



# Full wwPDB X-ray Structure Validation Report ⓘ

May 10, 2022 – 01:05 pm BST

PDB ID : 7P2B  
Title : Crystal structure of human gelsolin amyloid mutant A551P  
Authors : Bollati, M.; de Rosa, M.  
Deposited on : 2021-07-05  
Resolution : 3.00 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 : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.28.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0267  
CCP4 : 7.1.010 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.28.1

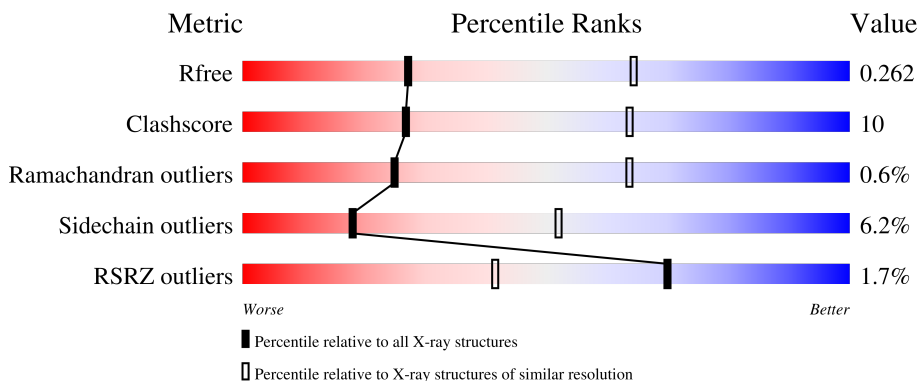
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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  $\geq 3$ , 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	778	
1	B	778	

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	806	-	-	-	X
3	GOL	A	807	-	-	-	X
3	GOL	A	809	-	-	-	X
3	GOL	B	805	-	-	-	X

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 11331 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 Gelsolin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	717	5607	3537	979	1075	16	9	1	0
1	B	709	5537	3496	970	1055	16	3	0	0

There are 48 discrepancies between the modelled and reference sequences:

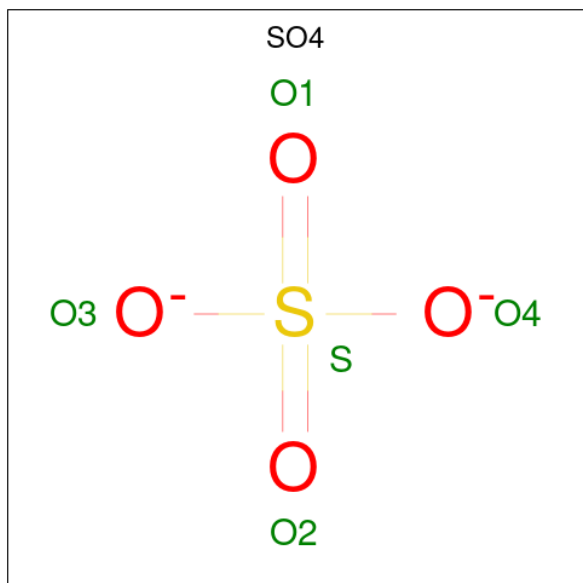
Chain	Residue	Modelled	Actual	Comment	Reference
A	-22	MET	-	initiating methionine	UNP P06396
A	-21	GLY	-	expression tag	UNP P06396
A	-20	SER	-	expression tag	UNP P06396
A	-19	SER	-	expression tag	UNP P06396
A	-18	HIS	-	expression tag	UNP P06396
A	-17	HIS	-	expression tag	UNP P06396
A	-16	HIS	-	expression tag	UNP P06396
A	-15	HIS	-	expression tag	UNP P06396
A	-14	HIS	-	expression tag	UNP P06396
A	-13	HIS	-	expression tag	UNP P06396
A	-12	SER	-	expression tag	UNP P06396
A	-11	SER	-	expression tag	UNP P06396
A	-10	GLY	-	expression tag	UNP P06396
A	-9	LEU	-	expression tag	UNP P06396
A	-8	VAL	-	expression tag	UNP P06396
A	-7	PRO	-	expression tag	UNP P06396
A	-6	ARG	-	expression tag	UNP P06396
A	-5	GLY	-	expression tag	UNP P06396
A	-4	SER	-	expression tag	UNP P06396
A	-3	HIS	-	expression tag	UNP P06396
A	-2	MET	-	expression tag	UNP P06396
A	-1	ALA	-	expression tag	UNP P06396
A	0	SER	-	expression tag	UNP P06396
A	551	PRO	ALA	engineered mutation	UNP P06396
B	-22	MET	-	initiating methionine	UNP P06396

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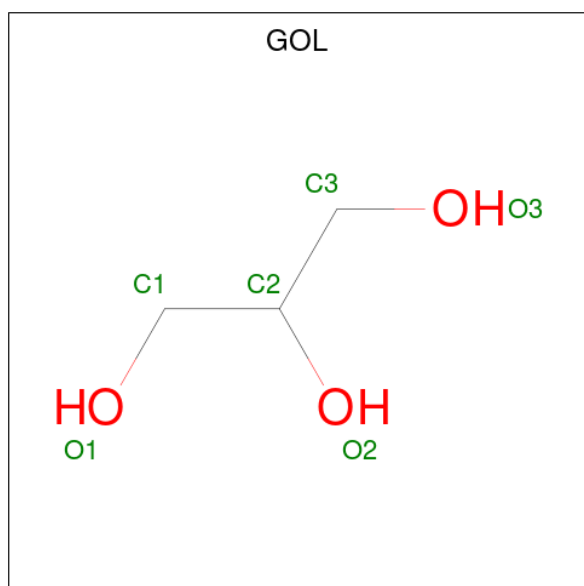
Chain	Residue	Modelled	Actual	Comment	Reference
B	-21	GLY	-	expression tag	UNP P06396
B	-20	SER	-	expression tag	UNP P06396
B	-19	SER	-	expression tag	UNP P06396
B	-18	HIS	-	expression tag	UNP P06396
B	-17	HIS	-	expression tag	UNP P06396
B	-16	HIS	-	expression tag	UNP P06396
B	-15	HIS	-	expression tag	UNP P06396
B	-14	HIS	-	expression tag	UNP P06396
B	-13	HIS	-	expression tag	UNP P06396
B	-12	SER	-	expression tag	UNP P06396
B	-11	SER	-	expression tag	UNP P06396
B	-10	GLY	-	expression tag	UNP P06396
B	-9	LEU	-	expression tag	UNP P06396
B	-8	VAL	-	expression tag	UNP P06396
B	-7	PRO	-	expression tag	UNP P06396
B	-6	ARG	-	expression tag	UNP P06396
B	-5	GLY	-	expression tag	UNP P06396
B	-4	SER	-	expression tag	UNP P06396
B	-3	HIS	-	expression tag	UNP P06396
B	-2	MET	-	expression tag	UNP P06396
B	-1	ALA	-	expression tag	UNP P06396
B	0	SER	-	expression tag	UNP P06396
B	551	PRO	ALA	engineered mutation	UNP P06396

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



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

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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

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

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	Cl	0	0
			1	1		

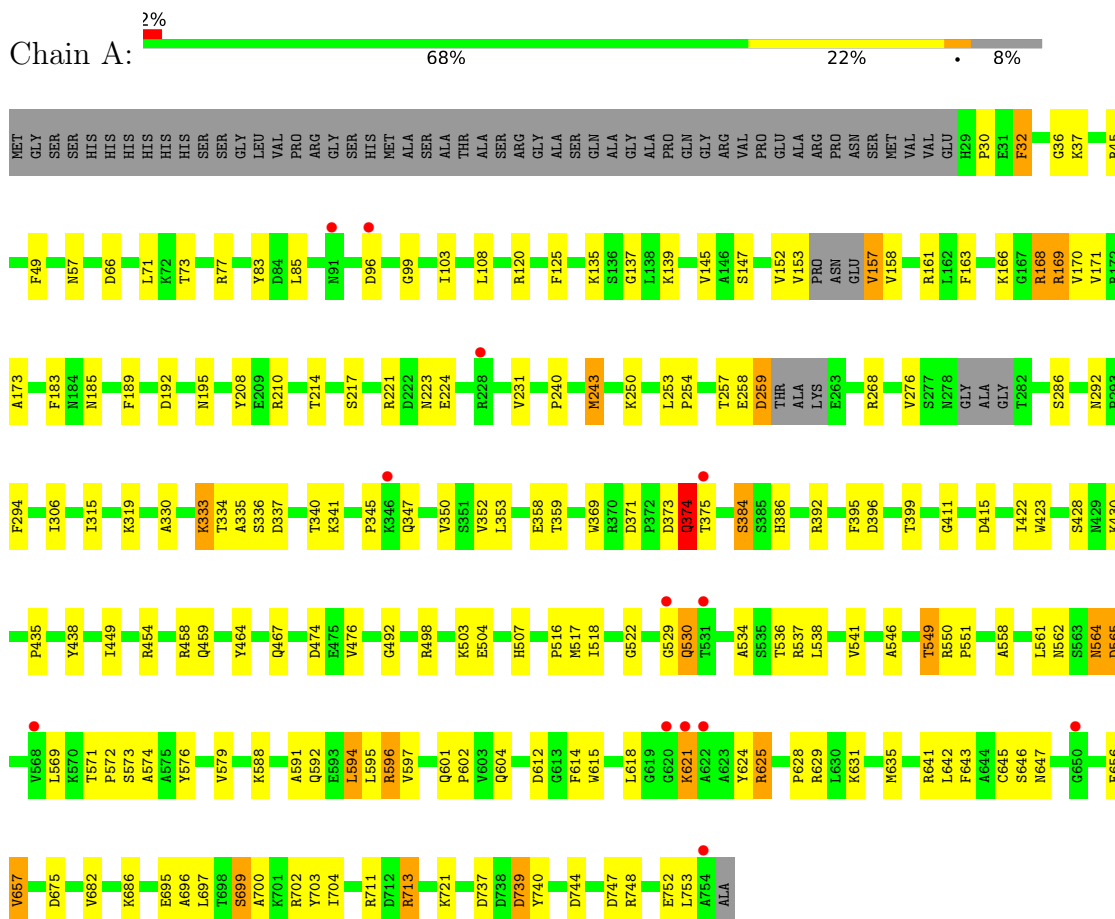
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	48	Total	O	0	0
			48	48		
5	B	55	Total	O	0	0
			55	55		

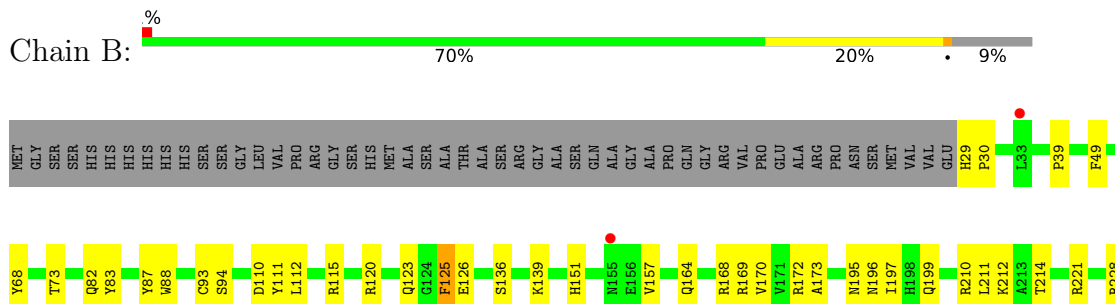
### 3 Residue-property plots

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.

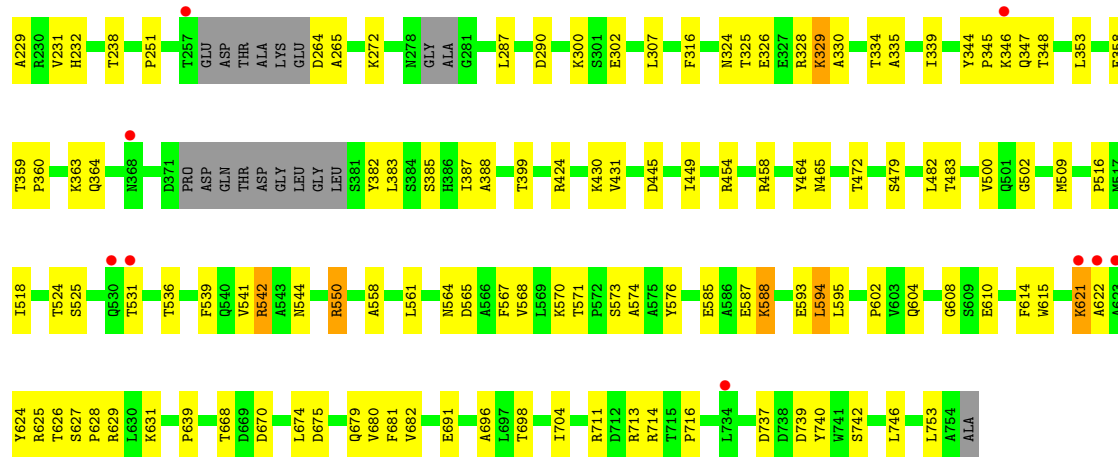
- Molecule 1: Gelsolin



- Molecule 1: Gelsolin







## 4 Data and refinement statistics

Property	Value	Source
Space group	P 4 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	170.07Å 170.07Å 152.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.91 – 3.00 19.91 – 3.00	Depositor EDS
% Data completeness (in resolution range)	99.9 (19.91-3.00) 100.0 (19.91-3.00)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.30 (at 2.98Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, $R_{free}$	0.213 , 0.263 0.213 , 0.262	Depositor DCC
$R_{free}$ test set	2249 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	76.9	Xtriage
Anisotropy	0.411	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	(Not available) , (Not available)	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	11331	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	84.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.64% 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: SO4, GOL, CL

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	0.26	0/5734	0.51	1/7766 (0.0%)
1	B	0.27	0/5664	0.51	1/7671 (0.0%)
All	All	0.27	0/11398	0.51	2/15437 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	259	ASP	CB-CG-OD2	5.16	122.94	118.30
1	B	329	LYS	CD-CE-NZ	-5.01	100.17	111.70

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5607	0	5450	117	0
1	B	5537	0	5395	109	0
2	A	20	0	0	1	0
2	B	15	0	0	1	0
3	A	30	0	40	1	0
3	B	18	0	24	1	0
4	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	48	0	0	1	0
5	B	55	0	0	1	0
All	All	11331	0	10909	225	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 10.

All (225) 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:325:THR:CG2	1:B:329:LYS:HE3	1.56	1.33
1:B:325:THR:CG2	1:B:329:LYS:CE	2.25	1.15
1:B:325:THR:HG23	1:B:329:LYS:HE3	1.21	1.14
1:B:325:THR:HG22	1:B:329:LYS:CE	1.83	1.08
1:B:325:THR:HG22	1:B:329:LYS:HE3	1.43	0.95
1:A:579:VAL:HG11	1:A:588:LYS:HE3	1.57	0.87
1:B:325:THR:CG2	1:B:329:LYS:NZ	2.43	0.82
1:A:221:ARG:HH22	1:A:753:LEU:HB3	1.45	0.80
1:B:595:LEU:HD13	1:B:602:PRO:HB3	1.62	0.80
1:A:541:VAL:HG11	1:A:591:ALA:HB2	1.64	0.78
1:B:614:PHE:HD1	1:B:615:TRP:CD1	2.02	0.77
1:B:518:ILE:HD12	1:B:594:LEU:HD23	1.66	0.77
1:A:152:VAL:O	1:A:153:VAL:HG22	1.88	0.73
1:B:300:LYS:HE3	1:B:300:LYS:HA	1.69	0.73
1:A:737:ASP:HB3	1:A:740:TYR:HB2	1.71	0.72
1:A:169:ARG:HG2	1:A:657:VAL:HB	1.71	0.72
1:B:585:GLU:HA	1:B:588:LYS:HE2	1.72	0.71
1:A:161:ARG:HH11	1:A:163:PHE:HE2	1.36	0.71
1:B:325:THR:HG22	1:B:329:LYS:NZ	2.04	0.70
1:B:465:ASN:HB2	1:B:483:THR:HG21	1.72	0.69
1:A:713:ARG:H	1:A:713:ARG:HD2	1.57	0.69
1:A:152:VAL:O	1:A:153:VAL:CG2	2.42	0.68
1:B:558:ALA:HB3	1:B:622:ALA:HB3	1.75	0.68
1:B:614:PHE:HD1	1:B:615:TRP:HD1	1.40	0.68
1:A:319:LYS:HD2	1:A:352:VAL:HG12	1.77	0.67
1:B:307:LEU:HB3	1:B:316:PHE:HB2	1.79	0.65
1:A:518:ILE:HG12	1:A:594:LEU:HD23	1.79	0.63
1:B:325:THR:HG21	1:B:329:LYS:NZ	2.13	0.63
1:B:272:LYS:NZ	1:B:290:ASP:OD1	2.31	0.62
1:A:516:PRO:HB3	1:A:549:THR:HG23	1.81	0.62
1:B:325:THR:HG22	1:B:329:LYS:CD	2.30	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:571:THR:HG23	1:A:573:SER:H	1.64	0.61
1:B:737:ASP:HB3	1:B:740:TYR:HB2	1.82	0.61
1:B:604:GLN:CD	1:B:604:GLN:H	2.04	0.61
1:B:126:GLU:OE1	1:B:172:ARG:NH1	2.33	0.61
1:B:221:ARG:HG3	1:B:229:ALA:HB3	1.83	0.60
1:A:373:ASP:OD1	1:A:374:GLN:N	2.32	0.60
1:B:449:ILE:HB	1:B:464:TYR:HB2	1.84	0.60
1:B:196:ASN:HD22	1:B:232:HIS:HE1	1.49	0.60
1:A:369:TRP:NE1	1:A:371:ASP:OD1	2.35	0.59
1:B:625:ARG:NH2	1:B:627:SER:OG	2.36	0.59
1:B:568:VAL:HG11	1:B:594:LEU:HD12	1.84	0.58
1:B:570:LYS:NZ	1:B:571:THR:O	2.29	0.58
1:A:595:LEU:HD13	1:A:602:PRO:HB3	1.85	0.58
1:A:695:GLU:O	1:A:699:SER:OG	2.21	0.58
1:B:169:ARG:NH2	1:B:670:ASP:OD2	2.36	0.57
1:A:454:ARG:NH2	1:A:459:GLN:HE22	2.02	0.57
1:B:82:GLN:NE2	1:B:383:LEU:O	2.38	0.57
1:B:199:GLN:HE22	1:B:214:THR:HG22	1.70	0.57
1:A:99:GLY:O	1:A:103:ILE:HG13	2.04	0.56
1:B:325:THR:HG22	1:B:329:LYS:HZ2	1.71	0.56
1:B:564:ASN:ND2	1:B:627:SER:O	2.39	0.55
1:A:534:ALA:HB3	1:A:537:ARG:HG2	1.89	0.55
1:B:360:PRO:HD3	1:B:382:TYR:CD1	2.42	0.55
1:A:682:VAL:HG11	1:A:696:ALA:HB1	1.87	0.55
1:A:240:PRO:HD2	1:A:243:MET:HE3	1.88	0.55
1:A:396:ASP:OD2	1:A:399:THR:HG22	2.06	0.55
1:A:335:ALA:HB1	1:A:350:VAL:HG21	1.89	0.55
1:B:585:GLU:CD	1:B:585:GLU:H	2.09	0.54
1:A:330:ALA:O	1:A:334:THR:HG23	2.08	0.54
1:B:39:PRO:HA	1:B:73:THR:HB	1.90	0.54
1:B:502:GLY:O	1:B:550:ARG:NH1	2.41	0.54
1:A:516:PRO:HB2	1:A:551:PRO:HD3	1.90	0.53
1:B:211:LEU:HD13	1:B:746:LEU:HA	1.90	0.53
1:A:558:ALA:HA	1:A:618:LEU:HD13	1.89	0.53
1:A:166:LYS:NZ	1:A:259:ASP:H	2.07	0.53
1:A:739:ASP:OD1	1:A:739:ASP:N	2.40	0.53
1:A:139:LYS:NZ	1:A:224:GLU:OE2	2.42	0.52
1:A:503:LYS:NZ	5:A:901:HOH:O	2.41	0.52
1:B:110:ASP:OD1	1:B:111:TYR:N	2.42	0.52
1:A:152:VAL:C	1:A:153:VAL:HG22	2.29	0.52
1:A:395:PHE:CE2	1:A:546:ALA:HA	2.44	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:700:ALA:O	1:A:704:ILE:HG13	2.10	0.52
1:B:168:ARG:HD3	1:B:169:ARG:NH2	2.25	0.51
1:B:625:ARG:NH1	1:B:626:THR:H	2.09	0.51
1:A:454:ARG:HH21	1:A:459:GLN:HE22	1.58	0.51
1:A:641:ARG:NH2	2:A:802:SO4:O2	2.43	0.51
1:B:509:MET:SD	1:B:544:ASN:HB3	2.51	0.51
1:A:66:ASP:OD1	1:A:145:VAL:HG12	2.11	0.50
1:A:530:GLN:H	1:A:530:GLN:CD	2.14	0.50
1:B:231:VAL:HB	1:B:753:LEU:HD12	1.93	0.50
1:B:542:ARG:HH21	1:B:629:ARG:HH11	1.58	0.50
1:A:641:ARG:NH1	1:A:656:GLU:OE2	2.44	0.50
1:B:68:TYR:CE2	1:B:151:HIS:HE1	2.29	0.50
1:B:680:VAL:HG21	1:B:704:ILE:HD11	1.94	0.50
1:B:516:PRO:HG2	1:B:518:ILE:HD11	1.92	0.50
1:A:36:GLY:HA2	1:A:73:THR:HG21	1.94	0.50
1:A:161:ARG:HD2	1:A:163:PHE:CE2	2.47	0.49
1:A:210:ARG:O	1:A:214:THR:HG23	2.12	0.49
1:B:360:PRO:O	1:B:364:GLN:HG3	2.12	0.49
1:B:675:ASP:OD2	1:B:711:ARG:NH1	2.36	0.49
1:A:415:ASP:OD1	1:A:415:ASP:N	2.39	0.49
1:A:641:ARG:NH1	1:A:641:ARG:HG2	2.27	0.49
1:A:399:THR:O	1:A:399:THR:OG1	2.31	0.49
1:B:68:TYR:HE2	1:B:151:HIS:HE1	1.59	0.49
1:A:221:ARG:HD3	1:A:231:VAL:HG23	1.94	0.49
1:A:596:ARG:HG2	1:A:596:ARG:HH11	1.78	0.49
1:A:641:ARG:HG2	1:A:641:ARG:HH11	1.76	0.49
1:B:387:ILE:HD13	1:B:639:PRO:HB3	1.95	0.48
1:A:422:ILE:HD12	1:A:449:ILE:HG12	1.95	0.48
1:A:337:ASP:HB3	1:A:341:LYS:HE2	1.95	0.48
1:A:449:ILE:HB	1:A:464:TYR:HB2	1.95	0.48
1:A:615:TRP:CD1	1:A:621:LYS:HD2	2.48	0.48
1:A:647:ASN:HD22	1:A:702:ARG:NH2	2.12	0.48
1:A:170:VAL:O	1:A:170:VAL:HG23	2.14	0.48
1:A:319:LYS:HD2	1:A:352:VAL:CG1	2.44	0.48
1:A:435:PRO:HA	1:A:438:TYR:CD1	2.48	0.48
1:A:642:LEU:HD23	1:A:657:VAL:HG11	1.95	0.48
1:B:87:TYR:CZ	1:B:120:ARG:HG3	2.49	0.48
1:B:29:HIS:N	1:B:30:PRO:HD2	2.29	0.47
1:A:675:ASP:OD1	1:A:711:ARG:NH2	2.43	0.47
1:B:561:LEU:HA	1:B:567:PHE:CZ	2.50	0.47
1:A:615:TRP:CG	1:A:621:LYS:HD2	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:674:LEU:HB3	1:B:681:PHE:HB2	1.96	0.47
1:B:564:ASN:HB3	1:B:629:ARG:HE	1.79	0.47
1:A:492:GLY:O	1:A:721:LYS:HG3	2.15	0.47
1:B:330:ALA:O	1:B:334:THR:HG23	2.15	0.47
1:B:711:ARG:HE	3:B:805:GOL:H2	1.78	0.47
1:A:336:SER:O	1:A:340:THR:HG23	2.15	0.47
1:B:445:ASP:OD1	1:B:524:THR:OG1	2.23	0.47
1:A:77:ARG:CZ	1:A:392:ARG:HG3	2.45	0.47
1:A:564:ASN:OD1	1:A:628:PRO:HA	2.15	0.47
1:A:625:ARG:HE	1:A:625:ARG:HA	1.80	0.47
1:A:330:ALA:O	1:A:333:LYS:HB3	2.15	0.46
1:B:325:THR:CG2	1:B:329:LYS:HZ2	2.25	0.46
1:B:479:SER:O	1:B:483:THR:HG23	2.15	0.46
1:B:539:PHE:HB2	1:B:568:VAL:HG13	1.98	0.46
1:B:324:ASN:O	1:B:328:ARG:HG3	2.16	0.46
1:A:36:GLY:HA3	1:A:83:TYR:CE1	2.51	0.46
1:A:474:ASP:OD1	1:A:474:ASP:N	2.47	0.46
1:A:125:PHE:CD2	1:A:347:GLN:HG3	2.50	0.46
1:A:744:ASP:HB3	1:A:747:ASP:HB2	1.98	0.46
1:B:264:ASP:OD1	1:B:265:ALA:N	2.48	0.46
1:A:504:GLU:HG2	1:A:517:MET:HE2	1.98	0.46
1:B:335:ALA:O	1:B:339:ILE:HG12	2.16	0.46
1:A:139:LYS:HG2	1:A:173:ALA:HB3	1.98	0.46
1:A:157:VAL:HB	1:A:158:VAL:H	1.64	0.46
1:B:197:ILE:HB	1:B:231:VAL:HG22	1.98	0.46
1:B:565:ASP:OD2	1:B:629:ARG:NH2	2.49	0.46
1:A:550:ARG:O	1:A:550:ARG:HG3	2.16	0.45
1:A:571:THR:HG22	1:A:574:ALA:O	2.17	0.45
1:B:325:THR:HG22	1:B:329:LYS:HD2	1.97	0.45
1:A:353:LEU:HD13	1:A:358:GLU:HA	1.98	0.45
1:B:500:VAL:HB	1:B:714:ARG:HB3	1.99	0.45
1:A:183:PHE:HA	1:A:189:PHE:CZ	2.52	0.44
1:A:268:ARG:NH2	1:A:703:TYR:O	2.50	0.44
1:A:423:TRP:HB3	1:A:430:LYS:HB3	2.00	0.44
1:B:325:THR:HG21	1:B:329:LYS:HZ1	1.82	0.44
1:B:458:ARG:NH1	5:B:905:HOH:O	2.50	0.44
1:A:85:LEU:HD21	1:A:108:LEU:HD23	1.99	0.44
1:A:430:LYS:HB2	1:A:430:LYS:HE2	1.84	0.44
1:A:185:ASN:HD22	1:A:253:LEU:HB2	1.83	0.44
1:B:324:ASN:HD21	1:B:326:GLU:HB2	1.82	0.44
1:A:569:LEU:HB3	1:A:576:TYR:HB2	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:112:LEU:O	1:B:115:ARG:HG2	2.17	0.44
1:B:383:LEU:HD21	1:B:388:ALA:HA	1.99	0.44
1:A:353:LEU:HD13	1:A:359:THR:H	1.83	0.44
1:A:315:ILE:HG13	1:A:350:VAL:HG23	1.99	0.44
1:A:168:ARG:HG3	1:A:208:TYR:HD2	1.82	0.44
1:B:571:THR:HG23	1:B:574:ALA:H	1.81	0.44
1:B:679:GLN:HB3	1:B:716:PRO:HG2	2.00	0.44
1:B:345:PRO:O	1:B:348:THR:OG1	2.31	0.43
1:A:135:LYS:HB3	1:A:135:LYS:HE3	1.80	0.43
1:A:384:SER:HB3	1:A:386:HIS:CD2	2.53	0.43
1:B:300:LYS:HB3	1:B:302:GLU:OE1	2.18	0.43
1:A:565:ASP:OD1	1:A:629:ARG:NH2	2.51	0.43
1:B:536:THR:HA	1:B:570:LYS:O	2.17	0.43
1:B:541:VAL:O	1:B:565:ASP:HB3	2.19	0.43
1:B:561:LEU:O	1:B:624:TYR:HB2	2.17	0.43
1:B:739:ASP:O	1:B:742:SER:OG	2.25	0.43
1:A:345:PRO:HB3	1:A:347:GLN:HE21	1.83	0.43
1:A:561:LEU:HD11	1:A:614:PHE:HZ	1.84	0.43
1:A:643:PHE:CE2	1:A:656:GLU:HB2	2.54	0.43
1:A:675:ASP:CG	1:A:711:ARG:HH22	2.22	0.43
1:B:594:LEU:O	1:B:594:LEU:HD22	2.19	0.43
1:A:243:MET:HE2	1:A:243:MET:HB2	1.93	0.42
1:A:518:ILE:HA	1:A:551:PRO:HD2	2.01	0.42
1:B:344:TYR:O	1:B:346:LYS:NZ	2.50	0.42
1:A:250:LYS:HE3	1:A:250:LYS:HB3	1.78	0.42
1:B:399:THR:O	1:B:399:THR:OG1	2.34	0.42
1:B:570:LYS:HD3	1:B:570:LYS:C	2.40	0.42
1:A:257:THR:O	1:A:258:GLU:HG3	2.18	0.42
1:B:238:THR:O	1:B:238:THR:OG1	2.29	0.42
1:B:608:GLY:N	1:B:610:GLU:OE2	2.51	0.42
1:B:614:PHE:CD1	1:B:615:TRP:CD1	2.93	0.42
1:A:71:LEU:HD13	1:A:85:LEU:HG	2.00	0.42
1:B:588:LYS:H	1:B:588:LYS:HG2	1.65	0.42
1:A:538:LEU:HD22	1:A:618:LEU:HD21	2.01	0.42
1:A:697:LEU:HD23	1:A:697:LEU:HA	1.82	0.42
1:B:626:THR:O	1:B:626:THR:OG1	2.36	0.42
1:B:164:GLN:NE2	2:B:801:SO4:O1	2.44	0.42
1:B:353:LEU:HD13	1:B:358:GLU:HA	2.00	0.42
1:A:503:LYS:HE2	3:A:807:GOL:H32	2.02	0.42
1:A:137:GLY:HA3	1:A:171:VAL:HG13	2.00	0.42
1:B:88:TRP:CZ2	1:B:123:GLN:HB2	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:292:ASN:HB3	1:A:294:PHE:CZ	2.55	0.41
1:B:360:PRO:HA	1:B:363:LYS:HE3	2.02	0.41
1:A:57:ASN:O	1:A:223:ASN:HB3	2.20	0.41
1:B:210:ARG:O	1:B:214:THR:HG23	2.20	0.41
1:B:682:VAL:HG11	1:B:696:ALA:HB1	2.02	0.41
1:A:32:PHE:CE1	1:A:108:LEU:HD13	2.55	0.41
1:A:536:THR:HG22	1:A:572:PRO:HD2	2.02	0.41
1:B:621:LYS:H	1:B:621:LYS:HG2	1.42	0.41
1:A:467:GLN:HB3	1:A:476:VAL:HG22	2.03	0.41
1:B:125:PHE:CD2	1:B:347:GLN:HB2	2.55	0.41
1:A:120:ARG:HB3	1:A:350:VAL:HG12	2.03	0.41
1:A:625:ARG:HA	1:A:625:ARG:NE	2.36	0.41
1:B:564:ASN:HD21	1:B:628:PRO:HA	1.85	0.41
1:B:139:LYS:HG2	1:B:173:ALA:HB3	2.03	0.41
1:B:430:LYS:HG2	1:B:482:LEU:HD13	2.03	0.41
1:A:541:VAL:HA	1:A:551:PRO:HA	2.02	0.41
1:B:424:ARG:O	1:B:431:VAL:HG22	2.21	0.40
1:B:73:THR:HG23	1:B:83:TYR:CE1	2.56	0.40
1:A:161:ARG:HG3	1:A:192:ASP:HB3	2.04	0.40
1:A:169:ARG:HE	1:A:169:ARG:HB2	1.78	0.40
1:A:748:ARG:HE	1:A:748:ARG:HB3	1.71	0.40
1:B:324:ASN:ND2	1:B:326:GLU:HB2	2.36	0.40
1:B:482:LEU:HD23	1:B:482:LEU:HA	1.91	0.40
1:A:158:VAL:HG13	1:B:157:VAL:HG21	2.03	0.40
1:A:340:THR:OG1	1:A:341:LYS:HD3	2.21	0.40
1:A:411:GLY:O	1:A:507:HIS:HB2	2.20	0.40
1:A:435:PRO:HA	1:A:438:TYR:CE1	2.57	0.40
1:A:594:LEU:O	1:A:597:VAL:HG22	2.21	0.40
1:B:359:THR:O	1:B:363:LYS:HG3	2.20	0.40
1:B:576:TYR:N	1:B:576:TYR:CD1	2.90	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	710/778 (91%)	664 (94%)	40 (6%)	6 (1%)	19	57
1	B	701/778 (90%)	669 (95%)	30 (4%)	2 (0%)	41	76
All	All	1411/1556 (91%)	1333 (94%)	70 (5%)	8 (1%)	25	64

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	30	PRO
1	A	752	GLU
1	A	374	GLN
1	A	529	GLY
1	A	254	PRO
1	B	531	THR
1	B	251	PRO
1	A	522	GLY

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	588/630 (93%)	543 (92%)	45 (8%)	13	42
1	B	580/630 (92%)	553 (95%)	27 (5%)	26	63
All	All	1168/1260 (93%)	1096 (94%)	72 (6%)	18	52

All (72) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	32	PHE
1	A	37	LYS
1	A	45	ARG
1	A	49	PHE
1	A	96	ASP

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	147	SER
1	A	157	VAL
1	A	168	ARG
1	A	169	ARG
1	A	195	ASN
1	A	217	SER
1	A	243	MET
1	A	276	VAL
1	A	286	SER
1	A	306	ILE
1	A	333	LYS
1	A	374	GLN
1	A	375	THR
1	A	384	SER
1	A	428	SER
1	A	458	ARG
1	A	498	ARG
1	A	530	GLN
1	A	549	THR
1	A	562	ASN
1	A	564	ASN
1	A	565	ASP
1	A	592	GLN
1	A	594	LEU
1	A	596	ARG
1	A	601	GLN
1	A	604	GLN
1	A	612	ASP
1	A	621	LYS
1	A	624	TYR
1	A	625	ARG
1	A	631	LYS
1	A	635	MET
1	A	645	CYS
1	A	646	SER
1	A	657	VAL
1	A	686	LYS
1	A	699	SER
1	A	713	ARG
1	A	739	ASP
1	B	49	PHE
1	B	93	CYS

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Mol	Chain	Res	Type
1	B	94	SER
1	B	125	PHE
1	B	136	SER
1	B	170	VAL
1	B	195	ASN
1	B	212	LYS
1	B	228	ARG
1	B	287	LEU
1	B	385	SER
1	B	454	ARG
1	B	472	THR
1	B	525	SER
1	B	542	ARG
1	B	550	ARG
1	B	573	SER
1	B	587	GLU
1	B	588	LYS
1	B	593	GLU
1	B	594	LEU
1	B	621	LYS
1	B	631	LYS
1	B	668	THR
1	B	691	GLU
1	B	698	THR
1	B	713	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	386	HIS
1	A	419	GLN
1	A	459	GLN
1	A	689	GLN
1	B	151	HIS
1	B	232	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](#)

Of 16 ligands modelled in this entry, 1 is monoatomic - leaving 15 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	SO4	A	804	-	4,4,4	0.14	0	6,6,6	0.05	0
3	GOL	A	808	-	5,5,5	0.88	0	5,5,5	1.06	0
2	SO4	A	803	-	4,4,4	0.13	0	6,6,6	0.06	0
2	SO4	A	801	-	4,4,4	0.14	0	6,6,6	0.06	0
2	SO4	B	801	-	4,4,4	0.14	0	6,6,6	0.06	0
2	SO4	B	803	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	A	802	-	4,4,4	0.13	0	6,6,6	0.08	0
3	GOL	A	805	-	5,5,5	0.87	0	5,5,5	1.04	0
3	GOL	A	806	-	5,5,5	0.84	0	5,5,5	1.06	0
3	GOL	A	807	-	5,5,5	0.85	0	5,5,5	1.00	0
3	GOL	B	805	-	5,5,5	0.93	0	5,5,5	0.93	0
3	GOL	B	807	-	5,5,5	0.91	0	5,5,5	0.99	0
2	SO4	B	802	-	4,4,4	0.14	0	6,6,6	0.05	0
3	GOL	B	806	-	5,5,5	0.88	0	5,5,5	1.06	0
3	GOL	A	809	-	5,5,5	0.90	0	5,5,5	1.04	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
3	GOL	A	808	-	-	2/4/4/4	-
3	GOL	A	807	-	-	0/4/4/4	-
3	GOL	A	805	-	-	0/4/4/4	-
3	GOL	A	806	-	-	2/4/4/4	-
3	GOL	B	805	-	-	4/4/4/4	-
3	GOL	B	807	-	-	0/4/4/4	-
3	GOL	B	806	-	-	2/4/4/4	-
3	GOL	A	809	-	-	1/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	806	GOL	C1-C2-C3-O3
3	A	808	GOL	C1-C2-C3-O3
3	B	805	GOL	O1-C1-C2-C3
3	B	805	GOL	C1-C2-C3-O3
3	B	805	GOL	O2-C2-C3-O3
3	A	808	GOL	O2-C2-C3-O3
3	B	806	GOL	C1-C2-C3-O3
3	A	806	GOL	O2-C2-C3-O3
3	B	806	GOL	O2-C2-C3-O3
3	B	805	GOL	O1-C1-C2-O2
3	A	809	GOL	O1-C1-C2-C3

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	801	SO4	1	0
2	A	802	SO4	1	0
3	A	807	GOL	1	0
3	B	805	GOL	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	717/778 (92%)	-0.04	13 (1%) 68 40	59, 79, 130, 167	12 (1%)
1	B	709/778 (91%)	-0.10	11 (1%) 72 44	57, 79, 127, 184	3 (0%)
All	All	1426/1556 (91%)	-0.07	24 (1%) 70 41	57, 79, 129, 184	15 (1%)

All (24) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	623	ALA	3.8
1	B	621	LYS	3.8
1	B	530	GLN	3.6
1	B	531	THR	3.4
1	A	620	GLY	3.2
1	A	531	THR	3.2
1	A	568	VAL	2.8
1	B	155	ASN	2.8
1	A	529	GLY	2.5
1	A	621	LYS	2.5
1	B	257	THR	2.5
1	B	33	LEU	2.5
1	A	228	ARG	2.4
1	A	650	GLY	2.4
1	B	622	ALA	2.3
1	A	96	ASP	2.3
1	B	734	LEU	2.2
1	A	375	THR	2.2
1	A	346	LYS	2.2
1	A	754	ALA	2.1
1	A	622	ALA	2.1
1	A	91	ASN	2.1
1	B	368	ASN	2.0
1	B	346	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, 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
3	GOL	A	806	6/6	0.43	0.73	69,79,82,85	0
3	GOL	A	807	6/6	0.62	0.60	75,76,76,81	6
3	GOL	A	809	6/6	0.64	0.54	87,89,91,92	0
3	GOL	B	805	6/6	0.70	0.58	69,73,76,80	0
3	GOL	A	808	6/6	0.76	0.36	82,87,92,96	0
2	SO4	B	801	5/5	0.77	0.40	103,105,114,119	0
2	SO4	A	801	5/5	0.79	0.40	77,79,88,89	5
3	GOL	B	807	6/6	0.79	0.33	76,80,82,82	0
2	SO4	A	802	5/5	0.80	0.31	74,79,81,84	5
4	CL	B	804	1/1	0.81	0.16	95,95,95,95	0
3	GOL	A	805	6/6	0.82	0.36	65,70,76,83	0
2	SO4	B	803	5/5	0.84	0.28	86,90,92,98	5
2	SO4	A	804	5/5	0.85	0.41	107,107,117,128	0
2	SO4	B	802	5/5	0.87	0.35	102,103,113,122	0
2	SO4	A	803	5/5	0.89	0.27	118,121,126,137	0
3	GOL	B	806	6/6	0.93	0.26	57,61,67,68	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.