56
1:B:570:GLU:OE2	1:B:1057:PRO:HG3	2.05	0.56
1:B:604:PHE:CD2	1:B:675:PRO:HG3	2.41	0.56
1:B:747:HIS:CD2	1:B:836:THR:HG21	2.42	0.56
1:A:32:ARG:HH12	1:A:676:GLU:CD	2.08	0.55
1:A:1102:GLU:HB3	1:A:1103:PRO:HD3	1.88	0.55
1:A:407:ILE:N	1:A:407:ILE:HD12	2.22	0.55
1:B:310:LYS:O	1:B:314:GLU:HG3	2.07	0.55
1:B:433:LYS:HE3	1:B:433:LYS:HA	1.89	0.55
1:B:216:LEU:HD23	1:B:219:LEU:HD12	1.89	0.55
1:B:1008:SER:HA	1:B:1081:VAL:HG11	1.88	0.55
1:A:752:ILE:CD1	1:A:822:PRO:HB3	2.38	0.54
1:A:1008:SER:HA	1:A:1081:VAL:HG11	1.88	0.54
1:B:757:GLU:HB3	1:B:786:ARG:HE	1.70	0.54
1:B:377:ARG:HG3	1:B:377:ARG:HH11	1.71	0.54
1:B:318:LYS:HD2	1:B:318:LYS:N	2.22	0.54
1:B:1279:ARG:HG2	1:B:1294:PHE:CE2	2.39	0.54
1:A:474:LEU:O	1:A:475[A]:SER:HB2	2.07	0.53
1:A:1249:ASN:O	1:A:1255:ALA:HA	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:615:ALA:O	1:A:659[A]:THR:HG23	2.09	0.52
1:B:281:PRO:HB2	1:B:287:LEU:CD1	2.39	0.52
1:A:141:ASP:OD1	1:A:551:LYS:NZ	2.42	0.52
1:B:752:ILE:CD1	1:B:822:PRO:HB3	2.39	0.52
1:A:406:SER:C	1:A:407:ILE:HD12	2.30	0.52
1:B:506:GLU:HG2	1:B:1319:THR:HG23	1.92	0.52
1:B:1326:LYS:HD3	1:B:1326:LYS:N	2.24	0.52
1:B:506:GLU:CG	1:B:1319:THR:HG23	2.40	0.51
1:A:1037:GLU:HB2	1:A:1043:HIS:CD2	2.46	0.51
1:A:421:PHE:CE2	1:A:518:LYS:NZ	2.79	0.51
1:A:670:VAL:HG11	1:A:681:ALA:HB3	1.92	0.51
1:B:91:ILE:O	1:B:99:HIS:HB2	2.11	0.51
1:B:264:ILE:HD11	5:B:1337:FAD:H3B	1.93	0.51
1:B:1314:THR:O	1:B:1318:VAL:HG13	2.11	0.51
3:B:1335:MTE:S1'	4:B:1336:MOS:S	3.09	0.50
1:A:544:SER:O	1:A:994:LYS:HE2	2.11	0.50
1:A:770[B]:MET:HE2	1:A:1073:ASN:C	2.31	0.50
1:A:247:ASP:O	1:A:251:GLN:HG3	2.12	0.50
1:B:711:GLU:HA	1:B:899:ARG:CD	2.41	0.50
1:A:747:HIS:CD2	1:A:836:THR:HG21	2.46	0.50
1:A:284:ILE:CG2	1:A:287:LEU:HD23	2.42	0.50
1:A:770[B]:MET:HE2	1:A:1074:SER:O	2.12	0.50
1:A:1007:ILE:O	1:A:1008:SER:CB	2.60	0.50
1:A:1153:PHE:HB2	1:A:1155:TYR:CZ	2.46	0.49
1:A:100:PRO:O	1:A:104:ARG:HG3	2.12	0.49
1:B:1007:ILE:O	1:B:1008:SER:CB	2.60	0.49
1:A:1082:SER:HB2	3:A:1335:MTE:O3P	2.12	0.49
1:A:911:PHE:O	1:A:912:ARG:C	2.50	0.49
1:B:572:THR:OG1	1:B:1048:GLN:HG2	2.12	0.49
1:B:670:VAL:HG11	1:B:681:ALA:HB3	1.95	0.49
1:B:1082:SER:HB2	3:B:1335:MTE:O3P	2.13	0.49
1:A:757:GLU:HB3	1:A:786:ARG:HE	1.78	0.49
1:B:82:HIS:NE2	1:B:219:LEU:HD13	2.27	0.48
1:B:217:LEU:O	1:B:220:LYS:HG2	2.13	0.48
1:A:32:ARG:NH1	1:A:676:GLU:OE2	2.43	0.48
1:B:348:LEU:HD13	1:B:407:ILE:CD1	2.43	0.48
1:A:1126:SER:HB2	1:B:1132:PHE:CD1	2.48	0.48
1:A:655:PHE:HE1	1:A:814:LEU:HD23	1.78	0.48
1:B:753:PRO:HD3	1:B:816:ALA:HB1	1.96	0.48
1:B:844:ALA:HB2	1:B:922:ILE:HD13	1.95	0.48
1:B:964:VAL:HB	1:B:965:PRO:HD3	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:338:ALA:HA	1:A:429:ASP:OD1	2.13	0.48
1:A:992[A]:CYS:SG	1:A:1285:HIS:CE1	3.07	0.48
1:A:197:ASN:ND2	1:A:200:GLU:HG3	2.29	0.48
1:B:992[A]:CYS:SG	1:B:1285:HIS:NE2	2.87	0.48
1:B:508:ARG:HD3	11:B:1385:HOH:O	2.14	0.47
1:A:219:LEU:O	1:A:222:VAL:HG12	2.13	0.47
1:A:263:GLU:HB2	5:A:1337:FAD:H52A	1.95	0.47
1:A:137:GLU:HG3	1:A:551:LYS:HD2	1.96	0.47
1:B:152:GLY:HA2	1:B:1200:VAL:HG21	1.96	0.47
1:A:61:LEU:N	1:A:61:LEU:HD12	2.29	0.47
1:A:770[B]:MET:HG3	1:A:1073:ASN:HA	1.96	0.47
1:A:964:VAL:HB	1:A:965:PRO:HD3	1.95	0.47
1:B:376:SER:HB3	1:B:402:GLU:HG2	1.97	0.47
1:B:736:ILE:CG2	1:B:842:PHE:HB2	2.43	0.47
1:B:911:PHE:O	1:B:912:ARG:C	2.53	0.47
1:A:480:GLU:O	1:A:484:GLN:HG3	2.14	0.47
1:A:606:ARG:CZ	1:A:679:GLU:HG3	2.45	0.47
1:B:721:LYS:O	1:B:725:GLU:HG3	2.15	0.47
1:A:569:LYS:NZ	1:A:569:LYS:HB3	2.29	0.47
1:B:433:LYS:HA	1:B:433:LYS:CE	2.46	0.46
1:B:593:CYS:HB3	1:B:748[B]:CYS:SG	2.55	0.46
1:B:348:LEU:HD13	1:B:407:ILE:HD11	1.95	0.46
1:B:441:LEU:HB3	1:B:451:GLU:HB2	1.96	0.46
1:B:263:GLU:HB2	5:B:1337:FAD:H52A	1.98	0.46
1:B:508:ARG:O	1:B:512:THR:HG23	2.16	0.46
1:B:1163:GLU:HB2	1:B:1174:LEU:HD11	1.98	0.46
1:A:992[A]:CYS:SG	1:A:1285:HIS:NE2	2.89	0.46
1:B:1261:GLU:N	1:B:1262:PRO:CD	2.78	0.46
1:A:95:LYS:HG3	1:A:589:GLU:OE1	2.15	0.46
1:B:141:ASP:O	1:B:144:GLN:HG3	2.16	0.46
1:B:1153:PHE:HB2	1:B:1155:TYR:CZ	2.50	0.46
1:A:259:VAL:HG11	1:A:347:SER:HB3	1.97	0.46
1:B:338:ALA:HA	1:B:429:ASP:OD1	2.16	0.46
1:A:955:PHE:HA	1:A:1145:ASN:ND2	2.12	0.46
1:B:628:VAL:HG21	1:B:681:ALA:HA	1.98	0.46
1:A:1102:GLU:OE2	1:A:1106:LYS:HE3	2.16	0.46
1:A:1271:PHE:CE1	1:A:1300:ALA:HB2	2.51	0.45
1:B:377:ARG:HG3	1:B:377:ARG:NH1	2.29	0.45
1:B:992[A]:CYS:SG	1:B:1285:HIS:CE1	3.09	0.45
1:B:1183:GLY:HA2	1:B:1247:CYS:O	2.17	0.45
3:A:1335:MTE:S1'	4:A:1336:MOS:S	3.13	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:1336:MOS:S	4:B:1336:MOS:O1	2.75	0.45
1:B:655:PHE:CE1	1:B:814:LEU:HD23	2.52	0.45
1:B:1173:ASN:O	1:B:1236:PRO:HA	2.16	0.45
1:B:1312:LYS:HE3	1:B:1313:PHE:CZ	2.52	0.45
1:A:599:TYR:HA	1:B:599:TYR:HA	1.97	0.45
1:A:1183:GLY:HA2	1:A:1247:CYS:O	2.16	0.45
1:B:46:GLY:HA2	2:B:1334:FES:S1	2.57	0.45
1:B:195:LEU:HD22	1:B:1189:ALA:HA	1.98	0.45
1:B:287:LEU:HD23	1:B:405:LEU:HD12	1.97	0.45
1:A:1261:GLU:N	1:A:1262:PRO:CD	2.80	0.45
1:B:58:TYR:CE2	1:B:220:LYS:HD2	2.52	0.45
1:B:655:PHE:HE1	1:B:814:LEU:HD23	1.80	0.45
1:A:711:GLU:HA	1:A:899:ARG:CD	2.47	0.45
1:A:736:ILE:CG2	1:A:842:PHE:HB2	2.47	0.45
1:A:1176:THR:HG21	1:A:1199:PHE:CZ	2.51	0.45
1:B:286:GLU:HB3	1:B:405:LEU:HD11	1.98	0.44
1:A:711:GLU:HA	1:A:899:ARG:HD2	1.99	0.44
1:B:711:GLU:HB2	1:B:899:ARG:HD3	1.99	0.44
1:B:509:ARG:HH11	1:B:509:ARG:HG2	1.83	0.44
1:A:325:GLU:HB2	1:A:412:SER:HB3	2.00	0.44
1:A:644:ASN:O	1:A:653:THR:HA	2.17	0.44
1:A:1203:LEU:HD23	1:A:1203:LEU:C	2.36	0.44
1:B:271:LYS:HD2	1:B:271:LYS:N	2.33	0.44
1:B:1279:ARG:HB3	1:B:1279:ARG:NH1	2.32	0.44
1:B:294:PRO:HG2	1:B:295:GLU:OE1	2.18	0.44
1:B:325:GLU:HB2	1:B:412:SER:HB3	1.98	0.44
1:B:65:ILE:HD13	1:B:212:PHE:CB	2.48	0.44
1:A:844:ALA:HB2	1:A:922:ILE:HD13	2.00	0.44
1:B:433:LYS:HD3	1:B:504:MET:SD	2.57	0.44
4:A:1336:MOS:S	4:A:1336:MOS:O1	2.76	0.44
1:A:229:PHE:HB2	1:A:236:TRP:HB3	2.00	0.44
1:A:609:THR:HG21	1:A:835:ILE:HD11	1.99	0.43
1:A:325:GLU:HB2	1:A:412:SER:CB	2.48	0.43
1:B:802:GLU:OE1	8:B:1340:SAL:H3	2.18	0.43
1:B:1289:ASN:ND2	1:B:1291:LYS:H	2.16	0.43
1:A:1102:GLU:HG3	1:A:1106:LYS:HE3	1.99	0.43
1:A:284:ILE:HA	1:A:285:PRO:HD3	1.90	0.43
1:A:975:SER:O	1:A:980:ARG:HD3	2.19	0.43
1:A:268[B]:MET:CE	11:A:1781:HOH:O	2.67	0.43
1:B:372:LEU:O	1:B:382:THR:HA	2.19	0.43
1:B:1017:ALA:HB1	1:B:1086:TYR:CD2	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:65:ILE:HD13	1:A:212:PHE:CB	2.49	0.43
1:A:572:THR:HA	1:A:575:ARG:HD2	2.01	0.43
1:B:986:LYS:HG2	1:B:990:GLU:OE2	2.19	0.43
1:B:1259:VAL:HG22	1:B:1259:VAL:O	2.19	0.43
1:A:1108:ASN:N	1:A:1109:PRO:HD3	2.33	0.43
1:B:1118:MET:O	1:B:1122:GLN:HG2	2.18	0.43
1:A:739:GLN:HG2	1:A:911:PHE:CE1	2.54	0.43
1:A:223:PRO:HA	1:A:224:PRO:HD3	1.82	0.42
1:A:508:ARG:O	1:A:512:THR:HG23	2.18	0.42
1:A:802:GLU:HG2	1:A:803:THR:HG23	2.01	0.42
1:B:558:GLN:HB3	1:B:1192:ILE:HD13	2.01	0.42
1:A:284:ILE:HG21	1:A:287:LEU:HD23	2.02	0.42
1:A:318:LYS:HG3	1:A:319:LEU:HG	2.02	0.42
1:A:621:ASP:CB	1:A:686:LYS:HE2	2.47	0.42
1:B:955:PHE:HA	1:B:1145:ASN:ND2	2.20	0.42
1:B:1176:THR:HG21	1:B:1199:PHE:CZ	2.54	0.42
1:A:1198:ALA:HB3	1:A:1263:PRO:HB2	2.00	0.42
1:B:544:SER:O	1:B:994:LYS:HE2	2.19	0.42
1:A:771:LYS:HD3	1:A:771:LYS:HA	1.87	0.42
1:A:866:ASN:C	1:A:866:ASN:HD22	2.22	0.42
1:A:46:GLY:HA2	2:A:1334:FES:S1	2.60	0.42
1:A:898:GLY:O	1:A:899:ARG:HD2	2.19	0.42
1:A:1259:VAL:O	1:A:1259:VAL:HG22	2.19	0.42
1:B:57:LYS:HE2	1:B:83:VAL:HG22	2.01	0.42
1:B:609:THR:HG21	1:B:835:ILE:HD11	2.01	0.42
1:B:657:LYS:O	1:B:658:ASP:HB2	2.18	0.42
1:B:890:LYS:HE2	1:B:951:ASP:CG	2.40	0.42
1:B:1326:LYS:HB2	1:B:1327:PRO:HD2	2.01	0.42
1:A:74:LEU:O	1:A:76:PRO:HD3	2.20	0.42
1:A:759:GLU:OE1	9:A:1348:GOL:H12	2.20	0.42
1:B:407:ILE:O	1:B:407:ILE:HG13	2.19	0.42
1:A:419:SER:HB2	1:A:519:PHE:CD1	2.55	0.42
1:A:1053:ALA:O	1:A:1098:LEU:HD11	2.20	0.42
1:A:574:GLY:CA	9:A:1345:GOL:H12	2.49	0.42
1:A:655:PHE:CE1	1:A:814:LEU:HD23	2.54	0.42
1:B:95:LYS:HG3	1:B:589:GLU:OE1	2.20	0.42
1:B:418:PHE:CD1	1:B:439:ARG:HB2	2.54	0.42
1:B:574:GLY:CA	9:B:1344:GOL:H12	2.50	0.42
1:B:661:THR:O	1:B:662:CYS:HB3	2.20	0.42
1:B:448:GLN:HB2	1:B:477:PHE:CE2	2.55	0.41
1:B:480:GLU:HG3	1:B:484:GLN:HE21	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:885:MET:SD	1:B:896:GLY:HA3	2.59	0.41
1:B:1299:PRO:HG2	1:B:1301:THR:HG23	2.01	0.41
1:B:644:ASN:O	1:B:653:THR:HA	2.21	0.41
1:A:600:GLU:OE2	1:B:598:ARG:HG2	2.20	0.41
1:B:890:LYS:HE2	1:B:951:ASP:OD2	2.19	0.41
1:B:316:VAL:HA	1:B:324:THR:HG21	2.02	0.41
1:B:752:ILE:HD13	1:B:822:PRO:HB3	2.02	0.41
1:B:987:PHE:CD2	1:B:996:ARG:HG3	2.56	0.41
1:A:154:ARG:C	1:A:154:ARG:HD2	2.41	0.41
1:A:675:PRO:HG2	1:A:676:GLU:OE1	2.20	0.41
1:A:1108:ASN:ND2	1:A:1111:GLY:HA3	2.36	0.41
1:B:65:ILE:HD13	1:B:212:PHE:HB2	2.03	0.41
1:B:1037:GLU:HB2	1:B:1043:HIS:CD2	2.54	0.41
1:A:570:GLU:CD	1:A:1057:PRO:HG3	2.41	0.41
1:A:659[A]:THR:HG22	1:A:660:VAL:N	2.35	0.41
1:A:802:GLU:OE1	8:A:1340:SAL:H3	2.20	0.41
1:A:1173:ASN:O	1:A:1236:PRO:HA	2.21	0.41
1:A:1282:ARG:O	1:A:1286:THR:HB	2.21	0.41
1:B:610:SER:HB2	1:B:660:VAL:HG11	2.03	0.41
1:B:705:ASN:HA	1:B:707:PHE:CE1	2.55	0.41
1:B:1102:GLU:HB3	1:B:1103:PRO:HD3	2.02	0.41
1:A:318:LYS:HG3	1:A:319:LEU:N	2.36	0.41
1:A:748[B]:CYS:HA	1:A:825:CYS:O	2.21	0.41
1:B:154:ARG:N	1:B:155:PRO:HD2	2.35	0.41
1:B:496:LEU:HB2	1:B:505:ILE:HG23	2.02	0.41
1:B:925:ASN:O	1:B:929:GLU:HG3	2.21	0.41
1:A:507:PHE:HB2	1:A:1303:GLU:HG3	2.03	0.41
1:A:952:LEU:HD23	1:A:958:ARG:HA	2.02	0.41
1:A:695:ILE:HG23	1:A:700:ASP:HB3	2.04	0.40
1:A:117:THR:HB	1:A:118:PRO:HD3	2.03	0.40
1:A:615:ALA:HB2	1:A:691:ASP:HA	2.02	0.40
1:A:955:PHE:HB2	1:A:1140:TYR:CE1	2.56	0.40
1:B:325:GLU:HB2	1:B:412:SER:CB	2.51	0.40
1:B:1203:LEU:C	1:B:1203:LEU:HD23	2.42	0.40
1:B:708:TYR:CE2	1:B:902:LYS:HD3	2.57	0.40
1:B:739:GLN:HG2	1:B:911:PHE:CE1	2.56	0.40
1:A:741:HIS:HA	1:A:911:PHE:CE1	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	1285/1332 (96%)	1241 (97%)	40 (3%)	4 (0%)	41	31
1	B	1285/1332 (96%)	1248 (97%)	33 (3%)	4 (0%)	41	31
All	All	2570/2664 (96%)	2489 (97%)	73 (3%)	8 (0%)	41	31

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1008	SER
1	B	1008	SER
1	A	912	ARG
1	B	912	ARG
1	A	797	GLY
1	B	797	GLY
1	B	1139	GLY
1	A	1139	GLY

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	1098/1128 (97%)	1090 (99%)	8 (1%)	84	84
1	B	1098/1128 (97%)	1089 (99%)	9 (1%)	81	82
All	All	2196/2256 (97%)	2179 (99%)	17 (1%)	81	82

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	341	GLN
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	100	PRO
1	B	271	LYS
1	B	565	ASN
1	B	743	TYR
1	B	911	PHE
1	B	1145	ASN
1	B	1239	PHE
1	B	1289	ASN
1	B	1326	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	131	GLN
1	A	251	GLN
1	A	272	ASN
1	A	341	GLN
1	A	471	GLN
1	A	473	GLN
1	A	650	ASN
1	A	683	HIS
1	A	866	ASN
1	A	1088	GLN
1	A	1145	ASN
1	A	1289	ASN
1	B	131	GLN
1	B	251	GLN
1	B	473	GLN
1	B	484	GLN
1	B	565	ASN
1	B	626	GLN
1	B	650	ASN
1	B	875	HIS
1	B	1088	GLN
1	B	1108	ASN

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Mol	Chain	Res	Type
1	B	1145	ASN
1	B	1288	ASN
1	B	1289	ASN

5.3.3   RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5   Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6   Ligand geometry ⓘ

Of 31 ligands modelled in this entry, 2 are monoatomic - leaving 29 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	$\#|Z| > 2$
5	FAD	A	1337	-	53,58,58	2.52	16 (30%)	68,89,89	2.06	19 (27%)
2	FES	B	1333	1	0,4,4	-	-	-		
6	NAD	A	1338	-	22,25,48	2.97	8 (36%)	25,38,73	2.37	5 (20%)
9	GOL	B	1341	-	5,5,5	0.58	0	5,5,5	0.42	0
3	MTE	A	1335	4	21,26,26	2.47	8 (38%)	21,40,40	3.26	7 (33%)
9	GOL	A	1343	-	5,5,5	0.63	0	5,5,5	0.33	0
9	GOL	B	1342	-	5,5,5	0.60	0	5,5,5	0.33	0
8	SAL	B	1340	-	10,10,10	1.94	5 (50%)	13,13,13	2.02	4 (30%)
9	GOL	B	1344	-	5,5,5	0.62	0	5,5,5	0.37	0
7	CO3	A	1339	-	2,3,3	0.30	0	2,3,3	0.12	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
9	GOL	A	1342	-	5,5,5	0.54	0	5,5,5	0.40	0
8	SAL	A	1340	-	10,10,10	1.93	5 (50%)	13,13,13	2.03	4 (30%)
9	GOL	A	1346	-	5,5,5	0.64	0	5,5,5	0.32	0
9	GOL	B	1345	-	5,5,5	0.58	0	5,5,5	0.29	0
2	FES	A	1334	1	0,4,4	-	-	-		
4	MOS	B	1336	3	0,3,3	-	-	-		
3	MTE	B	1335	4	21,26,26	2.45	8 (38%)	21,40,40	3.27	7 (33%)
4	MOS	A	1336	3	0,3,3	-	-	-		
9	GOL	A	1348	-	5,5,5	0.52	0	5,5,5	0.39	0
6	NAD	B	1338	-	22,25,48	2.97	8 (36%)	25,38,73	2.34	5 (20%)
2	FES	A	1333	1	0,4,4	-	-	-		
9	GOL	A	1347	-	5,5,5	0.59	0	5,5,5	0.34	0
9	GOL	A	1341	-	5,5,5	0.62	0	5,5,5	0.42	0
2	FES	B	1334	1	0,4,4	-	-	-		
7	CO3	B	1339	-	2,3,3	0.28	0	2,3,3	0.10	0
9	GOL	A	1344	-	5,5,5	0.67	0	5,5,5	0.30	0
5	FAD	B	1337	-	53,58,58	2.46	16 (30%)	68,89,89	2.07	20 (29%)
9	GOL	A	1345	-	5,5,5	0.62	0	5,5,5	0.37	0
9	GOL	B	1343	-	5,5,5	0.65	0	5,5,5	0.32	0

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
5	FAD	A	1337	-	-	6/30/50/50	0/6/6/6
2	FES	B	1333	1	-	-	0/1/1/1
6	NAD	A	1338	-	-	0/6/26/62	0/3/3/5
9	GOL	B	1341	-	-	2/4/4/4	-
3	MTE	A	1335	4	-	1/6/34/34	0/3/3/3
9	GOL	A	1343	-	-	2/4/4/4	-
9	GOL	B	1342	-	-	0/4/4/4	-
8	SAL	B	1340	-	-	0/4/4/4	0/1/1/1
9	GOL	B	1344	-	-	2/4/4/4	-
9	GOL	A	1342	-	-	2/4/4/4	-
8	SAL	A	1340	-	-	0/4/4/4	0/1/1/1
9	GOL	A	1346	-	-	0/4/4/4	-
9	GOL	B	1345	-	-	0/4/4/4	-
2	FES	A	1334	1	-	-	0/1/1/1
3	MTE	B	1335	4	-	1/6/34/34	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	GOL	A	1348	-	-	2/4/4/4	-
6	NAD	B	1338	-	-	0/6/26/62	0/3/3/5
2	FES	A	1333	1	-		0/1/1/1
9	GOL	A	1347	-	-	2/4/4/4	-
9	GOL	A	1341	-	-	4/4/4/4	-
2	FES	B	1334	1	-		0/1/1/1
9	GOL	A	1344	-	-	4/4/4/4	-
5	FAD	B	1337	-	-	6/30/50/50	0/6/6/6
9	GOL	A	1345	-	-	2/4/4/4	-
9	GOL	B	1343	-	-	0/4/4/4	-

All (74) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1337	FAD	O4B-C1B	7.49	1.51	1.41
5	B	1337	FAD	O4B-C1B	7.43	1.51	1.41
6	B	1338	NAD	C4A-N3A	7.13	1.45	1.35
6	A	1338	NAD	C4A-N3A	7.13	1.45	1.35
6	B	1338	NAD	C2A-N3A	6.89	1.43	1.32
6	A	1338	NAD	C2A-N3A	6.85	1.43	1.32
5	A	1337	FAD	C9A-N10	5.77	1.51	1.41
5	B	1337	FAD	C9A-C5X	5.56	1.50	1.41
5	B	1337	FAD	C9A-N10	5.47	1.50	1.41
5	A	1337	FAD	C9A-C5X	5.38	1.50	1.41
3	B	1335	MTE	O3'-C3'	5.15	1.50	1.43
6	B	1338	NAD	C2A-N1A	5.13	1.43	1.33
3	A	1335	MTE	C9-N5	5.11	1.48	1.38
3	A	1335	MTE	O3'-C3'	5.10	1.50	1.43
3	B	1335	MTE	C9-N5	5.10	1.48	1.38
6	A	1338	NAD	C2A-N1A	5.10	1.43	1.33
5	A	1337	FAD	C4A-N3A	5.04	1.42	1.35
5	A	1337	FAD	C9-C9A	4.82	1.47	1.39
5	B	1337	FAD	C4A-N3A	4.79	1.42	1.35
5	A	1337	FAD	C2A-N3A	4.76	1.39	1.32
6	A	1338	NAD	C8A-N7A	4.59	1.42	1.34
6	B	1338	NAD	C8A-N7A	4.58	1.42	1.34
5	B	1337	FAD	C2A-N3A	4.52	1.39	1.32
5	B	1337	FAD	C9-C9A	4.50	1.46	1.39
3	B	1335	MTE	O3'-C7	4.22	1.49	1.43
5	B	1337	FAD	C2A-N1A	4.18	1.41	1.33
5	A	1337	FAD	C2A-N1A	4.10	1.41	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1335	MTE	O4-C4	4.07	1.34	1.24
5	A	1337	FAD	C6-C5X	4.07	1.46	1.40
6	B	1338	NAD	O4B-C1B	4.02	1.46	1.41
5	B	1337	FAD	C4X-N5	4.01	1.38	1.30
3	A	1335	MTE	O3'-C7	3.98	1.49	1.43
3	B	1335	MTE	O4-C4	3.94	1.34	1.24
6	A	1338	NAD	O4B-C1B	3.91	1.46	1.41
5	A	1337	FAD	C8-C7	3.85	1.50	1.40
5	B	1337	FAD	C8-C7	3.84	1.50	1.40
5	B	1337	FAD	C6-C5X	3.79	1.45	1.40
5	A	1337	FAD	C4X-N5	3.79	1.38	1.30
5	A	1337	FAD	O4B-C4B	3.75	1.53	1.45
5	B	1337	FAD	O4B-C4B	3.64	1.53	1.45
5	A	1337	FAD	C10-N1	3.43	1.40	1.33
3	A	1335	MTE	C9-C10	3.31	1.47	1.41
5	B	1337	FAD	C10-N1	3.26	1.39	1.33
3	A	1335	MTE	C4-N3	3.24	1.38	1.33
3	B	1335	MTE	C9-C10	3.20	1.47	1.41
3	B	1335	MTE	C4-N3	3.12	1.38	1.33
8	A	1340	SAL	C1-C1'	-3.01	1.43	1.49
8	B	1340	SAL	C1-C1'	-2.96	1.43	1.49
5	B	1337	FAD	C2B-C1B	-2.86	1.49	1.53
5	B	1337	FAD	C2-N3	2.85	1.45	1.39
5	A	1337	FAD	C2-N3	2.84	1.45	1.39
5	A	1337	FAD	C2B-C1B	-2.74	1.49	1.53
8	B	1340	SAL	C5-C6	2.73	1.44	1.38
8	A	1340	SAL	C5-C6	2.69	1.44	1.38
6	A	1338	NAD	PA-O5B	-2.67	1.51	1.60
6	B	1338	NAD	PA-O5B	-2.64	1.51	1.60
6	A	1338	NAD	C6A-N6A	2.62	1.43	1.34
3	A	1335	MTE	C7-C6	2.57	1.55	1.53
6	B	1338	NAD	C6A-N6A	2.55	1.43	1.34
8	A	1340	SAL	O2'-C1'	-2.54	1.22	1.30
8	A	1340	SAL	C6-C1	2.52	1.43	1.39
8	B	1340	SAL	O2'-C1'	-2.52	1.22	1.30
8	B	1340	SAL	C6-C1	2.46	1.43	1.39
3	B	1335	MTE	C7-C6	2.44	1.55	1.53
5	A	1337	FAD	C4X-C10	2.39	1.51	1.44
3	A	1335	MTE	C2-N1	2.33	1.39	1.35
5	B	1337	FAD	C4X-C10	2.30	1.51	1.44
6	A	1338	NAD	O3B-C3B	2.23	1.48	1.43
5	B	1337	FAD	C5A-C4A	2.22	1.46	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	B	1340	SAL	C3-C2	2.21	1.43	1.39
5	A	1337	FAD	C5A-C4A	2.20	1.46	1.40
3	B	1335	MTE	C2-N1	2.18	1.39	1.35
6	B	1338	NAD	O3B-C3B	2.16	1.48	1.43
8	A	1340	SAL	C3-C2	2.15	1.43	1.39

All (71) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1335	MTE	C4-C9-N5	9.61	127.19	119.12
3	A	1335	MTE	C4-C9-N5	9.57	127.15	119.12
6	B	1338	NAD	O5B-C5B-C4B	7.95	136.37	108.99
6	A	1338	NAD	O5B-C5B-C4B	7.92	136.26	108.99
5	B	1337	FAD	C9-C9A-N10	6.87	131.12	121.84
5	A	1337	FAD	C9-C9A-N10	6.86	131.12	121.84
5	A	1337	FAD	C5X-C9A-N10	-6.01	111.75	117.95
5	B	1337	FAD	C5X-C9A-N10	-5.99	111.77	117.95
3	A	1335	MTE	N1-C2-N3	-5.40	116.96	125.42
3	B	1335	MTE	N1-C2-N3	-5.35	117.03	125.42
3	A	1335	MTE	N2-C2-N3	4.95	124.96	117.25
6	A	1338	NAD	C1B-N9A-C4A	-4.94	117.96	126.64
3	A	1335	MTE	C2-N1-C10	4.92	125.57	114.54
3	B	1335	MTE	N2-C2-N3	4.86	124.80	117.25
3	B	1335	MTE	C2-N1-C10	4.85	125.40	114.54
3	B	1335	MTE	O3'-C7-C6	-4.80	105.76	108.96
6	B	1338	NAD	C1B-N9A-C4A	-4.80	118.21	126.64
5	B	1337	FAD	C4-C4X-N5	4.72	124.95	118.23
5	A	1337	FAD	N3A-C2A-N1A	-4.65	121.41	128.68
5	A	1337	FAD	C4-C4X-N5	4.64	124.83	118.23
3	A	1335	MTE	O3'-C7-C6	-4.57	105.92	108.96
5	B	1337	FAD	N3A-C2A-N1A	-4.50	121.64	128.68
3	B	1335	MTE	C2-N3-C4	4.30	122.77	115.93
3	A	1335	MTE	C2-N3-C4	4.14	122.50	115.93
8	A	1340	SAL	O2'-C1'-O1'	-3.92	114.64	123.35
8	B	1340	SAL	O2'-C1'-O1'	-3.91	114.67	123.35
5	B	1337	FAD	C10-N1-C2	3.86	124.63	116.90
5	A	1337	FAD	C10-N1-C2	3.81	124.51	116.90
6	A	1338	NAD	O4B-C1B-C2B	-3.79	101.39	106.93
6	A	1338	NAD	C3B-C2B-C1B	3.75	106.63	100.98
6	B	1338	NAD	O4B-C1B-C2B	-3.63	101.63	106.93
6	B	1338	NAD	C3B-C2B-C1B	3.57	106.35	100.98
8	B	1340	SAL	C3-C2-C1	3.50	123.65	119.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	B	1337	FAD	C8M-C8-C7	3.49	127.88	120.74
5	A	1337	FAD	C8M-C8-C7	3.48	127.88	120.74
8	A	1340	SAL	C3-C2-C1	3.47	123.62	119.89
5	B	1337	FAD	C9A-N10-C10	3.29	125.89	120.77
5	A	1337	FAD	C9A-N10-C10	3.20	125.74	120.77
5	B	1337	FAD	C8M-C8-C9	-2.95	114.03	119.49
5	A	1337	FAD	C8M-C8-C9	-2.94	114.05	119.49
8	A	1340	SAL	C2-C1-C1'	2.88	123.10	120.03
5	B	1337	FAD	C4'-C3'-C2'	-2.80	107.55	113.36
5	A	1337	FAD	C4'-C3'-C2'	-2.68	107.78	113.36
5	A	1337	FAD	C1'-N10-C9A	-2.66	116.08	120.51
8	B	1340	SAL	C2-C1-C1'	2.64	122.84	120.03
5	B	1337	FAD	C1'-N10-C9A	-2.63	116.12	120.51
5	B	1337	FAD	O3B-C3B-C4B	-2.60	103.53	111.05
5	A	1337	FAD	O3B-C3B-C4B	-2.55	103.69	111.05
5	B	1337	FAD	O4-C4-C4X	-2.53	119.90	126.60
5	A	1337	FAD	O4-C4-C4X	-2.51	119.94	126.60
5	B	1337	FAD	O3'-C3'-C4'	2.50	114.85	108.81
8	B	1340	SAL	O2'-C1'-C1	2.50	122.49	115.31
5	A	1337	FAD	O3'-C3'-C4'	2.50	114.84	108.81
8	A	1340	SAL	O2'-C1'-C1	2.48	122.45	115.31
5	A	1337	FAD	C5X-N5-C4X	2.38	122.02	118.07
3	A	1335	MTE	C10-C9-C4	2.35	116.66	114.57
5	B	1337	FAD	C5X-N5-C4X	2.31	121.92	118.07
5	A	1337	FAD	C4A-C5A-N7A	2.30	111.80	109.40
6	B	1338	NAD	O5B-PA-O1A	2.29	112.90	106.47
5	B	1337	FAD	C10-C4X-N5	-2.29	120.00	124.86
6	A	1338	NAD	O5B-PA-O1A	2.27	112.85	106.47
5	A	1337	FAD	C10-C4X-N5	-2.27	120.04	124.86
3	B	1335	MTE	C10-C9-C4	2.19	116.52	114.57
5	B	1337	FAD	C4A-C5A-N7A	2.16	111.65	109.40
5	B	1337	FAD	C4X-C4-N3	2.14	118.62	113.19
5	B	1337	FAD	O4B-C4B-C5B	-2.11	102.44	109.37
5	A	1337	FAD	O2'-C2'-C3'	2.10	114.22	109.10
5	A	1337	FAD	C4X-C4-N3	2.06	118.43	113.19
5	A	1337	FAD	O4B-C4B-C5B	-2.06	102.60	109.37
5	B	1337	FAD	O5'-C5'-C4'	-2.06	103.87	109.36
5	B	1337	FAD	O2'-C2'-C3'	2.05	114.09	109.10

There are no chirality outliers.

All (36) 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'
5	B	1337	FAD	N10-C1'-C2'-O2'
5	B	1337	FAD	N10-C1'-C2'-C3'
9	A	1341	GOL	O1-C1-C2-C3
9	A	1345	GOL	O1-C1-C2-C3
9	B	1341	GOL	O1-C1-C2-O2
9	B	1341	GOL	O1-C1-C2-C3
9	B	1344	GOL	O1-C1-C2-C3
3	A	1335	MTE	C3'-C4'-O4'-P
3	B	1335	MTE	C3'-C4'-O4'-P
5	A	1337	FAD	C2'-C3'-C4'-C5'
5	B	1337	FAD	C2'-C3'-C4'-C5'
9	A	1341	GOL	O1-C1-C2-O2
9	A	1343	GOL	O2-C2-C3-O3
9	A	1348	GOL	O1-C1-C2-O2
5	A	1337	FAD	C2'-C3'-C4'-O4'
5	B	1337	FAD	C2'-C3'-C4'-O4'
5	A	1337	FAD	O3'-C3'-C4'-C5'
5	B	1337	FAD	O3'-C3'-C4'-C5'
5	A	1337	FAD	O3'-C3'-C4'-O4'
5	B	1337	FAD	O3'-C3'-C4'-O4'
9	A	1343	GOL	C1-C2-C3-O3
9	A	1344	GOL	O1-C1-C2-C3
9	A	1344	GOL	C1-C2-C3-O3
9	A	1347	GOL	C1-C2-C3-O3
9	A	1348	GOL	O1-C1-C2-C3
9	A	1345	GOL	O1-C1-C2-O2
9	B	1344	GOL	O1-C1-C2-O2
9	A	1341	GOL	O2-C2-C3-O3
9	A	1344	GOL	O2-C2-C3-O3
9	A	1344	GOL	O1-C1-C2-O2
9	A	1347	GOL	O2-C2-C3-O3
9	A	1342	GOL	C1-C2-C3-O3
9	A	1342	GOL	O2-C2-C3-O3
9	A	1341	GOL	C1-C2-C3-O3

There are no ring outliers.
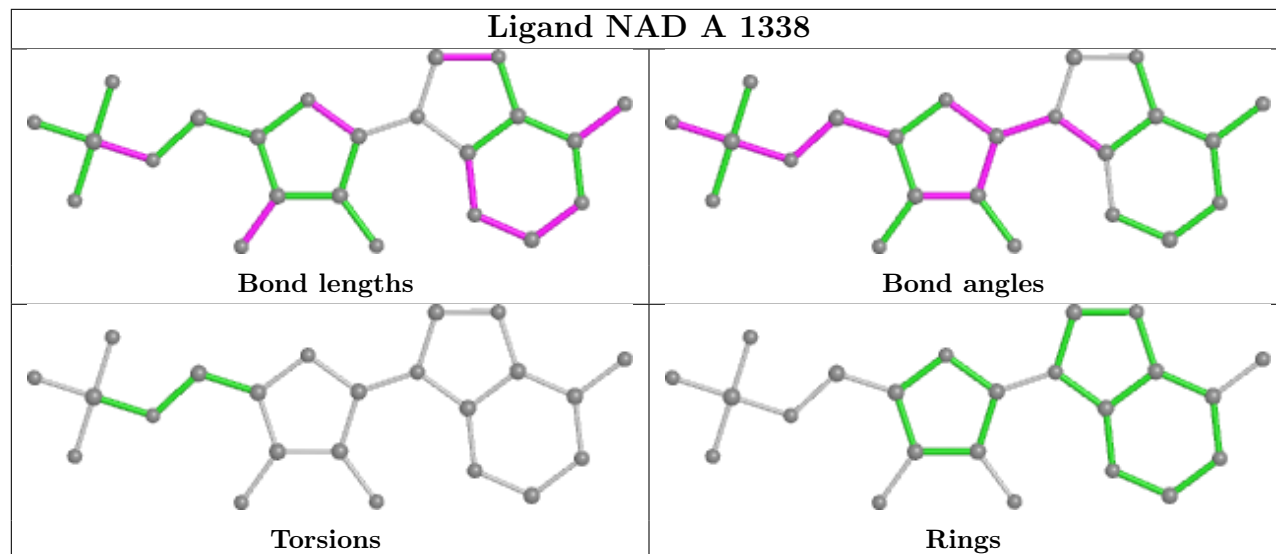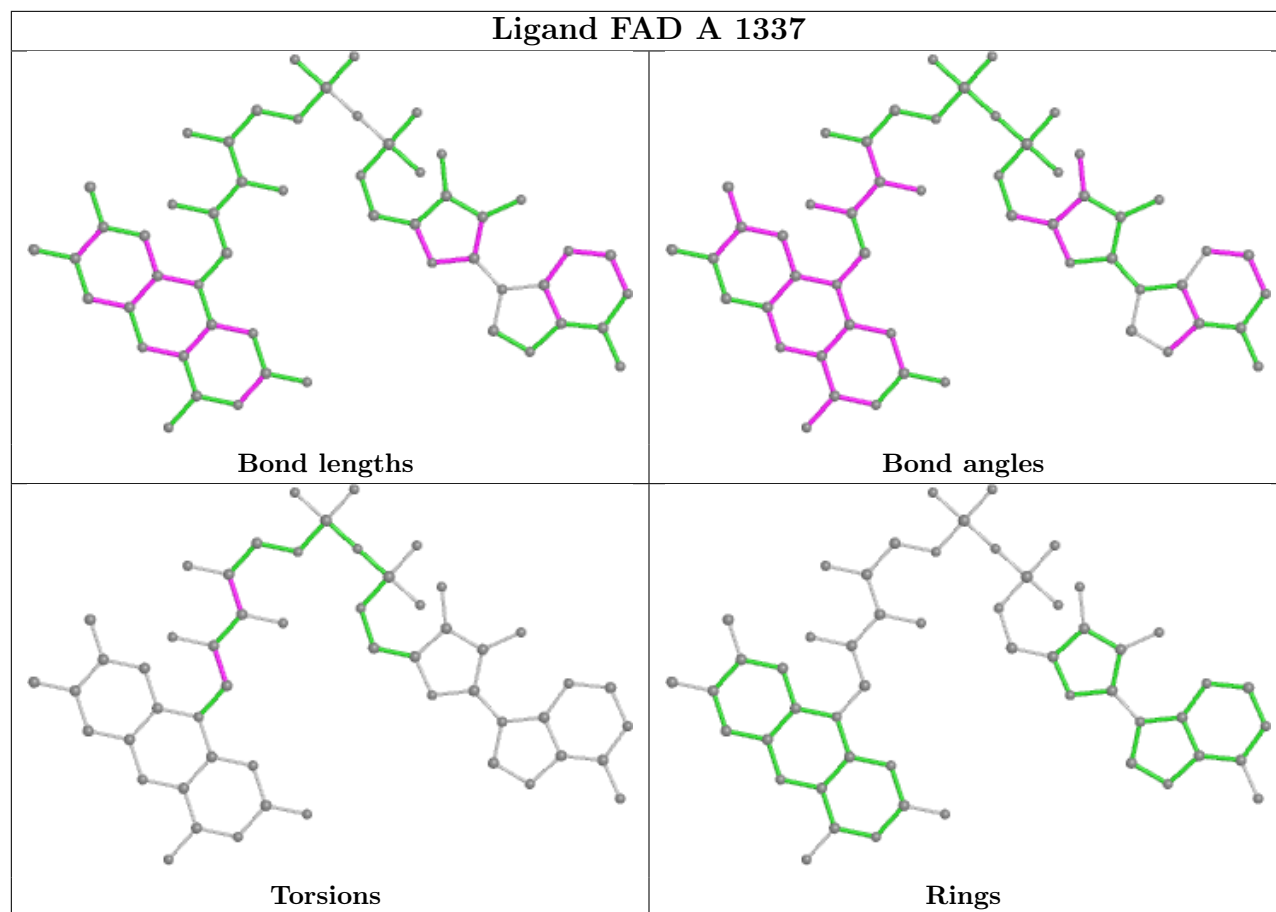
13 monomers are involved in 21 short contacts:

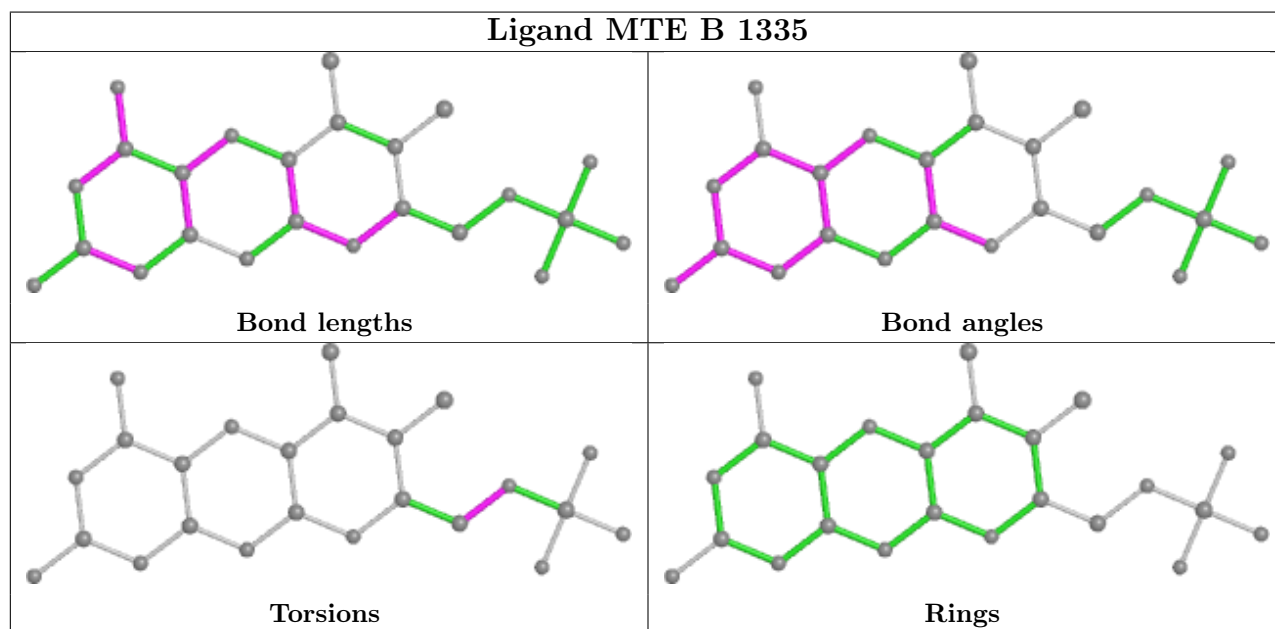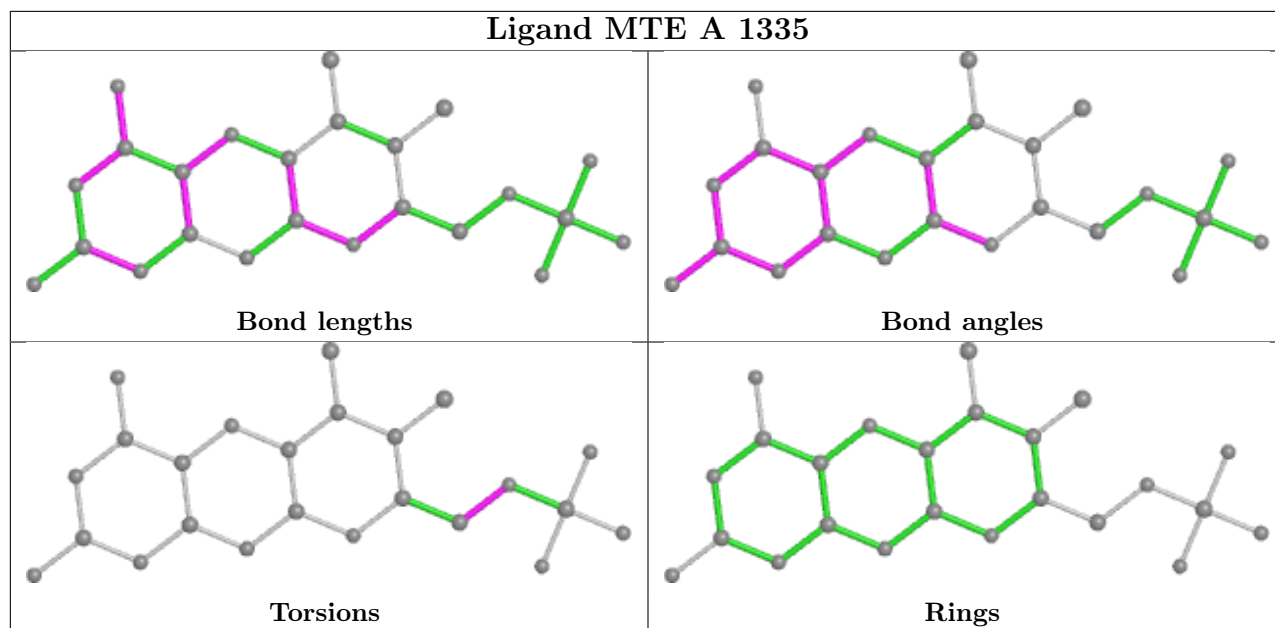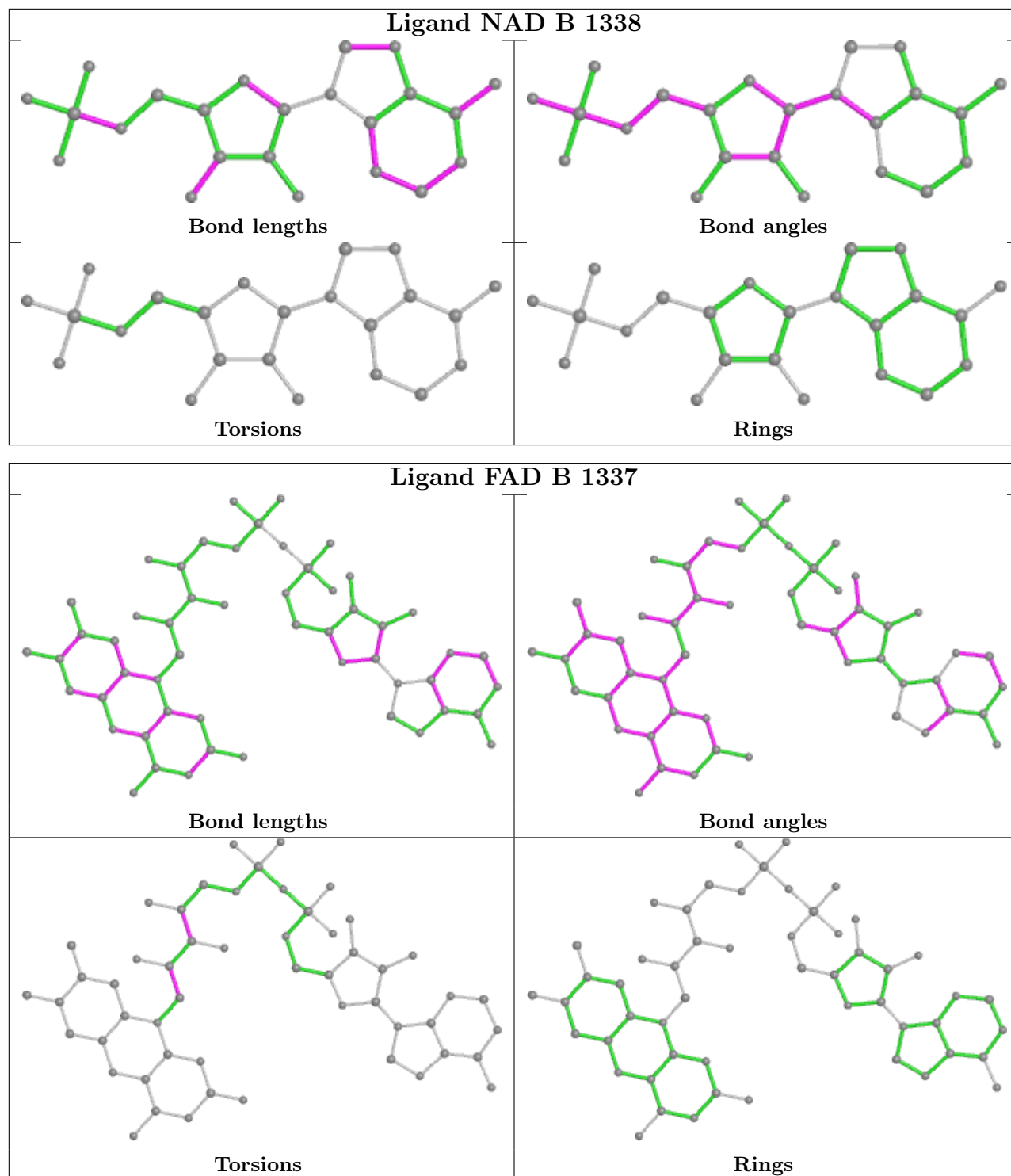| Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	1337	FAD	2	0
3	A	1335	MTE	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	B	1340	SAL	1	0
9	B	1344	GOL	1	0
8	A	1340	SAL	1	0
2	A	1334	FES	1	0
4	B	1336	MOS	4	0
3	B	1335	MTE	2	0
4	A	1336	MOS	4	0
9	A	1348	GOL	1	0
2	B	1334	FES	1	0
5	B	1337	FAD	2	0
9	A	1345	GOL	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 then 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.

Ligand FAD A 1337

Bond lengths

Bond angles

Torsions

Rings

Ligand NAD A 1338

Bond lengths

Bond angles

Torsions

Rings

Ligand MTE A 1335

Bond lengths

Bond angles

Torsions

Rings

Ligand MTE B 1335

Bond lengths

Bond angles

Torsions

Rings

Ligand NAD B 1338

Bond lengths

Bond angles

Torsions

Rings

Ligand FAD B 1337

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

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	1286/1332 (96%)	-0.12	33 (2%)	56	58	9, 18, 33, 53	0
1	B	1289/1332 (96%)	-0.07	31 (2%)	59	62	9, 18, 33, 52	0
All	All	2575/2664 (96%)	-0.09	64 (2%)	57	60	9, 18, 33, 53	0

All (64) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	1325	CYS	7.2
1	A	1288	ASN	7.0
1	B	1288	ASN	6.9
1	A	61	LEU	6.8
1	B	1318	VAL	5.8
1	B	537	LYS	5.6
1	B	61	LEU	5.3
1	B	1319	THR	4.8
1	B	565	ASN	4.7
1	A	565	ASN	4.6
1	B	222	VAL	4.4
1	A	221	ASP	4.3
1	B	528	GLY	4.3
1	B	566	GLY	4.0
1	A	537	LYS	3.9
1	B	221	ASP	3.9
1	B	63	ASP	3.7
1	A	1290	THR	3.6
1	A	553	PRO	3.5
1	B	1326	LYS	3.5
1	A	63	ASP	3.5
1	A	1286	THR	3.4
1	A	223	PRO	3.4
1	B	552	ASP	3.2

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Mol	Chain	Res	Type	RSRZ
1	B	378	GLY	3.2
1	A	566	GLY	3.2
1	B	272	ASN	3.0
1	A	1287	ASN	3.0
1	A	551	LYS	3.0
1	A	272	ASN	3.0
1	B	540	PRO	2.9
1	A	222	VAL	2.8
1	B	553	PRO	2.8
1	A	1316	LEU	2.8
1	B	1286	THR	2.7
1	B	1290	THR	2.7
1	A	199	GLU	2.7
1	B	217	LEU	2.7
1	A	550	GLN	2.6
1	B	60	ARG	2.6
1	B	1287	ASN	2.6
1	A	60	ARG	2.6
1	B	318	LYS	2.5
1	A	538	LEU	2.5
1	A	401	GLU	2.5
1	B	62	GLN	2.5
1	B	64	LYS	2.4
1	B	550	GLN	2.3
1	B	223	PRO	2.3
1	A	989	LYS	2.3
1	A	1143	GLU	2.3
1	B	538	LEU	2.3
1	A	318	LYS	2.3
1	B	569	LYS	2.3
1	A	133	GLU	2.2
1	A	982	SER	2.2
1	A	400	PRO	2.2
1	A	721	LYS	2.1
1	A	552	ASP	2.1
1	A	317	ALA	2.1
1	A	638	ASP	2.0
1	A	1317	CYS	2.0
1	B	133	GLU	2.0
1	A	1326	LYS	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
9	GOL	A	1342	6/6	0.65	0.32	44,46,47,49	0
9	GOL	B	1343	6/6	0.71	0.28	50,52,53,54	0
9	GOL	A	1343	6/6	0.77	0.20	35,39,40,41	0
6	NAD	B	1338	23/44	0.78	0.20	46,50,59,61	0
9	GOL	A	1347	6/6	0.79	0.24	40,43,44,47	0
6	NAD	A	1338	23/44	0.79	0.19	45,50,59,59	0
9	GOL	A	1344	6/6	0.84	0.15	35,38,39,39	0
9	GOL	A	1348	6/6	0.88	0.23	28,29,32,34	0
9	GOL	A	1345	6/6	0.90	0.15	30,33,34,35	0
9	GOL	A	1346	6/6	0.91	0.14	25,30,30,31	0
9	GOL	B	1342	6/6	0.91	0.13	18,25,26,31	0
8	SAL	B	1340	10/10	0.91	0.11	23,25,27,27	0
9	GOL	B	1344	6/6	0.92	0.15	28,30,32,33	0
9	GOL	B	1341	6/6	0.93	0.15	17,21,23,24	0
9	GOL	A	1341	6/6	0.94	0.12	16,18,18,19	0
9	GOL	B	1345	6/6	0.94	0.17	21,24,24,26	0
8	SAL	A	1340	10/10	0.96	0.10	19,22,25,26	0
3	MTE	B	1335	24/24	0.97	0.09	13,17,19,20	0
5	FAD	A	1337	53/53	0.97	0.09	13,16,19,19	0
5	FAD	B	1337	53/53	0.97	0.09	12,15,18,19	0
3	MTE	A	1335	24/24	0.97	0.08	14,17,19,20	0
7	CO3	B	1339	4/4	0.98	0.07	15,15,16,16	0
4	MOS	A	1336	4/4	0.99	0.12	21,23,24,30	0
7	CO3	A	1339	4/4	0.99	0.07	11,12,13,14	0
4	MOS	B	1336	4/4	0.99	0.11	20,22,23,28	0
2	FES	B	1334	4/4	0.99	0.05	11,11,11,12	0
2	FES	A	1333	4/4	0.99	0.04	12,12,12,13	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	FES	B	1333	4/4	0.99	0.04	12,12,12,12	0
10	CA	B	1346	1/1	0.99	0.04	15,15,15,15	0
10	CA	A	1349	1/1	1.00	0.05	14,14,14,14	0
2	FES	A	1334	4/4	1.00	0.04	11,12,12,13	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 NAD B 1338:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
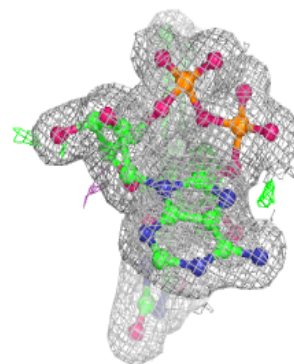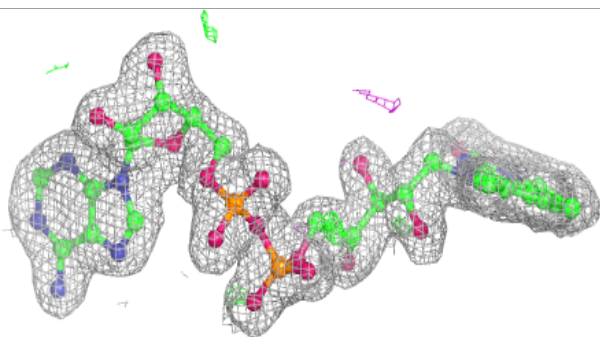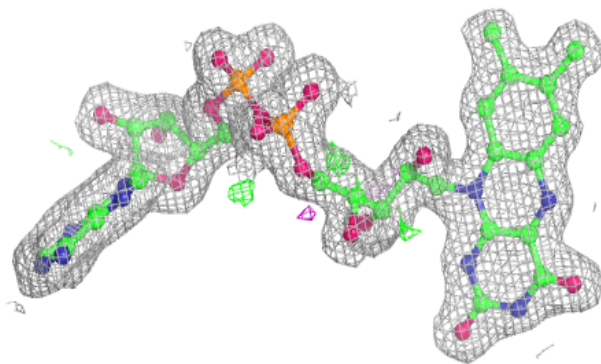mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
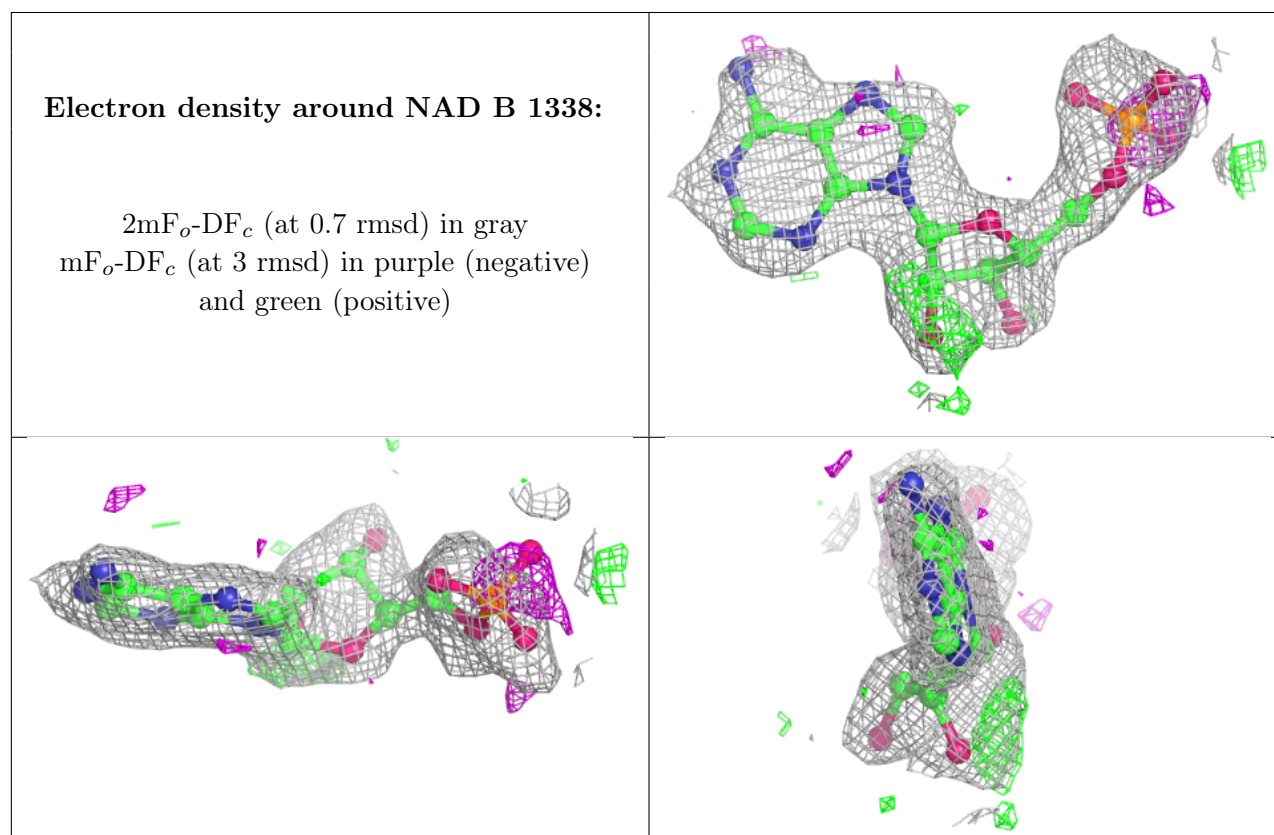
Electron density around NAD A 1338:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
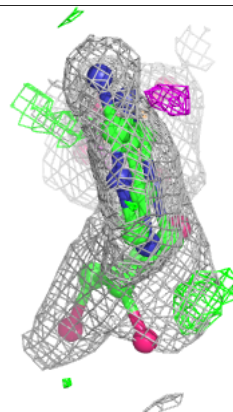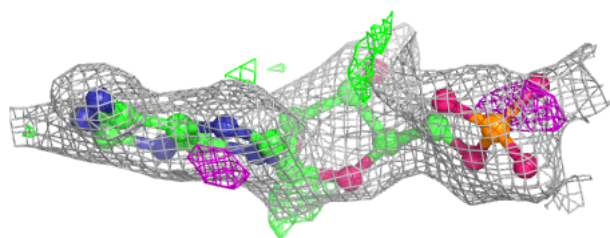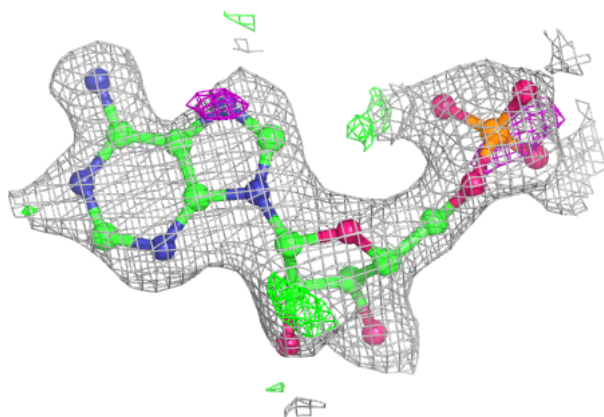
Electron density around MTE B 1335:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
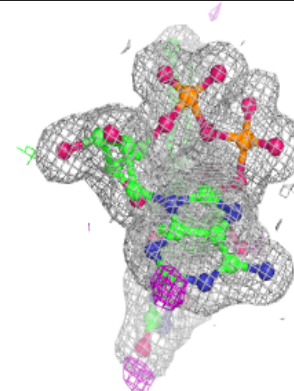$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
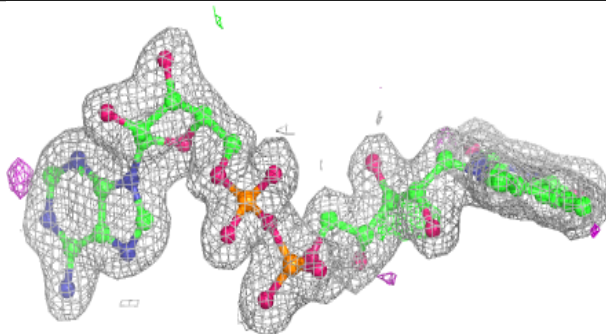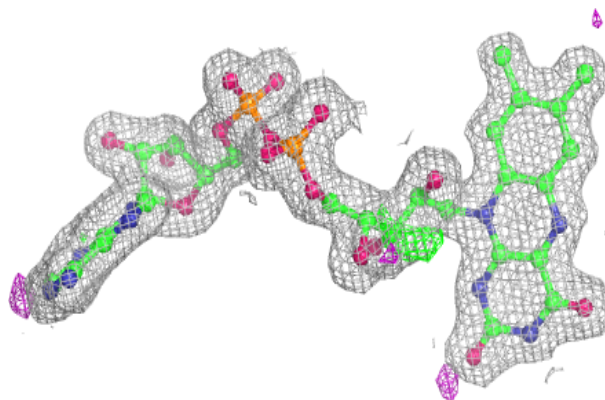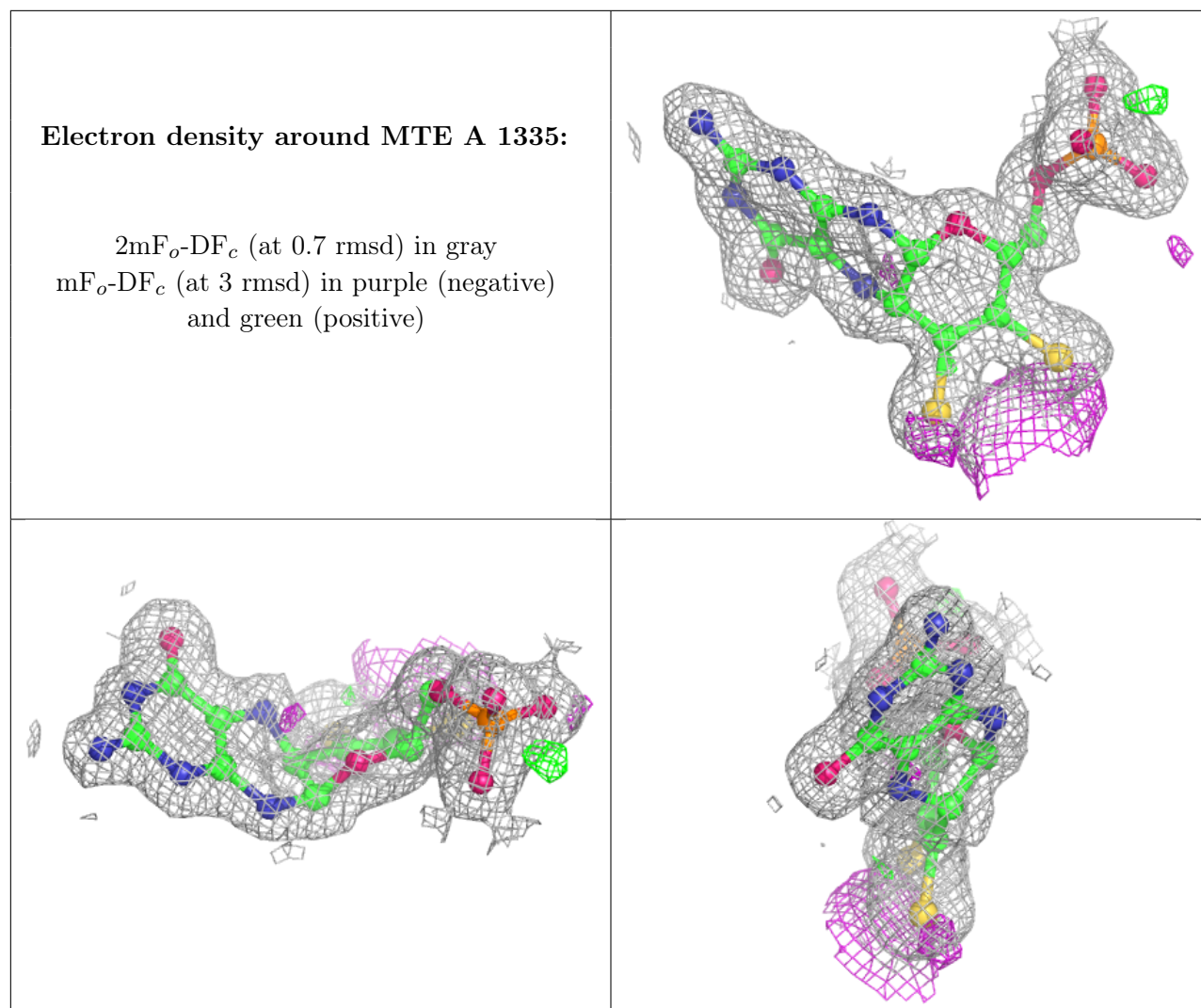and green (positive)
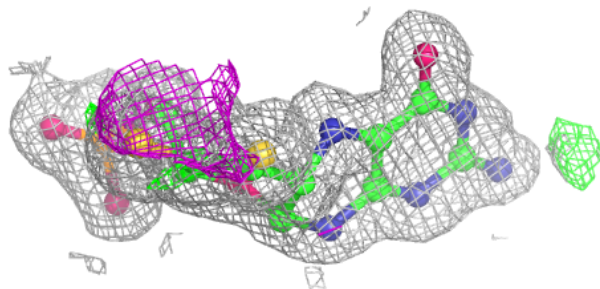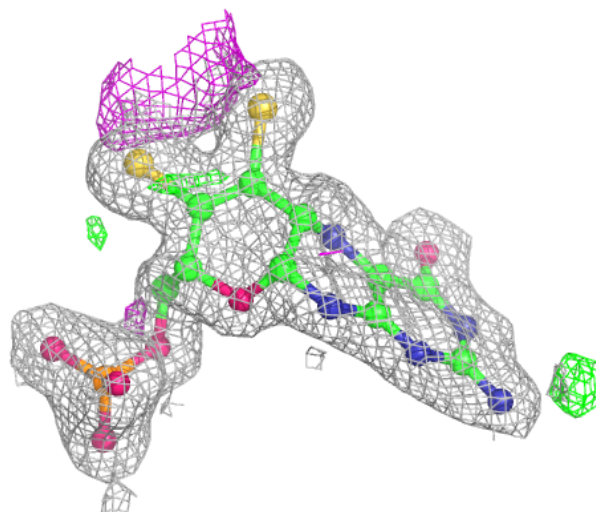
Electron density around FAD A 1337:

$2mF_o-DF_c$ (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 A 1335:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.