



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 19, 2024 – 11:48 PM EDT

PDB ID : 3SFU
Title : crystal structure of murine norovirus RNA dependent RNA polymerase in complex with ribavirin
Authors : Kim, K.H.; Alam, I.
Deposited on : 2011-06-14
Resolution : 2.50 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

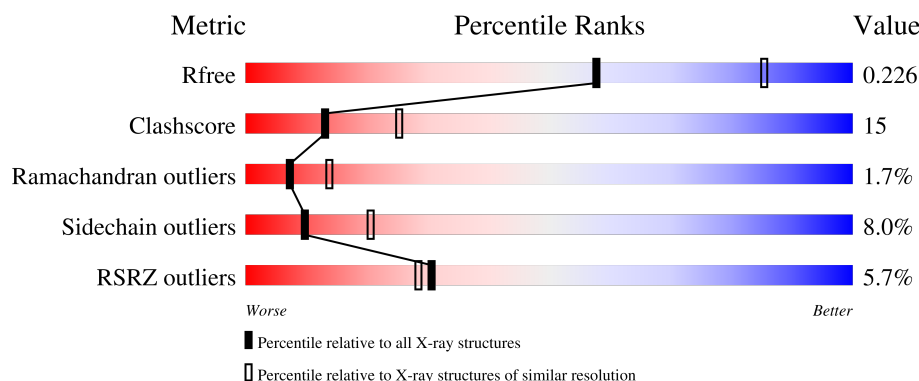
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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}	164625	5504 (2.50-2.50)
Clashscore	180529	6282 (2.50-2.50)
Ramachandran outliers	177936	6191 (2.50-2.50)
Sidechain outliers	177891	6193 (2.50-2.50)
RSRZ outliers	164620	5504 (2.50-2.50)

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	517	<div> <div>5%</div> <div> <div></div> <div>71%</div> <div>17%</div> <div>•</div> <div>7%</div> </div> </div>
1	B	517	<div> <div>6%</div> <div> <div></div> <div>69%</div> <div>21%</div> <div>5%</div> <div>6%</div> </div> </div>
1	C	517	<div> <div>5%</div> <div> <div></div> <div>67%</div> <div>21%</div> <div>5%</div> <div>•</div> <div>8%</div> </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	RBV	C	601	-	-	X	-
3	SO4	B	606	-	-	X	-
3	SO4	C	613	-	-	X	-
5	GOL	A	617	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 12321 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 RNA polymerase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	480	Total	C	N	O	S	0	1	0
			3828	2423	674	706	25			
1	B	487	Total	C	N	O	S	0	0	0
			3865	2444	680	716	25			
1	C	478	Total	C	N	O	S	0	0	0
			3800	2405	669	702	24			

There are 33 discrepancies between the modelled and reference sequences:

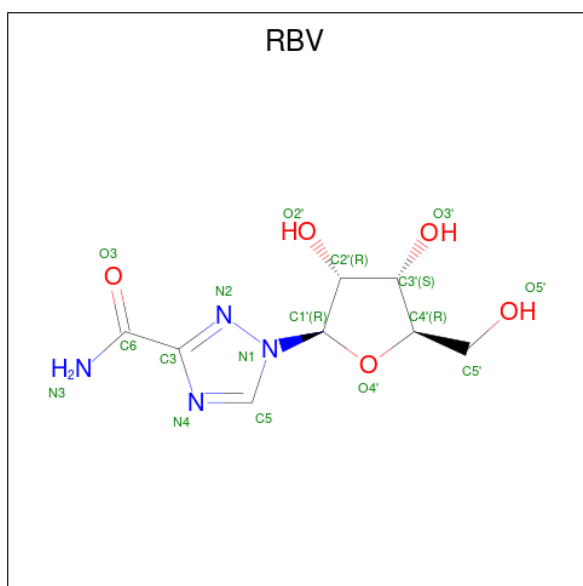
Chain	Residue	Modelled	Actual	Comment	Reference
A	510	ALA	-	expression tag	UNP Q80J95
A	511	ALA	-	expression tag	UNP Q80J95
A	512	ALA	-	expression tag	UNP Q80J95
A	513	LEU	-	expression tag	UNP Q80J95
A	514	GLU	-	expression tag	UNP Q80J95
A	515	HIS	-	expression tag	UNP Q80J95
A	516	HIS	-	expression tag	UNP Q80J95
A	517	HIS	-	expression tag	UNP Q80J95
A	518	HIS	-	expression tag	UNP Q80J95
A	519	HIS	-	expression tag	UNP Q80J95
A	520	HIS	-	expression tag	UNP Q80J95
B	510	ALA	-	expression tag	UNP Q80J95
B	511	ALA	-	expression tag	UNP Q80J95
B	512	ALA	-	expression tag	UNP Q80J95
B	513	LEU	-	expression tag	UNP Q80J95
B	514	GLU	-	expression tag	UNP Q80J95
B	515	HIS	-	expression tag	UNP Q80J95
B	516	HIS	-	expression tag	UNP Q80J95
B	517	HIS	-	expression tag	UNP Q80J95
B	518	HIS	-	expression tag	UNP Q80J95
B	519	HIS	-	expression tag	UNP Q80J95
B	520	HIS	-	expression tag	UNP Q80J95
C	510	ALA	-	expression tag	UNP Q80J95

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Chain	Residue	Modelled	Actual	Comment	Reference
C	511	ALA	-	expression tag	UNP Q80J95
C	512	ALA	-	expression tag	UNP Q80J95
C	513	LEU	-	expression tag	UNP Q80J95
C	514	GLU	-	expression tag	UNP Q80J95
C	515	HIS	-	expression tag	UNP Q80J95
C	516	HIS	-	expression tag	UNP Q80J95
C	517	HIS	-	expression tag	UNP Q80J95
C	518	HIS	-	expression tag	UNP Q80J95
C	519	HIS	-	expression tag	UNP Q80J95
C	520	HIS	-	expression tag	UNP Q80J95

- Molecule 2 is 1-(beta-D-ribofuranosyl)-1H-1,2,4-triazole-3-carboxamide (three-letter code: RBV) (formula: C₈H₁₂N₄O₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			17	8	4	5		
2	B	1	Total	C	N	O	0	0
			17	8	4	5		
2	C	1	Total	C	N	O	0	0
			17	8	4	5		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Mg	0	0
			1	1		
4	B	1	Total	Mg	0	0
			1	1		
4	C	1	Total	Mg	0	0
			1	1		

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

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

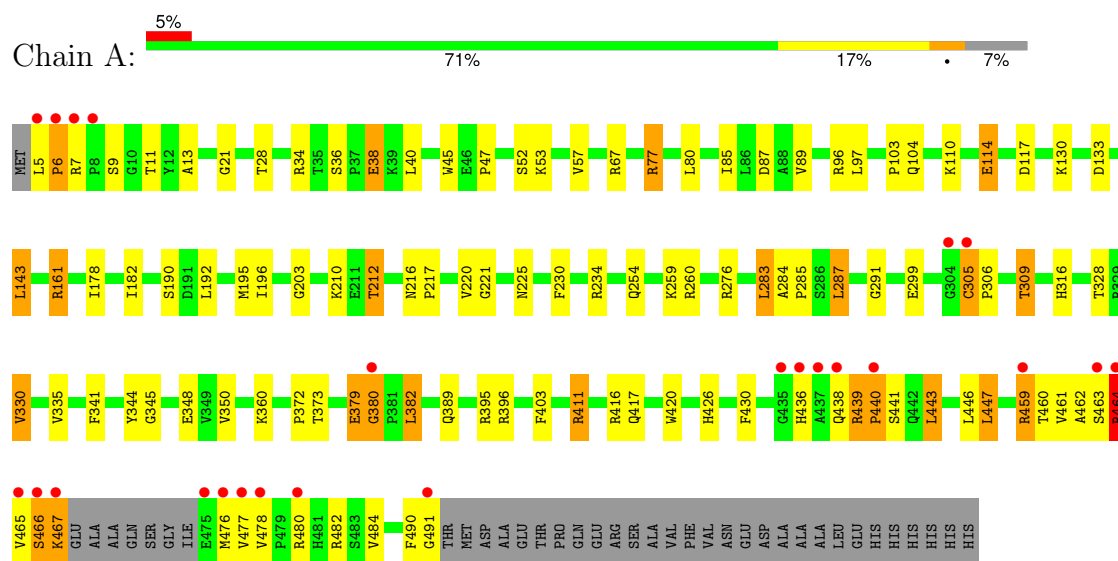
- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	179	Total O 179 179	0	0
6	B	149	Total O 149 149	0	0
6	C	155	Total O 155 155	0	0

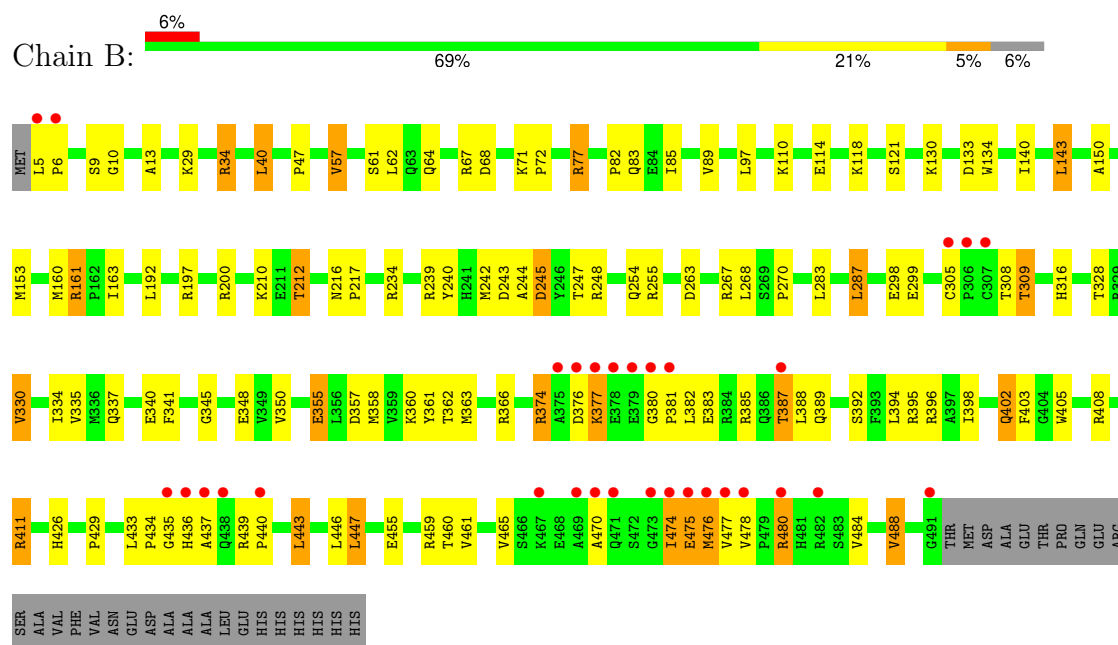
3 Residue-property plots

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.

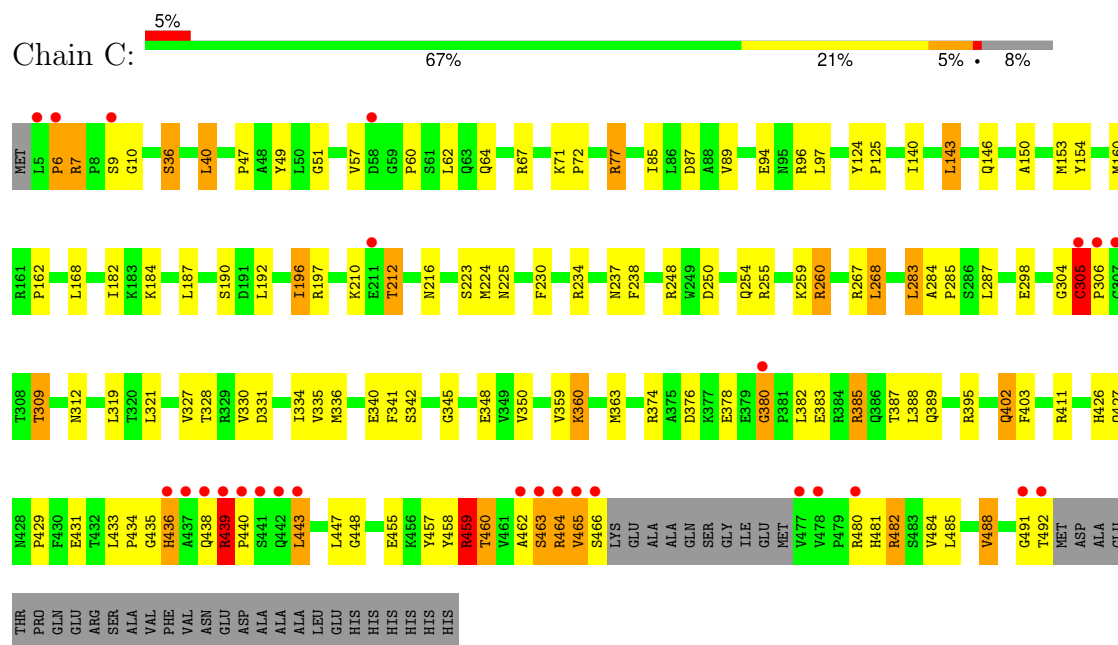
• Molecule 1: RNA polymerase



• Molecule 1: RNA polymerase



● Molecule 1: RNA polymerase



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	119.95Å 196.08Å 109.21Å 90.00° 114.12° 90.00°	Depositor
Resolution (Å)	47.85 – 2.50 47.85 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.6 (47.85-2.50) 95.6 (47.85-2.50)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	0.46	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.32 (at 2.51Å)	Xtriage
Refinement program	REFMAC, PHENIX 1.7.1_743	Depositor
R, R_{free}	0.181 , 0.229 0.184 , 0.226	Depositor DCC
R_{free} test set	2000 reflections (2.54%)	wwPDB-VP
Wilson B-factor (Å ²)	27.6	Xtriage
Anisotropy	0.628	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 48.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	12321	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.46% 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: SO4, RBV, GOL, 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	0.42	0/3923	0.58	0/5314
1	B	0.40	0/3961	0.57	1/5368 (0.0%)
1	C	0.41	0/3895	0.58	0/5280
All	All	0.41	0/11779	0.58	1/15962 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	57	VAL	CB-CA-C	-5.28	101.38	111.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	459	ARG	Peptide

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3828	0	3790	119	1
1	B	3865	0	3822	111	0
1	C	3800	0	3757	113	0
2	A	17	0	12	4	0
2	B	17	0	12	4	0
2	C	17	0	12	10	0
3	A	40	0	0	1	0
3	B	35	0	0	4	0
3	C	60	0	0	4	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
5	A	60	0	80	13	0
5	B	54	0	72	5	0
5	C	42	0	56	8	0
6	A	179	0	0	5	0
6	B	149	0	0	4	0
6	C	155	0	0	4	0
All	All	12321	0	11613	345	1

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 15.

All (345) 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:463:SER:HA	1:A:464:ARG:HB3	1.18	1.17
1:A:104:GLN:H	5:A:618:GOL:H32	1.02	1.15
1:B:436:HIS:H	1:B:437:ALA:HA	1.16	1.08
1:B:161:ARG:HG3	1:B:161:ARG:HH11	1.22	1.04
1:A:305:CYS:HB2	1:A:306:PRO:HD2	1.36	1.04
1:A:411:ARG:HD3	5:A:615:GOL:H12	1.40	1.01
1:C:146:GLN:HG3	5:C:620:GOL:H2	1.45	0.97
1:C:312:ASN:HD22	2:C:601:RBV:H3'	1.30	0.97
1:C:464:ARG:NE	1:C:464:ARG:H	1.67	0.91
1:C:259:LYS:HG3	1:C:283:LEU:HD23	1.52	0.90
1:A:104:GLN:N	5:A:618:GOL:H32	1.86	0.89
1:C:459:ARG:HA	1:C:462:ALA:HB3	1.55	0.88
1:B:366:ARG:HH22	1:B:380:GLY:HA3	1.38	0.88

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:476:MET:HB3	1:A:477:VAL:HA	1.57	0.86
1:A:464:ARG:HG2	1:A:465:VAL:HG22	1.59	0.85
1:A:477:VAL:HG22	1:A:478:VAL:H	1.42	0.85
1:C:491:GLY:HA2	1:C:492:THR:HB	1.58	0.85
1:C:385:ARG:NH1	1:C:387:THR:O	2.09	0.84
1:C:458:TYR:O	1:C:459:ARG:HB3	1.77	0.83
1:B:309:THR:HB	2:B:601:RBV:O2'	1.77	0.83
1:B:234:ARG:NH1	1:B:340:GLU:OE2	2.11	0.83
1:B:212:THR:HG21	1:B:216:ASN:HD22	1.44	0.83
1:B:436:HIS:N	1:B:437:ALA:HA	1.85	0.83
1:C:345:GLY:HA3	2:C:601:RBV:H5'A	1.61	0.82
1:A:463:SER:CA	1:A:464:ARG:HB3	2.06	0.80
1:B:82:PRO:HA	5:B:614:GOL:H12	1.64	0.80
1:B:83:GLN:H	5:B:614:GOL:H2	1.48	0.79
1:B:403:PHE:O	1:C:234:ARG:NH2	2.16	0.79
1:A:217:PRO:HD3	5:A:617:GOL:H32	1.64	0.78
1:A:305:CYS:HB2	1:A:306:PRO:CD	2.14	0.78
1:A:305:CYS:CB	1:A:306:PRO:HD2	2.12	0.77
1:A:459:ARG:HH11	1:A:459:ARG:CG	1.97	0.77
1:A:305:CYS:SG	6:A:772:HOH:O	2.42	0.77
1:A:463:SER:HA	1:A:464:ARG:CB	2.06	0.76
1:C:383:GLU:HB2	3:C:613:SO4:O1	1.84	0.76
1:A:466:SER:H	1:A:467:LYS:HA	1.49	0.76
1:A:341:PHE:N	5:A:617:GOL:O2	2.17	0.75
1:B:150:ALA:HA	1:B:160:MET:HE1	1.68	0.74
5:C:620:GOL:H12	6:C:855:HOH:O	1.87	0.74
1:A:225:ASN:H	5:A:614:GOL:H31	1.52	0.74
1:C:309:THR:HB	2:C:601:RBV:O3'	1.88	0.74
1:B:150:ALA:HA	1:B:160:MET:CE	2.18	0.73
1:A:464:ARG:HG2	1:A:465:VAL:N	2.04	0.72
1:B:161:ARG:HH11	1:B:161:ARG:CG	2.03	0.71
1:C:223:SER:HA	5:C:618:GOL:H32	1.72	0.71
1:A:217:PRO:CD	5:A:617:GOL:H32	2.21	0.71
1:A:476:MET:HB3	1:A:477:VAL:CA	2.20	0.71
1:B:337:GLN:HG2	1:C:402:GLN:HG3	1.72	0.70
1:C:385:ARG:NH1	1:C:389:GLN:O	2.25	0.69
1:B:212:THR:CG2	1:B:216:ASN:HD22	2.05	0.69
1:B:161:ARG:HG3	1:B:161:ARG:NH1	2.02	0.69
1:A:436:HIS:HD2	1:A:467:LYS:HG3	1.58	0.68
1:A:161:ARG:HD2	1:A:287:LEU:HD22	1.74	0.68
1:A:459:ARG:HH11	1:A:459:ARG:HG2	1.59	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:87:ASP:OD1	1:A:260:ARG:NH2	2.27	0.67
1:A:465:VAL:HB	1:A:466:SER:HB3	1.77	0.67
1:A:465:VAL:HB	1:A:466:SER:CB	2.24	0.67
1:C:327:VAL:HG22	1:C:360:LYS:HB3	1.76	0.67
1:A:396:ARG:NH1	6:A:759:HOH:O	2.13	0.67
1:A:309:THR:HB	2:A:601:RBV:H2'	1.76	0.66
1:B:455:GLU:O	1:B:459:ARG:HG2	1.96	0.66
1:B:29:LYS:HD2	5:B:612:GOL:H32	1.78	0.66
1:C:150:ALA:HA	1:C:160:MET:HE1	1.76	0.66
1:A:96:ARG:HE	1:A:216:ASN:ND2	1.93	0.66
1:C:431:GLU:OE1	6:C:834:HOH:O	2.13	0.66
1:A:417:GLN:O	1:A:439:ARG:NH2	2.28	0.65
1:C:464:ARG:NE	1:C:464:ARG:N	2.42	0.65
1:B:68:ASP:O	1:B:71:LYS:HE2	1.97	0.65
1:C:330:VAL:HG22	1:C:335:VAL:HG23	1.79	0.65
1:B:476:MET:O	1:B:477:VAL:HG22	1.97	0.64
1:A:461:VAL:C	1:A:463:SER:H	2.01	0.64
1:A:110:LYS:O	1:A:114:GLU:HG2	1.98	0.63
1:A:459:ARG:CZ	1:A:460:THR:HG22	2.29	0.63
1:A:77:ARG:HG2	1:A:254:GLN:HG2	1.78	0.63
1:C:491:GLY:CA	1:C:492:THR:HB	2.27	0.63
1:A:96:ARG:HE	1:A:216:ASN:HD22	1.47	0.63
1:A:178:ILE:O	1:A:182:ILE:HD11	1.99	0.63
1:B:110:LYS:O	1:B:114:GLU:HG3	1.97	0.63
1:C:480:ARG:CZ	1:C:482:ARG:HG3	2.28	0.62
1:A:330:VAL:HG22	1:A:335:VAL:HG23	1.81	0.62
1:A:395:ARG:NH2	6:A:792:HOH:O	2.32	0.62
1:A:466:SER:N	1:A:467:LYS:HA	2.11	0.62
1:B:240:TYR:OH	1:B:355:GLU:OE2	2.06	0.62
1:A:439:ARG:HH11	1:A:439:ARG:HG2	1.65	0.61
3:A:608:SO4:O1	6:A:843:HOH:O	2.15	0.61
1:B:408:ARG:NH2	3:B:608:SO4:O2	2.30	0.61
1:B:411:ARG:HG2	3:B:606:SO4:O2	1.99	0.61
1:B:234:ARG:NH2	1:C:403:PHE:O	2.32	0.61
1:C:439:ARG:HG2	1:C:443:LEU:HD23	1.83	0.61
1:B:13:ALA:HB2	1:B:67:ARG:HG2	1.82	0.61
1:C:77:ARG:HG2	1:C:254:GLN:HG2	1.82	0.60
1:B:5:LEU:N	1:B:6:PRO:HD2	2.15	0.60
1:C:438:GLN:O	1:C:439:ARG:HB2	2.01	0.60
1:C:85:ILE:O	1:C:89:VAL:HG13	2.01	0.60
1:A:464:ARG:HG2	1:A:465:VAL:CG2	2.32	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:143:LEU:HG	1:C:192:LEU:HD22	1.84	0.60
1:A:436:HIS:CD2	1:A:467:LYS:HG3	2.37	0.59
1:B:345:GLY:HA3	2:B:601:RBV:H1'	1.84	0.59
1:C:62:LEU:N	3:C:609:SO4:O4	2.33	0.59
1:B:153:MET:HB2	1:B:160:MET:HE1	1.85	0.59
1:A:464:ARG:HG2	1:A:465:VAL:H	1.68	0.58
1:B:436:HIS:N	1:B:437:ALA:CA	2.64	0.58
1:A:360:LYS:HE3	5:B:618:GOL:H31	1.84	0.58
1:B:77:ARG:HD2	1:B:299:GLU:HG3	1.83	0.58
1:A:117:ASP:O	1:A:130:LYS:HE2	2.04	0.58
1:A:439:ARG:HG2	1:A:439:ARG:NH1	2.17	0.58
1:A:477:VAL:HG22	1:A:478:VAL:HG12	1.85	0.58
1:C:9:SER:HB3	1:C:10:GLY:HA2	1.86	0.58
1:A:477:VAL:HG22	1:A:478:VAL:N	2.14	0.57
1:A:52:SER:HB2	1:A:53:LYS:NZ	2.19	0.57
5:A:620:GOL:O3	5:A:620:GOL:O1	2.19	0.57
1:C:94:GLU:OE2	1:C:267:ARG:HD2	2.04	0.57
1:B:61:SER:OG	1:B:64:GLN:HG3	2.05	0.57
1:B:212:THR:HG23	1:B:212:THR:O	2.03	0.57
1:A:306:PRO:HB2	5:A:619:GOL:H11	1.86	0.57
1:C:190:SER:HB2	1:C:305:CYS:N	2.20	0.57
1:A:212:THR:CG2	1:A:216:ASN:HB2	2.35	0.57
1:B:239:ARG:HD3	1:B:240:TYR:CE2	2.39	0.57
1:C:480:ARG:HG2	1:C:482:ARG:HE	1.69	0.57
1:B:480:ARG:HH11	1:B:480:ARG:H	1.53	0.57
1:C:225:ASN:HB2	5:C:618:GOL:O1	2.05	0.56
1:A:85:ILE:O	1:A:89:VAL:HG13	2.04	0.56
1:A:143:LEU:HG	1:A:192:LEU:HD22	1.87	0.56
1:B:461:VAL:O	1:B:465:VAL:HG23	2.05	0.56
1:C:436:HIS:CD2	1:C:466:SER:HA	2.40	0.56
1:B:77:ARG:HD2	1:B:299:GLU:CG	2.36	0.56
1:B:47:PRO:HG2	1:B:429:PRO:HB3	1.88	0.55
1:A:341:PHE:H	5:A:617:GOL:HO2	1.50	0.55
1:B:153:MET:HB2	1:B:160:MET:CE	2.36	0.55
1:B:374:ARG:HD2	1:B:381:PRO:O	2.06	0.55
1:C:87:ASP:OD1	1:C:260:ARG:NH2	2.39	0.55
1:C:96:ARG:HE	1:C:216:ASN:ND2	2.04	0.55
1:B:474:ILE:HG22	1:B:475:GLU:N	2.22	0.55
1:B:330:VAL:HG22	1:B:335:VAL:HG23	1.88	0.55
1:C:331:ASP:HB2	1:C:334:ILE:HD13	1.89	0.54
1:C:481:HIS:CE1	1:C:485:LEU:HD12	2.42	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:330:VAL:HG22	1:A:335:VAL:CG2	2.37	0.54
1:B:85:ILE:O	1:B:89:VAL:HG13	2.07	0.54
1:C:463:SER:HA	1:C:464:ARG:HH21	1.73	0.54
1:B:160:MET:HE2	1:B:197:ARG:HD3	1.89	0.54
1:B:242:MET:HE3	1:B:358:MET:HE1	1.89	0.54
1:A:309:THR:HB	2:A:601:RBV:C2'	2.37	0.54
1:B:330:VAL:HG22	1:B:335:VAL:CG2	2.37	0.54
1:A:53:LYS:HE2	1:A:53:LYS:H	1.72	0.54
1:A:476:MET:CB	1:A:477:VAL:HA	2.25	0.54
1:A:464:ARG:CG	1:A:465:VAL:N	2.71	0.54
1:B:474:ILE:O	1:B:475:GLU:HB2	2.08	0.54
1:A:379:GLU:O	1:A:380:GLY:O	2.26	0.53
1:C:153:MET:HB2	1:C:160:MET:HE1	1.90	0.53
1:B:163:ILE:HD13	1:B:287:LEU:HD23	1.90	0.53
1:B:212:THR:HG23	1:B:216:ASN:HB2	1.89	0.53
1:B:341:PHE:CE1	1:B:350:VAL:HG13	2.43	0.53
1:B:255:ARG:HG3	1:B:298:GLU:O	2.09	0.53
1:C:196:ILE:C	1:C:196:ILE:HD12	2.29	0.53
1:C:464:ARG:HD2	1:C:465:VAL:N	2.24	0.53
1:A:212:THR:HG23	1:A:216:ASN:HB2	1.91	0.53
1:B:143:LEU:HG	1:B:192:LEU:HD22	1.91	0.53
1:C:96:ARG:HE	1:C:216:ASN:HD22	1.57	0.52
1:B:160:MET:CE	1:B:197:ARG:HD3	2.39	0.52
1:C:49:TYR:CE2	1:C:51:GLY:HA2	2.44	0.52
1:A:439:ARG:HH11	1:A:439:ARG:CG	2.23	0.52
1:B:348:GLU:OE1	6:B:753:HOH:O	2.19	0.52
1:B:394:LEU:O	1:B:395:ARG:HB2	2.10	0.52
1:B:263:ASP:HB3	1:B:267:ARG:NH2	2.25	0.52
1:B:411:ARG:N	3:B:606:SO4:O2	2.29	0.52
1:C:154:TYR:HB2	1:C:197:ARG:HG3	1.90	0.52
1:C:312:ASN:ND2	2:C:601:RBV:H3'	2.13	0.52
1:A:77:ARG:HD2	1:A:299:GLU:HG3	1.91	0.51
1:C:248:ARG:NH1	6:C:775:HOH:O	2.42	0.51
1:C:457:TYR:O	1:C:460:THR:HB	2.11	0.51
1:C:459:ARG:O	1:C:460:THR:HB	2.09	0.51
1:A:45:TRP:HB2	1:A:416:ARG:HD3	1.92	0.51
1:A:316:HIS:CE1	1:A:348:GLU:HB3	2.46	0.51
1:A:309:THR:HA	2:A:601:RBV:O2'	2.11	0.50
1:A:5:LEU:N	1:A:6:PRO:CD	2.75	0.50
1:B:270:PRO:HD2	6:B:796:HOH:O	2.12	0.50
1:A:372:PRO:HB2	1:A:382:LEU:HD21	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:462:ALA:O	1:C:463:SER:HB3	2.12	0.50
1:A:443:LEU:O	1:A:447:LEU:HD22	2.12	0.50
1:C:190:SER:HB2	1:C:305:CYS:H	1.77	0.50
1:A:477:VAL:CG2	1:A:478:VAL:H	2.20	0.50
1:C:459:ARG:O	1:C:460:THR:CB	2.60	0.50
1:A:28:THR:HG21	1:A:53:LYS:HE3	1.93	0.50
1:B:341:PHE:HE1	1:B:350:VAL:HG13	1.76	0.50
1:B:5:LEU:N	1:B:6:PRO:CD	2.74	0.49
1:B:62:LEU:N	3:B:607:SO4:O2	2.39	0.49
1:B:163:ILE:CD1	1:B:287:LEU:HD23	2.42	0.49
1:A:464:ARG:CG	1:A:465:VAL:H	2.25	0.49
1:B:376:ASP:O	1:B:377:LYS:HG2	2.12	0.49
1:B:476:MET:HG3	1:B:478:VAL:HG22	1.95	0.49
1:B:316:HIS:CE1	1:B:348:GLU:HB3	2.47	0.49
1:B:239:ARG:NH2	6:B:814:HOH:O	2.45	0.49
1:C:6:PRO:O	1:C:7:ARG:HB3	2.12	0.49
1:A:341:PHE:CE1	1:A:350:VAL:HG13	2.48	0.49
1:B:212:THR:CG2	1:B:212:THR:O	2.60	0.48
1:C:250:ASP:OD1	2:C:601:RBV:C5	2.61	0.48
1:B:439:ARG:O	1:B:443:LEU:HB2	2.13	0.48
1:A:345:GLY:HA3	2:A:601:RBV:H1'	1.95	0.48
1:B:239:ARG:HD3	1:B:240:TYR:CZ	2.49	0.48
1:A:276:ARG:NH2	6:A:741:HOH:O	2.45	0.48
1:C:411:ARG:N	3:C:615:SO4:O2	2.35	0.48
1:A:77:ARG:HD2	1:A:299:GLU:CG	2.44	0.48
1:A:305:CYS:CB	1:A:306:PRO:CD	2.82	0.48
1:C:448:GLY:HA3	1:C:488:VAL:HG11	1.94	0.48
1:C:480:ARG:O	1:C:484:VAL:HG23	2.14	0.48
1:B:447:LEU:HD13	1:B:465:VAL:HG21	1.96	0.48
1:A:178:ILE:O	1:A:182:ILE:CD1	2.61	0.48
1:C:459:ARG:HA	1:C:462:ALA:CB	2.37	0.47
1:A:117:ASP:O	1:A:130:LYS:CE	2.62	0.47
1:C:374:ARG:HD3	1:C:378:GLU:O	2.13	0.47
1:B:71:LYS:N	1:B:72:PRO:HD2	2.29	0.47
1:B:435:GLY:HA2	1:B:436:HIS:HA	1.54	0.47
1:B:484:VAL:O	1:B:488:VAL:HG22	2.13	0.47
1:C:190:SER:HB2	1:C:304:GLY:HA3	1.97	0.47
1:C:402:GLN:CD	1:C:402:GLN:H	2.18	0.47
1:B:328:THR:OG1	1:B:330:VAL:HG13	2.14	0.47
1:C:383:GLU:N	3:C:613:SO4:O4	2.33	0.47
1:C:259:LYS:HE3	1:C:283:LEU:HB3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:459:ARG:HH11	1:A:459:ARG:HG3	1.79	0.46
1:B:217:PRO:HB3	1:B:341:PHE:HB2	1.97	0.46
1:A:217:PRO:HD3	5:A:617:GOL:C3	2.38	0.46
1:B:244:ALA:O	1:B:245:ASP:C	2.53	0.46
1:C:462:ALA:O	1:C:463:SER:CB	2.63	0.46
1:B:387:THR:HG22	1:B:389:GLN:H	1.80	0.46
2:B:601:RBV:H5	6:B:776:HOH:O	2.15	0.46
1:A:464:ARG:NE	1:A:465:VAL:O	2.49	0.46
1:C:64:GLN:OE1	1:C:67:ARG:NH1	2.49	0.46
1:C:77:ARG:CG	1:C:254:GLN:HG2	2.45	0.46
1:A:459:ARG:HG3	1:A:460:THR:N	2.30	0.46
1:A:464:ARG:CG	1:A:465:VAL:HG22	2.39	0.46
1:B:362:THR:HG22	1:B:366:ARG:NH1	2.30	0.46
1:C:150:ALA:HA	1:C:160:MET:CE	2.43	0.46
1:A:220:VAL:HA	1:A:344:TYR:CE2	2.51	0.46
1:B:376:ASP:OD2	1:B:376:ASP:N	2.48	0.46
1:C:374:ARG:NH2	1:C:376:ASP:OD2	2.43	0.46
1:C:455:GLU:O	1:C:458:TYR:O	2.33	0.46
1:C:458:TYR:O	1:C:459:ARG:CB	2.53	0.46
1:C:464:ARG:H	1:C:464:ARG:HE	1.60	0.45
1:C:250:ASP:OD1	2:C:601:RBV:H5	2.16	0.45
1:C:464:ARG:N	1:C:464:ARG:CZ	2.78	0.45
2:C:601:RBV:H2'	2:C:601:RBV:H5	1.76	0.45
1:B:77:ARG:HD2	1:B:299:GLU:CD	2.37	0.45
1:A:411:ARG:H	1:A:411:ARG:HG2	1.50	0.45
1:A:461:VAL:C	1:A:463:SER:N	2.66	0.45
1:C:85:ILE:O	1:C:89:VAL:CG1	2.64	0.45
1:C:168:LEU:HB3	1:C:184:LYS:HG2	1.99	0.45
1:A:259[B]:LYS:HA	1:A:283:LEU:HD23	1.98	0.45
1:A:480:ARG:HH12	1:A:482:ARG:HD3	1.82	0.45
1:A:47:PRO:HD3	1:A:420:TRP:CH2	2.52	0.45
1:A:464:ARG:HD3	1:A:464:ARG:N	2.32	0.45
1:A:13:ALA:HB2	1:A:67:ARG:HG3	1.98	0.44
1:C:187:LEU:HD23	2:C:601:RBV:O3	2.17	0.44
1:A:103:PRO:HA	5:A:618:GOL:H31	1.99	0.44
1:B:133:ASP:HB2	1:B:143:LEU:HD22	2.00	0.44
1:B:330:VAL:HG23	1:B:334:ILE:HB	2.00	0.44
1:B:212:THR:CG2	1:B:216:ASN:HB2	2.48	0.44
1:C:304:GLY:O	1:C:305:CYS:O	2.35	0.44
1:C:374:ARG:HD2	1:C:380:GLY:HA2	2.00	0.44
1:B:9:SER:HB2	1:B:10:GLY:HA2	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:433:LEU:HA	1:B:434:PRO:HD3	1.79	0.44
1:C:385:ARG:HE	1:C:385:ARG:HB2	1.45	0.44
1:A:52:SER:HB2	1:A:53:LYS:HZ3	1.82	0.44
1:B:140:ILE:C	1:B:140:ILE:HD12	2.38	0.44
1:A:21:GLY:HA3	1:A:291:GLY:O	2.18	0.43
1:A:212:THR:CG2	1:A:212:THR:O	2.65	0.43
1:C:47:PRO:HG2	1:C:429:PRO:HB3	2.00	0.43
1:C:160:MET:O	1:C:162:PRO:HD3	2.18	0.43
1:C:196:ILE:HD12	1:C:196:ILE:O	2.18	0.43
1:C:342:SER:O	1:C:348:GLU:HA	2.17	0.43
1:B:77:ARG:CG	1:B:254:GLN:HG2	2.48	0.43
1:B:82:PRO:HA	5:B:614:GOL:C1	2.43	0.43
1:B:366:ARG:NH2	1:B:380:GLY:HA3	2.19	0.43
1:A:80:LEU:HD12	1:A:80:LEU:HA	1.86	0.43
1:A:217:PRO:HB3	1:A:341:PHE:HB2	2.00	0.43
1:A:480:ARG:NH1	1:A:482:ARG:HD3	2.34	0.43
1:A:478:VAL:HG13	1:A:478:VAL:O	2.19	0.43
1:B:118:LYS:HE2	1:B:134:TRP:CD2	2.53	0.43
1:C:212:THR:HG23	1:C:212:THR:O	2.18	0.43
1:A:210:LYS:HG3	1:A:221:GLY:HA3	2.00	0.43
1:A:212:THR:HG23	1:A:212:THR:O	2.19	0.43
1:A:328:THR:OG1	1:A:330:VAL:HG13	2.18	0.43
1:B:388:LEU:HG	1:B:398:ILE:HG21	2.00	0.43
1:B:396:ARG:HG2	1:B:396:ARG:HH11	1.83	0.43
1:A:259[A]:LYS:HA	1:A:283:LEU:HD23	2.00	0.43
1:B:121:SER:O	1:B:130:LYS:HE2	2.18	0.43
1:B:242:MET:HE1	1:B:361:TYR:CE2	2.53	0.43
1:B:402:GLN:H	1:B:402:GLN:HG3	1.31	0.43
1:C:36:SER:HB3	6:C:806:HOH:O	2.19	0.43
1:A:190:SER:O	1:A:195:MET:HE3	2.19	0.42
1:B:388:LEU:HD12	1:B:388:LEU:HA	1.86	0.42
1:C:284:ALA:O	1:C:285:PRO:C	2.55	0.42
1:C:143:LEU:HD12	1:C:143:LEU:HA	1.78	0.42
1:C:255:ARG:O	1:C:259:LYS:HD2	2.19	0.42
1:B:242:MET:CE	1:B:358:MET:HE1	2.49	0.42
1:C:309:THR:HA	2:C:601:RBV:O3'	2.19	0.42
1:A:192:LEU:O	1:A:196:ILE:HG12	2.20	0.42
1:C:40:LEU:HD12	1:C:40:LEU:HA	1.91	0.42
1:C:388:LEU:H	5:C:616:GOL:H31	1.84	0.42
1:A:210:LYS:C	1:A:212:THR:H	2.21	0.42
1:B:357:ASP:C	1:B:357:ASP:OD1	2.58	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:357:ASP:OD2	1:B:360:LYS:HD2	2.20	0.42
1:C:146:GLN:HG3	5:C:620:GOL:C2	2.33	0.42
1:B:247:THR:HG22	1:B:248:ARG:HG3	2.01	0.42
1:B:309:THR:HA	2:B:601:RBV:O3'	2.20	0.42
1:B:242:MET:CE	1:B:358:MET:CE	2.98	0.42
1:B:77:ARG:HG2	1:B:254:GLN:HG2	2.01	0.42
1:C:336:MET:HB3	5:C:621:GOL:H12	2.02	0.42
1:C:312:ASN:HD22	2:C:601:RBV:C3'	2.16	0.41
1:A:212:THR:HG21	1:A:216:ASN:OD1	2.20	0.41
1:C:124:TYR:HA	1:C:125:PRO:HA	1.76	0.41
1:C:255:ARG:HG3	1:C:298:GLU:O	2.21	0.41
1:C:341:PHE:CE1	1:C:350:VAL:HG13	2.55	0.41
1:A:476:MET:CE	1:A:477:VAL:HG23	2.51	0.41
1:B:436:HIS:H	1:B:437:ALA:CA	2.06	0.41
1:A:490:PHE:O	1:A:491:GLY:C	2.58	0.41
1:A:459:ARG:CG	1:A:459:ARG:NH1	2.65	0.41
1:B:385:ARG:HD2	1:B:385:ARG:HA	1.93	0.41
1:C:140:ILE:HD12	1:C:140:ILE:C	2.41	0.41
1:A:284:ALA:O	1:A:285:PRO:C	2.58	0.41
1:B:383:GLU:CD	1:B:383:GLU:H	2.24	0.41
1:C:464:ARG:HB2	1:C:465:VAL:H	1.62	0.41
1:A:203:GLY:HA2	5:A:619:GOL:H32	2.02	0.41
1:B:477:VAL:O	1:B:477:VAL:HG23	2.21	0.41
1:C:268:LEU:HD12	1:C:268:LEU:HA	1.91	0.41
1:C:359:VAL:O	1:C:363:MET:HG3	2.20	0.41
1:C:459:ARG:H	1:C:462:ALA:H	1.69	0.41
1:A:133:ASP:CB	1:A:143:LEU:HB2	2.50	0.41
1:C:71:LYS:N	1:C:72:PRO:HD2	2.36	0.41
1:A:316:HIS:NE2	1:A:348:GLU:OE1	2.42	0.41
1:B:243:ASP:OD2	1:B:243:ASP:C	2.60	0.41
1:A:440:PRO:HG2	1:A:441:SER:H	1.86	0.40
1:C:319:LEU:HD23	1:C:319:LEU:HA	1.95	0.40
1:C:328:THR:OG1	1:C:330:VAL:HG13	2.21	0.40
1:B:150:ALA:HA	1:B:160:MET:HE3	2.00	0.40
1:A:52:SER:HB2	1:A:53:LYS:HZ1	1.85	0.40
1:B:34:ARG:HD2	1:B:40:LEU:CD1	2.51	0.40
1:C:238:PHE:CE1	1:C:340:GLU:HB2	2.56	0.40
1:C:330:VAL:HG22	1:C:335:VAL:CG2	2.46	0.40
1:C:464:ARG:NH1	1:C:465:VAL:HA	2.35	0.40
1:C:212:THR:CG2	1:C:216:ASN:OD1	2.70	0.40
1:C:433:LEU:HD12	1:C:434:PRO:HD2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:34:ARG:HG3	1:A:430:PHE:HA	2.04	0.40
1:B:389:GLN:HG2	1:B:405:TRP:CH2	2.57	0.40
1:C:60:PRO:HD2	1:C:182:ILE:HD12	2.04	0.40
1:C:224:MET:H	5:C:618:GOL:H32	1.86	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:234:ARG:NH2	1:A:403:PHE:O[2_454]	2.02	0.18

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	477/517 (92%)	455 (95%)	16 (3%)	6 (1%)	10	19
1	B	485/517 (94%)	456 (94%)	22 (4%)	7 (1%)	9	17
1	C	474/517 (92%)	444 (94%)	18 (4%)	12 (2%)	4	7
All	All	1436/1551 (93%)	1355 (94%)	56 (4%)	25 (2%)	7	14

All (25) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	440	PRO
1	B	475	GLU
1	C	6	PRO
1	C	305	CYS
1	C	436	HIS
1	C	439	ARG
1	C	440	PRO
1	C	460	THR

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Mol	Chain	Res	Type
1	C	463	SER
1	A	6	PRO
1	A	380	GLY
1	A	464	ARG
1	B	476	MET
1	C	380	GLY
1	C	435	GLY
1	B	245	ASP
1	B	377	LYS
1	B	470	ALA
1	B	474	ILE
1	A	38	GLU
1	C	7	ARG
1	A	462	ALA
1	B	440	PRO
1	C	465	VAL
1	C	306	PRO

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	412/440 (94%)	377 (92%)	35 (8%)	8	18
1	B	415/440 (94%)	383 (92%)	32 (8%)	10	22
1	C	409/440 (93%)	377 (92%)	32 (8%)	10	21
All	All	1236/1320 (94%)	1137 (92%)	99 (8%)	10	20

All (99) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	ARG
1	A	9	SER
1	A	11	THR
1	A	36	SER
1	A	38	GLU

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Mol	Chain	Res	Type
1	A	40	LEU
1	A	57	VAL
1	A	77	ARG
1	A	97	LEU
1	A	114	GLU
1	A	143	LEU
1	A	161	ARG
1	A	212	THR
1	A	230	PHE
1	A	283	LEU
1	A	287	LEU
1	A	305	CYS
1	A	309	THR
1	A	330	VAL
1	A	373	THR
1	A	379	GLU
1	A	382	LEU
1	A	389	GLN
1	A	411	ARG
1	A	426	HIS
1	A	438	GLN
1	A	439	ARG
1	A	443	LEU
1	A	446	LEU
1	A	447	LEU
1	A	459	ARG
1	A	464	ARG
1	A	466	SER
1	A	467	LYS
1	A	484	VAL
1	B	34	ARG
1	B	40	LEU
1	B	57	VAL
1	B	77	ARG
1	B	97	LEU
1	B	143	LEU
1	B	161	ARG
1	B	200	ARG
1	B	210	LYS
1	B	212	THR
1	B	268	LEU
1	B	283	LEU

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Mol	Chain	Res	Type
1	B	287	LEU
1	B	305	CYS
1	B	308	THR
1	B	309	THR
1	B	330	VAL
1	B	355	GLU
1	B	363	MET
1	B	374	ARG
1	B	382	LEU
1	B	387	THR
1	B	392	SER
1	B	402	GLN
1	B	411	ARG
1	B	426	HIS
1	B	443	LEU
1	B	446	LEU
1	B	447	LEU
1	B	460	THR
1	B	480	ARG
1	B	488	VAL
1	C	36	SER
1	C	40	LEU
1	C	57	VAL
1	C	77	ARG
1	C	97	LEU
1	C	143	LEU
1	C	196	ILE
1	C	210	LYS
1	C	212	THR
1	C	230	PHE
1	C	237	ASN
1	C	260	ARG
1	C	268	LEU
1	C	283	LEU
1	C	287	LEU
1	C	305	CYS
1	C	309	THR
1	C	321	LEU
1	C	360	LYS
1	C	382	LEU
1	C	385	ARG
1	C	395	ARG

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Mol	Chain	Res	Type
1	C	402	GLN
1	C	426	HIS
1	C	427	GLN
1	C	439	ARG
1	C	443	LEU
1	C	447	LEU
1	C	459	ARG
1	C	464	ARG
1	C	482	ARG
1	C	488	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	216	ASN
1	A	436	HIS
1	B	216	ASN
1	C	481	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 59 ligands modelled in this entry, 3 are monoatomic - leaving 56 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$
3	SO4	C	608	-	4,4,4	0.23	0	6,6,6	0.07	0
5	GOL	A	611	-	5,5,5	0.41	0	5,5,5	0.17	0
3	SO4	B	602	-	4,4,4	0.23	0	6,6,6	0.08	0
3	SO4	A	609	-	4,4,4	0.23	0	6,6,6	0.13	0
5	GOL	C	618	-	5,5,5	0.37	0	5,5,5	0.59	0
5	GOL	C	619	-	5,5,5	0.39	0	5,5,5	0.24	0
2	RBV	A	601	-	14,18,18	1.69	1 (7%)	16,26,26	4.78	4 (25%)
5	GOL	A	615	-	5,5,5	0.41	0	5,5,5	0.46	0
5	GOL	B	610	-	5,5,5	0.37	0	5,5,5	0.32	0
3	SO4	C	614	-	4,4,4	0.24	0	6,6,6	0.13	0
3	SO4	A	604	-	4,4,4	0.23	0	6,6,6	0.07	0
5	GOL	A	613	-	5,5,5	0.36	0	5,5,5	0.46	0
5	GOL	C	616	-	5,5,5	0.31	0	5,5,5	0.34	0
3	SO4	C	613	-	4,4,4	0.26	0	6,6,6	0.09	0
5	GOL	B	614	-	5,5,5	0.37	0	5,5,5	0.34	0
3	SO4	B	608	-	4,4,4	0.24	0	6,6,6	0.13	0
5	GOL	B	611	-	5,5,5	0.37	0	5,5,5	0.30	0
5	GOL	A	619	-	5,5,5	0.36	0	5,5,5	0.42	0
3	SO4	C	615	-	4,4,4	0.24	0	6,6,6	0.13	0
3	SO4	B	607	-	4,4,4	0.28	0	6,6,6	0.19	0
3	SO4	C	610	-	4,4,4	0.23	0	6,6,6	0.08	0
3	SO4	C	611	-	4,4,4	0.23	0	6,6,6	0.09	0
5	GOL	B	617	-	5,5,5	0.43	0	5,5,5	0.25	0
3	SO4	A	606	-	4,4,4	0.21	0	6,6,6	0.07	0
3	SO4	A	602	-	4,4,4	0.24	0	6,6,6	0.19	0
2	RBV	B	601	-	14,18,18	1.64	1 (7%)	16,26,26	4.61	3 (18%)
3	SO4	B	604	-	4,4,4	0.27	0	6,6,6	0.16	0
5	GOL	B	615	-	5,5,5	0.37	0	5,5,5	0.29	0
5	GOL	A	620	-	5,5,5	0.45	0	5,5,5	0.32	0
5	GOL	C	617	-	5,5,5	0.40	0	5,5,5	0.25	0
5	GOL	A	616	-	5,5,5	0.41	0	5,5,5	0.19	0
3	SO4	C	603	-	4,4,4	0.23	0	6,6,6	0.09	0
3	SO4	C	605	-	4,4,4	0.23	0	6,6,6	0.07	0
5	GOL	A	612	-	5,5,5	0.36	0	5,5,5	0.30	0
3	SO4	A	603	-	4,4,4	0.22	0	6,6,6	0.18	0
3	SO4	B	605	-	4,4,4	0.26	0	6,6,6	0.11	0
3	SO4	A	605	-	4,4,4	0.26	0	6,6,6	0.27	0
2	RBV	C	601	-	14,18,18	1.72	2 (14%)	16,26,26	3.93	2 (12%)
5	GOL	A	618	-	5,5,5	0.38	0	5,5,5	0.31	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	GOL	B	618	-	5,5,5	0.35	0	5,5,5	0.44	0
5	GOL	B	613	-	5,5,5	0.36	0	5,5,5	0.41	0
5	GOL	A	617	-	5,5,5	0.38	0	5,5,5	0.30	0
3	SO4	C	609	-	4,4,4	0.23	0	6,6,6	0.07	0
5	GOL	C	621	-	5,5,5	0.28	0	5,5,5	0.60	0
5	GOL	B	616	-	5,5,5	0.41	0	5,5,5	0.15	0
3	SO4	C	607	-	4,4,4	0.23	0	6,6,6	0.07	0
5	GOL	C	620	-	5,5,5	0.51	0	5,5,5	0.39	0
3	SO4	B	606	-	4,4,4	0.21	0	6,6,6	0.10	0
5	GOL	A	614	-	5,5,5	0.33	0	5,5,5	0.47	0
3	SO4	C	612	-	4,4,4	0.23	0	6,6,6	0.10	0
3	SO4	A	608	-	4,4,4	0.24	0	6,6,6	0.14	0
3	SO4	B	603	-	4,4,4	0.25	0	6,6,6	0.13	0
3	SO4	C	602	-	4,4,4	0.23	0	6,6,6	0.20	0
5	GOL	B	612	-	5,5,5	0.38	0	5,5,5	0.35	0
5	GOL	C	606	-	5,5,5	0.34	0	5,5,5	0.35	0
3	SO4	A	607	-	4,4,4	0.26	0	6,6,6	0.13	0

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	GOL	A	611	-	-	2/4/4/4	-
5	GOL	C	618	-	-	2/4/4/4	-
5	GOL	C	619	-	-	2/4/4/4	-
2	RBV	A	601	-	-	2/2/26/26	0/2/2/2
5	GOL	A	615	-	-	2/4/4/4	-
5	GOL	B	610	-	-	4/4/4/4	-
5	GOL	A	613	-	-	2/4/4/4	-
5	GOL	C	616	-	-	0/4/4/4	-
5	GOL	B	614	-	-	2/4/4/4	-
5	GOL	B	611	-	-	2/4/4/4	-
5	GOL	A	619	-	-	0/4/4/4	-
5	GOL	B	617	-	-	4/4/4/4	-
5	GOL	B	615	-	-	2/4/4/4	-
2	RBV	B	601	-	-	1/2/26/26	0/2/2/2
5	GOL	A	620	-	-	0/4/4/4	-
5	GOL	C	617	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GOL	A	616	-	-	0/4/4/4	-
5	GOL	A	612	-	-	2/4/4/4	-
5	GOL	A	618	-	-	4/4/4/4	-
5	GOL	B	618	-	-	2/4/4/4	-
5	GOL	B	613	-	-	0/4/4/4	-
5	GOL	A	617	-	-	2/4/4/4	-
5	GOL	C	621	-	-	4/4/4/4	-
5	GOL	B	616	-	-	2/4/4/4	-
5	GOL	C	620	-	-	4/4/4/4	-
5	GOL	A	614	-	-	2/4/4/4	-
5	GOL	B	612	-	-	2/4/4/4	-
5	GOL	C	606	-	-	2/4/4/4	-
2	RBV	C	601	-	-	0/2/26/26	0/2/2/2

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	RBV	C6-N3	5.83	1.43	1.33
2	B	601	RBV	C6-N3	5.65	1.43	1.33
2	C	601	RBV	C6-N3	5.60	1.43	1.33
2	C	601	RBV	C3-C6	-2.20	1.51	1.53

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	RBV	C5-N4-C3	16.77	107.78	101.63
2	B	601	RBV	C5-N4-C3	16.13	107.55	101.63
2	C	601	RBV	C5-N4-C3	13.93	106.74	101.63
2	A	601	RBV	N2-C3-N4	-8.56	107.63	114.72
2	B	601	RBV	N2-C3-N4	-8.38	107.78	114.72
2	C	601	RBV	N2-C3-N4	-6.72	109.14	114.72
2	A	601	RBV	C3-C6-N3	2.13	119.86	116.33
2	B	601	RBV	C3-C6-N3	2.04	119.72	116.33
2	A	601	RBV	O3-C6-N3	-2.04	119.67	122.62

There are no chirality outliers.

All (55) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	611	GOL	O1-C1-C2-C3
5	A	613	GOL	O1-C1-C2-C3
5	A	615	GOL	C1-C2-C3-O3
5	A	617	GOL	C1-C2-C3-O3
5	A	618	GOL	C1-C2-C3-O3
5	B	610	GOL	C1-C2-C3-O3
5	B	612	GOL	O1-C1-C2-C3
5	B	614	GOL	O1-C1-C2-C3
5	B	615	GOL	O1-C1-C2-C3
5	B	616	GOL	C1-C2-C3-O3
5	B	616	GOL	O2-C2-C3-O3
5	B	617	GOL	O1-C1-C2-C3
5	B	617	GOL	C1-C2-C3-O3
5	C	617	GOL	O1-C1-C2-O2
5	C	617	GOL	O1-C1-C2-C3
5	C	619	GOL	O1-C1-C2-C3
5	C	620	GOL	O1-C1-C2-C3
5	C	620	GOL	O2-C2-C3-O3
5	C	621	GOL	O1-C1-C2-O2
5	C	621	GOL	O1-C1-C2-C3
5	C	621	GOL	C1-C2-C3-O3
5	A	613	GOL	O1-C1-C2-O2
5	B	618	GOL	O1-C1-C2-O2
2	A	601	RBV	O4'-C4'-C5'-O5'
5	A	612	GOL	O1-C1-C2-C3
5	A	614	GOL	O1-C1-C2-C3
5	A	618	GOL	O1-C1-C2-C3
5	B	610	GOL	O1-C1-C2-C3
5	B	611	GOL	O1-C1-C2-C3
5	B	618	GOL	O1-C1-C2-C3
5	C	606	GOL	O1-C1-C2-C3
5	C	618	GOL	O1-C1-C2-C3
5	C	620	GOL	C1-C2-C3-O3
5	A	615	GOL	O2-C2-C3-O3
5	A	618	GOL	O2-C2-C3-O3
5	B	610	GOL	O2-C2-C3-O3
5	B	612	GOL	O1-C1-C2-O2
5	B	614	GOL	O1-C1-C2-O2
5	B	617	GOL	O1-C1-C2-O2
5	B	617	GOL	O2-C2-C3-O3
5	C	621	GOL	O2-C2-C3-O3
5	A	611	GOL	O1-C1-C2-O2
5	A	612	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
5	B	611	GOL	O1-C1-C2-O2
5	B	615	GOL	O1-C1-C2-O2
5	C	619	GOL	O1-C1-C2-O2
5	A	617	GOL	O2-C2-C3-O3
5	C	606	GOL	O1-C1-C2-O2
2	A	601	RBV	C3'-C4'-C5'-O5'
5	A	618	GOL	O1-C1-C2-O2
5	C	618	GOL	O1-C1-C2-O2
5	A	614	GOL	O1-C1-C2-O2
5	B	610	GOL	O1-C1-C2-O2
2	B	601	RBV	O4'-C4'-C5'-O5'
5	C	620	GOL	O1-C1-C2-O2

There are no ring outliers.

23 monomers are involved in 53 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	618	GOL	3	0
2	A	601	RBV	4	0
5	A	615	GOL	1	0
5	C	616	GOL	1	0
3	C	613	SO4	2	0
5	B	614	GOL	3	0
3	B	608	SO4	1	0
5	A	619	GOL	2	0
3	C	615	SO4	1	0
3	B	607	SO4	1	0
2	B	601	RBV	4	0
5	A	620	GOL	1	0
2	C	601	RBV	10	0
5	A	618	GOL	3	0
5	B	618	GOL	1	0
5	A	617	GOL	5	0
3	C	609	SO4	1	0
5	C	621	GOL	1	0
5	C	620	GOL	3	0
3	B	606	SO4	2	0
5	A	614	GOL	1	0
3	A	608	SO4	1	0
5	B	612	GOL	1	0

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	480/517 (92%)	-0.40	24 (5%)	35 32	9, 25, 72, 161	1 (0%)
1	B	487/517 (94%)	-0.26	31 (6%)	27 25	15, 29, 77, 149	0
1	C	478/517 (92%)	-0.25	27 (5%)	31 29	14, 28, 75, 137	0
All	All	1445/1551 (93%)	-0.30	82 (5%)	30 28	9, 28, 74, 161	1 (0%)

All (82) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	5	LEU	6.7
1	C	492	THR	6.4
1	C	6	PRO	6.3
1	B	5	LEU	5.6
1	A	466	SER	5.5
1	C	465	VAL	5.3
1	C	477	VAL	5.2
1	C	380	GLY	4.9
1	B	477	VAL	4.9
1	A	380	GLY	4.7
1	A	476	MET	4.6
1	A	475	GLU	4.6
1	B	380	GLY	4.5
1	A	437	ALA	4.5
1	B	478	VAL	4.5
1	A	440	PRO	4.5
1	A	465	VAL	4.4
1	A	5	LEU	4.3
1	A	491	GLY	4.3
1	B	378	GLU	4.3
1	B	375	ALA	4.3
1	B	305	CYS	4.2
1	B	435	GLY	4.2

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Mol	Chain	Res	Type	RSRZ
1	B	474	ILE	4.1
1	B	476	MET	4.0
1	C	442	GLN	4.0
1	B	473	GLY	3.9
1	A	436	HIS	3.9
1	A	463	SER	3.9
1	A	459	ARG	3.9
1	A	6	PRO	3.8
1	A	438	GLN	3.8
1	C	437	ALA	3.8
1	B	376	ASP	3.8
1	B	436	HIS	3.7
1	C	466	SER	3.7
1	C	438	GLN	3.6
1	A	467	LYS	3.6
1	C	464	ARG	3.6
1	A	435	GLY	3.5
1	B	491	GLY	3.5
1	B	6	PRO	3.5
1	C	436	HIS	3.3
1	A	7	ARG	3.3
1	B	379	GLU	3.3
1	C	478	VAL	3.3
1	C	440	PRO	3.2
1	B	480	ARG	3.2
1	A	477	VAL	3.1
1	B	482	ARG	3.1
1	A	478	VAL	3.0
1	B	475	GLU	3.0
1	C	480	ARG	3.0
1	B	467	LYS	2.8
1	B	437	ALA	2.6
1	C	441	SER	2.6
1	A	8	PRO	2.6
1	C	439	ARG	2.6
1	C	463	SER	2.5
1	C	462	ALA	2.5
1	B	471	GLN	2.5
1	B	440	PRO	2.4
1	A	480	ARG	2.4
1	A	304	GLY	2.4
1	B	387	THR	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	381	PRO	2.3
1	B	306	PRO	2.3
1	C	211	GLU	2.2
1	B	470	ALA	2.2
1	B	307	CYS	2.2
1	C	491	GLY	2.1
1	C	305	CYS	2.1
1	C	307	CYS	2.1
1	C	9	SER	2.1
1	A	305	CYS	2.1
1	C	58	ASP	2.1
1	C	443	LEU	2.1
1	A	464	ARG	2.1
1	B	438	GLN	2.1
1	B	469	ALA	2.1
1	C	306	PRO	2.1
1	B	377	LYS	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 monosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	GOL	B	615	6/6	0.68	0.18	68,75,75,81	0
3	SO4	C	609	5/5	0.72	0.27	8,23,26,26	4
3	SO4	C	611	5/5	0.73	0.10	86,91,106,109	1
5	GOL	C	619	6/6	0.79	0.17	49,54,60,65	0
3	SO4	B	608	5/5	0.80	0.11	59,69,74,79	2
3	SO4	C	605	5/5	0.80	0.17	60,65,80,81	3

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	GOL	B	616	6/6	0.81	0.21	57,63,66,69	1
5	GOL	A	618	6/6	0.82	0.20	31,34,40,40	4
3	SO4	A	605	5/5	0.82	0.15	52,52,55,58	1
2	RBV	B	601	17/17	0.83	0.24	40,53,63,70	17
5	GOL	A	617	6/6	0.83	0.23	19,24,29,31	4
2	RBV	C	601	17/17	0.83	0.30	49,72,82,83	17
3	SO4	C	607	5/5	0.84	0.17	62,64,74,81	2
3	SO4	A	609	5/5	0.85	0.14	72,76,88,92	2
3	SO4	B	603	5/5	0.85	0.13	59,67,81,87	2
3	SO4	B	606	5/5	0.85	0.14	53,58,64,68	3
2	RBV	A	601	17/17	0.85	0.19	24,39,45,45	17
5	GOL	C	606	6/6	0.85	0.19	58,61,68,70	1
3	SO4	C	612	5/5	0.85	0.17	74,75,87,102	4
3	SO4	C	614	5/5	0.86	0.17	75,77,93,100	2
5	GOL	B	611	6/6	0.86	0.16	51,52,61,66	2
5	GOL	B	614	6/6	0.87	0.15	54,56,60,61	1
5	GOL	A	612	6/6	0.87	0.17	53,55,63,65	1
3	SO4	B	605	5/5	0.87	0.14	61,65,77,80	2
5	GOL	B	617	6/6	0.87	0.19	41,45,49,54	4
3	SO4	C	615	5/5	0.87	0.18	66,71,73,74	3
5	GOL	A	611	6/6	0.87	0.16	35,37,40,44	2
5	GOL	C	617	6/6	0.88	0.16	49,50,55,55	1
5	GOL	C	616	6/6	0.88	0.16	43,47,48,54	1
5	GOL	A	615	6/6	0.89	0.16	28,37,39,44	4
3	SO4	C	603	5/5	0.89	0.14	52,60,80,81	2
3	SO4	C	610	5/5	0.89	0.12	42,44,46,55	2
3	SO4	A	608	5/5	0.89	0.13	44,47,60,65	4
3	SO4	A	604	5/5	0.89	0.16	41,48,54,57	3
5	GOL	A	613	6/6	0.89	0.14	58,62,64,66	0
3	SO4	A	602	5/5	0.90	0.11	45,47,53,59	4
3	SO4	C	608	5/5	0.90	0.12	52,65,73,74	3
5	GOL	B	610	6/6	0.90	0.10	46,52,56,57	0
3	SO4	C	613	5/5	0.90	0.20	59,64,66,72	4
3	SO4	A	606	5/5	0.91	0.14	68,69,84,95	1
3	SO4	A	607	5/5	0.91	0.10	58,58,73,74	2
5	GOL	B	618	6/6	0.91	0.16	47,48,57,59	1
5	GOL	B	612	6/6	0.91	0.13	49,51,55,58	2
5	GOL	B	613	6/6	0.91	0.11	41,44,46,47	2
5	GOL	A	614	6/6	0.91	0.11	48,55,58,59	0
5	GOL	A	619	6/6	0.91	0.13	46,49,54,56	2
5	GOL	A	620	6/6	0.92	0.11	31,37,41,55	2
5	GOL	A	616	6/6	0.92	0.12	33,35,36,37	1

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	GOL	C	620	6/6	0.92	0.15	26,28,31,41	4
5	GOL	C	618	6/6	0.93	0.09	38,39,44,47	2
3	SO4	A	603	5/5	0.93	0.12	49,50,55,57	3
3	SO4	B	604	5/5	0.93	0.09	43,46,55,60	3
3	SO4	B	607	5/5	0.94	0.16	34,35,37,38	4
5	GOL	C	621	6/6	0.94	0.14	35,39,41,46	4
3	SO4	C	602	5/5	0.95	0.13	29,34,43,43	3
4	MG	B	609	1/1	0.96	0.08	45,45,45,45	0
3	SO4	B	602	5/5	0.97	0.09	40,47,51,54	3
4	MG	C	604	1/1	0.97	0.09	40,40,40,40	0
4	MG	A	610	1/1	0.99	0.04	29,29,29,29	0

6.5 Other polymers [i](#)

There are no such residues in this entry.