



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 21, 2020 – 06:19 PM BST

PDB ID : 5CR4  
Title : Crystal structure of the Sleeping Beauty transposase catalytic domain  
Authors : Voigt, F.; Barabas, O.  
Deposited on : 2015-07-22  
Resolution : 1.40 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.13.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

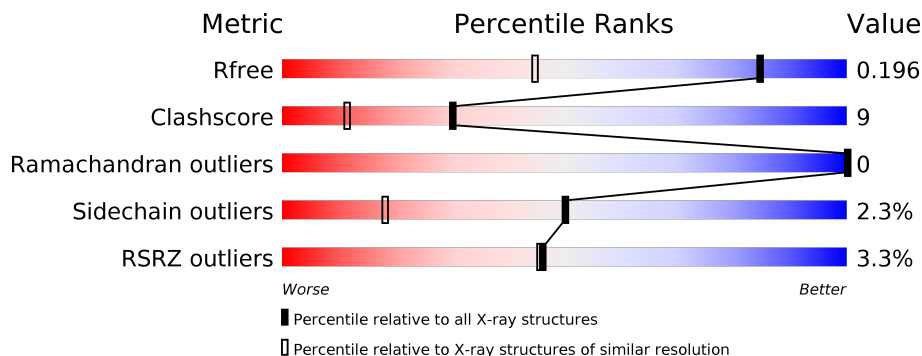
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.40 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1714 (1.40-1.40)
Clashscore	141614	1812 (1.40-1.40)
Ramachandran outliers	138981	1763 (1.40-1.40)
Sidechain outliers	138945	1762 (1.40-1.40)
RSRZ outliers	127900	1674 (1.40-1.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	230	
1	B	230	

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	GOL	A	315	-	-	X	-
3	GOL	B	314	-	-	X	-
3	GOL	B	315	-	-	X	-
5	EPE	B	320	-	-	-	X

## 2 Entry composition [i](#)

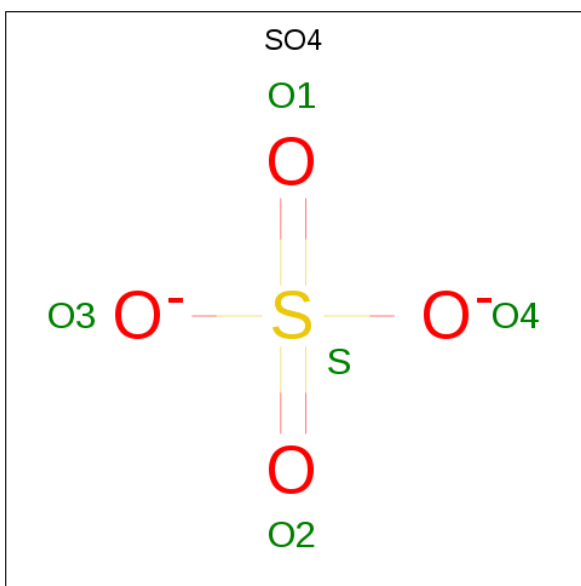
There are 6 unique types of molecules in this entry. The entry contains 4727 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Sleeping Beauty transposase, SB100X.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	224	Total 1852	C 1189	N 344	O 312	S 7	0	11	0
1	B	226	Total 1935	C 1243	N 352	O 332	S 8	0	22	0

- Molecule 2 is SULFATE ION (three-letter code: SO<sub>4</sub>) (formula: O<sub>4</sub>S).

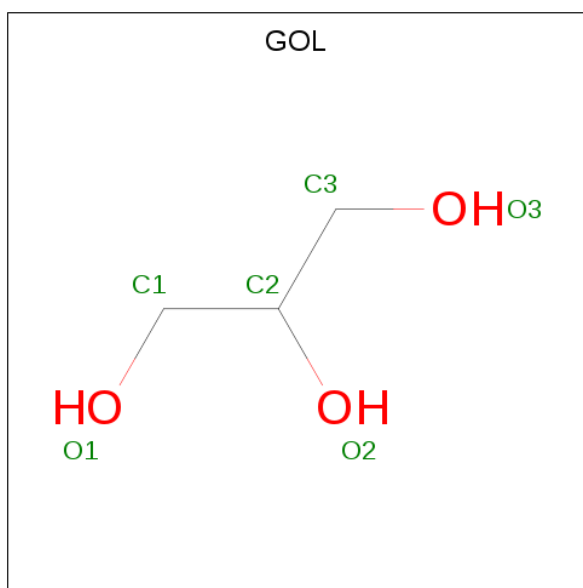


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	S		
2	A	1	Total 5	O 4	S 1	0	0
2	A	1	Total 5	O 4	S 1	0	0
2	A	1	Total 5	O 4	S 1	0	0
2	A	1	Total 5	O 4	S 1	0	0

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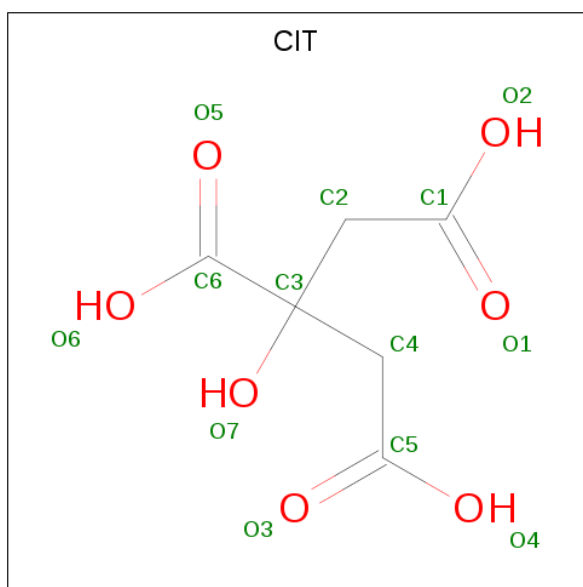


- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



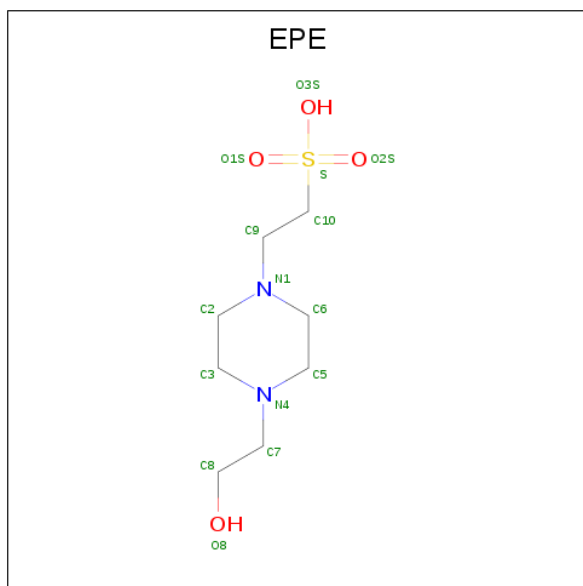
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0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

- Molecule 4 is CITRIC ACID (three-letter code: CIT) (formula:  $C_6H_8O_7$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	O	0	0
			13	6	7		

- Molecule 5 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula:  $C_8H_{18}N_2O_4S$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	B	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

- Molecule 6 is water.

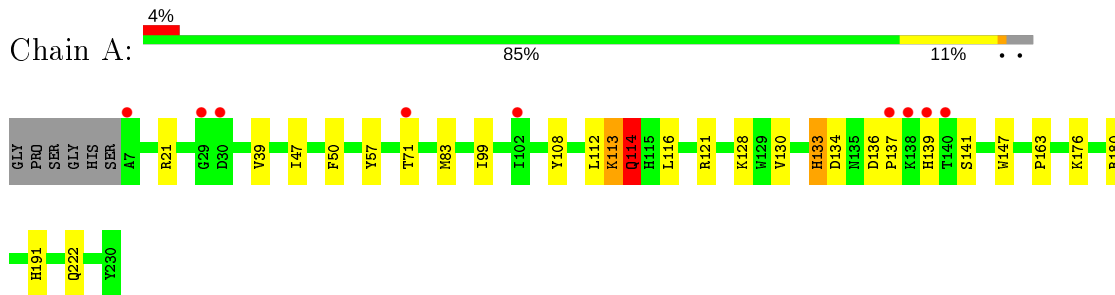
<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
6	A	352	Total 352	O 352	0	0
6	B	369	Total 369	O 369	0	0



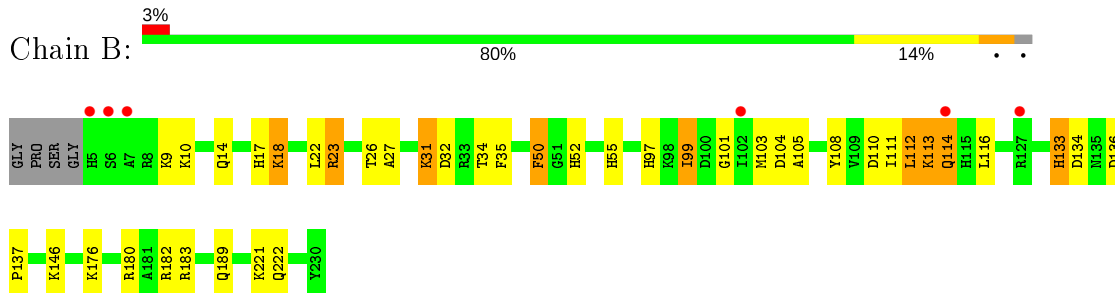
### 3 Residue-property plots [i](#)

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

- Molecule 1: Sleeping Beauty transposase, SB100X



- Molecule 1: Sleeping Beauty transposase, SB100X



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	84.24Å 113.98Å 144.94Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 1.40 72.83 – 1.30	Depositor EDS
% Data completeness (in resolution range)	100.0 (50.00-1.40) 100.0 (72.83-1.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.08	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.08 (at 1.30Å)	Xtrriage
Refinement program	PHENIX 1.9_1692	Depositor
R, $R_{free}$	0.171 , 0.195 0.172 , 0.196	Depositor DCC
$R_{free}$ test set	8512 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	18.6	Xtrriage
Anisotropy	0.226	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 51.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	4727	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.39% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

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

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, EPE, SO4, CIT

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.88	3/1918 (0.2%)	0.86	2/2595 (0.1%)
1	B	0.97	3/2018 (0.1%)	0.95	9/2728 (0.3%)
All	All	0.93	6/3936 (0.2%)	0.90	11/5323 (0.2%)

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	A	0	1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	113	LYS	C-O	13.18	1.48	1.23
1	A	113	LYS	C-O	13.07	1.48	1.23
1	A	114	GLN	C-O	9.41	1.41	1.23
1	B	114	GLN	C-O	9.12	1.40	1.23
1	A	57	TYR	CE2-CZ	-5.20	1.31	1.38
1	B	18	LYS	CB-CG	-5.16	1.38	1.52

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	134	ASP	CB-CG-OD1	6.63	124.27	118.30
1	A	21	ARG	NE-CZ-NH1	5.89	123.24	120.30
1	B	114	GLN	CA-C-O	5.86	132.41	120.10
1	B	50	PHE	CB-CG-CD2	-5.75	116.77	120.80
1	B	23	ARG	NE-CZ-NH2	5.59	123.10	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	31[A]	LYS	C-N-CA	-5.50	107.95	121.70
1	B	31[B]	LYS	C-N-CA	-5.50	107.95	121.70
1	B	182	ARG	NE-CZ-NH2	-5.27	117.67	120.30
1	B	112	LEU	CB-CG-CD1	-5.15	102.25	111.00
1	A	116	LEU	C-N-CA	-5.12	108.90	121.70
1	B	116	LEU	C-N-CA	-5.04	109.09	121.70

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	114	GLN	Mainchain

## 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	1852	0	1821	23	0
1	B	1935	0	1910	43	0
2	A	65	0	0	1	0
2	B	60	0	0	1	0
3	A	30	0	40	8	0
3	B	36	0	48	15	0
4	B	13	0	5	1	0
5	B	15	0	17	6	0
6	A	352	0	0	8	3
6	B	369	0	0	17	3
All	All	4727	0	3841	73	6

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 9.

All (73) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:114:GLN:O	6:B:401:HOH:O	1.71	1.06

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:105:ALA:H	3:B:315:GOL:H12	1.24	0.98
1:B:18:LYS:HG2	3:B:319:GOL:H2	1.50	0.92
1:A:114:GLN:O	6:A:401:HOH:O	1.94	0.86
1:B:113:LYS:O	6:B:403:HOH:O	1.94	0.84
1:B:17:HIS:N	3:B:319:GOL:O2	2.09	0.84
1:B:23:ARG:HH12	3:B:314:GOL:H11	1.52	0.75
1:B:104:ASP:HB2	3:B:315:GOL:H2	1.70	0.74
1:B:23:ARG:HH12	3:B:314:GOL:C1	2.00	0.73
2:B:312:SO4:O4	6:B:404:HOH:O	2.08	0.72
1:A:108:TYR:OH	1:A:133:HIS:HD2	1.74	0.70
5:B:320:EPE:O1S	6:B:405:HOH:O	2.09	0.69
1:B:108:TYR:OH	1:B:133:HIS:HD2	1.76	0.68
1:B:27[A]:ALA:O	6:B:406:HOH:O	2.13	0.67
3:B:317:GOL:H11	6:B:692:HOH:O	1.96	0.65
1:A:113:LYS:O	6:A:404:HOH:O	2.14	0.65
1:B:52:HIS:HE1	5:B:320:EPE:H21	1.62	0.64
1:A:222:GLN:NE2	6:A:405:HOH:O	2.19	0.63
1:B:105:ALA:N	3:B:315:GOL:H12	2.06	0.63
5:B:320:EPE:H72	6:B:697:HOH:O	2.00	0.61
1:B:183:ARG:HH22	3:B:318:GOL:H31	1.67	0.59
1:A:83[A]:MET:HG3	1:A:99:ILE:HD12	1.85	0.59
1:A:147:TRP:NE1	3:A:315:GOL:H12	2.19	0.58
1:B:112:LEU:O	1:B:113:LYS:C	2.42	0.58
1:A:112:LEU:O	1:A:113:LYS:C	2.43	0.57
1:A:112:LEU:O	1:A:113:LYS:O	2.23	0.57
1:B:14[B]:GLN:NE2	6:B:422:HOH:O	2.38	0.57
1:B:52:HIS:CE1	5:B:320:EPE:H21	2.40	0.56
1:B:23:ARG:NH1	3:B:314:GOL:H11	2.21	0.56
1:B:112:LEU:O	1:B:113:LYS:O	2.24	0.56
1:A:47:ILE:HG12	1:A:176:LYS:HE2	1.89	0.55
1:B:31[B]:LYS:HZ1	4:B:313:CIT:C6	2.20	0.55
1:A:71:THR:HG23	6:A:611:HOH:O	2.07	0.54
1:B:97:HIS:CD2	1:B:111:ILE:HD11	2.42	0.54
1:B:32:ASP:OD1	1:B:34[B]:THR:OG1	2.25	0.53
1:A:163:PRO:HB3	3:A:317:GOL:H2	1.90	0.53
1:A:121:ARG:HH22	3:A:316:GOL:H12	1.73	0.53
1:B:180:ARG:NE	6:B:428:HOH:O	2.41	0.53
1:B:222[A]:GLN:HG3	6:B:599:HOH:O	2.09	0.52
1:A:180:ARG:NH2	6:A:417:HOH:O	2.42	0.51
1:A:128:LYS:HB3	6:A:660:HOH:O	2.09	0.51
3:B:314:GOL:H32	6:B:447:HOH:O	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:147:TRP:HE1	3:A:315:GOL:H12	1.76	0.49
1:A:113:LYS:HE2	3:A:315:GOL:H2	1.94	0.49
1:A:108:TYR:OH	1:A:133:HIS:CD2	2.62	0.48
1:B:31[B]:LYS:HE3	1:B:35:PHE:CZ	2.48	0.48
1:B:189:GLN:HG2	6:B:664:HOH:O	2.13	0.48
3:A:317:GOL:H32	6:A:407:HOH:O	2.12	0.48
1:B:104:ASP:HB2	3:B:315:GOL:C2	2.42	0.47
1:B:221:LYS:O	3:B:317:GOL:H2	2.13	0.47
1:B:22:LEU:O	1:B:26[B]:THR:HG23	2.15	0.46
1:A:147:TRP:CD1	3:A:315:GOL:H12	2.50	0.46
1:B:176:LYS:CE	5:B:320:EPE:H51	2.45	0.46
1:B:9:LYS:NZ	6:B:407:HOH:O	2.18	0.46
5:B:320:EPE:H82	6:B:614:HOH:O	2.15	0.46
1:B:99[B]:ILE:HD13	1:B:103[B]:MET:SD	2.55	0.46
1:B:103[A]:MET:CE	1:B:111:ILE:HD12	2.46	0.45
1:B:97:HIS:CD2	1:B:111:ILE:CD1	2.99	0.45
1:A:139[B]:HIS:NE2	6:A:402:HOH:O	2.03	0.44
1:A:134:ASP:OD2	3:A:317:GOL:H31	2.18	0.43
1:B:183:ARG:NH2	3:B:318:GOL:H31	2.32	0.42
1:A:191:HIS:ND1	2:A:307:SO4:O1	2.25	0.42
1:B:99[B]:ILE:HG12	1:B:101[B]:GLY:O	2.18	0.42
1:A:136:ASP:HA	1:A:137[B]:PRO:HD2	1.87	0.42
1:B:18:LYS:NZ	6:B:430:HOH:O	2.45	0.42
1:B:136:ASP:HA	1:B:137:PRO:HD3	1.88	0.42
1:B:17:HIS:H	3:B:319:GOL:HO2	1.66	0.41
1:B:31[A]:LYS:HA	1:B:31[A]:LYS:HD2	1.82	0.41
1:B:146:LYS:HD3	6:B:756:HOH:O	2.20	0.41
1:B:31[B]:LYS:HD2	1:B:35:PHE:CG	2.56	0.41
1:B:110:ASP:O	1:B:114:GLN:HG2	2.21	0.41
1:A:39:VAL:HG22	1:A:130[B]:VAL:CG2	2.51	0.40
1:B:34[B]:THR:HG23	6:B:606:HOH:O	2.21	0.40

All (6) 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)
6:B:581:HOH:O	6:B:581:HOH:O[7_555]	1.92	0.28
6:A:595:HOH:O	6:A:701:HOH:O[8_554]	1.97	0.23
6:A:660:HOH:O	6:A:660:HOH:O[6_455]	2.01	0.19
6:B:564:HOH:O	6:B:613:HOH:O[6_555]	2.04	0.16

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:A:406:HOH:O	6:A:595:HOH:O[8_554]	2.10	0.10
6:B:417:HOH:O	6:B:577:HOH:O[7_555]	2.14	0.06

## 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	233/230 (101%)	228 (98%)	5 (2%)	0	100	100
1	B	246/230 (107%)	242 (98%)	4 (2%)	0	100	100
All	All	479/460 (104%)	470 (98%)	9 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 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	185/199 (93%)	181 (98%)	4 (2%)	52	19
1	B	193/199 (97%)	187 (97%)	6 (3%)	40	9
All	All	378/398 (95%)	368 (97%)	10 (3%)	50	13

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	50	PHE

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Mol	Chain	Res	Type
1	A	133	HIS
1	A	141[A]	SER
1	A	141[B]	SER
1	B	10	LYS
1	B	50	PHE
1	B	55	HIS
1	B	99[A]	ILE
1	B	99[B]	ILE
1	B	133	HIS

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

Mol	Chain	Res	Type
1	A	14	GLN
1	A	133	HIS
1	A	151	ASN
1	B	133	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

38 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the



expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	SO4	B	302	-	4,4,4	0.73	0	6,6,6	0.45	0
3	GOL	A	316	-	5,5,5	0.34	0	5,5,5	0.54	0
3	GOL	B	316	-	5,5,5	0.42	0	5,5,5	0.36	0
3	GOL	A	318	-	5,5,5	0.38	0	5,5,5	0.30	0
2	SO4	B	307	-	4,4,4	0.15	0	6,6,6	0.29	0
2	SO4	A	309	-	4,4,4	0.37	0	6,6,6	0.76	0
4	CIT	B	313	-	3,12,12	3.50	3 (100%)	3,17,17	1.99	1 (33%)
2	SO4	B	308	-	4,4,4	0.18	0	6,6,6	0.36	0
2	SO4	A	313	-	4,4,4	0.15	0	6,6,6	0.16	0
3	GOL	B	318	-	5,5,5	0.35	0	5,5,5	0.51	0
2	SO4	B	309	-	4,4,4	0.21	0	6,6,6	0.17	0
2	SO4	A	307	-	4,4,4	0.21	0	6,6,6	0.29	0
2	SO4	B	303	-	4,4,4	0.27	0	6,6,6	0.61	0
2	SO4	A	310	-	4,4,4	0.13	0	6,6,6	0.13	0
2	SO4	B	304	-	4,4,4	0.48	0	6,6,6	0.62	0
3	GOL	B	315	-	5,5,5	0.39	0	5,5,5	1.05	0
2	SO4	A	311	-	4,4,4	0.15	0	6,6,6	0.11	0
2	SO4	A	305	-	4,4,4	0.13	0	6,6,6	0.34	0
2	SO4	B	305	-	4,4,4	0.16	0	6,6,6	0.55	0
3	GOL	B	314	-	5,5,5	0.60	0	5,5,5	1.00	0
2	SO4	A	312	-	4,4,4	0.58	0	6,6,6	1.15	0
2	SO4	B	301	-	4,4,4	0.25	0	6,6,6	0.63	0
2	SO4	B	306	-	4,4,4	0.33	0	6,6,6	0.90	0
3	GOL	B	317	-	5,5,5	0.33	0	5,5,5	0.93	0
2	SO4	B	311	-	4,4,4	0.32	0	6,6,6	0.74	0
2	SO4	A	306	-	4,4,4	0.28	0	6,6,6	0.77	0
3	GOL	A	317	-	5,5,5	0.70	0	5,5,5	1.37	0
3	GOL	B	319	-	5,5,5	0.63	0	5,5,5	2.05	2 (40%)
3	GOL	A	315	-	5,5,5	0.36	0	5,5,5	0.56	0
2	SO4	B	310	-	4,4,4	0.17	0	6,6,6	0.47	0
2	SO4	A	303	-	4,4,4	0.51	0	6,6,6	0.33	0
2	SO4	A	304	-	4,4,4	0.22	0	6,6,6	0.21	0
2	SO4	A	302	-	4,4,4	0.24	0	6,6,6	0.62	0
2	SO4	A	308	-	4,4,4	0.15	0	6,6,6	0.18	0
3	GOL	A	314	-	5,5,5	0.25	0	5,5,5	0.78	0
2	SO4	A	301	-	4,4,4	0.88	0	6,6,6	0.62	0
2	SO4	B	312	-	4,4,4	0.14	0	6,6,6	0.11	0
5	EPE	B	320	-	15,15,15	0.75	1 (6%)	18,20,20	1.71	6 (33%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	B	317	-	-	0/4/4/4	-
3	GOL	B	318	-	-	3/4/4/4	-
4	CIT	B	313	-	-	0/6/16/16	-
3	GOL	A	315	-	-	3/4/4/4	-
3	GOL	A	316	-	-	2/4/4/4	-
3	GOL	B	316	-	-	2/4/4/4	-
3	GOL	A	318	-	-	4/4/4/4	-
3	GOL	B	315	-	-	2/4/4/4	-
3	GOL	A	317	-	-	2/4/4/4	-
3	GOL	B	319	-	-	2/4/4/4	-
3	GOL	A	314	-	-	4/4/4/4	-
5	EPE	B	320	-	-	5/9/19/19	0/1/1/1
3	GOL	B	314	-	-	4/4/4/4	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	313	CIT	C4-C3	-4.77	1.48	1.54
4	B	313	CIT	O7-C3	3.11	1.48	1.43
5	B	320	EPE	C10-S	2.46	1.81	1.77
4	B	313	CIT	C2-C3	-2.09	1.51	1.54

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	320	EPE	O2S-S-C10	3.58	111.22	106.92
3	B	319	GOL	C3-C2-C1	-3.20	99.28	111.70
4	B	313	CIT	C3-C4-C5	-3.15	109.94	114.98
5	B	320	EPE	C6-C5-N4	2.74	116.26	110.64
3	B	319	GOL	O2-C2-C3	-2.61	97.64	109.12
5	B	320	EPE	C7-N4-C5	2.49	117.60	111.23
5	B	320	EPE	C5-N4-C3	2.35	114.11	108.83
5	B	320	EPE	O3S-S-C10	2.23	109.38	105.77
5	B	320	EPE	C7-N4-C3	2.05	116.47	111.23

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	316	GOL	O1-C1-C2-C3
3	B	319	GOL	C1-C2-C3-O3
3	A	315	GOL	O1-C1-C2-C3
3	A	314	GOL	C1-C2-C3-O3
5	B	320	EPE	C10-C9-N1-C6
5	B	320	EPE	S-C10-C9-N1
5	B	320	EPE	C9-C10-S-O2S
3	B	319	GOL	O2-C2-C3-O3
3	B	316	GOL	O1-C1-C2-C3
3	A	318	GOL	O1-C1-C2-C3
3	A	318	GOL	C1-C2-C3-O3
3	B	318	GOL	O1-C1-C2-C3
3	B	315	GOL	C1-C2-C3-O3
3	B	314	GOL	O1-C1-C2-C3
3	B	314	GOL	C1-C2-C3-O3
3	A	317	GOL	O1-C1-C2-C3
3	A	315	GOL	C1-C2-C3-O3
3	A	314	GOL	O1-C1-C2-C3
3	A	318	GOL	O1-C1-C2-O2
3	A	318	GOL	O2-C2-C3-O3
3	A	315	GOL	O1-C1-C2-O2
3	A	314	GOL	O2-C2-C3-O3
3	A	316	GOL	O1-C1-C2-O2
3	B	318	GOL	O1-C1-C2-O2
3	B	315	GOL	O2-C2-C3-O3
3	A	314	GOL	O1-C1-C2-O2
5	B	320	EPE	C8-C7-N4-C3
3	B	314	GOL	O2-C2-C3-O3
3	A	317	GOL	O1-C1-C2-O2
3	B	318	GOL	C1-C2-C3-O3
3	B	314	GOL	O1-C1-C2-O2
5	B	320	EPE	C10-C9-N1-C2
3	B	316	GOL	O2-C2-C3-O3

There are no ring outliers.

12 monomers are involved in 32 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	316	GOL	1	0
4	B	313	CIT	1	0
3	B	318	GOL	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	307	SO4	1	0
3	B	315	GOL	4	0
3	B	314	GOL	4	0
3	B	317	GOL	2	0
3	A	317	GOL	3	0
3	B	319	GOL	3	0
3	A	315	GOL	4	0
2	B	312	SO4	1	0
5	B	320	EPE	6	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 [i](#)

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

In the following table, the column labelled '#RSRZ > 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	224/230 (97%)	-0.37	9 (4%) 38 39	13, 21, 42, 54	0
1	B	226/230 (98%)	-0.31	6 (2%) 54 54	12, 19, 35, 55	1 (0%)
All	All	450/460 (97%)	-0.34	15 (3%) 46 46	12, 20, 41, 55	1 (0%)

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	137[A]	PRO	5.6
1	A	102	ILE	4.0
1	A	71	THR	3.8
1	B	102[A]	ILE	3.6
1	A	139[A]	HIS	3.3
1	A	30	ASP	3.0
1	A	29	GLY	2.8
1	B	6	SER	2.7
1	B	5	HIS	2.4
1	A	140[A]	THR	2.3
1	B	127	ARG	2.3
1	A	138[A]	LYS	2.1
1	A	7	ALA	2.1
1	B	7	ALA	2.1
1	B	114	GLN	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
5	EPE	B	320	15/15	0.75	0.54	27,58,127,128	15
3	GOL	A	317	6/6	0.79	0.21	14,22,29,32	6
3	GOL	A	316	6/6	0.80	0.14	29,38,43,47	5
3	GOL	B	316	6/6	0.80	0.10	44,62,64,69	0
3	GOL	A	318	6/6	0.81	0.21	29,34,37,46	6
3	GOL	A	315	6/6	0.84	0.10	36,43,55,59	0
3	GOL	B	317	6/6	0.85	0.20	19,25,32,33	6
2	SO4	A	313	5/5	0.87	0.20	59,61,68,68	5
3	GOL	A	314	6/6	0.89	0.09	26,31,43,46	6
2	SO4	B	312	5/5	0.89	0.13	58,61,63,64	5
3	GOL	B	315	6/6	0.89	0.09	25,44,45,59	0
3	GOL	B	318	6/6	0.90	0.12	45,49,57,59	0
2	SO4	A	306	5/5	0.91	0.09	24,38,46,49	5
2	SO4	A	311	5/5	0.92	0.09	58,65,69,69	5
2	SO4	B	309	5/5	0.93	0.12	48,54,64,69	5
3	GOL	B	319	6/6	0.93	0.14	18,21,47,58	0
2	SO4	A	307	5/5	0.93	0.10	44,50,55,60	5
2	SO4	A	312	5/5	0.94	0.08	24,25,33,42	5
2	SO4	B	307	5/5	0.94	0.13	30,39,52,54	5
4	CIT	B	313	13/13	0.94	0.08	15,19,26,31	0
2	SO4	A	305	5/5	0.95	0.10	25,28,32,41	5
2	SO4	B	311	5/5	0.95	0.08	23,28,43,46	5
2	SO4	A	304	5/5	0.95	0.07	23,34,37,38	5
2	SO4	A	309	5/5	0.96	0.07	16,25,29,32	5
2	SO4	B	310	5/5	0.96	0.15	34,35,46,53	5
3	GOL	B	314	6/6	0.96	0.12	15,25,36,49	0
2	SO4	A	310	5/5	0.97	0.13	42,54,57,58	5
2	SO4	B	306	5/5	0.97	0.08	25,28,32,34	5
2	SO4	A	308	5/5	0.97	0.08	44,49,57,57	5
2	SO4	B	302	5/5	0.98	0.07	19,19,24,24	0
2	SO4	A	301	5/5	0.98	0.07	15,15,19,21	0
2	SO4	A	302	5/5	0.98	0.07	24,25,30,40	5
2	SO4	B	308	5/5	0.98	0.08	26,33,39,46	5
2	SO4	B	303	5/5	0.99	0.06	24,26,30,36	0
2	SO4	B	301	5/5	0.99	0.05	19,23,24,27	0
2	SO4	A	303	5/5	0.99	0.10	16,17,21,27	5
2	SO4	B	305	5/5	0.99	0.12	15,16,17,20	5

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	SO4	B	304	5/5	0.99	0.10	12,15,19,28	5

## 6.5 Other polymers [i](#)

There are no such residues in this entry.