



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 01:28 PM UTC

PDB ID : 1W1T / pdb_00001w1t
Title : Crystal structure of *S. marcescens* chitinase B in complex with the cyclic dipeptide inhibitor cyclo-(His-L-Pro) at 1.9 Å resolution
Authors : Houston, D.R.; Synstad, B.; Eijsink, V.G.H.; Eggleston, I.; van Aalten, D.M.F.
Deposited on : 2004-06-24
Resolution : 1.90 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

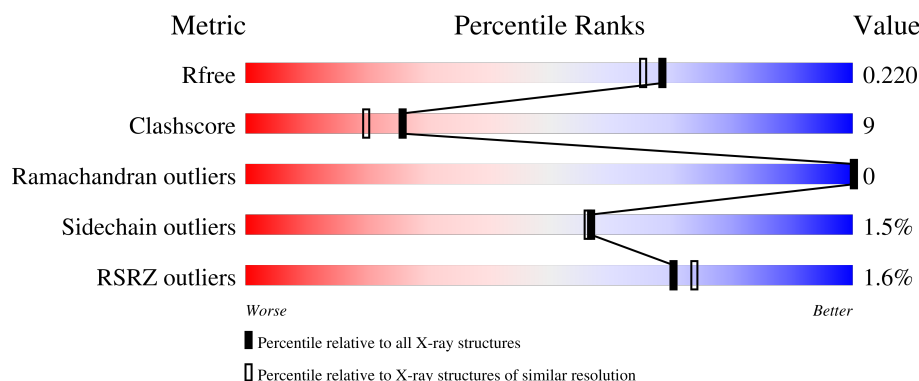
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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	7789 (1.90-1.90)
Clashscore	190562	8410 (1.90-1.90)
Ramachandran outliers	187476	8333 (1.90-1.90)
Sidechain outliers	187428	8333 (1.90-1.90)
RSRZ outliers	180081	7790 (1.90-1.90)

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	499	% 85% 14% .
1	B	499	2% 83% 15% .

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	GOL	A	1502	-	-	X	-
2	GOL	A	1503	-	-	X	-
2	GOL	A	1507	-	-	X	-
2	GOL	B	1500	-	-	X	-
2	GOL	B	1501	-	-	X	-
2	GOL	B	1504	-	-	X	-

2 Entry composition [i](#)

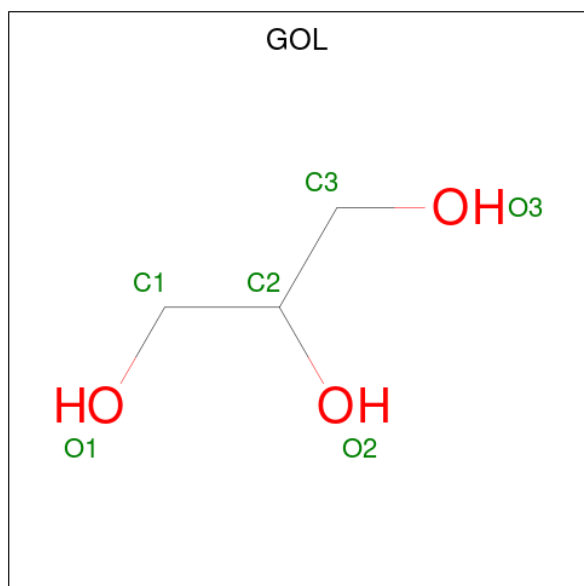
There are 5 unique types of molecules in this entry. The entry contains 8817 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 CHITINASE B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	497	Total	C	N	O	S	0	3	1
			3912	2501	661	736	14			
1	B	497	Total	C	N	O	S	1	2	0
			3913	2501	659	739	14			

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



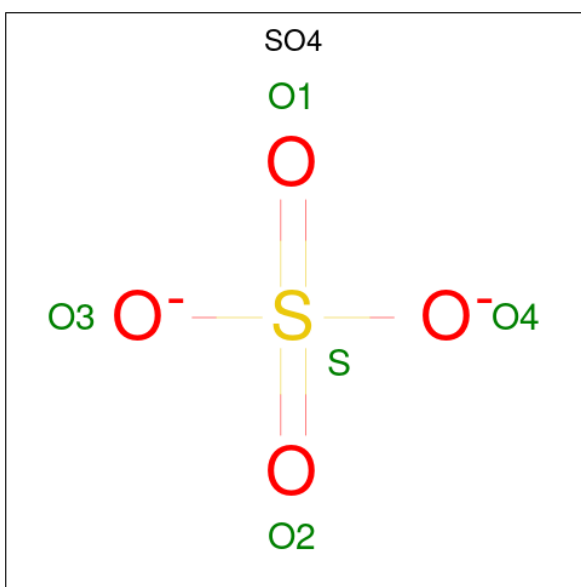
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		

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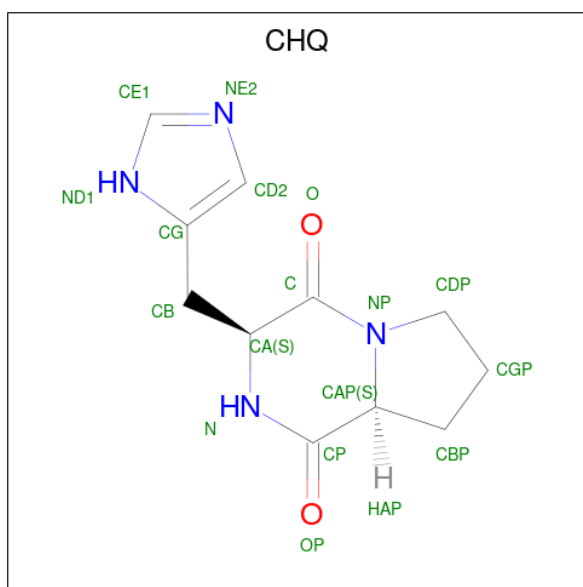
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total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

- Molecule 3 is SULFATE ION (CCD ID: 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	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		

- Molecule 4 is CYCLO-(L-HISTIDINE-L-PROLINE) INHIBITOR (CCD ID: CHQ) (formula: $C_{11}H_{14}N_4O_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			17	11	4	2		
4	A	1	Total	C	N	O	0	0
			17	11	4	2		
4	B	1	Total	C	N	O	0	0
			17	11	4	2		
4	B	1	Total	C	N	O	0	0
			17	11	4	2		

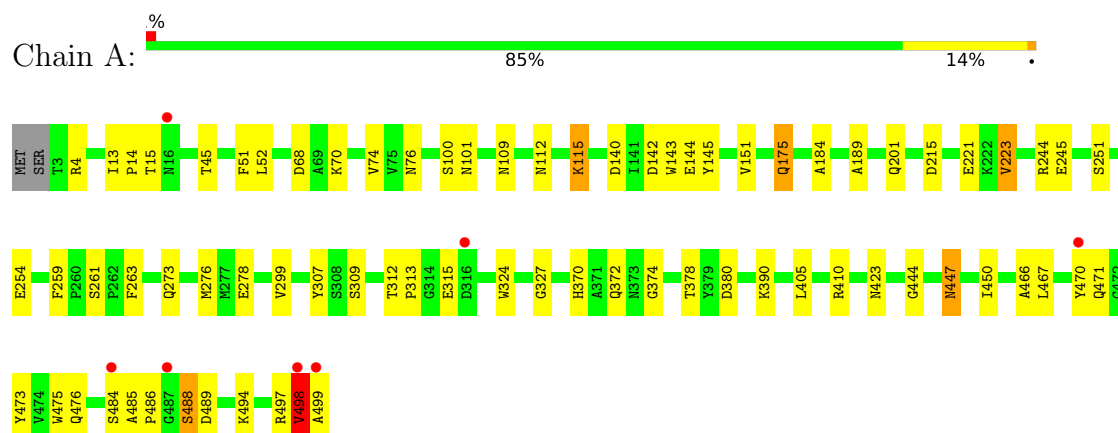
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	356	Total	O	0	0
			356	356		
5	B	424	Total	O	0	0
			424	424		

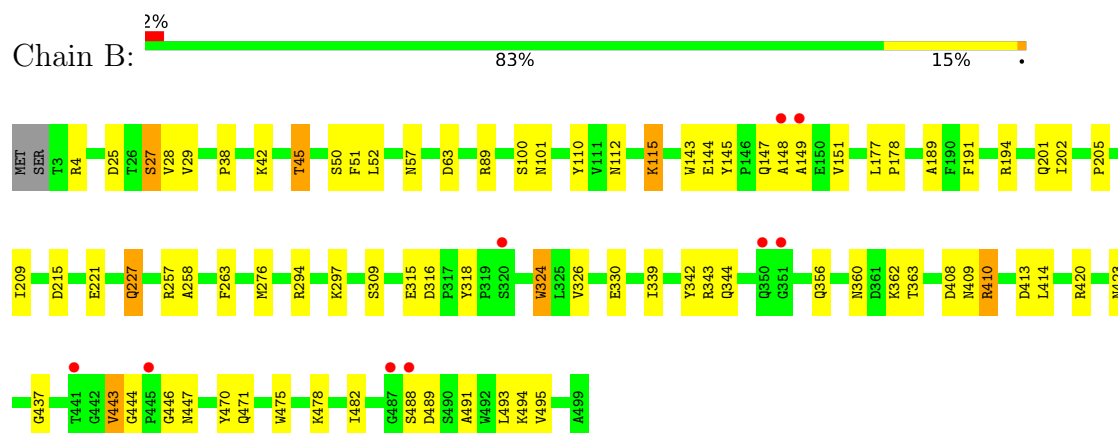
3 Residue-property plots [i](#)

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: CHITINASE B



• Molecule 1: CHITINASE B



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	55.84Å 103.97Å 186.02Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.88 – 1.90 24.88 – 1.90	Depositor EDS
% Data completeness (in resolution range)	98.7 (24.88-1.90) 98.6 (24.88-1.90)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.46 (at 1.90Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.193 , 0.222 0.185 , 0.220	Depositor DCC
R_{free} test set	846 reflections (0.99%)	wwPDB-VP
Wilson B-factor (Å ²)	25.0	Xtriage
Anisotropy	0.146	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 43.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	8817	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.63% 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: GOL, CHQ, SO4

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	0.61	1/4035 (0.0%)	1.01	17/5501 (0.3%)
1	B	0.63	0/4032	1.01	19/5496 (0.3%)
All	All	0.62	1/8067 (0.0%)	1.01	36/10997 (0.3%)

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	B	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	498	VAL	C-N	-5.55	1.25	1.33

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	115	LYS	N-CA-C	10.36	122.33	111.14
1	A	100	SER	N-CA-C	8.38	124.52	113.30
1	A	45	THR	N-CA-C	-8.02	104.01	113.88
1	B	100	SER	N-CA-C	7.58	123.46	113.30
1	A	115[A]	LYS	N-CA-C	7.51	119.11	111.07
1	A	115[B]	LYS	N-CA-C	7.51	119.11	111.07
1	A	423	ASN	N-CA-C	6.98	123.82	114.12
1	B	309	SER	N-CA-C	-6.79	101.39	110.55
1	A	324	TRP	N-CA-C	6.66	121.26	113.20
1	B	413	ASP	N-CA-C	6.53	118.40	111.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	318	TYR	CA-C-N	6.47	127.64	120.45
1	B	318	TYR	C-N-CA	6.47	127.64	120.45
1	B	423	ASN	N-CA-C	6.25	122.37	114.31
1	B	45	THR	N-CA-C	-6.18	106.06	113.97
1	A	189	ALA	N-CA-C	6.14	117.97	111.28
1	B	52	LEU	N-CA-C	-6.06	101.02	110.17
1	A	184	ALA	N-CA-C	-6.06	98.86	108.73
1	A	151	VAL	N-CA-C	6.01	116.19	110.42
1	B	57	ASN	N-CA-C	-5.80	106.19	113.20
1	B	151	VAL	N-CA-C	5.73	116.46	110.62
1	B	177	LEU	CA-C-N	5.71	125.64	119.76
1	B	177	LEU	C-N-CA	5.71	125.64	119.76
1	B	324	TRP	N-CA-C	5.67	120.19	113.16
1	B	63	ASP	N-CA-C	-5.65	101.34	109.48
1	A	405	LEU	N-CA-C	5.64	118.16	111.33
1	A	315	GLU	N-CA-C	5.54	117.84	110.53
1	A	52	LEU	N-CA-C	-5.51	102.04	110.14
1	A	68	ASP	N-CA-C	5.43	117.20	111.28
1	A	309	SER	N-CA-C	-5.39	103.42	110.53
1	B	189	ALA	N-CA-C	5.37	118.62	111.75
1	A	259	PHE	N-CA-C	5.25	118.18	108.94
1	B	408	ASP	N-CA-C	-5.24	103.61	110.53
1	A	488	SER	N-CA-C	-5.15	107.38	113.97
1	B	326	VAL	N-CA-C	5.13	116.02	109.30
1	A	485	ALA	N-CA-C	5.10	117.33	110.29
1	B	209	ILE	N-CA-C	-5.02	100.42	107.75

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	110	TYR	Sidechain

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	3912	0	3738	62	0
1	B	3913	0	3734	65	0
2	A	66	0	88	27	0
2	B	48	0	64	24	0
3	A	10	0	0	0	0
3	B	20	0	0	1	0
4	A	34	0	28	9	0
4	B	34	0	28	5	0
5	A	356	0	0	10	0
5	B	424	0	0	13	0
All	All	8817	0	7680	149	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 9.

All (149) 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:327:GLY:H	2:A:1510:GOL:H32	1.19	1.06
1:A:76:ASN:HD21	2:A:1506:GOL:H11	1.23	1.02
1:B:89:ARG:HH12	2:B:1504:GOL:H12	1.24	0.99
1:A:444:GLY:H	1:A:447:ASN:HD21	1.08	0.97
1:A:175:GLN:H	1:A:175:GLN:HE21	1.21	0.88
4:A:1514:CHQ:HD1	4:A:1514:CHQ:H	1.17	0.88
1:B:89:ARG:NH1	2:B:1504:GOL:H12	1.88	0.86
1:A:221:GLU:OE2	2:A:1500:GOL:H11	1.79	0.83
1:A:444:GLY:H	1:A:447:ASN:ND2	1.77	0.83
1:A:327:GLY:N	2:A:1510:GOL:H32	1.96	0.81
1:A:76:ASN:ND2	2:A:1506:GOL:H11	1.95	0.81
2:A:1505:GOL:H12	5:A:2346:HOH:O	1.82	0.79
4:A:1513:CHQ:CG	4:A:1514:CHQ:HD2	2.16	0.75
2:B:1500:GOL:H32	5:B:2408:HOH:O	1.87	0.74
1:B:221:GLU:OE2	2:B:1506:GOL:H11	1.88	0.74
1:B:263:PHE:HB2	2:B:1503:GOL:H31	1.71	0.71
1:A:175:GLN:H	1:A:175:GLN:NE2	1.88	0.71
1:B:330:GLU:H	1:B:344:GLN:HE21	1.38	0.70
2:A:1502:GOL:H11	5:A:2157:HOH:O	1.92	0.69
1:B:257:ARG:HG2	1:B:443:VAL:HG13	1.75	0.69
1:A:484:SER:HB3	1:A:489:ASP:HB2	1.74	0.68
1:B:89:ARG:HH12	2:B:1504:GOL:C1	2.03	0.68
1:B:45:THR:HG21	2:B:1501:GOL:O2	1.97	0.65
1:A:51:PHE:O	2:A:1507:GOL:H11	1.97	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:4:ARG:O	2:B:1501:GOL:H31	1.96	0.65
1:B:4:ARG:HB3	2:B:1501:GOL:H32	1.77	0.64
1:B:149:ALA:O	5:B:2162:HOH:O	2.15	0.64
1:B:89:ARG:HH22	2:B:1504:GOL:H12	1.61	0.64
1:A:473:TYR:CD1	1:A:494:LYS:HD3	2.33	0.64
1:A:263:PHE:HB2	2:A:1501:GOL:H31	1.79	0.64
1:B:444:GLY:N	1:B:447:ASN:OD1	2.27	0.63
1:A:498:VAL:HG12	1:A:499:ALA:N	2.12	0.63
1:A:14:PRO:HA	2:A:1507:GOL:O3	1.99	0.62
1:B:89:ARG:NH2	2:B:1504:GOL:H12	2.15	0.61
1:A:278:GLU:HG2	5:A:2199:HOH:O	2.01	0.61
2:A:1502:GOL:C1	5:A:2157:HOH:O	2.46	0.61
1:B:89:ARG:CZ	2:B:1504:GOL:H12	2.30	0.61
1:B:330:GLU:H	1:B:344:GLN:NE2	1.97	0.61
1:B:25:ASP:OD1	1:B:27:SER:HB3	2.01	0.60
1:A:327:GLY:H	2:A:1510:GOL:C3	2.06	0.59
1:B:478:LYS:HE2	1:B:493:LEU:HB2	1.84	0.58
1:B:4:ARG:O	2:B:1501:GOL:C3	2.52	0.57
1:B:475:TRP:CZ3	1:B:494:LYS:HG3	2.39	0.57
1:B:178:PRO:HD2	2:B:1504:GOL:O2	2.04	0.57
4:B:1512:CHQ:HBC1	4:B:1513:CHQ:HD2	1.87	0.57
1:A:444:GLY:N	1:A:447:ASN:HD21	1.92	0.56
1:A:498:VAL:CG1	1:A:499:ALA:N	2.69	0.56
1:A:244:ARG:NH1	2:A:1503:GOL:H12	2.21	0.55
1:B:294:ARG:NH1	1:B:339:ILE:HD11	2.21	0.55
1:A:447:ASN:H	1:A:447:ASN:HD22	1.54	0.55
1:B:362:LYS:HD2	1:B:437:GLY:HA2	1.88	0.54
1:A:4:ARG:O	2:A:1502:GOL:O3	2.15	0.54
1:A:144:GLU:HB3	1:A:145:TYR:CE2	2.44	0.53
1:B:191:PHE:CE1	2:B:1500:GOL:H11	2.42	0.53
4:B:1513:CHQ:H	4:B:1513:CHQ:HD1	1.56	0.53
4:A:1514:CHQ:ND1	4:A:1514:CHQ:N	2.48	0.53
2:A:1509:GOL:H32	4:A:1514:CHQ:HDP2	1.91	0.53
1:B:28:VAL:HG12	1:B:29:VAL:HG23	1.90	0.53
1:B:410:ARG:NH2	5:B:2337:HOH:O	2.43	0.52
1:A:201:GLN:HG3	5:A:2152:HOH:O	2.11	0.51
1:B:89:ARG:HH22	2:B:1504:GOL:C1	2.24	0.51
4:B:1513:CHQ:NE2	5:B:2424:HOH:O	2.34	0.51
1:A:144:GLU:HA	1:A:145:TYR:CG	2.46	0.51
1:A:175:GLN:HE21	1:A:175:GLN:N	2.00	0.50
1:A:112:ASN:HA	1:A:115[A]:LYS:HG3	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:273:GLN:HA	1:A:276:MET:HE2	1.92	0.50
1:B:194:ARG:HH21	2:B:1500:GOL:H32	1.75	0.50
4:A:1513:CHQ:CP	4:A:1513:CHQ:HD2	2.42	0.50
1:A:223:VAL:HG23	1:A:307:TYR:HA	1.94	0.49
1:A:15:THR:OG1	2:A:1507:GOL:H32	2.11	0.49
1:A:70:LYS:O	1:A:74:VAL:HG23	2.12	0.49
1:B:315:GLU:H	1:B:315:GLU:CD	2.19	0.49
2:A:1509:GOL:H32	4:A:1514:CHQ:CDP	2.43	0.48
1:A:261:SER:O	2:A:1503:GOL:H32	2.14	0.48
1:B:410:ARG:HE	1:B:410:ARG:CA	2.26	0.48
2:B:1500:GOL:C3	5:B:2408:HOH:O	2.52	0.48
1:A:447:ASN:HD22	1:A:447:ASN:N	2.11	0.48
1:A:470:TYR:CD2	1:A:471:GLN:HG3	2.49	0.48
1:B:201:GLN:HG3	5:B:2204:HOH:O	2.13	0.48
1:A:140:ASP:OD2	1:A:142:ASP:OD1	2.31	0.47
1:A:244:ARG:HH11	2:A:1503:GOL:C1	2.27	0.47
2:A:1500:GOL:H32	2:A:1509:GOL:H12	1.96	0.47
2:B:1501:GOL:C1	5:B:2409:HOH:O	2.62	0.47
4:A:1513:CHQ:HD2	4:A:1513:CHQ:N	2.30	0.47
1:B:297:LYS:HD3	1:B:324:TRP:CE2	2.50	0.47
1:B:343:ARG:HB2	1:B:409:ASN:HA	1.97	0.47
1:B:444:GLY:C	1:B:446:GLY:H	2.23	0.47
1:A:263:PHE:HB2	2:A:1501:GOL:C3	2.42	0.47
1:A:488:SER:O	1:B:148:ALA:HB2	2.15	0.47
2:A:1505:GOL:C1	5:A:2346:HOH:O	2.54	0.47
1:B:356:GLN:HG3	5:B:2310:HOH:O	2.14	0.46
1:A:101:ASN:HA	1:A:144:GLU:O	2.15	0.46
1:A:244:ARG:HH11	2:A:1503:GOL:H12	1.81	0.46
1:B:470:TYR:CD2	1:B:471:GLN:HG3	2.50	0.46
1:A:215:ASP:OD2	4:A:1513:CHQ:ND1	2.47	0.46
1:B:263:PHE:HB2	2:B:1503:GOL:C3	2.42	0.46
1:B:488:SER:O	1:B:489:ASP:C	2.58	0.46
1:B:42:LYS:HE3	5:B:2105:HOH:O	2.15	0.46
4:B:1512:CHQ:N	4:B:1512:CHQ:HD2	2.31	0.46
1:B:343:ARG:CZ	1:B:410:ARG:HG2	2.46	0.46
1:B:444:GLY:C	1:B:446:GLY:N	2.74	0.46
1:A:475:TRP:CD2	1:A:486:PRO:HB3	2.51	0.45
1:B:215:ASP:H	1:B:227:GLN:HE21	1.64	0.45
1:A:109:ASN:ND2	5:A:2086:HOH:O	2.45	0.45
1:B:143:TRP:O	1:B:145:TYR:HA	2.16	0.45
1:A:466:ALA:O	1:A:476:GLN:HA	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:484:SER:HB2	1:B:147:GLN:HE22	1.82	0.45
1:B:482:ILE:HD12	1:B:491:ALA:HB1	1.99	0.45
1:B:147:GLN:HB3	1:B:194:ARG:HD3	1.99	0.44
1:B:420:ARG:HD3	3:B:1508:SO4:O2	2.17	0.44
1:B:144:GLU:HA	1:B:145:TYR:CG	2.52	0.44
1:B:342:TYR:CG	1:B:414:LEU:HD11	2.53	0.44
1:A:450:ILE:HD11	1:A:497:ARG:CZ	2.48	0.44
2:B:1501:GOL:H2	5:B:2409:HOH:O	2.17	0.44
1:A:390:LYS:HE3	5:A:2306:HOH:O	2.18	0.44
1:A:307:TYR:CD1	1:A:307:TYR:N	2.86	0.44
2:A:1502:GOL:H12	5:A:2157:HOH:O	2.16	0.43
1:A:244:ARG:NH1	2:A:1503:GOL:C1	2.81	0.43
1:B:257:ARG:HH12	1:B:495:VAL:HA	1.84	0.43
2:B:1501:GOL:H11	5:B:2409:HOH:O	2.18	0.43
4:B:1512:CHQ:HD2	4:B:1512:CHQ:CP	2.48	0.43
1:B:101:ASN:HA	1:B:144:GLU:O	2.19	0.43
1:B:50:SER:HA	1:B:51:PHE:HA	1.75	0.42
1:B:50:SER:HB2	1:B:51:PHE:CG	2.53	0.42
1:A:51:PHE:H	2:A:1507:GOL:H11	1.84	0.42
1:B:227:GLN:HE21	1:B:227:GLN:HB2	1.67	0.42
1:B:475:TRP:CH2	1:B:494:LYS:HG3	2.54	0.42
1:A:143:TRP:O	1:A:145:TYR:HA	2.19	0.42
1:A:370:HIS:CE1	1:A:372:GLN:HB3	2.55	0.41
1:A:467:LEU:HA	1:A:475:TRP:O	2.20	0.41
1:B:294:ARG:HG2	1:B:339:ILE:HD13	2.01	0.41
1:B:294:ARG:HG2	1:B:339:ILE:CD1	2.50	0.41
1:B:444:GLY:HA2	5:B:2372:HOH:O	2.19	0.41
1:B:258:ALA:O	1:B:276:MET:HE1	2.20	0.41
1:A:144:GLU:OE1	4:A:1513:CHQ:NE2	2.54	0.41
2:B:1501:GOL:O1	2:B:1504:GOL:O1	2.32	0.41
1:A:251:SER:OG	1:A:254:GLU:HG3	2.21	0.41
1:B:360:ASN:HB3	1:B:363:THR:OG1	2.21	0.41
1:A:410:ARG:NH1	5:A:2238:HOH:O	2.53	0.41
1:A:299:VAL:HG22	1:A:374:GLY:C	2.45	0.41
1:A:312:THR:HA	1:A:313:PRO:HD3	1.92	0.41
1:B:112:ASN:HD22	1:B:115:LYS:HE3	1.86	0.41
2:B:1504:GOL:C3	5:B:2411:HOH:O	2.67	0.41
1:A:13:ILE:O	2:A:1507:GOL:O1	2.39	0.41
1:B:202:ILE:O	1:B:205:PRO:HD2	2.20	0.41
1:A:245:GLU:OE1	1:B:478:LYS:NZ	2.37	0.40
1:A:410:ARG:HH11	1:A:410:ARG:HA	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:299:VAL:HG22	1:A:374:GLY:O	2.21	0.40
1:B:410:ARG:HE	1:B:410:ARG:HA	1.85	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	498/499 (100%)	490 (98%)	8 (2%)	0	100	100
1	B	497/499 (100%)	489 (98%)	8 (2%)	0	100	100
All	All	995/998 (100%)	979 (98%)	16 (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	405/405 (100%)	399 (98%)	6 (2%)	57	56
1	B	404/405 (100%)	398 (98%)	6 (2%)	57	56
All	All	809/810 (100%)	797 (98%)	12 (2%)	57	56

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	175	GLN
1	A	223	VAL
1	A	378	THR
1	A	380	ASP
1	A	447	ASN
1	A	498	VAL
1	B	27	SER
1	B	38	PRO
1	B	227	GLN
1	B	316	ASP
1	B	410	ARG
1	B	443	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	17	GLN
1	A	35	ASN
1	A	76	ASN
1	A	109	ASN
1	A	125	GLN
1	A	175	GLN
1	A	272	GLN
1	A	347	GLN
1	A	352	ASN
1	A	395	GLN
1	A	447	ASN
1	A	464	GLN
1	B	35	ASN
1	B	57	ASN
1	B	112	ASN
1	B	147	GLN
1	B	180	GLN
1	B	227	GLN
1	B	273	GLN
1	B	303	ASN
1	B	344	GLN
1	B	372	GLN
1	B	431	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

29 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	GOL	A	1507	-	5,5,5	0.65	0	5,5,5	0.55	0
2	GOL	A	1509	-	5,5,5	0.34	0	5,5,5	0.33	0
2	GOL	A	1508	-	5,5,5	0.44	0	5,5,5	0.46	0
2	GOL	A	1500	-	5,5,5	0.47	0	5,5,5	0.23	0
2	GOL	A	1510	-	5,5,5	0.50	0	5,5,5	0.13	0
2	GOL	B	1500	-	5,5,5	0.40	0	5,5,5	0.19	0
2	GOL	A	1502	-	5,5,5	0.30	0	5,5,5	0.53	0
2	GOL	B	1505	-	5,5,5	0.24	0	5,5,5	0.46	0
2	GOL	B	1502	-	5,5,5	0.48	0	5,5,5	0.34	0
2	GOL	A	1504	-	5,5,5	0.26	0	5,5,5	0.40	0
3	SO4	A	1511	-	4,4,4	0.39	0	6,6,6	0.10	0
2	GOL	A	1501	-	5,5,5	0.37	0	5,5,5	0.41	0
3	SO4	B	1511	-	4,4,4	0.42	0	6,6,6	0.15	0
3	SO4	B	1508	-	4,4,4	0.41	0	6,6,6	0.08	0
2	GOL	B	1504	-	5,5,5	0.18	0	5,5,5	0.24	0
3	SO4	A	1512	-	4,4,4	0.44	0	6,6,6	0.10	0
2	GOL	B	1501	-	5,5,5	0.27	0	5,5,5	0.25	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	CHQ	A	1513	-	19,19,19	1.66	5 (26%)	25,27,27	1.72	9 (36%)
2	GOL	A	1503	-	5,5,5	0.52	0	5,5,5	0.39	0
4	CHQ	B	1513	-	19,19,19	1.67	5 (26%)	25,27,27	1.64	7 (28%)
2	GOL	B	1503	-	5,5,5	0.38	0	5,5,5	0.56	0
4	CHQ	B	1512	-	19,19,19	1.67	5 (26%)	25,27,27	1.67	9 (36%)
2	GOL	A	1506	-	5,5,5	0.32	0	5,5,5	0.30	0
2	GOL	B	1506	-	5,5,5	0.44	0	5,5,5	0.16	0
3	SO4	B	1510	-	4,4,4	0.38	0	6,6,6	0.08	0
3	SO4	B	1509	-	4,4,4	0.42	0	6,6,6	0.06	0
2	GOL	A	1505	-	5,5,5	0.27	0	5,5,5	0.27	0
2	GOL	B	1507	-	5,5,5	0.57	0	5,5,5	0.19	0
4	CHQ	A	1514	-	19,19,19	1.65	5 (26%)	25,27,27	1.76	9 (36%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GOL	A	1507	-	-	0/4/4/4	-
2	GOL	A	1509	-	-	0/4/4/4	-
2	GOL	A	1508	-	-	0/4/4/4	-
2	GOL	A	1500	-	-	0/4/4/4	-
2	GOL	A	1510	-	-	0/4/4/4	-
2	GOL	B	1500	-	-	0/4/4/4	-
2	GOL	A	1502	-	-	0/4/4/4	-
2	GOL	B	1505	-	-	0/4/4/4	-
2	GOL	B	1502	-	-	0/4/4/4	-
2	GOL	A	1504	-	-	0/4/4/4	-
2	GOL	A	1501	-	-	0/4/4/4	-
2	GOL	B	1504	-	-	0/4/4/4	-
2	GOL	B	1501	-	-	0/4/4/4	-
4	CHQ	A	1513	-	-	2/4/30/30	0/3/3/3
2	GOL	A	1503	-	-	0/4/4/4	-
4	CHQ	B	1513	-	-	2/4/30/30	0/3/3/3
2	GOL	B	1503	-	-	0/4/4/4	-
4	CHQ	B	1512	-	-	2/4/30/30	0/3/3/3
2	GOL	A	1506	-	-	0/4/4/4	-
2	GOL	B	1506	-	-	0/4/4/4	-
2	GOL	A	1505	-	-	0/4/4/4	-
2	GOL	B	1507	-	-	0/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	CHQ	A	1514	-	-	2/4/30/30	0/3/3/3

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1512	CHQ	CP-N	4.62	1.40	1.33
4	B	1513	CHQ	CP-N	4.62	1.40	1.33
4	A	1513	CHQ	CP-N	4.57	1.40	1.33
4	A	1514	CHQ	CP-N	4.51	1.40	1.33
4	B	1513	CHQ	C-NP	2.95	1.40	1.34
4	A	1514	CHQ	C-NP	2.89	1.40	1.34
4	B	1512	CHQ	CB-CG	2.83	1.53	1.49
4	B	1512	CHQ	C-NP	2.81	1.40	1.34
4	A	1513	CHQ	C-NP	2.74	1.40	1.34
4	A	1513	CHQ	CB-CG	2.71	1.53	1.49
4	A	1514	CHQ	CB-CG	2.59	1.53	1.49
4	B	1513	CHQ	CB-CG	2.58	1.53	1.49
4	A	1513	CHQ	CD2-NE2	-2.36	1.33	1.37
4	A	1514	CHQ	CG-ND1	-2.36	1.33	1.37
4	A	1514	CHQ	CD2-NE2	-2.34	1.33	1.37
4	B	1513	CHQ	CD2-NE2	-2.33	1.33	1.37
4	A	1513	CHQ	CG-ND1	-2.33	1.33	1.37
4	B	1513	CHQ	CG-ND1	-2.32	1.33	1.37
4	B	1512	CHQ	CG-ND1	-2.31	1.33	1.37
4	B	1512	CHQ	CD2-NE2	-2.25	1.33	1.37

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1514	CHQ	CDP-NP-C	3.53	129.24	123.07
4	A	1513	CHQ	O-C-NP	-3.42	118.10	123.00
4	B	1513	CHQ	CDP-NP-C	3.31	128.86	123.07
4	B	1512	CHQ	O-C-NP	-3.17	118.46	123.00
4	A	1513	CHQ	CB-CA-N	-2.96	107.42	111.15
4	B	1512	CHQ	CDP-NP-C	2.78	127.94	123.07
4	A	1514	CHQ	CD2-CG-ND1	2.70	108.84	105.65
4	B	1513	CHQ	CE1-ND1-CG	-2.67	104.44	107.91
4	B	1513	CHQ	CD2-CG-ND1	2.65	108.78	105.65
4	A	1514	CHQ	CE1-ND1-CG	-2.63	104.49	107.91
4	B	1512	CHQ	CB-CA-N	-2.55	107.94	111.15
4	A	1514	CHQ	CAP-NP-C	-2.53	119.17	124.31
4	A	1513	CHQ	CD2-CG-ND1	2.52	108.62	105.65

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1513	CHQ	CA-C-NP	2.52	122.90	116.88
4	A	1513	CHQ	CDP-NP-C	2.49	127.42	123.07
4	B	1512	CHQ	CA-C-NP	2.49	122.84	116.88
4	A	1513	CHQ	CE1-ND1-CG	-2.45	104.72	107.91
4	B	1513	CHQ	O-C-NP	-2.43	119.53	123.00
4	B	1512	CHQ	CD2-CG-ND1	2.40	108.48	105.65
4	A	1513	CHQ	OP-CP-N	-2.36	119.55	122.67
4	B	1513	CHQ	CAP-NP-C	-2.34	119.56	124.31
4	B	1512	CHQ	CE1-ND1-CG	-2.34	104.87	107.91
4	A	1513	CHQ	CBP-CAP-NP	-2.33	99.60	103.02
4	A	1514	CHQ	CA-N-CP	-2.33	120.80	125.83
4	A	1514	CHQ	O-C-NP	-2.28	119.74	123.00
4	A	1514	CHQ	CB-CA-N	-2.27	108.29	111.15
4	B	1512	CHQ	OP-CP-N	-2.26	119.68	122.67
4	B	1513	CHQ	CGP-CBP-CAP	-2.25	99.46	104.14
4	A	1514	CHQ	CGP-CBP-CAP	-2.24	99.47	104.14
4	B	1512	CHQ	CGP-CBP-CAP	-2.21	99.54	104.14
4	B	1512	CHQ	CBP-CAP-NP	-2.16	99.85	103.02
4	A	1513	CHQ	CGP-CBP-CAP	-2.15	99.66	104.14
4	B	1513	CHQ	CA-N-CP	-2.12	121.24	125.83
4	A	1514	CHQ	OP-CP-N	-2.11	119.89	122.67

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1514	CHQ	CA-CB-CG-ND1
4	A	1514	CHQ	CA-CB-CG-CD2
4	B	1513	CHQ	CA-CB-CG-ND1
4	B	1513	CHQ	CA-CB-CG-CD2
4	B	1512	CHQ	CA-CB-CG-ND1
4	A	1513	CHQ	CA-CB-CG-CD2
4	B	1512	CHQ	CA-CB-CG-CD2
4	A	1513	CHQ	CA-CB-CG-ND1

There are no ring outliers.

19 monomers are involved in 64 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1507	GOL	5	0
2	A	1509	GOL	3	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1500	GOL	2	0
2	A	1510	GOL	3	0
2	B	1500	GOL	4	0
2	A	1502	GOL	4	0
2	A	1501	GOL	2	0
3	B	1508	SO4	1	0
2	B	1504	GOL	10	0
2	B	1501	GOL	8	0
4	A	1513	CHQ	5	0
2	A	1503	GOL	5	0
4	B	1513	CHQ	3	0
2	B	1503	GOL	2	0
4	B	1512	CHQ	3	0
2	A	1506	GOL	2	0
2	B	1506	GOL	1	0
2	A	1505	GOL	2	0
4	A	1514	CHQ	5	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, 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	497/499 (99%)	0.02	7 (1%) 73 76	16, 28, 43, 63	3 (0%)
1	B	497/499 (99%)	-0.13	9 (1%) 67 71	15, 25, 42, 56	3 (0%)
All	All	994/998 (99%)	-0.05	16 (1%) 70 74	15, 26, 42, 63	6 (0%)

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	499	ALA	6.1
1	A	498	VAL	5.2
1	A	16	ASN	2.8
1	B	488	SER	2.8
1	B	445	PRO	2.7
1	B	351	GLY	2.5
1	B	350	GLN	2.5
1	A	484	SER	2.4
1	B	487	GLY	2.4
1	A	470	TYR	2.4
1	B	149	ALA	2.3
1	B	148	ALA	2.3
1	B	320	SER	2.2
1	A	316	ASP	2.2
1	A	487	GLY	2.2
1	B	441	THR	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 ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	GOL	B	1501	6/6	0.66	0.24	56,58,59,60	0
2	GOL	B	1500	6/6	0.69	0.21	59,61,62,63	0
2	GOL	A	1503	6/6	0.70	0.17	53,58,58,59	0
2	GOL	A	1507	6/6	0.72	0.20	42,47,49,52	0
2	GOL	A	1510	6/6	0.72	0.14	52,54,55,56	0
2	GOL	B	1505	6/6	0.74	0.17	46,50,52,53	0
4	CHQ	B	1513	17/17	0.74	0.15	54,56,59,59	0
2	GOL	A	1504	6/6	0.75	0.19	58,59,60,60	0
2	GOL	B	1504	6/6	0.75	0.23	60,61,63,65	0
2	GOL	A	1506	6/6	0.77	0.17	70,70,71,72	0
4	CHQ	A	1514	17/17	0.78	0.16	49,51,59,59	0
2	GOL	B	1506	6/6	0.79	0.14	51,52,54,55	0
3	SO4	A	1512	5/5	0.79	0.12	69,71,72,72	0
2	GOL	A	1502	6/6	0.80	0.16	46,52,53,55	0
2	GOL	A	1509	6/6	0.82	0.16	51,52,53,56	0
2	GOL	A	1505	6/6	0.82	0.19	52,55,57,59	0
2	GOL	A	1500	6/6	0.83	0.14	47,49,50,51	0
3	SO4	B	1511	5/5	0.83	0.11	61,61,61,62	0
2	GOL	B	1503	6/6	0.85	0.14	34,41,44,46	0
3	SO4	B	1508	5/5	0.85	0.09	75,76,76,76	0
3	SO4	B	1510	5/5	0.85	0.12	75,76,76,76	0
2	GOL	B	1507	6/6	0.86	0.13	34,42,44,45	0
3	SO4	B	1509	5/5	0.86	0.10	74,75,75,75	0
2	GOL	A	1501	6/6	0.87	0.11	36,41,44,45	0
2	GOL	B	1502	6/6	0.90	0.10	36,39,40,40	0
2	GOL	A	1508	6/6	0.91	0.10	34,39,40,41	0
4	CHQ	B	1512	17/17	0.95	0.07	21,22,30,30	0
3	SO4	A	1511	5/5	0.95	0.07	52,53,54,55	0
4	CHQ	A	1513	17/17	0.96	0.05	21,22,24,24	0

6.5 Other polymers [i](#)

There are no such residues in this entry.