



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 15, 2017 – 02:02 am GMT

PDB ID : 2GVC
Title : Crystal structure of flavin-containing monooxygenase (FMO) from *S. pombe* and substrate (methimazole) complex
Authors : Eswaramoorthy, S.; Swaminathan, S.; Burley, S.K.; New York SGX Research Center for Structural Genomics (NYSGXRC)
Deposited on : 2006-05-02
Resolution : 2.22 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity	:	4.02b-467
Mogul	:	1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix)	:	1.9-1692
EDS	:	trunk28620
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	recalc28949

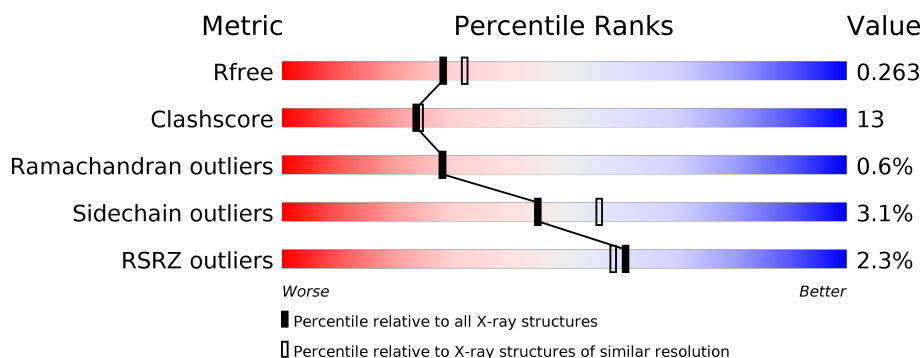
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.22 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}	100719	4744 (2.24-2.20)
Clashscore	112137	5509 (2.24-2.20)
Ramachandran outliers	110173	5427 (2.24-2.20)
Sidechain outliers	110143	5428 (2.24-2.20)
RSRZ outliers	101464	4776 (2.24-2.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	447	<div> <div>2%</div> <div> <div></div> <div>72%</div> <div>24%</div> <div>..</div> </div> </div>
1	B	447	<div> <div>3%</div> <div> <div></div> <div>77%</div> <div>20%</div> <div>..</div> </div> </div>
1	D	447	<div> <div>2%</div> <div> <div></div> <div>74%</div> <div>23%</div> <div>..</div> </div> </div>
1	E	447	<div> <div>2%</div> <div> <div></div> <div>77%</div> <div>21%</div> <div>..</div> </div> </div>

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	MMZ	A	501	-	X	-	X
4	MMZ	B	501	-	X	-	-
4	MMZ	D	501	-	X	-	X
4	MMZ	E	501	-	X	-	X

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 14753 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.

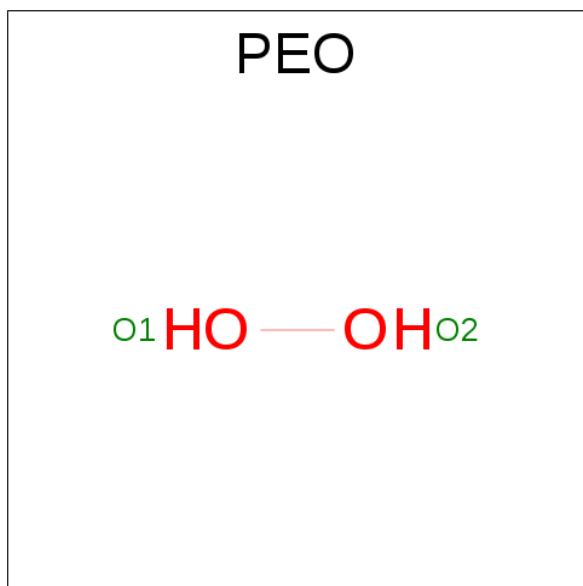
- Molecule 1 is a protein called monooxygenase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	442	Total	C	N	O	S	Se	0	0	0
			3486	2259	578	641	4	4			
1	B	442	Total	C	N	O	S	Se	0	0	0
			3486	2259	578	641	4	4			
1	D	442	Total	C	N	O	S	Se	0	0	0
			3486	2259	578	641	4	4			
1	E	442	Total	C	N	O	S	Se	0	0	0
			3486	2259	578	641	4	4			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
A	97	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
A	377	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
A	386	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
A	433	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
B	1	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
B	97	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
B	377	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
B	386	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
B	433	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
D	1	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
D	97	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
D	377	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
D	386	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
D	433	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
E	1	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
E	97	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
E	377	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
E	386	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4
E	433	MSE	MET	MODIFIED RESIDUE	UNP Q9HFE4

- Molecule 2 is HYDROGEN PEROXIDE (three-letter code: PEO) (formula: H_2O_2).



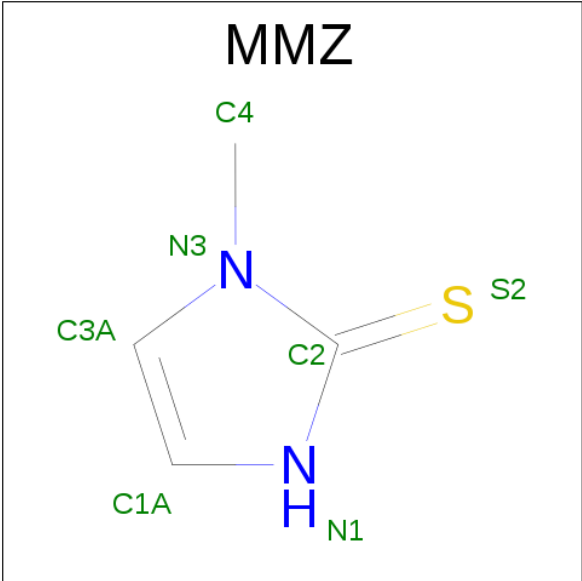
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	O	0	0
			2	2		
2	B	1	Total	O	0	0
			2	2		
2	D	1	Total	O	0	0
			2	2		
2	E	1	Total	O	0	0
			2	2		

- Molecule 3 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $\text{C}_{27}\text{H}_{33}\text{N}_9\text{O}_{15}\text{P}_2$).



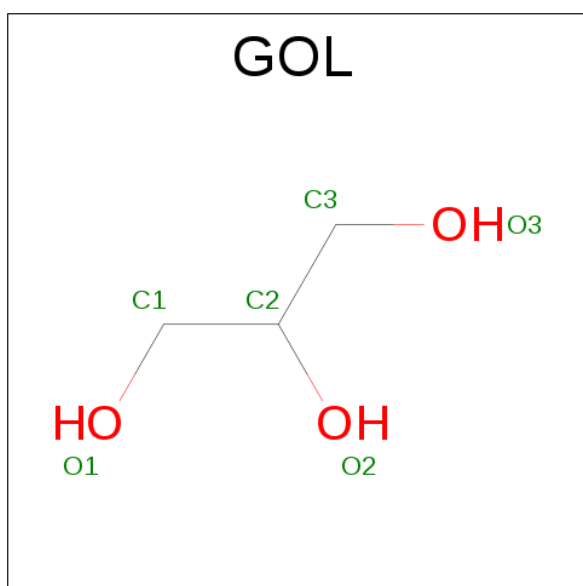
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	D	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	E	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 4 is 1-METHYL-1,3-DIHYDRO-2H-IMIDAZOLE-2-THIONE (three-letter code: MMZ) (formula: C₄H₆N₂S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C N S 7 4 2 1	0	0
4	B	1	Total C N S 7 4 2 1	0	0
4	D	1	Total C N S 7 4 2 1	0	0
4	E	1	Total C N S 7 4 2 1	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	146	Total O 146 146	0	0
6	B	114	Total O 114 114	0	0

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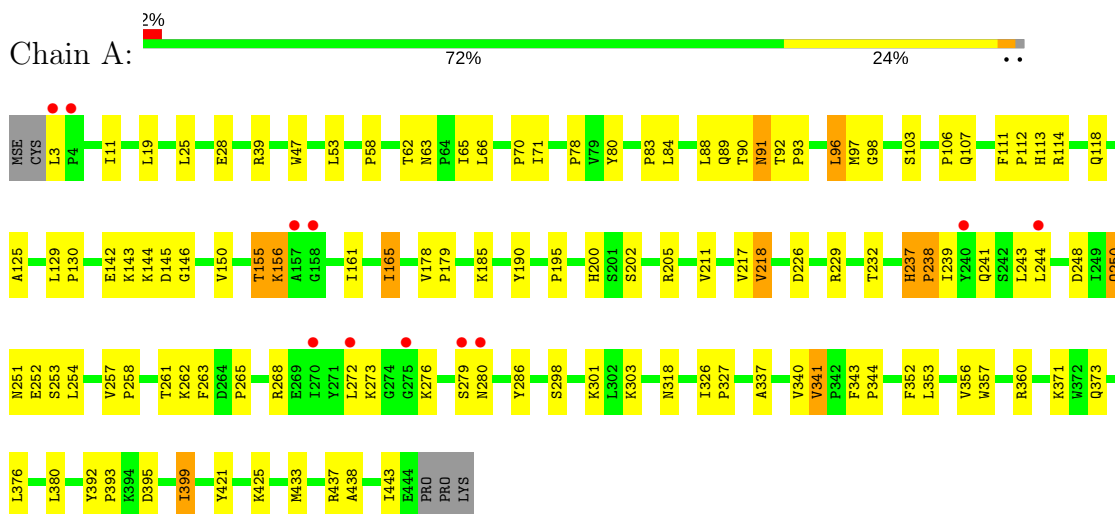
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	D	135	Total 135	O 135	0	0
6	E	142	Total 142	O 142	0	0

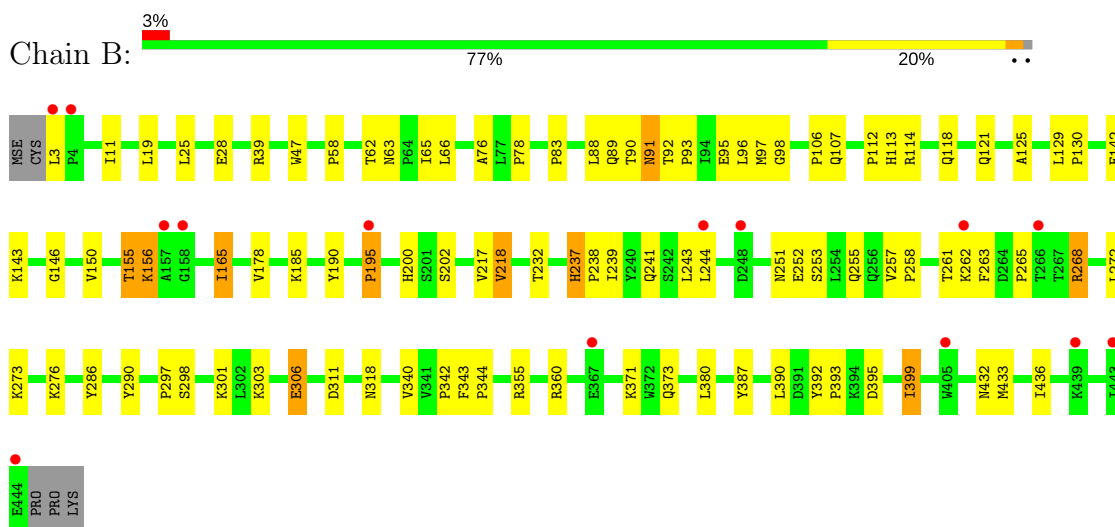
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA 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: monooxygenase

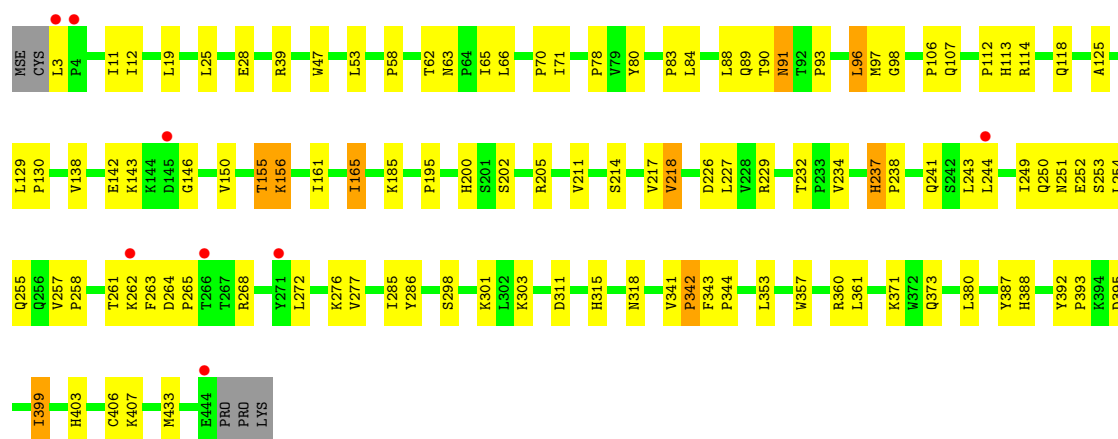


• Molecule 1: monooxygenase

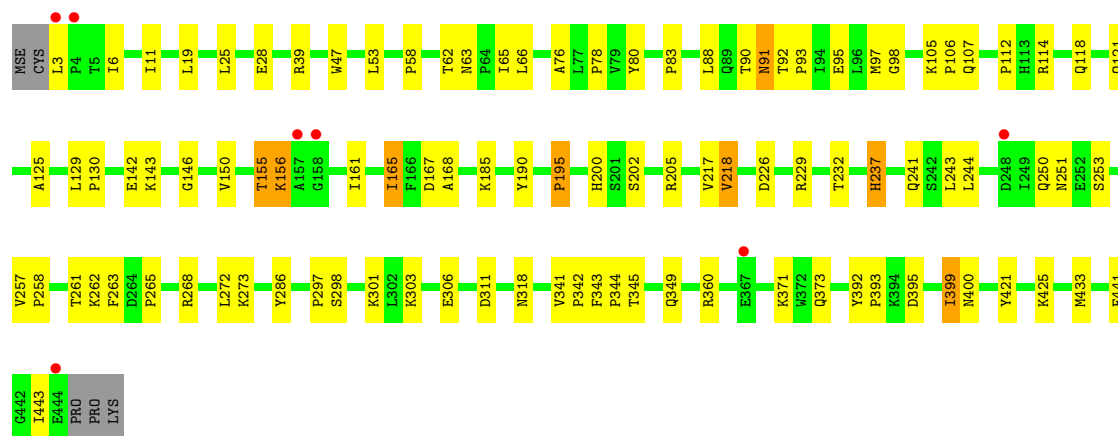
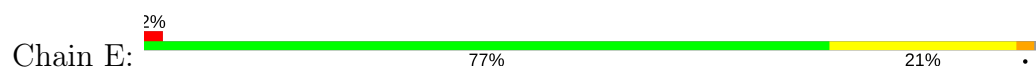


• Molecule 1: monooxygenase





● Molecule 1: monooxygenase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	72.70Å 84.45Å 113.51Å 107.73° 90.76° 106.50°	Depositor
Resolution (Å)	50.00 – 2.22 45.07 – 2.22	Depositor EDS
% Data completeness (in resolution range)	(Not available) (50.00-2.22) 77.8 (45.07-2.22)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.89 (at 2.22Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.230 , 0.265 0.229 , 0.263	Depositor DCC
R_{free} test set	4254 reflections (4.04%)	DCC
Wilson B-factor (Å ²)	21.2	Xtriage
Anisotropy	0.119	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 38.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	14753	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 73.87 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 1.6986e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: GOL, PEO, FAD, MMZ

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	0/3583	0.64	1/4880 (0.0%)
1	B	0.38	0/3583	0.62	0/4880
1	D	0.37	0/3583	0.62	0/4880
1	E	0.37	0/3583	0.63	0/4880
All	All	0.38	0/14332	0.63	1/19520 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	341	VAL	N-CA-C	-5.05	97.37	111.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3486	0	3483	96	0
1	B	3486	0	3483	85	0
1	D	3486	0	3483	96	0
1	E	3486	0	3483	86	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	2	0	0	0	0
2	E	2	0	0	0	0
3	A	53	0	31	3	0
3	B	53	0	31	2	0
3	D	53	0	31	3	0
3	E	53	0	31	2	0
4	A	7	0	6	0	0
4	B	7	0	6	0	0
4	D	7	0	6	0	0
4	E	7	0	6	0	0
5	A	6	0	8	0	0
5	B	6	0	8	0	0
5	D	6	0	8	0	0
5	E	6	0	8	0	0
6	A	146	0	0	4	0
6	B	114	0	0	3	0
6	D	135	0	0	4	0
6	E	142	0	0	3	0
All	All	14753	0	14112	358	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 13.

All (358) 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:155:THR:HG21	6:B:615:HOH:O	1.57	1.02
1:B:114:ARG:HH11	1:B:118:GLN:HE22	1.05	1.00
1:A:114:ARG:HH11	1:A:118:GLN:HE22	1.13	0.95
1:D:155:THR:HG21	6:D:634:HOH:O	1.64	0.95
1:E:114:ARG:HH11	1:E:118:GLN:HE22	1.16	0.93
1:A:155:THR:HG21	6:A:645:HOH:O	1.75	0.86
1:D:39:ARG:HD2	6:D:521:HOH:O	1.74	0.86
1:D:218:VAL:HG13	1:D:286:TYR:HA	1.58	0.86
1:D:93:PRO:HD2	1:D:433:MSE:HE2	1.58	0.85
1:E:155:THR:HG21	6:E:637:HOH:O	1.75	0.85
1:E:39:ARG:HD2	6:E:521:HOH:O	1.77	0.85
1:E:251:ASN:HD22	1:E:253:SER:H	1.22	0.84
1:E:218:VAL:HG13	1:E:286:TYR:HA	1.59	0.84
1:D:63:ASN:OD1	1:D:65:ILE:HG22	1.78	0.83
1:E:261:THR:HG22	1:E:262:LYS:HG3	1.60	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:114:ARG:HH11	1:D:118:GLN:HE22	1.22	0.82
1:E:395:ASP:O	1:E:399:ILE:HG23	1.79	0.82
1:E:185:LYS:HG2	1:E:262:LYS:HZ2	1.44	0.82
1:B:39:ARG:HD2	6:B:523:HOH:O	1.81	0.81
1:D:47:TRP:O	1:D:118:GLN:HG2	1.81	0.80
1:B:218:VAL:HG13	1:B:286:TYR:HA	1.62	0.79
1:B:251:ASN:HD22	1:B:253:SER:H	1.33	0.77
1:A:218:VAL:HG13	1:A:286:TYR:HA	1.68	0.76
1:B:63:ASN:OD1	1:B:65:ILE:HG22	1.86	0.76
1:B:93:PRO:HD2	1:B:433:MSE:HE2	1.67	0.76
1:E:251:ASN:ND2	1:E:253:SER:H	1.83	0.76
1:A:3:LEU:HD22	6:A:565:HOH:O	1.86	0.74
1:A:47:TRP:O	1:A:118:GLN:HG2	1.87	0.74
1:A:39:ARG:HD2	6:A:545:HOH:O	1.86	0.74
1:A:142:GLU:HB3	1:A:298:SER:CB	2.18	0.74
1:B:114:ARG:HH11	1:B:118:GLN:NE2	1.82	0.74
1:B:114:ARG:NH1	1:B:118:GLN:HE22	1.82	0.74
1:B:155:THR:O	1:B:156:LYS:HB2	1.88	0.74
1:D:263:PHE:O	1:D:265:PRO:HD3	1.89	0.73
1:D:142:GLU:HB3	1:D:298:SER:CB	2.17	0.73
1:E:93:PRO:HD2	1:E:433:MSE:HE2	1.71	0.72
1:B:261:THR:HG22	1:B:262:LYS:HG3	1.71	0.71
1:A:106:PRO:HG2	1:B:106:PRO:HG2	1.71	0.71
1:E:185:LYS:HG2	1:E:262:LYS:NZ	2.04	0.71
1:D:3:LEU:HD13	1:D:146:GLY:O	1.91	0.71
1:A:28:GLU:OE1	1:A:360:ARG:HD3	1.91	0.70
1:B:251:ASN:ND2	1:B:253:SER:H	1.88	0.70
1:E:47:TRP:O	1:E:118:GLN:HG2	1.92	0.70
1:A:155:THR:O	1:A:156:LYS:CB	2.39	0.69
1:A:155:THR:O	1:A:156:LYS:HB2	1.91	0.69
1:D:261:THR:HG22	1:D:262:LYS:HG3	1.74	0.69
1:E:318:ASN:H	1:E:373:GLN:HE22	1.40	0.69
1:E:91:ASN:C	1:E:91:ASN:HD22	1.94	0.69
1:A:97:MSE:HE1	1:A:112:PRO:HD2	1.75	0.69
1:A:318:ASN:H	1:A:373:GLN:HE22	1.40	0.69
1:E:155:THR:O	1:E:156:LYS:HB2	1.91	0.69
1:E:114:ARG:HH11	1:E:118:GLN:NE2	1.89	0.68
1:D:155:THR:O	1:D:156:LYS:CB	2.41	0.68
1:D:155:THR:O	1:D:156:LYS:HB2	1.93	0.68
1:A:395:ASP:O	1:A:399:ILE:HG23	1.93	0.68
1:E:244:LEU:H	1:E:244:LEU:HD12	1.58	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:395:ASP:O	1:D:399:ILE:HG23	1.94	0.68
1:B:3:LEU:HD13	1:B:146:GLY:O	1.93	0.68
1:B:200:HIS:HD2	1:B:202:SER:OG	1.77	0.67
1:A:251:ASN:HD22	1:A:253:SER:H	1.43	0.67
1:A:98:GLY:HA2	1:A:343:PHE:HD2	1.60	0.67
1:A:232:THR:O	1:A:237:HIS:HE1	1.78	0.66
1:B:318:ASN:HA	1:B:373:GLN:HE22	1.60	0.66
1:D:251:ASN:O	1:D:255:GLN:NE2	2.27	0.66
1:A:261:THR:HG22	1:A:262:LYS:HG3	1.78	0.66
1:B:165:ILE:HD13	1:B:165:ILE:H	1.61	0.66
1:D:238:PRO:HB3	1:D:252:GLU:O	1.96	0.66
1:B:395:ASP:O	1:B:399:ILE:HG23	1.95	0.66
1:D:106:PRO:HG2	1:E:106:PRO:HG2	1.76	0.66
1:E:3:LEU:HD13	1:E:146:GLY:O	1.95	0.66
1:B:155:THR:O	1:B:156:LYS:CB	2.44	0.66
1:D:232:THR:O	1:D:237:HIS:HE1	1.80	0.65
1:B:241:GLN:HG2	1:B:243:LEU:HD22	1.77	0.65
1:E:155:THR:O	1:E:156:LYS:CB	2.45	0.64
1:B:106:PRO:O	1:B:107:GLN:HB2	1.96	0.64
1:D:241:GLN:HG2	1:D:243:LEU:HD22	1.79	0.63
1:B:232:THR:O	1:B:237:HIS:HE1	1.82	0.63
1:E:341:VAL:O	1:E:344:PRO:HD2	1.97	0.63
1:B:241:GLN:HG2	1:B:243:LEU:CD2	2.29	0.63
1:D:241:GLN:HG2	1:D:243:LEU:CD2	2.29	0.62
1:E:63:ASN:OD1	1:E:65:ILE:HG22	1.99	0.62
1:E:244:LEU:N	1:E:244:LEU:HD12	2.14	0.62
1:D:93:PRO:CD	1:D:433:MSE:HE2	2.29	0.61
1:A:3:LEU:HD13	1:A:146:GLY:O	1.99	0.61
1:D:244:LEU:HD12	1:D:244:LEU:H	1.64	0.61
1:E:165:ILE:H	1:E:165:ILE:HD13	1.64	0.61
1:D:185:LYS:HB3	1:D:262:LYS:HG2	1.82	0.61
1:D:318:ASN:H	1:D:373:GLN:HE22	1.47	0.61
1:B:343:PHE:HB2	1:B:344:PRO:HD3	1.82	0.60
1:B:142:GLU:HB3	1:B:298:SER:CB	2.31	0.60
1:E:142:GLU:HB3	1:E:298:SER:CB	2.30	0.60
1:D:97:MSE:HE1	1:D:112:PRO:HD2	1.83	0.60
1:E:106:PRO:O	1:E:107:GLN:HB2	2.02	0.60
1:A:392:TYR:CD1	1:A:393:PRO:HA	2.37	0.60
1:B:263:PHE:O	1:B:265:PRO:HD3	2.01	0.59
1:D:84:LEU:HD22	1:D:88:LEU:HD13	1.83	0.59
1:A:185:LYS:HG2	1:A:262:LYS:NZ	2.17	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:232:THR:O	1:E:237:HIS:HE1	1.85	0.59
1:A:337:ALA:HB1	1:A:340:VAL:HG11	1.85	0.59
1:D:53:LEU:HD11	1:E:76:ALA:HB2	1.84	0.59
1:D:257:VAL:HB	1:D:258:PRO:HD2	1.85	0.59
1:B:93:PRO:CD	1:B:433:MSE:HE2	2.31	0.59
1:A:244:LEU:HD12	1:A:244:LEU:H	1.67	0.59
1:A:185:LYS:HB3	1:A:262:LYS:HG2	1.85	0.59
1:A:93:PRO:HD2	1:A:433:MSE:HE2	1.83	0.59
1:B:19:LEU:HD13	1:B:125:ALA:HB2	1.85	0.58
1:D:343:PHE:HB2	1:D:344:PRO:HD3	1.85	0.58
1:B:392:TYR:CD1	1:B:393:PRO:HA	2.38	0.58
1:B:98:GLY:HA2	1:B:343:PHE:HD2	1.68	0.58
1:E:97:MSE:HE1	1:E:112:PRO:HD2	1.85	0.58
1:E:190:TYR:O	1:E:268:ARG:NH2	2.37	0.58
1:E:244:LEU:CD1	1:E:244:LEU:H	2.17	0.58
1:D:19:LEU:HD13	1:D:125:ALA:HB2	1.86	0.57
1:A:62:THR:O	1:A:62:THR:HG22	2.04	0.57
1:D:392:TYR:CD1	1:D:393:PRO:HA	2.39	0.57
1:A:343:PHE:HB2	1:A:344:PRO:HD3	1.85	0.57
1:A:251:ASN:ND2	1:A:253:SER:H	2.02	0.57
1:A:91:ASN:C	1:A:91:ASN:HD22	2.08	0.57
1:A:258:PRO:HG2	1:A:272:LEU:HB3	1.87	0.56
1:A:341:VAL:O	1:A:344:PRO:HD2	2.06	0.56
1:A:71:ILE:HD12	1:A:71:ILE:N	2.21	0.56
1:D:244:LEU:HD12	1:D:244:LEU:N	2.20	0.56
1:D:106:PRO:O	1:D:107:GLN:HB2	2.04	0.56
1:D:272:LEU:HD12	1:D:276:LYS:HG3	1.88	0.56
1:D:91:ASN:HD22	1:D:91:ASN:C	2.09	0.56
1:A:257:VAL:HB	1:A:258:PRO:HD2	1.87	0.56
1:D:28:GLU:OE1	1:D:360:ARG:HD3	2.05	0.56
1:E:98:GLY:HA2	1:E:343:PHE:HD2	1.70	0.56
1:E:318:ASN:N	1:E:373:GLN:HE22	2.04	0.56
1:B:47:TRP:O	1:B:118:GLN:HG2	2.05	0.56
1:A:165:ILE:H	1:A:165:ILE:HD13	1.70	0.55
1:A:263:PHE:O	1:A:265:PRO:HD3	2.07	0.55
1:A:96:LEU:HD23	1:A:433:MSE:CE	2.36	0.55
1:A:92:THR:O	1:A:97:MSE:HE2	2.05	0.55
1:A:244:LEU:N	1:A:244:LEU:HD12	2.20	0.55
1:D:251:ASN:HD22	1:D:253:SER:H	1.53	0.55
1:B:244:LEU:HD12	1:B:244:LEU:N	2.22	0.55
1:E:114:ARG:NH1	1:E:118:GLN:HE22	1.94	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:19:LEU:HD12	1:E:121:GLN:HE22	1.72	0.55
1:B:185:LYS:HB3	1:B:262:LYS:HG2	1.89	0.54
1:E:392:TYR:CD1	1:E:393:PRO:HA	2.41	0.54
1:B:78:PRO:HD2	1:B:155:THR:CG2	2.37	0.54
1:A:84:LEU:HD22	1:A:88:LEU:HD13	1.89	0.54
1:B:93:PRO:HB2	1:B:95:GLU:OE1	2.07	0.54
1:E:200:HIS:CD2	1:E:202:SER:H	2.25	0.54
1:A:190:TYR:O	1:A:268:ARG:NH2	2.40	0.53
1:B:97:MSE:HE1	1:B:112:PRO:HD2	1.89	0.53
1:D:62:THR:O	1:D:62:THR:HG22	2.08	0.53
1:B:258:PRO:HG2	1:B:272:LEU:HB3	1.90	0.53
1:A:226:ASP:OD1	1:A:229:ARG:NH2	2.41	0.53
1:E:371:LYS:NZ	1:E:371:LYS:HB3	2.24	0.53
1:D:58:PRO:HG3	1:D:66:LEU:CD2	2.39	0.52
1:E:301:LYS:O	1:E:303:LYS:HG3	2.09	0.52
1:A:318:ASN:N	1:A:373:GLN:HE22	2.06	0.52
1:B:318:ASN:H	1:B:373:GLN:HE22	1.55	0.52
1:E:88:LEU:C	1:E:88:LEU:HD23	2.30	0.52
1:E:226:ASP:OD1	1:E:229:ARG:NH2	2.42	0.52
1:D:343:PHE:N	1:D:343:PHE:CD1	2.78	0.52
1:A:142:GLU:HB3	1:A:298:SER:HB3	1.92	0.52
1:D:107:GLN:HB3	1:E:105:LYS:HD2	1.90	0.52
1:B:238:PRO:HB3	1:B:252:GLU:O	2.10	0.52
1:B:272:LEU:HD12	1:B:276:LYS:HG3	1.92	0.52
1:D:341:VAL:O	1:D:344:PRO:HD2	2.10	0.52
1:E:241:GLN:HG2	1:E:243:LEU:HD22	1.92	0.52
1:A:217:VAL:O	1:A:241:GLN:HA	2.09	0.51
1:D:244:LEU:H	1:D:244:LEU:CD1	2.23	0.51
1:B:306:GLU:OE1	1:B:306:GLU:N	2.33	0.51
1:E:19:LEU:HD13	1:E:125:ALA:HB2	1.91	0.51
1:E:62:THR:HG22	1:E:62:THR:O	2.09	0.51
1:B:19:LEU:HD12	1:B:121:GLN:HE22	1.75	0.51
1:A:244:LEU:H	1:A:244:LEU:CD1	2.23	0.51
1:D:78:PRO:HD2	1:D:155:THR:CG2	2.40	0.51
1:B:91:ASN:C	1:B:91:ASN:HD22	2.13	0.51
1:A:399:ILE:HD11	1:A:421:TYR:HA	1.93	0.51
1:D:200:HIS:HD2	1:D:202:SER:OG	1.94	0.51
1:E:91:ASN:C	1:E:91:ASN:ND2	2.64	0.51
1:A:238:PRO:HB3	1:A:252:GLU:O	2.11	0.50
1:E:318:ASN:HA	1:E:373:GLN:HE22	1.76	0.50
1:E:91:ASN:ND2	1:E:92:THR:HG23	2.25	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:78:PRO:HD2	1:E:155:THR:CG2	2.41	0.50
1:B:165:ILE:HG12	6:B:555:HOH:O	2.10	0.50
1:E:343:PHE:HB2	1:E:344:PRO:HD3	1.93	0.50
1:B:165:ILE:H	1:B:165:ILE:CD1	2.24	0.50
1:D:89:GLN:HG2	1:D:113:HIS:HA	1.94	0.50
1:A:106:PRO:O	1:A:107:GLN:HB2	2.11	0.50
1:A:376:LEU:O	1:A:380:LEU:HG	2.12	0.50
1:D:342:PRO:HG2	3:D:500:FAD:N1	2.27	0.50
1:A:90:THR:HA	3:A:500:FAD:O4	2.11	0.50
1:D:78:PRO:HG2	1:D:155:THR:HG23	1.94	0.50
1:D:399:ILE:HD12	1:D:399:ILE:C	2.32	0.50
1:E:441:PHE:O	1:E:443:ILE:HG23	2.12	0.50
1:E:39:ARG:HD3	1:E:80:TYR:CE1	2.47	0.50
1:A:53:LEU:HD11	1:B:76:ALA:HB2	1.93	0.50
1:B:301:LYS:O	1:B:303:LYS:HG3	2.12	0.50
1:B:432:ASN:O	1:B:436:ILE:HG13	2.12	0.50
1:D:165:ILE:H	1:D:165:ILE:HD13	1.77	0.49
1:A:200:HIS:CD2	1:A:202:SER:H	2.31	0.49
1:E:11:ILE:HD11	1:E:25:LEU:HD12	1.94	0.49
1:A:111:PHE:CE2	1:A:437:ARG:HA	2.48	0.49
1:B:340:VAL:O	1:B:342:PRO:HD3	2.12	0.49
1:B:62:THR:HG22	1:B:62:THR:O	2.10	0.49
1:D:142:GLU:HB3	1:D:298:SER:HB3	1.94	0.49
1:E:93:PRO:HB2	1:E:95:GLU:OE1	2.13	0.49
1:B:200:HIS:CD2	1:B:202:SER:H	2.30	0.49
1:A:241:GLN:HG2	1:A:243:LEU:HD22	1.95	0.49
1:A:239:ILE:O	1:A:254:LEU:HD12	2.12	0.49
1:B:318:ASN:CA	1:B:373:GLN:HE22	2.24	0.49
1:D:257:VAL:HB	1:D:272:LEU:HD13	1.94	0.49
1:A:11:ILE:HD11	1:A:25:LEU:HD12	1.95	0.49
1:B:257:VAL:HB	1:B:258:PRO:HD2	1.95	0.49
1:B:190:TYR:O	1:B:268:ARG:NH2	2.45	0.49
1:D:226:ASP:OD1	1:D:229:ARG:NH2	2.46	0.49
1:A:53:LEU:HD21	1:A:205:ARG:HG3	1.95	0.48
1:B:318:ASN:N	1:B:373:GLN:HE22	2.11	0.48
1:B:343:PHE:N	1:B:343:PHE:CD1	2.82	0.48
1:D:165:ILE:HD13	6:D:637:HOH:O	2.12	0.48
1:B:244:LEU:HD12	1:B:244:LEU:H	1.76	0.48
1:E:93:PRO:CD	1:E:433:MSE:HE2	2.41	0.48
1:D:39:ARG:HB2	1:D:80:TYR:CE2	2.48	0.48
1:E:6:ILE:HG23	1:E:167:ASP:HB2	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:11:ILE:HD11	1:D:25:LEU:HD12	1.95	0.48
1:E:165:ILE:CD1	1:E:165:ILE:H	2.27	0.48
1:E:306:GLU:OE1	1:E:306:GLU:N	2.36	0.48
1:B:258:PRO:HG3	1:B:273:LYS:O	2.14	0.48
1:D:249:ILE:HG21	1:D:254:LEU:HD23	1.96	0.48
1:A:185:LYS:HG2	1:A:262:LYS:HZ2	1.78	0.48
1:B:83:PRO:HG2	3:B:500:FAD:HM82	1.95	0.48
1:D:251:ASN:ND2	1:D:253:SER:H	2.12	0.47
1:E:343:PHE:CD1	1:E:343:PHE:N	2.82	0.47
1:A:371:LYS:NZ	1:A:371:LYS:HB3	2.29	0.47
1:B:185:LYS:HG2	1:B:262:LYS:NZ	2.29	0.47
1:D:83:PRO:HG2	3:D:500:FAD:HM82	1.96	0.47
1:B:290:TYR:CD1	1:B:290:TYR:N	2.82	0.47
1:D:361:LEU:HD11	1:D:406:CYS:HA	1.96	0.47
1:B:19:LEU:CD1	1:B:125:ALA:HB2	2.44	0.47
1:B:258:PRO:O	1:B:272:LEU:HD22	2.14	0.47
1:D:88:LEU:C	1:D:88:LEU:HD23	2.34	0.47
1:B:390:LEU:O	1:B:395:ASP:HB3	2.14	0.47
1:E:58:PRO:HG3	1:E:66:LEU:CD2	2.44	0.47
1:A:257:VAL:HB	1:A:272:LEU:HD13	1.96	0.47
1:D:343:PHE:N	1:D:343:PHE:HD1	2.12	0.47
1:A:399:ILE:C	1:A:399:ILE:HD12	2.34	0.47
1:D:39:ARG:HD3	1:D:80:TYR:CE1	2.50	0.47
1:A:63:ASN:OD1	1:A:65:ILE:HG22	2.15	0.46
1:B:217:VAL:O	1:B:241:GLN:HA	2.15	0.46
1:A:39:ARG:HB2	1:A:80:TYR:CE2	2.50	0.46
1:B:11:ILE:HD11	1:B:25:LEU:HD12	1.97	0.46
1:B:355:ARG:HG3	1:B:355:ARG:HH11	1.80	0.46
1:B:380:LEU:HD11	1:B:387:TYR:HA	1.96	0.46
1:B:371:LYS:HB3	1:B:371:LYS:NZ	2.30	0.46
1:A:258:PRO:HG3	1:A:273:LYS:O	2.15	0.46
1:D:211:VAL:O	1:D:211:VAL:HG23	2.15	0.46
1:A:114:ARG:HB2	1:A:118:GLN:HE21	1.81	0.46
1:D:19:LEU:CD1	1:D:125:ALA:HB2	2.45	0.46
1:A:144:LYS:O	1:A:145:ASP:HB2	2.15	0.46
1:E:78:PRO:HG2	1:E:155:THR:HG23	1.97	0.46
1:E:263:PHE:O	1:E:265:PRO:HD3	2.15	0.46
1:A:318:ASN:HA	1:A:373:GLN:HE22	1.81	0.46
1:B:178:VAL:O	1:B:290:TYR:HB3	2.17	0.45
1:B:89:GLN:HG2	1:B:113:HIS:HA	1.98	0.45
1:B:244:LEU:CD1	1:B:244:LEU:H	2.29	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:200:HIS:HD2	1:A:202:SER:OG	2.00	0.45
1:A:88:LEU:HD11	3:A:500:FAD:H6	1.99	0.45
1:D:214:SER:HA	6:D:545:HOH:O	2.15	0.45
1:E:90:THR:HA	3:E:500:FAD:O4	2.16	0.45
1:A:301:LYS:O	1:A:303:LYS:HG3	2.17	0.45
1:A:343:PHE:N	1:A:343:PHE:CD1	2.85	0.45
1:E:6:ILE:HD13	1:E:168:ALA:HB2	1.98	0.45
1:E:83:PRO:HG2	3:E:500:FAD:HM82	1.98	0.45
1:A:279:SER:O	1:A:280:ASN:HB2	2.16	0.45
1:B:92:THR:O	1:B:97:MSE:HE2	2.17	0.45
1:E:28:GLU:OE1	1:E:360:ARG:HD3	2.17	0.45
1:E:78:PRO:HD2	1:E:155:THR:HG22	1.99	0.45
1:A:272:LEU:HD12	1:A:276:LYS:HG3	1.98	0.44
1:D:217:VAL:O	1:D:241:GLN:HA	2.17	0.44
1:B:88:LEU:HD23	1:B:88:LEU:C	2.38	0.44
1:D:315:HIS:HB2	1:D:388:HIS:CD2	2.52	0.44
1:D:90:THR:HA	3:D:500:FAD:O4	2.17	0.44
1:A:326:ILE:HB	1:A:327:PRO:HD3	2.00	0.44
1:D:53:LEU:HD21	1:D:205:ARG:HG3	1.99	0.44
1:E:425:LYS:HB2	1:E:425:LYS:HE3	1.79	0.44
1:A:226:ASP:OD1	1:A:437:ARG:NH2	2.51	0.44
1:D:98:GLY:HA2	1:D:343:PHE:HD2	1.81	0.44
1:E:399:ILE:HG13	1:E:400:ASN:N	2.32	0.44
1:D:237:HIS:HD2	1:D:252:GLU:OE2	2.01	0.44
1:E:217:VAL:O	1:E:241:GLN:HA	2.17	0.44
1:A:89:GLN:HG2	1:A:113:HIS:HA	2.00	0.44
1:D:237:HIS:CD2	1:D:252:GLU:OE2	2.71	0.44
1:E:161:ILE:N	1:E:161:ILE:HD12	2.32	0.43
1:E:39:ARG:HD3	1:E:80:TYR:CD1	2.52	0.43
1:D:318:ASN:N	1:D:373:GLN:HE22	2.15	0.43
1:E:318:ASN:H	1:E:373:GLN:NE2	2.13	0.43
1:A:352:PHE:O	1:A:356:VAL:HG23	2.18	0.43
1:A:71:ILE:N	1:A:71:ILE:CD1	2.81	0.43
1:B:257:VAL:HB	1:B:272:LEU:HD13	1.99	0.43
1:B:28:GLU:OE1	1:B:360:ARG:HD3	2.18	0.43
1:A:78:PRO:HG2	1:A:155:THR:HG23	1.99	0.43
1:A:90:THR:HG23	1:A:112:PRO:O	2.18	0.43
1:E:268:ARG:NH1	6:E:537:HOH:O	2.52	0.43
1:A:103:SER:HB2	6:A:559:HOH:O	2.19	0.43
1:D:96:LEU:HD23	1:D:433:MSE:CE	2.49	0.43
1:B:58:PRO:HG3	1:B:66:LEU:CD2	2.49	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:244:LEU:CD1	1:E:244:LEU:N	2.80	0.43
1:D:200:HIS:CD2	1:D:202:SER:H	2.37	0.42
1:D:71:ILE:N	1:D:71:ILE:HD12	2.34	0.42
1:B:129:LEU:N	1:B:130:PRO:HD2	2.34	0.42
1:B:185:LYS:HG2	1:B:262:LYS:HZ2	1.84	0.42
1:D:403:HIS:O	1:D:407:LYS:HG2	2.20	0.42
1:D:113:HIS:CE1	1:D:114:ARG:HG2	2.54	0.42
1:E:318:ASN:CA	1:E:373:GLN:HE22	2.31	0.42
1:A:248:ASP:C	1:A:250:GLN:HE21	2.22	0.42
1:A:58:PRO:HG3	1:A:66:LEU:CD2	2.50	0.42
1:B:98:GLY:HA2	1:B:343:PHE:CD2	2.53	0.42
1:E:200:HIS:HD2	1:E:202:SER:H	1.65	0.42
1:D:161:ILE:N	1:D:161:ILE:HD12	2.34	0.42
1:D:264:ASP:O	1:D:268:ARG:N	2.51	0.42
1:A:70:PRO:HB3	1:A:80:TYR:CE1	2.54	0.42
1:A:353:LEU:HD11	1:A:357:TRP:CE2	2.55	0.42
1:E:258:PRO:HG2	1:E:272:LEU:HB3	2.01	0.42
1:A:19:LEU:HD13	1:A:125:ALA:HB2	2.02	0.42
1:A:83:PRO:HG2	3:A:500:FAD:HM82	2.01	0.42
1:D:12:ILE:HD12	1:D:138:VAL:HG21	2.01	0.42
1:B:343:PHE:HD1	1:B:343:PHE:N	2.18	0.41
1:D:371:LYS:HB3	1:D:371:LYS:NZ	2.35	0.41
1:D:392:TYR:HA	1:D:395:ASP:OD1	2.20	0.41
1:D:380:LEU:HD11	1:D:387:TYR:HA	2.01	0.41
1:E:53:LEU:HD21	1:E:205:ARG:HG3	2.02	0.41
1:A:425:LYS:HE3	1:A:425:LYS:HB2	1.67	0.41
1:D:114:ARG:HG3	1:D:118:GLN:NE2	2.35	0.41
1:D:58:PRO:HG3	1:D:66:LEU:HD21	2.01	0.41
1:A:96:LEU:HD23	1:A:433:MSE:HE3	2.02	0.41
1:A:129:LEU:N	1:A:130:PRO:HD2	2.35	0.41
1:A:218:VAL:HG22	1:A:218:VAL:O	2.19	0.41
1:E:114:ARG:O	1:E:118:GLN:HG3	2.19	0.41
1:E:257:VAL:HB	1:E:272:LEU:HD13	2.02	0.41
1:A:178:VAL:HA	1:A:179:PRO:HD3	1.95	0.41
1:B:62:THR:CG2	1:B:62:THR:O	2.68	0.41
1:D:257:VAL:CG2	1:D:272:LEU:HD13	2.50	0.41
1:E:258:PRO:HG3	1:E:273:LYS:O	2.20	0.41
1:E:345:THR:O	1:E:349:GLN:HG3	2.21	0.41
1:D:353:LEU:HD11	1:D:357:TRP:CE2	2.55	0.41
1:A:161:ILE:HD12	1:A:161:ILE:N	2.36	0.41
1:B:90:THR:HA	3:B:500:FAD:O4	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:129:LEU:N	1:D:130:PRO:HD2	2.36	0.41
1:E:399:ILE:HD11	1:E:421:TYR:HA	2.02	0.41
1:A:438:ALA:HA	1:A:443:ILE:HG12	2.02	0.41
1:B:232:THR:HA	1:B:239:ILE:HD11	2.02	0.41
1:D:227:LEU:HD21	1:D:285:ILE:HG21	2.02	0.41
1:E:129:LEU:N	1:E:130:PRO:HD2	2.36	0.40
1:A:211:VAL:O	1:A:211:VAL:HG23	2.20	0.40
1:A:62:THR:CG2	1:A:62:THR:O	2.68	0.40
1:D:70:PRO:HB3	1:D:80:TYR:CE1	2.56	0.40
1:D:211:VAL:HA	1:D:234:VAL:O	2.22	0.40
1:E:200:HIS:HD2	1:E:202:SER:OG	2.03	0.40
1:D:277:VAL:HG13	1:D:277:VAL:O	2.22	0.40
1:D:301:LYS:O	1:D:303:LYS:HG3	2.21	0.40
1:B:251:ASN:O	1:B:255:GLN:NE2	2.43	0.40
1:D:78:PRO:CG	1:D:155:THR:HG23	2.51	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	440/447 (98%)	417 (95%)	22 (5%)	1 (0%)	51	58
1	B	440/447 (98%)	419 (95%)	18 (4%)	3 (1%)	25	24
1	D	440/447 (98%)	419 (95%)	19 (4%)	2 (0%)	32	34
1	E	440/447 (98%)	421 (96%)	15 (3%)	4 (1%)	20	17
All	All	1760/1788 (98%)	1676 (95%)	74 (4%)	10 (1%)	28	28

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	156	LYS
1	B	156	LYS
1	D	156	LYS
1	E	156	LYS
1	E	195	PRO
1	D	342	PRO
1	E	342	PRO
1	B	195	PRO
1	B	297	PRO
1	E	297	PRO

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	384/385 (100%)	372 (97%)	12 (3%)	45	56
1	B	384/385 (100%)	371 (97%)	13 (3%)	42	52
1	D	384/385 (100%)	372 (97%)	12 (3%)	45	56
1	E	384/385 (100%)	373 (97%)	11 (3%)	48	59
All	All	1536/1540 (100%)	1488 (97%)	48 (3%)	45	56

All (48) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	91	ASN
1	A	96	LEU
1	A	143	LYS
1	A	150	VAL
1	A	155	THR
1	A	165	ILE
1	A	195	PRO
1	A	218	VAL
1	A	237	HIS
1	A	238	PRO
1	A	250	GLN
1	A	399	ILE

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Mol	Chain	Res	Type
1	B	91	ASN
1	B	96	LEU
1	B	143	LYS
1	B	150	VAL
1	B	155	THR
1	B	165	ILE
1	B	195	PRO
1	B	218	VAL
1	B	237	HIS
1	B	268	ARG
1	B	306	GLU
1	B	311	ASP
1	B	399	ILE
1	D	91	ASN
1	D	96	LEU
1	D	143	LYS
1	D	150	VAL
1	D	155	THR
1	D	165	ILE
1	D	195	PRO
1	D	218	VAL
1	D	237	HIS
1	D	250	GLN
1	D	311	ASP
1	D	399	ILE
1	E	91	ASN
1	E	143	LYS
1	E	150	VAL
1	E	155	THR
1	E	165	ILE
1	E	195	PRO
1	E	218	VAL
1	E	237	HIS
1	E	250	GLN
1	E	311	ASP
1	E	399	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (36) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	48	ASN
1	A	91	ASN

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Mol	Chain	Res	Type
1	A	118	GLN
1	A	121	GLN
1	A	200	HIS
1	A	237	HIS
1	A	250	GLN
1	A	251	ASN
1	A	373	GLN
1	B	48	ASN
1	B	91	ASN
1	B	118	GLN
1	B	121	GLN
1	B	200	HIS
1	B	237	HIS
1	B	250	GLN
1	B	251	ASN
1	B	373	GLN
1	D	48	ASN
1	D	91	ASN
1	D	118	GLN
1	D	121	GLN
1	D	200	HIS
1	D	237	HIS
1	D	250	GLN
1	D	251	ASN
1	D	373	GLN
1	E	48	ASN
1	E	91	ASN
1	E	118	GLN
1	E	121	GLN
1	E	200	HIS
1	E	237	HIS
1	E	250	GLN
1	E	251	ASN
1	E	373	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

16 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$
3	FAD	A	500	-	51,58,58	2.73	14 (27%)	54,89,89	2.36	8 (14%)
4	MMZ	A	501	-	5,7,7	3.27	3 (60%)	6,9,9	4.31	5 (83%)
5	GOL	A	502	-	5,5,5	0.21	0	5,5,5	0.57	0
2	PEO	A	503	-	1,1,1	0.82	0	0,0,0	0.00	-
3	FAD	B	500	-	51,58,58	2.79	14 (27%)	54,89,89	2.34	10 (18%)
4	MMZ	B	501	-	5,7,7	3.63	3 (60%)	6,9,9	3.54	5 (83%)
5	GOL	B	502	-	5,5,5	0.32	0	5,5,5	0.66	0
2	PEO	B	503	-	1,1,1	0.62	0	0,0,0	0.00	-
3	FAD	D	500	-	51,58,58	2.78	15 (29%)	54,89,89	2.36	9 (16%)
4	MMZ	D	501	-	5,7,7	3.68	3 (60%)	6,9,9	4.46	5 (83%)
5	GOL	D	502	-	5,5,5	0.28	0	5,5,5	0.61	0
2	PEO	D	503	-	1,1,1	0.57	0	0,0,0	0.00	-
3	FAD	E	500	-	51,58,58	2.66	15 (29%)	54,89,89	2.37	10 (18%)
4	MMZ	E	501	-	5,7,7	3.19	3 (60%)	6,9,9	3.78	5 (83%)
5	GOL	E	502	-	5,5,5	0.15	0	5,5,5	0.59	0
2	PEO	E	503	-	1,1,1	0.76	0	0,0,0	0.00	-

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	FAD	A	500	-	-	0/28/50/50	0/6/6/6
4	MMZ	A	501	-	-	0/0/0/0	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GOL	A	502	-	-	0/4/4/4	0/0/0/0
2	PEO	A	503	-	-	0/0/0/0	0/0/0/0
3	FAD	B	500	-	-	0/28/50/50	0/6/6/6
4	MMZ	B	501	-	-	0/0/0/0	0/1/1/1
5	GOL	B	502	-	-	0/4/4/4	0/0/0/0
2	PEO	B	503	-	-	0/0/0/0	0/0/0/0
3	FAD	D	500	-	-	0/28/50/50	0/6/6/6
4	MMZ	D	501	-	-	0/0/0/0	0/1/1/1
5	GOL	D	502	-	-	0/4/4/4	0/0/0/0
2	PEO	D	503	-	-	0/0/0/0	0/0/0/0
3	FAD	E	500	-	-	0/28/50/50	0/6/6/6
4	MMZ	E	501	-	-	0/0/0/0	0/1/1/1
5	GOL	E	502	-	-	0/4/4/4	0/0/0/0
2	PEO	E	503	-	-	0/0/0/0	0/0/0/0

All (70) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	501	MMZ	C3A-C1A	-6.88	1.40	1.52
4	D	501	MMZ	C3A-C1A	-6.85	1.40	1.52
4	E	501	MMZ	C3A-C1A	-6.37	1.41	1.52
4	A	501	MMZ	C3A-C1A	-6.15	1.41	1.52
3	A	500	FAD	C1'-N10	-4.96	1.43	1.48
3	B	500	FAD	C1'-N10	-4.81	1.43	1.48
3	D	500	FAD	C1'-N10	-4.44	1.43	1.48
3	E	500	FAD	C1'-N10	-4.28	1.44	1.48
3	B	500	FAD	C5A-C4A	-3.91	1.31	1.40
3	A	500	FAD	C5A-C4A	-3.88	1.31	1.40
3	E	500	FAD	C5A-C4A	-3.74	1.32	1.40
3	D	500	FAD	C5A-C4A	-3.58	1.32	1.40
3	A	500	FAD	C5'-C4'	-3.27	1.46	1.51
4	A	501	MMZ	C1A-N1	-3.11	1.39	1.46
3	B	500	FAD	C5'-C4'	-3.00	1.47	1.51
3	D	500	FAD	C5'-C4'	-2.97	1.47	1.51
3	A	500	FAD	C2B-C3B	-2.67	1.46	1.53
3	B	500	FAD	C2B-C3B	-2.66	1.46	1.53
3	E	500	FAD	C2B-C3B	-2.58	1.46	1.53
3	D	500	FAD	C2B-C3B	-2.39	1.47	1.53
4	D	501	MMZ	C1A-N1	-2.37	1.41	1.46
3	E	500	FAD	C5'-C4'	-2.35	1.48	1.51
4	E	501	MMZ	C1A-N1	-2.26	1.41	1.46
3	A	500	FAD	C8A-N7A	-2.09	1.30	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	500	FAD	C8A-N7A	-2.07	1.30	1.34
4	B	501	MMZ	C1A-N1	-2.05	1.41	1.46
3	D	500	FAD	C8A-N7A	-2.03	1.30	1.34
3	B	500	FAD	C2'-C3'	-2.03	1.49	1.53
3	D	500	FAD	C6-C7	2.04	1.43	1.37
3	E	500	FAD	C6-C7	2.07	1.43	1.37
4	E	501	MMZ	C2-S2	2.18	1.71	1.67
4	A	501	MMZ	C2-S2	2.21	1.71	1.67
3	A	500	FAD	C9A-C5X	2.66	1.48	1.42
3	B	500	FAD	C9A-C5X	2.71	1.48	1.42
3	E	500	FAD	C9A-C5X	2.85	1.48	1.42
3	D	500	FAD	C9A-C5X	2.97	1.48	1.42
3	A	500	FAD	C10-N1	3.39	1.38	1.33
3	E	500	FAD	C10-N1	3.47	1.38	1.33
3	B	500	FAD	C10-N1	3.65	1.38	1.33
4	B	501	MMZ	C2-S2	3.78	1.74	1.67
4	D	501	MMZ	C2-S2	3.79	1.74	1.67
3	D	500	FAD	C10-N1	3.93	1.38	1.33
3	E	500	FAD	C5X-N5	4.49	1.42	1.35
3	B	500	FAD	C5X-N5	4.56	1.42	1.35
3	D	500	FAD	C5X-N5	4.77	1.42	1.35
3	A	500	FAD	C5X-N5	4.82	1.42	1.35
3	E	500	FAD	C4-N3	4.83	1.41	1.33
3	B	500	FAD	P-O5'	4.88	1.80	1.59
3	E	500	FAD	P-O5'	4.91	1.80	1.59
3	A	500	FAD	P-O5'	4.96	1.80	1.59
3	B	500	FAD	C4-N3	5.05	1.42	1.33
3	D	500	FAD	P-O5'	5.25	1.81	1.59
3	A	500	FAD	C4-N3	5.26	1.42	1.33
3	D	500	FAD	C4-N3	5.34	1.42	1.33
3	A	500	FAD	C2A-N3A	5.50	1.41	1.32
3	E	500	FAD	C2A-N3A	5.51	1.41	1.32
3	D	500	FAD	C2A-N3A	5.72	1.41	1.32
3	E	500	FAD	C4A-N3A	5.80	1.44	1.35
3	B	500	FAD	C2A-N3A	5.84	1.41	1.32
3	A	500	FAD	C4A-N3A	6.10	1.44	1.35
3	B	500	FAD	C4A-N3A	6.43	1.45	1.35
3	D	500	FAD	C4A-N3A	6.49	1.45	1.35
3	E	500	FAD	C4X-N5	7.23	1.43	1.33
3	B	500	FAD	C4X-N5	7.42	1.44	1.33
3	A	500	FAD	C4X-N5	7.47	1.44	1.33
3	D	500	FAD	C4X-N5	7.59	1.44	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	500	FAD	C9A-N10	7.86	1.49	1.38
3	D	500	FAD	C9A-N10	8.46	1.49	1.38
3	E	500	FAD	C9A-N10	8.50	1.49	1.38
3	B	500	FAD	C9A-N10	8.90	1.50	1.38

All (57) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	500	FAD	C4X-C4-N3	-6.41	114.36	123.48
3	D	500	FAD	C4X-C4-N3	-6.24	114.60	123.48
3	E	500	FAD	C4X-C4-N3	-6.18	114.68	123.48
3	B	500	FAD	C4X-C4-N3	-5.95	115.01	123.48
3	B	500	FAD	N3A-C2A-N1A	-4.97	124.53	128.86
3	D	500	FAD	N3A-C2A-N1A	-4.77	124.70	128.86
3	A	500	FAD	N3A-C2A-N1A	-4.75	124.72	128.86
3	B	500	FAD	C5X-C9A-N10	-4.53	114.29	117.66
3	E	500	FAD	N3A-C2A-N1A	-4.48	124.95	128.86
3	E	500	FAD	C5X-C9A-N10	-4.24	114.51	117.66
3	A	500	FAD	C5X-C9A-N10	-4.20	114.54	117.66
3	D	500	FAD	C5X-C9A-N10	-4.02	114.67	117.66
4	A	501	MMZ	C3A-N3-C2	-4.00	108.35	111.14
4	D	501	MMZ	C1A-N1-C2	-3.64	108.27	113.17
4	E	501	MMZ	C1A-N1-C2	-3.63	108.28	113.17
4	E	501	MMZ	C3A-N3-C2	-3.55	108.67	111.14
4	D	501	MMZ	C3A-N3-C2	-3.54	108.68	111.14
4	A	501	MMZ	C1A-N1-C2	-3.53	108.41	113.17
4	B	501	MMZ	C1A-N1-C2	-3.12	108.97	113.17
3	D	500	FAD	O3'-C3'-C4'	-3.02	101.34	108.82
3	E	500	FAD	O3'-C3'-C4'	-2.89	101.65	108.82
3	A	500	FAD	O3'-C3'-C4'	-2.88	101.68	108.82
3	B	500	FAD	O3'-C3'-C4'	-2.88	101.68	108.82
4	B	501	MMZ	C3A-N3-C2	-2.76	109.22	111.14
3	E	500	FAD	O2'-C2'-C1'	-2.73	103.48	109.79
3	D	500	FAD	O2'-C2'-C1'	-2.70	103.54	109.79
3	B	500	FAD	O2'-C2'-C1'	-2.57	103.84	109.79
3	A	500	FAD	O2'-C2'-C1'	-2.57	103.84	109.79
3	E	500	FAD	C10-C4X-N5	2.04	122.94	120.59
3	B	500	FAD	C10-C4X-N5	2.10	123.00	120.59
3	D	500	FAD	C4'-C3'-C2'	2.17	118.08	113.41
4	B	501	MMZ	C1A-C3A-N3	2.18	104.70	103.02
3	E	500	FAD	C4'-C3'-C2'	2.37	118.51	113.41
3	D	500	FAD	O2B-C2B-C3B	2.38	119.46	111.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	500	FAD	C4'-C3'-C2'	2.42	118.62	113.41
4	D	501	MMZ	C1A-C3A-N3	2.54	104.99	103.02
4	E	501	MMZ	C1A-C3A-N3	2.57	105.00	103.02
3	A	500	FAD	O2B-C2B-C3B	2.58	120.08	111.83
3	E	500	FAD	O2B-C2B-C3B	2.73	120.58	111.83
4	A	501	MMZ	C1A-C3A-N3	2.77	105.16	103.02
3	D	500	FAD	O5'-P-O1P	2.86	120.79	109.25
3	B	500	FAD	O2B-C2B-C3B	2.88	121.06	111.83
3	B	500	FAD	O5'-P-O1P	2.90	120.95	109.25
3	A	500	FAD	O5'-P-O1P	2.91	120.98	109.25
3	E	500	FAD	O5'-P-O1P	2.96	121.19	109.25
4	E	501	MMZ	C3A-C1A-N1	4.56	107.95	102.61
4	A	501	MMZ	C3A-C1A-N1	4.81	108.24	102.61
4	B	501	MMZ	C3A-C1A-N1	4.86	108.31	102.61
4	D	501	MMZ	C3A-C1A-N1	5.13	108.62	102.61
4	B	501	MMZ	C4-N3-C2	5.43	131.08	126.51
4	E	501	MMZ	C4-N3-C2	5.70	131.31	126.51
4	A	501	MMZ	C4-N3-C2	7.20	132.57	126.51
4	D	501	MMZ	C4-N3-C2	7.76	133.04	126.51
3	B	500	FAD	C4-N3-C2	11.74	125.43	115.16
3	A	500	FAD	C4-N3-C2	12.01	125.66	115.16
3	D	500	FAD	C4-N3-C2	12.06	125.71	115.16
3	E	500	FAD	C4-N3-C2	12.21	125.84	115.16

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	500	FAD	3	0
3	B	500	FAD	2	0
3	D	500	FAD	3	0
3	E	500	FAD	2	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	438/447 (97%)	0.05	11 (2%) 58 55	9, 26, 41, 50	0
1	B	438/447 (97%)	0.02	14 (3%) 48 46	11, 27, 41, 50	0
1	D	438/447 (97%)	-0.04	8 (1%) 69 66	11, 26, 40, 50	0
1	E	438/447 (97%)	-0.06	7 (1%) 72 70	10, 26, 40, 50	0
All	All	1752/1788 (97%)	-0.01	40 (2%) 61 58	9, 26, 41, 50	0

All (40) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	3	LEU	6.4
1	B	3	LEU	6.3
1	D	3	LEU	5.8
1	E	3	LEU	5.5
1	D	244	LEU	4.5
1	D	4	PRO	4.4
1	A	4	PRO	4.0
1	B	4	PRO	4.0
1	E	4	PRO	3.8
1	B	244	LEU	3.7
1	D	262	LYS	3.3
1	D	271	TYR	3.3
1	A	275	GLY	3.2
1	E	444	GLU	3.1
1	E	157	ALA	3.1
1	B	158	GLY	3.0
1	B	367	GLU	2.9
1	A	270	ILE	2.8
1	B	443	ILE	2.8
1	B	444	GLU	2.8
1	A	244	LEU	2.8

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Mol	Chain	Res	Type	RSRZ
1	D	444	GLU	2.7
1	B	262	LYS	2.6
1	A	279	SER	2.5
1	D	266	THR	2.5
1	A	240	TYR	2.5
1	B	248	ASP	2.4
1	B	157	ALA	2.4
1	B	405	TRP	2.4
1	E	367	GLU	2.4
1	B	266	THR	2.3
1	E	158	GLY	2.3
1	A	280	ASN	2.3
1	E	248	ASP	2.3
1	D	145	ASP	2.2
1	B	439	LYS	2.2
1	B	195	PRO	2.2
1	A	158	GLY	2.2
1	A	272	LEU	2.0
1	A	157	ALA	2.0

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
4	MMZ	E	501	7/7	0.79	0.23	3.55	48,50,51,52	0
4	MMZ	A	501	7/7	0.79	0.26	2.32	48,50,51,52	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
4	MMZ	D	501	7/7	0.86	0.23	2.32	48,50,52,52	0
5	GOL	E	502	6/6	0.96	0.18	1.85	15,16,17,20	0
3	FAD	B	500	53/53	0.97	0.18	1.16	11,19,23,24	0
4	MMZ	B	501	7/7	0.88	0.18	1.13	49,50,52,53	0
5	GOL	A	502	6/6	0.97	0.17	1.07	18,18,19,20	0
3	FAD	D	500	53/53	0.97	0.17	0.96	11,18,22,22	0
5	GOL	B	502	6/6	0.92	0.17	0.83	15,16,17,18	0
3	FAD	A	500	53/53	0.96	0.18	0.68	12,19,21,22	0
3	FAD	E	500	53/53	0.96	0.18	0.59	10,18,22,23	0
5	GOL	D	502	6/6	0.97	0.16	0.47	15,15,17,18	0
2	PEO	B	503	2/2	0.84	0.33	-	41,41,41,43	0
2	PEO	A	503	2/2	0.89	0.34	-	45,45,45,46	0
2	PEO	E	503	2/2	0.85	0.39	-	43,43,43,43	0
2	PEO	D	503	2/2	0.85	0.32	-	43,43,43,44	0

6.5 Other polymers [i](#)

There are no such residues in this entry.