



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 02:13 PM UTC

PDB ID : 3WCA / pdb_00003wca
Title : The complex structure of TcSQS with ligand, FSPP
Authors : Shang, N.; Li, Q.; Ko, T.P.; Chan, H.C.; Huang, C.H.; Oldfield, E.; Guo, R.T.
Deposited on : 2013-05-26
Resolution : 2.24 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

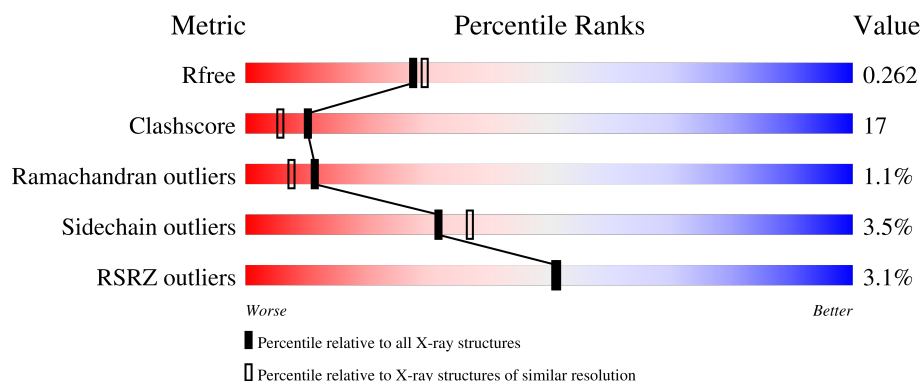
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.24 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	3416 (2.26-2.22)
Clashscore	190562	3556 (2.26-2.22)
Ramachandran outliers	187476	3500 (2.26-2.22)
Sidechain outliers	187428	3501 (2.26-2.22)
RSRZ outliers	180081	3415 (2.26-2.22)

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

Mol	Chain	Length	Quality of chain
1	A	365	9% 70% 22% • 7%
1	B	365	63% 25% 5% 7%
1	C	365	69% 23% • 7%
1	D	365	9% 50% 39% 5% 7%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 11869 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 Farnesyltransferase, putative.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	341	Total	C	N	O	S	0	0	0
			2751	1745	473	511	22			
1	B	341	Total	C	N	O	S	0	0	0
			2751	1745	473	511	22			
1	C	341	Total	C	N	O	S	0	0	0
			2751	1745	473	511	22			
1	D	341	Total	C	N	O	S	0	0	0
			2752	1745	473	512	22			

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	4	MET	-	expression tag	UNP Q4CWB4
A	5	GLY	-	expression tag	UNP Q4CWB4
A	6	SER	-	expression tag	UNP Q4CWB4
A	7	SER	-	expression tag	UNP Q4CWB4
A	8	HIS	-	expression tag	UNP Q4CWB4
A	9	HIS	-	expression tag	UNP Q4CWB4
A	10	HIS	-	expression tag	UNP Q4CWB4
A	11	HIS	-	expression tag	UNP Q4CWB4
A	12	HIS	-	expression tag	UNP Q4CWB4
A	13	HIS	-	expression tag	UNP Q4CWB4
A	14	SER	-	expression tag	UNP Q4CWB4
A	15	SER	-	expression tag	UNP Q4CWB4
A	16	GLY	-	expression tag	UNP Q4CWB4
A	17	LEU	-	expression tag	UNP Q4CWB4
A	18	VAL	-	expression tag	UNP Q4CWB4
A	19	PRO	-	expression tag	UNP Q4CWB4
A	20	ARG	-	expression tag	UNP Q4CWB4
A	21	GLY	-	expression tag	UNP Q4CWB4
A	22	SER	-	expression tag	UNP Q4CWB4
A	23	HIS	-	expression tag	UNP Q4CWB4
A	24	MET	-	expression tag	UNP Q4CWB4

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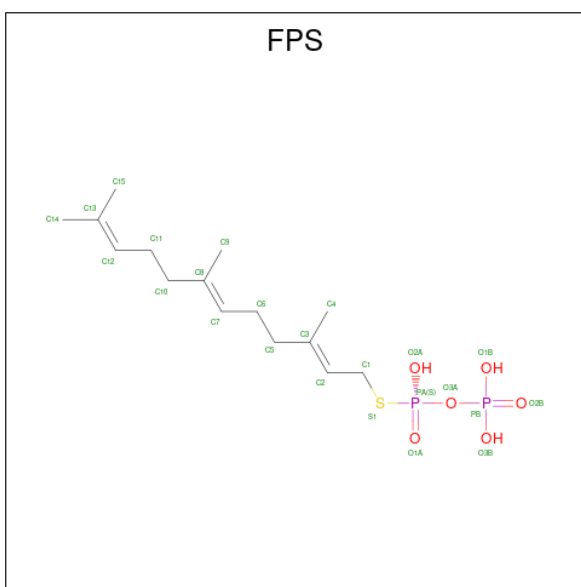
Chain	Residue	Modelled	Actual	Comment	Reference
A	82	GLU	ASP	engineered mutation	UNP Q4CWB4
B	4	MET	-	expression tag	UNP Q4CWB4
B	5	GLY	-	expression tag	UNP Q4CWB4
B	6	SER	-	expression tag	UNP Q4CWB4
B	7	SER	-	expression tag	UNP Q4CWB4
B	8	HIS	-	expression tag	UNP Q4CWB4
B	9	HIS	-	expression tag	UNP Q4CWB4
B	10	HIS	-	expression tag	UNP Q4CWB4
B	11	HIS	-	expression tag	UNP Q4CWB4
B	12	HIS	-	expression tag	UNP Q4CWB4
B	13	HIS	-	expression tag	UNP Q4CWB4
B	14	SER	-	expression tag	UNP Q4CWB4
B	15	SER	-	expression tag	UNP Q4CWB4
B	16	GLY	-	expression tag	UNP Q4CWB4
B	17	LEU	-	expression tag	UNP Q4CWB4
B	18	VAL	-	expression tag	UNP Q4CWB4
B	19	PRO	-	expression tag	UNP Q4CWB4
B	20	ARG	-	expression tag	UNP Q4CWB4
B	21	GLY	-	expression tag	UNP Q4CWB4
B	22	SER	-	expression tag	UNP Q4CWB4
B	23	HIS	-	expression tag	UNP Q4CWB4
B	24	MET	-	expression tag	UNP Q4CWB4
B	82	GLU	ASP	engineered mutation	UNP Q4CWB4
C	4	MET	-	expression tag	UNP Q4CWB4
C	5	GLY	-	expression tag	UNP Q4CWB4
C	6	SER	-	expression tag	UNP Q4CWB4
C	7	SER	-	expression tag	UNP Q4CWB4
C	8	HIS	-	expression tag	UNP Q4CWB4
C	9	HIS	-	expression tag	UNP Q4CWB4
C	10	HIS	-	expression tag	UNP Q4CWB4
C	11	HIS	-	expression tag	UNP Q4CWB4
C	12	HIS	-	expression tag	UNP Q4CWB4
C	13	HIS	-	expression tag	UNP Q4CWB4
C	14	SER	-	expression tag	UNP Q4CWB4
C	15	SER	-	expression tag	UNP Q4CWB4
C	16	GLY	-	expression tag	UNP Q4CWB4
C	17	LEU	-	expression tag	UNP Q4CWB4
C	18	VAL	-	expression tag	UNP Q4CWB4
C	19	PRO	-	expression tag	UNP Q4CWB4
C	20	ARG	-	expression tag	UNP Q4CWB4
C	21	GLY	-	expression tag	UNP Q4CWB4
C	22	SER	-	expression tag	UNP Q4CWB4

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Chain	Residue	Modelled	Actual	Comment	Reference
C	23	HIS	-	expression tag	UNP Q4CWB4
C	24	MET	-	expression tag	UNP Q4CWB4
C	82	GLU	ASP	engineered mutation	UNP Q4CWB4
D	4	MET	-	expression tag	UNP Q4CWB4
D	5	GLY	-	expression tag	UNP Q4CWB4
D	6	SER	-	expression tag	UNP Q4CWB4
D	7	SER	-	expression tag	UNP Q4CWB4
D	8	HIS	-	expression tag	UNP Q4CWB4
D	9	HIS	-	expression tag	UNP Q4CWB4
D	10	HIS	-	expression tag	UNP Q4CWB4
D	11	HIS	-	expression tag	UNP Q4CWB4
D	12	HIS	-	expression tag	UNP Q4CWB4
D	13	HIS	-	expression tag	UNP Q4CWB4
D	14	SER	-	expression tag	UNP Q4CWB4
D	15	SER	-	expression tag	UNP Q4CWB4
D	16	GLY	-	expression tag	UNP Q4CWB4
D	17	LEU	-	expression tag	UNP Q4CWB4
D	18	VAL	-	expression tag	UNP Q4CWB4
D	19	PRO	-	expression tag	UNP Q4CWB4
D	20	ARG	-	expression tag	UNP Q4CWB4
D	21	GLY	-	expression tag	UNP Q4CWB4
D	22	SER	-	expression tag	UNP Q4CWB4
D	23	HIS	-	expression tag	UNP Q4CWB4
D	24	MET	-	expression tag	UNP Q4CWB4
D	82	GLU	ASP	engineered mutation	UNP Q4CWB4

- Molecule 2 is S-[(2E,6E)-3,7,11-TRIMETHYLDODECA-2,6,10-TRIENYL] TRIHYDRO-GEN THIODIPHOSPHATE (CCD ID: FPS) (formula: C₁₅H₂₈O₆P₂S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	O	P	S	0	0
			24	15	6	2	1		
2	B	1	Total	C	O	P	S	0	0
			24	15	6	2	1		
2	C	1	Total	C	O	P	S	0	0
			24	15	6	2	1		
2	C	1	Total	C	O	P	S	0	0
			24	15	6	2	1		
2	D	1	Total	C	O	P	S	0	0
			24	15	6	2	1		

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

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

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	233	Total	O	0	0
			233	233		
4	B	208	Total	O	0	0
			208	208		

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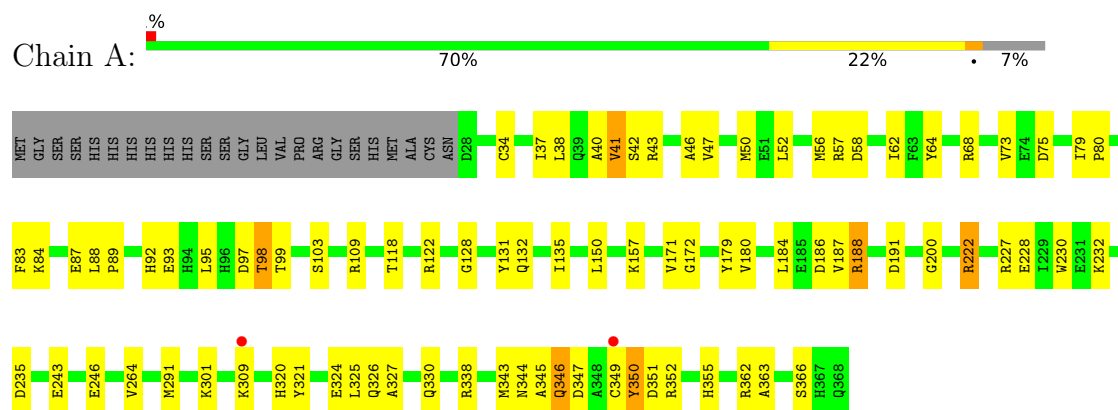
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	195	Total 195	O 195	0	0
4	D	105	Total 105	O 105	0	0

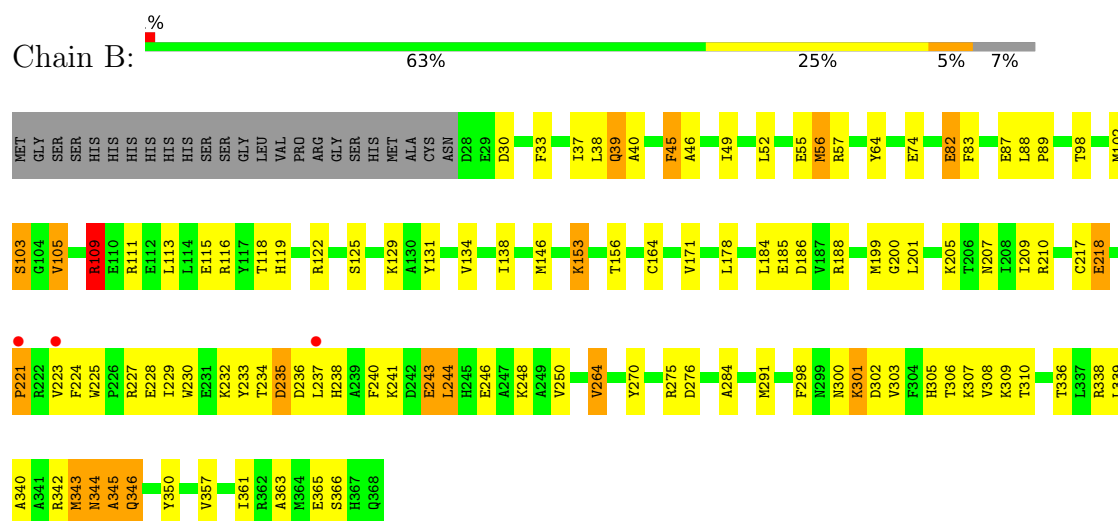
3 Residue-property plots

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.

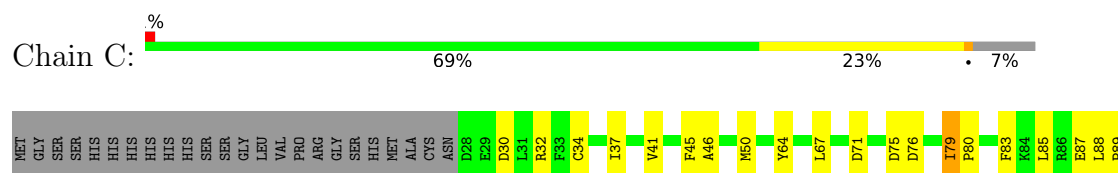
• Molecule 1: Farnesyltransferase, putative

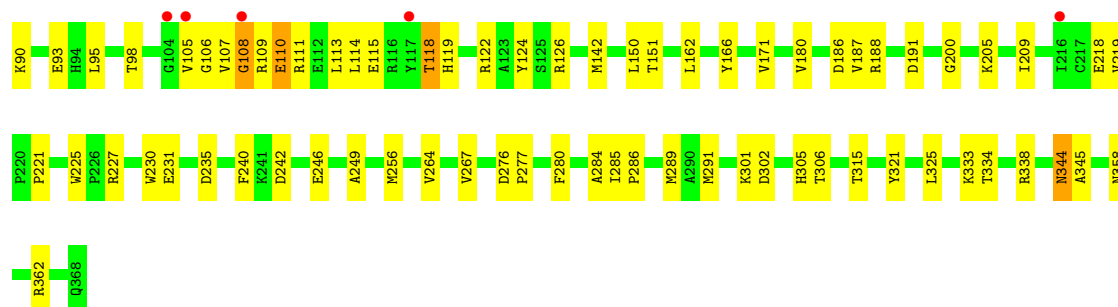


• Molecule 1: Farnesyltransferase, putative

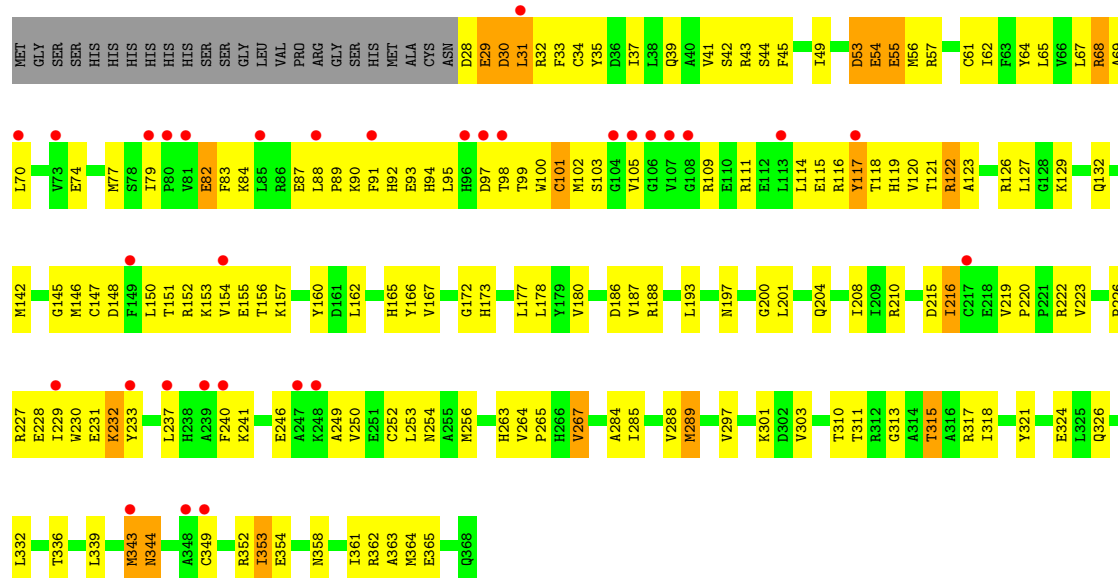


• Molecule 1: Farnesyltransferase, putative





● Molecule 1: Farnesyltransferase, putative



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	79.13Å 132.87Å 141.91Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	25.00 – 2.24 25.00 – 2.24	Depositor EDS
% Data completeness (in resolution range)	(Not available) (25.00-2.24) 97.4 (25.00-2.24)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.99 (at 2.24Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.215 , 0.259 0.215 , 0.262	Depositor DCC
R_{free} test set	3592 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	40.8	Xtriage
Anisotropy	0.197	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 44.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	11869	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 4.16% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: FPS, MG

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.45	0/2809	0.91	10/3806 (0.3%)
1	B	0.43	0/2809	0.87	6/3806 (0.2%)
1	C	0.39	0/2809	0.84	4/3806 (0.1%)
1	D	0.36	1/2810 (0.0%)	0.84	6/3806 (0.2%)
All	All	0.41	1/11237 (0.0%)	0.87	26/15224 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	285	ILE	CA-CB	5.21	1.56	1.54

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	103	SER	N-CA-C	9.36	124.89	113.38
1	C	325	LEU	N-CA-C	7.72	120.38	111.11
1	A	171	VAL	N-CA-C	-7.45	103.20	110.72
1	A	103	SER	N-CA-C	7.38	122.70	112.45
1	B	45	PHE	N-CA-C	7.20	119.98	111.71
1	A	79	ILE	CA-C-N	6.54	126.57	119.90
1	A	79	ILE	C-N-CA	6.54	126.57	119.90
1	C	321	TYR	N-CA-C	6.44	121.33	112.90
1	A	325	LEU	N-CA-C	6.39	118.82	111.02
1	C	284	ALA	N-CA-C	5.97	117.59	111.14
1	D	310	THR	N-CA-C	-5.95	101.67	110.48
1	A	150	LEU	N-CA-C	-5.82	106.01	113.23
1	A	87	GLU	N-CA-C	5.81	117.69	111.36
1	D	363	ALA	N-CA-C	-5.78	105.07	111.36
1	D	321	TYR	N-CA-C	5.75	120.43	112.90
1	D	82	GLU	N-CA-C	-5.70	106.49	113.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	343	MET	N-CA-C	5.63	115.55	108.45
1	B	264	VAL	N-CA-C	5.51	118.97	112.35
1	D	267	VAL	N-CA-C	-5.50	105.14	110.42
1	B	284	ALA	N-CA-C	5.44	118.39	111.69
1	A	235	ASP	N-CA-C	-5.37	107.10	113.97
1	A	320	HIS	N-CA-C	5.24	116.80	111.14
1	B	171	VAL	N-CA-C	-5.21	104.58	111.09
1	A	321	TYR	N-CA-C	5.09	119.54	113.23
1	B	235	ASP	N-CA-C	-5.09	107.25	113.50
1	C	267	VAL	N-CA-C	-5.07	105.45	110.62

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	2751	0	2698	53	0
1	B	2751	0	2698	101	0
1	C	2751	0	2698	67	0
1	D	2752	0	2698	155	0
2	A	24	0	25	3	0
2	B	24	0	25	3	0
2	C	48	0	50	6	0
2	D	24	0	25	3	0
3	A	1	0	0	0	0
3	B	2	0	0	0	0
4	A	233	0	0	2	0
4	B	208	0	0	3	0
4	C	195	0	0	0	0
4	D	105	0	0	0	0
All	All	11869	0	10917	377	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 17.

All (377) close contacts within the same asymmetric unit are listed below, sorted by their clash

magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:129:LYS:HA	1:D:132:GLN:HE21	1.20	1.00
1:A:362:ARG:HD3	1:D:111:ARG:HH12	1.30	0.97
1:B:340:ALA:HB2	1:B:357:VAL:HG21	1.50	0.93
1:B:234:THR:HG22	1:B:236:ASP:H	1.33	0.93
1:B:344:ASN:HD22	1:B:346:GLN:HG3	1.32	0.91
1:D:88:LEU:HB2	1:D:89:PRO:HD3	1.54	0.86
1:A:362:ARG:HD3	1:D:111:ARG:NH1	1.92	0.85
1:D:122:ARG:HH11	1:D:122:ARG:HB3	1.41	0.85
1:C:289:MET:HE1	1:C:315:THR:HG22	1.56	0.85
1:D:227:ARG:HG2	1:D:231:GLU:HG3	1.60	0.83
1:B:223:VAL:HG21	1:B:237:LEU:HD21	1.62	0.82
1:B:298:PHE:HZ	1:B:343:MET:HE3	1.45	0.81
1:D:336:THR:HG21	1:D:364:MET:HE1	1.62	0.80
1:A:56:MET:HE1	1:A:179:TYR:HA	1.64	0.79
1:C:188:ARG:HG2	1:C:191:ASP:OD2	1.83	0.79
1:D:180:VAL:HG13	1:D:187:VAL:HA	1.65	0.78
1:A:97:ASP:OD1	1:A:99:THR:HG22	1.83	0.78
1:C:76:ASP:HB2	1:C:105:VAL:HG11	1.65	0.77
1:D:142:MET:HE2	1:D:167:VAL:HA	1.67	0.76
1:C:88:LEU:HB2	1:C:89:PRO:HD3	1.69	0.75
1:D:240:PHE:CE1	1:D:249:ALA:HA	2.22	0.75
1:A:41:VAL:HG11	1:A:68:ARG:HG2	1.70	0.73
1:D:358:ASN:HD22	1:D:362:ARG:HH22	1.35	0.73
1:C:46:ALA:O	1:C:50:MET:HG2	1.90	0.72
1:D:30:ASP:OD2	1:D:122:ARG:HB2	1.91	0.71
1:B:344:ASN:HD22	1:B:346:GLN:CG	2.03	0.71
1:A:98:THR:O	1:A:118:THR:HG23	1.91	0.70
1:D:361:ILE:O	1:D:365:GLU:HG3	1.91	0.70
1:B:102:MET:HE2	1:B:105:VAL:CG2	2.22	0.70
1:A:56:MET:HE2	1:A:184:LEU:HD12	1.74	0.69
1:B:306:THR:HG22	1:B:307:LYS:N	2.07	0.69
1:A:264:VAL:HG21	1:A:291:MET:HE1	1.74	0.69
1:D:227:ARG:HA	1:D:230:TRP:NE1	2.08	0.69
1:C:90:LYS:HG2	1:C:93:GLU:OE1	1.93	0.68
1:D:237:LEU:HD12	1:D:240:PHE:CE2	2.28	0.68
1:B:164:CYS:HB3	1:B:201:LEU:HD22	1.76	0.68
1:B:344:ASN:ND2	1:B:346:GLN:HG3	2.07	0.67
1:D:204:GLN:O	1:D:208:ILE:HG12	1.95	0.67
1:A:343:MET:SD	1:A:350:TYR:HA	2.35	0.66
1:C:106:GLY:O	1:C:111:ARG:HB2	1.95	0.66
1:D:352:ARG:HH21	1:D:352:ARG:HG3	1.60	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:55:GLU:HG2	1:B:131:TYR:CE2	2.31	0.66
1:D:311:THR:O	1:D:315:THR:HG22	1.96	0.66
1:B:246:GLU:CD	1:B:301:LYS:HG3	2.20	0.65
1:D:156:THR:HA	1:D:228:GLU:HB2	1.78	0.65
1:D:117:TYR:CD1	1:D:120:VAL:HG11	2.31	0.65
1:D:79:ILE:HG21	1:D:83:PHE:CD2	2.32	0.64
1:D:100:TRP:O	1:D:101:CYS:HB3	1.95	0.64
1:D:31:LEU:HD23	1:D:32:ARG:N	2.12	0.64
1:C:32:ARG:NH2	1:C:32:ARG:HB2	2.13	0.64
1:C:90:LYS:HG2	1:C:93:GLU:CD	2.23	0.64
1:D:30:ASP:CG	1:D:122:ARG:HB2	2.24	0.64
1:C:344:ASN:HD22	1:C:344:ASN:C	2.06	0.63
1:D:237:LEU:HD12	1:D:240:PHE:HE2	1.61	0.63
1:D:105:VAL:HG21	1:D:114:LEU:HD13	1.80	0.63
1:B:55:GLU:HG2	1:B:131:TYR:HE2	1.62	0.63
1:B:217:CYS:SG	1:B:241:LYS:HE3	2.38	0.63
1:B:306:THR:HG22	1:B:307:LYS:H	1.64	0.63
1:D:28:ASP:O	1:D:29:GLU:C	2.41	0.63
1:D:43:ARG:HG3	1:D:44:SER:H	1.61	0.63
1:B:223:VAL:HG21	1:B:237:LEU:CD2	2.28	0.63
1:B:234:THR:HG22	1:B:235:ASP:N	2.13	0.62
1:D:69:ALA:HB1	1:D:114:LEU:HD21	1.80	0.62
1:A:40:ALA:HB1	1:A:109:ARG:HG3	1.82	0.62
1:D:240:PHE:HE1	1:D:249:ALA:HA	1.62	0.62
1:D:230:TRP:HA	1:D:233:TYR:HD2	1.64	0.62
1:C:219:VAL:HA	1:C:221:PRO:HD3	1.81	0.61
1:D:142:MET:HG3	1:D:166:TYR:O	2.00	0.61
1:D:358:ASN:HD22	1:D:362:ARG:NH2	1.97	0.61
1:B:111:ARG:O	1:B:115:GLU:HG3	2.00	0.61
1:B:102:MET:HE2	1:B:105:VAL:HG22	1.83	0.61
1:C:111:ARG:O	1:C:115:GLU:HG3	2.00	0.61
1:C:302:ASP:O	1:C:306:THR:HG22	1.99	0.61
1:C:105:VAL:HG12	1:C:106:GLY:N	2.14	0.61
1:D:216:ILE:HG23	1:D:241:LYS:HE2	1.83	0.60
1:D:289:MET:HE1	1:D:315:THR:HB	1.83	0.60
1:B:363:ALA:O	1:B:366:SER:HB3	2.02	0.60
1:D:30:ASP:OD1	1:D:119:HIS:HA	2.01	0.59
1:B:229:ILE:HA	1:B:232:LYS:HZ3	1.67	0.59
1:C:334:THR:O	1:C:338:ARG:HG2	2.02	0.59
1:D:358:ASN:HB3	1:D:362:ARG:NH1	2.17	0.59
1:A:88:LEU:HB2	1:A:89:PRO:HD3	1.83	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:67:LEU:HD22	1:D:142:MET:SD	2.43	0.59
1:D:129:LYS:HA	1:D:132:GLN:NE2	2.05	0.58
1:A:188:ARG:HG3	1:A:191:ASP:OD2	2.04	0.58
1:C:105:VAL:CG1	1:C:106:GLY:N	2.66	0.58
1:C:32:ARG:HB2	1:C:32:ARG:HH21	1.68	0.57
1:D:232:LYS:HG2	1:D:232:LYS:O	2.05	0.57
1:D:343:MET:SD	1:D:353:ILE:HG21	2.45	0.57
1:B:233:TYR:O	1:B:248:LYS:HD3	2.05	0.56
1:D:157:LYS:HE2	1:D:229:ILE:HD11	1.87	0.56
1:B:244:LEU:O	1:B:244:LEU:HG	2.05	0.56
1:B:344:ASN:O	1:B:345:ALA:HB2	2.05	0.56
1:C:76:ASP:CB	1:C:105:VAL:HG11	2.35	0.56
1:B:207:ASN:HD22	2:B:401:FPS:H43	1.69	0.56
1:D:123:ALA:HA	1:D:126:ARG:HH11	1.71	0.56
1:D:227:ARG:HA	1:D:230:TRP:CE2	2.41	0.56
1:D:358:ASN:O	1:D:362:ARG:HG2	2.06	0.55
1:B:229:ILE:HA	1:B:232:LYS:NZ	2.20	0.55
1:C:180:VAL:HG13	1:C:187:VAL:HA	1.88	0.55
1:D:153:LYS:HD2	1:D:154:VAL:H	1.72	0.55
1:B:52:LEU:O	1:B:57:ARG:HD3	2.07	0.55
1:B:116:ARG:HH21	1:B:119:HIS:HE1	1.55	0.55
1:D:42:SER:OG	1:D:45:PHE:HB3	2.06	0.55
1:D:358:ASN:HB3	1:D:362:ARG:HH12	1.71	0.55
1:D:95:LEU:O	1:D:121:THR:HG23	2.06	0.55
1:B:164:CYS:CB	1:B:201:LEU:HD22	2.36	0.55
2:C:401:FPS:H93	2:C:402:FPS:H152	1.89	0.55
1:C:118:THR:O	1:C:122:ARG:HB2	2.06	0.55
1:C:122:ARG:HG2	1:C:126:ARG:NH2	2.22	0.54
1:D:232:LYS:HZ3	1:D:232:LYS:HB3	1.73	0.54
1:D:240:PHE:CD1	1:D:249:ALA:HA	2.42	0.54
1:D:97:ASP:HB3	1:D:100:TRP:HB2	1.89	0.54
1:D:92:HIS:CD2	1:D:93:GLU:HG3	2.43	0.54
1:D:264:VAL:HB	1:D:265:PRO:HD3	1.88	0.54
1:C:80:PRO:HG2	1:C:83:PHE:HB2	1.88	0.54
1:D:232:LYS:HB3	1:D:232:LYS:NZ	2.23	0.54
1:C:107:VAL:O	1:C:108:GLY:C	2.51	0.54
1:D:56:MET:HE1	1:D:178:LEU:HB3	1.88	0.54
1:B:46:ALA:O	1:B:49:ILE:HG22	2.08	0.54
1:B:246:GLU:OE2	1:B:301:LYS:HG3	2.08	0.54
1:C:64:TYR:HA	2:C:402:FPS:H142	1.90	0.54
1:D:70:LEU:HD12	1:D:91:PHE:HD1	1.73	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:30:ASP:HA	1:C:119:HIS:CD2	2.43	0.53
1:D:118:THR:O	1:D:122:ARG:HG2	2.08	0.53
1:C:106:GLY:C	1:C:111:ARG:HB2	2.33	0.53
1:C:186:ASP:OD2	1:C:188:ARG:HB3	2.08	0.53
1:B:56:MET:HE3	1:B:56:MET:HA	1.89	0.53
1:B:83:PHE:CZ	1:B:87:GLU:HG3	2.43	0.53
1:C:110:GLU:O	1:C:113:LEU:HB3	2.08	0.53
1:D:68:ARG:HH21	1:D:68:ARG:HG3	1.74	0.53
1:D:289:MET:HE3	1:D:318:ILE:HD12	1.90	0.53
1:C:45:PHE:HD2	2:C:401:FPS:O1A	1.92	0.53
1:D:79:ILE:HG21	1:D:83:PHE:HD2	1.74	0.53
1:C:83:PHE:CZ	1:C:87:GLU:HG3	2.44	0.53
1:D:91:PHE:HD2	1:D:91:PHE:O	1.92	0.53
1:D:226:PRO:HG2	1:D:229:ILE:CG1	2.39	0.53
1:B:118:THR:O	1:B:122:ARG:HG3	2.08	0.52
1:A:228:GLU:O	1:A:232:LYS:NZ	2.42	0.52
1:D:114:LEU:HA	1:D:117:TYR:HB2	1.91	0.52
1:B:82:GLU:CD	1:B:82:GLU:H	2.17	0.52
1:D:62:ILE:HD12	1:D:127:LEU:HD11	1.90	0.52
1:D:102:MET:SD	1:D:105:VAL:HG21	2.49	0.52
1:D:35:TYR:OH	1:D:57:ARG:HG2	2.10	0.52
1:D:55:GLU:HG2	1:D:56:MET:N	2.25	0.52
1:A:118:THR:HG22	1:A:122:ARG:HE	1.75	0.52
1:B:303:VAL:HG22	1:B:308:VAL:HG21	1.92	0.52
1:D:343:MET:HE1	1:D:349:CYS:SG	2.48	0.52
1:B:264:VAL:HG21	1:B:291:MET:HE1	1.91	0.51
1:C:227:ARG:O	1:C:231:GLU:HB3	2.11	0.51
1:D:43:ARG:HG3	1:D:44:SER:N	2.24	0.51
1:C:358:ASN:HB3	1:C:362:ARG:HH12	1.76	0.51
1:B:237:LEU:HD12	1:B:240:PHE:CE2	2.44	0.51
1:D:97:ASP:C	1:D:99:THR:H	2.19	0.51
1:D:349:CYS:HB2	1:D:353:ILE:HD13	1.93	0.51
1:D:324:GLU:OE1	1:D:326:GLN:HB2	2.11	0.51
1:D:142:MET:O	1:D:146:MET:HG3	2.10	0.51
1:B:40:ALA:HB1	1:B:109:ARG:HG2	1.93	0.51
1:D:230:TRP:HB3	1:D:252:CYS:SG	2.51	0.51
1:B:125:SER:HB3	4:B:694:HOH:O	2.11	0.51
1:C:264:VAL:HG21	1:C:291:MET:HE1	1.93	0.51
1:D:227:ARG:O	1:D:231:GLU:HG3	2.11	0.50
1:D:263:HIS:O	1:D:267:VAL:HG23	2.11	0.50
1:A:343:MET:SD	1:A:350:TYR:HD1	2.35	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:302:ASP:HA	1:C:305:HIS:CE1	2.47	0.50
1:D:116:ARG:C	1:D:118:THR:H	2.19	0.50
1:D:42:SER:HB2	1:D:64:TYR:OH	2.12	0.50
1:C:246:GLU:HA	1:C:249:ALA:HB3	1.93	0.50
1:D:28:ASP:O	1:D:30:ASP:N	2.44	0.50
1:D:162:LEU:O	1:D:165:HIS:HB3	2.12	0.50
1:A:157:LYS:HG3	1:A:228:GLU:CD	2.37	0.50
1:B:129:LYS:O	1:B:129:LYS:HD3	2.12	0.50
1:B:33:PHE:CZ	1:B:37:ILE:HG13	2.47	0.50
1:B:345:ALA:HA	1:B:350:TYR:CG	2.47	0.50
1:D:117:TYR:CE1	1:D:120:VAL:HG11	2.47	0.50
1:D:146:MET:O	1:D:150:LEU:HB2	2.12	0.50
1:B:234:THR:HG22	1:B:235:ASP:H	1.77	0.49
1:C:142:MET:HG3	1:C:166:TYR:O	2.12	0.49
1:D:339:LEU:HD23	1:D:339:LEU:C	2.37	0.49
1:D:352:ARG:HG3	1:D:352:ARG:NH2	2.24	0.49
1:D:103:SER:HA	1:D:115:GLU:HG2	1.93	0.49
1:B:153:LYS:NZ	1:B:153:LYS:HB3	2.28	0.49
1:D:172:GLY:HA2	2:D:401:FPS:H152	1.95	0.49
1:A:42:SER:HB2	1:A:64:TYR:OH	2.12	0.49
1:D:227:ARG:HG2	1:D:231:GLU:CG	2.36	0.49
1:A:58:ASP:O	1:A:62:ILE:HG12	2.13	0.49
1:D:252:CYS:O	1:D:256:MET:HG2	2.13	0.49
1:B:102:MET:HE2	1:B:105:VAL:HG21	1.91	0.49
1:D:339:LEU:HD23	1:D:339:LEU:O	2.13	0.49
1:D:344:ASN:C	1:D:344:ASN:HD22	2.20	0.49
1:D:186:ASP:OD2	1:D:188:ARG:HB2	2.13	0.48
1:D:254:ASN:HB3	1:D:349:CYS:SG	2.53	0.48
1:D:313:GLY:O	1:D:317:ARG:HG3	2.12	0.48
1:B:238:HIS:O	1:B:241:LYS:HB3	2.13	0.48
1:D:142:MET:HE2	1:D:167:VAL:CA	2.42	0.48
1:A:42:SER:CB	1:A:64:TYR:OH	2.61	0.48
1:D:200:GLY:HA2	2:D:401:FPS:H102	1.95	0.48
1:A:346:GLN:HG3	1:A:347:ASP:H	1.79	0.48
1:C:200:GLY:HA2	2:C:401:FPS:H102	1.95	0.48
1:B:103:SER:HA	1:B:115:GLU:HG2	1.96	0.48
1:B:306:THR:CG2	1:B:307:LYS:N	2.75	0.48
1:B:336:THR:HG22	1:B:357:VAL:HG13	1.95	0.48
1:B:243:GLU:O	1:B:246:GLU:HG3	2.13	0.48
1:D:197:ASN:O	1:D:201:LEU:HG	2.13	0.48
1:D:122:ARG:HH11	1:D:122:ARG:CB	2.20	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:148:ASP:O	1:D:152:ARG:HG2	2.13	0.48
1:A:118:THR:O	1:A:122:ARG:HG3	2.15	0.47
1:D:284:ALA:O	1:D:288:VAL:HG23	2.14	0.47
1:B:339:LEU:HD23	1:B:339:LEU:C	2.40	0.47
1:D:37:ILE:O	1:D:41:VAL:HG22	2.13	0.47
1:C:218:GLU:O	1:C:221:PRO:HA	2.15	0.47
1:C:285:ILE:HB	1:C:286:PRO:HD3	1.96	0.47
1:A:344:ASN:HB3	1:A:346:GLN:HG2	1.96	0.47
1:D:157:LYS:HE2	1:D:229:ILE:CD1	2.43	0.47
1:D:289:MET:HG2	1:D:318:ILE:HG21	1.96	0.47
1:B:200:GLY:HA2	2:B:401:FPS:H102	1.95	0.47
1:B:227:ARG:HA	1:B:230:TRP:CE2	2.49	0.47
1:B:298:PHE:CZ	1:B:343:MET:HE3	2.36	0.47
1:C:95:LEU:HB3	1:C:124:TYR:CE2	2.50	0.47
1:D:120:VAL:HG13	1:D:121:THR:N	2.28	0.47
1:D:210:ARG:HD2	1:D:210:ARG:O	2.15	0.47
1:D:246:GLU:O	1:D:250:VAL:HG23	2.15	0.47
1:A:324:GLU:OE1	1:A:326:GLN:HB2	2.15	0.47
1:D:35:TYR:O	1:D:39:GLN:HG3	2.15	0.47
1:D:129:LYS:HD3	1:D:129:LYS:C	2.40	0.47
1:D:157:LYS:O	1:D:160:TYR:HB3	2.15	0.47
1:B:199:MET:HE2	1:B:270:TYR:CD1	2.50	0.46
1:D:353:ILE:HG22	1:D:354:GLU:N	2.30	0.46
1:B:227:ARG:HA	1:B:230:TRP:NE1	2.30	0.46
1:A:346:GLN:HG3	1:A:347:ASP:N	2.30	0.46
1:D:33:PHE:HD2	1:D:119:HIS:HB2	1.81	0.46
1:D:129:LYS:HD3	1:D:129:LYS:O	2.16	0.46
1:D:289:MET:HE3	1:D:318:ILE:CD1	2.45	0.46
1:B:210:ARG:HD3	1:B:307:LYS:HG3	1.97	0.46
1:B:237:LEU:HD12	1:B:240:PHE:CD2	2.51	0.46
1:B:309:LYS:HG2	1:B:310:THR:N	2.31	0.46
1:B:236:ASP:OD2	1:B:238:HIS:HB2	2.16	0.46
1:C:162:LEU:HD11	1:C:166:TYR:CZ	2.51	0.46
1:D:88:LEU:C	1:D:90:LYS:H	2.24	0.46
1:D:156:THR:HB	1:D:228:GLU:OE1	2.15	0.46
1:A:345:ALA:HA	1:A:350:TYR:CD2	2.51	0.46
1:D:92:HIS:NE2	1:D:93:GLU:HG3	2.31	0.46
1:A:128:GLY:O	1:A:132:GLN:HG3	2.15	0.46
1:B:343:MET:CE	1:B:350:TYR:HA	2.46	0.46
1:A:180:VAL:HG13	1:A:187:VAL:HA	1.97	0.46
1:D:68:ARG:HH21	1:D:68:ARG:CG	2.29	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:40:ALA:CB	1:B:109:ARG:HG2	2.46	0.45
1:C:205:LYS:O	1:C:209:ILE:HG13	2.15	0.45
1:D:49:ILE:HG12	1:D:57:ARG:HG3	1.99	0.45
1:A:80:PRO:O	1:A:83:PHE:HB3	2.16	0.45
1:A:349:CYS:O	1:A:350:TYR:C	2.59	0.45
1:B:186:ASP:OD2	1:B:188:ARG:HG3	2.16	0.45
1:D:84:LYS:CD	1:D:150:LEU:HD21	2.46	0.45
1:C:37:ILE:O	1:C:41:VAL:HG22	2.17	0.45
1:D:232:LYS:NZ	1:D:232:LYS:CB	2.78	0.45
1:B:234:THR:CG2	1:B:235:ASP:N	2.80	0.45
1:C:37:ILE:HD11	1:C:109:ARG:O	2.16	0.45
1:A:186:ASP:OD2	1:A:188:ARG:HB2	2.17	0.45
1:B:38:LEU:HD21	1:B:49:ILE:HG21	1.99	0.45
1:D:297:VAL:HB	1:D:303:VAL:HG21	1.98	0.45
1:B:223:VAL:HG22	1:B:224:PHE:N	2.31	0.45
1:B:302:ASP:HA	1:B:305:HIS:CE1	2.52	0.45
1:B:361:ILE:O	1:B:365:GLU:HG3	2.17	0.45
1:C:227:ARG:HA	1:C:230:TRP:NE1	2.32	0.45
1:C:240:PHE:CE1	1:C:249:ALA:HA	2.52	0.45
1:D:145:GLY:HA3	1:D:166:TYR:CD1	2.52	0.45
1:D:253:LEU:HD21	1:D:297:VAL:O	2.16	0.45
1:A:52:LEU:O	1:A:57:ARG:HD3	2.17	0.45
1:D:61:CYS:O	1:D:65:LEU:HG	2.17	0.45
1:D:332:LEU:O	1:D:336:THR:HG23	2.17	0.45
1:B:64:TYR:CD2	1:B:64:TYR:C	2.95	0.44
1:D:74:GLU:HG3	1:D:146:MET:HB3	1.98	0.44
1:D:147:CYS:O	1:D:151:THR:HG23	2.17	0.44
1:A:172:GLY:HA2	2:A:501:FPS:H152	1.99	0.44
1:C:225:TRP:CG	1:C:256:MET:HE2	2.52	0.44
1:D:70:LEU:HD12	1:D:91:PHE:CD1	2.52	0.44
1:D:87:GLU:O	1:D:88:LEU:C	2.60	0.44
1:D:344:ASN:C	1:D:344:ASN:ND2	2.75	0.44
1:A:227:ARG:HA	1:A:230:TRP:CE2	2.52	0.44
1:C:67:LEU:HD13	1:C:142:MET:HE1	1.99	0.44
1:A:352:ARG:O	1:A:355:HIS:CD2	2.71	0.44
1:B:74:GLU:HG3	1:B:146:MET:SD	2.58	0.44
1:B:306:THR:CG2	1:B:307:LYS:H	2.29	0.44
1:A:131:TYR:O	1:A:135:ILE:HG13	2.18	0.44
2:A:501:FPS:H112	2:A:501:FPS:H91	1.79	0.44
2:D:401:FPS:H91	2:D:401:FPS:H112	1.79	0.44
1:D:28:ASP:CA	1:D:32:ARG:HG2	2.48	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:215:ASP:HB3	1:D:222:ARG:O	2.18	0.44
1:B:156:THR:HA	1:B:228:GLU:HB2	2.00	0.44
1:C:225:TRP:CD1	1:C:256:MET:HE2	2.53	0.44
1:D:30:ASP:O	1:D:33:PHE:HB3	2.18	0.44
1:B:102:MET:CE	1:B:105:VAL:HG21	2.48	0.43
1:C:122:ARG:HG2	1:C:126:ARG:HH21	1.82	0.43
1:B:37:ILE:HG21	1:B:113:LEU:HD13	2.00	0.43
1:D:91:PHE:HA	1:D:94:HIS:CD2	2.52	0.43
1:B:134:VAL:O	1:B:138:ILE:HG12	2.18	0.43
1:D:53:ASP:O	1:D:54:GLU:C	2.60	0.43
1:D:223:VAL:CG2	1:D:237:LEU:HD23	2.48	0.43
1:B:205:LYS:O	1:B:209:ILE:HG13	2.18	0.43
1:C:98:THR:HG22	1:C:122:ARG:HH21	1.84	0.43
1:D:87:GLU:O	1:D:90:LYS:N	2.45	0.43
1:D:155:GLU:OE1	1:D:227:ARG:NE	2.49	0.43
1:B:300:ASN:HB2	1:B:342:ARG:HH22	1.83	0.43
1:D:173:HIS:O	1:D:177:LEU:HG	2.18	0.43
1:D:344:ASN:HD22	1:D:344:ASN:H	1.65	0.43
1:A:73:VAL:O	1:A:84:LYS:HE2	2.18	0.43
1:D:117:TYR:O	1:D:120:VAL:HG12	2.18	0.43
1:A:264:VAL:CG2	1:A:291:MET:HE1	2.45	0.43
1:C:111:ARG:HG2	1:C:115:GLU:CD	2.44	0.43
1:D:88:LEU:CB	1:D:89:PRO:HD3	2.35	0.43
1:D:173:HIS:ND1	1:D:193:LEU:HD13	2.34	0.43
1:B:344:ASN:OD1	1:B:344:ASN:N	2.52	0.43
1:C:79:ILE:HG13	1:C:105:VAL:HG21	2.01	0.43
1:C:218:GLU:O	1:C:221:PRO:N	2.51	0.43
1:C:171:VAL:HG21	2:C:402:FPS:H101	2.00	0.42
1:D:84:LYS:HD3	1:D:150:LEU:HD21	2.01	0.42
1:B:156:THR:HB	4:B:703:HOH:O	2.19	0.42
1:C:338:ARG:NH1	1:C:338:ARG:HG3	2.34	0.42
1:A:50:MET:HA	1:A:57:ARG:HD2	2.00	0.42
1:A:349:CYS:O	1:A:351:ASP:N	2.51	0.42
1:B:116:ARG:NH2	1:B:119:HIS:HE1	2.18	0.42
1:B:184:LEU:HD22	1:B:276:ASP:OD2	2.20	0.42
1:B:207:ASN:ND2	2:B:401:FPS:H43	2.35	0.42
1:B:345:ALA:HA	1:B:350:TYR:CD1	2.54	0.42
1:C:85:LEU:HD11	1:C:151:THR:HG21	2.01	0.42
1:D:30:ASP:OD1	1:D:122:ARG:HB2	2.20	0.42
1:C:34:CYS:O	1:C:37:ILE:HG22	2.19	0.42
1:D:219:VAL:HA	1:D:220:PRO:HA	1.91	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:250:VAL:O	1:D:253:LEU:HB3	2.20	0.42
1:A:34:CYS:O	1:A:37:ILE:HG22	2.20	0.42
1:B:336:THR:CG2	1:B:357:VAL:HG13	2.50	0.42
1:D:126:ARG:H	1:D:126:ARG:HD2	1.85	0.42
1:A:363:ALA:O	1:A:366:SER:HB3	2.19	0.42
1:D:226:PRO:HG2	1:D:229:ILE:HG13	2.02	0.42
1:A:43:ARG:O	1:A:47:VAL:HG23	2.20	0.42
1:B:33:PHE:CE2	1:B:37:ILE:HG13	2.54	0.42
1:D:28:ASP:N	1:D:31:LEU:HD22	2.35	0.42
1:A:309:LYS:HE3	4:A:833:HOH:O	2.20	0.42
1:B:185:GLU:OE1	1:B:275:ARG:HG2	2.20	0.42
1:C:30:ASP:HA	1:C:119:HIS:HD2	1.84	0.42
1:B:346:GLN:H	1:B:346:GLN:HG2	1.66	0.41
1:A:347:ASP:C	1:A:349:CYS:H	2.28	0.41
1:B:30:ASP:OD1	1:B:119:HIS:HD2	2.03	0.41
1:B:223:VAL:HG22	1:B:225:TRP:H	1.84	0.41
1:C:71:ASP:O	1:C:75:ASP:HB2	2.20	0.41
1:C:358:ASN:HB3	1:C:362:ARG:NH1	2.35	0.41
1:A:200:GLY:HA2	2:A:501:FPS:H102	2.02	0.41
1:B:343:MET:SD	1:B:350:TYR:HA	2.61	0.41
1:A:75:ASP:CB	1:A:222:ARG:HH22	2.34	0.41
1:B:338:ARG:O	1:B:342:ARG:HG3	2.20	0.41
1:D:210:ARG:HD2	1:D:210:ARG:C	2.46	0.41
1:D:232:LYS:O	1:D:232:LYS:CG	2.67	0.41
1:A:243:GLU:O	1:A:246:GLU:HB2	2.21	0.41
1:B:56:MET:HE1	1:B:178:LEU:HB3	2.02	0.41
1:B:300:ASN:OD1	1:B:302:ASP:N	2.51	0.41
1:B:39:GLN:HE21	1:B:39:GLN:HB3	1.62	0.41
1:C:85:LEU:HD11	1:C:151:THR:CG2	2.50	0.41
1:A:38:LEU:HG	1:A:46:ALA:HB2	2.02	0.41
1:A:92:HIS:CE1	1:A:93:GLU:HG3	2.56	0.41
1:B:218:GLU:O	1:B:221:PRO:HG3	2.20	0.41
1:C:79:ILE:CD1	1:C:105:VAL:HG21	2.51	0.41
1:A:327:ALA:HA	1:A:330:GLN:HG2	2.03	0.41
1:C:85:LEU:HD23	1:C:150:LEU:HD23	2.03	0.41
1:C:344:ASN:C	1:C:344:ASN:ND2	2.77	0.41
2:C:401:FPS:H91	2:C:401:FPS:H112	1.82	0.41
1:A:366:SER:O	1:D:109:ARG:HD2	2.21	0.41
1:B:344:ASN:O	1:B:345:ALA:CB	2.69	0.41
1:B:234:THR:HG21	1:B:236:ASP:O	2.21	0.40
1:B:365:GLU:HB2	4:B:566:HOH:O	2.20	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:280:PHE:CD1	1:C:280:PHE:C	3.00	0.40
1:A:93:GLU:HG2	4:A:813:HOH:O	2.21	0.40
1:B:88:LEU:N	1:B:89:PRO:CD	2.85	0.40
1:C:276:ASP:HA	1:C:277:PRO:HD3	1.87	0.40
1:A:338:ARG:HD2	1:A:338:ARG:HA	1.97	0.40
1:B:246:GLU:O	1:B:250:VAL:HG23	2.21	0.40
1:D:91:PHE:C	1:D:91:PHE:CD2	2.98	0.40
1:D:34:CYS:HB3	1:D:65:LEU:HD11	2.04	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	339/365 (93%)	329 (97%)	8 (2%)	2 (1%)	21	20
1	B	339/365 (93%)	325 (96%)	10 (3%)	4 (1%)	10	6
1	C	339/365 (93%)	320 (94%)	17 (5%)	2 (1%)	21	20
1	D	339/365 (93%)	301 (89%)	31 (9%)	7 (2%)	5	2
All	All	1356/1460 (93%)	1275 (94%)	66 (5%)	15 (1%)	11	7

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	345	ALA
1	D	29	GLU
1	D	54	GLU
1	D	101	CYS
1	A	350	TYR
1	B	98	THR
1	C	108	GLY

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Mol	Chain	Res	Type
1	C	345	ALA
1	D	55	GLU
1	D	98	THR
1	A	98	THR
1	D	30	ASP
1	D	117	TYR
1	B	109	ARG
1	B	221	PRO

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	298/318 (94%)	292 (98%)	6 (2%)	48	58
1	B	298/318 (94%)	284 (95%)	14 (5%)	23	24
1	C	298/318 (94%)	289 (97%)	9 (3%)	36	43
1	D	298/318 (94%)	285 (96%)	13 (4%)	25	27
All	All	1192/1272 (94%)	1150 (96%)	42 (4%)	32	37

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	VAL
1	A	95	LEU
1	A	188	ARG
1	A	222	ARG
1	A	301	LYS
1	A	346	GLN
1	B	39	GLN
1	B	45	PHE
1	B	56	MET
1	B	82	GLU
1	B	105	VAL
1	B	109	ARG
1	B	153	LYS

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Mol	Chain	Res	Type
1	B	218	GLU
1	B	243	GLU
1	B	244	LEU
1	B	301	LYS
1	B	343	MET
1	B	344	ASN
1	B	346	GLN
1	C	79	ILE
1	C	110	GLU
1	C	114	LEU
1	C	118	THR
1	C	235	ASP
1	C	242	ASP
1	C	301	LYS
1	C	333	LYS
1	C	344	ASN
1	D	31	LEU
1	D	53	ASP
1	D	68	ARG
1	D	77	MET
1	D	82	GLU
1	D	122	ARG
1	D	216	ILE
1	D	232	LYS
1	D	289	MET
1	D	301	LYS
1	D	315	THR
1	D	344	ASN
1	D	353	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (37) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	92	HIS
1	A	119	HIS
1	A	207	ASN
1	A	238	HIS
1	A	245	HIS
1	A	320	HIS
1	B	39	GLN
1	B	119	HIS
1	B	144	ASN

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Mol	Chain	Res	Type
1	B	207	ASN
1	B	238	HIS
1	B	287	GLN
1	B	344	ASN
1	B	358	ASN
1	C	39	GLN
1	C	94	HIS
1	C	119	HIS
1	C	204	GLN
1	C	238	HIS
1	C	245	HIS
1	C	266	HIS
1	C	305	HIS
1	C	320	HIS
1	C	344	ASN
1	C	358	ASN
1	D	92	HIS
1	D	94	HIS
1	D	132	GLN
1	D	204	GLN
1	D	245	HIS
1	D	266	HIS
1	D	287	GLN
1	D	300	ASN
1	D	330	GLN
1	D	344	ASN
1	D	358	ASN
1	D	367	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 8 ligands modelled in this entry, 3 are monoatomic - leaving 5 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
2	FPS	C	401	-	20,23,23	1.38	3 (15%)	24,31,31	1.33	4 (16%)
2	FPS	A	501	-	20,23,23	1.64	4 (20%)	24,31,31	1.41	3 (12%)
2	FPS	B	401	-	20,23,23	1.64	4 (20%)	24,31,31	1.64	5 (20%)
2	FPS	C	402	-	20,23,23	1.41	2 (10%)	24,31,31	1.64	7 (29%)
2	FPS	D	401	-	20,23,23	1.61	4 (20%)	24,31,31	1.58	5 (20%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	FPS	C	401	-	-	7/19/25/25	-
2	FPS	A	501	-	-	7/19/25/25	-
2	FPS	B	401	-	-	7/19/25/25	-
2	FPS	C	402	-	-	8/19/25/25	-
2	FPS	D	401	-	-	6/19/25/25	-

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	401	FPS	PA-O1A	4.32	1.56	1.46
2	A	501	FPS	PA-O1A	4.25	1.55	1.46
2	B	401	FPS	PA-O1A	4.19	1.55	1.46
2	C	402	FPS	PA-O1A	3.77	1.54	1.46
2	C	401	FPS	PA-O1A	3.19	1.53	1.46
2	A	501	FPS	C2-C3	2.82	1.39	1.33
2	B	401	FPS	PB-O2B	2.76	1.59	1.50
2	C	401	FPS	C2-C3	2.70	1.39	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	401	FPS	C2-C3	2.59	1.39	1.33
2	B	401	FPS	C10-C8	2.55	1.56	1.51
2	C	402	FPS	PB-O2B	2.47	1.58	1.50
2	D	401	FPS	C2-C3	2.45	1.38	1.33
2	D	401	FPS	C1-S1	2.36	1.87	1.84
2	C	401	FPS	PB-O2B	2.29	1.57	1.50
2	A	501	FPS	PB-O2B	2.29	1.57	1.50
2	D	401	FPS	PB-O2B	2.22	1.57	1.50
2	A	501	FPS	PA-O2A	-2.21	1.51	1.56

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	401	FPS	C9-C8-C10	4.17	122.47	115.23
2	C	402	FPS	C9-C8-C10	3.91	122.02	115.23
2	D	401	FPS	C9-C8-C10	3.77	121.78	115.23
2	C	402	FPS	C10-C8-C7	-3.58	113.13	121.17
2	D	401	FPS	C10-C8-C7	-3.26	113.85	121.17
2	B	401	FPS	C10-C8-C7	-3.24	113.90	121.17
2	A	501	FPS	O2A-PA-O3A	-3.05	99.04	107.27
2	D	401	FPS	C5-C3-C2	-2.99	114.45	121.17
2	A	501	FPS	C9-C8-C10	2.78	120.05	115.23
2	C	401	FPS	C9-C8-C10	2.68	119.87	115.23
2	D	401	FPS	C4-C3-C5	2.67	119.87	115.23
2	B	401	FPS	O1B-PB-O3A	2.48	112.96	104.64
2	B	401	FPS	C6-C5-C3	2.41	121.17	113.19
2	C	401	FPS	O1B-PB-O3A	2.28	112.29	104.64
2	D	401	FPS	O1B-PB-O3A	2.26	112.21	104.64
2	A	501	FPS	C10-C8-C7	-2.25	116.13	121.17
2	C	402	FPS	O1B-PB-O3A	2.20	112.01	104.64
2	C	401	FPS	C10-C8-C7	-2.19	116.25	121.17
2	C	402	FPS	C5-C6-C7	-2.14	101.42	112.02
2	C	402	FPS	C5-C3-C2	-2.10	116.45	121.17
2	B	401	FPS	C4-C3-C5	2.08	118.83	115.23
2	C	401	FPS	C15-C13-C14	2.08	119.36	114.59
2	C	402	FPS	C4-C3-C5	2.05	118.79	115.23
2	C	402	FPS	C6-C5-C3	2.02	119.89	113.19

There are no chirality outliers.

All (35) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	FPS	C11-C10-C8-C7
2	A	501	FPS	C11-C10-C8-C9
2	A	501	FPS	PA-O3A-PB-O1B
2	A	501	FPS	PA-O3A-PB-O3B
2	B	401	FPS	PA-O3A-PB-O1B
2	B	401	FPS	C11-C10-C8-C9
2	C	402	FPS	C11-C10-C8-C9
2	D	401	FPS	C11-C10-C8-C9
2	B	401	FPS	C11-C10-C8-C7
2	D	401	FPS	C11-C10-C8-C7
2	C	402	FPS	C11-C10-C8-C7
2	C	402	FPS	C3-C5-C6-C7
2	C	402	FPS	C8-C10-C11-C12
2	A	501	FPS	C3-C5-C6-C7
2	C	401	FPS	C3-C5-C6-C7
2	C	401	FPS	C11-C10-C8-C9
2	B	401	FPS	C4-C3-C5-C6
2	D	401	FPS	C4-C3-C5-C6
2	B	401	FPS	C2-C3-C5-C6
2	D	401	FPS	C2-C3-C5-C6
2	C	401	FPS	C8-C10-C11-C12
2	D	401	FPS	C3-C5-C6-C7
2	C	402	FPS	C4-C3-C5-C6
2	C	401	FPS	PA-O3A-PB-O1B
2	C	401	FPS	C11-C10-C8-C7
2	C	402	FPS	C2-C3-C5-C6
2	B	401	FPS	PA-O3A-PB-O2B
2	C	401	FPS	C4-C3-C5-C6
2	C	401	FPS	C2-C3-C5-C6
2	B	401	FPS	C8-C10-C11-C12
2	D	401	FPS	C8-C10-C11-C12
2	A	501	FPS	C4-C3-C5-C6
2	C	402	FPS	PA-O3A-PB-O1B
2	C	402	FPS	PA-O3A-PB-O3B
2	A	501	FPS	PA-O3A-PB-O2B

There are no ring outliers.

5 monomers are involved in 15 short contacts:

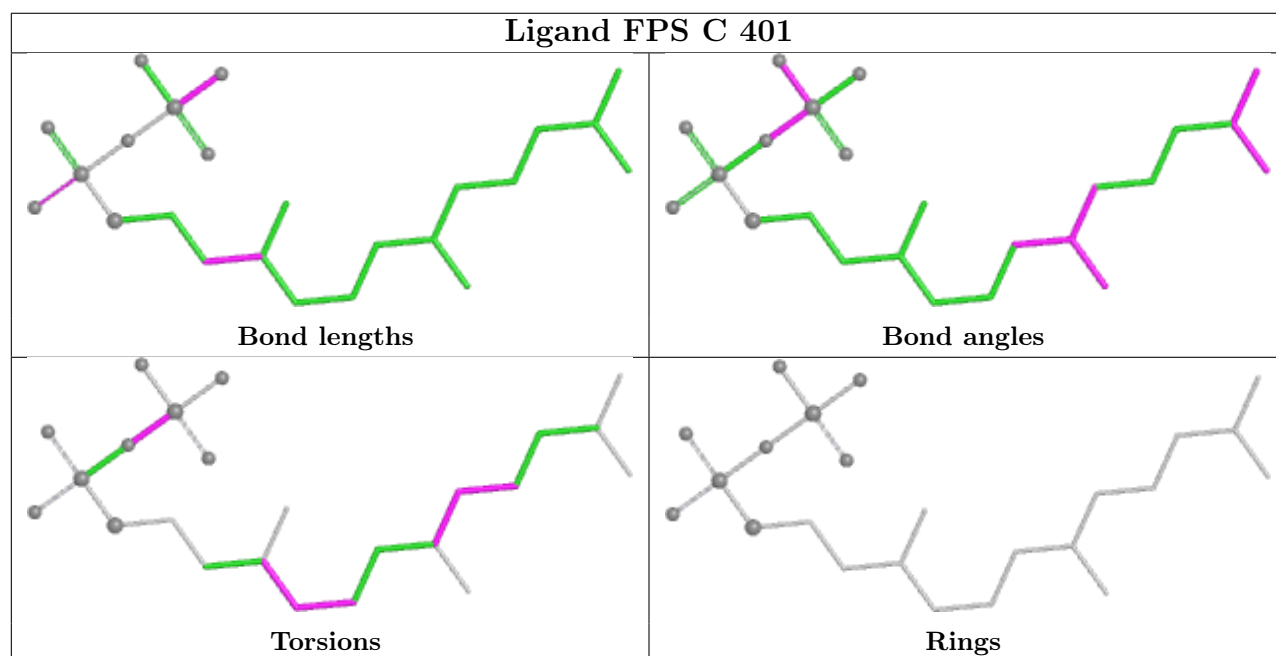
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	401	FPS	4	0
2	A	501	FPS	3	0
2	B	401	FPS	3	0

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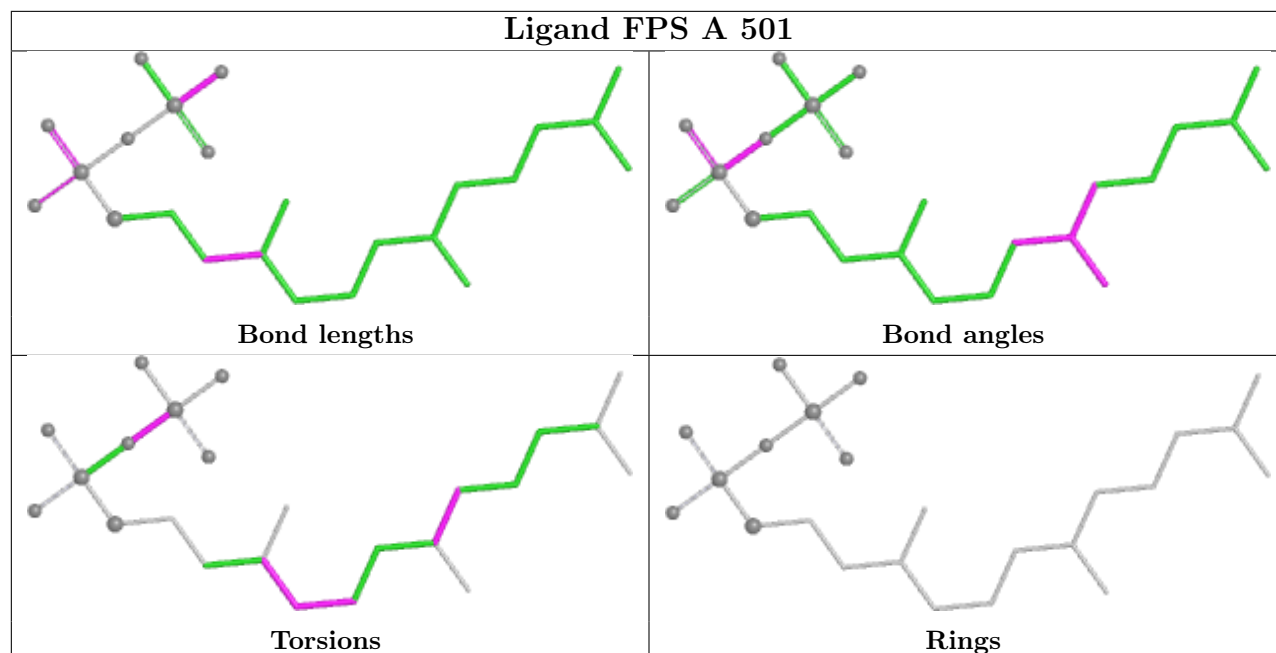
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	402	FPS	3	0
2	D	401	FPS	3	0

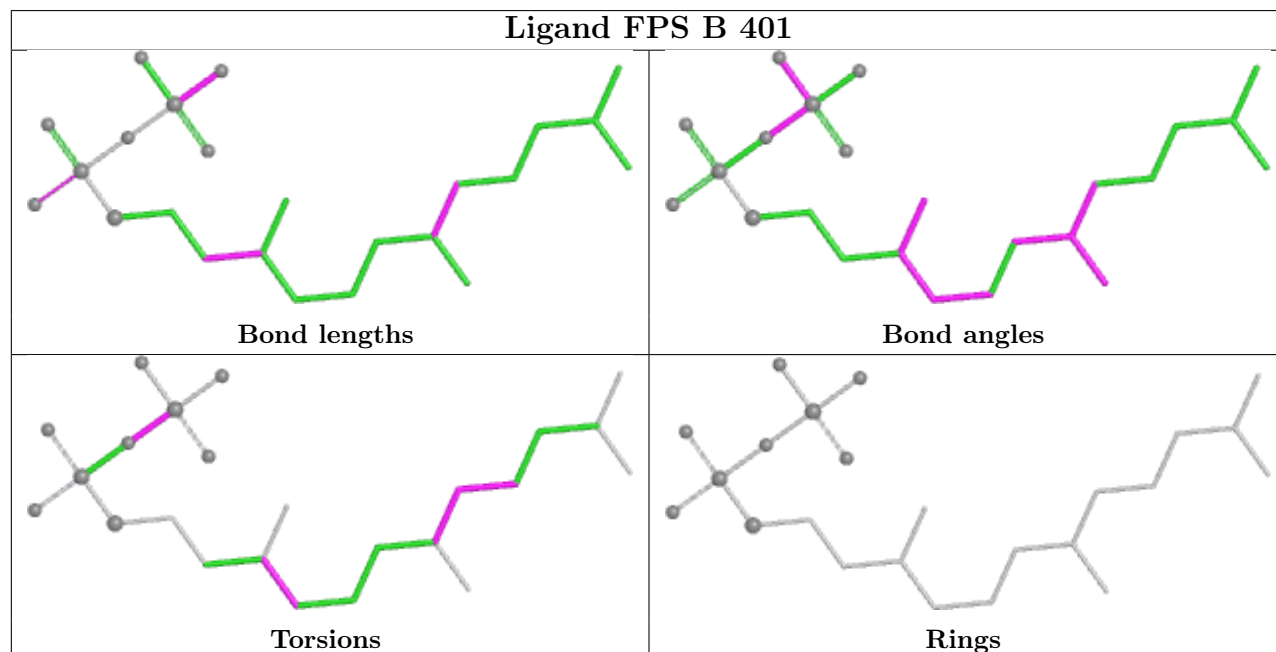
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

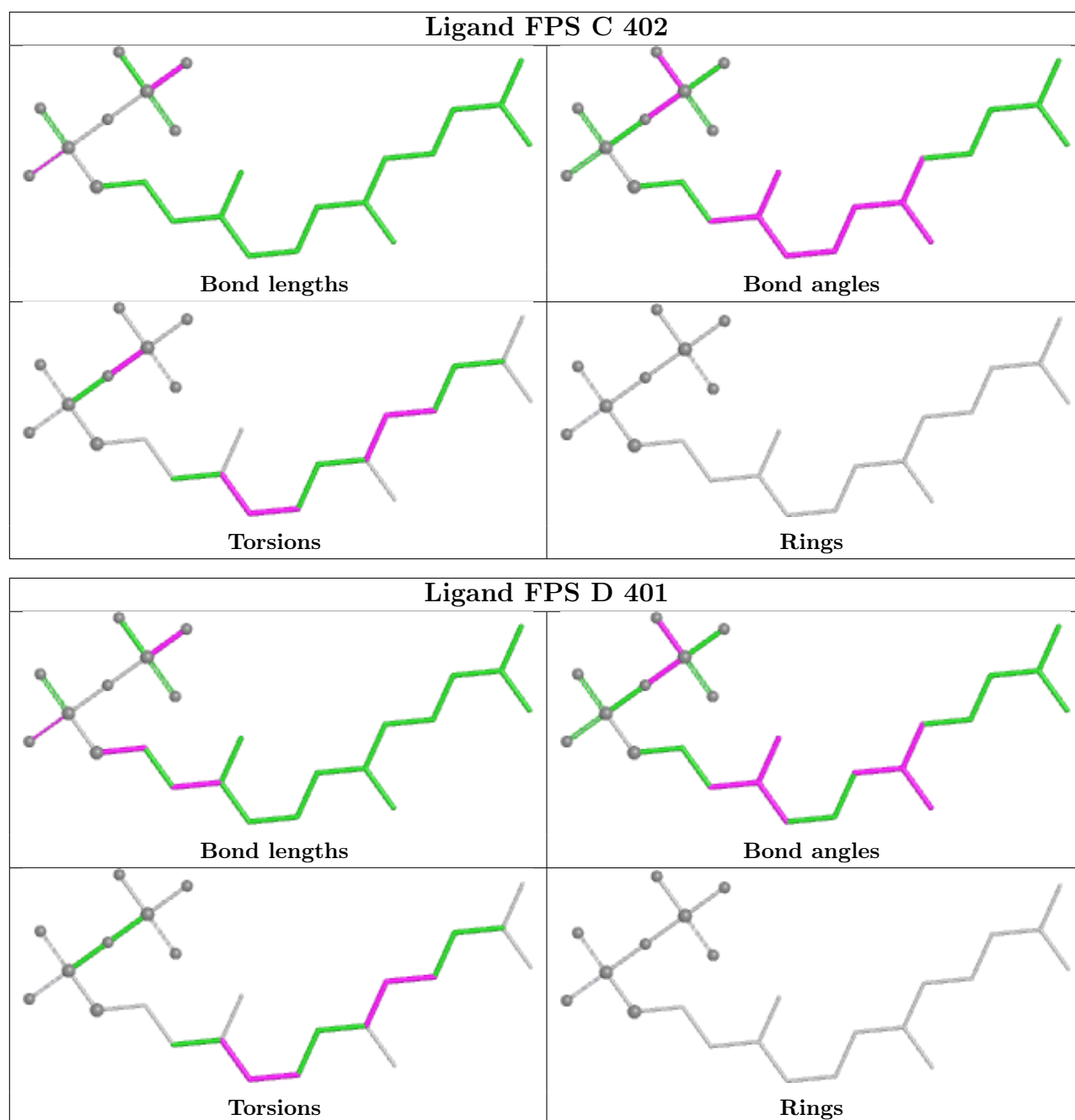


Ligand FPS A 501



Ligand FPS B 401





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	341/365 (93%)	-0.15	2 (0%) 85 87	22, 40, 61, 91	0
1	B	341/365 (93%)	-0.10	3 (0%) 81 82	22, 43, 80, 95	0
1	C	341/365 (93%)	0.10	5 (1%) 72 73	22, 47, 84, 96	0
1	D	341/365 (93%)	0.69	32 (9%) 14 13	30, 70, 113, 125	0
All	All	1364/1460 (93%)	0.14	42 (3%) 51 51	22, 47, 100, 125	0

All (42) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	349	CYS	3.5
1	D	107	VAL	3.4
1	D	70	LEU	3.3
1	C	108	GLY	3.2
1	D	233	TYR	3.1
1	D	81	VAL	3.0
1	D	105	VAL	3.0
1	B	223	VAL	2.9
1	D	106	GLY	2.9
1	D	229	ILE	2.9
1	D	73	VAL	2.6
1	D	85	LEU	2.6
1	D	240	PHE	2.6
1	C	105	VAL	2.6
1	D	79	ILE	2.6
1	D	237	LEU	2.5
1	D	239	ALA	2.5
1	D	113	LEU	2.5
1	D	96	HIS	2.5
1	D	80	PRO	2.5
1	D	149	PHE	2.4

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Mol	Chain	Res	Type	RSRZ
1	D	108	GLY	2.4
1	D	117	TYR	2.3
1	C	104	GLY	2.3
1	D	217	CYS	2.3
1	D	88	LEU	2.3
1	D	349	CYS	2.3
1	D	154	VAL	2.3
1	D	348	ALA	2.2
1	B	237	LEU	2.2
1	D	97	ASP	2.2
1	D	98	THR	2.2
1	C	216	ILE	2.2
1	D	31	LEU	2.1
1	B	221	PRO	2.1
1	D	247	ALA	2.1
1	D	248	LYS	2.1
1	A	309	LYS	2.0
1	C	117	TYR	2.0
1	D	104	GLY	2.0
1	D	91	PHE	2.0
1	D	343	MET	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	FPS	C	402	24/24	0.75	0.21	72,96,114,114	0
3	MG	B	402	1/1	0.78	0.13	57,57,57,57	0

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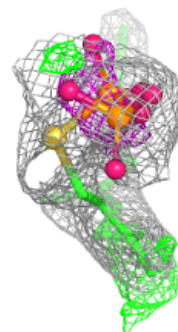
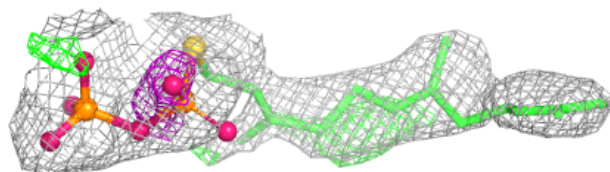
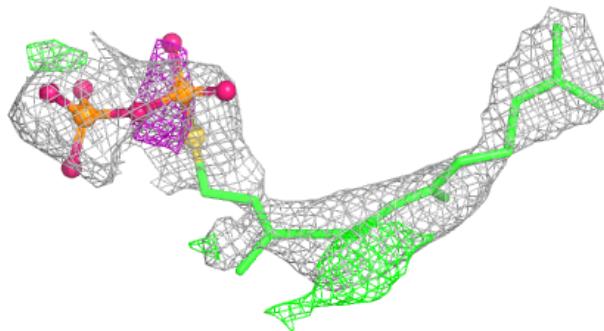
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	MG	A	502	1/1	0.80	0.13	68,68,68,68	0
2	FPS	B	401	24/24	0.81	0.13	30,68,97,98	0
2	FPS	D	401	24/24	0.82	0.17	81,106,120,121	0
2	FPS	C	401	24/24	0.83	0.14	30,68,97,98	0
2	FPS	A	501	24/24	0.84	0.14	26,77,99,100	0
3	MG	B	403	1/1	0.91	0.11	50,50,50,50	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

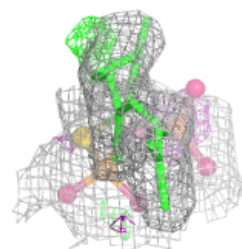
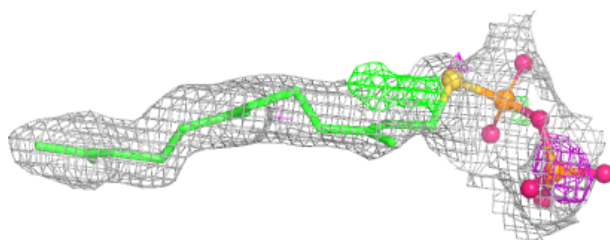
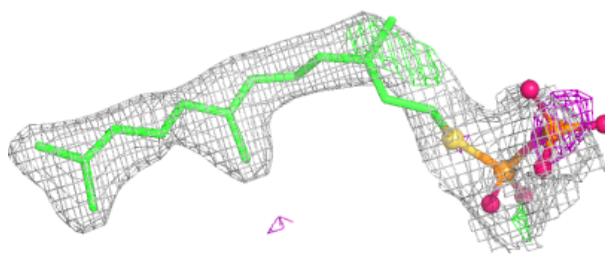
Electron density around FPS C 402:

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

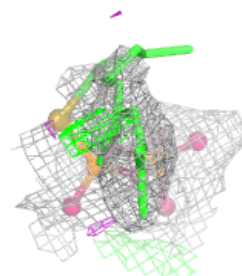
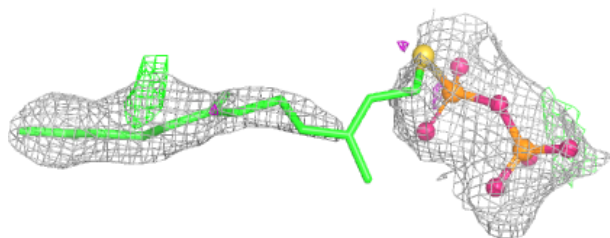
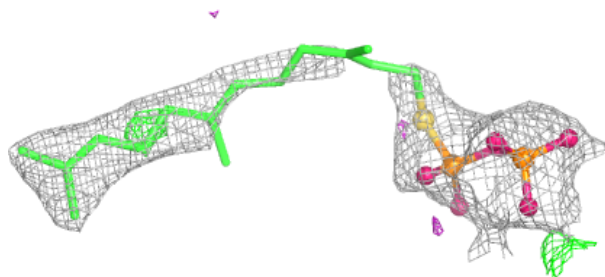


Electron density around FPS B 401:

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

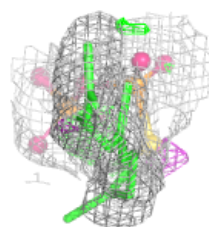
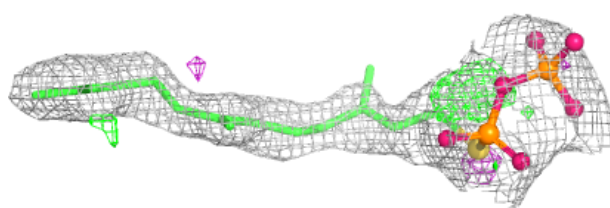
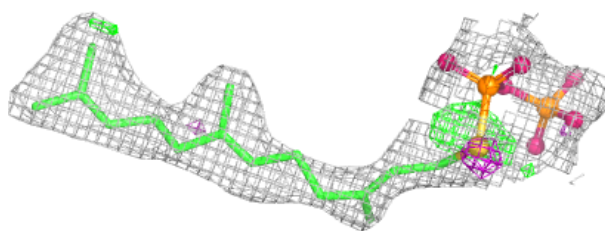
**Electron density around FPS D 401:**

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

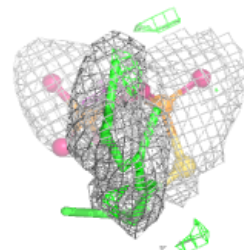
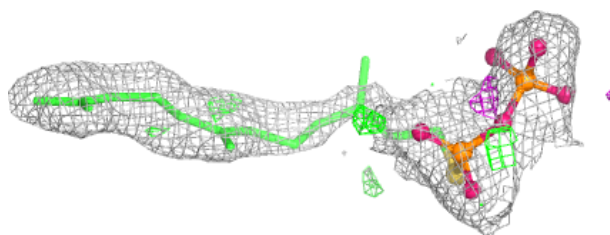
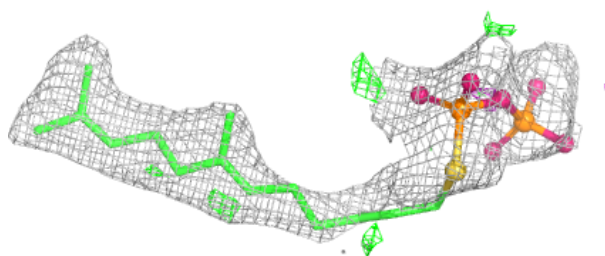


Electron density around FPS C 401:

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

**Electron density around FPS A 501:**

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



6.5 Other polymers [i](#)

There are no such residues in this entry.