



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 8, 2023 – 02:33 PM EDT

PDB ID : 4RJ2
Title : Crystal structure of E.coli purine nucleoside phosphorylase at 0.99 Å resolution
Authors : Timofeev, V.I.; Abramchik, Y.A.; Esipov, R.S.; Kuranova, I.P.
Deposited on : 2014-10-08
Resolution : 0.99 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35.1
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) : 2.35.1

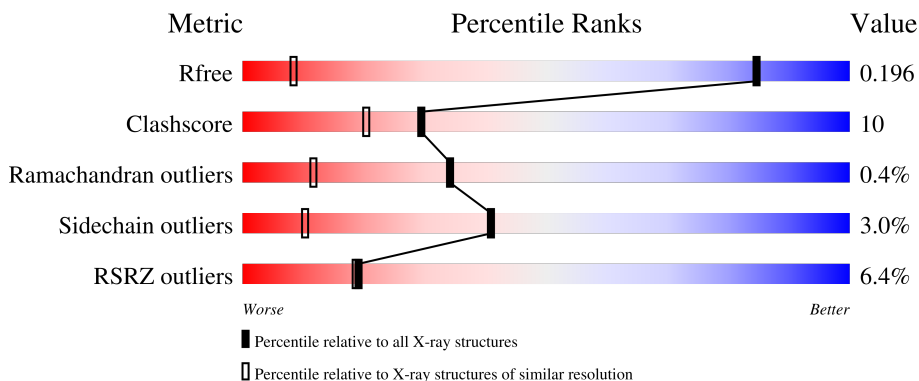
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 0.99 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	1050 (1.06-0.94)
Clashscore	141614	1117 (1.06-0.94)
Ramachandran outliers	138981	1043 (1.06-0.94)
Sidechain outliers	138945	1045 (1.06-0.94)
RSRZ outliers	127900	1023 (1.06-0.94)

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	237	4% 90% 8% .
1	B	237	12% 89% 10% .
1	C	237	4% 91% 8% .
1	D	237	% 89% 9% .
1	E	237	5% 90% 9% .

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Mol	Chain	Length	Quality of chain
1	F	237	

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	C	301[A]	-	-	X	-
2	GOL	D	301[A]	-	-	X	-
2	GOL	D	301[B]	-	-	X	-
2	GOL	D	301[C]	-	-	X	-
2	GOL	D	303	-	X	X	-
2	GOL	F	301	-	-	X	-

2 Entry composition [i](#)

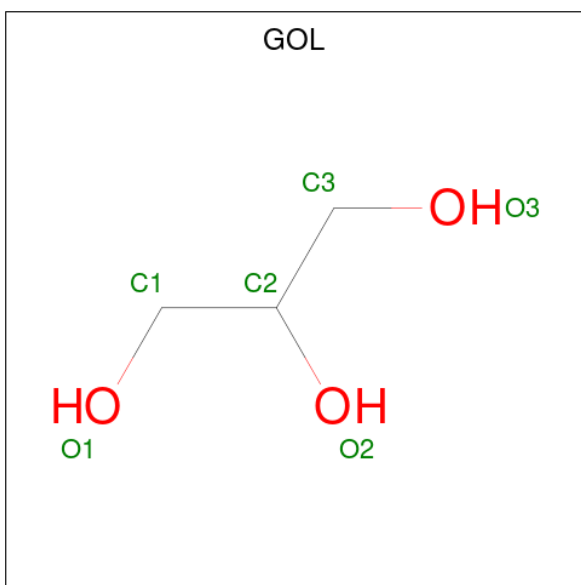
There are 3 unique types of molecules in this entry. The entry contains 12253 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Purine nucleoside phosphorylase DeoD-type.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	237	Total 1960	C 1237	N 340	O 366	S 17	0	20	0
1	B	237	Total 1859	C 1176	N 318	O 347	S 18	0	8	0
1	C	237	Total 1861	C 1173	N 322	O 349	S 17	0	8	0
1	D	237	Total 1866	C 1180	N 320	O 349	S 17	0	9	0
1	E	237	Total 1829	C 1157	N 312	O 344	S 16	0	4	0
1	F	237	Total 1853	C 1170	N 319	O 346	S 18	0	7	0

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 18 9 9	0	1
2	C	1	Total C O 12 6 6	0	1
2	D	1	Total C O 18 9 9	0	1
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	F	1	Total C O 6 3 3	0	0

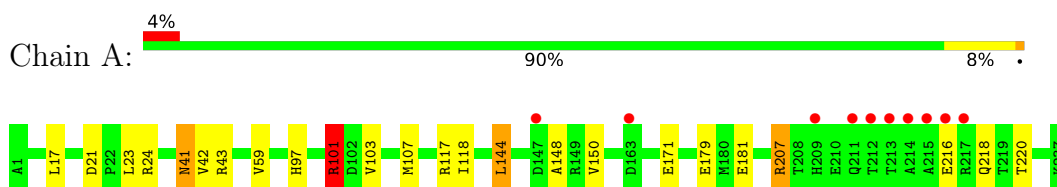
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	176	Total O 178 178	0	2
3	B	124	Total O 125 125	0	1
3	C	180	Total O 183 183	0	3
3	D	194	Total O 195 195	0	1
3	E	171	Total O 174 174	0	3
3	F	104	Total O 104 104	0	0

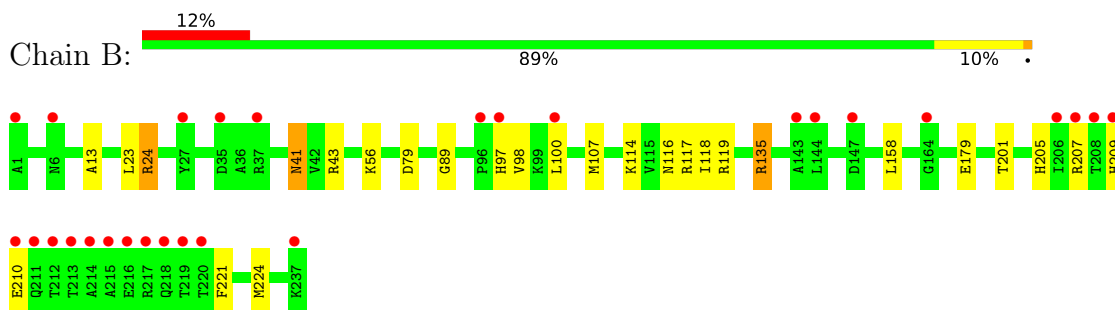
3 Residue-property plots [i](#)

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.

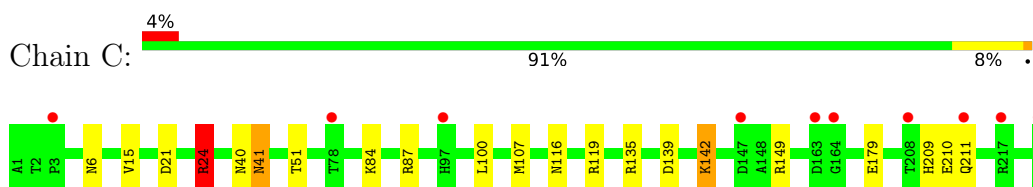
- Molecule 1: Purine nucleoside phosphorylase DeoD-type



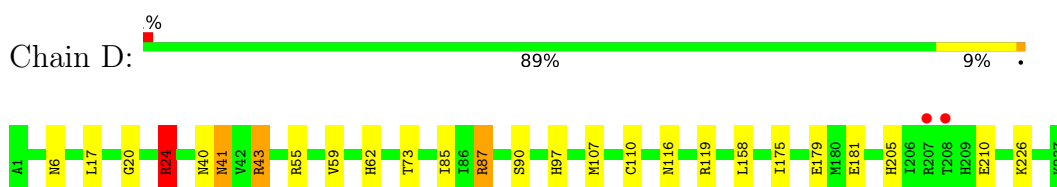
- Molecule 1: Purine nucleoside phosphorylase DeoD-type



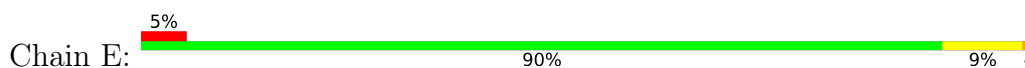
- Molecule 1: Purine nucleoside phosphorylase DeoD-type

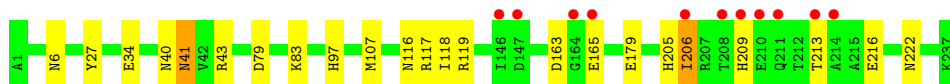


- Molecule 1: Purine nucleoside phosphorylase DeoD-type

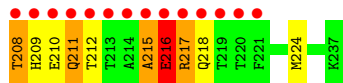
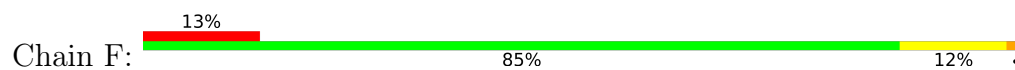


- Molecule 1: Purine nucleoside phosphorylase DeoD-type





- Molecule 1: Purine nucleoside phosphorylase DeoD-type



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	74.12Å 110.22Å 88.21Å 90.00° 111.08° 90.00°	Depositor
Resolution (Å)	16.28 – 0.99 16.28 – 0.99	Depositor EDS
% Data completeness (in resolution range)	98.3 (16.28-0.99) 98.4 (16.28-0.99)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.60 (at 0.99Å)	Xtrriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.176 , 0.189 0.185 , 0.196	Depositor DCC
R_{free} test set	35993 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	8.6	Xtrriage
Anisotropy	0.459	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.56 , 71.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	12253	wwPDB-VP
Average B, all atoms (Å ²)	11.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.83% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality i

5.1 Standard geometry i

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

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	0.43	0/1988	0.89	7/2674 (0.3%)
1	B	0.37	0/1888	0.69	2/2541 (0.1%)
1	C	0.41	0/1890	0.75	2/2546 (0.1%)
1	D	0.42	0/1895	0.77	6/2554 (0.2%)
1	E	0.44	0/1859	0.72	1/2506 (0.0%)
1	F	0.41	0/1882	0.70	2/2533 (0.1%)
All	All	0.42	0/11402	0.76	20/15354 (0.1%)

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	F	0	1

There are no bond length outliers.

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	207[A]	ARG	NE-CZ-NH2	-12.32	114.14	120.30
1	A	207[B]	ARG	NE-CZ-NH2	-12.32	114.14	120.30
1	A	207[A]	ARG	NE-CZ-NH1	12.11	126.36	120.30
1	A	207[B]	ARG	NE-CZ-NH1	12.11	126.36	120.30
1	E	117	ARG	NE-CZ-NH2	-6.99	116.81	120.30
1	B	24	ARG	NE-CZ-NH2	-6.73	116.93	120.30
1	D	87	ARG	NE-CZ-NH2	-6.69	116.96	120.30
1	A	117	ARG	NE-CZ-NH2	-6.61	117.00	120.30
1	A	101	ARG	NE-CZ-NH1	6.44	123.52	120.30
1	D	43	ARG	NE-CZ-NH2	-6.11	117.24	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	24	ARG	NE-CZ-NH1	5.98	123.29	120.30
1	D	24[A]	ARG	NE-CZ-NH2	-5.96	117.32	120.30
1	D	24[B]	ARG	NE-CZ-NH2	-5.96	117.32	120.30
1	B	117	ARG	NE-CZ-NH2	-5.91	117.34	120.30
1	A	117	ARG	NE-CZ-NH1	5.90	123.25	120.30
1	D	24[A]	ARG	NE-CZ-NH1	5.83	123.22	120.30
1	D	24[B]	ARG	NE-CZ-NH1	5.83	123.22	120.30
1	C	24[A]	ARG	CG-CD-NE	5.66	123.69	111.80
1	C	24[B]	ARG	CG-CD-NE	5.66	123.69	111.80
1	F	24	ARG	NE-CZ-NH2	-5.52	117.54	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	F	216	GLU	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	1960	0	1967	27	0
1	B	1859	0	1869	23	0
1	C	1861	0	1863	26	0
1	D	1866	0	1874	40	0
1	E	1829	0	1827	15	0
1	F	1853	0	1859	66	0
2	A	18	0	24	4	0
2	C	12	0	16	7	0
2	D	30	0	40	50	0
2	F	6	0	8	11	0
3	A	178	0	0	6	0
3	B	125	0	0	5	0
3	C	183	0	0	5	0
3	D	195	0	0	4	0
3	E	174	0	0	4	0
3	F	104	0	0	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	12253	0	11347	217	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 (217) 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:F:204:ASP:HB2	1:F:211:GLN:CG	1.39	1.48
1:F:212:THR:CG2	1:F:216:GLU:HB2	1.62	1.29
1:F:212:THR:HG23	1:F:216:GLU:CB	1.62	1.27
1:F:204:ASP:CB	1:F:211:GLN:CG	2.26	1.14
1:F:204:ASP:HA	1:F:211:GLN:HA	1.24	1.13
1:A:171[B]:GLU:OE1	1:A:207[B]:ARG:NH2	1.79	1.13
1:D:73[A]:THR:HG23	1:D:85[A]:ILE:CD1	1.79	1.13
1:F:159:PHE:HB2	1:F:180[B]:MET:HE1	1.35	1.09
1:F:212:THR:CG2	1:F:216:GLU:CB	2.24	1.06
1:F:204:ASP:HB2	1:F:211:GLN:HG2	1.10	1.06
1:F:89:GLY:HA2	2:F:301:GOL:O3	1.54	1.05
1:F:204:ASP:CB	1:F:211:GLN:HG2	1.84	1.05
1:F:204:ASP:HB2	1:F:211:GLN:HG3	1.36	1.05
1:C:107[A]:MET:SD	1:F:107[A]:MET:SD	2.55	1.04
1:B:201:THR:HG23	1:B:224[B]:MET:CE	1.90	1.00
1:D:73[A]:THR:HG23	1:D:85[A]:ILE:HD12	1.44	0.99
1:F:204:ASP:HB3	1:F:211:GLN:HB3	1.46	0.97
1:D:24[A]:ARG:HD3	3:D:506:HOH:O	1.65	0.96
1:B:107[A]:MET:SD	1:D:107[A]:MET:SD	2.65	0.94
1:F:159:PHE:CB	1:F:180[B]:MET:HE1	1.98	0.94
1:F:204:ASP:CB	1:F:211:GLN:CB	2.47	0.92
1:F:87:ARG:HH12	2:F:301:GOL:H32	1.35	0.91
1:F:20:GLY:H	2:F:301:GOL:H31	1.35	0.89
1:D:181:GLU:OE2	2:D:303:GOL:H2	1.74	0.88
2:D:301[C]:GOL:C3	2:D:303:GOL:H32	2.03	0.88
1:B:201:THR:HG23	1:B:224[B]:MET:HE2	1.56	0.87
1:A:181:GLU:OE2	2:A:301[A]:GOL:H2	1.76	0.86
1:F:204:ASP:CB	1:F:211:GLN:HB3	2.04	0.86
1:F:201:THR:HG23	1:F:224[B]:MET:CE	2.06	0.85
2:D:301[C]:GOL:C2	2:D:303:GOL:H32	2.07	0.84
1:F:212:THR:CG2	1:F:216:GLU:HB3	2.08	0.84
1:F:204:ASP:HA	1:F:211:GLN:CA	2.07	0.83
1:F:212:THR:HG21	1:F:216:GLU:HB3	1.62	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:301[B]:GOL:H32	3:C:434[B]:HOH:O	1.79	0.80
1:F:204:ASP:HB2	1:F:211:GLN:CB	2.10	0.79
1:F:212:THR:HG21	1:F:216:GLU:CB	2.13	0.78
2:D:303:GOL:H12	3:D:573:HOH:O	1.83	0.76
1:F:20:GLY:HA3	2:F:301:GOL:H12	1.67	0.76
1:C:100:LEU:HD11	1:C:210:GLU:HG3	1.68	0.76
1:B:201:THR:HG23	1:B:224[B]:MET:HE3	1.67	0.75
1:F:212:THR:HG23	1:F:216:GLU:HB2	0.81	0.75
1:F:201:THR:HG23	1:F:224[B]:MET:HE2	1.67	0.74
1:C:24[A]:ARG:HG2	1:C:24[A]:ARG:HH21	1.53	0.74
2:C:301[A]:GOL:C1	1:E:43:ARG:HH12	2.00	0.74
2:D:301[C]:GOL:O3	2:D:303:GOL:H11	1.89	0.73
1:C:87:ARG:HH22	2:C:301[A]:GOL:H31	1.52	0.73
1:F:83:LYS:HA	1:F:83:LYS:HE2	1.72	0.72
1:F:89:GLY:CA	2:F:301:GOL:O3	2.34	0.72
1:D:87:ARG:HH22	2:D:301[A]:GOL:C1	2.03	0.71
1:F:203:SER:O	1:F:212:THR:N	2.23	0.71
1:C:24[A]:ARG:NH2	3:C:463:HOH:O	2.24	0.70
2:D:301[C]:GOL:O3	2:D:303:GOL:C3	2.40	0.70
1:A:118:ILE:HB	3:A:506:HOH:O	1.92	0.69
1:D:87:ARG:HH22	2:D:301[A]:GOL:H12	1.57	0.69
2:D:301[C]:GOL:O1	2:D:303:GOL:H11	1.92	0.69
2:D:301[C]:GOL:HO3	2:D:303:GOL:C3	2.06	0.69
1:E:118:ILE:HB	3:E:427:HOH:O	1.92	0.68
1:F:20:GLY:H	2:F:301:GOL:C3	2.05	0.68
1:D:62:HIS:HE1	2:D:303:GOL:H31	1.59	0.67
2:D:301[A]:GOL:C3	2:D:303:GOL:H32	2.24	0.67
1:D:87:ARG:HH22	2:D:301[B]:GOL:H12	1.59	0.67
1:B:118[B]:ILE:HB	3:B:413:HOH:O	1.95	0.66
2:D:301[B]:GOL:H31	2:D:303:GOL:H32	1.78	0.65
2:D:301[C]:GOL:O3	2:D:303:GOL:C1	2.44	0.65
2:D:301[C]:GOL:O3	2:D:303:GOL:C2	2.45	0.65
1:C:149:ARG:HG3	3:C:573:HOH:O	1.97	0.64
1:E:206:ILE:O	1:E:209:HIS:NE2	2.31	0.64
1:C:87:ARG:HH22	2:C:301[A]:GOL:C3	2.10	0.63
2:A:301[C]:GOL:C2	1:D:43:ARG:HH22	2.11	0.63
1:D:90:SER:H	2:D:301[C]:GOL:H12	1.62	0.63
1:D:205:HIS:HD2	1:D:210:GLU:OE2	1.82	0.63
2:D:301[C]:GOL:H11	2:D:303:GOL:C1	2.29	0.63
2:D:301[C]:GOL:C1	2:D:303:GOL:H11	2.29	0.63
2:D:301[A]:GOL:H32	2:D:303:GOL:H32	1.81	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:163:ASP:OD1	1:E:165:GLU:HG2	2.00	0.61
1:F:87:ARG:NH1	2:F:301:GOL:H32	2.12	0.61
1:C:107[A]:MET:CG	1:F:107[A]:MET:SD	2.88	0.61
1:C:107[A]:MET:SD	1:F:107[A]:MET:CG	2.89	0.60
1:F:118:ILE:HB	3:F:497:HOH:O	2.00	0.60
1:D:87:ARG:HH22	2:D:301[C]:GOL:C1	2.13	0.60
1:E:27:TYR:HE2	1:E:222:ASN:HD21	1.49	0.60
1:B:118[B]:ILE:N	1:B:118[B]:ILE:HD13	2.15	0.59
2:D:301[C]:GOL:C3	2:D:303:GOL:C3	2.79	0.59
1:D:87:ARG:HH22	2:D:301[B]:GOL:C1	2.14	0.59
1:B:89:GLY:O	1:B:224[B]:MET:HE1	2.02	0.58
1:D:181:GLU:CD	2:D:303:GOL:H2	2.23	0.58
1:D:181:GLU:OE1	2:D:303:GOL:C2	2.51	0.58
2:D:301[B]:GOL:C2	2:D:303:GOL:H32	2.32	0.58
1:F:100:LEU:HD21	1:F:211:GLN:HA	1.85	0.58
1:C:51[A]:THR:HG23	3:C:472:HOH:O	2.02	0.58
1:B:100:LEU:HD11	1:B:210:GLU:HB3	1.85	0.58
1:E:213:THR:HG23	1:E:216:GLU:H	1.69	0.57
1:A:107[B]:MET:HE2	1:A:150:VAL:HG12	1.85	0.57
1:D:87:ARG:HH22	2:D:301[C]:GOL:H12	1.69	0.57
2:D:301[B]:GOL:C3	2:D:303:GOL:H32	2.34	0.57
1:F:204:ASP:HB3	1:F:211:GLN:CB	2.19	0.57
1:F:204:ASP:CA	1:F:211:GLN:HA	2.17	0.57
1:A:43[B]:ARG:HH12	2:D:301[B]:GOL:C3	2.18	0.56
1:D:90:SER:H	2:D:301[A]:GOL:C1	2.18	0.56
1:F:20:GLY:HA3	2:F:301:GOL:C1	2.35	0.56
1:D:73[A]:THR:CG2	1:D:85[A]:ILE:HD12	2.29	0.56
1:A:101:ARG:HG2	1:A:101:ARG:HH11	1.69	0.55
1:F:159:PHE:CA	1:F:180[B]:MET:HE1	2.36	0.55
1:A:42:VAL:HG12	1:A:43[A]:ARG:HG3	1.88	0.54
1:D:90:SER:H	2:D:301[B]:GOL:C1	2.20	0.54
1:E:97:HIS:HE1	3:E:385:HOH:O	1.91	0.54
1:B:107[A]:MET:CG	1:D:107[A]:MET:SD	2.96	0.54
1:C:142:LYS:HE3	1:C:142:LYS:HA	1.90	0.54
1:F:41:ASN:HD22	1:F:41:ASN:C	2.11	0.53
1:F:208:THR:O	1:F:210:GLU:N	2.42	0.53
1:B:114:LYS:HE3	1:B:118[B]:ILE:HD11	1.90	0.52
2:D:301[A]:GOL:H32	2:D:303:GOL:C3	2.39	0.52
1:F:215:ALA:O	1:F:217:ARG:O	2.27	0.52
1:D:73[A]:THR:HG23	1:D:85[A]:ILE:HD13	1.82	0.52
1:B:158:LEU:HD12	3:F:497:HOH:O	2.09	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:142:LYS:HA	1:C:142:LYS:CE	2.40	0.51
2:D:301[C]:GOL:C1	2:D:303:GOL:C1	2.88	0.51
1:E:116:ASN:ND2	1:E:119:ARG:HH11	2.09	0.51
1:A:107[B]:MET:HG3	1:E:107[B]:MET:SD	2.51	0.51
1:F:215:ALA:O	1:F:216:GLU:C	2.50	0.50
1:B:24:ARG:HD3	1:B:221:PHE:CE1	2.46	0.50
1:F:218:GLN:NE2	3:F:441:HOH:O	2.44	0.50
1:B:107[A]:MET:SD	1:D:107[A]:MET:CG	2.99	0.50
1:B:116:ASN:ND2	1:B:119:ARG:HH11	2.09	0.50
1:C:116:ASN:ND2	1:C:119:ARG:HH11	2.09	0.50
1:E:41:ASN:C	1:E:41:ASN:HD22	2.15	0.50
1:A:43[B]:ARG:NH1	3:D:470:HOH:O	2.44	0.49
1:C:107[A]:MET:SD	1:F:107[A]:MET:HG3	2.53	0.49
1:C:6:ASN:H	1:C:40:ASN:ND2	2.11	0.49
2:D:301[A]:GOL:H32	2:D:303:GOL:H11	1.94	0.49
2:C:301[A]:GOL:H12	1:E:43:ARG:HH12	1.76	0.48
1:F:116:ASN:ND2	1:F:119:ARG:HH11	2.11	0.48
2:D:301[B]:GOL:O2	2:D:303:GOL:H32	2.13	0.48
1:A:21:ASP:HB3	1:A:24[B]:ARG:HG3	1.96	0.48
1:D:20:GLY:H	2:D:301[B]:GOL:HO2	1.60	0.48
1:D:90:SER:O	2:D:301[A]:GOL:O1	2.27	0.48
2:D:301[C]:GOL:O2	2:D:303:GOL:H32	2.13	0.48
1:D:116:ASN:ND2	1:D:119:ARG:HH21	2.12	0.48
1:E:97:HIS:HD2	3:E:341:HOH:O	1.96	0.47
1:C:41:ASN:C	1:C:41:ASN:HD22	2.17	0.47
1:D:97:HIS:HE1	3:D:514:HOH:O	1.97	0.47
1:E:118:ILE:CG2	3:E:427:HOH:O	2.61	0.47
2:D:301[B]:GOL:H31	2:D:303:GOL:C3	2.44	0.47
1:D:87:ARG:HH22	2:D:301[C]:GOL:H11	1.79	0.47
1:D:62:HIS:CE1	2:D:303:GOL:H31	2.45	0.47
1:A:41:ASN:C	1:A:41:ASN:HD22	2.18	0.47
1:A:103[A]:VAL:HG13	1:A:148:ALA:HA	1.97	0.47
1:C:100:LEU:CD1	1:C:210:GLU:HG3	2.42	0.47
1:A:97:HIS:HD2	3:A:437:HOH:O	1.96	0.47
1:C:21:ASP:HB3	1:C:24[B]:ARG:HG3	1.97	0.47
1:F:215:ALA:O	1:F:216:GLU:O	2.33	0.47
1:A:216:GLU:O	1:A:220[A]:THR:HG22	2.14	0.46
1:A:118:ILE:CG2	3:A:506:HOH:O	2.62	0.46
3:B:413:HOH:O	1:F:158:LEU:HD12	2.13	0.46
2:D:301[A]:GOL:H11	2:D:303:GOL:H32	1.98	0.46
2:D:301[C]:GOL:H11	2:D:303:GOL:C2	2.45	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:107[B]:MET:HE3	1:A:107[B]:MET:HB3	1.78	0.46
1:B:158:LEU:CD1	3:F:497:HOH:O	2.63	0.46
1:C:107[A]:MET:HG3	1:F:107[A]:MET:SD	2.55	0.46
1:A:24[B]:ARG:HH22	1:A:218:GLN:HE22	1.63	0.46
1:F:159:PHE:CA	1:F:180[B]:MET:CE	2.94	0.46
1:B:118[A]:ILE:HB	3:B:413:HOH:O	2.16	0.45
2:D:301[B]:GOL:H11	2:D:303:GOL:H32	1.98	0.45
2:D:301[B]:GOL:O3	2:D:301[B]:GOL:O1	2.34	0.45
1:C:209:HIS:O	1:C:211:GLN:NE2	2.49	0.45
1:A:207[A]:ARG:HD3	1:A:207[A]:ARG:HA	1.20	0.45
2:D:301[A]:GOL:H11	2:D:303:GOL:C1	2.46	0.45
1:D:41:ASN:C	1:D:41:ASN:HD22	2.20	0.45
1:A:144[A]:LEU:N	1:A:144[A]:LEU:CD1	2.80	0.44
1:C:15[A]:VAL:HG12	1:C:84:LYS:HB2	1.99	0.44
2:D:301[A]:GOL:H11	2:D:303:GOL:C2	2.47	0.44
1:D:24[A]:ARG:HA	1:D:24[A]:ARG:HD2	1.57	0.44
1:A:101:ARG:HH11	1:A:101:ARG:CG	2.30	0.44
1:C:87:ARG:HH22	2:C:301[B]:GOL:C3	2.30	0.44
1:D:6:ASN:H	1:D:40:ASN:ND2	2.16	0.44
1:F:217:ARG:CB	1:F:218:GLN:HA	2.47	0.44
1:F:87:ARG:HH12	2:F:301:GOL:C3	2.20	0.44
1:F:201:THR:N	1:F:224[B]:MET:HE1	2.33	0.44
1:B:43:ARG:HH12	2:F:301:GOL:C1	2.30	0.44
3:B:413:HOH:O	1:F:158:LEU:CD1	2.66	0.44
2:D:301[C]:GOL:HO3	2:D:303:GOL:C2	2.30	0.43
1:A:207[A]:ARG:NE	3:A:549:HOH:O	2.36	0.43
1:B:135:ARG:CG	1:B:135:ARG:HH11	2.31	0.43
1:C:107[A]:MET:CE	1:F:107[A]:MET:HG3	2.48	0.43
1:C:139:ASP:OD1	1:F:135[A]:ARG:NH2	2.51	0.43
1:A:181:GLU:CD	2:A:301[A]:GOL:H2	2.37	0.43
2:C:301[B]:GOL:C3	3:C:434[B]:HOH:O	2.50	0.43
1:D:24[A]:ARG:HD2	1:D:24[A]:ARG:N	2.27	0.43
1:D:17:LEU:HB2	1:D:59[A]:VAL:HG22	2.00	0.43
1:F:201:THR:HG23	1:F:224[B]:MET:HE3	1.93	0.42
1:D:87:ARG:NH2	2:D:301[A]:GOL:H12	2.30	0.42
1:F:216:GLU:C	1:F:217:ARG:O	2.57	0.42
1:F:204:ASP:CA	1:F:211:GLN:CB	2.97	0.42
1:B:97:HIS:HE1	3:B:408:HOH:O	2.03	0.42
1:A:207[A]:ARG:HD3	1:A:207[A]:ARG:O	2.20	0.42
1:C:116:ASN:HD22	1:C:119:ARG:HH11	1.67	0.42
1:D:110:CYS:SG	1:D:175[B]:ILE:HD11	2.60	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:41:ASN:HD22	1:B:41:ASN:C	2.24	0.42
2:A:301[C]:GOL:O1	1:D:43:ARG:NH2	2.53	0.41
1:B:43:ARG:HH12	2:F:301:GOL:H12	1.85	0.41
1:A:21:ASP:OD1	1:D:43:ARG:HA	2.20	0.41
1:A:207[A]:ARG:NH2	3:A:549:HOH:O	2.47	0.41
1:B:98:VAL:O	1:B:205:HIS:CE1	2.73	0.41
1:D:226[B]:LYS:HE2	1:D:226[B]:LYS:HB2	1.19	0.41
1:E:6:ASN:H	1:E:40:ASN:ND2	2.18	0.41
1:F:159:PHE:HA	1:F:180[B]:MET:CE	2.50	0.41
1:F:118:ILE:CG2	3:F:497:HOH:O	2.68	0.41
1:A:17:LEU:O	1:A:59:VAL:HA	2.21	0.41
3:A:506:HOH:O	1:D:158:LEU:HD12	2.19	0.41
1:C:135[A]:ARG:NH2	1:F:139:ASP:OD1	2.51	0.40
1:B:13:ALA:HB2	1:B:56[B]:LYS:HG2	2.03	0.40
2:D:301[A]:GOL:H11	2:D:303:GOL:C3	2.52	0.40
1:F:103:VAL:HG22	1:F:201:THR:HG22	2.04	0.40
1:A:23[A]:LEU:HD22	1:A:23[A]:LEU:N	2.36	0.40
1:E:116:ASN:HD22	1:E:119:ARG:HH11	1.70	0.40
1:F:215:ALA:C	1:F:216:GLU:O	2.58	0.40
1:F:217:ARG:HB2	1:F:218:GLN:HA	2.03	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	254/237 (107%)	248 (98%)	6 (2%)	0	100 100
1	B	243/237 (102%)	238 (98%)	5 (2%)	0	100 100
1	C	243/237 (102%)	237 (98%)	6 (2%)	0	100 100
1	D	244/237 (103%)	237 (97%)	7 (3%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	E	239/237 (101%)	229 (96%)	10 (4%)	0	100	100
1	F	242/237 (102%)	228 (94%)	9 (4%)	5 (2%)	7	0
All	All	1465/1422 (103%)	1417 (97%)	43 (3%)	5 (0%)	34	14

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	F	209	HIS
1	F	215	ALA
1	F	216	GLU
1	F	211	GLN
1	F	217	ARG

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	206/188 (110%)	201 (98%)	5 (2%)	49	15
1	B	195/188 (104%)	188 (96%)	7 (4%)	35	6
1	C	195/188 (104%)	190 (97%)	5 (3%)	46	13
1	D	196/188 (104%)	191 (97%)	5 (3%)	46	13
1	E	191/188 (102%)	184 (96%)	7 (4%)	34	6
1	F	194/188 (103%)	186 (96%)	8 (4%)	30	5
All	All	1177/1128 (104%)	1140 (97%)	37 (3%)	41	9

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	ASN
1	A	101	ARG
1	A	144[A]	LEU
1	A	144[B]	LEU
1	A	179	GLU

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Mol	Chain	Res	Type
1	B	23	LEU
1	B	41	ASN
1	B	79	ASP
1	B	135	ARG
1	B	179	GLU
1	B	207	ARG
1	B	209	HIS
1	C	24[A]	ARG
1	C	24[B]	ARG
1	C	41	ASN
1	C	142	LYS
1	C	179	GLU
1	D	24[A]	ARG
1	D	24[B]	ARG
1	D	41	ASN
1	D	55	ARG
1	D	179	GLU
1	E	34	GLU
1	E	41	ASN
1	E	79	ASP
1	E	83	LYS
1	E	179	GLU
1	E	205	HIS
1	E	206	ILE
1	F	34	GLU
1	F	37	ARG
1	F	41	ASN
1	F	179	GLU
1	F	205	HIS
1	F	207	ARG
1	F	208	THR
1	F	216	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (34) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	41	ASN
1	A	97	HIS
1	A	218	GLN
1	A	222	ASN
1	B	6	ASN
1	B	40	ASN

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Mol	Chain	Res	Type
1	B	41	ASN
1	B	97	HIS
1	B	116	ASN
1	B	205	HIS
1	B	222	ASN
1	C	40	ASN
1	C	41	ASN
1	C	116	ASN
1	C	218	GLN
1	C	222	ASN
1	D	6	ASN
1	D	40	ASN
1	D	41	ASN
1	D	97	HIS
1	D	116	ASN
1	D	205	HIS
1	D	222	ASN
1	E	40	ASN
1	E	41	ASN
1	E	97	HIS
1	E	116	ASN
1	E	222	ASN
1	F	40	ASN
1	F	41	ASN
1	F	97	HIS
1	F	116	ASN
1	F	218	GLN
1	F	222	ASN

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

11 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	D	302	-	5,5,5	0.29	0	5,5,5	0.48	0
2	GOL	C	301[B]	-	5,5,5	0.50	0	5,5,5	0.84	0
2	GOL	D	301[C]	-	5,5,5	0.50	0	5,5,5	1.19	1 (20%)
2	GOL	F	301	-	5,5,5	0.68	0	5,5,5	1.54	1 (20%)
2	GOL	A	301[B]	-	5,5,5	0.37	0	5,5,5	0.99	0
2	GOL	A	301[A]	-	5,5,5	0.20	0	5,5,5	1.29	0
2	GOL	D	303	-	5,5,5	0.82	0	5,5,5	3.26	3 (60%)
2	GOL	D	301[A]	-	5,5,5	0.18	0	5,5,5	0.60	0
2	GOL	A	301[C]	-	5,5,5	0.37	0	5,5,5	0.87	0
2	GOL	D	301[B]	-	5,5,5	0.20	0	5,5,5	0.95	0
2	GOL	C	301[A]	-	5,5,5	0.27	0	5,5,5	0.87	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
2	GOL	D	302	-	-	0/4/4/4	-
2	GOL	C	301[B]	-	-	0/4/4/4	-
2	GOL	D	301[C]	-	-	2/4/4/4	-
2	GOL	F	301	-	-	2/4/4/4	-
2	GOL	A	301[B]	-	-	4/4/4/4	-
2	GOL	A	301[A]	-	-	3/4/4/4	-
2	GOL	D	303	-	-	4/4/4/4	-
2	GOL	D	301[A]	-	-	4/4/4/4	-
2	GOL	A	301[C]	-	-	2/4/4/4	-
2	GOL	D	301[B]	-	-	0/4/4/4	-
2	GOL	C	301[A]	-	-	2/4/4/4	-

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
2	D	303	GOL	C3-C2-C1	6.09	135.38	111.70
2	D	303	GOL	O2-C2-C3	-2.95	96.14	109.12
2	D	303	GOL	O2-C2-C1	-2.63	97.55	109.12
2	F	301	GOL	O2-C2-C3	-2.16	99.59	109.12
2	D	301[C]	GOL	C3-C2-C1	2.06	119.72	111.70

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301[A]	GOL	C1-C2-C3-O3
2	A	301[B]	GOL	O2-C2-C3-O3
2	A	301[C]	GOL	C1-C2-C3-O3
2	D	301[A]	GOL	C1-C2-C3-O3
2	D	301[C]	GOL	C1-C2-C3-O3
2	D	301[C]	GOL	O2-C2-C3-O3
2	D	303	GOL	O1-C1-C2-C3
2	D	303	GOL	O2-C2-C3-O3
2	A	301[B]	GOL	O1-C1-C2-C3
2	A	301[B]	GOL	C1-C2-C3-O3
2	D	301[A]	GOL	O1-C1-C2-C3
2	D	303	GOL	C1-C2-C3-O3
2	F	301	GOL	O1-C1-C2-C3
2	A	301[C]	GOL	O2-C2-C3-O3
2	D	303	GOL	O1-C1-C2-O2
2	A	301[A]	GOL	O2-C2-C3-O3
2	A	301[B]	GOL	O1-C1-C2-O2
2	D	301[A]	GOL	O2-C2-C3-O3
2	C	301[A]	GOL	O1-C1-C2-O2
2	F	301	GOL	O1-C1-C2-O2
2	A	301[A]	GOL	O1-C1-C2-O2
2	D	301[A]	GOL	O1-C1-C2-O2
2	C	301[A]	GOL	O1-C1-C2-C3

There are no ring outliers.

9 monomers are involved in 72 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	301[B]	GOL	3	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	301[C]	GOL	19	0
2	F	301	GOL	11	0
2	A	301[A]	GOL	2	0
2	D	303	GOL	35	0
2	D	301[A]	GOL	13	0
2	A	301[C]	GOL	2	0
2	D	301[B]	GOL	12	0
2	C	301[A]	GOL	4	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	237/237 (100%)	0.13	10 (4%) 36 30	3, 7, 21, 39	0
1	B	237/237 (100%)	0.71	28 (11%) 4 7	4, 11, 24, 73	0
1	C	237/237 (100%)	0.08	10 (4%) 36 30	3, 7, 18, 24	0
1	D	237/237 (100%)	-0.02	2 (0%) 86 81	4, 7, 14, 23	0
1	E	237/237 (100%)	0.21	11 (4%) 32 27	3, 7, 21, 77	0
1	F	237/237 (100%)	1.04	30 (12%) 3 7	5, 11, 36, 93	0
All	All	1422/1422 (100%)	0.36	91 (6%) 19 18	3, 8, 22, 93	0

All (91) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	214	ALA	18.8
1	F	213	THR	17.1
1	F	211	GLN	12.5
1	F	217	ARG	11.1
1	F	212	THR	10.2
1	F	209	HIS	9.6
1	F	208	THR	9.4
1	B	209	HIS	8.6
1	A	215	ALA	8.6
1	E	208	THR	8.2
1	F	215	ALA	8.2
1	F	206	ILE	7.3
1	E	209	HIS	7.3
1	A	214	ALA	7.1
1	E	211	GLN	6.1
1	F	210	GLU	6.0
1	B	215	ALA	5.7
1	A	213	THR	5.6
1	B	208	THR	5.6

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Mol	Chain	Res	Type	RSRZ
1	F	216	GLU	5.1
1	B	214	ALA	5.1
1	B	211	GLN	5.0
1	E	210	GLU	4.9
1	F	207	ARG	4.8
1	B	217	ARG	4.5
1	B	213	THR	4.5
1	F	220	THR	4.4
1	E	213	THR	4.3
1	F	99	LYS	4.0
1	E	206	ILE	3.9
1	B	210	GLU	3.8
1	B	218	GLN	3.7
1	C	211	GLN	3.7
1	C	164	GLY	3.7
1	E	164	GLY	3.6
1	F	218	GLN	3.6
1	E	147	ASP	3.6
1	A	216	GLU	3.5
1	B	212	THR	3.5
1	F	100	LEU	3.5
1	F	219	THR	3.4
1	F	97	HIS	3.4
1	B	35	ASP	3.3
1	B	216	GLU	3.2
1	A	211	GLN	3.2
1	F	147	ASP	3.1
1	A	163[A]	ASP	3.1
1	F	101	ARG	3.1
1	F	163	ASP	3.1
1	A	217	ARG	3.1
1	B	164	GLY	3.0
1	F	1	ALA	3.0
1	B	219	THR	3.0
1	E	214	ALA	2.9
1	A	212	THR	2.9
1	F	3	PRO	2.9
1	C	237	LYS	2.9
1	C	163	ASP	2.8
1	C	3	PRO	2.8
1	A	147	ASP	2.8
1	F	164	GLY	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	1	ALA	2.7
1	B	237	LYS	2.7
1	B	144	LEU	2.6
1	F	146	ILE	2.5
1	C	147	ASP	2.5
1	B	206	ILE	2.5
1	E	146	ILE	2.5
1	B	97	HIS	2.4
1	B	207	ARG	2.4
1	E	165	GLU	2.3
1	F	2	THR	2.3
1	A	209	HIS	2.3
1	F	36	ALA	2.3
1	C	78	THR	2.3
1	F	165	GLU	2.3
1	B	100	LEU	2.3
1	B	143	ALA	2.2
1	D	208	THR	2.2
1	B	96	PRO	2.2
1	C	208	THR	2.2
1	B	37	ARG	2.2
1	C	217	ARG	2.2
1	B	27	TYR	2.2
1	F	204	ASP	2.2
1	C	97	HIS	2.2
1	B	220	THR	2.2
1	B	147	ASP	2.1
1	F	221	PHE	2.1
1	D	207	ARG	2.1
1	B	6	ASN	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	GOL	F	301	6/6	0.71	0.27	10,15,27,30	0
2	GOL	A	301[B]	6/6	0.77	0.32	5,10,13,14	6
2	GOL	A	301[C]	6/6	0.77	0.32	8,11,12,16	6
2	GOL	A	301[A]	6/6	0.77	0.32	7,8,11,11	6
2	GOL	D	301[B]	6/6	0.81	0.28	7,10,12,12	6
2	GOL	D	301[C]	6/6	0.81	0.28	9,10,13,18	6
2	GOL	D	301[A]	6/6	0.81	0.28	3,9,10,10	6
2	GOL	D	303	6/6	0.85	0.18	14,17,19,21	0
2	GOL	C	301[B]	6/6	0.88	0.20	13,14,15,17	6
2	GOL	C	301[A]	6/6	0.88	0.20	7,9,11,19	6
2	GOL	D	302	6/6	0.94	0.08	12,12,13,14	0

6.5 Other polymers [i](#)

There are no such residues in this entry.