



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 27, 2023 – 11:09 AM EDT

PDB ID : 3ITJ
Title : Crystal structure of *Saccharomyces cerevisiae* thioredoxin reductase 1 (Trr1)
Authors : Oliveira, M.A.; Discola, K.F.; Alves, S.V.; Medrano, F.J.; Guimaraes, B.G.; Netto, L.E.S.
Deposited on : 2009-08-28
Resolution : 2.40 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

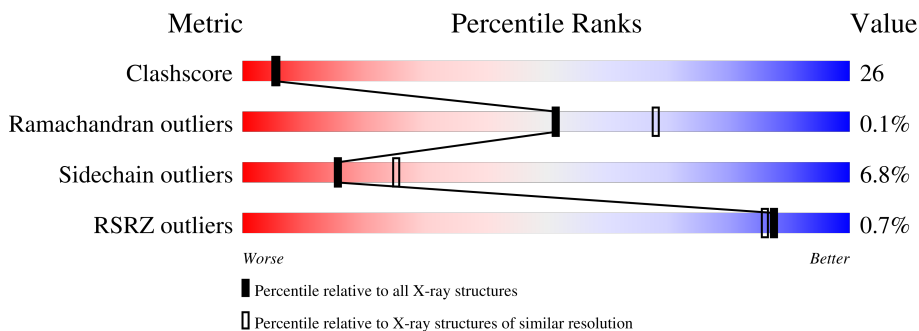
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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))
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

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	338	
1	B	338	
1	C	338	
1	D	338	

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
3	CIT	A	501	-	-	X	-
3	CIT	B	506	-	X	-	-

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 9837 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 Thioredoxin reductase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	317	2376	1499	402	463	12	0	1	0
1	B	319	2373	1496	402	463	12	0	0	0
1	C	314	2299	1444	388	456	11	0	0	0
1	D	307	2222	1401	369	442	10	0	0	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP P29509
A	-18	GLY	-	expression tag	UNP P29509
A	-17	SER	-	expression tag	UNP P29509
A	-16	SER	-	expression tag	UNP P29509
A	-15	HIS	-	expression tag	UNP P29509
A	-14	HIS	-	expression tag	UNP P29509
A	-13	HIS	-	expression tag	UNP P29509
A	-12	HIS	-	expression tag	UNP P29509
A	-11	HIS	-	expression tag	UNP P29509
A	-10	HIS	-	expression tag	UNP P29509
A	-9	SER	-	expression tag	UNP P29509
A	-8	SER	-	expression tag	UNP P29509
A	-7	GLY	-	expression tag	UNP P29509
A	-6	LEU	-	expression tag	UNP P29509
A	-5	VAL	-	expression tag	UNP P29509
A	-4	PRO	-	expression tag	UNP P29509
A	-3	ARG	-	expression tag	UNP P29509
A	-2	GLY	-	expression tag	UNP P29509
A	-1	SER	-	expression tag	UNP P29509
A	0	HIS	-	expression tag	UNP P29509
B	-19	MET	-	expression tag	UNP P29509

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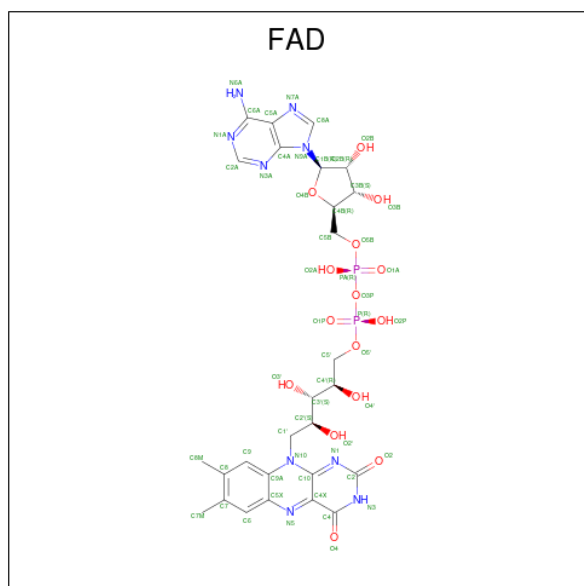
Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP P29509
B	-17	SER	-	expression tag	UNP P29509
B	-16	SER	-	expression tag	UNP P29509
B	-15	HIS	-	expression tag	UNP P29509
B	-14	HIS	-	expression tag	UNP P29509
B	-13	HIS	-	expression tag	UNP P29509
B	-12	HIS	-	expression tag	UNP P29509
B	-11	HIS	-	expression tag	UNP P29509
B	-10	HIS	-	expression tag	UNP P29509
B	-9	SER	-	expression tag	UNP P29509
B	-8	SER	-	expression tag	UNP P29509
B	-7	GLY	-	expression tag	UNP P29509
B	-6	LEU	-	expression tag	UNP P29509
B	-5	VAL	-	expression tag	UNP P29509
B	-4	PRO	-	expression tag	UNP P29509
B	-3	ARG	-	expression tag	UNP P29509
B	-2	GLY	-	expression tag	UNP P29509
B	-1	SER	-	expression tag	UNP P29509
B	0	HIS	-	expression tag	UNP P29509
C	-19	MET	-	expression tag	UNP P29509
C	-18	GLY	-	expression tag	UNP P29509
C	-17	SER	-	expression tag	UNP P29509
C	-16	SER	-	expression tag	UNP P29509
C	-15	HIS	-	expression tag	UNP P29509
C	-14	HIS	-	expression tag	UNP P29509
C	-13	HIS	-	expression tag	UNP P29509
C	-12	HIS	-	expression tag	UNP P29509
C	-11	HIS	-	expression tag	UNP P29509
C	-10	HIS	-	expression tag	UNP P29509
C	-9	SER	-	expression tag	UNP P29509
C	-8	SER	-	expression tag	UNP P29509
C	-7	GLY	-	expression tag	UNP P29509
C	-6	LEU	-	expression tag	UNP P29509
C	-5	VAL	-	expression tag	UNP P29509
C	-4	PRO	-	expression tag	UNP P29509
C	-3	ARG	-	expression tag	UNP P29509
C	-2	GLY	-	expression tag	UNP P29509
C	-1	SER	-	expression tag	UNP P29509
C	0	HIS	-	expression tag	UNP P29509
D	-19	MET	-	expression tag	UNP P29509
D	-18	GLY	-	expression tag	UNP P29509
D	-17	SER	-	expression tag	UNP P29509

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP P29509
D	-15	HIS	-	expression tag	UNP P29509
D	-14	HIS	-	expression tag	UNP P29509
D	-13	HIS	-	expression tag	UNP P29509
D	-12	HIS	-	expression tag	UNP P29509
D	-11	HIS	-	expression tag	UNP P29509
D	-10	HIS	-	expression tag	UNP P29509
D	-9	SER	-	expression tag	UNP P29509
D	-8	SER	-	expression tag	UNP P29509
D	-7	GLY	-	expression tag	UNP P29509
D	-6	LEU	-	expression tag	UNP P29509
D	-5	VAL	-	expression tag	UNP P29509
D	-4	PRO	-	expression tag	UNP P29509
D	-3	ARG	-	expression tag	UNP P29509
D	-2	GLY	-	expression tag	UNP P29509
D	-1	SER	-	expression tag	UNP P29509
D	0	HIS	-	expression tag	UNP P29509

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



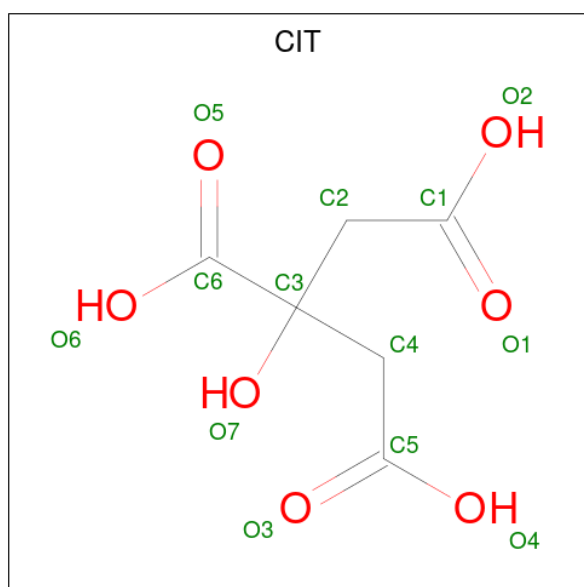
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
2	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

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

- Molecule 3 is CITRIC ACID (three-letter code: CIT) (formula: C₆H₈O₇).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	
3	A	1	Total	C	O	0	0
			13	6	7		
3	B	1	Total	C	O	0	0
			13	6	7		
3	B	1	Total	C	O	0	0
			13	6	7		
3	C	1	Total	C	O	0	0
			13	6	7		
3	C	1	Total	C	O	0	0
			13	6	7		
3	D	1	Total	C	O	0	0
			13	6	7		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	82	Total	O	0	0
			82	82		

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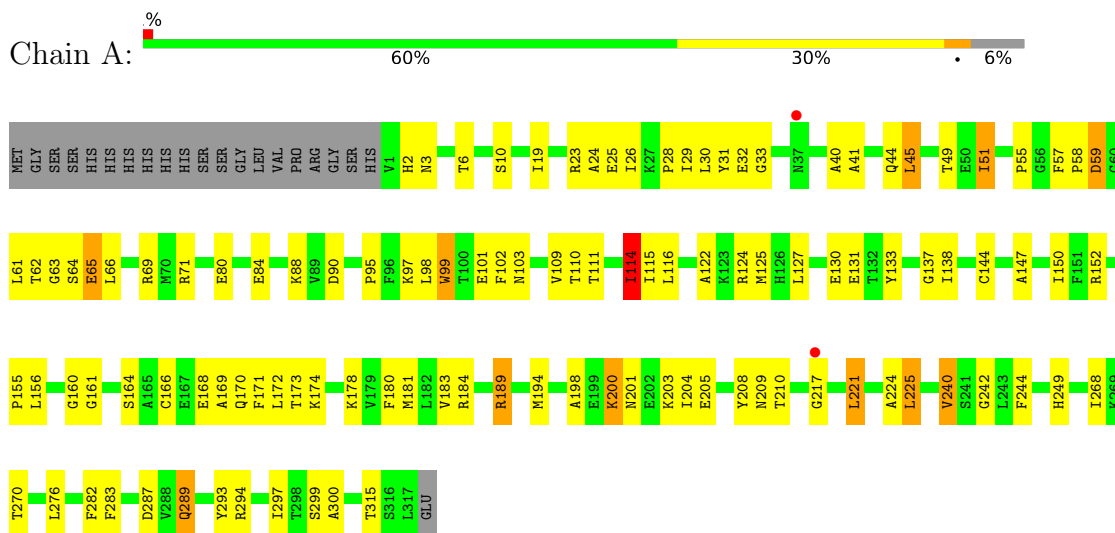
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	76	Total 76	O 76	0	0
4	C	65	Total 65	O 65	0	0
4	D	54	Total 54	O 54	0	0

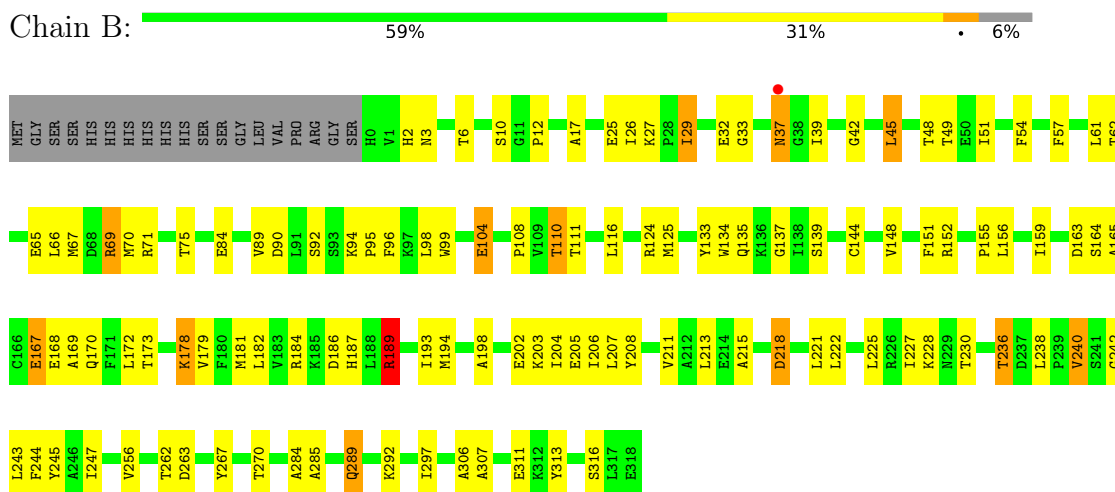
3 Residue-property plots i

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: Thioredoxin reductase 1

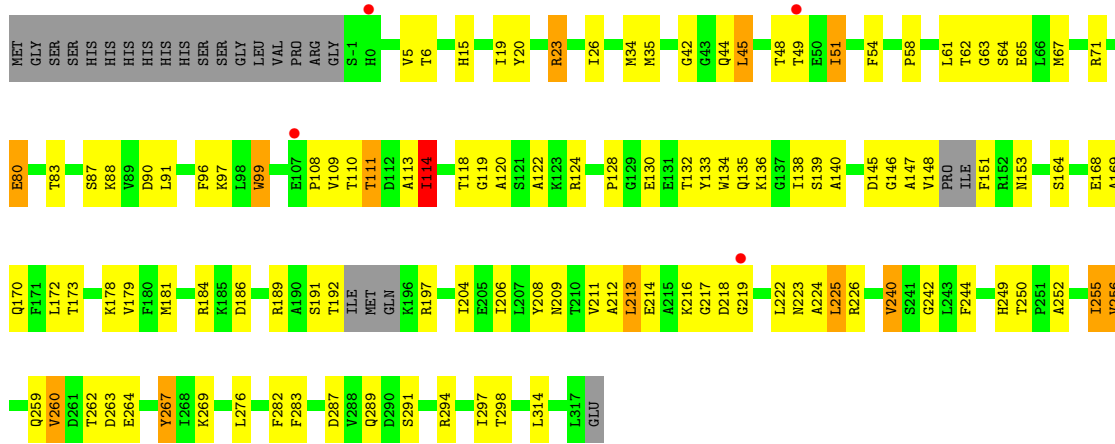


• Molecule 1: Thioredoxin reductase 1

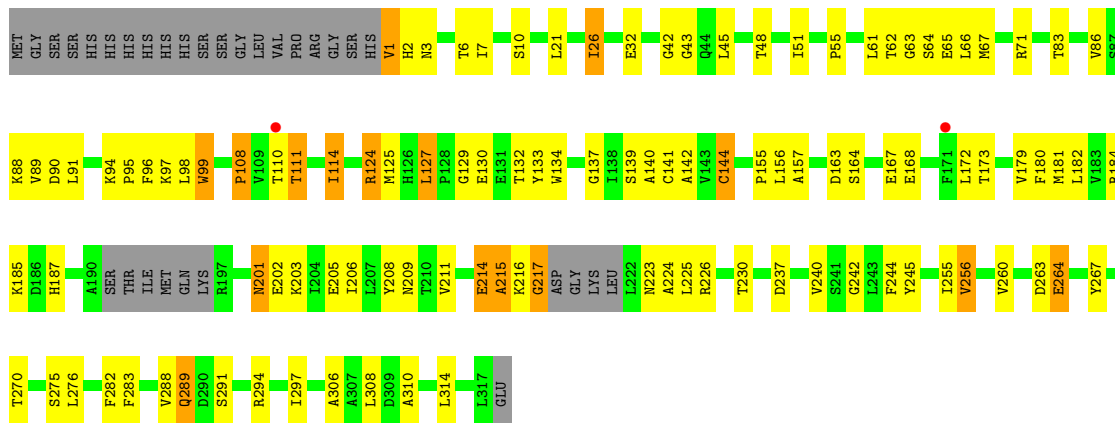


• Molecule 1: Thioredoxin reductase 1





• Molecule 1: Thioredoxin reductase 1



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	127.97Å 135.41Å 75.82Å 90.00° 89.95° 90.00°	Depositor
Resolution (Å)	50.00 – 2.40 46.50 – 2.39	Depositor EDS
% Data completeness (in resolution range)	97.0 (50.00-2.40) 79.0 (46.50-2.39)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.06 (at 2.39Å)	Xtriage
Refinement program	REFMAC 5.5.0066	Depositor
R, R_{free}	0.169 , 0.194 0.199 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	28.9	Xtriage
Anisotropy	0.147	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 42.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.52$, $\langle L^2 \rangle = 0.36$	Xtriage
Estimated twinning fraction	0.000 for -h,-k,l	Xtriage
Reported twinning fraction	0.783 for H, K, L 0.217 for -h,-k,l	Depositor
Outliers	0 of 40523 reflections	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	9837	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 4.33% 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: FAD, CIT

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	1.10	3/2420 (0.1%)	1.03	2/3276 (0.1%)
1	B	1.17	3/2413 (0.1%)	1.07	4/3267 (0.1%)
1	C	1.12	3/2336 (0.1%)	1.08	7/3168 (0.2%)
1	D	1.11	3/2261 (0.1%)	1.06	6/3076 (0.2%)
All	All	1.13	12/9430 (0.1%)	1.06	19/12787 (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	D	0	1

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	80	GLU	CG-CD	6.54	1.61	1.51
1	C	20	TYR	CD1-CE1	-6.22	1.30	1.39
1	B	167	GLU	CG-CD	5.88	1.60	1.51
1	A	300	ALA	CA-CB	5.72	1.64	1.52
1	B	165	ALA	CA-CB	5.67	1.64	1.52
1	D	144	CYS	CB-SG	-5.56	1.72	1.81
1	A	65	GLU	CG-CD	5.50	1.60	1.51
1	B	25	GLU	CG-CD	5.42	1.60	1.51
1	A	293	TYR	CE1-CZ	5.29	1.45	1.38
1	D	264	GLU	CG-CD	5.24	1.59	1.51
1	D	215	ALA	CA-CB	-5.21	1.41	1.52
1	C	267	TYR	CD1-CE1	5.09	1.47	1.39

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	217	GLY	N-CA-C	10.59	139.56	113.10
1	C	114	ILE	CG1-CB-CG2	-9.13	91.32	111.40
1	C	225	LEU	CB-CG-CD2	-7.23	98.71	111.00
1	D	294	ARG	CG-CD-NE	-6.65	97.84	111.80
1	A	114	ILE	CG1-CB-CG2	-6.57	96.95	111.40
1	C	71	ARG	NE-CZ-NH2	-6.29	117.16	120.30
1	B	69	ARG	NE-CZ-NH1	-6.11	117.25	120.30
1	C	61	LEU	CA-CB-CG	6.00	129.10	115.30
1	D	71	ARG	NE-CZ-NH1	5.96	123.28	120.30
1	D	294	ARG	NE-CZ-NH2	-5.96	117.32	120.30
1	C	189	ARG	NE-CZ-NH1	5.94	123.27	120.30
1	D	98	LEU	CA-CB-CG	5.65	128.29	115.30
1	C	71	ARG	CG-CD-NE	-5.64	99.95	111.80
1	B	189	ARG	NE-CZ-NH2	5.59	123.09	120.30
1	C	23	ARG	NE-CZ-NH1	-5.29	117.66	120.30
1	B	69	ARG	NE-CZ-NH2	5.20	122.90	120.30
1	D	71	ARG	NE-CZ-NH2	-5.05	117.78	120.30
1	A	189	ARG	NE-CZ-NH1	5.03	122.81	120.30
1	B	238	LEU	CB-CG-CD2	-5.03	102.45	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	185	LYS	Peptide

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2376	0	2382	113	0
1	B	2373	0	2375	129	0
1	C	2299	0	2234	113	0
1	D	2222	0	2130	129	0
2	A	53	0	31	4	0
2	B	53	0	31	9	0
2	C	53	0	31	2	0
2	D	53	0	31	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	13	0	5	7	0
3	B	26	0	10	8	0
3	C	26	0	10	6	0
3	D	13	0	5	2	0
4	A	82	0	0	7	0
4	B	76	0	0	4	0
4	C	65	0	0	4	0
4	D	54	0	0	4	0
All	All	9837	0	9275	493	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 26.

All (493) 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:D:216:LYS:CB	1:D:224:ALA:H	1.26	1.45
1:D:201:ASN:ND2	1:D:203:LYS:H	1.37	1.20
1:C:191:SER:O	1:C:192:THR:HB	1.44	1.16
1:C:147:ALA:HB1	1:C:151:PHE:CB	1.75	1.15
1:C:249:HIS:ND1	3:C:505:CIT:O4	1.77	1.15
1:D:216:LYS:CB	1:D:224:ALA:N	2.08	1.13
1:B:48:THR:HG21	2:B:401:FAD:H6	1.33	1.10
1:C:169:ALA:CB	1:C:181:MET:CE	2.32	1.06
1:C:169:ALA:CB	1:C:181:MET:HE3	1.85	1.06
1:D:181:MET:HE2	1:D:206:ILE:HG12	1.38	1.03
1:C:80:GLU:HB2	4:C:352:HOH:O	1.57	1.03
1:A:221:LEU:HD21	4:A:351:HOH:O	1.58	1.03
1:D:124:ARG:H	1:D:124:ARG:HD2	1.20	1.02
1:B:189:ARG:HH11	3:B:502:CIT:H22	1.21	1.02
1:A:116:LEU:HD23	1:A:268:ILE:HD11	1.43	1.01
1:D:164:SER:O	1:D:168:GLU:HB2	1.61	1.00
1:B:67:MET:HE2	1:B:70:MET:HE2	1.42	0.99
1:D:133:TYR:OH	1:D:217:GLY:HA2	1.62	0.98
1:D:51:ILE:HD11	1:D:63:GLY:HA2	1.44	0.98
1:D:201:ASN:HD22	1:D:202:GLU:N	1.60	0.98
1:B:67:MET:CE	1:B:70:MET:HE2	1.97	0.95
1:B:67:MET:CE	1:B:70:MET:CE	2.46	0.94
1:D:181:MET:CE	1:D:206:ILE:HG12	1.98	0.93
1:B:48:THR:CG2	2:B:401:FAD:H6	1.98	0.93
1:C:62:THR:OG1	1:C:65:GLU:HG3	1.68	0.93

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:201:ASN:HD22	1:D:203:LYS:H	1.15	0.92
1:C:169:ALA:HB3	1:C:181:MET:CE	1.98	0.92
1:B:48:THR:HG21	2:B:401:FAD:C6	2.00	0.91
1:D:6:THR:OG1	1:D:111:THR:HG21	1.71	0.90
1:A:51:ILE:HD12	1:A:61:LEU:O	1.72	0.89
1:D:201:ASN:ND2	1:D:203:LYS:N	2.21	0.89
1:C:169:ALA:HB1	1:C:181:MET:HE3	1.55	0.86
1:D:124:ARG:H	1:D:124:ARG:CD	1.87	0.86
1:C:169:ALA:CB	1:C:181:MET:HE2	2.05	0.85
1:B:189:ARG:NH1	3:B:502:CIT:H22	1.92	0.84
1:B:124:ARG:HD3	1:B:134:TRP:CZ3	2.13	0.84
1:B:66:LEU:HG	1:B:67:MET:CE	2.07	0.84
1:A:116:LEU:CD2	1:A:268:ILE:HD11	2.07	0.83
1:C:256:VAL:HG13	1:C:260:VAL:CG2	2.09	0.82
1:D:2:HIS:HB2	1:D:110:THR:CG2	2.10	0.81
1:A:225:LEU:N	1:A:225:LEU:HD23	1.95	0.81
1:B:65:GLU:O	1:B:69:ARG:HG3	1.80	0.80
1:B:48:THR:CG2	2:B:401:FAD:C6	2.57	0.80
1:B:167:GLU:HG3	1:B:194:MET:HE2	1.63	0.79
1:A:114:ILE:HD12	1:A:282:PHE:CE1	2.17	0.79
1:C:133:TYR:CZ	1:C:217:GLY:HA3	2.17	0.79
1:A:114:ILE:HG21	1:A:282:PHE:CD1	2.18	0.79
1:B:66:LEU:HG	1:B:67:MET:HE3	1.64	0.79
1:A:62:THR:HG22	1:A:64:SER:H	1.47	0.79
1:A:116:LEU:HD23	1:A:268:ILE:CD1	2.12	0.79
1:D:201:ASN:HD21	1:D:203:LYS:H	1.28	0.78
1:C:191:SER:O	1:C:192:THR:CB	2.24	0.78
1:D:2:HIS:HB2	1:D:110:THR:HG21	1.66	0.78
1:D:2:HIS:HA	1:D:110:THR:HG23	1.66	0.78
1:A:114:ILE:CG2	1:A:282:PHE:CD1	2.66	0.78
1:C:99:TRP:CZ3	1:C:108:PRO:HD3	2.20	0.77
1:A:164:SER:OG	3:A:501:CIT:H41	1.85	0.77
1:A:221:LEU:CD2	4:A:351:HOH:O	2.22	0.76
1:A:208:TYR:O	1:A:210:THR:HG23	1.83	0.76
1:B:67:MET:SD	1:B:70:MET:CE	2.74	0.76
3:C:503:CIT:O1	3:C:503:CIT:O7	2.01	0.76
3:B:506:CIT:H42	4:B:380:HOH:O	1.85	0.76
1:A:49:THR:O	1:A:62:THR:HA	1.86	0.76
1:D:201:ASN:ND2	1:D:202:GLU:N	2.35	0.75
1:A:51:ILE:HD12	1:A:51:ILE:H	1.52	0.75
1:B:67:MET:HE2	1:B:70:MET:CE	2.12	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:167:GLU:HG3	1:B:194:MET:CE	2.17	0.74
1:C:218:ASP:CB	1:C:219:GLY:CA	2.64	0.74
1:D:201:ASN:HD22	1:D:201:ASN:C	1.90	0.74
1:B:89:VAL:HG21	1:B:256:VAL:HG12	1.68	0.74
1:C:51:ILE:HD11	1:C:54:PHE:HB2	1.68	0.73
1:B:12:PRO:HA	1:B:70:MET:CE	2.19	0.73
1:D:1:VAL:O	1:D:110:THR:HG22	1.89	0.73
1:A:29:ILE:HD13	1:A:29:ILE:N	2.03	0.73
1:D:86:VAL:HG12	1:D:255:ILE:HD11	1.70	0.73
1:A:62:THR:CG2	4:A:320:HOH:O	2.36	0.73
1:C:147:ALA:HA	1:C:148:VAL:C	2.09	0.73
1:B:124:ARG:HD3	1:B:134:TRP:CH2	2.23	0.73
1:D:216:LYS:CB	1:D:223:ASN:H	2.03	0.72
1:C:256:VAL:HG13	1:C:260:VAL:HG23	1.71	0.72
1:B:181:MET:HE3	1:B:198:ALA:HB1	1.71	0.72
1:A:55:PRO:HD2	1:A:297:ILE:HD13	1.72	0.72
1:C:218:ASP:CB	1:C:219:GLY:HA3	2.19	0.71
1:C:249:HIS:CE1	3:C:505:CIT:O4	2.43	0.71
1:D:124:ARG:HD2	1:D:124:ARG:N	2.02	0.71
1:C:133:TYR:OH	1:C:217:GLY:HA3	1.90	0.71
1:A:114:ILE:HG21	1:A:282:PHE:HD1	1.54	0.71
1:C:218:ASP:H	1:C:219:GLY:HA3	1.55	0.71
1:D:86:VAL:O	1:D:255:ILE:CD1	2.39	0.70
1:C:169:ALA:HB2	1:C:181:MET:HE2	1.72	0.70
1:D:226:ARG:HG2	1:D:237:ASP:OD1	1.92	0.70
3:A:501:CIT:O3	3:A:501:CIT:O2	2.09	0.70
1:D:45:LEU:O	1:D:48:THR:HG22	1.91	0.69
1:B:12:PRO:HA	1:B:70:MET:HE3	1.74	0.69
1:D:2:HIS:CB	1:D:110:THR:CG2	2.69	0.69
1:B:67:MET:SD	1:B:70:MET:HE2	2.32	0.69
1:D:1:VAL:N	4:D:354:HOH:O	2.25	0.69
1:A:33:GLY:HA2	1:A:84:GLU:C	2.12	0.69
1:A:62:THR:HG22	4:A:320:HOH:O	1.93	0.69
1:D:96:PHE:HD2	1:D:114:ILE:HG22	1.57	0.69
3:D:504:CIT:C5	4:D:352:HOH:O	2.41	0.69
1:B:155:PRO:HD2	4:B:361:HOH:O	1.92	0.68
1:D:124:ARG:CD	1:D:124:ARG:N	2.56	0.68
1:A:33:GLY:HA2	1:A:84:GLU:O	1.93	0.68
1:D:6:THR:OG1	1:D:111:THR:CG2	2.40	0.68
1:A:224:ALA:C	1:A:225:LEU:HD23	2.14	0.68
1:D:181:MET:CE	1:D:206:ILE:CG1	2.72	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:170:GLN:HE22	1:A:198:ALA:HA	1.59	0.67
1:C:49:THR:HG22	1:C:49:THR:O	1.95	0.67
1:D:2:HIS:HA	1:D:110:THR:CG2	2.25	0.67
1:B:181:MET:CE	1:B:204:ILE:HG21	2.25	0.67
1:B:67:MET:SD	1:B:70:MET:HE1	2.35	0.66
1:D:2:HIS:CB	1:D:110:THR:HG23	2.25	0.66
1:C:164:SER:H	3:C:505:CIT:C6	2.08	0.66
1:D:86:VAL:O	1:D:255:ILE:HD11	1.95	0.66
1:A:170:GLN:O	1:A:173:THR:OG1	2.14	0.66
1:C:213:LEU:HD23	1:C:226:ARG:NH1	2.10	0.66
1:D:157:ALA:HB1	1:D:182:LEU:HD11	1.77	0.66
1:B:10:SER:HB3	1:B:32:GLU:HA	1.77	0.65
1:D:125:MET:CB	1:D:245:TYR:CE1	2.79	0.65
1:D:182:LEU:HD12	1:D:182:LEU:H	1.62	0.65
1:B:32:GLU:OE1	1:B:71:ARG:CZ	2.44	0.65
1:D:209:ASN:HB3	1:D:230:THR:HB	1.76	0.65
1:A:240:VAL:HG13	1:A:242:GLY:H	1.60	0.65
1:D:86:VAL:C	1:D:255:ILE:HD11	2.17	0.65
1:A:164:SER:H	3:A:501:CIT:H21	1.61	0.65
1:D:134:TRP:CH2	1:D:140:ALA:HB2	2.31	0.65
1:A:133:TYR:CZ	1:A:217:GLY:HA3	2.32	0.65
1:B:67:MET:CE	1:B:70:MET:HE1	2.27	0.64
1:C:170:GLN:HG2	1:C:197:ARG:CZ	2.27	0.64
1:D:182:LEU:HD12	1:D:182:LEU:N	2.12	0.64
1:A:3:ASN:O	1:A:111:THR:HA	1.97	0.64
1:D:264:GLU:OE2	1:D:264:GLU:N	2.31	0.64
1:C:99:TRP:N	1:C:99:TRP:CD1	2.65	0.64
1:A:194:MET:HA	1:A:194:MET:CE	2.28	0.63
1:D:2:HIS:CA	1:D:110:THR:HG23	2.28	0.63
1:D:201:ASN:HD22	1:D:203:LYS:N	1.88	0.63
1:C:218:ASP:N	1:C:219:GLY:HA3	2.12	0.63
1:A:28:PRO:C	1:A:29:ILE:HD13	2.19	0.63
1:D:96:PHE:CD2	1:D:114:ILE:HG22	2.33	0.63
1:A:62:THR:HG22	1:A:64:SER:N	2.13	0.63
1:A:147:ALA:O	1:A:152:ARG:NH2	2.32	0.62
1:C:42:GLY:O	1:C:67:MET:HG3	1.98	0.62
1:D:157:ALA:HB1	1:D:182:LEU:CD1	2.29	0.62
1:C:99:TRP:CH2	1:C:108:PRO:HD3	2.35	0.62
1:B:67:MET:HE3	1:B:67:MET:N	2.14	0.62
1:B:3:ASN:ND2	1:B:29:ILE:HG12	2.14	0.62
1:D:2:HIS:CD2	1:D:110:THR:HG23	2.36	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:164:SER:O	1:D:168:GLU:CB	2.42	0.61
1:A:95:PRO:CG	1:A:110:THR:HG23	2.30	0.61
1:C:146:GLY:HA2	1:C:148:VAL:CB	2.31	0.61
1:A:201:ASN:HB3	1:A:204:ILE:HD12	1.81	0.61
1:B:32:GLU:OE1	1:B:71:ARG:NE	2.34	0.61
1:D:173:THR:HG21	1:D:201:ASN:OD1	2.01	0.60
1:B:49:THR:O	1:B:62:THR:HA	2.02	0.60
1:D:3:ASN:O	1:D:111:THR:HA	2.02	0.60
1:A:166:CYS:O	1:A:170:GLN:HG2	2.01	0.60
1:D:43:GLY:HA2	2:D:403:FAD:O3B	2.00	0.60
1:D:137:GLY:O	1:D:242:GLY:HA2	2.02	0.60
1:B:67:MET:CE	1:B:67:MET:HA	2.31	0.60
1:D:86:VAL:HG12	1:D:255:ILE:CD1	2.32	0.60
1:B:67:MET:HE2	1:B:67:MET:HA	1.84	0.60
1:B:181:MET:HE3	1:B:204:ILE:HG21	1.82	0.60
1:B:181:MET:CE	1:B:204:ILE:HD13	2.32	0.60
1:D:156:LEU:HA	1:D:240:VAL:CG2	2.32	0.59
1:A:315:THR:HG22	1:A:315:THR:O	2.02	0.59
1:A:287:ASP:OD1	1:A:294:ARG:HA	2.02	0.59
1:A:41:ALA:HB3	4:A:322:HOH:O	2.03	0.59
1:A:161:GLY:O	1:A:189:ARG:HG2	2.03	0.59
1:C:91:LEU:H	1:C:259:GLN:NE2	2.00	0.59
1:B:71:ARG:O	1:B:75:THR:HG23	2.03	0.59
1:B:169:ALA:O	1:B:173:THR:HG23	2.02	0.59
1:B:89:VAL:HG23	1:B:89:VAL:O	2.02	0.58
1:C:87:SER:HA	1:C:255:ILE:HD11	1.85	0.58
1:C:216:LYS:O	1:C:222:LEU:HD12	2.03	0.58
1:C:256:VAL:CG1	1:C:260:VAL:CG2	2.81	0.58
1:D:10:SER:HB3	1:D:32:GLU:HA	1.84	0.58
1:C:91:LEU:H	1:C:259:GLN:HE22	1.50	0.58
1:C:140:ALA:HB1	4:C:341:HOH:O	2.03	0.58
1:C:206:ILE:HD12	4:C:374:HOH:O	2.04	0.58
1:A:124:ARG:NH1	1:A:130:GLU:OE2	2.35	0.57
1:B:2:HIS:CD2	1:B:110:THR:HG22	2.39	0.57
1:B:2:HIS:HD2	1:B:110:THR:HG22	1.68	0.57
1:C:44:GLN:OE1	1:C:122:ALA:N	2.24	0.57
1:A:10:SER:HB3	1:A:32:GLU:HA	1.85	0.57
1:C:169:ALA:HB3	1:C:181:MET:HE2	1.76	0.57
1:D:155:PRO:O	1:D:240:VAL:HG23	2.05	0.57
1:A:55:PRO:CD	1:A:297:ILE:HD13	2.35	0.57
1:A:178:LYS:HD3	1:A:180:PHE:CZ	2.40	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:181:MET:CE	1:D:206:ILE:CD1	2.82	0.57
1:C:133:TYR:OH	1:C:217:GLY:CA	2.53	0.57
1:D:267:TYR:CE1	1:D:291:SER:HB3	2.39	0.57
1:A:131:GLU:CD	1:A:131:GLU:H	2.08	0.56
1:C:184:ARG:HH21	3:C:503:CIT:C2	2.18	0.56
1:A:32:GLU:OE2	1:A:71:ARG:NH2	2.38	0.56
1:D:156:LEU:HA	1:D:240:VAL:HG23	1.87	0.56
1:C:169:ALA:HB2	1:C:181:MET:CE	2.26	0.56
1:C:186:ASP:HB3	1:C:209:ASN:OD1	2.06	0.56
1:A:95:PRO:HG2	1:A:110:THR:HG23	1.88	0.56
1:A:164:SER:O	1:A:168:GLU:HG3	2.05	0.56
1:B:95:PRO:HB2	1:B:110:THR:HG23	1.86	0.56
1:B:181:MET:HE2	1:B:204:ILE:HD13	1.87	0.56
1:D:216:LYS:CB	1:D:224:ALA:O	2.53	0.56
1:D:264:GLU:H	1:D:264:GLU:CD	2.09	0.56
1:A:169:ALA:O	1:A:173:THR:HG23	2.06	0.55
1:D:45:LEU:O	1:D:63:GLY:HA3	2.06	0.55
1:A:44:GLN:NE2	2:A:400:FAD:H9	2.21	0.55
1:C:147:ALA:CB	1:C:151:PHE:CB	2.68	0.55
1:A:30:LEU:C	1:A:30:LEU:HD23	2.27	0.55
1:C:90:ASP:HB3	1:C:97:LYS:HB2	1.88	0.55
1:B:66:LEU:HG	1:B:67:MET:HE1	1.89	0.55
1:B:66:LEU:C	1:B:67:MET:HE3	2.26	0.55
3:A:501:CIT:O3	3:A:501:CIT:C1	2.55	0.55
1:C:222:LEU:HD11	1:C:224:ALA:O	2.06	0.55
1:B:313:TYR:O	1:B:316:SER:OG	2.21	0.55
1:C:184:ARG:O	1:C:209:ASN:HA	2.06	0.55
1:D:99:TRP:CH2	1:D:108:PRO:HD3	2.42	0.55
1:D:51:ILE:HD13	1:D:66:LEU:HD23	1.89	0.55
1:A:171:PHE:O	1:A:174:LYS:HG3	2.08	0.54
1:B:51:ILE:HD11	1:B:54:PHE:HB2	1.89	0.54
1:C:133:TYR:CE2	1:C:217:GLY:HA3	2.41	0.54
1:D:83:THR:O	1:D:83:THR:HG22	2.07	0.54
1:B:45:LEU:HD12	4:B:327:HOH:O	2.06	0.54
1:A:44:GLN:CD	2:A:400:FAD:HM81	2.27	0.54
1:D:156:LEU:CA	1:D:240:VAL:HG23	2.38	0.54
3:B:502:CIT:C6	3:B:502:CIT:O2	2.51	0.54
1:A:2:HIS:ND1	1:A:110:THR:HG22	2.22	0.54
1:D:2:HIS:CA	1:D:110:THR:CG2	2.85	0.54
1:B:37:ASN:HD21	1:B:39:ILE:HD13	1.73	0.54
1:C:124:ARG:HD3	1:C:134:TRP:CH2	2.43	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:99:TRP:CD2	1:D:108:PRO:HB3	2.43	0.53
1:A:114:ILE:CG2	1:A:282:PHE:HD1	2.15	0.53
1:A:29:ILE:HD12	1:A:80:GLU:HB3	1.88	0.53
1:B:148:VAL:HG22	1:B:151:PHE:CD2	2.43	0.53
1:D:163:ASP:O	1:D:167:GLU:HB2	2.08	0.53
1:C:223:ASN:O	1:C:224:ALA:HB2	2.08	0.53
1:D:61:LEU:HD23	1:D:66:LEU:HB2	1.91	0.53
1:D:99:TRP:CZ3	1:D:108:PRO:HD3	2.43	0.53
1:B:48:THR:HG23	2:B:401:FAD:HM72	1.90	0.53
1:D:42:GLY:O	1:D:67:MET:HG3	2.08	0.53
1:B:67:MET:CE	1:B:67:MET:CA	2.87	0.52
1:A:194:MET:HA	1:A:194:MET:HE2	1.92	0.52
1:B:94:LYS:HE3	1:B:96:PHE:CZ	2.45	0.52
1:B:240:VAL:HG13	1:B:242:GLY:O	2.09	0.52
1:C:145:ASP:CB	1:C:146:GLY:HA2	2.39	0.52
1:D:62:THR:HG22	1:D:65:GLU:H	1.75	0.52
1:C:139:SER:O	1:C:244:PHE:HA	2.10	0.52
1:D:129:GLY:HA3	1:D:215:ALA:HB2	1.92	0.52
1:B:178:LYS:HE3	1:B:205:GLU:HB2	1.92	0.52
1:A:55:PRO:CG	1:A:297:ILE:HD13	2.39	0.52
1:B:134:TRP:O	1:B:135:GLN:HB2	2.10	0.52
1:D:124:ARG:O	1:D:124:ARG:HD3	2.11	0.51
1:D:7:ILE:HD11	1:D:21:LEU:HD12	1.92	0.51
1:D:275:SER:OG	1:D:306:ALA:HA	2.10	0.51
1:D:89:VAL:HG21	1:D:256:VAL:HG23	1.91	0.51
1:C:133:TYR:O	1:C:138:ILE:HG13	2.11	0.51
1:C:169:ALA:O	1:C:173:THR:HG23	2.11	0.51
1:C:184:ARG:HH21	3:C:503:CIT:H21	1.76	0.51
1:C:49:THR:O	1:C:49:THR:CG2	2.59	0.51
1:C:128:PRO:HD2	1:C:213:LEU:O	2.11	0.51
1:C:45:LEU:O	1:C:63:GLY:HA3	2.11	0.50
1:C:45:LEU:O	1:C:48:THR:HG22	2.11	0.50
1:D:86:VAL:O	1:D:255:ILE:HD12	2.11	0.50
1:A:170:GLN:HE22	1:A:198:ALA:CA	2.23	0.50
1:A:24:ALA:O	1:A:25:GLU:CB	2.59	0.50
1:A:208:TYR:O	1:A:210:THR:CG2	2.55	0.50
1:D:91:LEU:HD11	1:D:256:VAL:CG2	2.42	0.50
1:D:88:LYS:HA	4:D:337:HOH:O	2.12	0.50
1:D:99:TRP:CE2	1:D:108:PRO:HB3	2.45	0.50
1:A:24:ALA:HB3	1:A:26:ILE:HD12	1.93	0.50
1:A:181:MET:HE2	1:A:198:ALA:HB1	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:270:THR:OG1	1:D:289:GLN:NE2	2.44	0.50
1:C:147:ALA:HA	1:C:148:VAL:CB	2.40	0.50
1:D:130:GLU:C	1:D:132:THR:H	2.13	0.50
1:A:164:SER:O	1:A:168:GLU:CG	2.59	0.50
1:B:240:VAL:CG1	1:B:242:GLY:O	2.59	0.50
1:C:130:GLU:HA	1:C:138:ILE:HD12	1.94	0.50
1:A:299:SER:OG	2:A:400:FAD:H5'2	2.11	0.50
1:C:5:VAL:HG22	1:C:113:ALA:HB3	1.93	0.49
1:A:88:LYS:O	1:A:99:TRP:HD1	1.95	0.49
1:D:133:TYR:OH	1:D:217:GLY:CA	2.49	0.49
1:B:193:ILE:N	1:B:193:ILE:HD13	2.28	0.49
1:C:214:GLU:O	1:C:225:LEU:HD12	2.11	0.49
1:B:57:PHE:HE2	1:B:69:ARG:NH1	2.11	0.49
1:B:155:PRO:O	1:B:156:LEU:HD23	2.13	0.49
1:C:297:ILE:HG23	1:C:298:THR:N	2.28	0.49
1:D:267:TYR:CZ	1:D:291:SER:HB3	2.46	0.49
1:C:264:GLU:HG2	4:C:369:HOH:O	2.12	0.49
1:B:137:GLY:O	1:B:242:GLY:HA2	2.12	0.49
1:B:167:GLU:CG	1:B:194:MET:HE1	2.42	0.48
1:A:31:TYR:OH	1:A:109:VAL:HG21	2.13	0.48
1:B:263:ASP:O	4:B:344:HOH:O	2.20	0.48
1:B:285:ALA:HB2	1:B:306:ALA:HB2	1.95	0.48
1:B:116:LEU:O	1:B:284:ALA:HA	2.14	0.48
1:A:51:ILE:HD12	1:A:51:ILE:N	2.25	0.48
1:D:62:THR:HG22	1:D:64:SER:N	2.28	0.48
1:B:186:ASP:OD1	1:B:187:HIS:ND1	2.35	0.48
1:D:21:LEU:HD22	1:D:26:ILE:HG21	1.96	0.48
1:D:133:TYR:CE2	1:D:215:ALA:HB1	2.49	0.48
1:C:130:GLU:O	1:C:130:GLU:HG2	2.14	0.48
1:B:33:GLY:HA2	1:B:84:GLU:C	2.34	0.48
1:B:167:GLU:HG3	1:B:194:MET:HE1	1.95	0.48
1:D:2:HIS:CG	1:D:110:THR:HG23	2.48	0.48
1:B:89:VAL:O	1:B:89:VAL:CG2	2.62	0.48
1:A:10:SER:HB3	1:A:32:GLU:CA	2.43	0.47
1:C:132:THR:HG22	1:C:132:THR:O	2.14	0.47
1:D:263:ASP:HB2	1:D:264:GLU:OE2	2.14	0.47
1:A:137:GLY:O	1:A:242:GLY:HA2	2.13	0.47
1:A:181:MET:CE	1:A:198:ALA:HB1	2.43	0.47
1:B:37:ASN:O	1:B:37:ASN:ND2	2.46	0.47
1:C:96:PHE:O	1:C:110:THR:HA	2.14	0.47
1:B:48:THR:HG23	2:B:401:FAD:C6	2.41	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:263:ASP:OD1	1:B:263:ASP:C	2.52	0.47
1:D:96:PHE:O	1:D:110:THR:HA	2.14	0.47
1:C:26:ILE:HG22	1:C:26:ILE:O	2.15	0.47
1:C:181:MET:HE3	1:C:204:ILE:HD13	1.96	0.47
1:D:214:GLU:HB2	1:D:226:ARG:HB2	1.96	0.47
1:B:89:VAL:HG21	1:B:256:VAL:CG1	2.40	0.47
1:C:114:ILE:HG13	1:C:282:PHE:CD1	2.49	0.47
1:B:184:ARG:HG3	1:B:211:VAL:CG2	2.44	0.47
1:C:15:HIS:O	1:C:19:ILE:N	2.44	0.47
1:A:19:ILE:O	1:A:23:ARG:HG3	2.14	0.47
1:B:67:MET:HE1	1:B:70:MET:CE	2.39	0.47
1:B:181:MET:HE2	1:B:204:ILE:HG21	1.96	0.47
1:C:120:ALA:HA	1:C:250:THR:O	2.15	0.47
1:B:51:ILE:CD1	1:B:54:PHE:HB2	2.45	0.47
1:B:133:TYR:CE2	1:B:218:ASP:O	2.67	0.47
1:D:10:SER:HB3	1:D:32:GLU:CA	2.45	0.47
1:B:99:TRP:CE2	1:B:108:PRO:HB3	2.49	0.47
1:B:186:ASP:OD1	1:B:186:ASP:C	2.54	0.47
1:C:213:LEU:HD23	1:C:226:ARG:HH12	1.80	0.47
1:D:156:LEU:O	1:D:179:VAL:HA	2.15	0.47
1:D:62:THR:HB	1:D:65:GLU:CD	2.35	0.46
1:D:288:VAL:O	1:D:288:VAL:HG22	2.14	0.46
1:B:3:ASN:O	1:B:111:THR:HA	2.16	0.46
1:B:152:ARG:HD3	1:B:152:ARG:HA	1.75	0.46
1:A:101:GLU:O	1:A:102:PHE:HB2	2.15	0.46
1:A:181:MET:CE	1:A:204:ILE:HG21	2.46	0.46
1:C:134:TRP:O	1:C:135:GLN:HB2	2.15	0.46
1:C:240:VAL:HG13	1:C:242:GLY:H	1.80	0.46
1:A:99:TRP:CD1	1:A:99:TRP:N	2.84	0.46
1:A:114:ILE:O	1:A:114:ILE:HG23	2.15	0.46
1:A:150:ILE:HD12	1:A:150:ILE:HG23	1.72	0.46
1:B:67:MET:CE	1:B:67:MET:N	2.77	0.46
1:B:179:VAL:O	1:B:204:ILE:HA	2.16	0.46
1:B:189:ARG:NH1	3:B:502:CIT:H41	2.30	0.46
1:C:276:LEU:HD23	1:C:283:PHE:CE2	2.51	0.46
1:D:139:SER:HB3	1:D:244:PHE:CD2	2.51	0.46
1:A:95:PRO:CG	1:A:110:THR:CG2	2.94	0.46
1:A:114:ILE:HD12	1:A:282:PHE:HE1	1.78	0.46
1:D:133:TYR:CD2	1:D:215:ALA:HB1	2.50	0.46
3:A:501:CIT:O3	3:A:501:CIT:C2	2.60	0.45
1:B:125:MET:CG	1:B:245:TYR:CE1	2.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:51:ILE:HD11	1:A:63:GLY:HA2	1.97	0.45
1:B:262:THR:HA	1:B:267:TYR:O	2.16	0.45
1:D:94:LYS:HA	1:D:94:LYS:HD3	1.78	0.45
1:D:141:CYS:HB3	1:D:144:CYS:HB2	1.84	0.45
1:A:114:ILE:HG23	1:A:114:ILE:HD13	1.36	0.45
1:B:167:GLU:CG	1:B:194:MET:CE	2.92	0.45
1:D:95:PRO:CG	1:D:110:THR:OG1	2.65	0.45
1:B:29:ILE:N	1:B:29:ILE:CD1	2.80	0.45
1:B:67:MET:HE1	1:B:70:MET:HE1	1.98	0.45
1:B:213:LEU:HD11	1:B:228:LYS:HB2	1.98	0.45
1:C:91:LEU:HD11	1:C:256:VAL:HG21	1.97	0.45
1:A:66:LEU:O	1:A:69:ARG:HB2	2.17	0.45
1:B:104:GLU:H	1:B:104:GLU:HG2	1.46	0.45
1:B:139:SER:O	1:B:244:PHE:HA	2.16	0.45
1:C:91:LEU:HD11	1:C:256:VAL:CG2	2.47	0.45
1:B:6:THR:HG21	1:B:98:LEU:HD22	1.98	0.45
1:C:287:ASP:OD1	1:C:294:ARG:HA	2.16	0.45
1:A:114:ILE:HD12	1:A:282:PHE:CD1	2.52	0.45
1:B:133:TYR:OH	1:B:218:ASP:O	2.33	0.45
1:B:182:LEU:CD2	1:B:207:LEU:HD12	2.47	0.45
1:D:62:THR:HG22	1:D:64:SER:H	1.81	0.45
1:A:133:TYR:CE2	1:A:217:GLY:HA3	2.51	0.45
1:B:144:CYS:SG	2:B:401:FAD:C4X	3.05	0.45
1:A:114:ILE:HD12	1:A:114:ILE:HG21	1.56	0.44
1:C:118:THR:HB	1:C:252:ALA:HB3	1.99	0.44
1:D:263:ASP:C	1:D:263:ASP:OD1	2.55	0.44
1:A:90:ASP:HB3	1:A:97:LYS:HB2	1.98	0.44
1:D:142:ALA:HA	1:D:244:PHE:CD2	2.52	0.44
1:C:83:THR:HG22	1:C:83:THR:O	2.18	0.44
1:C:256:VAL:CG1	1:C:260:VAL:HG21	2.46	0.44
1:B:17:ALA:HA	1:B:307:ALA:HB2	1.97	0.44
1:C:62:THR:HG1	1:C:65:GLU:HG3	1.77	0.44
1:A:155:PRO:O	1:A:156:LEU:HD23	2.17	0.44
1:B:168:GLU:O	1:B:172:LEU:HG	2.18	0.44
1:B:125:MET:HB2	1:B:245:TYR:CE1	2.52	0.44
1:C:6:THR:HB	1:C:114:ILE:HG22	2.00	0.44
1:D:187:HIS:ND1	1:D:208:TYR:HE2	2.16	0.44
1:B:57:PHE:CD2	1:B:61:LEU:HD22	2.53	0.44
1:B:163:ASP:OD2	3:B:506:CIT:O1	2.36	0.44
1:D:43:GLY:O	1:D:45:LEU:N	2.51	0.44
1:B:94:LYS:HA	1:B:95:PRO:C	2.38	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:114:ILE:CD1	1:A:282:PHE:CE1	2.97	0.43
1:C:119:GLY:HA3	2:C:402:FAD:O1A	2.18	0.43
1:C:213:LEU:HD12	1:C:213:LEU:HA	1.70	0.43
2:C:402:FAD:H9	2:C:402:FAD:H1'1	1.85	0.43
1:D:180:PHE:HE1	1:D:205:GLU:OE2	2.01	0.43
1:A:172:LEU:HD11	1:A:244:PHE:CG	2.54	0.43
1:B:62:THR:OG1	1:B:65:GLU:HG3	2.18	0.43
1:D:91:LEU:HA	1:D:96:PHE:CD1	2.53	0.43
1:D:310:ALA:O	1:D:314:LEU:HG	2.17	0.43
1:A:57:PHE:CG	1:A:61:LEU:HD22	2.53	0.43
1:A:240:VAL:CG1	1:A:242:GLY:O	2.67	0.43
1:A:115:ILE:HG12	1:A:283:PHE:HB2	2.00	0.43
1:A:62:THR:HB	1:A:65:GLU:HB2	2.01	0.43
1:C:184:ARG:HB2	1:C:211:VAL:HG22	2.01	0.43
1:C:211:VAL:HG12	1:C:212:ALA:O	2.19	0.43
1:A:315:THR:O	1:A:315:THR:CG2	2.67	0.43
1:B:240:VAL:HG13	1:B:242:GLY:H	1.84	0.43
1:C:34:MET:O	1:C:35:MET:HB2	2.19	0.43
1:C:114:ILE:HG23	1:C:114:ILE:HD13	1.32	0.43
1:D:181:MET:HE3	1:D:206:ILE:HD13	2.01	0.43
1:A:103:ASN:ND2	4:A:348:HOH:O	2.48	0.43
1:B:37:ASN:ND2	1:B:39:ILE:HD13	2.34	0.43
1:B:90:ASP:OD1	1:B:92:SER:OG	2.30	0.43
1:A:6:THR:O	1:A:114:ILE:HA	2.18	0.42
1:B:12:PRO:CA	1:B:70:MET:CE	2.95	0.42
1:D:55:PRO:HG2	1:D:297:ILE:HD13	2.00	0.42
3:D:504:CIT:C4	4:D:352:HOH:O	2.67	0.42
1:B:225:LEU:HD11	1:B:243:LEU:HD13	2.00	0.42
1:C:45:LEU:HA	1:C:45:LEU:HD12	1.63	0.42
1:B:48:THR:CG2	2:B:401:FAD:HM72	2.49	0.42
1:B:94:LYS:HE3	1:B:96:PHE:CE2	2.54	0.42
1:B:159:ILE:HG22	1:B:247:ILE:CG2	2.50	0.42
1:D:55:PRO:CG	1:D:297:ILE:HD13	2.49	0.42
1:D:90:ASP:N	1:D:97:LYS:O	2.36	0.42
1:A:114:ILE:HD13	1:A:114:ILE:C	2.39	0.42
1:B:270:THR:OG1	1:B:289:GLN:NE2	2.50	0.42
1:A:59:ASP:HB2	4:A:324:HOH:O	2.19	0.42
1:C:34:MET:O	1:C:34:MET:HG2	2.20	0.42
1:C:88:LYS:O	1:C:99:TRP:HD1	2.02	0.42
1:B:26:ILE:CD1	1:B:311:GLU:HG2	2.50	0.42
1:B:144:CYS:SG	2:B:401:FAD:C10	3.08	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:173:THR:HB	1:B:203:LYS:HE3	2.01	0.42
1:C:6:THR:OG1	1:C:111:THR:HG21	2.19	0.42
1:C:186:ASP:HA	1:C:208:TYR:HB3	2.00	0.42
1:A:164:SER:HB2	3:A:501:CIT:H22	2.02	0.42
1:B:10:SER:O	1:B:42:GLY:HA2	2.20	0.42
1:B:69:ARG:HB3	1:C:58:PRO:HG3	2.02	0.42
1:D:99:TRP:CE3	1:D:108:PRO:HB3	2.55	0.42
1:D:134:TRP:CZ2	1:D:140:ALA:HB2	2.55	0.42
1:D:214:GLU:O	1:D:225:LEU:HD12	2.19	0.42
1:B:57:PHE:CG	1:B:61:LEU:HD22	2.55	0.42
1:C:170:GLN:HG2	1:C:197:ARG:NH2	2.34	0.42
1:D:6:THR:HG1	1:D:111:THR:HG21	1.81	0.42
1:A:45:LEU:O	1:A:63:GLY:HA3	2.20	0.42
1:C:213:LEU:HB2	1:C:226:ARG:O	2.20	0.42
1:C:276:LEU:CD2	1:C:283:PHE:HE2	2.33	0.42
1:D:201:ASN:ND2	1:D:201:ASN:C	2.61	0.41
1:A:160:GLY:O	1:A:183:VAL:HG22	2.19	0.41
1:A:200:LYS:HA	1:A:200:LYS:HD3	1.79	0.41
2:D:403:FAD:H9	2:D:403:FAD:H1'1	1.72	0.41
1:C:263:ASP:HB3	1:C:269:LYS:HZ2	1.85	0.41
1:D:91:LEU:HD11	1:D:256:VAL:HG21	2.03	0.41
1:D:184:ARG:O	1:D:209:ASN:HA	2.20	0.41
1:A:240:VAL:HG13	1:A:242:GLY:O	2.21	0.41
1:B:181:MET:CE	1:B:198:ALA:HB1	2.45	0.41
1:D:127:LEU:HD22	1:D:127:LEU:HA	1.64	0.41
1:B:215:ALA:HB1	1:B:222:LEU:CD1	2.50	0.41
1:C:122:ALA:HA	1:C:249:HIS:CD2	2.55	0.41
1:A:127:LEU:HD23	1:A:127:LEU:HA	1.90	0.41
1:A:164:SER:OG	3:A:501:CIT:C4	2.63	0.41
1:A:270:THR:OG1	1:A:289:GLN:NE2	2.53	0.41
1:B:206:ILE:HG21	1:B:208:TYR:CZ	2.56	0.41
1:C:262:THR:HA	1:C:267:TYR:O	2.21	0.41
1:A:57:PHE:HA	1:A:58:PRO:HD2	1.88	0.41
1:A:144:CYS:SG	2:A:400:FAD:C4X	3.09	0.41
1:B:178:LYS:HA	1:B:178:LYS:HD3	1.84	0.41
1:C:124:ARG:HD3	1:C:134:TRP:CZ3	2.55	0.41
1:C:134:TRP:C	1:C:136:LYS:H	2.24	0.41
1:C:168:GLU:O	1:C:172:LEU:HG	2.21	0.41
1:D:172:LEU:HD23	1:D:172:LEU:HA	1.94	0.41
1:D:240:VAL:HG22	1:D:242:GLY:H	1.85	0.41
1:A:133:TYR:HB2	1:A:138:ILE:HD12	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:227:ILE:HD11	1:B:236:THR:HG23	2.03	0.41
1:C:225:LEU:HD12	1:C:225:LEU:HA	1.78	0.41
1:D:114:ILE:HD12	1:D:282:PHE:CE1	2.56	0.41
1:B:189:ARG:NH2	3:B:506:CIT:O6	2.53	0.40
1:A:109:VAL:HG12	1:A:110:THR:N	2.37	0.40
1:A:178:LYS:NZ	1:A:205:GLU:OE1	2.54	0.40
1:B:164:SER:CB	3:B:506:CIT:O5	2.69	0.40
1:B:227:ILE:CG1	1:B:236:THR:HG23	2.51	0.40
1:C:172:LEU:HB2	1:C:179:VAL:HG21	2.03	0.40
1:A:122:ALA:HA	1:A:249:HIS:CD2	2.56	0.40
1:B:178:LYS:HD3	1:B:203:LYS:O	2.21	0.40
1:C:109:VAL:H	1:C:109:VAL:HG23	1.57	0.40
1:C:133:TYR:CZ	1:C:217:GLY:CA	2.97	0.40
1:C:147:ALA:CA	1:C:148:VAL:CB	2.98	0.40
1:D:276:LEU:HD23	1:D:283:PHE:HE2	1.87	0.40
1:D:155:PRO:C	1:D:240:VAL:HG23	2.42	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	316/338 (94%)	300 (95%)	15 (5%)	1 (0%)	41	55
1	B	317/338 (94%)	301 (95%)	16 (5%)	0	100	100
1	C	308/338 (91%)	296 (96%)	12 (4%)	0	100	100
1	D	301/338 (89%)	280 (93%)	21 (7%)	0	100	100
All	All	1242/1352 (92%)	1177 (95%)	64 (5%)	1 (0%)	51	68

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	40	ALA

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	249/270 (92%)	233 (94%)	16 (6%)	17	28
1	B	247/270 (92%)	229 (93%)	18 (7%)	14	22
1	C	232/270 (86%)	215 (93%)	17 (7%)	14	22
1	D	222/270 (82%)	207 (93%)	15 (7%)	16	25
All	All	950/1080 (88%)	884 (93%)	66 (7%)	16	25

All (66) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	45	LEU
1	A	51	ILE
1	A	59	ASP
1	A	98	LEU
1	A	99	TRP
1	A	114	ILE
1	A	125	MET
1	A	184[A]	ARG
1	A	184[B]	ARG
1	A	200	LYS
1	A	203	LYS
1	A	221	LEU
1	A	225	LEU
1	A	240	VAL
1	A	276	LEU
1	A	289	GLN
1	B	27	LYS
1	B	29	ILE
1	B	37	ASN
1	B	45	LEU
1	B	104	GLU

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Mol	Chain	Res	Type
1	B	110	THR
1	B	170	GLN
1	B	178	LYS
1	B	189	ARG
1	B	202	GLU
1	B	218	ASP
1	B	221	LEU
1	B	230	THR
1	B	236	THR
1	B	240	VAL
1	B	289	GLN
1	B	292	LYS
1	B	297	ILE
1	C	23	ARG
1	C	45	LEU
1	C	51	ILE
1	C	64	SER
1	C	99	TRP
1	C	111	THR
1	C	114	ILE
1	C	153	ASN
1	C	178	LYS
1	C	213	LEU
1	C	240	VAL
1	C	255	ILE
1	C	256	VAL
1	C	260	VAL
1	C	289	GLN
1	C	291	SER
1	C	314	LEU
1	D	1	VAL
1	D	26	ILE
1	D	99	TRP
1	D	108	PRO
1	D	111	THR
1	D	114	ILE
1	D	124	ARG
1	D	127	LEU
1	D	201	ASN
1	D	211	VAL
1	D	214	GLU
1	D	256	VAL

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Mol	Chain	Res	Type
1	D	260	VAL
1	D	289	GLN
1	D	308	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	103	ASN
1	A	289	GLN
1	B	2	HIS
1	B	3	ASN
1	B	37	ASN
1	B	170	GLN
1	B	289	GLN
1	C	170	GLN
1	C	259	GLN
1	C	289	GLN
1	D	201	ASN
1	D	289	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](#)

10 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The

Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	FAD	A	400	-	53,58,58	1.39	5 (9%)	68,89,89	1.54	14 (20%)
3	CIT	B	502	-	12,12,12	1.24	2 (16%)	17,17,17	2.44	5 (29%)
3	CIT	C	505	-	12,12,12	2.69	2 (16%)	17,17,17	3.84	12 (70%)
2	FAD	B	401	-	53,58,58	1.22	4 (7%)	68,89,89	1.56	9 (13%)
3	CIT	D	504	-	12,12,12	1.27	1 (8%)	17,17,17	2.07	7 (41%)
2	FAD	D	403	-	53,58,58	1.29	7 (13%)	68,89,89	1.70	15 (22%)
3	CIT	B	506	-	12,12,12	1.88	2 (16%)	17,17,17	2.75	11 (64%)
3	CIT	C	503	-	12,12,12	1.55	2 (16%)	17,17,17	2.46	7 (41%)
2	FAD	C	402	-	53,58,58	1.22	7 (13%)	68,89,89	1.73	13 (19%)
3	CIT	A	501	-	12,12,12	1.41	3 (25%)	17,17,17	2.92	9 (52%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	FAD	A	400	-	-	9/30/50/50	0/6/6/6
3	CIT	B	502	-	-	5/16/16/16	-
3	CIT	C	505	-	-	1/16/16/16	-
2	FAD	B	401	-	-	5/30/50/50	0/6/6/6
3	CIT	D	504	-	-	6/16/16/16	-
2	FAD	D	403	-	-	4/30/50/50	0/6/6/6
3	CIT	B	506	-	-	10/16/16/16	-
3	CIT	C	503	-	-	7/16/16/16	-
2	FAD	C	402	-	-	7/30/50/50	0/6/6/6
3	CIT	A	501	-	-	5/16/16/16	-

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	505	CIT	C3-C6	-8.47	1.44	1.53
3	B	506	CIT	C3-C6	-4.68	1.48	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	503	CIT	C3-C6	4.10	1.57	1.53
2	A	400	FAD	C2A-N1A	4.10	1.41	1.33
2	D	403	FAD	C2A-N3A	4.05	1.38	1.32
2	A	400	FAD	C4X-N5	4.01	1.38	1.30
2	D	403	FAD	O4B-C1B	3.62	1.46	1.41
2	C	402	FAD	C4X-N5	3.35	1.37	1.30
2	B	401	FAD	C2A-N3A	3.29	1.37	1.32
2	B	401	FAD	C4X-N5	3.22	1.37	1.30
2	A	400	FAD	C2A-N3A	3.04	1.37	1.32
2	C	402	FAD	C2A-N3A	3.02	1.37	1.32
3	B	506	CIT	C2-C3	-2.97	1.50	1.53
2	B	401	FAD	C2A-N1A	2.86	1.39	1.33
2	D	403	FAD	C4X-N5	2.78	1.36	1.30
2	A	400	FAD	O4B-C4B	-2.61	1.39	1.45
2	D	403	FAD	C8A-N7A	2.59	1.39	1.34
3	D	504	CIT	C3-C6	-2.55	1.50	1.53
2	D	403	FAD	C4'-C3'	-2.51	1.48	1.53
2	A	400	FAD	C8A-N7A	2.46	1.39	1.34
3	A	501	CIT	C4-C3	-2.34	1.50	1.53
3	B	502	CIT	C3-C6	-2.32	1.51	1.53
2	C	402	FAD	O2-C2	-2.22	1.20	1.24
2	C	402	FAD	C2A-N1A	2.20	1.38	1.33
3	C	503	CIT	O7-C3	2.19	1.47	1.43
2	D	403	FAD	C2A-N1A	2.18	1.38	1.33
2	D	403	FAD	C4X-C4	-2.15	1.36	1.44
2	C	402	FAD	C10-N1	2.15	1.37	1.33
2	B	401	FAD	C4X-C4	-2.13	1.36	1.44
3	A	501	CIT	O7-C3	2.12	1.47	1.43
3	C	505	CIT	O2-C1	-2.05	1.23	1.30
2	C	402	FAD	C5X-N5	-2.05	1.35	1.39
3	B	502	CIT	C4-C3	-2.03	1.51	1.53
3	A	501	CIT	C3-C6	2.02	1.55	1.53
2	C	402	FAD	C4X-C10	-2.01	1.38	1.44

All (102) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	505	CIT	O7-C3-C6	-8.26	97.26	108.86
3	C	503	CIT	O6-C6-C3	7.62	126.28	113.05
2	C	402	FAD	N3A-C2A-N1A	-5.98	119.33	128.68
2	D	403	FAD	N3A-C2A-N1A	-5.96	119.37	128.68
3	B	502	CIT	O5-C6-C3	-5.88	113.93	122.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	501	CIT	O6-C6-C3	5.75	123.03	113.05
2	B	401	FAD	N3A-C2A-N1A	-5.69	119.79	128.68
3	B	506	CIT	C2-C3-C6	-5.59	98.08	110.11
3	C	505	CIT	O5-C6-C3	-5.50	114.46	122.25
3	B	502	CIT	O6-C6-C3	5.45	122.51	113.05
3	C	505	CIT	O2-C1-C2	5.29	131.34	114.35
3	A	501	CIT	C4-C3-C2	-4.99	96.13	109.16
3	D	504	CIT	O7-C3-C6	-4.84	102.06	108.86
3	C	505	CIT	C4-C3-C6	-4.65	100.12	110.11
3	C	505	CIT	O2-C1-O1	-4.34	112.48	123.30
3	A	501	CIT	O1-C1-C2	-4.27	110.46	122.94
3	A	501	CIT	C3-C4-C5	-4.21	103.62	113.81
3	B	506	CIT	O2-C1-C2	4.20	127.84	114.35
3	B	506	CIT	O5-C6-C3	-4.14	116.39	122.25
3	C	505	CIT	C2-C3-C6	-4.13	101.23	110.11
2	A	400	FAD	N3A-C2A-N1A	-4.11	122.25	128.68
2	B	401	FAD	C4X-C10-N10	4.05	122.40	116.48
2	C	402	FAD	C9A-C5X-N5	-4.02	118.06	122.43
3	A	501	CIT	C3-C2-C1	-4.02	104.08	113.81
2	B	401	FAD	C4-N3-C2	-3.93	118.37	125.64
3	C	505	CIT	C4-C3-C2	3.68	118.76	109.16
3	C	505	CIT	O7-C3-C4	3.62	117.88	109.40
2	D	403	FAD	C4X-C10-N10	3.60	121.74	116.48
2	B	401	FAD	C4X-C4-N3	3.48	122.02	113.19
2	B	401	FAD	C4X-C10-N1	-3.40	116.85	124.73
3	B	506	CIT	O4-C5-O3	-3.32	115.03	123.30
2	D	403	FAD	O5'-C5'-C4'	-3.25	100.68	109.36
2	A	400	FAD	O4-C4-C4X	-3.25	117.99	126.60
2	C	402	FAD	C2A-N1A-C6A	3.21	124.25	118.75
2	C	402	FAD	C5'-C4'-C3'	-3.20	106.02	112.20
3	C	503	CIT	O5-C6-C3	-3.20	117.72	122.25
2	D	403	FAD	C9A-C5X-N5	-3.17	118.99	122.43
3	C	505	CIT	O3-C5-C4	-3.11	113.86	122.94
3	B	502	CIT	C3-C2-C1	-3.11	106.28	113.81
2	D	403	FAD	C10-N1-C2	3.09	123.08	116.90
2	A	400	FAD	C4-N3-C2	-3.06	119.98	125.64
2	A	400	FAD	C4X-C4-N3	3.02	120.86	113.19
3	B	506	CIT	O6-C6-C3	3.02	118.29	113.05
2	D	403	FAD	C1B-N9A-C4A	-3.02	121.34	126.64
2	C	402	FAD	O5'-C5'-C4'	-3.00	101.34	109.36
3	C	505	CIT	O4-C5-C4	3.00	124.00	114.35
2	C	402	FAD	O3'-C3'-C2'	2.95	115.94	108.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	400	FAD	C1'-N10-C9A	2.93	125.39	120.51
2	D	403	FAD	C2A-N1A-C6A	2.91	123.73	118.75
2	A	400	FAD	C9A-C5X-N5	-2.88	119.30	122.43
2	D	403	FAD	C10-C4X-N5	-2.87	118.76	124.86
2	C	402	FAD	O4'-C4'-C3'	2.85	116.04	109.10
3	D	504	CIT	O4-C5-C4	2.84	123.47	114.35
2	C	402	FAD	O2'-C2'-C3'	-2.83	102.21	109.10
3	D	504	CIT	O4-C5-O3	-2.83	116.26	123.30
3	B	506	CIT	O4-C5-C4	2.80	123.36	114.35
2	C	402	FAD	C4-N3-C2	-2.80	120.47	125.64
3	A	501	CIT	O2-C1-C2	2.72	123.07	114.35
3	A	501	CIT	C2-C3-C6	2.71	115.94	110.11
2	B	401	FAD	C10-C4X-N5	-2.70	119.12	124.86
2	B	401	FAD	C10-N1-C2	2.70	122.30	116.90
3	B	506	CIT	O1-C1-C2	-2.69	115.07	122.94
3	A	501	CIT	O6-C6-O5	-2.68	115.30	123.82
2	A	400	FAD	C4X-C10-N10	2.67	120.39	116.48
3	B	502	CIT	C4-C3-C6	-2.63	104.47	110.11
2	A	400	FAD	O5B-C5B-C4B	-2.59	100.09	108.99
3	D	504	CIT	C4-C3-C2	2.56	115.84	109.16
2	D	403	FAD	C4X-C10-N1	-2.56	118.80	124.73
3	D	504	CIT	O2-C1-C2	2.56	122.56	114.35
3	B	506	CIT	O2-C1-O1	-2.55	116.94	123.30
3	D	504	CIT	C3-C2-C1	-2.53	107.68	113.81
2	D	403	FAD	C5X-C9A-N10	2.53	120.56	117.95
3	A	501	CIT	O7-C3-C2	2.51	115.28	109.40
3	C	505	CIT	O7-C3-C2	2.51	115.26	109.40
3	C	503	CIT	O6-C6-O5	-2.46	115.99	123.82
2	C	402	FAD	C6-C5X-C9A	2.46	122.42	118.94
2	D	403	FAD	C4-N3-C2	-2.42	121.17	125.64
2	A	400	FAD	C6-C5X-C9A	2.40	122.34	118.94
2	A	400	FAD	C10-N1-C2	2.40	121.69	116.90
3	D	504	CIT	O2-C1-O1	-2.37	117.39	123.30
3	C	503	CIT	C3-C2-C1	-2.36	108.10	113.81
3	C	503	CIT	O1-C1-C2	-2.36	116.06	122.94
3	C	503	CIT	O2-C1-C2	2.35	121.90	114.35
2	A	400	FAD	C4'-C3'-C2'	-2.33	108.52	113.36
2	B	401	FAD	O4-C4-C4X	-2.32	120.43	126.60
3	C	505	CIT	O1-C1-C2	-2.32	116.17	122.94
3	B	502	CIT	O7-C3-C6	-2.27	105.68	108.86
2	A	400	FAD	O3'-C3'-C4'	-2.25	103.37	108.81
3	B	506	CIT	C3-C2-C1	-2.22	108.44	113.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	402	FAD	C5X-N5-C4X	2.19	121.71	118.07
2	D	403	FAD	C4-C4X-C10	2.18	120.45	116.79
3	B	506	CIT	C4-C3-C6	2.17	114.77	110.11
2	A	400	FAD	C1B-N9A-C4A	-2.15	122.86	126.64
2	C	402	FAD	C5B-C4B-C3B	-2.14	107.17	115.18
2	C	402	FAD	C5A-C6A-N6A	2.13	123.59	120.35
2	B	401	FAD	C4-C4X-C10	2.08	120.29	116.79
3	C	503	CIT	O4-C5-C4	2.07	120.99	114.35
2	D	403	FAD	C5X-N5-C4X	2.06	121.50	118.07
2	D	403	FAD	C4X-C4-N3	2.05	118.40	113.19
2	A	400	FAD	O2'-C2'-C3'	-2.03	104.17	109.10
3	B	506	CIT	C4-C3-C2	2.03	114.44	109.16
2	D	403	FAD	C1'-C2'-C3'	-2.01	104.16	109.79

There are no chirality outliers.

All (59) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	400	FAD	O4'-C4'-C5'-O5'
2	B	401	FAD	O4B-C4B-C5B-O5B
2	B	401	FAD	C3B-C4B-C5B-O5B
2	C	402	FAD	C5'-O5'-P-O2P
3	A	501	CIT	C1-C2-C3-O7
3	A	501	CIT	C1-C2-C3-C4
3	A	501	CIT	C1-C2-C3-C6
3	B	502	CIT	C2-C3-C4-C5
3	B	502	CIT	C6-C3-C4-C5
3	C	503	CIT	C2-C3-C6-O5
3	C	503	CIT	C2-C3-C6-O6
3	C	503	CIT	O7-C3-C6-O5
3	C	503	CIT	O7-C3-C6-O6
3	D	504	CIT	C1-C2-C3-C6
3	D	504	CIT	C2-C3-C6-O5
3	D	504	CIT	C2-C3-C6-O6
3	D	504	CIT	O7-C3-C6-O5
3	D	504	CIT	O7-C3-C6-O6
2	A	400	FAD	O4B-C4B-C5B-O5B
2	A	400	FAD	C3B-C4B-C5B-O5B
2	C	402	FAD	O4B-C4B-C5B-O5B
2	C	402	FAD	C3B-C4B-C5B-O5B
2	D	403	FAD	O4B-C4B-C5B-O5B
2	D	403	FAD	C3B-C4B-C5B-O5B

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Mol	Chain	Res	Type	Atoms
3	B	506	CIT	O7-C3-C4-C5
2	A	400	FAD	O2'-C2'-C3'-C4'
3	B	506	CIT	C6-C3-C4-C5
3	D	504	CIT	C1-C2-C3-C4
3	B	506	CIT	C2-C3-C4-C5
3	C	503	CIT	C1-C2-C3-O7
3	C	503	CIT	C1-C2-C3-C6
3	C	503	CIT	C1-C2-C3-C4
2	B	401	FAD	P-O3P-PA-O1A
2	C	402	FAD	PA-O3P-P-O1P
3	A	501	CIT	C2-C3-C6-O6
3	B	502	CIT	O7-C3-C4-C5
3	B	506	CIT	C1-C2-C3-O7
2	A	400	FAD	PA-O3P-P-O5'
2	B	401	FAD	PA-O3P-P-O5'
2	C	402	FAD	PA-O3P-P-O5'
2	C	402	FAD	C5'-O5'-P-O3P
2	A	400	FAD	P-O3P-PA-O2A
2	A	400	FAD	C5'-O5'-P-O1P
3	A	501	CIT	C2-C3-C6-O5
3	B	506	CIT	C4-C3-C6-O5
2	D	403	FAD	P-O3P-PA-O2A
3	B	506	CIT	O7-C3-C6-O5
3	B	502	CIT	O2-C1-C2-C3
3	B	502	CIT	O1-C1-C2-C3
3	B	506	CIT	O1-C1-C2-C3
2	D	403	FAD	PA-O3P-P-O5'
3	B	506	CIT	O2-C1-C2-C3
3	B	506	CIT	C3-C4-C5-O3
3	B	506	CIT	C3-C4-C5-O4
2	A	400	FAD	PA-O3P-P-O2P
2	B	401	FAD	P-O3P-PA-O2A
3	C	505	CIT	C2-C3-C4-C5
2	A	400	FAD	C5'-O5'-P-O2P
2	C	402	FAD	C5'-O5'-P-O1P

There are no ring outliers.

10 monomers are involved in 40 short contacts:

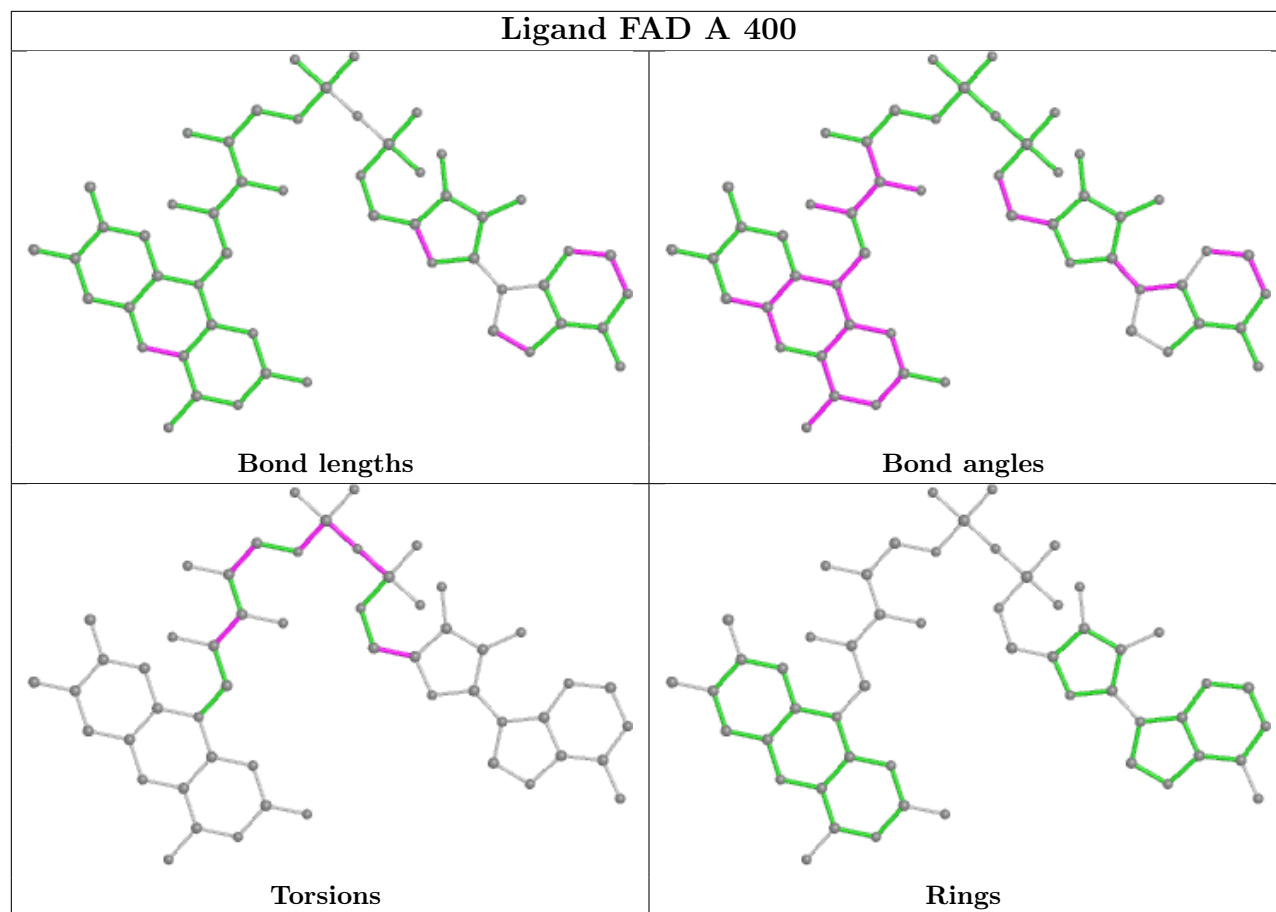
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	400	FAD	4	0
3	B	502	CIT	4	0

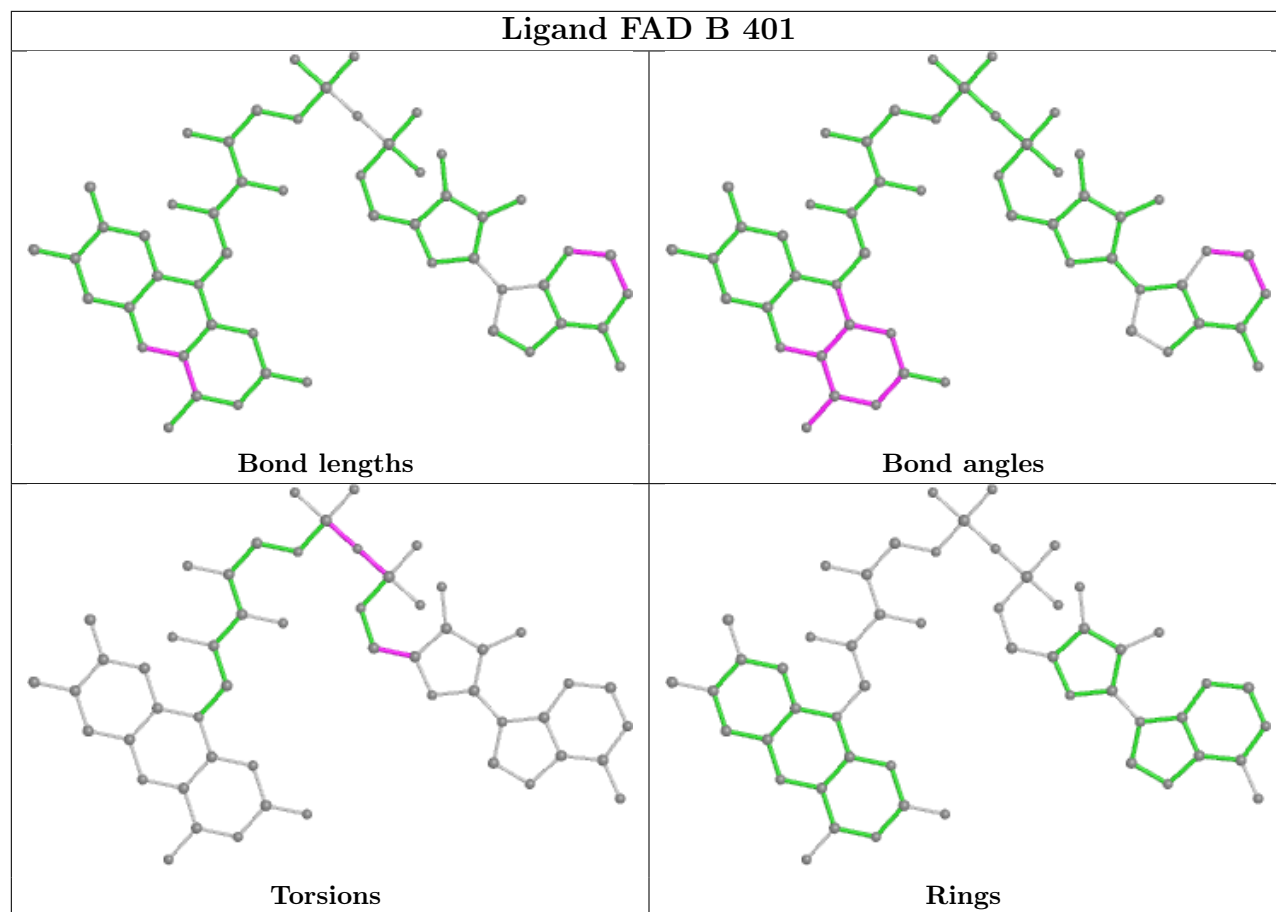
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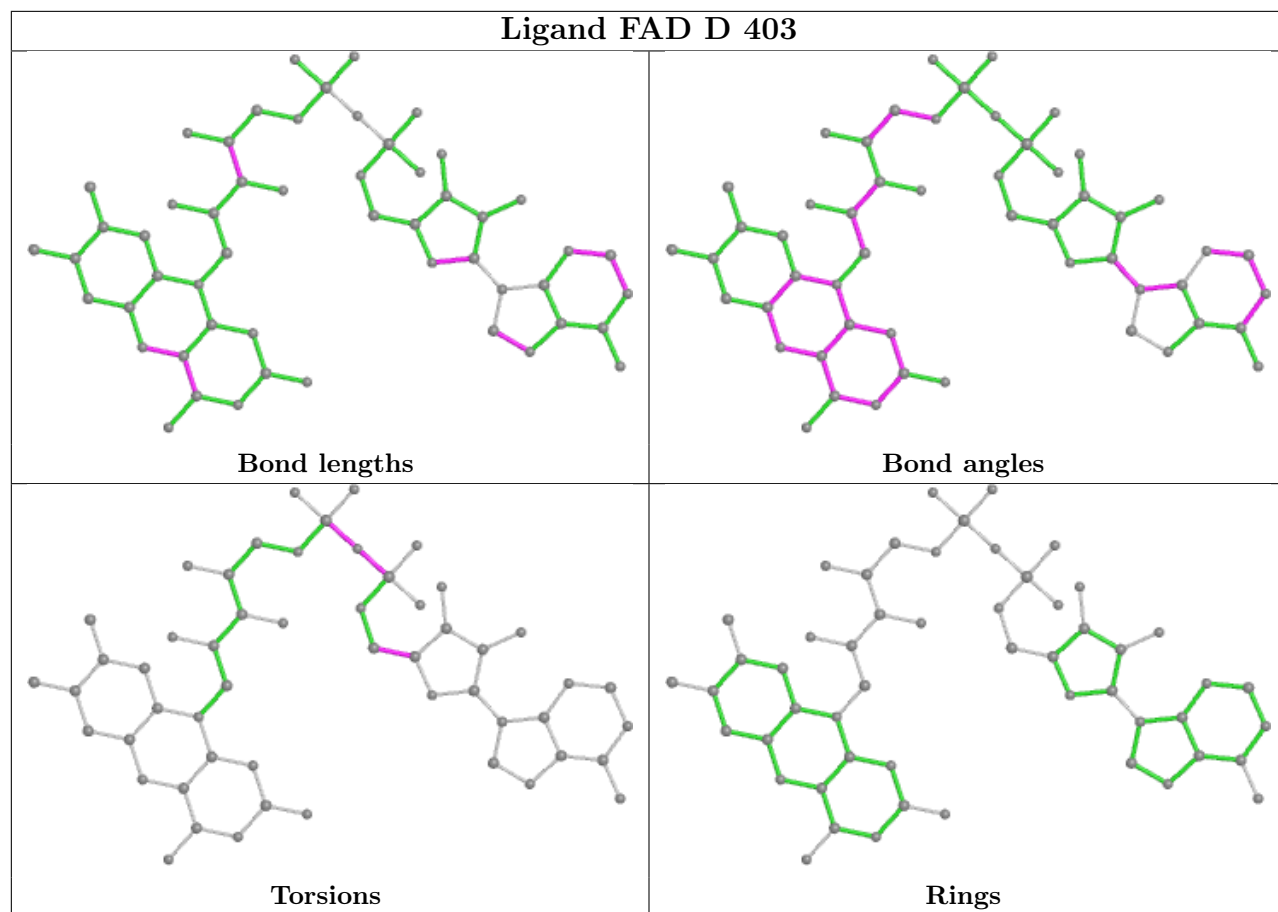
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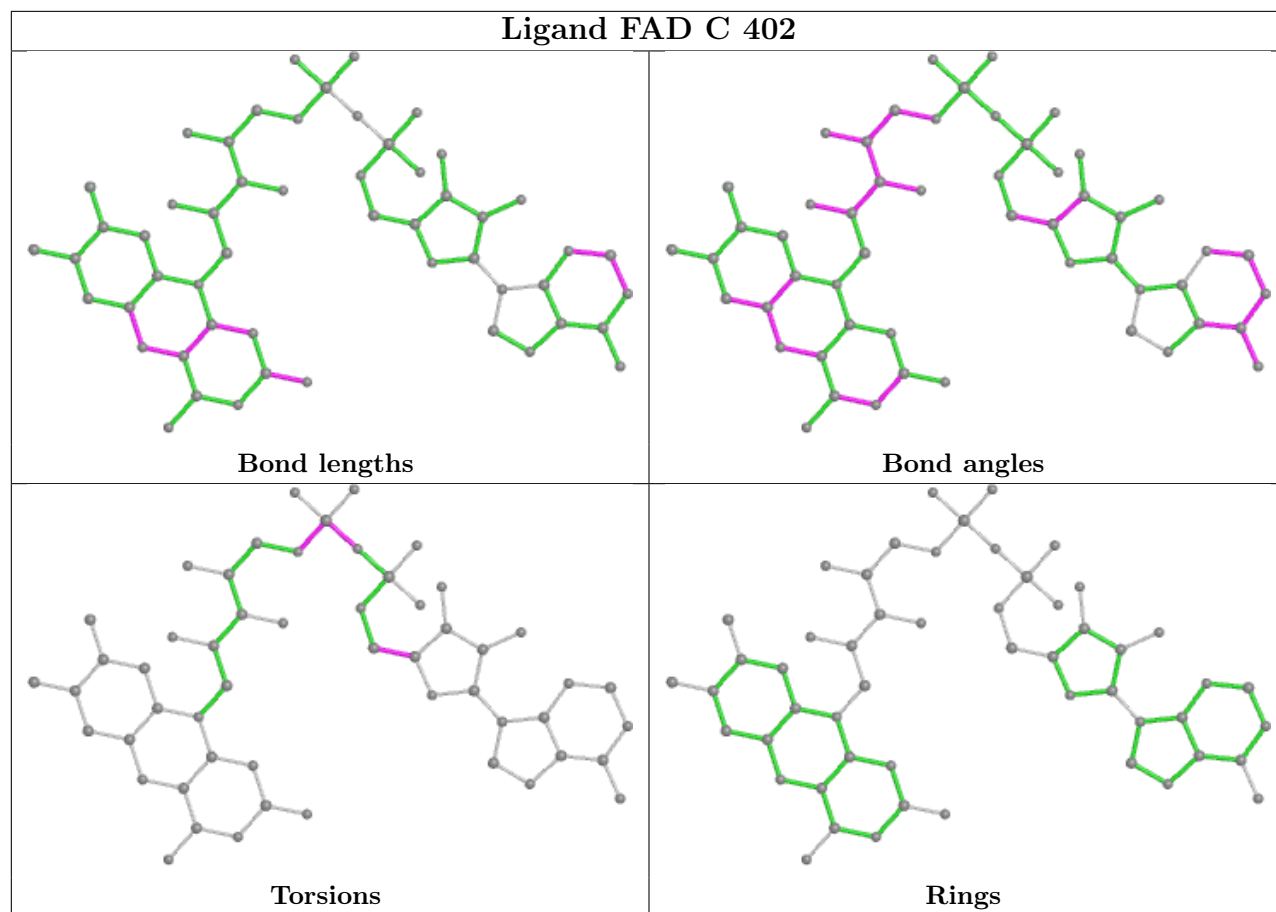
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	505	CIT	3	0
2	B	401	FAD	9	0
3	D	504	CIT	2	0
2	D	403	FAD	2	0
3	B	506	CIT	4	0
3	C	503	CIT	3	0
2	C	402	FAD	2	0
3	A	501	CIT	7	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	317/338 (93%)	-0.29	2 (0%) 89 88	9, 19, 31, 41	0
1	B	319/338 (94%)	-0.30	1 (0%) 94 93	10, 19, 31, 38	0
1	C	314/338 (92%)	-0.18	4 (1%) 77 75	10, 20, 33, 46	0
1	D	307/338 (90%)	-0.11	2 (0%) 87 86	9, 19, 32, 40	0
All	All	1257/1352 (92%)	-0.22	9 (0%) 87 86	9, 19, 33, 46	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	110	THR	3.2
1	B	37	ASN	2.5
1	C	107	GLU	2.5
1	D	171	PHE	2.3
1	A	37	ASN	2.2
1	C	0	HIS	2.2
1	A	217	GLY	2.2
1	C	219	GLY	2.2
1	C	49	THR	2.1

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](#)

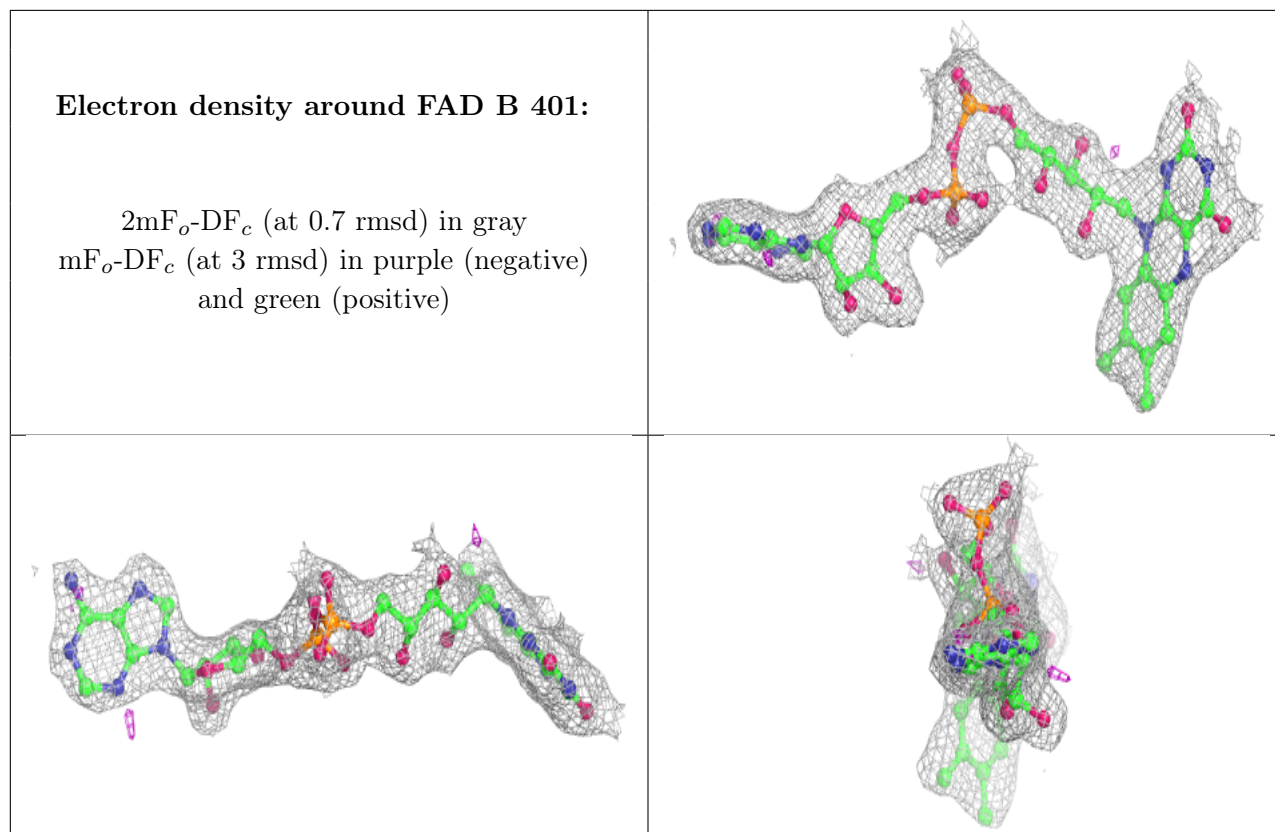
There are no monosaccharides in this entry.

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.

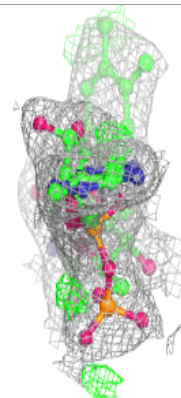
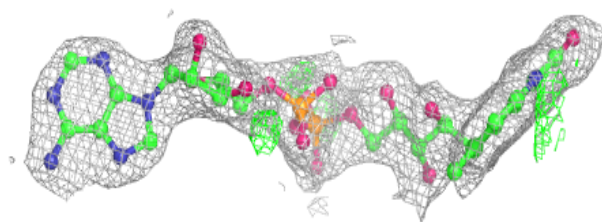
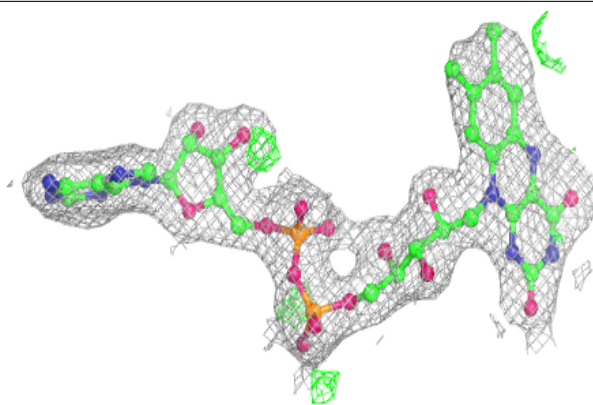
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	CIT	C	503	13/13	0.79	0.17	44,49,52,56	0
3	CIT	C	505	13/13	0.84	0.20	31,39,46,50	0
3	CIT	D	504	13/13	0.86	0.17	55,58,64,65	0
3	CIT	A	501	13/13	0.88	0.18	26,39,49,51	0
3	CIT	B	502	13/13	0.91	0.11	33,37,40,40	0
3	CIT	B	506	13/13	0.95	0.13	28,35,40,44	0
2	FAD	B	401	53/53	0.96	0.13	7,22,31,35	1
2	FAD	A	400	53/53	0.97	0.12	5,19,27,30	1
2	FAD	C	402	53/53	0.97	0.13	12,23,29,35	1
2	FAD	D	403	53/53	0.97	0.13	11,22,28,31	1

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.

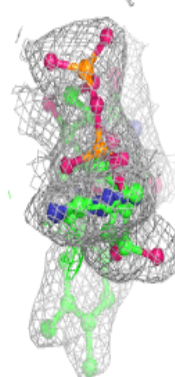
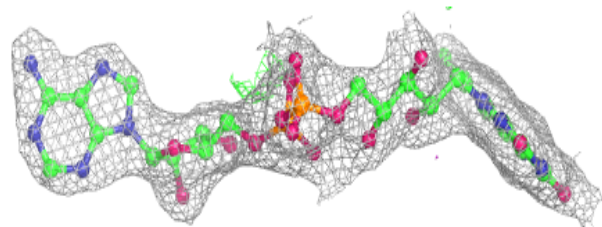
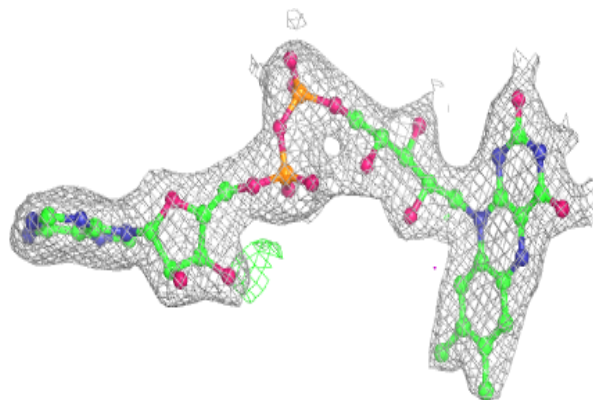


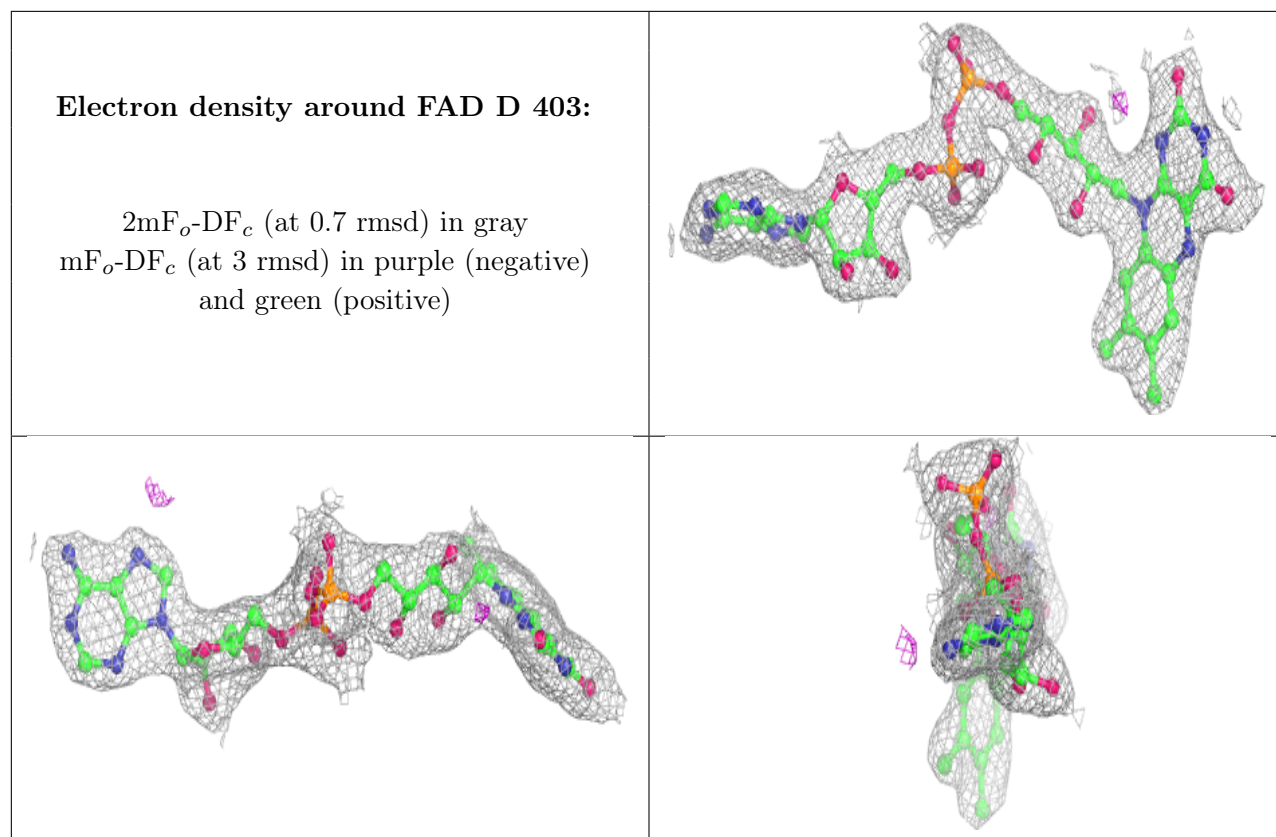
Electron density around FAD A 400:

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

**Electron density around FAD C 402:**

$2mF_o-DF_c$ (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.