WORLDWIDE PDB

PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Dec 4, 2023 – 10:14 pm GMT

PDB ID	:	2W3R
Title	:	Crystal Structure of Xanthine Dehydrogenase (desulfo form) from Rhodobacter capsulatus in complex with hypoxanthine
Authors	:	Dietzel, U.; Kuper, J.; Leimkuhler, S.; Kisker, C.
Deposited on	:	2008-11-14
Resolution	:	2.90 Å(reported)

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
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)	:	2.36

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 2.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
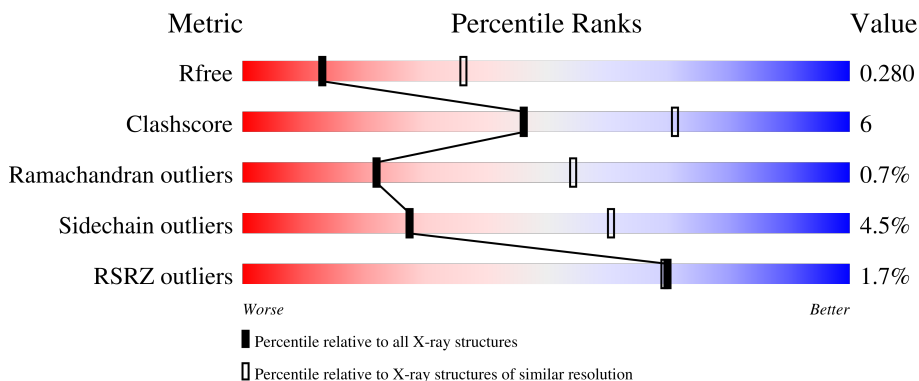
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

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

Mol	Chain	Length	Quality of chain
1	A	462	5% / 80% / 17% / •
1	C	462	85% / 12% / • •
1	E	462	3% / 79% / 17% / • •
1	G	462	7% / 76% / 20% / • •
2	B	777	83% / 13% / • •

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Mol	Chain	Length	Quality of chain
2	D	777	79% 18% ••
2	F	777	82% 15% ••
2	H	777	80% 17% ••

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
5	MTE	B	1778	X	-	-	-
5	MTE	D	1778	X	-	-	-
5	MTE	F	1778	X	-	-	-
5	MTE	H	1778	X	-	-	-
8	MOM	B	1781	-	-	X	-
8	MOM	D	1781	-	-	X	-
8	MOM	F	1781	-	-	X	-
8	MOM	H	1781	-	-	X	-

2 Entry composition ⓘ

There are 9 unique types of molecules in this entry. The entry contains 36853 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called XANTHINE DEHYDROGENASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	450	Total	C	N	O	S	0	0	0
			3376	2115	608	628	25			
1	C	450	Total	C	N	O	S	0	0	0
			3376	2115	608	628	25			
1	E	450	Total	C	N	O	S	0	0	0
			3376	2115	608	628	25			
1	G	450	Total	C	N	O	S	0	0	0
			3376	2115	608	628	25			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	26	TRP	LEU	conflict	UNP O54050
C	26	TRP	LEU	conflict	UNP O54050
E	26	TRP	LEU	conflict	UNP O54050
G	26	TRP	LEU	conflict	UNP O54050

- Molecule 2 is a protein called XANTHINE DEHYDROGENASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	760	Total	C	N	O	S	0	0	0
			5717	3581	1056	1054	26			
2	D	760	Total	C	N	O	S	0	0	0
			5717	3581	1056	1054	26			
2	F	760	Total	C	N	O	S	0	0	0
			5717	3581	1056	1054	26			
2	H	760	Total	C	N	O	S	0	0	0
			5717	3581	1056	1054	26			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	772	ARG	GLY	conflict	UNP O54051
D	772	ARG	GLY	conflict	UNP O54051
F	772	ARG	GLY	conflict	UNP O54051
H	772	ARG	GLY	conflict	UNP O54051

- Molecule 3 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).
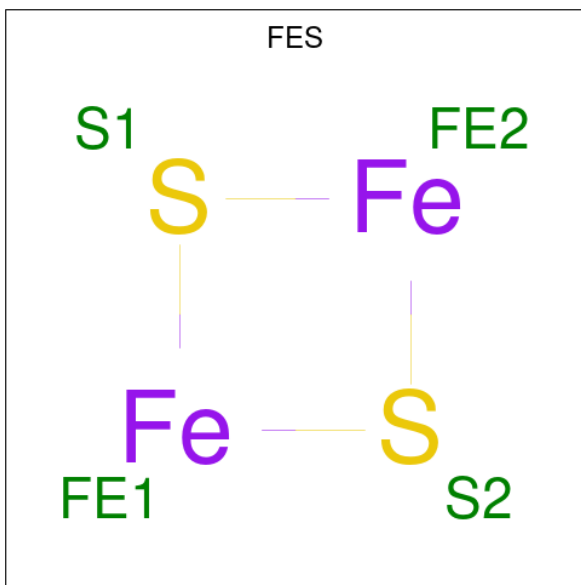
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 4	Fe 2	S 2	0	0
3	A	1	Total 4	Fe 2	S 2	0	0
3	C	1	Total 4	Fe 2	S 2	0	0
3	C	1	Total 4	Fe 2	S 2	0	0
3	E	1	Total 4	Fe 2	S 2	0	0
3	E	1	Total 4	Fe 2	S 2	0	0
3	G	1	Total 4	Fe 2	S 2	0	0
3	G	1	Total 4	Fe 2	S 2	0	0

- Molecule 4 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).

FAD

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

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

MTE

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

- Molecule 6 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	1	Total	Ca	0	0
			1	1		
6	D	1	Total	Ca	0	0
			1	1		
6	F	1	Total	Ca	0	0
			1	1		
6	H	1	Total	Ca	0	0
			1	1		

- Molecule 7 is HYPOXANTHINE (three-letter code: HPA) (formula: $C_5H_4N_4O$).
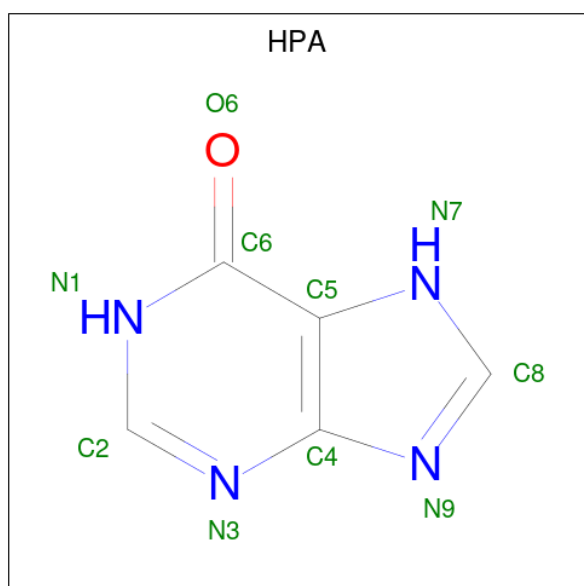
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	B	1	Total	C	N	O	0	0
			10	5	4	1		
7	D	1	Total	C	N	O	0	0
			10	5	4	1		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	F	1	Total	C	N	O	0	0
			10	5	4	1		
7	H	1	Total	C	N	O	0	0
			10	5	4	1		

- Molecule 8 is HYDROXY(DIOXO)MOLYBDENUM (three-letter code: MOM) (formula: $HMoO_3$).
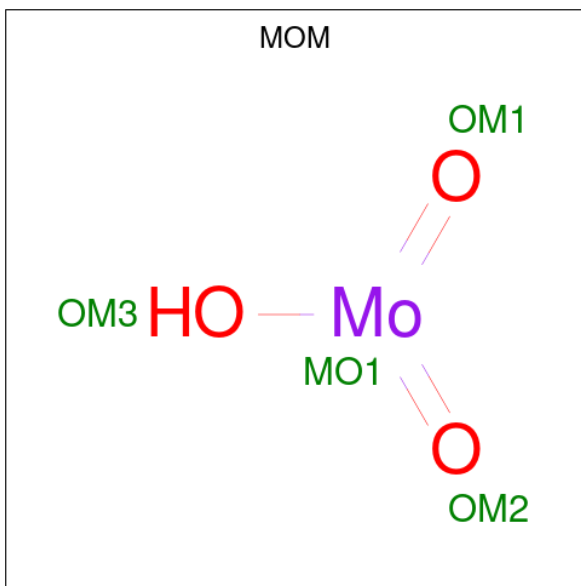
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	B	1	Total	Mo	O	0	0
			4	1	3		
8	D	1	Total	Mo	O	0	0
			4	1	3		
8	F	1	Total	Mo	O	0	0
			4	1	3		
8	H	1	Total	Mo	O	0	0
			4	1	3		

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	6	Total	O	0	0
			6	6		
9	B	15	Total	O	0	0
			15	15		
9	C	10	Total	O	0	0
			10	10		

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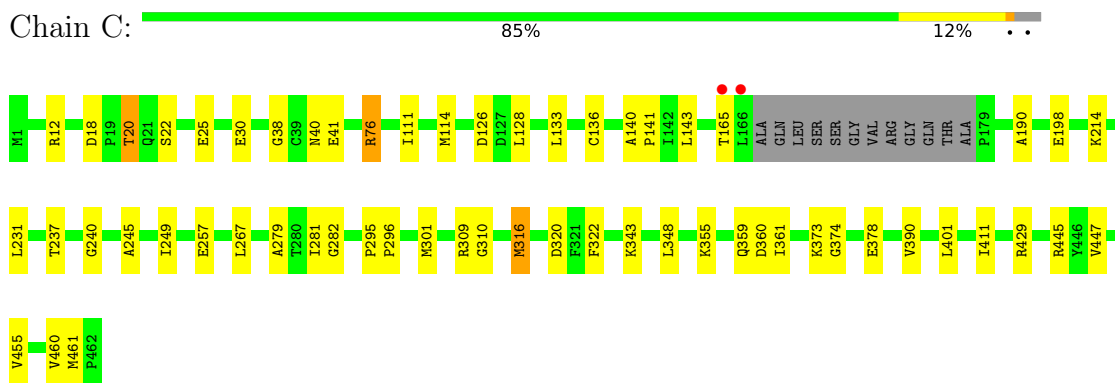| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	D	16	Total 16	O 16	0	0
9	E	2	Total 2	O 2	0	0
9	F	11	Total 11	O 11	0	0
9	G	5	Total 5	O 5	0	0
9	H	16	Total 16	O 16	0	0

3 Residue-property plots ⓘ

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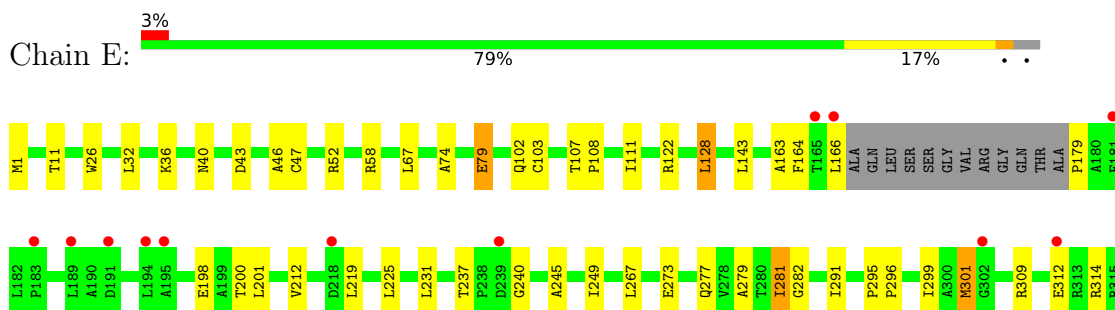
• Molecule 1: XANTHINE DEHYDROGENASE

Chain A:

• Molecule 1: XANTHINE DEHYDROGENASE

Chain C:

• Molecule 1: XANTHINE DEHYDROGENASE

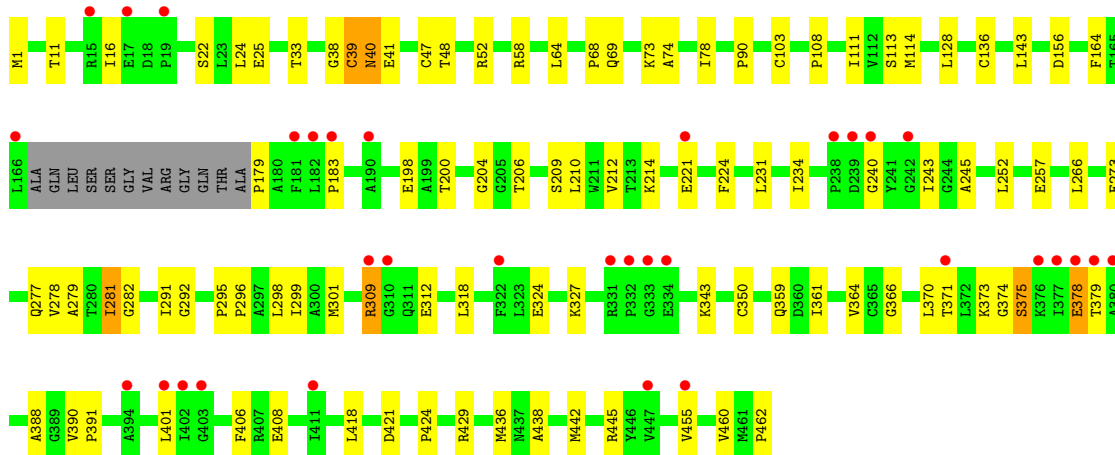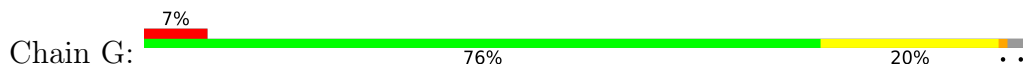Chain E:

• Molecule 1: XANTHINE DEHYDROGENASE

Chain G:

• Molecule 2: XANTHINE DEHYDROGENASE

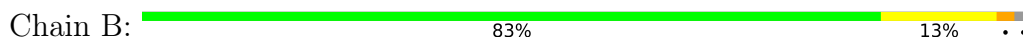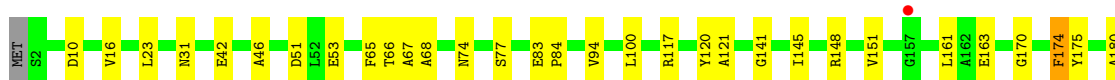Chain B:

• Molecule 2: XANTHINE DEHYDROGENASE

Chain D:

L184 E187 I192 H193 C194 S195 S196 Q197 H198 I202 K205 L210 H215 V219 R222 G227 N236 I240 A243 R247 R251 P252 R256 R259 R269 H270 D271 F272 R273 R277 I278 G279 A280 D281 K285 G288 L294

L303 S304 L305 P306 V307 L313 D316 G317 S318 V321 P322 A323 E327 R330 F341 R342 R355 L360 M364 E381 ARG GLY GLY LEU SER ALA PRO PRO SER PRO GLU ILE ALA THR K398 K399 H404 Q407 L414 V418 T419 K423

W437 R442 R446 L450 I457 S458 F459 T460 L461 N465 Q472 I473 S478 V479 A480 H493 R512 I513 A526 T527 A528 R550 L551 F554 V555 A556 G560 A563 I585 I594 S595 K606 W609 D610 R611 G616 R617 P618 I628

V632 R635 R641 G652 I661 G666 E679 R687 P693 S694 K697 I698 F701 R704 F708 L712 I722 K726 E730 P731 L741 A742 L743 G751 A773 A777

● Molecule 2: XANTHINE DEHYDROGENASE

Chain F: 82%   15%   ● ●

MET S2 V3 D10 V16 L23 P27 C28 P29 A30 N31 S40 A46 D51 F65 T66 A67 A68 A76 S77 E83 P84 V85 V91 V94 L100 R107 R117 A121 L129 L133 I145 V151 L161 A162 E163 I168

Y175 A180 E187 H198 I202 L210 H215 D216 M221 R222 R223 M224 N236 A243 R247 R251 R256 K268 R273 I274 R275 Y276 R277 A280 G288 V292 H293 L294 L305 P306 R310 L313 V321 P322 A323 E327 R330

L331 F341 R342 R355 L360 M364 D367 P368 E381 ARG GLY GLY LEU SER ALA PRO PRO SER PRO GLU ILE ALA THR K398 K399 Q407 L417 V418 T419 R420 K423 L450 I457 S458 L461 I473 V479 G489 V497 A502

V511 R512 T516 A526 T527 A528 T599 G600 F601 K606 R617 P618 I628 V631 V632 R635 L636 I642 L643 L648 G652 L655 A667 E679 D683 R687 L688 M689 A700 F701 R704 F708 W713 F723 K726 P732

L743 W754 P755 A759 A777

● Molecule 2: XANTHINE DEHYDROGENASE

Chain H: 80%   17%   ● ●

MET S2 D10 V16 L23 P27 C28 P29 A30 N31 L35 L39 A46 L50 D51 P54 T66 A67 A68 D69 L70 D73 N74 D75 A76 S77 E83 P84 V85 V94 G95 V101 R107 K115 A116 R117 I118 R123 I145 R148

V151 E163 G164 C165 H173 F174 Y175 A180 E187 C194 Q197 H198 I202 L210 H215 D216 V217 R218 M221 R222 R223 M224 G227 F228 Q234 G235 N236 C242 R247 R251 R256 R259 T266 G267 K268 D271 R277 I278 G279 A280

D281 K285 L303 P306 V307 L313 E327 R330 F341 R342 G343 F344 R355 L360 M364 E381 ARG GLY GLY LEU SER ALA PRO PRO SER PRO GLU ILE ALA THR K398 K399 H404 V418 R442 T443 L450 I457 S458 L461

A469 I473 H483 M488 H493 V497 Q498 V499 V503 I506 D507 P508 Q510 V511 R512 I513 A526 T527 A528 G532 A533 D534 M535 N536 V540 A556 G560 A563 S576 S595 L596 T599 R617 P618 F619 I628 V631 V632 N640

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	92.77Å 139.94Å 158.04Å 109.33° 106.15° 101.05°	Depositor
Resolution (Å)	51.23 – 2.90 51.01 – 2.90	Depositor EDS
% Data completeness (in resolution range)	98.2 (51.23-2.90) 98.2 (51.01-2.90)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.72 (at 2.91Å)	Xtriage
Refinement program	REFMAC 5.5.0055	Depositor
R, R_{free}	0.240 , 0.281 0.240 , 0.280	Depositor DCC
R_{free} test set	7476 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	53.6	Xtriage
Anisotropy	0.316	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 52.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.48, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	36853	wwPDB-VP
Average B, all atoms (Å^2)	53.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.80% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

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

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: FES, FAD, MTE, HPA, CA, MOM

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	0.33	0/3439	0.50	0/4659
1	C	0.31	0/3439	0.50	0/4659
1	E	0.33	0/3439	0.49	0/4659
1	G	0.34	0/3439	0.51	0/4659
2	B	0.33	0/5845	0.50	0/7942
2	D	0.31	0/5845	0.51	0/7942
2	F	0.32	0/5845	0.50	0/7942
2	H	0.35	0/5845	0.50	0/7942
All	All	0.33	0/37136	0.50	0/50404

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3376	0	3367	43	0
1	C	3376	0	3367	35	0
1	E	3376	0	3367	45	0
1	G	3376	0	3367	56	0
2	B	5717	0	5631	65	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	5717	0	5630	84	0
2	F	5717	0	5631	70	0
2	H	5717	0	5631	80	0
3	A	8	0	0	0	0
3	C	8	0	0	0	0
3	E	8	0	0	0	0
3	G	8	0	0	1	0
4	A	53	0	31	5	0
4	C	53	0	31	3	0
4	E	53	0	31	3	0
4	G	53	0	31	4	0
5	B	24	0	8	1	0
5	D	24	0	8	1	0
5	F	24	0	8	1	0
5	H	24	0	8	2	0
6	B	1	0	0	0	0
6	D	1	0	0	0	0
6	F	1	0	0	0	0
6	H	1	0	0	0	0
7	B	10	0	4	2	0
7	D	10	0	4	1	0
7	F	10	0	4	1	0
7	H	10	0	4	0	0
8	B	4	0	0	2	0
8	D	4	0	0	2	0
8	F	4	0	0	2	0
8	H	4	0	0	2	0
9	A	6	0	0	0	0
9	B	15	0	0	1	0
9	C	10	0	0	1	0
9	D	16	0	0	0	0
9	E	2	0	0	0	0
9	F	11	0	0	0	0
9	G	5	0	0	0	0
9	H	16	0	0	1	0
All	All	36853	0	36163	461	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (461) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:190:ALA:HB1	1:A:310:GLY:HA2	1.53	0.91
1:A:445:ARG:HG3	1:A:455:VAL:HG11	1.56	0.86
2:F:31:ASN:HB2	2:F:251:ARG:HD3	1.62	0.82
1:G:136:CYS:HB2	3:G:1463:FES:S2	2.21	0.81
1:E:445:ARG:HG3	1:E:455:VAL:HG11	1.61	0.80
1:C:445:ARG:HG3	1:C:455:VAL:HG11	1.64	0.80
1:C:240:GLY:HA2	1:C:343:LYS:HG2	1.65	0.78
2:D:94:VAL:HG11	2:D:687:ARG:HG2	1.66	0.77
2:B:205:LYS:HG3	2:B:236:ASN:OD1	1.85	0.76
2:F:221:MET:HE1	2:F:224:MET:HG3	1.67	0.76
1:A:359:GLN:HE22	4:A:1465:FAD:H6	1.49	0.75
2:F:94:VAL:HG11	2:F:687:ARG:HG2	1.66	0.75
2:F:360:LEU:HG	2:F:364:MET:HE3	1.69	0.75
1:G:240:GLY:HA2	1:G:343:LYS:HG2	1.71	0.73
1:E:32:LEU:HD22	1:E:79:GLU:HG3	1.69	0.72
2:F:65:PHE:HB2	2:F:100:LEU:HB3	1.71	0.72
2:B:94:VAL:HG11	2:B:687:ARG:HG2	1.72	0.72
1:C:411:ILE:HG13	1:C:447:VAL:HG21	1.71	0.72
2:H:163:GLU:HG2	2:H:277:ARG:HG2	1.72	0.72
1:A:41:GLU:HG3	1:A:214:LYS:HE3	1.70	0.71
2:B:399:LYS:HD2	2:B:399:LYS:H	1.54	0.71
1:G:445:ARG:HG3	1:G:455:VAL:HG11	1.72	0.70
2:D:606:LYS:O	2:D:617:ARG:HD2	1.92	0.69
2:D:163:GLU:HG2	2:D:277:ARG:HG2	1.74	0.69
1:E:295:PRO:HB2	1:E:296:PRO:HD3	1.75	0.69
2:F:145:ILE:HG12	2:F:327:GLU:HG3	1.75	0.69
2:D:74:ASN:O	2:D:84:PRO:HA	1.92	0.68
1:A:373:LYS:HB2	1:A:378:GLU:HG3	1.76	0.68
1:A:322:PHE:HB3	1:A:390:VAL:HG23	1.77	0.67
2:D:407:GLN:OE1	2:D:618:PRO:HD2	1.95	0.67
2:H:148:ARG:HD2	2:H:404:HIS:HA	1.76	0.67
2:H:173:HIS:HA	2:H:341:PHE:CZ	2.30	0.67
1:A:309:ARG:HB3	1:A:312:GLU:HB2	1.76	0.66
2:F:51:ASP:HB3	2:F:117:ARG:HB2	1.78	0.66
1:C:359:GLN:O	1:C:359:GLN:HG3	1.94	0.66
2:F:163:GLU:HG2	2:F:277:ARG:HG2	1.77	0.66
2:B:528:ALA:HA	5:B:1778:MTE:S2'	2.37	0.65
8:B:1781:MOM:MO1	8:B:1781:MOM:OM1	1.68	0.65
2:B:274:ILE:HG12	2:B:293:HIS:HD2	1.63	0.64
8:F:1781:MOM:OM1	8:F:1781:MOM:MO1	1.68	0.64
2:B:360:LEU:HG	2:B:364:MET:HE3	1.80	0.64
2:B:148:ARG:HD2	2:B:404:HIS:HA	1.80	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:399:LYS:H	2:F:399:LYS:HD2	1.62	0.64
2:H:399:LYS:H	2:H:399:LYS:HD2	1.62	0.63
8:H:1781:MOM:OM1	8:H:1781:MOM:MO1	1.70	0.63
2:H:457:ILE:O	2:H:458:SER:HB2	1.98	0.63
8:D:1781:MOM:OM1	8:D:1781:MOM:MO1	1.69	0.63
2:H:51:ASP:HB3	2:H:117:ARG:HB2	1.81	0.63
2:H:280:ALA:HB2	2:H:360:LEU:HD21	1.80	0.62
8:H:1781:MOM:MO1	8:H:1781:MOM:OM3	1.70	0.62
2:F:27:PRO:HB2	2:H:29:PRO:HG3	1.82	0.62
1:C:41:GLU:HG3	1:C:214:LYS:HE3	1.80	0.62
2:D:419:THR:O	2:D:423:LYS:HG2	1.98	0.62
2:H:66:THR:HG22	2:H:68:ALA:H	1.63	0.62
2:F:280:ALA:HB2	2:F:360:LEU:HD21	1.81	0.62
8:F:1781:MOM:MO1	8:F:1781:MOM:OM3	1.70	0.62
1:A:240:GLY:HA2	1:A:343:LYS:HG2	1.82	0.61
2:F:3:VAL:HG13	2:F:655:LEU:HD23	1.80	0.61
1:G:299:ILE:HG13	1:G:318:LEU:HD23	1.82	0.61
8:B:1781:MOM:MO1	8:B:1781:MOM:OM3	1.70	0.61
1:G:279:ALA:HB1	4:G:1465:FAD:H4'	1.82	0.61
1:C:401:LEU:HD11	1:C:411:ILE:HD13	1.82	0.61
2:F:473:ILE:HG12	2:F:479:VAL:HG22	1.82	0.61
1:A:269:ARG:HH21	1:A:357:PHE:HA	1.66	0.61
1:G:460:VAL:HG11	2:H:632:VAL:HG11	1.83	0.61
2:D:418:VAL:HG13	2:D:450:LEU:HD11	1.83	0.61
1:A:11:THR:HG22	1:A:164:PHE:HE1	1.66	0.60
8:D:1781:MOM:MO1	8:D:1781:MOM:OM3	1.70	0.60
1:C:279:ALA:HB1	4:C:1465:FAD:H4'	1.82	0.60
1:G:374:GLY:O	1:G:375:SER:HB3	2.00	0.60
1:E:279:ALA:HB1	4:E:1465:FAD:H4'	1.84	0.60
2:H:23:LEU:HD13	2:H:194:CYS:HA	1.84	0.60
2:D:399:LYS:H	2:D:399:LYS:HD2	1.67	0.59
2:D:528:ALA:HA	5:D:1778:MTE:S2'	2.43	0.59
1:G:418:LEU:HA	1:G:421:ASP:HB2	1.85	0.59
1:E:356:ARG:HH21	1:E:359:GLN:HB3	1.68	0.59
1:C:237:THR:HG23	1:C:240:GLY:H	1.66	0.59
2:D:174:PHE:HZ	2:D:693:PRO:HG3	1.68	0.59
2:B:66:THR:HG22	2:B:68:ALA:H	1.67	0.59
2:H:77:SER:HB2	2:H:83:GLU:HB3	1.84	0.59
1:G:22:SER:OG	1:G:25:GLU:HG2	2.02	0.58
1:C:373:LYS:HB2	1:C:378:GLU:CG	2.34	0.58
1:G:371:THR:HB	1:G:379:THR:H	1.69	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:51:ASP:HB3	2:D:117:ARG:HB2	1.86	0.58
2:D:661:ILE:HD11	2:D:712:LEU:HG	1.84	0.58
2:F:683:ASP:HB3	2:F:689:MET:CE	2.33	0.58
2:D:23:LEU:HD22	2:D:180:ALA:HB1	1.85	0.58
2:H:218:ARG:HD2	9:H:2009:HOH:O	2.04	0.58
1:A:52:ARG:HB3	1:A:74:ALA:HB3	1.86	0.58
2:B:74:ASN:O	2:B:84:PRO:HA	2.04	0.58
2:B:281:ASP:HB3	2:B:284:GLY:H	1.69	0.57
1:A:252:LEU:HD23	1:A:267:LEU:HD11	1.87	0.57
2:H:398:LYS:HA	2:H:398:LYS:HE3	1.84	0.57
2:B:755:PRO:O	2:B:772:ARG:HD2	2.05	0.56
2:F:31:ASN:HB2	2:F:251:ARG:CD	2.33	0.56
1:E:240:GLY:HA2	1:E:343:LYS:HG2	1.87	0.56
2:F:407:GLN:OE1	2:F:618:PRO:HD2	2.05	0.56
1:G:373:LYS:HB2	1:G:378:GLU:CG	2.36	0.56
2:F:288:GLY:HA2	2:F:323:ALA:O	2.05	0.56
2:D:280:ALA:HB2	2:D:360:LEU:HD21	1.87	0.56
1:C:445:ARG:HG3	1:C:455:VAL:CG1	2.34	0.56
1:G:41:GLU:HG3	1:G:214:LYS:HE3	1.87	0.56
1:A:418:LEU:HA	1:A:421:ASP:HB2	1.87	0.56
1:C:38:GLY:O	2:D:259:ARG:HD2	2.06	0.56
1:A:32:LEU:HD22	1:A:79:GLU:HG3	1.88	0.55
1:C:316:MET:HG3	1:C:320:ASP:HB2	1.88	0.55
1:A:64:LEU:HD13	1:A:206:THR:HG22	1.88	0.55
2:B:419:THR:O	2:B:423:LYS:HG2	2.07	0.55
1:E:322:PHE:HB3	1:E:390:VAL:HG23	1.89	0.54
2:D:77:SER:HB2	2:D:83:GLU:HB3	1.89	0.54
1:A:455:VAL:HG13	2:B:443:THR:HG21	1.88	0.54
1:A:347:GLY:O	1:A:369:ASN:HA	2.06	0.54
2:B:461:LEU:H	7:B:1780:HPA:H8	1.72	0.54
2:D:459:PHE:HB2	2:D:465:ASN:ND2	2.23	0.54
2:F:77:SER:HB2	2:F:83:GLU:HB3	1.90	0.54
1:G:266:LEU:HD13	1:G:350:CYS:HB3	1.89	0.54
2:B:280:ALA:HB2	2:B:360:LEU:HD21	1.89	0.54
2:H:74:ASN:O	2:H:84:PRO:HA	2.08	0.54
2:H:631:VAL:HG12	2:H:642:ILE:HA	1.90	0.54
1:E:299:ILE:HG13	1:E:318:LEU:HD23	1.89	0.54
2:B:446:ARG:HG2	2:B:632:VAL:HG12	1.90	0.53
2:D:202:ILE:HD13	2:D:236:ASN:HD22	1.72	0.53
1:C:373:LYS:HB2	1:C:378:GLU:HG2	1.90	0.53
1:C:22:SER:OG	1:C:25:GLU:HG2	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:370:LEU:HD23	1:E:380:ALA:HA	1.90	0.53
2:B:606:LYS:O	2:B:617:ARG:HD2	2.09	0.53
2:D:31:ASN:HB2	2:D:251:ARG:HD3	1.90	0.53
2:H:221:MET:HE1	2:H:224:MET:HG3	1.90	0.53
2:B:205:LYS:HB3	2:B:240:ILE:HD11	1.91	0.53
2:D:66:THR:HG22	2:D:68:ALA:H	1.73	0.53
2:D:730:GLU:H	2:D:731:PRO:CD	2.22	0.53
2:F:461:LEU:H	7:F:1780:HPA:H8	1.73	0.53
2:F:46:ALA:HB3	2:F:121:ALA:HB3	1.91	0.52
2:H:499:VAL:O	2:H:503:VAL:HG23	2.09	0.52
1:E:462:PRO:HA	2:F:643:LEU:HD22	1.92	0.52
2:H:67:ALA:HA	2:H:70:LEU:HD12	1.91	0.52
1:C:249:ILE:HG23	1:C:267:LEU:HD22	1.90	0.52
1:G:309:ARG:HB3	1:G:312:GLU:HB2	1.91	0.52
2:H:632:VAL:HG13	2:H:643:LEU:HD11	1.92	0.52
9:C:2009:HOH:O	2:D:641:ARG:HD2	2.09	0.52
2:B:274:ILE:HG12	2:B:293:HIS:CD2	2.45	0.51
2:D:450:LEU:HB2	2:D:628:ILE:HG12	1.90	0.51
1:G:48:THR:HG21	1:G:113:SER:OG	2.10	0.51
1:G:234:ILE:HG12	1:G:243:ILE:HG23	1.92	0.51
2:B:51:ASP:HB3	2:B:117:ARG:HB2	1.91	0.51
2:F:528:ALA:HA	5:F:1778:MTE:S2'	2.51	0.51
2:B:221:MET:HE1	2:B:224:MET:HG3	1.93	0.51
1:A:245:ALA:HB1	1:A:282:GLY:HA3	1.92	0.51
1:E:52:ARG:HB3	1:E:74:ALA:HB3	1.93	0.51
2:B:65:PHE:HB2	2:B:100:LEU:HB3	1.92	0.51
2:H:667:ALA:HB3	2:H:732:PRO:HB2	1.93	0.51
1:C:411:ILE:HG13	1:C:447:VAL:CG2	2.39	0.51
2:D:273:ARG:HD2	2:D:294:LEU:HD12	1.93	0.51
4:E:1465:FAD:H2'	4:E:1465:FAD:N1	2.25	0.51
1:G:370:LEU:HD12	1:G:406:PHE:HE1	1.76	0.51
1:A:40:ASN:HD22	1:A:63:CYS:HB2	1.76	0.50
2:D:42:GLU:HG3	2:D:120:TYR:CG	2.46	0.50
2:D:550:ARG:NH1	2:D:595:SER:HB3	2.26	0.50
2:D:730:GLU:N	2:D:731:PRO:CD	2.74	0.50
2:B:145:ILE:HG12	2:B:327:GLU:HG3	1.94	0.50
2:F:310:ARG:NH2	2:F:458:SER:O	2.45	0.50
1:G:52:ARG:HB3	1:G:74:ALA:HB3	1.92	0.50
2:F:210:LEU:HD22	2:F:247:ARG:HD2	1.94	0.50
2:B:399:LYS:H	2:B:399:LYS:CD	2.24	0.49
1:E:373:LYS:HB2	1:E:378:GLU:HG2	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:170:GLY:N	2:D:271:ASP:HB3	2.28	0.49
2:B:418:VAL:HG13	2:B:450:LEU:HD11	1.93	0.49
2:D:701:PHE:O	2:D:704:ARG:HG2	2.12	0.49
2:F:418:VAL:HG13	2:F:450:LEU:HD11	1.94	0.49
2:D:288:GLY:HA2	2:D:323:ALA:O	2.13	0.49
2:F:66:THR:HG22	2:F:68:ALA:H	1.77	0.49
2:F:305:LEU:HB3	2:F:306:PRO:CD	2.42	0.49
2:H:210:LEU:HD22	2:H:247:ARG:HD2	1.95	0.49
2:H:266:THR:O	2:H:268:LYS:HE2	2.13	0.49
2:B:513:ILE:HG22	9:B:2012:HOH:O	2.13	0.49
4:C:1465:FAD:H2'	4:C:1465:FAD:N1	2.27	0.49
2:D:341:PHE:HD2	2:D:342:ARG:N	2.11	0.49
2:D:457:ILE:O	2:D:458:SER:CB	2.61	0.49
1:A:370:LEU:HD12	1:A:406:PHE:HE1	1.77	0.49
1:A:445:ARG:HG3	1:A:455:VAL:CG1	2.36	0.49
2:D:184:LEU:HD23	2:D:252:PRO:HB3	1.95	0.49
2:F:129:LEU:HD23	2:F:331:LEU:HD12	1.95	0.49
2:H:198:HIS:ND1	2:H:526:ALA:HB2	2.28	0.49
2:B:166:PHE:HB3	2:B:355:ARG:NH2	2.28	0.48
2:B:266:THR:O	2:B:268:LYS:HE2	2.12	0.48
1:A:411:ILE:HG13	1:A:447:VAL:HG21	1.95	0.48
2:F:419:THR:O	2:F:423:LYS:HG2	2.12	0.48
1:G:373:LYS:HB2	1:G:378:GLU:HG2	1.95	0.48
1:E:316:MET:HG3	1:E:320:ASP:HB2	1.93	0.48
1:C:136:CYS:O	2:D:666:GLY:HA3	2.13	0.48
1:G:111:ILE:HA	1:G:114:MET:HE2	1.95	0.48
2:H:457:ILE:O	2:H:458:SER:CB	2.62	0.48
1:C:322:PHE:HB3	1:C:390:VAL:HG23	1.96	0.48
1:E:245:ALA:HB1	1:E:282:GLY:HA3	1.96	0.48
1:G:243:ILE:HG21	1:G:252:LEU:HD13	1.95	0.48
1:C:133:LEU:HD13	2:D:698:ILE:HD11	1.95	0.48
2:D:461:LEU:HB2	7:D:1780:HPA:H8	1.95	0.48
1:G:11:THR:HG22	1:G:164:PHE:HE1	1.78	0.48
2:D:148:ARG:HD2	2:D:404:HIS:HA	1.95	0.47
1:E:1:MET:HB2	1:E:179:PRO:HD2	1.96	0.47
2:F:216:ASP:OD1	2:H:512:ARG:HD2	2.14	0.47
1:G:111:ILE:HD11	2:H:16:VAL:HG22	1.96	0.47
2:H:94:VAL:HG11	2:H:687:ARG:HG2	1.96	0.47
2:H:556:ALA:HB2	2:H:563:ALA:HA	1.96	0.47
2:D:192:ILE:HB	2:D:219:VAL:HG22	1.96	0.47
2:D:551:LEU:HD22	2:D:585:ILE:HG22	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:212:VAL:O	2:F:107:ARG:NH1	2.47	0.47
2:B:171:GLN:NE2	2:B:674:TRP:HB2	2.30	0.47
2:B:360:LEU:HG	2:B:364:MET:CE	2.43	0.47
2:D:65:PHE:HB2	2:D:100:LEU:HB3	1.96	0.47
2:F:606:LYS:O	2:F:617:ARG:HD2	2.14	0.47
2:F:652:GLY:HA3	2:F:726:LYS:HG3	1.96	0.47
1:E:102:GLN:HB3	2:F:489:GLY:O	2.15	0.47
4:G:1465:FAD:N1	4:G:1465:FAD:H2'	2.29	0.47
2:B:77:SER:HB2	2:B:83:GLU:HB3	1.97	0.47
1:C:322:PHE:HB3	1:C:390:VAL:CG2	2.45	0.47
1:E:356:ARG:NH2	1:E:359:GLN:HB3	2.30	0.47
2:H:145:ILE:HG12	2:H:327:GLU:HG3	1.97	0.47
2:D:360:LEU:HG	2:D:364:MET:HE3	1.94	0.47
2:F:341:PHE:O	2:F:342:ARG:C	2.53	0.47
2:D:31:ASN:O	2:D:251:ARG:HD2	2.15	0.47
2:F:398:LYS:HE3	2:F:398:LYS:HA	1.96	0.47
1:G:234:ILE:HG23	1:G:243:ILE:HG12	1.97	0.47
1:G:388:ALA:C	1:G:390:VAL:H	2.17	0.47
2:B:601:PHE:CG	2:D:595:SER:HB2	2.50	0.47
1:C:126:ASP:OD1	2:D:704:ARG:NH1	2.47	0.47
1:A:26:TRP:CD1	1:A:67:LEU:HD11	2.50	0.46
1:A:352:LYS:HG3	1:A:362:SER:OG	2.14	0.46
1:E:364:VAL:HG21	1:E:438:ALA:HB3	1.97	0.46
1:G:366:GLY:HA3	1:G:442:MET:SD	2.56	0.46
1:E:200:THR:HG21	1:E:219:LEU:HD13	1.98	0.46
2:H:173:HIS:HA	2:H:341:PHE:CE1	2.49	0.46
2:D:437:TRP:CE3	2:D:446:ARG:HG3	2.50	0.46
1:E:26:TRP:CD1	1:E:67:LEU:HD11	2.51	0.46
1:E:249:ILE:HG23	1:E:267:LEU:HD22	1.98	0.46
2:F:450:LEU:HB2	2:F:628:ILE:HG12	1.97	0.46
2:B:446:ARG:HG2	2:B:632:VAL:CG1	2.46	0.46
1:E:163:ALA:HA	1:E:166:LEU:HD12	1.96	0.46
2:F:275:ARG:HB3	2:F:292:VAL:HB	1.96	0.46
1:G:212:VAL:O	2:H:107:ARG:NH1	2.49	0.46
2:D:23:LEU:HD13	2:D:194:CYS:HA	1.97	0.46
2:F:29:PRO:HG3	2:H:27:PRO:HB2	1.96	0.46
2:F:76:ALA:HB2	2:F:85:VAL:HG22	1.97	0.46
2:H:202:ILE:HD13	2:H:236:ASN:HD22	1.80	0.46
2:B:377:TYR:HB2	2:B:412:CYS:SG	2.56	0.46
1:C:355:LYS:HE2	2:D:679:GLU:OE1	2.16	0.46
2:F:701:PHE:O	2:F:704:ARG:HG2	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:245:ALA:HB1	1:G:282:GLY:HA3	1.98	0.46
2:H:281:ASP:HB2	2:H:285:LYS:O	2.16	0.46
1:A:424:PRO:HG2	1:A:436:MET:HB2	1.97	0.46
2:B:23:LEU:HD22	2:B:180:ALA:HB1	1.97	0.46
4:A:1465:FAD:H9	4:A:1465:FAD:H1'2	1.82	0.46
1:C:295:PRO:HB2	1:C:296:PRO:HD3	1.98	0.46
2:D:210:LEU:HD11	2:D:243:ALA:HB1	1.98	0.46
2:D:554:PHE:HB2	2:D:594:ILE:HD13	1.97	0.46
1:E:427:ASP:OD1	1:E:435:ARG:NH2	2.48	0.46
2:B:700:ALA:O	2:B:703:ASP:HB2	2.15	0.45
2:H:528:ALA:HA	5:H:1778:MTE:S2'	2.56	0.45
1:A:445:ARG:HE	1:A:455:VAL:HG12	1.81	0.45
2:B:42:GLU:HG3	2:B:120:TYR:CG	2.50	0.45
2:D:194:CYS:SG	2:D:196:SER:HB3	2.56	0.45
2:H:532:GLY:O	2:H:536:ASN:HB2	2.16	0.45
1:C:361:ILE:HD11	1:C:429:ARG:CZ	2.46	0.45
2:D:269:ARG:NH2	2:D:341:PHE:CD2	2.84	0.45
2:D:694:SER:O	2:D:697:LYS:HE2	2.16	0.45
2:H:497:VAL:HG13	2:H:511:VAL:HB	1.99	0.45
2:B:38:GLY:HA3	2:B:99:PHE:CE2	2.52	0.45
2:D:145:ILE:HG12	2:D:327:GLU:HG3	1.97	0.45
1:E:240:GLY:HA3	1:E:341:LEU:O	2.16	0.45
1:E:355:LYS:HE2	2:F:679:GLU:OE1	2.16	0.45
1:G:41:GLU:HA	1:G:210:LEU:HD21	1.98	0.45
2:H:341:PHE:O	2:H:342:ARG:C	2.54	0.45
1:A:183:PRO:HG3	1:A:189:LEU:HD13	1.98	0.45
1:A:252:LEU:HB2	1:A:281:ILE:HD11	1.98	0.45
4:E:1465:FAD:H9	4:E:1465:FAD:H1'2	1.77	0.45
2:F:512:ARG:NH1	2:H:216:ASP:OD2	2.50	0.45
1:G:370:LEU:HD12	1:G:406:PHE:CE1	2.52	0.45
4:G:1465:FAD:H1'2	4:G:1465:FAD:H9	1.78	0.45
1:A:65:MET:CE	1:A:278:VAL:HG11	2.47	0.45
2:H:31:ASN:O	2:H:251:ARG:HD2	2.17	0.45
2:H:631:VAL:HG21	2:H:743:LEU:HD12	1.99	0.45
1:C:111:ILE:HD13	1:C:114:MET:HE1	1.99	0.44
1:G:24:LEU:HD13	1:G:47:CYS:HB2	1.98	0.44
2:H:228:PHE:HA	5:H:1778:MTE:HN5	1.81	0.44
1:A:212:VAL:O	2:B:107:ARG:NH1	2.50	0.44
2:B:46:ALA:HB3	2:B:121:ALA:HB3	1.99	0.44
2:B:184:LEU:HD23	2:B:252:PRO:HB3	1.99	0.44
1:G:455:VAL:HG13	2:H:443:THR:HG21	1.97	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:174:PHE:CZ	2:D:693:PRO:HG3	2.51	0.44
2:D:730:GLU:H	2:D:731:PRO:HD3	1.82	0.44
2:H:717:ASN:HD22	2:H:726:LYS:HG2	1.83	0.44
2:B:146:TRP:CZ3	2:B:313:LEU:HD13	2.53	0.44
2:B:457:ILE:O	2:B:458:SER:CB	2.66	0.44
2:D:472:GLN:HB2	2:D:480:ALA:HB3	1.99	0.44
1:E:36:LYS:O	1:E:47:CYS:HB3	2.18	0.44
1:E:373:LYS:HB2	1:E:378:GLU:CG	2.48	0.44
2:F:273:ARG:HD2	2:F:294:LEU:HD12	1.98	0.44
1:G:390:VAL:HG22	1:G:391:PRO:HD2	2.00	0.44
2:H:730:GLU:H	2:H:731:PRO:CD	2.31	0.44
1:G:364:VAL:HG21	1:G:438:ALA:HB3	2.00	0.44
2:H:306:PRO:HB2	2:H:344:PHE:HE2	1.81	0.44
2:H:754:TRP:HA	2:H:755:PRO:HD3	1.84	0.44
4:A:1465:FAD:N1	4:A:1465:FAD:H2'	2.32	0.44
2:F:420:ARG:HE	2:F:713:TRP:HZ3	1.65	0.44
2:F:2:SER:N	2:F:502:ALA:HB2	2.32	0.44
2:F:202:ILE:HD13	2:F:236:ASN:HD22	1.83	0.44
2:B:434:ILE:HG23	2:B:446:ARG:HB2	1.98	0.44
2:D:457:ILE:O	2:D:458:SER:HB2	2.18	0.44
2:H:730:GLU:H	2:H:731:PRO:HD2	1.82	0.44
1:A:279:ALA:HB1	4:A:1465:FAD:H4'	1.98	0.44
2:B:461:LEU:HD12	2:B:463:HIS:CE1	2.52	0.44
2:F:23:LEU:HD22	2:F:180:ALA:HB1	2.00	0.44
1:G:78:ILE:HG21	1:G:108:PRO:HB3	2.00	0.44
1:G:273:GLU:O	1:G:277:GLN:HG2	2.18	0.44
1:G:408:GLU:OE1	2:H:442:ARG:NH2	2.50	0.44
1:E:281:ILE:H	1:E:281:ILE:HG13	1.52	0.43
1:G:183:PRO:HD2	1:G:224:PHE:O	2.18	0.43
1:G:359:GLN:O	1:G:359:GLN:HG3	2.18	0.43
1:A:1:MET:HB2	1:A:179:PRO:HG2	2.00	0.43
1:A:462:PRO:HA	2:B:643:LEU:HB3	2.00	0.43
2:D:473:ILE:HG12	2:D:479:VAL:HG22	2.00	0.43
1:G:292:GLY:HA2	4:G:1465:FAD:O2	2.18	0.43
4:C:1465:FAD:N1	4:C:1465:FAD:C2'	2.81	0.43
2:D:318:SER:HB3	2:D:414:LEU:CD1	2.49	0.43
1:E:111:ILE:HD11	2:F:16:VAL:HG22	1.99	0.43
1:G:1:MET:HB2	1:G:179:PRO:HG2	2.00	0.43
2:B:224:MET:CE	2:B:488:MET:HB3	2.49	0.43
2:D:305:LEU:HB3	2:D:306:PRO:CD	2.49	0.43
1:C:301:MET:HB3	1:C:348:LEU:HD22	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:360:LEU:HG	2:D:364:MET:CE	2.48	0.43
2:F:601:PHE:CG	2:H:595:SER:HB2	2.54	0.43
2:H:197:GLN:HG2	2:H:488:MET:HE1	2.00	0.43
2:D:210:LEU:HD22	2:D:247:ARG:HD2	2.00	0.43
2:D:305:LEU:HB3	2:D:306:PRO:HD3	2.00	0.43
1:E:415:LEU:HD22	1:E:440:GLN:HB3	2.01	0.43
2:F:133:LEU:HD13	2:F:331:LEU:HD21	2.01	0.43
2:F:667:ALA:HB3	2:F:732:PRO:HB2	2.00	0.43
1:G:252:LEU:HD22	1:G:281:ILE:HG12	2.00	0.43
2:F:168:ILE:HA	2:F:759:ALA:HB3	2.00	0.43
2:B:163:GLU:HG2	2:B:277:ARG:HG2	2.00	0.43
2:B:215:HIS:ND1	2:D:478:SER:HB2	2.33	0.43
2:D:198:HIS:ND1	2:D:526:ALA:HB2	2.34	0.43
2:F:3:VAL:HG21	2:F:723:PHE:CE1	2.54	0.43
1:G:16:ILE:HD13	1:G:68:PRO:HG3	2.00	0.43
2:B:341:PHE:O	2:B:342:ARG:C	2.56	0.43
1:C:76:ARG:HA	1:C:76:ARG:HD3	1.87	0.43
2:D:66:THR:HG22	2:D:67:ALA:N	2.34	0.43
2:D:493:HIS:CG	2:D:513:ILE:HG12	2.54	0.43
2:F:210:LEU:HD11	2:F:243:ALA:HB1	2.01	0.43
2:H:39:LEU:HB3	2:H:95:GLY:HA2	2.01	0.43
2:F:77:SER:HB2	2:F:83:GLU:CB	2.48	0.43
2:F:367:ASP:HA	2:F:368:PRO:HD3	1.92	0.43
1:G:371:THR:HB	1:G:378:GLU:HB2	2.00	0.43
2:B:506:ILE:HD12	2:B:510:GLN:HB2	2.01	0.42
1:E:301:MET:HA	1:E:369:ASN:HD22	1.84	0.42
1:G:324:GLU:HB2	1:G:327:LYS:HB3	2.01	0.42
2:H:632:VAL:O	2:H:640:ASN:HA	2.19	0.42
2:H:657:PRO:O	2:H:661:ILE:HG12	2.19	0.42
2:D:661:ILE:CD1	2:D:712:LEU:HG	2.50	0.42
2:F:40:SER:HB2	2:F:91:VAL:HG11	2.00	0.42
2:H:418:VAL:HG13	2:H:450:LEU:HD11	2.00	0.42
2:D:46:ALA:HB3	2:D:121:ALA:HB3	2.00	0.42
1:A:356:ARG:HH21	1:A:359:GLN:HB3	1.84	0.42
2:B:96:GLN:HA	2:B:97:PRO:HD3	1.95	0.42
1:A:273:GLU:O	1:A:277:GLN:HG2	2.19	0.42
2:B:398:LYS:HE3	2:B:398:LYS:HA	2.00	0.42
1:C:140:ALA:N	1:C:141:PRO:HD2	2.33	0.42
2:H:50:LEU:HD12	2:H:118:ILE:HG12	2.00	0.42
2:B:53:GLU:HB3	2:B:54:PRO:HD3	2.01	0.42
1:E:11:THR:HG22	1:E:164:PHE:HE1	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:107:THR:HB	1:E:108:PRO:HD3	2.02	0.42
1:G:39:CYS:O	1:G:40:ASN:HB2	2.19	0.42
1:G:424:PRO:HG2	1:G:436:MET:HB2	2.01	0.42
2:H:650:ASP:HA	2:H:713:TRP:HB3	2.01	0.42
1:G:69:GLN:O	1:G:73:LYS:HE2	2.19	0.42
2:H:76:ALA:HB2	2:H:85:VAL:HG22	2.02	0.42
2:B:138:ARG:HA	2:B:331:LEU:HA	2.00	0.42
2:D:281:ASP:HB2	2:D:285:LYS:O	2.19	0.42
1:E:295:PRO:HB2	1:E:296:PRO:CD	2.47	0.42
1:C:445:ARG:CG	1:C:455:VAL:HG11	2.42	0.42
2:F:66:THR:HG22	2:F:67:ALA:N	2.34	0.42
1:G:204:GLY:HA3	1:G:278:VAL:O	2.19	0.42
1:G:209:SER:O	1:G:212:VAL:HG12	2.20	0.42
2:H:35:LEU:HA	2:H:101:VAL:O	2.20	0.42
2:H:506:ILE:HD12	2:H:510:GLN:HB2	2.01	0.42
1:A:368:LEU:HB2	1:A:446:TYR:CD1	2.55	0.42
2:B:437:TRP:CE3	2:B:446:ARG:HG3	2.55	0.42
1:E:273:GLU:OE2	1:E:277:GLN:NE2	2.51	0.42
2:F:497:VAL:HG13	2:F:511:VAL:HB	2.01	0.42
1:G:64:LEU:HD13	1:G:206:THR:HG22	2.02	0.42
1:G:298:LEU:HB2	1:G:318:LEU:HD22	2.01	0.42
2:H:360:LEU:HG	2:H:364:MET:CE	2.50	0.42
1:A:40:ASN:ND2	1:A:63:CYS:HB2	2.35	0.41
1:A:283:GLY:HA2	4:A:1465:FAD:C8A	2.50	0.41
2:D:556:ALA:HB2	2:D:563:ALA:HA	2.01	0.41
2:H:23:LEU:HD22	2:H:180:ALA:HB1	2.01	0.41
2:H:278:ILE:HG12	2:H:360:LEU:HD22	2.02	0.41
2:H:450:LEU:HB2	2:H:628:ILE:HG12	2.02	0.41
2:H:493:HIS:CG	2:H:513:ILE:HG12	2.55	0.41
1:E:372:LEU:HD23	1:E:377:ILE:HA	2.01	0.41
2:F:683:ASP:HB3	2:F:689:MET:HE2	2.02	0.41
2:H:617:ARG:HD3	2:H:619:PHE:O	2.20	0.41
2:D:281:ASP:N	2:D:285:LYS:O	2.49	0.41
1:E:36:LYS:HB2	1:E:46:ALA:HB1	2.02	0.41
2:F:599:THR:HG23	2:H:599:THR:HG23	2.02	0.41
2:H:536:ASN:O	2:H:540:VAL:HG23	2.20	0.41
1:C:12:ARG:NH2	1:C:30:GLU:OE1	2.53	0.41
1:C:18:ASP:OD2	1:C:20:THR:HG22	2.20	0.41
1:E:314:ARG:HD3	1:E:334:GLU:OE1	2.20	0.41
2:H:46:ALA:HB2	2:H:123:ARG:NH2	2.36	0.41
2:H:469:ALA:HA	2:H:483:HIS:HA	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:122:ARG:HB3	1:E:128:LEU:HD21	2.01	0.41
2:H:473:ILE:HB	2:H:596:LEU:HB3	2.02	0.41
1:A:110:PHE:HE1	1:A:134:CYS:HB2	1.85	0.41
1:E:411:ILE:HG13	1:E:447:VAL:HG21	2.02	0.41
2:F:417:LEU:HG	2:F:648:LEU:HD23	2.02	0.41
2:B:309:ASP:OD1	2:B:330:ARG:NH2	2.50	0.41
1:C:190:ALA:HB1	1:C:310:GLY:HA2	2.02	0.41
1:C:360:ASP:OD1	2:D:697:LYS:HE3	2.20	0.41
2:D:321:VAL:HG12	2:D:323:ALA:O	2.21	0.41
1:E:441:ALA:HB1	2:F:636:LEU:HB3	2.02	0.41
1:A:360:ASP:OD1	2:B:697:LYS:HE3	2.20	0.41
2:B:532:GLY:O	2:B:536:ASN:HB2	2.20	0.41
2:D:751:GLY:HA3	2:D:773:ALA:O	2.21	0.41
1:E:312:GLU:H	1:E:312:GLU:HG2	1.68	0.41
1:A:408:GLU:CD	2:B:442:ARG:HH22	2.22	0.41
2:B:70:LEU:HD23	2:B:244:VAL:HG11	2.01	0.41
2:D:316:ASP:HB3	2:D:404:HIS:ND1	2.36	0.41
2:D:652:GLY:HA3	2:D:726:LYS:HG3	2.02	0.41
1:E:201:LEU:HD22	1:E:225:LEU:HD21	2.02	0.41
2:F:457:ILE:O	2:F:458:SER:CB	2.68	0.41
1:G:361:ILE:HD11	1:G:429:ARG:CZ	2.50	0.41
1:G:462:PRO:HA	2:H:643:LEU:HD22	2.03	0.41
1:C:245:ALA:HB1	1:C:282:GLY:HA3	2.03	0.41
2:D:609:TRP:HA	2:D:616:GLY:HA3	2.02	0.41
1:G:38:GLY:O	2:H:259:ARG:HD3	2.21	0.41
2:H:35:LEU:HD11	2:H:242:CYS:HA	2.02	0.41
2:H:174:PHE:HA	2:H:259:ARG:HH21	1.86	0.41
2:D:205:LYS:HB3	2:D:240:ILE:HD11	2.04	0.40
2:F:198:HIS:ND1	2:F:526:ALA:HB2	2.36	0.40
2:H:303:LEU:O	2:H:307:VAL:HG23	2.21	0.40
2:B:631:VAL:HG12	2:B:642:ILE:HA	2.03	0.40
2:B:694:SER:O	2:B:697:LYS:HE2	2.21	0.40
2:F:754:TRP:HA	2:F:755:PRO:HD3	1.88	0.40
2:H:54:PRO:HB2	2:H:115:LYS:HB3	2.03	0.40
1:A:436:MET:O	1:A:436:MET:HE3	2.21	0.40
2:B:148:ARG:O	2:B:323:ALA:HA	2.21	0.40
2:B:460:THR:H	7:B:1780:HPA:HN7	1.70	0.40
2:D:236:ASN:HD22	2:D:236:ASN:HA	1.68	0.40
2:F:321:VAL:HG12	2:F:323:ALA:O	2.21	0.40
2:F:631:VAL:HG12	2:F:642:ILE:HA	2.02	0.40
1:G:295:PRO:HB2	1:G:296:PRO:HD3	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:460:VAL:HG11	2:D:632:VAL:HG11	2.02	0.40
2:D:303:LEU:O	2:D:307:VAL:HG23	2.21	0.40
1:E:401:LEU:HD11	1:E:411:ILE:HD13	2.03	0.40
1:A:206:THR:HG21	1:A:275:VAL:HG13	2.02	0.40
2:D:278:ILE:HG12	2:D:360:LEU:HD22	2.03	0.40
2:D:305:LEU:HD21	2:D:611:ARG:NE	2.35	0.40
2:F:700:ALA:O	2:F:701:PHE:C	2.60	0.40
2:H:360:LEU:HG	2:H:364:MET:HE3	2.03	0.40
2:H:507:ASP:HA	2:H:508:PRO:HD2	1.93	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	446/462 (96%)	415 (93%)	29 (6%)	2 (0%)	34	66
1	C	446/462 (96%)	425 (95%)	19 (4%)	2 (0%)	34	66
1	E	446/462 (96%)	416 (93%)	29 (6%)	1 (0%)	47	78
1	G	446/462 (96%)	415 (93%)	27 (6%)	4 (1%)	17	48
2	B	756/777 (97%)	722 (96%)	28 (4%)	6 (1%)	19	51
2	D	756/777 (97%)	725 (96%)	24 (3%)	7 (1%)	17	48
2	F	756/777 (97%)	721 (95%)	32 (4%)	3 (0%)	34	66
2	H	756/777 (97%)	711 (94%)	38 (5%)	7 (1%)	17	48
All	All	4808/4956 (97%)	4550 (95%)	226 (5%)	32 (1%)	22	54

All (32) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	458	SER

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Mol	Chain	Res	Type
2	D	187	GLU
2	D	458	SER
2	F	187	GLU
2	F	458	SER
2	H	458	SER
2	B	342	ARG
2	B	722	ILE
1	C	165	THR
2	F	342	ARG
1	G	221	GLU
1	G	378	GLU
2	H	187	GLU
2	H	342	ARG
2	B	227	GLY
2	D	342	ARG
1	E	374	GLY
1	G	375	SER
2	B	593	ARG
2	D	141	GLY
2	H	227	GLY
1	A	221	GLU
2	B	187	GLU
2	D	227	GLY
1	G	39	CYS
2	H	234	GLN
2	D	722	ILE
2	H	730	GLU
2	D	560	GLY
1	A	374	GLY
1	C	374	GLY
2	H	560	GLY

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	339/347 (98%)	324 (96%)	15 (4%)	28	61
1	C	339/347 (98%)	327 (96%)	12 (4%)	36	70
1	E	339/347 (98%)	321 (95%)	18 (5%)	22	54
1	G	339/347 (98%)	322 (95%)	17 (5%)	24	57
2	B	571/584 (98%)	545 (95%)	26 (5%)	27	60
2	D	571/584 (98%)	545 (95%)	26 (5%)	27	60
2	F	571/584 (98%)	549 (96%)	22 (4%)	32	66
2	H	571/584 (98%)	544 (95%)	27 (5%)	26	59
All	All	3640/3724 (98%)	3477 (96%)	163 (4%)	27	61

All (163) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	20	THR
1	A	33	THR
1	A	40	ASN
1	A	58	ARG
1	A	79	GLU
1	A	103	CYS
1	A	143	LEU
1	A	156	ASP
1	A	198	GLU
1	A	231	LEU
1	A	291	ILE
1	A	301	MET
1	A	401	LEU
1	A	409	ASP
1	A	425	LEU
2	B	10	ASP
2	B	16	VAL
2	B	152	GLU
2	B	161	LEU
2	B	175	TYR
2	B	215	HIS
2	B	222	ARG
2	B	256	ARG
2	B	268	LYS

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Mol	Chain	Res	Type
2	B	313	LEU
2	B	330	ARG
2	B	341	PHE
2	B	355	ARG
2	B	398	LYS
2	B	399	LYS
2	B	442	ARG
2	B	450	LEU
2	B	461	LEU
2	B	512	ARG
2	B	534	ASP
2	B	604	THR
2	B	617	ARG
2	B	632	VAL
2	B	683	ASP
2	B	708	PHE
2	B	743	LEU
1	C	20	THR
1	C	40	ASN
1	C	76	ARG
1	C	128	LEU
1	C	143	LEU
1	C	198	GLU
1	C	231	LEU
1	C	257	GLU
1	C	281	ILE
1	C	309	ARG
1	C	316	MET
1	C	461	MET
2	D	10	ASP
2	D	16	VAL
2	D	53	GLU
2	D	151	VAL
2	D	161	LEU
2	D	174	PHE
2	D	175	TYR
2	D	215	HIS
2	D	222	ARG
2	D	256	ARG
2	D	313	LEU
2	D	330	ARG
2	D	341	PHE

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Mol	Chain	Res	Type
2	D	355	ARG
2	D	398	LYS
2	D	399	LYS
2	D	442	ARG
2	D	450	LEU
2	D	461	LEU
2	D	512	ARG
2	D	617	ARG
2	D	632	VAL
2	D	635	ARG
2	D	708	PHE
2	D	741	LEU
2	D	743	LEU
1	E	40	ASN
1	E	43	ASP
1	E	58	ARG
1	E	79	GLU
1	E	103	CYS
1	E	128	LEU
1	E	143	LEU
1	E	198	GLU
1	E	231	LEU
1	E	237	THR
1	E	281	ILE
1	E	291	ILE
1	E	301	MET
1	E	309	ARG
1	E	316	MET
1	E	359	GLN
1	E	390	VAL
1	E	428	MET
2	F	2	SER
2	F	10	ASP
2	F	151	VAL
2	F	161	LEU
2	F	175	TYR
2	F	215	HIS
2	F	222	ARG
2	F	256	ARG
2	F	268	LYS
2	F	313	LEU
2	F	330	ARG

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Mol	Chain	Res	Type
2	F	341	PHE
2	F	355	ARG
2	F	398	LYS
2	F	399	LYS
2	F	450	LEU
2	F	512	ARG
2	F	516	THR
2	F	632	VAL
2	F	635	ARG
2	F	708	PHE
2	F	743	LEU
1	G	33	THR
1	G	40	ASN
1	G	58	ARG
1	G	90	PRO
1	G	103	CYS
1	G	128	LEU
1	G	143	LEU
1	G	156	ASP
1	G	198	GLU
1	G	200	THR
1	G	231	LEU
1	G	257	GLU
1	G	281	ILE
1	G	291	ILE
1	G	301	MET
1	G	309	ARG
1	G	401	LEU
2	H	2	SER
2	H	10	ASP
2	H	16	VAL
2	H	73	ASP
2	H	151	VAL
2	H	165	CYS
2	H	175	TYR
2	H	215	HIS
2	H	216	ASP
2	H	222	ARG
2	H	256	ARG
2	H	268	LYS
2	H	271	ASP
2	H	313	LEU

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Mol	Chain	Res	Type
2	H	330	ARG
2	H	341	PHE
2	H	355	ARG
2	H	398	LYS
2	H	399	LYS
2	H	450	LEU
2	H	458	SER
2	H	461	LEU
2	H	512	ARG
2	H	534	ASP
2	H	617	ARG
2	H	632	VAL
2	H	708	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	40	ASN
1	A	61	ASN
1	A	359	GLN
2	B	208	HIS
2	B	293	HIS
2	B	359	HIS
2	B	463	HIS
1	C	40	ASN
1	C	61	ASN
2	D	236	ASN
2	D	426	ASN
2	D	463	HIS
1	E	40	ASN
1	E	61	ASN
1	E	369	ASN
2	F	236	ASN
2	F	293	HIS
2	F	359	HIS
2	F	426	ASN
2	F	463	HIS
1	G	40	ASN
1	G	359	GLN
2	H	204	HIS
2	H	208	HIS
2	H	236	ASN

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Mol	Chain	Res	Type
2	H	293	HIS
2	H	359	HIS
2	H	426	ASN
2	H	463	HIS
2	H	466	GLN
2	H	510	GLN
2	H	572	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 ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 28 ligands modelled in this entry, 4 are monoatomic - leaving 24 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
5	MTE	B	1778	8	21,26,26	3.73	5 (23%)	21,40,40	2.41	6 (28%)
7	HPA	H	1780	-	8,11,11	2.18	3 (37%)	5,15,15	3.15	3 (60%)
7	HPA	F	1780	-	8,11,11	2.19	3 (37%)	5,15,15	3.18	3 (60%)
7	HPA	D	1780	-	8,11,11	2.23	3 (37%)	5,15,15	3.18	3 (60%)
3	FES	C	1463	1	0,4,4	-	-	-		
8	MOM	F	1781	5	0,3,3	-	-	-		

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
5	MTE	H	1778	8	21,26,26	3.74	6 (28%)	21,40,40	2.26	7 (33%)
5	MTE	F	1778	8	21,26,26	3.74	5 (23%)	21,40,40	2.25	9 (42%)
4	FAD	A	1465	-	53,58,58	1.29	4 (7%)	68,89,89	1.31	9 (13%)
3	FES	G	1463	1	0,4,4	-	-	-		
8	MOM	H	1781	5	0,3,3	-	-	-		
3	FES	E	1463	1	0,4,4	-	-	-		
3	FES	E	1464	1	0,4,4	-	-	-		
8	MOM	B	1781	5	0,3,3	-	-	-		
4	FAD	C	1465	-	53,58,58	1.29	3 (5%)	68,89,89	1.35	9 (13%)
3	FES	A	1464	1	0,4,4	-	-	-		
3	FES	C	1464	1	0,4,4	-	-	-		
4	FAD	G	1465	-	53,58,58	1.31	4 (7%)	68,89,89	1.29	9 (13%)
5	MTE	D	1778	8	21,26,26	3.81	5 (23%)	21,40,40	2.51	6 (28%)
3	FES	A	1463	1	0,4,4	-	-	-		
3	FES	G	1464	1	0,4,4	-	-	-		
4	FAD	E	1465	-	53,58,58	1.28	3 (5%)	68,89,89	1.33	9 (13%)
7	HPA	B	1780	-	8,11,11	2.19	3 (37%)	5,15,15	3.12	3 (60%)
8	MOM	D	1781	5	0,3,3	-	-	-		

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	MTE	B	1778	8	1/1/6/8	3/6/34/34	0/3/3/3
7	HPA	H	1780	-	-	-	0/2/2/2
7	HPA	F	1780	-	-	-	0/2/2/2
7	HPA	D	1780	-	-	-	0/2/2/2
3	FES	C	1463	1	-	-	0/1/1/1
5	MTE	H	1778	8	1/1/6/8	1/6/34/34	0/3/3/3
5	MTE	F	1778	8	1/1/6/8	5/6/34/34	0/3/3/3
4	FAD	A	1465	-	-	10/30/50/50	0/6/6/6
3	FES	G	1463	1	-	-	0/1/1/1
3	FES	E	1463	1	-	-	0/1/1/1
3	FES	E	1464	1	-	-	0/1/1/1
4	FAD	C	1465	-	-	10/30/50/50	0/6/6/6
3	FES	A	1464	1	-	-	0/1/1/1
3	FES	C	1464	1	-	-	0/1/1/1
5	MTE	D	1778	8	1/1/6/8	5/6/34/34	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	FAD	G	1465	-	-	11/30/50/50	0/6/6/6
3	FES	A	1463	1	-	-	0/1/1/1
3	FES	G	1464	1	-	-	0/1/1/1
4	FAD	E	1465	-	-	9/30/50/50	0/6/6/6
7	HPA	B	1780	-	-	-	0/2/2/2

All (47) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	D	1778	MTE	C4'-C3'	-13.60	1.33	1.52
5	H	1778	MTE	C4'-C3'	-13.25	1.34	1.52
5	B	1778	MTE	C4'-C3'	-13.03	1.34	1.52
5	F	1778	MTE	C4'-C3'	-12.88	1.34	1.52
5	F	1778	MTE	C6-N5	-8.21	1.33	1.45
5	D	1778	MTE	C6-N5	-7.86	1.34	1.45
5	B	1778	MTE	C6-N5	-7.72	1.34	1.45
5	H	1778	MTE	C6-N5	-7.60	1.34	1.45
4	E	1465	FAD	C4X-N5	5.23	1.40	1.30
5	B	1778	MTE	C9-C4	5.11	1.48	1.41
4	C	1465	FAD	C4X-N5	5.07	1.40	1.30
5	D	1778	MTE	C9-C4	5.03	1.48	1.41
4	G	1465	FAD	C4X-N5	5.01	1.40	1.30
4	A	1465	FAD	C4X-N5	4.87	1.40	1.30
5	H	1778	MTE	C9-C4	4.84	1.48	1.41
5	F	1778	MTE	C9-C4	4.82	1.48	1.41
7	D	1780	HPA	C2-N3	4.23	1.38	1.32
7	H	1780	HPA	C2-N3	4.23	1.38	1.32
7	F	1780	HPA	C2-N3	4.21	1.38	1.32
4	G	1465	FAD	O4B-C1B	4.21	1.47	1.41
7	B	1780	HPA	C2-N3	4.19	1.38	1.32
4	A	1465	FAD	O4B-C1B	3.98	1.46	1.41
4	C	1465	FAD	O4B-C1B	3.88	1.46	1.41
4	E	1465	FAD	C10-N1	3.84	1.41	1.33
4	C	1465	FAD	C10-N1	3.84	1.41	1.33
4	E	1465	FAD	O4B-C1B	3.76	1.46	1.41
5	B	1778	MTE	C9-N5	3.70	1.45	1.38
5	H	1778	MTE	C9-N5	3.68	1.45	1.38
4	A	1465	FAD	C10-N1	3.67	1.40	1.33
4	G	1465	FAD	C10-N1	3.67	1.40	1.33
7	D	1780	HPA	C6-N1	3.64	1.39	1.33
5	D	1778	MTE	C9-N5	3.55	1.45	1.38
7	B	1780	HPA	C6-N1	3.53	1.39	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	F	1780	HPA	C6-N1	3.46	1.39	1.33
5	F	1778	MTE	C9-N5	3.35	1.44	1.38
7	H	1780	HPA	C6-N1	3.34	1.38	1.33
5	B	1778	MTE	C9-C10	3.30	1.47	1.41
5	H	1778	MTE	C9-C10	3.18	1.47	1.41
5	D	1778	MTE	C9-C10	3.11	1.47	1.41
5	F	1778	MTE	C9-C10	3.10	1.47	1.41
7	F	1780	HPA	C2-N1	2.72	1.39	1.33
7	B	1780	HPA	C2-N1	2.69	1.38	1.33
7	D	1780	HPA	C2-N1	2.68	1.38	1.33
7	H	1780	HPA	C2-N1	2.66	1.38	1.33
5	H	1778	MTE	C7-C6	-2.31	1.51	1.53
4	A	1465	FAD	C10-N10	2.21	1.42	1.37
4	G	1465	FAD	C10-N10	2.08	1.41	1.37

All (76) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	H	1778	MTE	C4-C9-N5	6.39	124.48	119.12
5	D	1778	MTE	C4-C9-N5	6.32	124.42	119.12
7	D	1780	HPA	N3-C2-N1	-5.58	119.96	128.68
5	B	1778	MTE	C4-C9-N5	5.54	123.77	119.12
7	H	1780	HPA	N3-C2-N1	-5.53	120.03	128.68
7	F	1780	HPA	N3-C2-N1	-5.53	120.03	128.68
7	B	1780	HPA	N3-C2-N1	-5.44	120.17	128.68
5	B	1778	MTE	O3'-C7-C6	5.26	112.47	108.96
5	D	1778	MTE	O3'-C7-C6	5.24	112.46	108.96
5	F	1778	MTE	C4-C9-N5	5.15	123.44	119.12
4	E	1465	FAD	N3A-C2A-N1A	-4.85	121.10	128.68
4	G	1465	FAD	N3A-C2A-N1A	-4.75	121.25	128.68
4	A	1465	FAD	N3A-C2A-N1A	-4.60	121.48	128.68
4	C	1465	FAD	N3A-C2A-N1A	-4.42	121.77	128.68
5	H	1778	MTE	C2-N3-C4	3.92	122.15	115.93
5	F	1778	MTE	C2-N3-C4	3.85	122.04	115.93
5	D	1778	MTE	C2-N3-C4	3.81	121.98	115.93
5	B	1778	MTE	C2-N3-C4	3.66	121.75	115.93
4	C	1465	FAD	P-O3P-PA	-3.45	120.99	132.83
4	A	1465	FAD	P-O3P-PA	-3.45	121.00	132.83
4	E	1465	FAD	P-O3P-PA	-3.45	121.00	132.83
5	F	1778	MTE	C10-C9-C4	3.42	117.61	114.57
5	D	1778	MTE	C7-C6-C1'	3.36	118.06	110.53
4	C	1465	FAD	C4-N3-C2	-3.26	119.61	125.64

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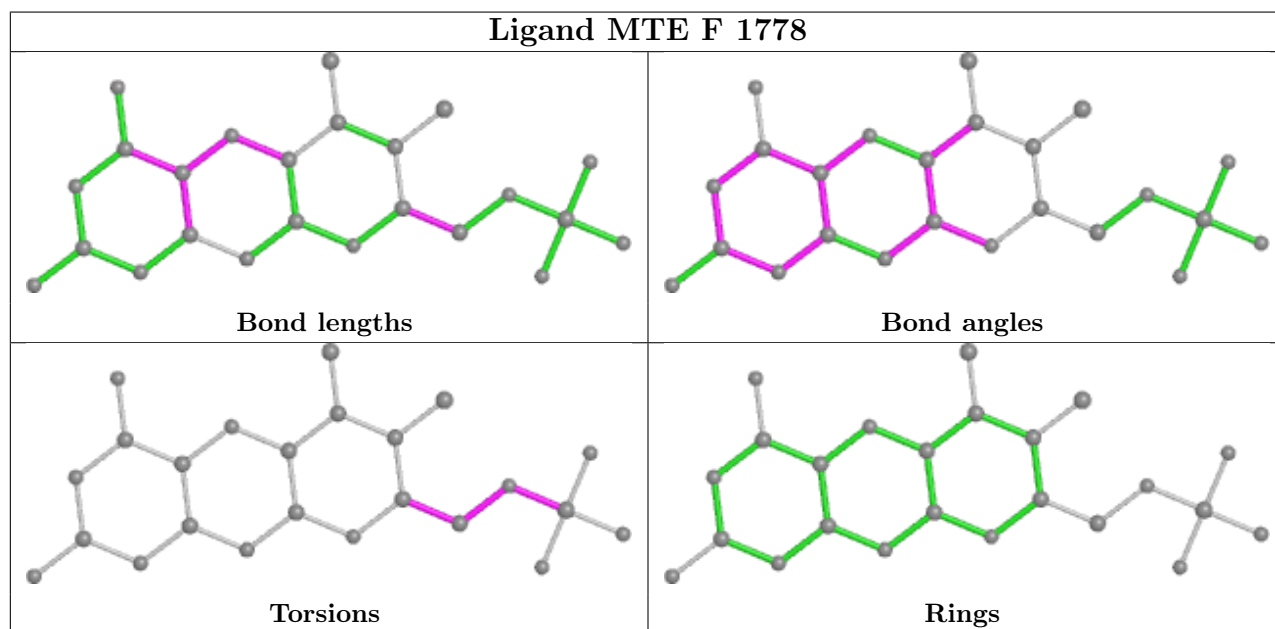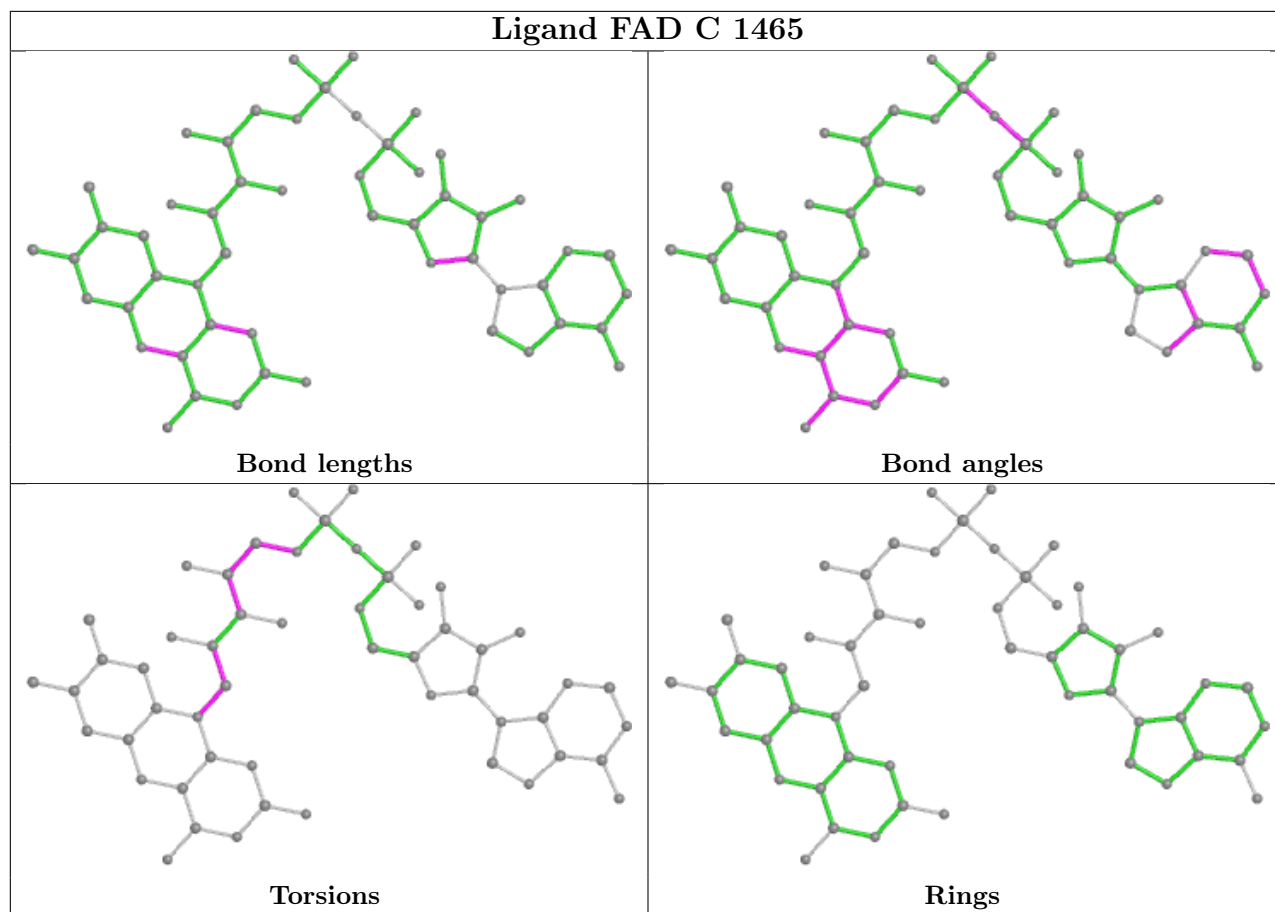| Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	G	1465	FAD	C4-N3-C2	-3.23	119.68	125.64
4	A	1465	FAD	C4-N3-C2	-3.18	119.77	125.64
5	F	1778	MTE	C2-N1-C10	3.15	121.59	114.54
4	E	1465	FAD	C4-N3-C2	-3.14	119.83	125.64
5	F	1778	MTE	C7-C6-C1'	3.14	117.56	110.53
5	B	1778	MTE	C2-N1-C10	3.11	121.50	114.54
5	B	1778	MTE	C7-C6-C1'	3.06	117.40	110.53
5	D	1778	MTE	C2-N1-C10	3.06	121.40	114.54
7	D	1780	HPA	C2-N3-C4	3.03	120.53	113.45
5	H	1778	MTE	C2-N1-C10	3.02	121.30	114.54
7	F	1780	HPA	C2-N3-C4	3.01	120.50	113.45
7	B	1780	HPA	C2-N3-C4	2.98	120.43	113.45
7	H	1780	HPA	C2-N3-C4	2.96	120.37	113.45
4	E	1465	FAD	C4X-C4-N3	2.90	120.55	113.19
5	H	1778	MTE	C7-C6-C1'	2.83	116.88	110.53
4	C	1465	FAD	C10-C4X-N5	-2.81	118.90	124.86
4	G	1465	FAD	C4X-C10-N10	2.78	120.54	116.48
4	C	1465	FAD	C4X-C4-N3	2.78	120.24	113.19
5	B	1778	MTE	C10-C9-C4	2.77	117.03	114.57
4	C	1465	FAD	C4X-C10-N10	2.77	120.53	116.48
4	G	1465	FAD	C4X-C4-N3	2.77	120.21	113.19
4	G	1465	FAD	P-O3P-PA	-2.69	123.58	132.83
4	A	1465	FAD	C4X-C4-N3	2.64	119.91	113.19
4	A	1465	FAD	C4X-C10-N10	2.58	120.25	116.48
4	G	1465	FAD	C10-C4X-N5	-2.58	119.39	124.86
5	D	1778	MTE	C10-C9-C4	2.55	116.84	114.57
4	E	1465	FAD	C4X-C10-N10	2.53	120.18	116.48
4	E	1465	FAD	C10-C4X-N5	-2.51	119.53	124.86
4	A	1465	FAD	O4-C4-C4X	-2.46	120.07	126.60
7	F	1780	HPA	C2-N1-C6	2.44	119.97	115.88
7	D	1780	HPA	C2-N1-C6	2.43	119.96	115.88
7	B	1780	HPA	C2-N1-C6	2.43	119.95	115.88
4	A	1465	FAD	C10-C4X-N5	-2.38	119.80	124.86
4	A	1465	FAD	C4X-C10-N1	-2.37	119.23	124.73
7	H	1780	HPA	C2-N1-C6	2.33	119.78	115.88
4	G	1465	FAD	C4X-C10-N1	-2.29	119.42	124.73
4	A	1465	FAD	C4-C4X-C10	2.29	120.63	116.79
4	E	1465	FAD	C4X-C10-N1	-2.27	119.47	124.73
4	E	1465	FAD	O4-C4-C4X	-2.25	120.64	126.60
5	H	1778	MTE	C10-C9-C4	2.24	116.56	114.57
4	C	1465	FAD	C4X-C10-N1	-2.24	119.54	124.73
4	C	1465	FAD	O4-C4-C4X	-2.22	120.70	126.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	C	1465	FAD	C4A-C5A-N7A	-2.16	107.15	109.40
4	G	1465	FAD	O4-C4-C4X	-2.14	120.93	126.60
4	E	1465	FAD	C9A-C5X-N5	-2.14	120.11	122.43
5	F	1778	MTE	N1-C2-N3	-2.13	122.07	125.42
5	F	1778	MTE	O3'-C7-N8	2.12	110.75	108.57
5	H	1778	MTE	N1-C2-N3	-2.12	122.10	125.42
5	F	1778	MTE	O3'-C7-C6	2.07	110.35	108.96
4	G	1465	FAD	C4-C4X-C10	2.06	120.25	116.79
5	H	1778	MTE	O3'-C7-C6	-2.04	107.61	108.96
5	F	1778	MTE	C9-C4-N3	-2.02	118.27	124.01

All (4) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
5	B	1778	MTE	C3'
5	D	1778	MTE	C3'
5	F	1778	MTE	C3'
5	H	1778	MTE	C3'

All (54) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1465	FAD	N10-C1'-C2'-O2'
4	A	1465	FAD	N10-C1'-C2'-C3'
4	A	1465	FAD	C2'-C3'-C4'-O4'
4	A	1465	FAD	C2'-C3'-C4'-C5'
4	A	1465	FAD	O3'-C3'-C4'-O4'
4	A	1465	FAD	O3'-C3'-C4'-C5'
4	C	1465	FAD	C2'-C1'-N10-C10
4	C	1465	FAD	N10-C1'-C2'-O2'
4	C	1465	FAD	N10-C1'-C2'-C3'
4	C	1465	FAD	C2'-C3'-C4'-O4'
4	C	1465	FAD	C2'-C3'-C4'-C5'
4	C	1465	FAD	O3'-C3'-C4'-O4'
4	C	1465	FAD	O3'-C3'-C4'-C5'
4	C	1465	FAD	C3'-C4'-C5'-O5'
4	C	1465	FAD	O4'-C4'-C5'-O5'
4	E	1465	FAD	N10-C1'-C2'-O2'
4	E	1465	FAD	N10-C1'-C2'-C3'
4	E	1465	FAD	C2'-C3'-C4'-O4'
4	E	1465	FAD	C2'-C3'-C4'-C5'
4	E	1465	FAD	O3'-C3'-C4'-O4'

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Mol	Chain	Res	Type	Atoms
4	E	1465	FAD	O3'-C3'-C4'-C5'
4	E	1465	FAD	C3'-C4'-C5'-O5'
4	E	1465	FAD	O4'-C4'-C5'-O5'
4	G	1465	FAD	N10-C1'-C2'-O2'
4	G	1465	FAD	N10-C1'-C2'-C3'
4	G	1465	FAD	C2'-C3'-C4'-C5'
4	G	1465	FAD	C3'-C4'-C5'-O5'
5	B	1778	MTE	O3'-C3'-C4'-O4'
5	D	1778	MTE	O3'-C3'-C4'-O4'
5	D	1778	MTE	C4'-O4'-P-O2P
5	D	1778	MTE	C4'-O4'-P-O3P
5	F	1778	MTE	C4'-O4'-P-O2P
5	F	1778	MTE	C4'-O4'-P-O3P
5	H	1778	MTE	O3'-C3'-C4'-O4'
4	G	1465	FAD	O3'-C3'-C4'-O4'
4	G	1465	FAD	C2'-C3'-C4'-O4'
4	G	1465	FAD	O3'-C3'-C4'-C5'
4	A	1465	FAD	O4'-C4'-C5'-O5'
4	G	1465	FAD	O4'-C4'-C5'-O5'
4	A	1465	FAD	C3'-C4'-C5'-O5'
5	D	1778	MTE	C4'-O4'-P-O1P
5	F	1778	MTE	C4'-O4'-P-O1P
5	B	1778	MTE	C3'-C4'-O4'-P
4	A	1465	FAD	C2'-C1'-N10-C10
4	E	1465	FAD	C2'-C1'-N10-C10
4	G	1465	FAD	C2'-C1'-N10-C10
5	F	1778	MTE	O3'-C3'-C4'-O4'
5	F	1778	MTE	C3'-C4'-O4'-P
4	C	1465	FAD	C4'-C5'-O5'-P
4	G	1465	FAD	C4'-C5'-O5'-P
5	B	1778	MTE	C4'-O4'-P-O1P
4	A	1465	FAD	C4'-C5'-O5'-P
5	D	1778	MTE	C3'-C4'-O4'-P
4	G	1465	FAD	PA-O3P-P-O1P

There are no ring outliers.

16 monomers are involved in 33 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	1778	MTE	1	0
7	F	1780	HPA	1	0
7	D	1780	HPA	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	F	1781	MOM	2	0
5	H	1778	MTE	2	0
5	F	1778	MTE	1	0
4	A	1465	FAD	5	0
3	G	1463	FES	1	0
8	H	1781	MOM	2	0
8	B	1781	MOM	2	0
4	C	1465	FAD	3	0
4	G	1465	FAD	4	0
5	D	1778	MTE	1	0
4	E	1465	FAD	3	0
7	B	1780	HPA	2	0
8	D	1781	MOM	2	0

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

Ligand MTE B 1778

Bond lengths

Bond angles

Torsions

Rings

Ligand MTE H 1778

Bond lengths

Bond angles

Torsions

Rings

Ligand MTE F 1778

Bond lengths

Bond angles

Torsions

Rings

Ligand FAD A 1465

Bond lengths

Bond angles

Torsions

Rings

Ligand FAD C 1465

Bond lengths

Bond angles

Torsions

Rings

Ligand FAD G 1465

Bond lengths

Bond angles

Torsions

Rings

Ligand MTE D 1778

Bond lengths

Bond angles

Torsions

Rings

Ligand FAD E 1465

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å²)	Q<0.9
1	A	450/462 (97%)	0.26	23 (5%)	28	24	40, 63, 78, 79	0
1	C	450/462 (97%)	0.06	2 (0%)	92	93	40, 63, 77, 79	0
1	E	450/462 (97%)	0.19	15 (3%)	46	41	40, 63, 78, 79	0
1	G	450/462 (97%)	0.34	33 (7%)	15	11	40, 63, 78, 79	0
2	B	760/777 (97%)	-0.27	2 (0%)	94	94	34, 47, 60, 65	0
2	D	760/777 (97%)	-0.21	4 (0%)	91	91	34, 46, 60, 65	0
2	F	760/777 (97%)	-0.31	2 (0%)	94	94	35, 46, 60, 65	0
2	H	760/777 (97%)	-0.29	3 (0%)	92	93	35, 47, 60, 66	0
All	All	4840/4956 (97%)	-0.09	84 (1%)	70	69	34, 51, 75, 79	0

All (84) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	166	LEU	5.2
1	A	239	ASP	4.4
1	A	413	ALA	4.2
1	A	377	ILE	4.1
1	G	239	ASP	3.9
1	G	182	LEU	3.8
1	G	401	LEU	3.7
1	C	166	LEU	3.7
1	G	371	THR	3.5
1	G	378	GLU	3.5
1	E	302	GLY	3.4
1	A	166	LEU	3.3
1	A	375	SER	3.2
1	E	312	GLU	3.2
1	G	238	PRO	3.2
1	A	403	GLY	3.1

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Mol	Chain	Res	Type	RSRZ
2	D	157	GLY	3.1
1	E	461	MET	3.0
1	A	411	ILE	3.0
2	D	398	LYS	3.0
2	F	398	LYS	2.9
1	G	166	LEU	2.9
1	G	333	GLY	2.9
1	A	401	LEU	2.8
1	G	377	ILE	2.8
2	D	777	ALA	2.8
1	E	194	LEU	2.7
2	H	576	SER	2.7
1	G	19	PRO	2.6
1	E	218	ASP	2.6
1	G	15	ARG	2.5
1	G	376	LYS	2.5
1	G	402	ILE	2.5
1	A	417	LEU	2.5
1	C	165	THR	2.5
1	E	195	ALA	2.5
1	G	334	GLU	2.5
2	H	777	ALA	2.5
1	A	238	PRO	2.5
1	G	403	GLY	2.5
2	B	777	ALA	2.5
1	A	461	MET	2.5
1	G	332	PRO	2.4
1	G	183	PRO	2.4
1	A	313	ARG	2.4
1	E	165	THR	2.4
1	G	447	VAL	2.4
1	A	240	GLY	2.4
2	B	398	LYS	2.4
1	A	402	ILE	2.4
1	E	191	ASP	2.4
1	G	310	GLY	2.4
1	G	380	ALA	2.4
1	G	17	GLU	2.4
1	A	379	THR	2.3
1	G	240	GLY	2.3
1	A	192	TRP	2.3
1	G	379	THR	2.3

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Mol	Chain	Res	Type	RSRZ
1	E	181	PHE	2.3
1	G	221	GLU	2.2
1	A	418	LEU	2.2
1	E	189	LEU	2.1
1	G	309	ARG	2.1
1	A	191	ASP	2.1
1	E	183	PRO	2.1
1	G	331	ARG	2.1
1	G	322	PHE	2.1
1	A	396	ALA	2.1
1	E	333	GLY	2.1
1	A	182	LEU	2.1
1	G	181	PHE	2.1
1	G	411	ILE	2.1
1	A	344	SER	2.0
1	E	239	ASP	2.0
1	A	150	ALA	2.0
2	D	560	GLY	2.0
1	A	378	GLU	2.0
1	E	337	GLU	2.0
1	G	242	GLY	2.0
1	G	394	ALA	2.0
2	F	777	ALA	2.0
2	H	398	LYS	2.0
1	G	190	ALA	2.0
1	G	455	VAL	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	HPA	B	1780	10/10	0.85	0.20	57,58,58,58	0
7	HPA	D	1780	10/10	0.85	0.19	52,53,54,54	0
7	HPA	F	1780	10/10	0.85	0.19	55,56,57,57	0
4	FAD	G	1465	53/53	0.89	0.18	68,70,76,76	0
7	HPA	H	1780	10/10	0.91	0.16	59,59,60,60	0
4	FAD	E	1465	53/53	0.92	0.17	51,58,73,73	0
5	MTE	B	1778	24/24	0.93	0.29	50,52,54,55	24
5	MTE	H	1778	24/24	0.93	0.26	60,61,64,65	24
4	FAD	A	1465	53/53	0.93	0.18	58,61,68,68	0
5	MTE	F	1778	24/24	0.94	0.27	39,40,42,42	24
5	MTE	D	1778	24/24	0.94	0.26	30,35,39,39	24
4	FAD	C	1465	53/53	0.95	0.16	32,35,44,44	0
8	MOM	H	1781	4/4	0.96	0.10	63,65,66,66	3
6	CA	F	1779	1/1	0.97	0.23	54,54,54,54	0
6	CA	B	1779	1/1	0.97	0.23	55,55,55,55	0
6	CA	D	1779	1/1	0.98	0.15	48,48,48,48	0
3	FES	E	1463	4/4	0.98	0.17	43,43,45,45	0
6	CA	H	1779	1/1	0.98	0.24	65,65,65,65	0
3	FES	C	1464	4/4	0.98	0.21	42,42,44,46	0
3	FES	G	1464	4/4	0.99	0.21	53,55,55,56	0
3	FES	C	1463	4/4	0.99	0.20	38,40,40,41	0
3	FES	A	1463	4/4	0.99	0.20	41,42,42,43	0
3	FES	A	1464	4/4	0.99	0.23	52,52,53,53	0
3	FES	E	1464	4/4	0.99	0.21	55,56,56,58	0
8	MOM	B	1781	4/4	0.99	0.06	55,55,56,58	3
8	MOM	F	1781	4/4	0.99	0.12	40,41,42,42	3
3	FES	G	1463	4/4	0.99	0.17	47,49,50,50	0
8	MOM	D	1781	4/4	1.00	0.08	38,38,39,40	3

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 G 1465:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
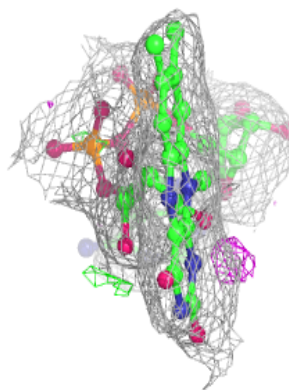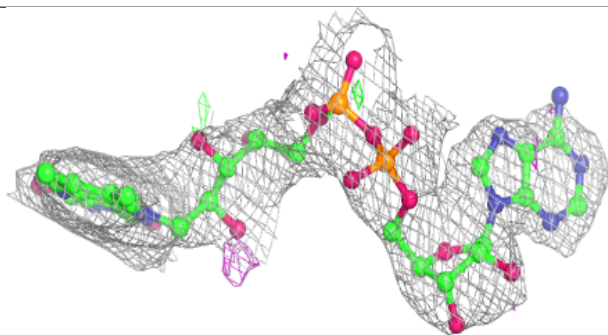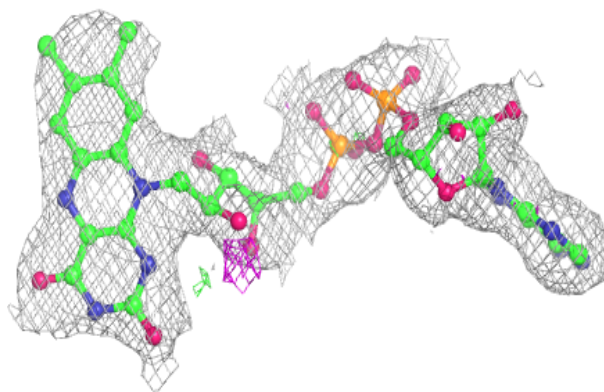
Electron density around FAD E 1465:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
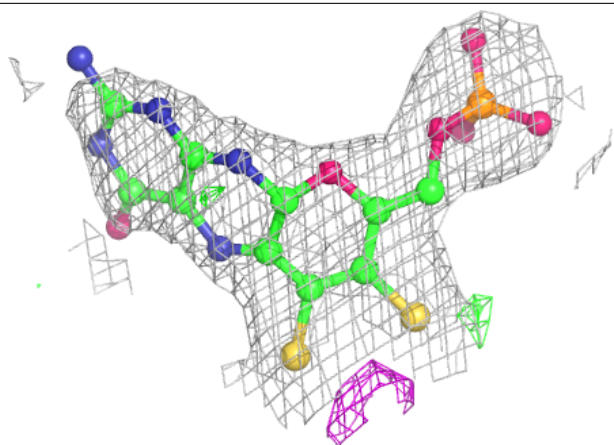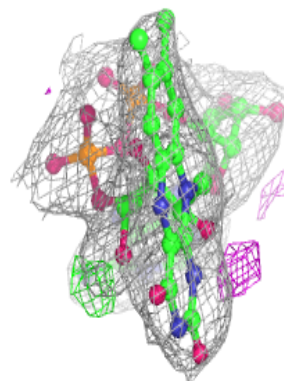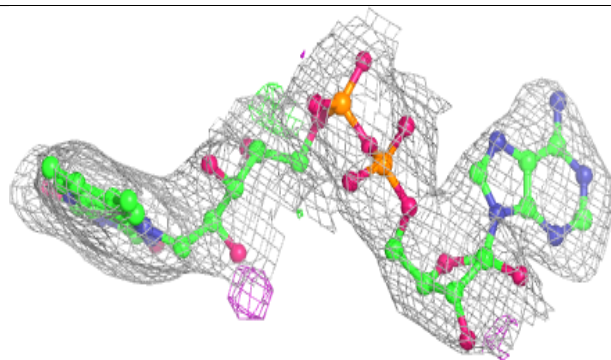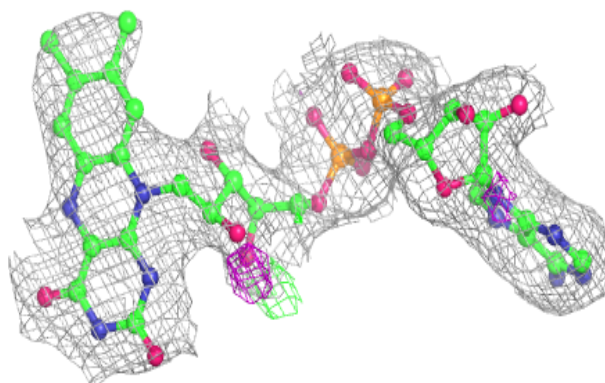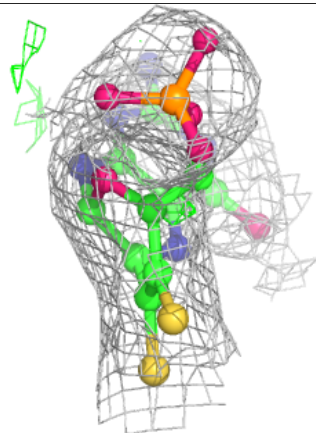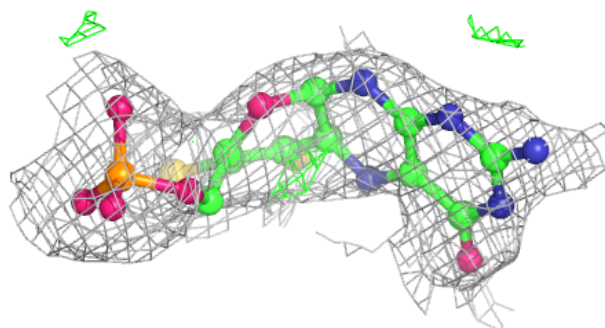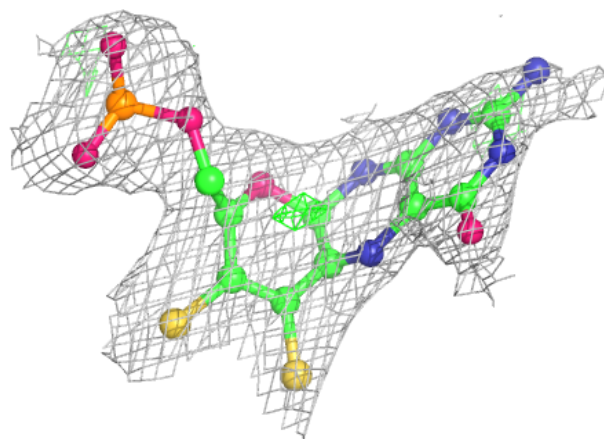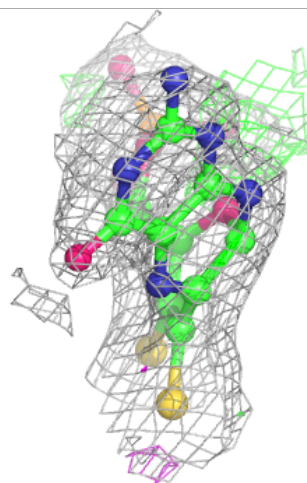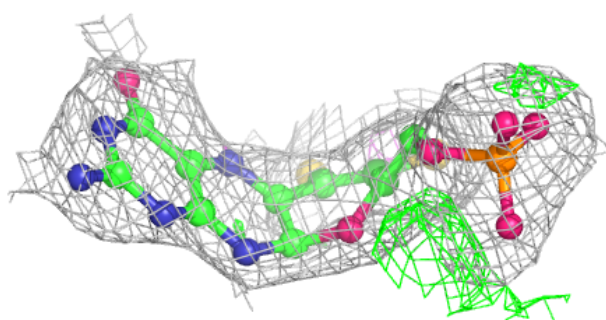$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
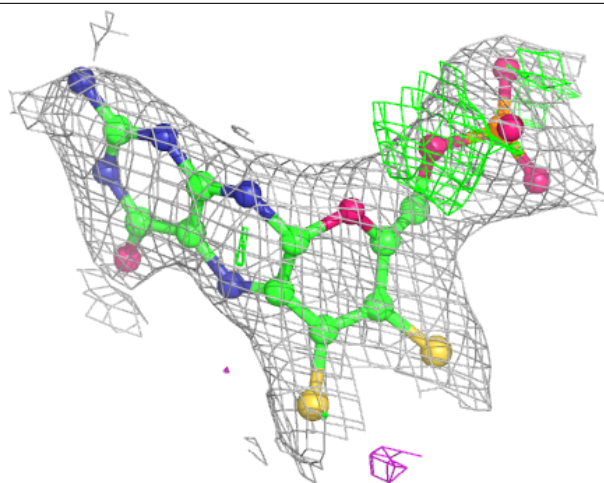and green (positive)
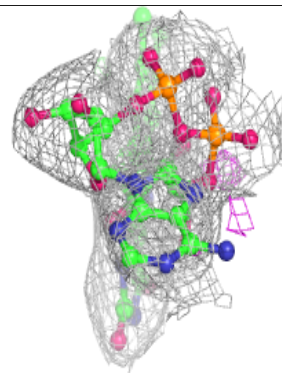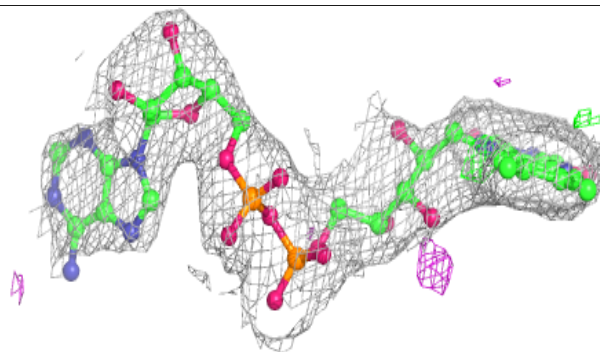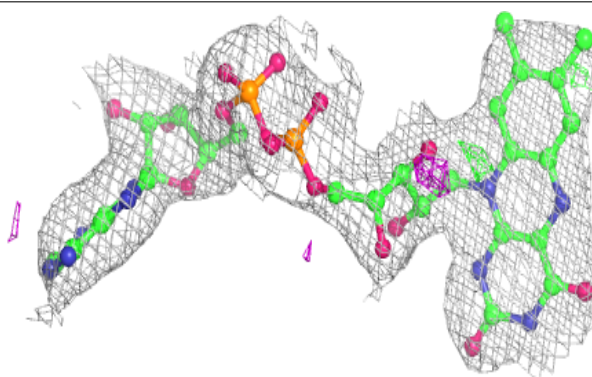
Electron density around MTE B 1778:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
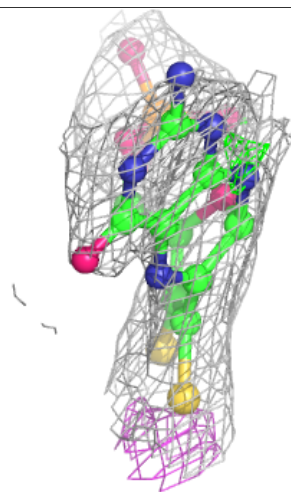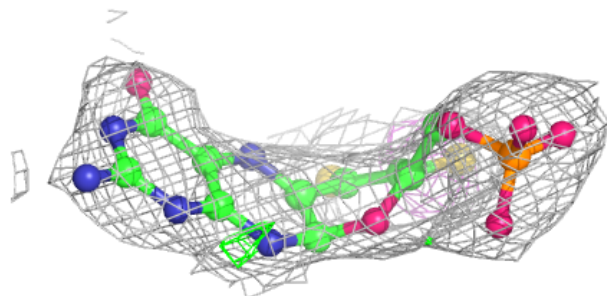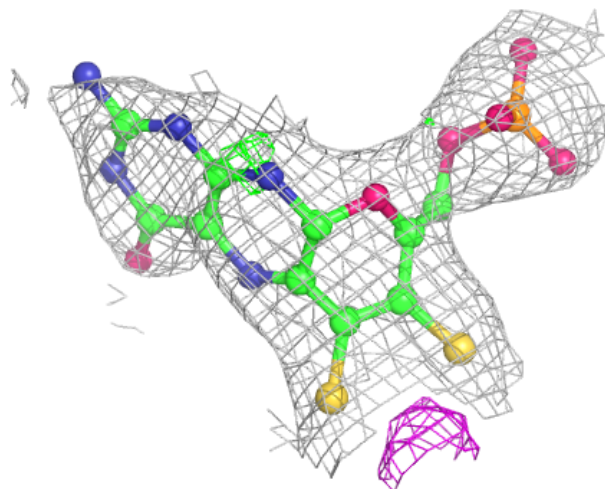
Electron density around MTE H 1778:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
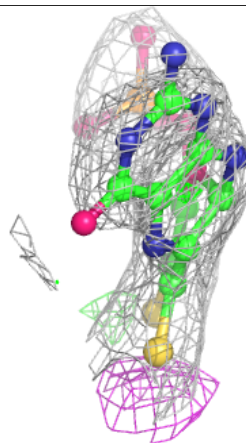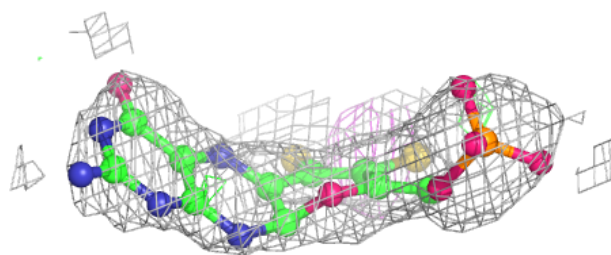
Electron density around FAD A 1465:

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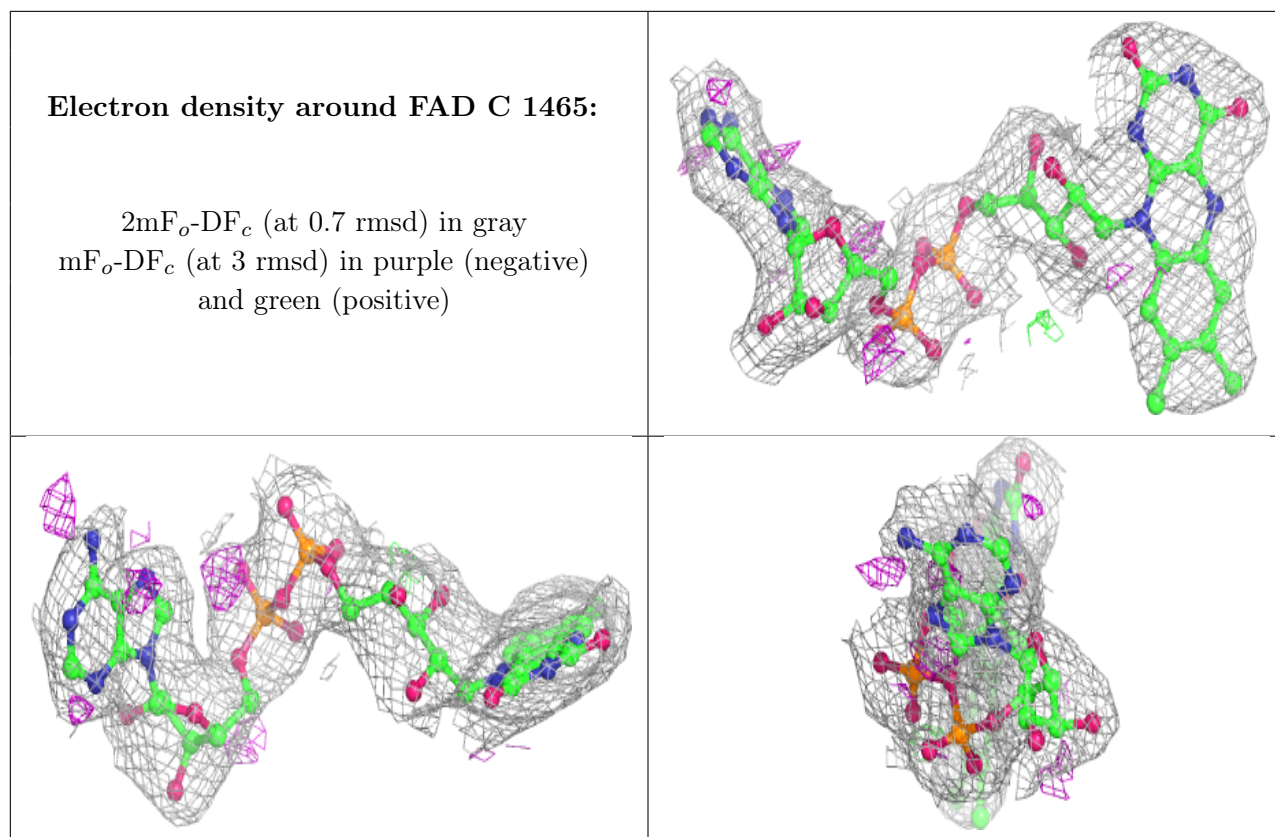and green (positive)

Electron density around MTE F 1778:

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

Electron density around MTE D 1778:

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 1465:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.