



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 08:28 AM UTC

PDB ID : 1T9C / pdb_00001t9c
Title : Crystal Structure Of Yeast Acetohydroxyacid Synthase In Complex With A
Sulfonylurea Herbicide, Sulfometuron methyl
Authors : McCourt, J.A.; Pang, S.S.; Guddat, L.W.; Duggleby, R.G.
Deposited on : 2004-05-16
Resolution : 2.34 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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

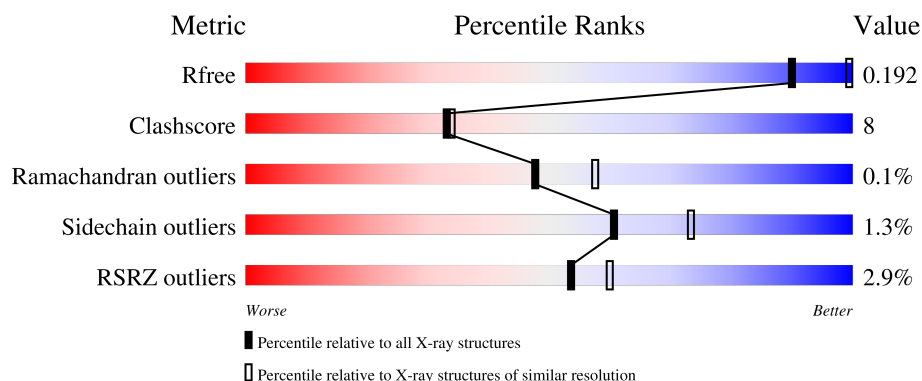
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.34 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}	180053	3031 (2.36-2.32)
Clashscore	190562	3127 (2.36-2.32)
Ramachandran outliers	187476	3095 (2.36-2.32)
Sidechain outliers	187428	3095 (2.36-2.32)
RSRZ outliers	180081	3033 (2.36-2.32)

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	677	0.1% 73% 14% • 12%
1	B	677	4% 72% 15% • 12%

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	1SM	A	695	-	X	-	-
4	1SM	B	1695	-	X	-	-

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 10410 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 Acetolactate synthase, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	596	Total	C	N	O	S	0	6	0
			4546	2879	785	860	22			
1	B	593	Total	C	N	O	S	0	4	0
			4505	2856	776	851	22			

There are 94 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	11	MET	-	cloning artifact	UNP P07342
A	12	HIS	-	cloning artifact	UNP P07342
A	13	HIS	-	cloning artifact	UNP P07342
A	14	HIS	-	cloning artifact	UNP P07342
A	15	HIS	-	cloning artifact	UNP P07342
A	16	HIS	-	cloning artifact	UNP P07342
A	17	HIS	-	cloning artifact	UNP P07342
A	18	SER	-	cloning artifact	UNP P07342
A	19	SER	-	cloning artifact	UNP P07342
A	20	GLY	-	cloning artifact	UNP P07342
A	21	LEU	-	cloning artifact	UNP P07342
A	22	VAL	-	cloning artifact	UNP P07342
A	23	PRO	-	cloning artifact	UNP P07342
A	24	ARG	-	cloning artifact	UNP P07342
A	25	GLY	-	cloning artifact	UNP P07342
A	26	SER	-	cloning artifact	UNP P07342
A	27	GLY	-	cloning artifact	UNP P07342
A	28	MET	-	cloning artifact	UNP P07342
A	29	LYS	-	cloning artifact	UNP P07342
A	30	GLU	-	cloning artifact	UNP P07342
A	31	THR	-	cloning artifact	UNP P07342
A	32	ALA	-	cloning artifact	UNP P07342
A	33	ALA	-	cloning artifact	UNP P07342
A	34	ALA	-	cloning artifact	UNP P07342
A	35	LYS	-	cloning artifact	UNP P07342

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Chain	Residue	Modelled	Actual	Comment	Reference
A	36	PHE	-	cloning artifact	UNP P07342
A	37	GLU	-	cloning artifact	UNP P07342
A	38	ARG	-	cloning artifact	UNP P07342
A	39	GLN	-	cloning artifact	UNP P07342
A	40	HIS	-	cloning artifact	UNP P07342
A	41	MET	-	cloning artifact	UNP P07342
A	42	ASP	-	cloning artifact	UNP P07342
A	43	SER	-	cloning artifact	UNP P07342
A	44	PRO	-	cloning artifact	UNP P07342
A	45	ASP	-	cloning artifact	UNP P07342
A	46	LEU	-	cloning artifact	UNP P07342
A	47	GLY	-	cloning artifact	UNP P07342
A	48	THR	-	cloning artifact	UNP P07342
A	49	ASP	-	cloning artifact	UNP P07342
A	50	ASP	-	cloning artifact	UNP P07342
A	51	ASP	-	cloning artifact	UNP P07342
A	52	ASP	-	cloning artifact	UNP P07342
A	53	LYS	-	cloning artifact	UNP P07342
A	54	ALA	-	cloning artifact	UNP P07342
A	55	MET	-	cloning artifact	UNP P07342
A	56	GLY	-	cloning artifact	UNP P07342
A	57	SER	-	cloning artifact	UNP P07342
B	11	MET	-	cloning artifact	UNP P07342
B	12	HIS	-	cloning artifact	UNP P07342
B	13	HIS	-	cloning artifact	UNP P07342
B	14	HIS	-	cloning artifact	UNP P07342
B	15	HIS	-	cloning artifact	UNP P07342
B	16	HIS	-	cloning artifact	UNP P07342
B	17	HIS	-	cloning artifact	UNP P07342
B	18	SER	-	cloning artifact	UNP P07342
B	19	SER	-	cloning artifact	UNP P07342
B	20	GLY	-	cloning artifact	UNP P07342
B	21	LEU	-	cloning artifact	UNP P07342
B	22	VAL	-	cloning artifact	UNP P07342
B	23	PRO	-	cloning artifact	UNP P07342
B	24	ARG	-	cloning artifact	UNP P07342
B	25	GLY	-	cloning artifact	UNP P07342
B	26	SER	-	cloning artifact	UNP P07342
B	27	GLY	-	cloning artifact	UNP P07342
B	28	MET	-	cloning artifact	UNP P07342
B	29	LYS	-	cloning artifact	UNP P07342
B	30	GLU	-	cloning artifact	UNP P07342

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Chain	Residue	Modelled	Actual	Comment	Reference
B	31	THR	-	cloning artifact	UNP P07342
B	32	ALA	-	cloning artifact	UNP P07342
B	33	ALA	-	cloning artifact	UNP P07342
B	34	ALA	-	cloning artifact	UNP P07342
B	35	LYS	-	cloning artifact	UNP P07342
B	36	PHE	-	cloning artifact	UNP P07342
B	37	GLU	-	cloning artifact	UNP P07342
B	38	ARG	-	cloning artifact	UNP P07342
B	39	GLN	-	cloning artifact	UNP P07342
B	40	HIS	-	cloning artifact	UNP P07342
B	41	MET	-	cloning artifact	UNP P07342
B	42	ASP	-	cloning artifact	UNP P07342
B	43	SER	-	cloning artifact	UNP P07342
B	44	PRO	-	cloning artifact	UNP P07342
B	45	ASP	-	cloning artifact	UNP P07342
B	46	LEU	-	cloning artifact	UNP P07342
B	47	GLY	-	cloning artifact	UNP P07342
B	48	THR	-	cloning artifact	UNP P07342
B	49	ASP	-	cloning artifact	UNP P07342
B	50	ASP	-	cloning artifact	UNP P07342
B	51	ASP	-	cloning artifact	UNP P07342
B	52	ASP	-	cloning artifact	UNP P07342
B	53	LYS	-	cloning artifact	UNP P07342
B	54	ALA	-	cloning artifact	UNP P07342
B	55	MET	-	cloning artifact	UNP P07342
B	56	GLY	-	cloning artifact	UNP P07342
B	57	SER	-	cloning artifact	UNP P07342

- Molecule 2 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total K 1 1	0	0
2	B	1	Total K 1 1	0	0

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

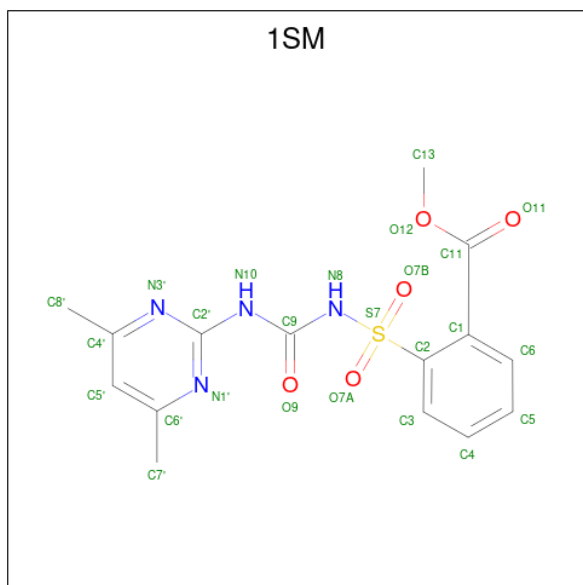
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Mg 1 1	0	0

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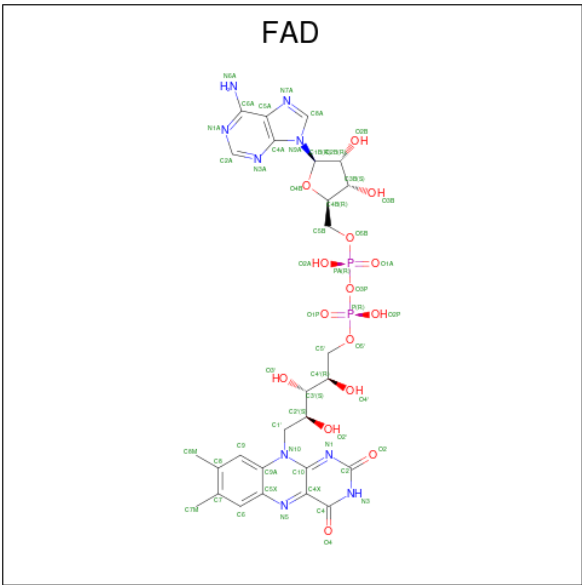
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	Mg	0	0
			1	1		

- Molecule 4 is METHYL 2-[(4,6-DIMETHYLPYRIMIDIN-2-YL)AMINO]CARBONYL}AMINO)SULFONYL]BENZOATE (CCD ID: 1SM) (formula: C₁₅H₁₆N₄O₅S).



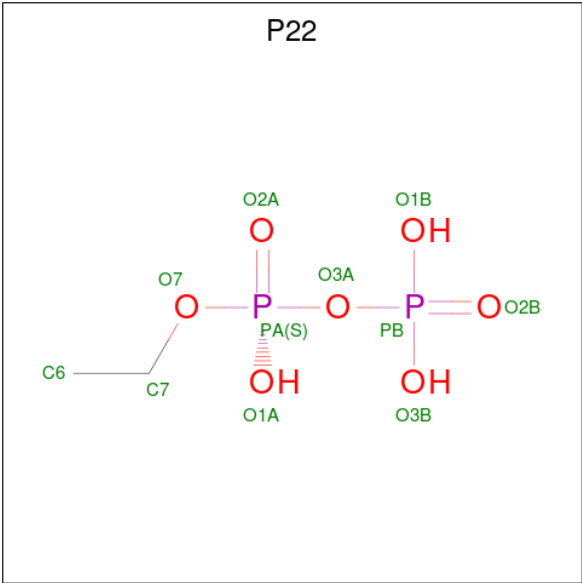
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	S	0	0
			25	15	4	5	1		
4	B	1	Total	C	N	O	S	0	0
			25	15	4	5	1		

- Molecule 5 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: C₂₇H₃₃N₉O₁₅P₂).



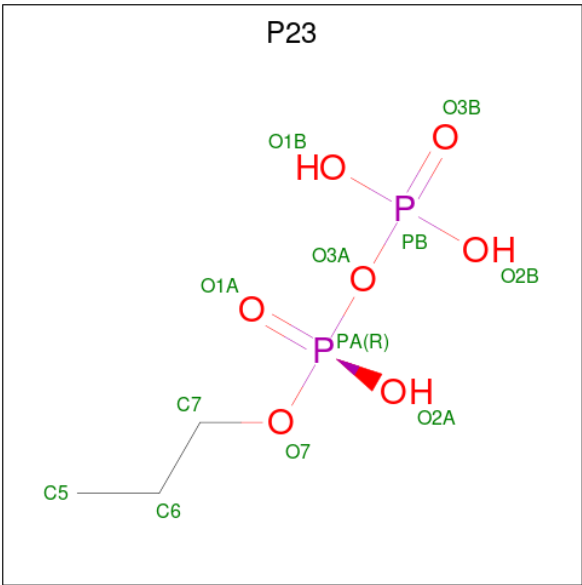
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total 53	C 27	N 9	O 15	P 2	0	0
5	B	1	Total 53	C 27	N 9	O 15	P 2	0	0

- Molecule 6 is ETHYL DIHYDROGEN DIPHOSPHATE (CCD ID: P22) (formula: C₂H₈O₇P₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	O	P	0	0
			11	2	7	2		

- Molecule 7 is PROPYL TRIHYDROGEN DIPHOSPHATE (CCD ID: P23) (formula: C₃H₁₀O₇P₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	B	1	Total	C	O	P	0	0
			12	3	7	2		

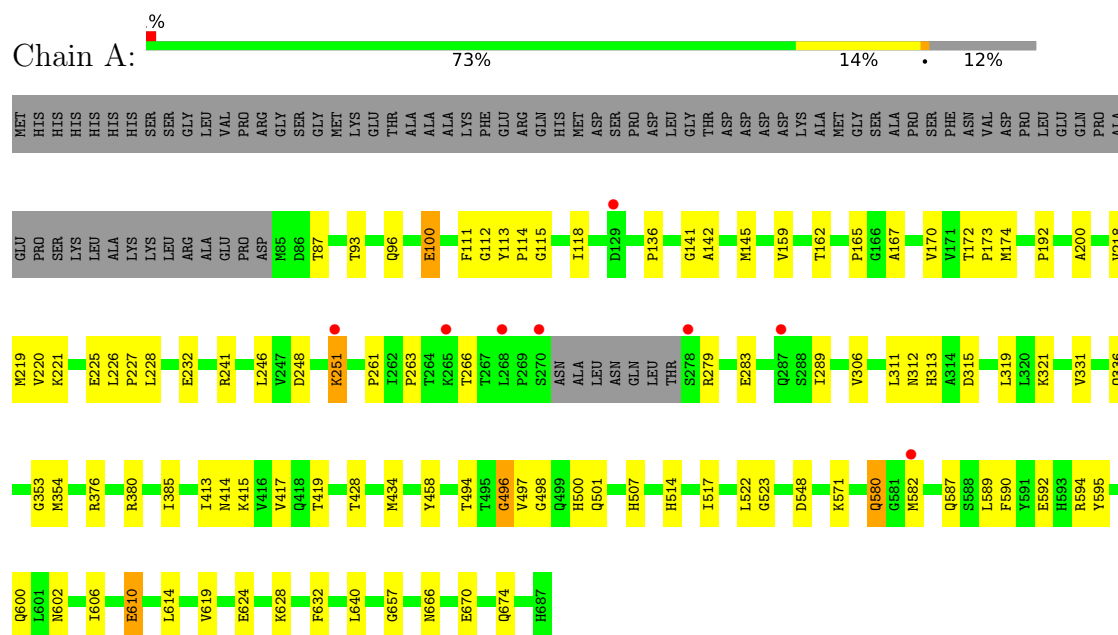
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	682	Total	O	0	0
			682	682		
8	B	494	Total	O	0	0
			494	494		

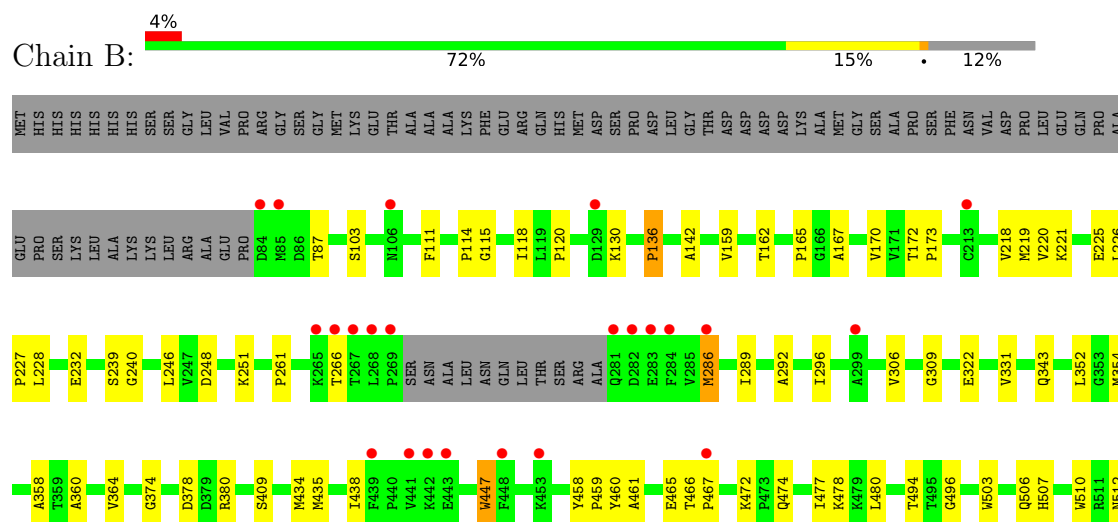
3 Residue-property plots

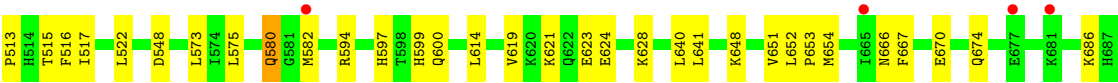
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Acetolactate synthase, mitochondrial



- Molecule 1: Acetolactate synthase, mitochondrial





4 Data and refinement statistics

Property	Value	Source
Space group	P 4 2 2	Depositor
Cell constants a, b, c, α , β , γ	154.49Å 154.49Å 178.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.34 50.00 – 2.34	Depositor EDS
% Data completeness (in resolution range)	96.5 (50.00-2.34) 96.6 (50.00-2.34)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.23 (at 2.34Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.162 , 0.191 0.166 , 0.192	Depositor DCC
R_{free} test set	9021 reflections (9.97%)	wwPDB-VP
Wilson B-factor (Å ²)	22.6	Xtriage
Anisotropy	0.284	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 62.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	10410	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.67% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: P23, FAD, P22, K, 1SM, MG

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.38	0/4664	0.91	11/6326 (0.2%)
1	B	0.34	0/4615	0.86	5/6263 (0.1%)
All	All	0.36	0/9279	0.88	16/12589 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	580	GLN	N-CA-C	-7.23	99.52	109.71
1	A	496	GLY	N-CA-C	-7.10	102.45	112.60
1	A	306	VAL	N-CA-C	6.77	118.35	108.53
1	B	507	HIS	N-CA-C	5.95	120.16	113.02
1	A	507	HIS	N-CA-C	5.84	120.41	113.28
1	A	376	ARG	N-CA-C	5.80	119.67	112.59
1	A	458	TYR	N-CA-C	5.73	120.21	110.02
1	A	113	TYR	CA-C-N	5.52	125.83	119.92
1	A	113	TYR	C-N-CA	5.52	125.83	119.92
1	B	306	VAL	N-CA-C	5.51	116.92	108.71
1	B	331	VAL	N-CA-C	5.50	115.81	108.11
1	A	331	VAL	N-CA-C	5.36	115.61	108.11
1	A	241	ARG	N-CA-C	-5.26	101.93	109.24
1	B	496	GLY	N-CA-C	-5.19	103.74	112.77

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	353	GLY	N-CA-C	5.07	119.01	111.76
1	B	506	GLN	N-CA-C	5.04	116.58	111.14

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	610[A]	GLU	Sidechain
1	A	610[B]	GLU	Sidechain

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	4546	0	4530	74	0
1	B	4505	0	4485	73	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	25	0	15	2	0
4	B	25	0	15	6	0
5	A	53	0	31	0	0
5	B	53	0	31	0	0
6	A	11	0	5	2	0
7	B	12	0	7	3	0
8	A	682	0	0	10	0
8	B	494	0	0	5	0
All	All	10410	0	9119	143	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 (143) 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:619:VAL:HG22	1:B:628:LYS:HG2	1.43	0.96
1:A:313:HIS:HD2	1:A:315:ASP:H	1.24	0.85
1:A:251[A]:LYS:HE2	8:A:4547:HOH:O	1.77	0.83
1:B:582[A]:MET:HE2	7:B:700:P23:H52	1.63	0.80
1:B:87:THR:HG22	1:B:261:PRO:HB3	1.64	0.80
1:A:600:GLN:HE21	1:A:602:ASN:HD21	1.32	0.78
1:A:251[B]:LYS:HD3	4:B:1695:1SM:O7B	1.85	0.77
1:A:385:ILE:HD11	1:A:417:VAL:CG1	2.18	0.72
1:A:580:GLN:HE22	1:B:114:PRO:HG2	1.58	0.68
1:B:619:VAL:HG23	1:B:641:LEU:HD11	1.78	0.66
1:A:172:THR:HB	1:A:173:PRO:HD3	1.78	0.66
1:B:289:ILE:HG23	1:B:434:MET:HB2	1.78	0.66
1:A:136:PRO:HG3	1:A:142:ALA:HB2	1.79	0.65
1:A:251[B]:LYS:CD	4:B:1695:1SM:O7B	2.45	0.65
1:A:624:GLU:HG2	8:A:4378:HOH:O	1.96	0.64
1:A:385:ILE:HD11	1:A:417:VAL:HG13	1.80	0.61
1:B:286:MET:HE2	1:B:289:ILE:HD12	1.81	0.61
1:B:172:THR:HB	1:B:173:PRO:HD3	1.82	0.61
1:A:522:LEU:HG	1:B:165:PRO:HD3	1.82	0.61
1:B:226:LEU:HB3	1:B:227:PRO:HD3	1.82	0.61
1:A:414:ASN:ND2	1:A:419:THR:H	1.97	0.61
1:A:87:THR:HG22	1:A:261:PRO:HB3	1.84	0.59
1:B:580[A]:GLN:HG2	7:B:700:P23:H71	1.86	0.58
1:A:192:PRO:HG3	1:A:251[A]:LYS:HG2	1.86	0.58
1:A:414:ASN:HD21	1:A:419:THR:H	1.52	0.58
1:A:413:ILE:HG22	8:A:4140:HOH:O	2.04	0.57
1:A:226:LEU:HB3	1:A:227:PRO:HD3	1.85	0.57
1:B:594:ARG:NH2	8:B:4084:HOH:O	2.37	0.57
1:B:666:ASN:HB3	8:B:4303:HOH:O	2.06	0.56
1:A:228:LEU:O	1:A:232:GLU:HG3	2.06	0.56
1:A:93:THR:OG1	1:A:96:GLN:HG3	2.06	0.56
1:B:640:LEU:C	1:B:640:LEU:HD23	2.31	0.56
1:B:228:LEU:HB2	1:B:266:THR:HB	1.88	0.55
1:A:251[B]:LYS:NZ	8:A:4036:HOH:O	2.30	0.55
1:A:496:GLY:H	1:A:500:HIS:HE1	1.54	0.55
1:B:378:ASP:OD2	1:B:380:ARG:HB2	2.07	0.55
1:B:218:VAL:HG22	1:B:219:MET:N	2.22	0.55
1:B:219:MET:HE2	1:B:221:LYS:HD3	1.90	0.54
4:A:695:1SM:O7B	1:B:251[A]:LYS:HD3	2.08	0.53
1:B:512:ASN:HB2	1:B:515:THR:HG21	1.90	0.53
1:B:623:GLU:H	1:B:623:GLU:CD	2.16	0.53
1:A:415:LYS:HD2	8:B:4945:HOH:O	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:670:GLU:O	1:B:674:GLN:HG3	2.09	0.53
1:A:263:PRO:HB2	1:A:266:THR:HG23	1.92	0.52
1:A:606:ILE:O	1:A:610[B]:GLU:HB3	2.09	0.52
1:A:228:LEU:HB2	1:A:266:THR:HB	1.91	0.52
1:A:96:GLN:O	1:A:100[B]:GLU:HG2	2.09	0.52
1:B:322:GLU:OE2	1:B:435:MET:HG2	2.10	0.52
1:B:322:GLU:HB3	1:B:435:MET:HE3	1.91	0.52
1:B:465:GLU:HG3	1:B:472:LYS:HG2	1.91	0.52
1:A:640:LEU:HD23	1:A:640:LEU:C	2.34	0.51
1:B:619:VAL:CG2	1:B:641:LEU:HD11	2.39	0.51
1:A:289:ILE:HG23	1:A:434:MET:HB2	1.91	0.51
1:A:666:ASN:ND2	8:A:4216:HOH:O	2.44	0.51
1:A:657:GLY:HA3	8:A:4909:HOH:O	2.11	0.51
1:A:167:ALA:O	1:A:170:VAL:HG22	2.10	0.51
1:B:136:PRO:HG3	1:B:142:ALA:HB2	1.93	0.50
4:A:695:1SM:O7B	1:B:251[B]:LYS:HD3	2.11	0.50
1:B:621:LYS:HE2	1:B:624:GLU:OE2	2.12	0.50
1:A:582[A]:MET:HE2	8:A:4934:HOH:O	2.11	0.49
1:A:571:LYS:HB3	1:A:632:PHE:CZ	2.47	0.49
1:A:118:ILE:HG13	1:A:118:ILE:O	2.13	0.48
1:A:600:GLN:HB2	8:B:4075:HOH:O	2.13	0.48
1:B:292:ALA:O	1:B:296:ILE:HG13	2.14	0.48
1:A:114:PRO:HG2	1:B:597:HIS:O	2.14	0.47
1:A:170:VAL:HG23	1:A:174:MET:HE2	1.95	0.47
1:A:494:THR:HA	1:A:517:ILE:O	2.14	0.47
1:A:220:VAL:HG13	1:A:225:GLU:HG3	1.97	0.47
1:A:592:GLU:HB2	1:A:594[A]:ARG:NH1	2.29	0.47
1:B:352:LEU:H	1:B:352:LEU:HD23	1.80	0.47
1:B:580[A]:GLN:HG2	7:B:700:P23:C7	2.44	0.47
1:B:599:HIS:HE1	1:B:648:LYS:NZ	2.11	0.47
1:A:111:PHE:O	1:A:159:VAL:HA	2.15	0.47
1:A:200:ALA:HB1	4:B:1695:1SM:H5	1.97	0.46
1:A:218:VAL:HG22	1:A:219:MET:N	2.30	0.46
1:A:619:VAL:HB	1:A:628:LYS:HG3	1.98	0.46
1:A:319:LEU:HD12	1:A:428:THR:CG2	2.46	0.46
1:A:496:GLY:N	1:A:500:HIS:HE1	2.14	0.46
1:B:582[A]:MET:HG2	4:B:1695:1SM:H5'	1.98	0.46
1:A:587:GLN:NE2	1:A:595:TYR:HA	2.31	0.46
1:B:219:MET:HG3	1:B:248:ASP:HB3	1.98	0.46
1:A:251[B]:LYS:HE3	8:A:4036:HOH:O	2.16	0.45
1:A:582[B]:MET:HE2	6:A:1702:P22:H61	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:358:ALA:HB3	1:B:458:TYR:HB3	1.98	0.45
1:B:599:HIS:HE1	1:B:648:LYS:HZ1	1.64	0.45
1:B:466:THR:HB	1:B:467:PRO:HD2	1.98	0.45
1:B:666:ASN:ND2	1:B:667:PHE:H	2.15	0.45
1:B:621:LYS:HB3	1:B:623:GLU:OE1	2.16	0.45
1:A:319:LEU:HD12	1:A:428:THR:HG23	1.99	0.44
1:B:118:ILE:O	1:B:118:ILE:HG13	2.17	0.44
1:B:480:LEU:HD22	1:B:573:LEU:HD22	1.99	0.44
1:A:497:VAL:HG21	1:A:523:GLY:C	2.42	0.44
1:A:670:GLU:O	1:A:674:GLN:HG3	2.17	0.44
1:B:619:VAL:CG2	1:B:628:LYS:HG2	2.30	0.44
1:A:498:GLY:O	1:A:501:GLN:HB3	2.17	0.44
1:B:360:ALA:O	1:B:364:VAL:HG23	2.18	0.44
1:A:219:MET:HE2	1:A:221:LYS:CE	2.47	0.44
1:B:115:GLY:HA3	1:B:162:THR:HB	2.00	0.44
1:B:582[A]:MET:CG	4:B:1695:ISM:H5'	2.48	0.44
1:B:582[B]:MET:HG3	4:B:1695:ISM:H5'	1.99	0.44
1:A:336:GLN:HA	1:A:336:GLN:OE1	2.17	0.44
1:B:246:LEU:C	1:B:246:LEU:HD23	2.42	0.44
1:B:459:PRO:O	1:B:461:ALA:N	2.51	0.44
1:B:120:PRO:HG2	1:B:251[A]:LYS:HG3	2.00	0.43
1:A:170:VAL:C	1:A:173:PRO:HD2	2.42	0.43
1:B:228:LEU:O	1:B:232:GLU:HG3	2.19	0.43
1:B:494:THR:HG22	1:B:517:ILE:HB	2.00	0.43
1:B:447:TRP:HA	1:B:447:TRP:CE3	2.53	0.43
1:A:251[B]:LYS:CE	8:A:4036:HOH:O	2.66	0.43
1:B:170:VAL:C	1:B:173:PRO:HD2	2.44	0.43
1:B:409:SER:HB3	8:B:4679:HOH:O	2.18	0.43
1:A:219:MET:HG3	1:A:248:ASP:HB3	2.01	0.43
1:A:311:LEU:O	1:A:514:HIS:HE1	2.01	0.42
1:B:447:TRP:HA	1:B:447:TRP:HE3	1.84	0.42
1:A:313:HIS:CD2	1:A:315:ASP:H	2.16	0.42
1:A:589:LEU:HD23	1:A:590:PHE:CE1	2.55	0.42
1:B:103:SER:HB2	1:B:130:LYS:HD2	2.02	0.42
1:A:219:MET:HE2	1:A:221:LYS:HE2	2.02	0.42
1:A:354:MET:HE1	1:A:380:ARG:NH1	2.34	0.42
1:A:141:GLY:O	1:A:145:MET:HG3	2.19	0.42
1:B:309:GLY:HA3	1:B:374:GLY:HA3	2.00	0.42
1:B:220:VAL:HG13	1:B:225:GLU:HG3	2.02	0.41
1:A:321:LYS:NZ	8:A:4855:HOH:O	2.52	0.41
1:B:474:GLN:O	1:B:478:LYS:HG3	2.19	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:279:ARG:O	1:A:283:GLU:HG3	2.20	0.41
1:B:652:LEU:HA	1:B:653:PRO:C	2.45	0.41
1:A:246:LEU:C	1:A:246:LEU:HD23	2.45	0.41
1:B:354:MET:O	1:B:654:MET:HA	2.21	0.41
1:B:434:MET:HE3	1:B:438:ILE:HD11	2.01	0.41
1:B:512:ASN:HA	1:B:513:PRO:HD3	1.84	0.41
1:A:580:GLN:HG2	6:A:1702:P22:H71	2.02	0.41
1:B:477:ILE:HD11	1:B:575:LEU:HD11	2.02	0.41
1:A:312:ASN:HD22	1:A:312:ASN:HA	1.67	0.41
1:B:167:ALA:O	1:B:170:VAL:HG22	2.21	0.40
1:B:239:SER:O	1:B:240:GLY:C	2.64	0.40
1:B:510:TRP:CH2	1:B:516:PHE:CD1	3.09	0.40
1:A:165:PRO:HD3	1:B:522:LEU:HG	2.03	0.40
1:B:111:PHE:O	1:B:159:VAL:HA	2.22	0.40
1:B:503:TRP:CE2	1:B:651:VAL:HG22	2.57	0.40
1:A:115:GLY:HA3	1:A:162:THR:HB	2.03	0.40
1:B:343:GLN:HG3	1:B:510:TRP:O	2.22	0.40
1:A:112:GLY:O	1:A:136:PRO:HD2	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	598/677 (88%)	586 (98%)	12 (2%)	0	100	100
1	B	593/677 (88%)	576 (97%)	16 (3%)	1 (0%)	43	50
All	All	1191/1354 (88%)	1162 (98%)	28 (2%)	1 (0%)	48	57

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	460	TYR

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	487/556 (88%)	481 (99%)	6 (1%)	63	75
1	B	481/556 (86%)	472 (98%)	9 (2%)	50	63
All	All	968/1112 (87%)	953 (98%)	15 (2%)	61	69

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	100[A]	GLU
1	A	100[B]	GLU
1	A	251[A]	LYS
1	A	251[B]	LYS
1	A	548	ASP
1	A	614	LEU
1	B	136	PRO
1	B	286	MET
1	B	447	TRP
1	B	548	ASP
1	B	580[A]	GLN
1	B	580[B]	GLN
1	B	600	GLN
1	B	614	LEU
1	B	686	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	106	ASN
1	A	127	ASN
1	A	312	ASN

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Mol	Chain	Res	Type
1	A	313	HIS
1	A	414	ASN
1	A	500	HIS
1	A	512	ASN
1	A	580	GLN
1	A	587	GLN
1	A	602	ASN
1	A	666	ASN
1	A	687	HIS
1	B	106	ASN
1	B	126	HIS
1	B	127	ASN
1	B	312	ASN
1	B	587	GLN
1	B	599	HIS
1	B	602	ASN
1	B	666	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 4 are monoatomic - leaving 6 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	B	1701	-	58,58,58	2.79	24 (41%)	85,89,89	1.57	15 (17%)
4	1SM	A	695	-	26,26,26	7.28	15 (57%)	36,37,37	3.02	13 (36%)
6	P22	A	1702	3	9,10,10	2.35	6 (66%)	13,15,15	2.27	3 (23%)
7	P23	B	700	3	10,11,11	1.95	5 (50%)	14,16,16	2.43	4 (28%)
5	FAD	A	701	-	58,58,58	2.67	24 (41%)	85,89,89	1.56	12 (14%)
4	1SM	B	1695	-	26,26,26	7.38	15 (57%)	36,37,37	3.05	11 (30%)

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	B	1701	-	-	1/34/50/50	0/6/6/6
4	1SM	A	695	-	-	11/21/21/21	0/2/2/2
6	P22	A	1702	3	-	2/10/10/10	-
7	P23	B	700	3	-	1/11/11/11	-
5	FAD	A	701	-	-	3/34/50/50	0/6/6/6
4	1SM	B	1695	-	-	12/21/21/21	0/2/2/2

All (89) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1695	1SM	O7A-S7	24.75	1.72	1.43
4	A	695	1SM	O7A-S7	24.12	1.71	1.43
4	A	695	1SM	O7B-S7	23.57	1.70	1.43
4	B	1695	1SM	O7B-S7	23.37	1.70	1.43
5	B	1701	FAD	C4A-N3A	7.69	1.48	1.34
5	A	701	FAD	C4A-N3A	7.31	1.48	1.34
5	B	1701	FAD	C2A-N1A	6.74	1.45	1.33
5	A	701	FAD	C2A-N1A	6.19	1.44	1.33
5	B	1701	FAD	C5A-C4A	6.17	1.50	1.39
5	B	1701	FAD	C8A-N9A	5.91	1.47	1.37
5	A	701	FAD	C8A-N9A	5.68	1.47	1.37
5	A	701	FAD	C5A-C4A	5.56	1.49	1.39
5	B	1701	FAD	C5A-C6A	5.51	1.56	1.41
4	B	1695	1SM	C5'-C6'	5.38	1.48	1.38
4	B	1695	1SM	C2'-N10	-5.37	1.31	1.38
4	B	1695	1SM	C6'-N1'	5.33	1.44	1.34
4	A	695	1SM	C2'-N10	-5.30	1.31	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	695	1SM	C6'-N1'	5.25	1.44	1.34
5	A	701	FAD	C5A-C6A	5.22	1.55	1.41
4	B	1695	1SM	O12-C11	5.12	1.44	1.33
4	A	695	1SM	O12-C11	5.08	1.44	1.33
4	A	695	1SM	C5'-C6'	5.04	1.48	1.38
4	B	1695	1SM	C4'-N3'	5.02	1.43	1.34
4	B	1695	1SM	C5'-C4'	4.98	1.48	1.38
4	A	695	1SM	C4'-N3'	4.95	1.43	1.34
4	A	695	1SM	C5'-C4'	4.94	1.48	1.38
5	B	1701	FAD	C9A-C5X	4.68	1.48	1.41
4	B	1695	1SM	C1-C2	4.44	1.45	1.40
5	A	701	FAD	C9A-C5X	4.41	1.48	1.41
5	A	701	FAD	O4'-C4'	4.40	1.52	1.43
5	B	1701	FAD	C1'-C2'	-4.29	1.46	1.52
5	B	1701	FAD	O4'-C4'	4.28	1.52	1.43
5	A	701	FAD	O3'-C3'	4.07	1.53	1.43
5	B	1701	FAD	C6A-N1A	3.93	1.46	1.35
5	B	1701	FAD	O3'-C3'	3.91	1.52	1.43
5	B	1701	FAD	C2A-N3A	3.90	1.40	1.33
5	A	701	FAD	C1'-C2'	-3.88	1.47	1.52
4	A	695	1SM	C1-C2	3.79	1.44	1.40
5	A	701	FAD	C5'-C4'	-3.76	1.46	1.51
5	A	701	FAD	C6A-N1A	3.70	1.46	1.35
5	B	1701	FAD	C5'-C4'	-3.68	1.46	1.51
4	B	1695	1SM	S7-N8	3.60	1.72	1.64
5	B	1701	FAD	C4X-N5	3.47	1.38	1.30
5	A	701	FAD	C4X-N5	3.42	1.38	1.30
6	A	1702	P22	PA-O7	-3.40	1.46	1.59
5	B	1701	FAD	C10-N1	3.29	1.39	1.33
4	A	695	1SM	S7-N8	3.28	1.72	1.64
7	B	700	P23	PA-O7	-3.25	1.46	1.59
4	B	1695	1SM	C3-C2	3.24	1.43	1.39
5	A	701	FAD	C2A-N3A	3.24	1.39	1.33
4	A	695	1SM	C3-C2	3.18	1.42	1.39
4	A	695	1SM	C2'-N1'	3.15	1.43	1.34
5	A	701	FAD	C3B-C4B	3.13	1.60	1.53
4	B	1695	1SM	C2'-N3'	3.10	1.43	1.34
4	B	1695	1SM	C2'-N1'	3.04	1.43	1.34
4	A	695	1SM	C2'-N3'	3.00	1.43	1.34
7	B	700	P23	PA-O2A	-2.95	1.41	1.55
5	A	701	FAD	C10-N1	2.93	1.39	1.33
6	A	1702	P22	PA-O2A	-2.90	1.40	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1701	FAD	C1B-N9A	2.90	1.54	1.46
5	A	701	FAD	C8-C7	2.83	1.47	1.40
5	A	701	FAD	P-O2P	-2.79	1.42	1.55
5	B	1701	FAD	C3B-C4B	2.78	1.60	1.53
5	B	1701	FAD	C8-C7	2.72	1.47	1.40
6	A	1702	P22	PB-O1B	-2.70	1.44	1.54
5	B	1701	FAD	P-O2P	-2.67	1.43	1.55
7	B	700	P23	PB-O1B	-2.67	1.44	1.54
6	A	1702	P22	O7-C7	2.67	1.59	1.44
5	A	701	FAD	C1B-N9A	2.63	1.53	1.46
5	A	701	FAD	C6-C5X	2.47	1.43	1.40
5	A	701	FAD	C9-C9A	2.45	1.43	1.39
5	B	1701	FAD	C9-C9A	2.45	1.43	1.39
7	B	700	P23	PB-O2B	-2.40	1.45	1.54
4	A	695	1SM	C9-N8	-2.30	1.34	1.39
5	B	1701	FAD	C10-N10	2.30	1.42	1.37
4	A	695	1SM	C9-N10	-2.28	1.32	1.37
5	B	1701	FAD	PA-O5B	-2.27	1.50	1.59
4	B	1695	1SM	C9-N10	-2.24	1.32	1.37
5	A	701	FAD	C6-C7	2.22	1.42	1.39
6	A	1702	P22	PA-O1A	-2.21	1.45	1.55
5	A	701	FAD	PA-O2A	-2.17	1.45	1.55
5	A	701	FAD	PA-O5B	-2.15	1.51	1.59
7	B	700	P23	PA-O1A	-2.13	1.43	1.50
6	A	1702	P22	PA-O3A	-2.12	1.57	1.59
5	B	1701	FAD	PA-O2A	-2.12	1.45	1.55
5	B	1701	FAD	C6-C7	2.10	1.42	1.39
4	B	1695	1SM	C9-N8	-2.10	1.34	1.39
5	B	1701	FAD	C5A-N7A	-2.07	1.35	1.39
5	A	701	FAD	C5A-N7A	-2.05	1.35	1.39

All (58) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	1695	1SM	C2'-N10-C9	11.38	142.06	130.34
4	A	695	1SM	C2'-N10-C9	11.10	141.77	130.34
4	B	1695	1SM	C3-C2-S7	-8.81	104.85	117.51
4	A	695	1SM	C3-C2-S7	-8.75	104.94	117.51
6	A	1702	P22	O7-C7-C6	6.55	149.81	110.80
7	B	700	P23	C5-C6-C7	6.24	148.26	112.24
5	B	1701	FAD	C4A-N9A-C1B	4.86	138.00	126.63
4	A	695	1SM	C2-C1-C11	-4.61	118.10	124.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	701	FAD	C4A-N9A-C1B	4.60	137.40	126.63
4	B	1695	1SM	C2-C1-C11	-4.59	118.12	124.25
7	B	700	P23	O7-C7-C6	4.36	140.13	110.96
5	B	1701	FAD	C4A-N9A-C8A	-3.62	101.94	105.74
5	A	701	FAD	C6A-C5A-C4A	-3.57	112.31	117.18
4	A	695	1SM	O12-C11-C1	3.50	118.11	112.31
4	B	1695	1SM	O12-C11-C1	3.46	118.06	112.31
4	B	1695	1SM	C4'-C5'-C6'	-3.41	114.76	118.80
5	B	1701	FAD	C6A-C5A-C4A	-3.38	112.57	117.18
4	A	695	1SM	C4'-C5'-C6'	-3.33	114.86	118.80
5	A	701	FAD	C4A-N9A-C8A	-3.31	102.26	105.74
4	B	1695	1SM	C6-C1-C11	3.24	125.22	118.66
5	B	1701	FAD	N3A-C2A-N1A	-3.21	123.72	128.58
5	A	701	FAD	N3A-C2A-N1A	-3.19	123.75	128.58
5	B	1701	FAD	C1B-N9A-C8A	-3.18	120.04	127.09
4	A	695	1SM	C6-C1-C11	3.17	125.07	118.66
6	A	1702	P22	PA-O7-C7	3.16	138.34	121.12
5	B	1701	FAD	O2B-C2B-C1B	3.15	120.95	110.10
5	A	701	FAD	O2B-C2B-C1B	3.07	120.69	110.10
4	B	1695	1SM	O7B-S7-N8	-3.07	97.97	106.77
5	A	701	FAD	C1B-N9A-C8A	-3.05	120.32	127.09
5	A	701	FAD	C6A-C5A-N7A	3.01	137.90	132.09
5	B	1701	FAD	C6A-C5A-N7A	2.93	137.75	132.09
5	A	701	FAD	O2-C2-N1	-2.89	117.00	121.80
4	A	695	1SM	N3'-C2'-N1'	-2.88	121.54	126.26
7	B	700	P23	PA-O7-C7	2.87	134.92	121.26
5	A	701	FAD	O2B-C2B-C3B	2.84	120.94	111.82
4	A	695	1SM	O7B-S7-N8	-2.79	98.78	106.77
4	B	1695	1SM	N3'-C2'-N1'	-2.76	121.73	126.26
5	B	1701	FAD	O2B-C2B-C3B	2.76	120.65	111.82
7	B	700	P23	O2B-PB-O1B	2.70	117.94	107.80
5	A	701	FAD	O3'-C3'-C4'	-2.62	102.98	108.93
5	B	1701	FAD	O2-C2-N1	-2.56	117.55	121.80
4	B	1695	1SM	C2-S7-N8	2.53	109.11	105.96
4	A	695	1SM	C8'-C4'-C5'	-2.52	118.07	121.80
4	B	1695	1SM	C8'-C4'-C5'	-2.46	118.15	121.80
4	A	695	1SM	N10-C2'-N1'	2.45	123.56	116.44
5	B	1701	FAD	O4B-C4B-C5B	-2.45	101.49	109.33
5	B	1701	FAD	O3'-C3'-C4'	-2.40	103.48	108.93
4	A	695	1SM	C2-S7-N8	2.39	108.94	105.96
4	B	1695	1SM	N10-C2'-N1'	2.36	123.29	116.44
4	A	695	1SM	N8-C9-N10	2.30	118.53	114.87

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	701	FAD	O4B-C4B-C5B	-2.29	102.01	109.33
5	B	1701	FAD	C1'-C2'-C3'	2.25	115.76	109.66
5	B	1701	FAD	O4-C4-C4X	-2.13	120.90	126.53
5	A	701	FAD	C1'-C2'-C3'	2.13	115.44	109.66
5	B	1701	FAD	O2'-C2'-C3'	-2.12	104.30	109.25
6	A	1702	P22	O3B-PB-O1B	2.11	115.70	107.80
5	B	1701	FAD	O3B-C3B-C4B	2.05	116.97	111.08
4	A	695	1SM	C8'-C4'-N3'	2.03	119.63	116.56

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	695	1SM	C1-C2-S7-O7A
4	B	1695	1SM	C1-C2-S7-O7A
6	A	1702	P22	C6-C7-O7-PA
4	A	695	1SM	C3-C2-S7-N8
4	B	1695	1SM	C3-C2-S7-N8
4	A	695	1SM	C1-C2-S7-N8
4	B	1695	1SM	C1-C2-S7-N8
4	A	695	1SM	C1-C2-S7-O7B
4	B	1695	1SM	C1-C2-S7-O7B
6	A	1702	P22	PA-O3A-PB-O2B
7	B	700	P23	PB-O3A-PA-O7
4	A	695	1SM	C3-C2-S7-O7B
4	B	1695	1SM	C3-C2-S7-O7B
4	A	695	1SM	C3-C2-S7-O7A
4	B	1695	1SM	C3-C2-S7-O7A
4	B	1695	1SM	C6-C1-C11-O12
4	A	695	1SM	C6-C1-C11-O12
4	A	695	1SM	C2-C1-C11-O12
4	B	1695	1SM	C2-C1-C11-O12
4	A	695	1SM	C2-C1-C11-O11
4	B	1695	1SM	C2-C1-C11-O11
5	B	1701	FAD	O4B-C4B-C5B-O5B
4	A	695	1SM	C6-C1-C11-O11
4	B	1695	1SM	C6-C1-C11-O11
4	A	695	1SM	N8-C9-N10-C2'
4	B	1695	1SM	N8-C9-N10-C2'
5	A	701	FAD	O4B-C4B-C5B-O5B
5	A	701	FAD	C2B-C1B-N9A-C8A
4	B	1695	1SM	O9-C9-N10-C2'

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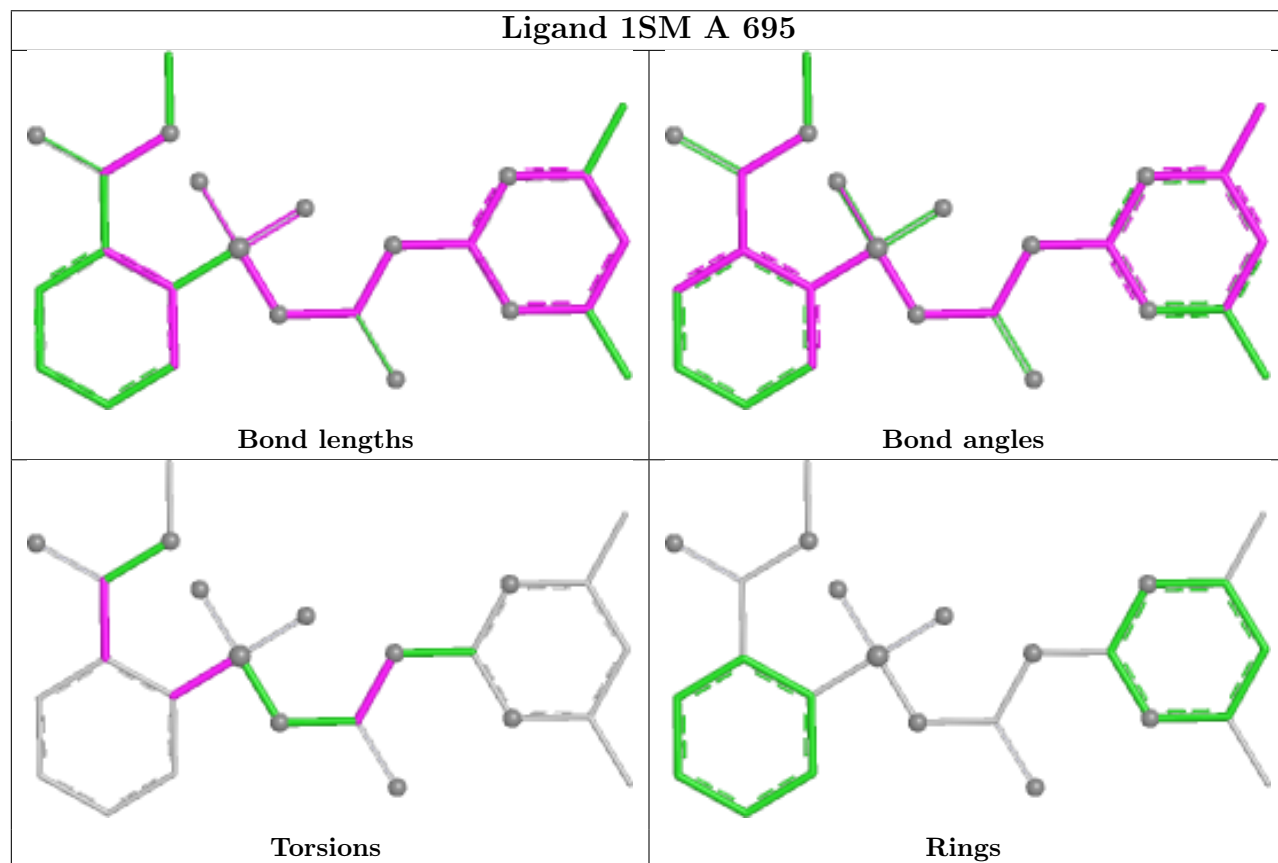
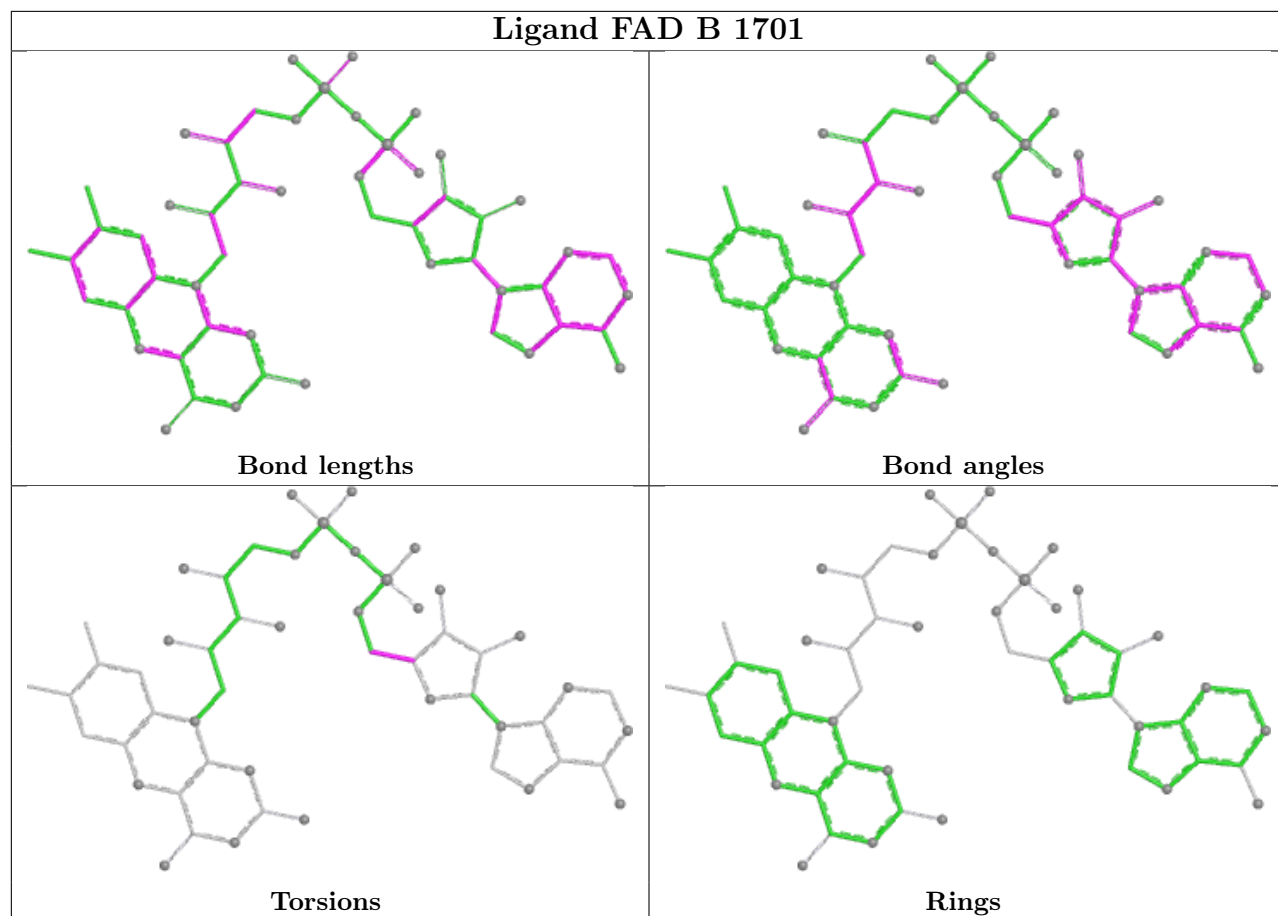
Mol	Chain	Res	Type	Atoms
5	A	701	FAD	PA-O3P-P-O2P

There are no ring outliers.

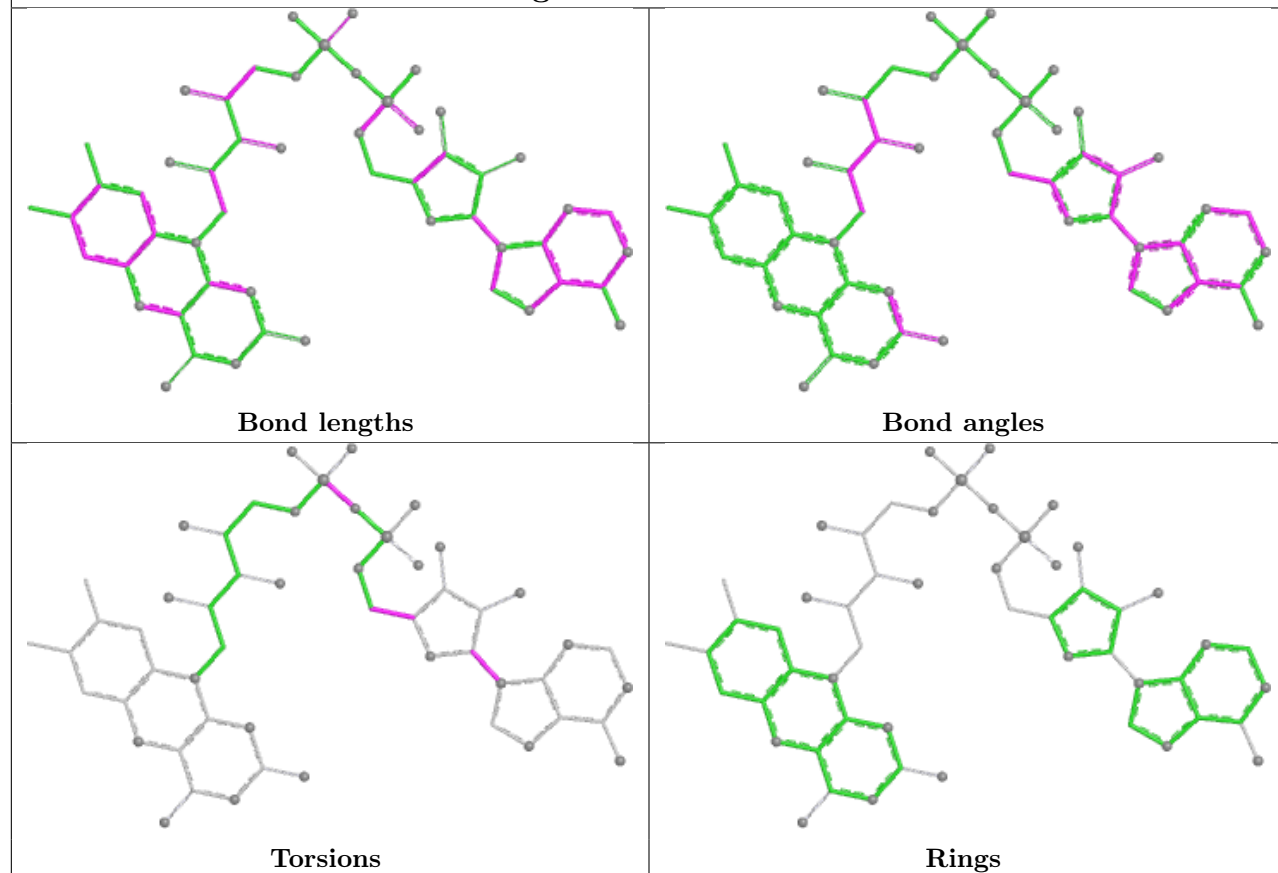
4 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	695	1SM	2	0
6	A	1702	P22	2	0
7	B	700	P23	3	0
4	B	1695	1SM	6	0

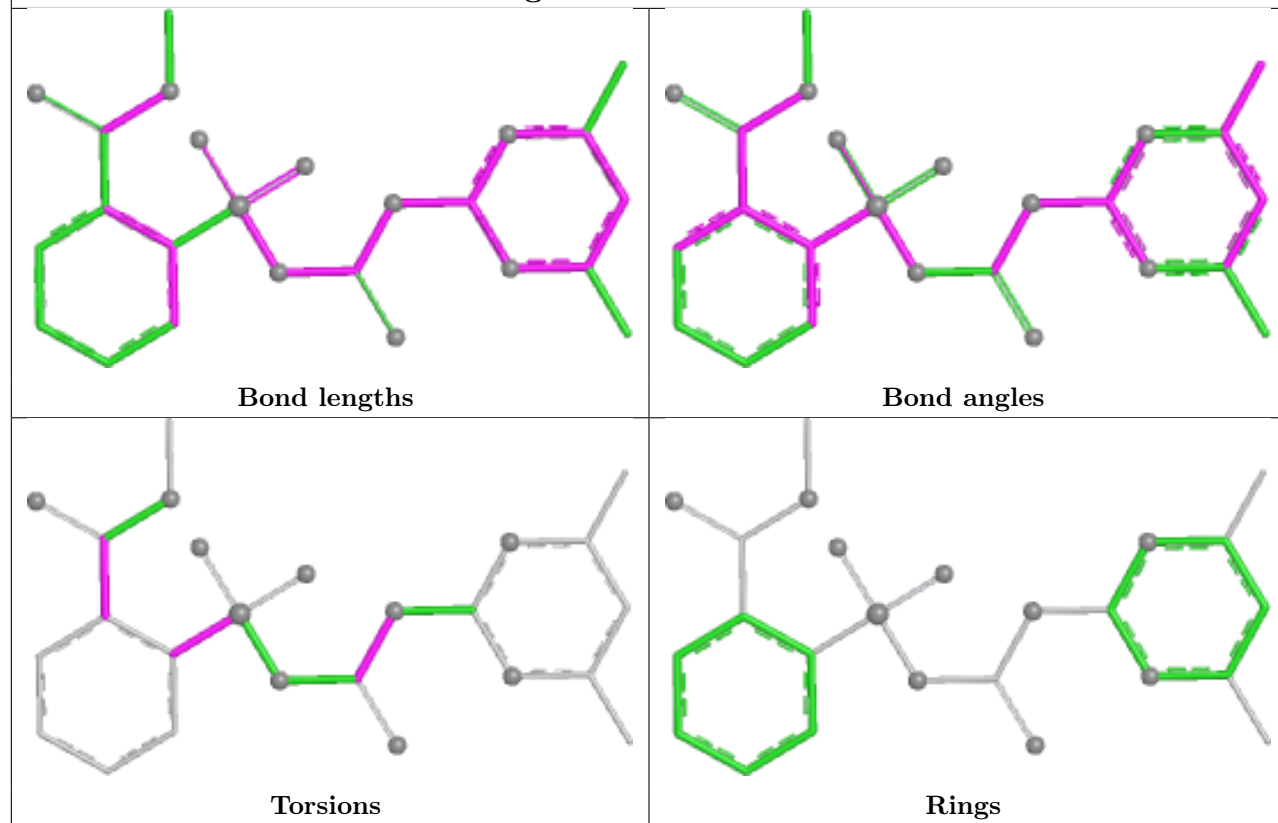
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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



Ligand FAD A 701



Ligand 1SM B 1695



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

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	596/677 (88%)	-0.52	8 (1%) 75 79	10, 18, 34, 72	6 (1%)
1	B	593/677 (87%)	0.21	27 (4%) 37 43	13, 32, 56, 82	4 (0%)
All	All	1189/1354 (87%)	-0.15	35 (2%) 53 60	10, 23, 53, 82	10 (0%)

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	281	GLN	6.3
1	A	251[A]	LYS	6.1
1	B	681	LYS	4.8
1	A	270	SER	4.8
1	B	269	PRO	4.4
1	B	213	CYS	4.2
1	B	284	PHE	4.0
1	B	84	ASP	3.8
1	B	265	LYS	3.8
1	B	266	THR	3.6
1	B	268	LEU	3.5
1	A	268	LEU	3.2
1	B	283	GLU	3.0
1	B	282	ASP	3.0
1	B	267	THR	2.9
1	B	439	PHE	2.9
1	A	265	LYS	2.8
1	A	582[A]	MET	2.8
1	B	443	GLU	2.4
1	B	286	MET	2.4
1	B	299	ALA	2.4
1	A	278	SER	2.4
1	B	677	GLU	2.4
1	B	448	PHE	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	129	ASP	2.2
1	B	85	MET	2.2
1	B	665	ILE	2.1
1	B	582[A]	MET	2.1
1	B	129	ASP	2.1
1	B	453	LYS	2.1
1	B	441	VAL	2.1
1	A	287	GLN	2.0
1	B	467	PRO	2.0
1	B	442	LYS	2.0
1	B	106	ASN	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 oligosaccharides 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.

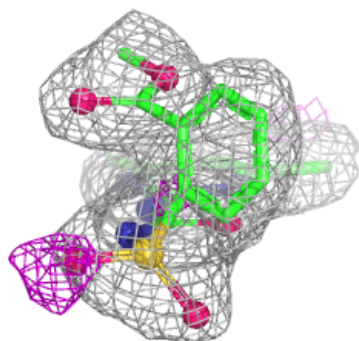
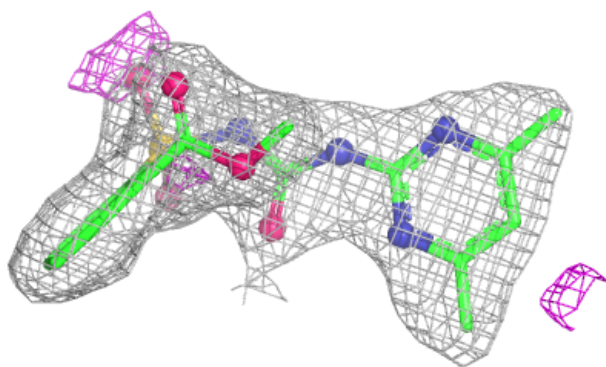
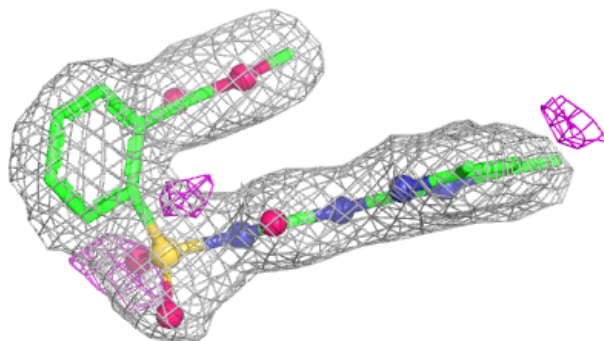
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	1SM	B	1695	25/25	0.96	0.09	30,33,36,38	0
7	P23	B	700	12/12	0.96	0.09	19,26,34,38	0
5	FAD	B	1701	53/53	0.97	0.07	25,28,32,33	0
4	1SM	A	695	25/25	0.98	0.06	13,18,21,22	0
5	FAD	A	701	53/53	0.99	0.04	8,12,14,17	0
2	K	B	696	1/1	0.99	0.05	33,33,33,33	0
3	MG	B	699	1/1	0.99	0.04	21,21,21,21	0
2	K	A	1696	1/1	1.00	0.05	16,16,16,16	0
6	P22	A	1702	11/11	1.00	0.03	11,13,20,22	0
3	MG	A	1699	1/1	1.00	0.02	11,11,11,11	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.

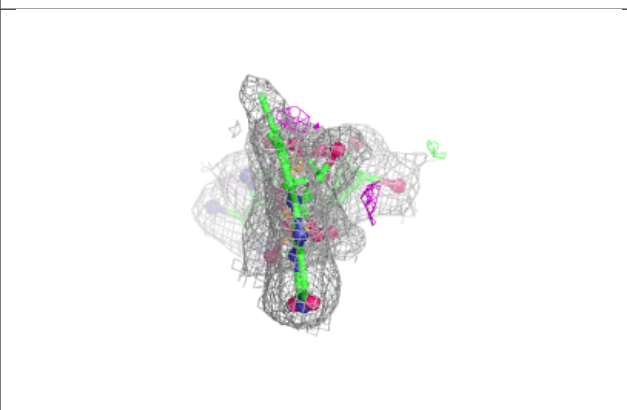
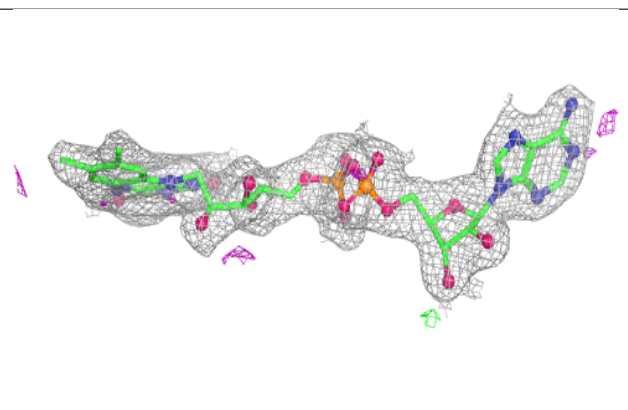
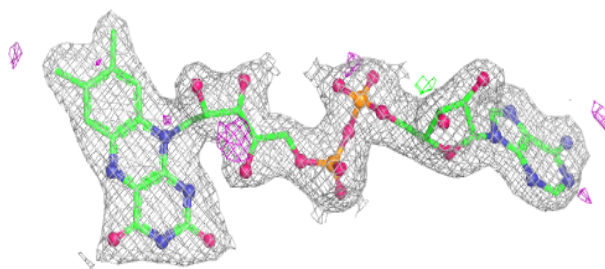
Electron density around 1SM B 1695:

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

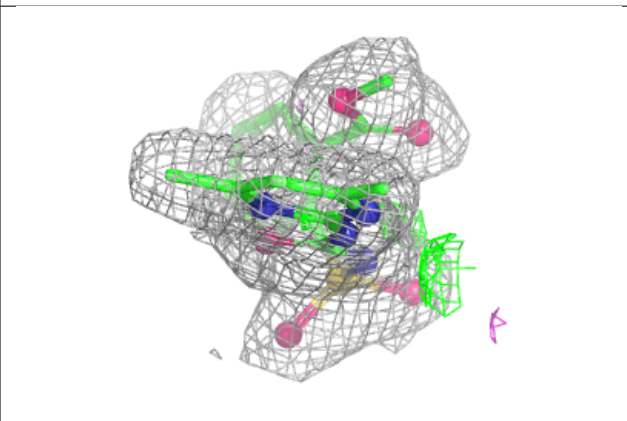
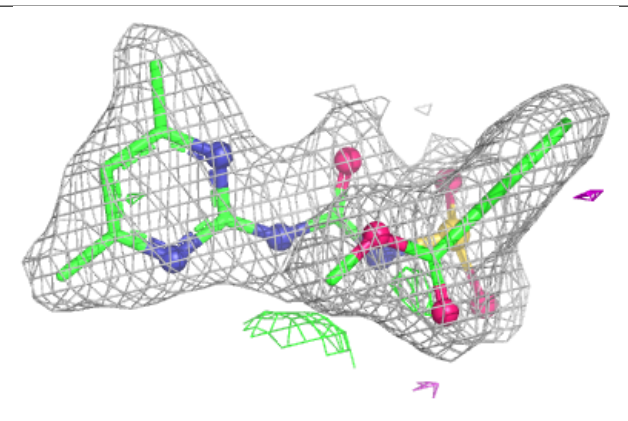
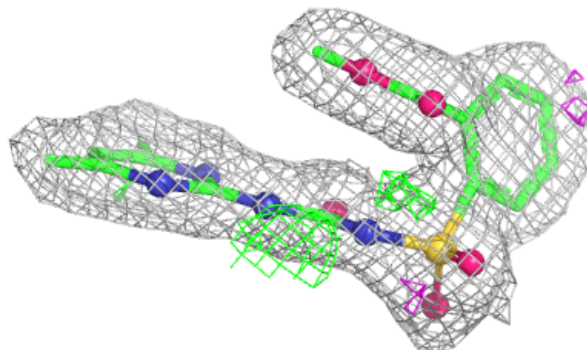


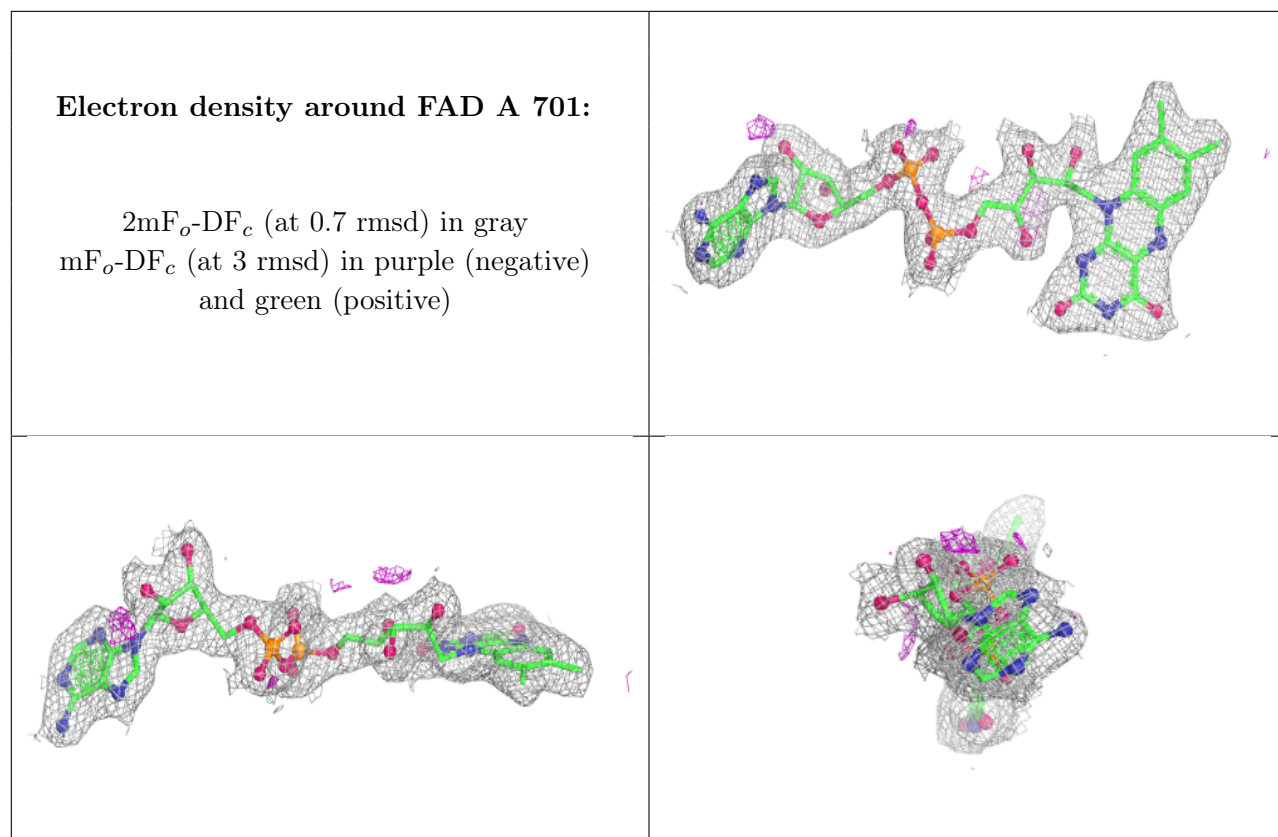
Electron density around FAD B 1701:

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

**Electron density around 1SM A 695:**

$2mF_o-DF_c$ (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.