



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 09:21 AM UTC

PDB ID : 2RG9 / pdb_00002rg9
Title : Crystal structure of viscum album mistletoe lectin I in native state at 1.95 Å resolution, comparison of structure active site conformation in ricin and in viscumin
Authors : Karpechenko, N.U.; Timofeev, V.I.; Gabdoulkhakov, A.G.; Mikhailov, A.M.
Deposited on : 2007-10-03
Resolution : 1.95 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

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

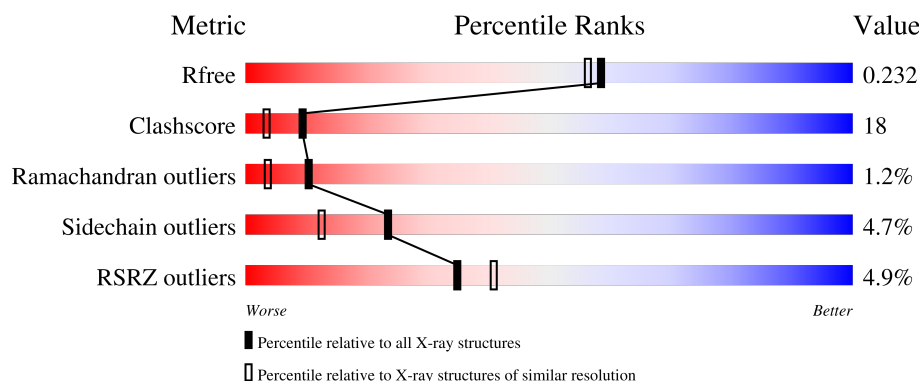
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	3494 (1.96-1.96)
Clashscore	190562	3612 (1.96-1.96)
Ramachandran outliers	187476	3587 (1.96-1.96)
Sidechain outliers	187428	3587 (1.96-1.96)
RSRZ outliers	180081	3495 (1.96-1.96)

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	249	5% 73% 22% • •
2	B	263	5% 82% 13% • •

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
4	SO4	A	4001	-	-	X	-
5	AZI	A	4004	-	X	-	-
5	AZI	B	4003	-	X	-	-
5	AZI	B	4005	-	X	-	-
7	GOL	A	4020	-	-	X	-
7	GOL	B	4017	-	-	X	-

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 4396 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 Beta-galactoside-specific lectin 1 chain A isoform 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	249	Total	C	N	O	S	0	0	0
			1921	1218	328	371	4			

There are 17 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	5	SER	ARG	conflict	UNP P81446
A	8	THR	VAL	conflict	UNP P81446
A	9	VAL	THR	conflict	UNP P81446
A	10	GLN	HIS	conflict	UNP P81446
A	19	SER	ARG	conflict	UNP P81446
A	27	PHE	TYR	conflict	UNP P81446
A	36	ASN	GLU	conflict	UNP P81446
A	49	GLU	ASP	conflict	UNP P81446
A	51	SER	GLN	conflict	UNP P81446
A	84	GLN	ASP	conflict	UNP P81446
A	90	LYS	ARG	conflict	UNP P81446
A	99	GLN	HIS	conflict	UNP P81446
A	100	ASP	LEU	conflict	UNP P81446
A	208	HIS	GLN	conflict	UNP P81446
A	222	LEU	ILE	conflict	UNP P81446
A	227	VAL	PHE	conflict	UNP P81446
A	233	ILE	VAL	conflict	UNP P81446

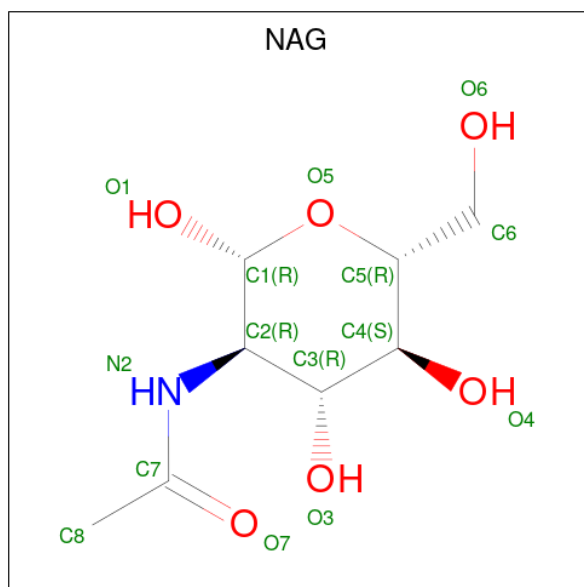
- Molecule 2 is a protein called Beta-galactoside-specific lectin 1 chain B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	263	Total	C	N	O	S	0	0	0
			1996	1238	353	393	12			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	11	ILE	THR	conflict	UNP P81446
B	21	THR	CYS	conflict	UNP P81446
B	30	GLN	HIS	conflict	UNP P81446
B	54	LYS	ARG	conflict	UNP P81446
B	90	ILE	LEU	conflict	UNP P81446
B	92	GLN	GLU	conflict	UNP P81446
B	166	THR	VAL	conflict	UNP P81446
B	168	GLY	SER	conflict	UNP P81446
B	170	GLU	GLN	conflict	UNP P81446
B	189	SER	ASP	conflict	UNP P81446
B	194	ASN	CYS	conflict	UNP P81446
B	254	ASN	LYS	conflict	UNP P81446

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



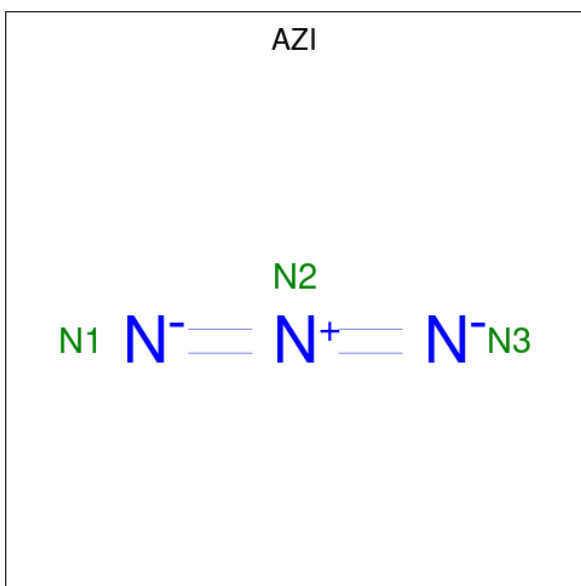
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



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

- Molecule 5 is AZIDE ION (CCD ID: AZI) (formula: N_3).

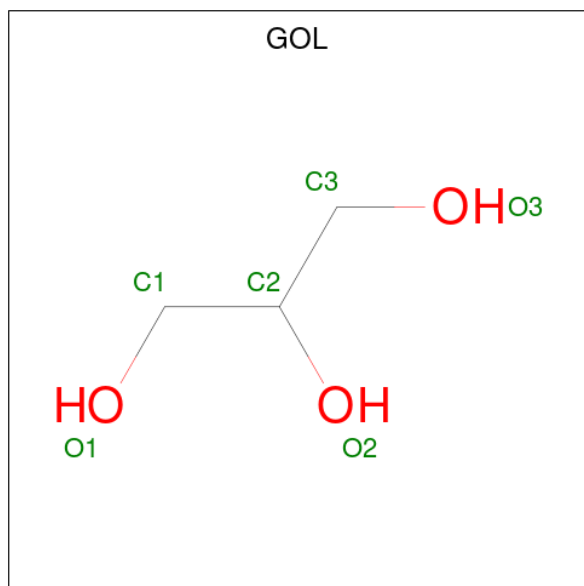


Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	N	0	0
			3	3		
5	B	1	Total	N	0	0
			3	3		
5	B	1	Total	N	0	0
			3	3		

- Molecule 6 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	Cl	0	0
			2	2		

- Molecule 7 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



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

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

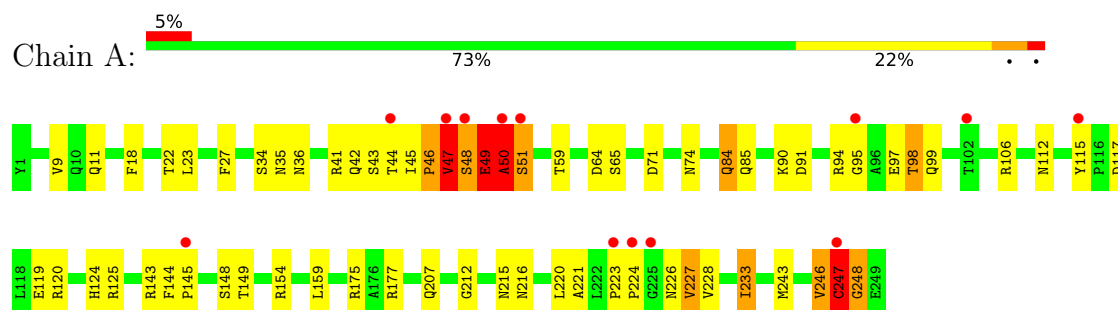
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	113	Total	O	0	0
			113	113		
8	B	204	Total	O	0	0
			204	204		

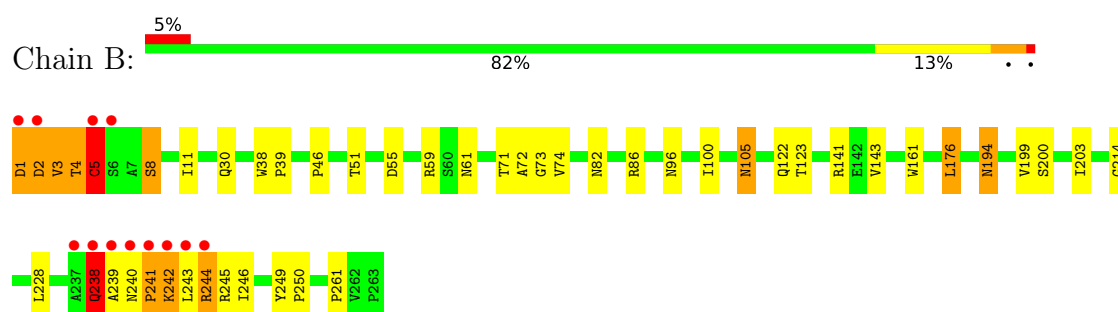
3 Residue-property plots

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: Beta-galactoside-specific lectin 1 chain A isoform 1



- Molecule 2: Beta-galactoside-specific lectin 1 chain B



4 Data and refinement statistics

Property	Value	Source
Space group	P 65 2 2	Depositor
Cell constants a, b, c, α , β , γ	106.95Å 106.95Å 310.95Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	8.00 – 1.95 8.00 – 1.95	Depositor EDS
% Data completeness (in resolution range)	(Not available) (8.00-1.95) 98.1 (8.00-1.95)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.86 (at 1.95Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.222 , 0.239 0.213 , 0.232	Depositor DCC
R_{free} test set	3802 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	36.8	Xtriage
Anisotropy	0.055	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.44 , 65.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	4396	wwPDB-VP
Average B, all atoms (Å ²)	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.54% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, CL, GOL, AZI, NAG

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	0.49	1/1960 (0.1%)	0.78	1/2670 (0.0%)
2	B	0.48	0/2035	0.78	1/2777 (0.0%)
All	All	0.48	1/3995 (0.0%)	0.78	2/5447 (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	A	1	8
2	B	1	5
All	All	2	13

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	49	GLU	C-N	-5.93	1.25	1.33

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	5	CYS	N-CA-C	-6.37	107.36	114.62
1	A	247	CYS	N-CA-C	-6.15	105.94	113.50

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	49	GLU	CA
2	B	5	CYS	CA

All (13) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	246	VAL	Peptide
1	A	248	GLY	Peptide
1	A	46	PRO	Peptide
1	A	47	VAL	Peptide
1	A	48	SER	Peptide
1	A	49	GLU	Peptide
1	A	50	ALA	Peptide
1	A	51	SER	Peptide
2	B	1	ASP	Peptide
2	B	238	GLN	Peptide
2	B	242	LYS	Peptide
2	B	244	ARG	Peptide
2	B	4	THR	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	1921	0	1881	90	0
2	B	1996	0	1920	64	0
3	A	14	0	13	3	0
3	B	42	0	39	5	0
4	A	5	0	0	3	0
5	A	3	0	0	0	0
5	B	6	0	0	0	0
6	A	2	0	0	1	0
7	A	48	0	64	16	0
7	B	42	0	56	12	0
8	A	113	0	0	2	0
8	B	204	0	0	3	0
All	All	4396	0	3973	145	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 18.

All (145) 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:247:CYS:HB2	2:B:5:CYS:SG	1.55	1.45
1:A:49:GLU:HG2	1:A:50:ALA:CA	1.66	1.25
1:A:247:CYS:CB	2:B:5:CYS:SG	2.33	1.15
1:A:9:VAL:HG23	1:A:11:GLN:H	1.13	1.08
2:B:59:ARG:HH22	7:B:4017:GOL:H32	1.17	1.07
1:A:119:GLU:OE2	4:A:4001:SO4:O2	1.74	1.04
1:A:49:GLU:CG	1:A:50:ALA:CA	2.37	1.02
2:B:194:ASN:HD22	2:B:194:ASN:H	1.01	0.98
2:B:96:ASN:HD22	2:B:228:LEU:HD11	1.28	0.95
1:A:247:CYS:CB	2:B:5:CYS:HG	1.74	0.94
1:A:148:SER:HB2	7:A:4020:GOL:H11	1.50	0.93
1:A:48:SER:HB2	1:A:49:GLU:HA	1.49	0.93
1:A:27:PHE:HZ	1:A:51:SER:HG	1.15	0.91
1:A:247:CYS:HA	2:B:5:CYS:SG	2.13	0.89
2:B:240:ASN:OD1	2:B:241:PRO:HD2	1.73	0.88
1:A:97:GLU:HG3	7:A:4010:GOL:H12	1.56	0.86
1:A:49:GLU:HG2	1:A:50:ALA:N	1.79	0.85
1:A:247:CYS:CA	2:B:5:CYS:SG	2.64	0.84
2:B:59:ARG:HH22	7:B:4017:GOL:C3	1.89	0.84
2:B:61:ASN:HD21	3:B:5004:NAG:C1	1.91	0.84
2:B:194:ASN:HD22	2:B:194:ASN:N	1.77	0.82
1:A:47:VAL:O	1:A:47:VAL:HG23	1.80	0.81
1:A:9:VAL:HG23	1:A:11:GLN:N	1.95	0.80
2:B:96:ASN:HD22	2:B:228:LEU:CD1	1.96	0.79
1:A:47:VAL:O	1:A:47:VAL:CG2	2.30	0.79
2:B:59:ARG:NH2	7:B:4017:GOL:H32	1.96	0.78
1:A:95:GLY:H	7:A:4010:GOL:H2	1.50	0.76
2:B:96:ASN:ND2	2:B:228:LEU:HD11	2.00	0.75
2:B:240:ASN:OD1	2:B:241:PRO:CD	2.39	0.71
1:A:48:SER:HB2	1:A:49:GLU:CA	2.21	0.69
1:A:46:PRO:HA	1:A:47:VAL:HG12	1.73	0.69
2:B:141:ARG:HG3	7:B:4018:GOL:O1	1.94	0.68
1:A:46:PRO:CA	1:A:47:VAL:HG12	2.24	0.67
2:B:11:ILE:HG13	8:B:3199:HOH:O	1.94	0.67
2:B:194:ASN:H	2:B:194:ASN:ND2	1.83	0.67
1:A:246:VAL:HG12	1:A:246:VAL:O	1.94	0.67
1:A:246:VAL:O	1:A:246:VAL:CG1	2.43	0.67
1:A:65:SER:HB2	7:A:4009:GOL:H31	1.76	0.66
1:A:42:GLN:HG3	7:A:4008:GOL:H31	1.77	0.66
1:A:143:ARG:HH22	7:A:4019:GOL:H32	1.62	0.65
2:B:243:LEU:N	2:B:243:LEU:HD12	2.11	0.65
2:B:241:PRO:O	2:B:244:ARG:CB	2.45	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:238:GLN:NE2	2:B:238:GLN:HA	2.13	0.64
1:A:124:HIS:HD2	4:A:4001:SO4:O1	1.81	0.63
2:B:240:ASN:C	2:B:242:LYS:H	2.08	0.62
1:A:47:VAL:N	1:A:48:SER:O	2.29	0.62
2:B:2:ASP:O	2:B:4:THR:HG23	2.00	0.62
1:A:119:GLU:CD	4:A:4001:SO4:O2	2.42	0.62
1:A:112:ASN:HD21	3:A:5003:NAG:C1	2.14	0.61
1:A:49:GLU:HG3	1:A:50:ALA:CA	2.29	0.60
1:A:247:CYS:HB2	2:B:5:CYS:HG	0.78	0.60
1:A:84:GLN:O	1:A:84:GLN:HG2	2.02	0.60
2:B:11:ILE:HG12	2:B:51:THR:OG1	2.01	0.60
2:B:243:LEU:HD12	2:B:243:LEU:H	1.67	0.60
1:A:47:VAL:N	1:A:48:SER:CA	2.65	0.59
1:A:154:ARG:HD3	8:A:3288:HOH:O	2.03	0.59
2:B:61:ASN:ND2	3:B:5004:NAG:C1	2.65	0.58
1:A:47:VAL:N	1:A:48:SER:C	2.63	0.57
1:A:212:GLY:HA2	1:A:233:ILE:HG23	1.86	0.56
1:A:18:PHE:O	1:A:22:THR:HG23	2.06	0.56
1:A:47:VAL:CG2	1:A:94:ARG:O	2.54	0.56
1:A:106:ARG:HB2	1:A:106:ARG:NH1	2.22	0.55
1:A:49:GLU:HG2	1:A:50:ALA:C	2.28	0.55
2:B:243:LEU:H	2:B:243:LEU:CD1	2.20	0.55
1:A:35:ASN:H	2:B:2:ASP:CB	2.20	0.55
2:B:176:LEU:HD23	7:B:4018:GOL:H11	1.87	0.55
2:B:71:THR:O	2:B:74:VAL:HG22	2.07	0.54
2:B:46:PRO:HD2	8:B:3034:HOH:O	2.06	0.54
3:B:5002:NAG:O7	7:B:4013:GOL:H2	2.07	0.54
2:B:240:ASN:C	2:B:242:LYS:N	2.66	0.53
1:A:149:THR:HB	7:A:4020:GOL:H12	1.93	0.51
1:A:42:GLN:C	1:A:44:THR:H	2.19	0.51
2:B:82:ASN:HD21	7:B:4017:GOL:H11	1.74	0.51
1:A:48:SER:CB	1:A:49:GLU:HA	2.23	0.49
1:A:148:SER:HB2	7:A:4020:GOL:C1	2.33	0.49
1:A:216:ASN:ND2	6:A:4021:CL:CL	2.82	0.49
2:B:240:ASN:O	2:B:242:LYS:N	2.45	0.49
1:A:220:LEU:HB2	1:A:228:VAL:HG12	1.94	0.49
7:B:4014:GOL:H32	8:B:3178:HOH:O	2.11	0.49
1:A:115:TYR:O	1:A:119:GLU:HG3	2.13	0.49
1:A:27:PHE:HZ	1:A:51:SER:OG	1.88	0.49
1:A:143:ARG:NH2	7:A:4019:GOL:H32	2.26	0.49
1:A:97:GLU:CG	7:A:4010:GOL:H12	2.37	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:84:GLN:NE2	1:A:85:GLN:HE21	2.12	0.48
1:A:34:SER:HB3	1:A:243:MET:HE1	1.96	0.48
1:A:47:VAL:H	1:A:48:SER:C	2.16	0.48
2:B:73:GLY:HA2	2:B:122:GLN:HE22	1.78	0.48
1:A:207:GLN:O	2:B:5:CYS:HA	2.14	0.47
2:B:243:LEU:HD23	2:B:245:ARG:HH21	1.79	0.47
1:A:42:GLN:H	7:A:4008:GOL:C3	2.26	0.47
1:A:35:ASN:H	2:B:2:ASP:HB2	1.79	0.47
1:A:47:VAL:HG21	1:A:94:ARG:O	2.15	0.47
1:A:221:ALA:HA	1:A:227:VAL:HG12	1.95	0.47
1:A:45:ILE:HA	1:A:46:PRO:HD3	1.62	0.47
1:A:48:SER:H	1:A:99:GLN:HG3	1.79	0.47
1:A:223:PRO:HB2	1:A:224:PRO:HD3	1.97	0.47
2:B:243:LEU:N	2:B:243:LEU:CD1	2.75	0.47
2:B:38:TRP:CG	2:B:39:PRO:HD2	2.49	0.46
2:B:240:ASN:OD1	2:B:241:PRO:N	2.48	0.46
2:B:123:THR:OG1	7:B:4014:GOL:H2	2.15	0.46
1:A:143:ARG:HH21	7:A:4009:GOL:H12	1.81	0.46
2:B:239:ALA:O	2:B:240:ASN:HB2	2.16	0.46
1:A:46:PRO:O	1:A:49:GLU:HB3	2.15	0.46
2:B:199:VAL:O	2:B:200:SER:HB2	2.16	0.46
2:B:249:TYR:CZ	7:B:4006:GOL:H12	2.51	0.46
1:A:106:ARG:HB2	1:A:106:ARG:HH11	1.79	0.45
1:A:247:CYS:SG	2:B:3:VAL:CG1	3.04	0.45
1:A:112:ASN:ND2	3:A:5003:NAG:C1	2.79	0.45
1:A:90:LYS:O	1:A:112:ASN:HB3	2.17	0.45
1:A:144:PHE:HA	1:A:145:PRO:HD3	1.79	0.45
2:B:249:TYR:CG	2:B:250:PRO:HD2	2.52	0.44
2:B:38:TRP:CD1	2:B:39:PRO:HD2	2.53	0.44
1:A:95:GLY:O	1:A:98:THR:HG23	2.18	0.43
1:A:117:ASP:O	1:A:120:ARG:HB2	2.17	0.43
2:B:61:ASN:HD21	3:B:5004:NAG:C2	2.30	0.43
2:B:243:LEU:C	2:B:245:ARG:H	2.27	0.43
2:B:261:PRO:HG2	7:B:4018:GOL:H31	2.01	0.43
1:A:119:GLU:OE2	1:A:125:ARG:HG3	2.19	0.43
1:A:41:ARG:HA	7:A:4008:GOL:H32	2.01	0.43
1:A:35:ASN:O	1:A:36:ASN:HB2	2.19	0.43
2:B:194:ASN:HD21	2:B:214:GLY:HA2	1.84	0.42
1:A:59:THR:HA	1:A:64:ASP:O	2.19	0.42
1:A:149:THR:H	7:A:4020:GOL:H11	1.83	0.42
1:A:90:LYS:O	1:A:91:ASP:HB2	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:203:ILE:HD12	2:B:246:ILE:HG22	2.01	0.42
1:A:46:PRO:HB3	1:A:47:VAL:HG12	2.02	0.42
2:B:249:TYR:CD2	2:B:250:PRO:HD2	2.55	0.42
1:A:27:PHE:HZ	1:A:51:SER:CB	2.33	0.42
3:A:5003:NAG:H61	8:A:3271:HOH:O	2.18	0.42
2:B:72:ALA:HB1	7:B:4014:GOL:H12	2.01	0.42
2:B:100:ILE:HD11	2:B:105:ASN:ND2	2.35	0.41
1:A:18:PHE:CD1	1:A:177:ARG:NH1	2.89	0.41
1:A:84:GLN:HE21	1:A:85:GLN:HG2	1.86	0.41
1:A:84:GLN:NE2	1:A:85:GLN:HG2	2.35	0.41
2:B:96:ASN:CG	3:B:5002:NAG:C1	2.94	0.41
1:A:71:ASP:HB3	1:A:74:ASN:OD1	2.21	0.41
1:A:215:ASN:OD1	2:B:8:SER:HB3	2.21	0.41
1:A:45:ILE:HD13	1:A:45:ILE:HG21	1.69	0.41
1:A:46:PRO:CB	1:A:47:VAL:HG12	2.50	0.41
2:B:194:ASN:ND2	2:B:214:GLY:O	2.54	0.41
2:B:55:ASP:HB2	2:B:86:ARG:HH22	1.86	0.41
2:B:100:ILE:HD11	2:B:105:ASN:HD22	1.86	0.40
1:A:149:THR:N	7:A:4020:GOL:H11	2.35	0.40
1:A:175:ARG:NH2	7:A:4011:GOL:O2	2.54	0.40
1:A:35:ASN:H	2:B:2:ASP:HB3	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	247/249 (99%)	235 (95%)	8 (3%)	4 (2%)	7	2
2	B	261/263 (99%)	249 (95%)	10 (4%)	2 (1%)	16	8
All	All	508/512 (99%)	484 (95%)	18 (4%)	6 (1%)	10	4

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	49	GLU
1	A	50	ALA
1	A	248	GLY
2	B	3	VAL
2	B	241	PRO
1	A	43	SER

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	209/215 (97%)	200 (96%)	9 (4%)	26	15
2	B	217/222 (98%)	206 (95%)	11 (5%)	21	10
All	All	426/437 (98%)	406 (95%)	20 (5%)	23	12

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	LEU
1	A	47	VAL
1	A	84	GLN
1	A	98	THR
1	A	159	LEU
1	A	226	ASN
1	A	227	VAL
1	A	233	ILE
1	A	247	CYS
2	B	1	ASP
2	B	2	ASP
2	B	5	CYS
2	B	8	SER
2	B	30	GLN
2	B	105	ASN
2	B	143	VAL
2	B	161	TRP

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Mol	Chain	Res	Type
2	B	176	LEU
2	B	194	ASN
2	B	238	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	36	ASN
1	A	84	GLN
1	A	124	HIS
1	A	127	GLN
2	B	44	ASN
2	B	61	ASN
2	B	82	ASN
2	B	96	ASN
2	B	105	ASN
2	B	122	GLN
2	B	169	GLN
2	B	188	GLN
2	B	194	ASN
2	B	215	GLN

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 25 ligands modelled in this entry, 2 are monoatomic - leaving 23 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	NAG	A	5003	-	14,14,15	0.52	0	17,19,21	0.78	1 (5%)
7	GOL	B	4015	-	5,5,5	0.39	0	5,5,5	0.60	0
5	AZI	B	4005	-	2,2,2	2.90	2 (100%)	0,1,1	-	-
3	NAG	B	5001	2	14,14,15	0.63	0	17,19,21	1.17	2 (11%)
3	NAG	B	5002	-	14,14,15	0.52	0	17,19,21	1.47	2 (11%)
7	GOL	B	4012	-	5,5,5	0.39	0	5,5,5	0.34	0
7	GOL	A	4007	-	5,5,5	0.34	0	5,5,5	0.54	0
7	GOL	A	4016	-	5,5,5	0.36	0	5,5,5	0.53	0
7	GOL	B	4013	-	5,5,5	0.36	0	5,5,5	0.44	0
7	GOL	A	4009	-	5,5,5	0.39	0	5,5,5	0.42	0
7	GOL	A	4010	-	5,5,5	0.36	0	5,5,5	0.41	0
7	GOL	B	4017	-	5,5,5	0.37	0	5,5,5	0.31	0
7	GOL	A	4008	-	5,5,5	0.37	0	5,5,5	0.50	0
7	GOL	B	4006	-	5,5,5	0.39	0	5,5,5	0.39	0
7	GOL	A	4019	-	5,5,5	0.35	0	5,5,5	0.50	0
7	GOL	A	4020	-	5,5,5	0.38	0	5,5,5	0.57	0
5	AZI	B	4003	-	2,2,2	3.08	2 (100%)	0,1,1	-	-
7	GOL	B	4014	-	5,5,5	0.34	0	5,5,5	0.18	0
7	GOL	B	4018	-	5,5,5	0.36	0	5,5,5	0.57	0
7	GOL	A	4011	-	5,5,5	0.34	0	5,5,5	0.44	0
3	NAG	B	5004	-	14,14,15	0.52	0	17,19,21	0.87	0
4	SO4	A	4001	-	4,4,4	0.84	0	6,6,6	0.69	0
5	AZI	A	4004	-	2,2,2	2.91	2 (100%)	0,1,1	-	-

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	NAG	A	5003	-	-	0/6/23/26	0/1/1/1
7	GOL	B	4015	-	-	2/4/4/4	-
3	NAG	B	5001	2	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	B	5002	-	-	2/6/23/26	0/1/1/1
7	GOL	B	4012	-	-	0/4/4/4	-
7	GOL	A	4007	-	-	2/4/4/4	-
7	GOL	A	4016	-	-	2/4/4/4	-
7	GOL	B	4013	-	-	0/4/4/4	-
7	GOL	A	4009	-	-	2/4/4/4	-
7	GOL	A	4010	-	-	2/4/4/4	-
7	GOL	B	4017	-	-	3/4/4/4	-
7	GOL	A	4008	-	-	4/4/4/4	-
7	GOL	B	4006	-	-	2/4/4/4	-
7	GOL	A	4019	-	-	2/4/4/4	-
7	GOL	A	4020	-	-	0/4/4/4	-
7	GOL	B	4014	-	-	2/4/4/4	-
7	GOL	B	4018	-	-	0/4/4/4	-
7	GOL	A	4011	-	-	2/4/4/4	-
3	NAG	B	5004	-	-	0/6/23/26	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	4003	AZI	N1-N2	-3.08	1.16	1.23
5	B	4003	AZI	N3-N2	-3.08	1.16	1.23
5	B	4005	AZI	N3-N2	-2.96	1.17	1.23
5	A	4004	AZI	N3-N2	-2.96	1.17	1.23
5	A	4004	AZI	N1-N2	-2.87	1.17	1.23
5	B	4005	AZI	N1-N2	-2.84	1.17	1.23

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	5002	NAG	C1-O5-C5	4.03	117.58	112.19
3	B	5002	NAG	C2-N2-C7	-3.07	118.79	122.90
3	B	5001	NAG	O5-C1-C2	2.47	115.11	111.29
3	B	5001	NAG	C2-N2-C7	2.26	125.93	122.90
3	A	5003	NAG	C2-N2-C7	-2.04	120.17	122.90

There are no chirality outliers.

All (29) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	4007	GOL	O1-C1-C2-C3
7	A	4010	GOL	O1-C1-C2-O2
7	A	4010	GOL	O1-C1-C2-C3
7	A	4019	GOL	O1-C1-C2-C3
7	B	4006	GOL	O1-C1-C2-C3
3	B	5001	NAG	O5-C5-C6-O6
3	B	5001	NAG	C4-C5-C6-O6
3	B	5002	NAG	O5-C5-C6-O6
7	A	4008	GOL	O1-C1-C2-C3
7	A	4008	GOL	C1-C2-C3-O3
7	A	4009	GOL	C1-C2-C3-O3
7	A	4016	GOL	C1-C2-C3-O3
7	B	4015	GOL	C1-C2-C3-O3
7	B	4017	GOL	O1-C1-C2-C3
7	B	4017	GOL	C1-C2-C3-O3
7	A	4007	GOL	O1-C1-C2-O2
7	A	4019	GOL	O1-C1-C2-O2
7	B	4006	GOL	O1-C1-C2-O2
7	B	4017	GOL	O1-C1-C2-O2
7	A	4016	GOL	O2-C2-C3-O3
7	B	4014	GOL	O1-C1-C2-O2
3	B	5002	NAG	C4-C5-C6-O6
7	A	4011	GOL	C1-C2-C3-O3
7	A	4008	GOL	O2-C2-C3-O3
7	A	4009	GOL	O2-C2-C3-O3
7	B	4015	GOL	O2-C2-C3-O3
7	A	4008	GOL	O1-C1-C2-O2
7	B	4014	GOL	O1-C1-C2-C3
7	A	4011	GOL	O2-C2-C3-O3

There are no ring outliers.

15 monomers are involved in 38 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	5003	NAG	3	0
3	B	5002	NAG	2	0
7	B	4013	GOL	1	0
7	A	4009	GOL	2	0
7	A	4010	GOL	3	0
7	B	4017	GOL	4	0
7	A	4008	GOL	3	0
7	B	4006	GOL	1	0
7	A	4019	GOL	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	4020	GOL	5	0
7	B	4014	GOL	3	0
7	B	4018	GOL	3	0
7	A	4011	GOL	1	0
3	B	5004	NAG	3	0
4	A	4001	SO4	3	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	249/249 (100%)	-0.04	13 (5%) 33 38	32, 46, 76, 105	0
2	B	263/263 (100%)	-0.36	12 (4%) 37 43	25, 37, 67, 107	0
All	All	512/512 (100%)	-0.20	25 (4%) 35 41	25, 42, 74, 107	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	247	CYS	6.6
1	A	223	PRO	6.0
1	A	50	ALA	5.9
1	A	225	GLY	5.7
2	B	241	PRO	5.4
2	B	240	ASN	5.2
2	B	239	ALA	5.0
2	B	244	ARG	4.6
2	B	243	LEU	4.4
1	A	51	SER	4.2
2	B	242	LYS	4.0
1	A	115	TYR	3.7
1	A	48	SER	3.7
2	B	2	ASP	3.6
2	B	5	CYS	2.9
1	A	44	THR	2.8
2	B	238	GLN	2.6
2	B	237	ALA	2.5
2	B	1	ASP	2.4
1	A	47	VAL	2.4
1	A	102	THR	2.4
2	B	6	SER	2.2
1	A	145	PRO	2.1
1	A	224	PRO	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	95	GLY	2.1

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	NAG	B	5002	14/15	0.52	0.14	51,81,90,93	0
7	GOL	A	4010	6/6	0.64	0.14	70,80,84,88	0
7	GOL	A	4009	6/6	0.66	0.16	56,66,72,80	0
5	AZI	B	4005	3/3	0.68	0.19	41,41,51,58	0
3	NAG	B	5004	14/15	0.75	0.12	51,78,85,90	0
7	GOL	A	4007	6/6	0.77	0.12	77,82,88,88	0
7	GOL	A	4016	6/6	0.77	0.12	49,51,58,61	0
3	NAG	A	5003	14/15	0.78	0.12	77,91,96,106	0
7	GOL	B	4017	6/6	0.78	0.10	67,70,80,87	0
7	GOL	A	4019	6/6	0.80	0.13	69,74,76,80	0
6	CL	A	4022	1/1	0.81	0.18	58,58,58,58	1
7	GOL	B	4014	6/6	0.83	0.17	31,46,64,66	0
7	GOL	A	4020	6/6	0.83	0.13	54,60,63,80	0
7	GOL	B	4018	6/6	0.84	0.15	48,58,61,69	0
7	GOL	A	4011	6/6	0.86	0.08	61,68,80,81	0
3	NAG	B	5001	14/15	0.88	0.08	32,43,57,57	0
5	AZI	A	4004	3/3	0.88	0.11	42,42,44,55	0
7	GOL	B	4013	6/6	0.89	0.07	60,63,85,88	0
5	AZI	B	4003	3/3	0.89	0.06	47,47,56,57	0
7	GOL	A	4008	6/6	0.90	0.09	62,70,73,78	0
6	CL	A	4021	1/1	0.94	0.08	71,71,71,71	0
7	GOL	B	4006	6/6	0.94	0.06	61,67,68,74	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
7	GOL	B	4015	6/6	0.95	0.06	31,44,47,52	0
7	GOL	B	4012	6/6	0.96	0.05	34,35,44,45	0
4	SO4	A	4001	5/5	0.96	0.12	53,56,60,63	0

6.5 Other polymers [i](#)

There are no such residues in this entry.