



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 23, 2023 – 11:45 PM EDT

PDB ID : 5SWI
Title : Crystal structure of SpGH92 in complex with mannose
Authors : Shapiro-Ward, S.; Boraston, A.B.
Deposited on : 2016-08-08
Resolution : 2.15 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)
Xtrriage (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

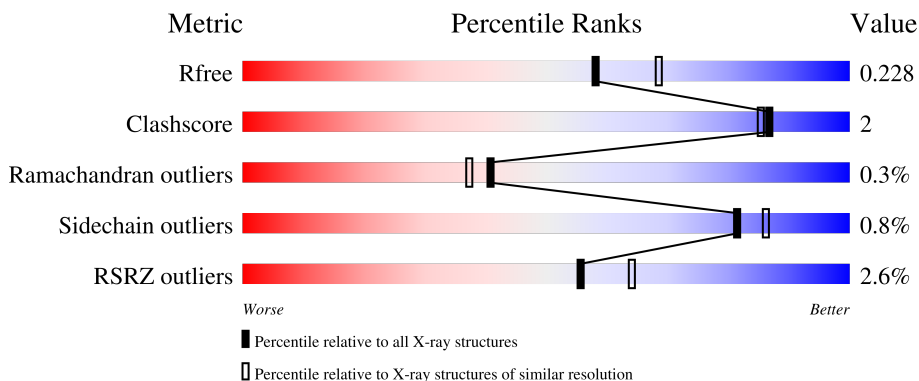
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.15 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	1479 (2.16-2.16)
Clashscore	141614	1585 (2.16-2.16)
Ramachandran outliers	138981	1560 (2.16-2.16)
Sidechain outliers	138945	1559 (2.16-2.16)
RSRZ outliers	127900	1456 (2.16-2.16)

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	717	
1	B	717	
1	C	717	
1	D	717	

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 23499 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 Sugar hydrolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	693	Total 5525	C 3544	N 911	O 1046	S 24	0	0	0
1	A	692	Total 5592	C 3578	N 924	O 1064	S 26	0	8	0
1	C	680	Total 5438	C 3489	N 897	O 1029	S 23	0	1	0
1	D	681	Total 5432	C 3485	N 895	O 1030	S 22	0	1	0

There are 92 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-22	MET	-	initiating methionine	UNP A0A0Y0HIE3
B	-21	GLY	-	expression tag	UNP A0A0Y0HIE3
B	-20	SER	-	expression tag	UNP A0A0Y0HIE3
B	-19	SER	-	expression tag	UNP A0A0Y0HIE3
B	-18	HIS	-	expression tag	UNP A0A0Y0HIE3
B	-17	HIS	-	expression tag	UNP A0A0Y0HIE3
B	-16	HIS	-	expression tag	UNP A0A0Y0HIE3
B	-15	HIS	-	expression tag	UNP A0A0Y0HIE3
B	-14	HIS	-	expression tag	UNP A0A0Y0HIE3
B	-13	HIS	-	expression tag	UNP A0A0Y0HIE3
B	-12	SER	-	expression tag	UNP A0A0Y0HIE3
B	-11	SER	-	expression tag	UNP A0A0Y0HIE3
B	-10	GLY	-	expression tag	UNP A0A0Y0HIE3
B	-9	LEU	-	expression tag	UNP A0A0Y0HIE3
B	-8	VAL	-	expression tag	UNP A0A0Y0HIE3
B	-7	PRO	-	expression tag	UNP A0A0Y0HIE3
B	-6	ARG	-	expression tag	UNP A0A0Y0HIE3
B	-5	GLY	-	expression tag	UNP A0A0Y0HIE3
B	-4	SER	-	expression tag	UNP A0A0Y0HIE3
B	-3	HIS	-	expression tag	UNP A0A0Y0HIE3
B	-2	MET	-	expression tag	UNP A0A0Y0HIE3

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-1	ALA	-	expression tag	UNP A0A0Y0HIE3
B	0	SER	-	expression tag	UNP A0A0Y0HIE3
A	-22	MET	-	initiating methionine	UNP A0A0Y0HIE3
A	-21	GLY	-	expression tag	UNP A0A0Y0HIE3
A	-20	SER	-	expression tag	UNP A0A0Y0HIE3
A	-19	SER	-	expression tag	UNP A0A0Y0HIE3
A	-18	HIS	-	expression tag	UNP A0A0Y0HIE3
A	-17	HIS	-	expression tag	UNP A0A0Y0HIE3
A	-16	HIS	-	expression tag	UNP A0A0Y0HIE3
A	-15	HIS	-	expression tag	UNP A0A0Y0HIE3
A	-14	HIS	-	expression tag	UNP A0A0Y0HIE3
A	-13	HIS	-	expression tag	UNP A0A0Y0HIE3
A	-12	SER	-	expression tag	UNP A0A0Y0HIE3
A	-11	SER	-	expression tag	UNP A0A0Y0HIE3
A	-10	GLY	-	expression tag	UNP A0A0Y0HIE3
A	-9	LEU	-	expression tag	UNP A0A0Y0HIE3
A	-8	VAL	-	expression tag	UNP A0A0Y0HIE3
A	-7	PRO	-	expression tag	UNP A0A0Y0HIE3
A	-6	ARG	-	expression tag	UNP A0A0Y0HIE3
A	-5	GLY	-	expression tag	UNP A0A0Y0HIE3
A	-4	SER	-	expression tag	UNP A0A0Y0HIE3
A	-3	HIS	-	expression tag	UNP A0A0Y0HIE3
A	-2	MET	-	expression tag	UNP A0A0Y0HIE3
A	-1	ALA	-	expression tag	UNP A0A0Y0HIE3
A	0	SER	-	expression tag	UNP A0A0Y0HIE3
C	-22	MET	-	initiating methionine	UNP A0A0Y0HIE3
C	-21	GLY	-	expression tag	UNP A0A0Y0HIE3
C	-20	SER	-	expression tag	UNP A0A0Y0HIE3
C	-19	SER	-	expression tag	UNP A0A0Y0HIE3
C	-18	HIS	-	expression tag	UNP A0A0Y0HIE3
C	-17	HIS	-	expression tag	UNP A0A0Y0HIE3
C	-16	HIS	-	expression tag	UNP A0A0Y0HIE3
C	-15	HIS	-	expression tag	UNP A0A0Y0HIE3
C	-14	HIS	-	expression tag	UNP A0A0Y0HIE3
C	-13	HIS	-	expression tag	UNP A0A0Y0HIE3
C	-12	SER	-	expression tag	UNP A0A0Y0HIE3
C	-11	SER	-	expression tag	UNP A0A0Y0HIE3
C	-10	GLY	-	expression tag	UNP A0A0Y0HIE3
C	-9	LEU	-	expression tag	UNP A0A0Y0HIE3
C	-8	VAL	-	expression tag	UNP A0A0Y0HIE3
C	-7	PRO	-	expression tag	UNP A0A0Y0HIE3
C	-6	ARG	-	expression tag	UNP A0A0Y0HIE3

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-5	GLY	-	expression tag	UNP A0A0Y0HIE3
C	-4	SER	-	expression tag	UNP A0A0Y0HIE3
C	-3	HIS	-	expression tag	UNP A0A0Y0HIE3
C	-2	MET	-	expression tag	UNP A0A0Y0HIE3
C	-1	ALA	-	expression tag	UNP A0A0Y0HIE3
C	0	SER	-	expression tag	UNP A0A0Y0HIE3
D	-22	MET	-	initiating methionine	UNP A0A0Y0HIE3
D	-21	GLY	-	expression tag	UNP A0A0Y0HIE3
D	-20	SER	-	expression tag	UNP A0A0Y0HIE3
D	-19	SER	-	expression tag	UNP A0A0Y0HIE3
D	-18	HIS	-	expression tag	UNP A0A0Y0HIE3
D	-17	HIS	-	expression tag	UNP A0A0Y0HIE3
D	-16	HIS	-	expression tag	UNP A0A0Y0HIE3
D	-15	HIS	-	expression tag	UNP A0A0Y0HIE3
D	-14	HIS	-	expression tag	UNP A0A0Y0HIE3
D	-13	HIS	-	expression tag	UNP A0A0Y0HIE3
D	-12	SER	-	expression tag	UNP A0A0Y0HIE3
D	-11	SER	-	expression tag	UNP A0A0Y0HIE3
D	-10	GLY	-	expression tag	UNP A0A0Y0HIE3
D	-9	LEU	-	expression tag	UNP A0A0Y0HIE3
D	-8	VAL	-	expression tag	UNP A0A0Y0HIE3
D	-7	PRO	-	expression tag	UNP A0A0Y0HIE3
D	-6	ARG	-	expression tag	UNP A0A0Y0HIE3
D	-5	GLY	-	expression tag	UNP A0A0Y0HIE3
D	-4	SER	-	expression tag	UNP A0A0Y0HIE3
D	-3	HIS	-	expression tag	UNP A0A0Y0HIE3
D	-2	MET	-	expression tag	UNP A0A0Y0HIE3
D	-1	ALA	-	expression tag	UNP A0A0Y0HIE3
D	0	SER	-	expression tag	UNP A0A0Y0HIE3

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total Ca 1 1	0	0
2	A	1	Total Ca 1 1	0	0
2	C	1	Total Ca 1 1	0	0
2	D	1	Total Ca 1 1	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



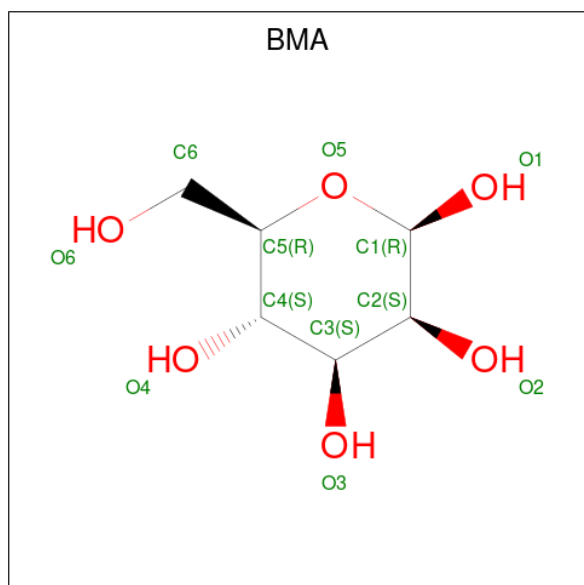
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0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

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

- Molecule 4 is beta-D-mannopyranose (three-letter code: BMA) (formula: C₆H₁₂O₆).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C O 12 6 6	0	0
4	A	1	Total C O 12 6 6	0	0
4	C	1	Total C O 12 6 6	0	0
4	D	1	Total C O 12 6 6	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	363	Total O 363 363	0	0
5	A	393	Total O 393 393	0	0
5	C	354	Total O 354 354	0	0

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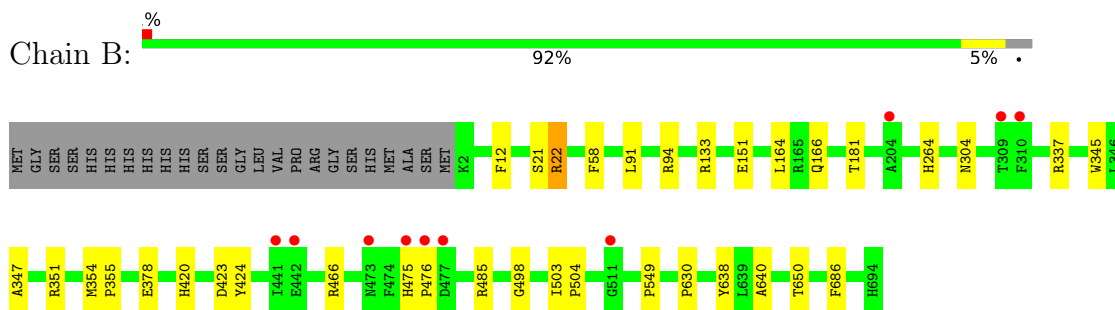
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	D	254	Total 254	O 254	0	0

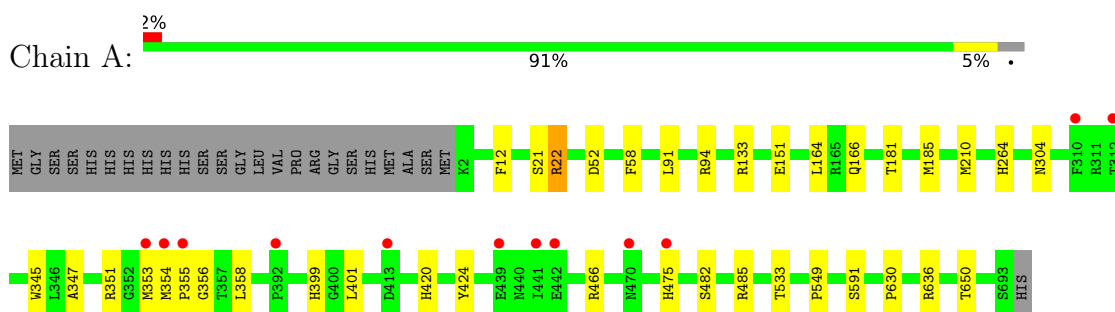
3 Residue-property plots

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.

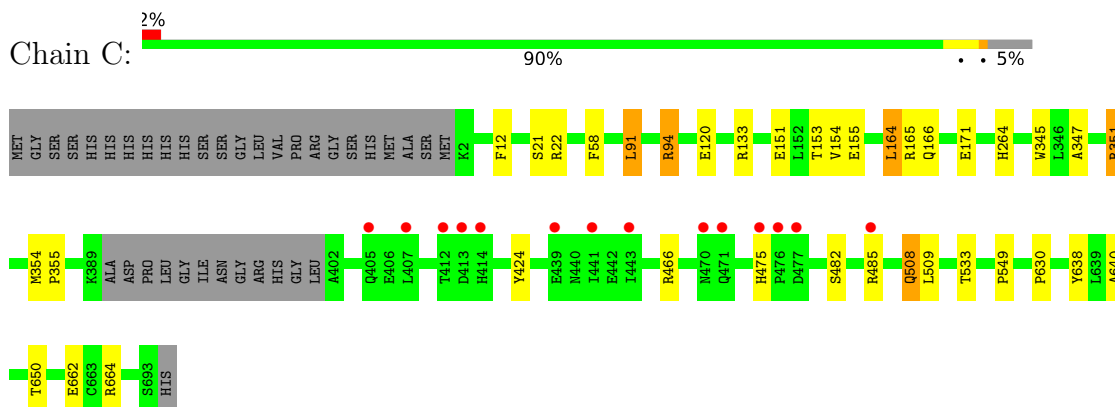
- Molecule 1: Sugar hydrolase



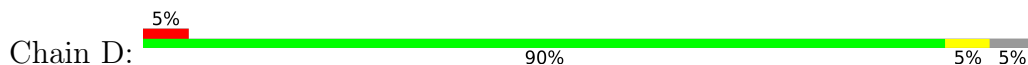
- Molecule 1: Sugar hydrolase

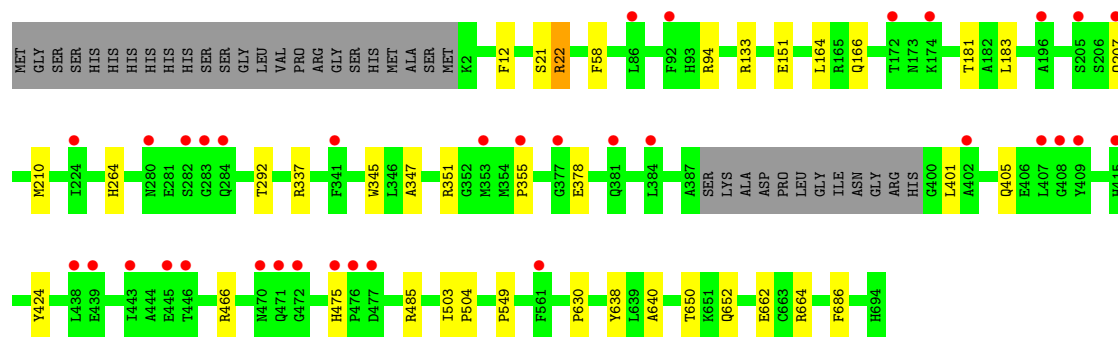


- Molecule 1: Sugar hydrolase



- Molecule 1: Sugar hydrolase





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	130.00Å 161.71Å 208.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	127.76 – 2.15 38.84 – 2.15	Depositor EDS
% Data completeness (in resolution range)	99.9 (127.76-2.15) 99.9 (38.84-2.15)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.97 (at 2.16Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.197 , 0.221 0.203 , 0.228	Depositor DCC
R_{free} test set	11855 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	30.7	Xtrriage
Anisotropy	0.141	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 48.7	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	0.95	EDS
Total number of atoms	23499	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.51% 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: BMA, CA, 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	0.49	0/5753	0.65	4/7825 (0.1%)
1	B	0.46	0/5688	0.64	3/7744 (0.0%)
1	C	0.49	0/5597	0.65	5/7620 (0.1%)
1	D	0.47	0/5592	0.62	2/7615 (0.0%)
All	All	0.48	0/22630	0.64	14/30804 (0.0%)

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	94	ARG	NE-CZ-NH1	5.99	123.30	120.30
1	A	91	LEU	CA-CB-CG	5.94	128.96	115.30
1	D	94	ARG	NE-CZ-NH1	5.88	123.24	120.30
1	B	91	LEU	CA-CB-CG	5.88	128.83	115.30
1	C	91	LEU	CA-CB-CG	5.81	128.67	115.30
1	B	94	ARG	NE-CZ-NH1	5.78	123.19	120.30
1	C	94	ARG	NE-CZ-NH2	-5.78	117.41	120.30
1	C	164	LEU	CA-CB-CG	5.65	128.29	115.30
1	A	94	ARG	NE-CZ-NH1	5.41	123.01	120.30
1	B	94	ARG	NE-CZ-NH2	-5.37	117.61	120.30
1	D	94	ARG	NE-CZ-NH2	-5.19	117.71	120.30
1	A	94	ARG	NE-CZ-NH2	-5.18	117.71	120.30
1	A	52	ASP	CB-CG-OD1	5.15	122.94	118.30
1	C	351	ARG	NE-CZ-NH2	-5.01	117.79	120.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5592	0	5290	30	0
1	B	5525	0	5218	17	0
1	C	5438	0	5139	24	1
1	D	5432	0	5109	20	1
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	42	0	54	1	0
3	B	24	0	30	4	0
3	C	12	0	16	0	0
3	D	18	0	23	0	0
4	A	12	0	12	0	0
4	B	12	0	12	0	0
4	C	12	0	12	0	0
4	D	12	0	12	0	0
5	A	393	0	0	3	0
5	B	363	0	0	1	0
5	C	354	0	0	10	0
5	D	254	0	0	2	0
All	All	23499	0	20927	92	1

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 2.

All (92) 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:355[B]:PRO:HB3	1:A:420:HIS:CD2	2.25	0.72
1:A:355[B]:PRO:HB3	1:A:420:HIS:HD2	1.54	0.71
1:D:183:LEU:HD13	1:D:210:MET:CE	2.18	0.71
1:C:133:ARG:NH1	5:C:802:HOH:O	2.16	0.69
1:C:120:GLU:OE1	5:C:801:HOH:O	2.11	0.68
1:A:185:MET:HG3	1:A:210:MET:HG2	1.77	0.67
1:A:354[B]:MET:HB3	1:A:355[B]:PRO:CD	2.24	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:662:GLU:OE2	1:C:664:ARG:NH1	2.29	0.66
1:A:354[B]:MET:CB	1:A:355[B]:PRO:CD	2.73	0.64
1:B:420:HIS:NE2	3:B:705:GOL:O1	2.21	0.63
1:B:12:PHE:HB2	1:B:264:HIS:CE1	2.34	0.63
1:D:662:GLU:OE2	1:D:664:ARG:NH1	2.32	0.62
1:C:165:ARG:HD3	5:C:1098:HOH:O	1.99	0.62
1:D:12:PHE:HB2	1:D:264:HIS:CE1	2.35	0.61
1:A:133:ARG:NH1	5:A:801:HOH:O	2.09	0.61
1:A:354[B]:MET:HB3	1:A:355[B]:PRO:HD2	1.83	0.61
1:A:354[B]:MET:SD	1:A:355[B]:PRO:HD3	2.41	0.61
1:A:12:PHE:HB2	1:A:264:HIS:CE1	2.36	0.61
1:C:12:PHE:HB2	1:C:264:HIS:CE1	2.36	0.60
1:A:353[B]:MET:O	1:A:354[B]:MET:HB2	2.02	0.59
1:C:153:THR:CG2	5:C:1140:HOH:O	2.49	0.59
1:A:354[B]:MET:CB	1:A:355[B]:PRO:HD3	2.31	0.58
1:A:591:SER:HB2	3:A:707:GOL:H31	1.86	0.57
1:A:355[A]:PRO:HB3	1:A:399:HIS:CG	2.41	0.55
1:C:482:SER:OG	1:C:533:THR:OG1	2.23	0.53
1:C:153:THR:HG22	5:C:1140:HOH:O	2.10	0.52
1:A:355[A]:PRO:HB3	1:A:399:HIS:CD2	2.44	0.52
1:C:22[B]:ARG:HH11	1:C:22[B]:ARG:HA	1.74	0.52
1:C:355:PRO:HB2	1:C:424:TYR:OH	2.10	0.51
1:C:351:ARG:NH2	5:C:810:HOH:O	2.44	0.50
1:A:355[A]:PRO:HB2	1:A:424:TYR:OH	2.11	0.50
1:A:355[B]:PRO:CB	5:A:826:HOH:O	2.60	0.49
1:D:183:LEU:HD13	1:D:210:MET:HE1	1.93	0.49
1:D:355:PRO:HB2	1:D:424:TYR:OH	2.12	0.49
1:D:466:ARG:NH2	1:D:475:HIS:O	2.46	0.49
1:A:401:LEU:H	1:A:401:LEU:HD12	1.78	0.49
1:B:133:ARG:NH1	5:B:801:HOH:O	2.17	0.48
1:C:466:ARG:NH2	1:C:475:HIS:O	2.46	0.48
1:C:153:THR:HG21	5:C:1140:HOH:O	2.10	0.48
1:B:466:ARG:NH2	1:B:475:HIS:O	2.47	0.48
1:D:652:GLN:HG2	5:D:852:HOH:O	2.14	0.48
1:B:355:PRO:HB2	1:B:424:TYR:OH	2.15	0.47
1:C:153:THR:HG23	5:C:1057:HOH:O	2.14	0.47
1:D:183:LEU:HD22	1:D:210:MET:HE2	1.98	0.46
1:D:21:SER:O	1:D:22:ARG:HD2	2.16	0.46
1:A:356[B]:GLY:HA3	1:A:358:LEU:CD2	2.46	0.45
1:C:171:GLU:HG2	1:C:351:ARG:NH1	2.32	0.45
1:D:133:ARG:NH1	5:D:801:HOH:O	2.28	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:21:SER:O	1:A:22:ARG:HD2	2.17	0.45
1:A:482:SER:OG	1:A:533:THR:OG1	2.24	0.45
1:A:636:ARG:HD3	5:A:912:HOH:O	2.17	0.45
1:C:155:GLU:HG3	5:C:841:HOH:O	2.16	0.45
1:B:21:SER:O	1:B:22:ARG:HD2	2.16	0.45
1:B:630:PRO:HG2	1:B:650:THR:OG1	2.17	0.45
1:C:154:VAL:HG22	1:C:164:LEU:HD22	1.99	0.45
1:C:21:SER:O	1:C:22[B]:ARG:NH1	2.49	0.44
1:A:353[A]:MET:CE	1:A:353[A]:MET:HA	2.47	0.44
1:C:638:TYR:CE2	1:C:640:ALA:HA	2.53	0.44
1:C:508:GLN:HG3	1:C:509:LEU:N	2.33	0.44
1:D:630:PRO:HG2	1:D:650:THR:OG1	2.18	0.44
1:B:151:GLU:O	1:B:166:GLN:HA	2.19	0.43
1:A:151:GLU:O	1:A:166:GLN:HA	2.18	0.43
1:D:151:GLU:O	1:D:166:GLN:HA	2.17	0.43
1:B:347:ALA:HB3	1:B:351:ARG:HG3	2.00	0.43
1:B:423:ASP:OD1	3:B:704:GOL:O2	2.36	0.43
1:C:151:GLU:O	1:C:166:GLN:HA	2.18	0.43
1:C:630:PRO:HG2	1:C:650:THR:OG1	2.18	0.43
1:A:630:PRO:HG2	1:A:650:THR:OG1	2.17	0.43
1:A:466:ARG:NH2	1:A:475:HIS:O	2.52	0.43
1:D:638:TYR:CE2	1:D:640:ALA:HA	2.54	0.43
1:A:22:ARG:HD2	1:A:22:ARG:HA	1.82	0.42
1:A:164:LEU:HB2	1:A:181:THR:HB	2.01	0.42
1:A:347:ALA:HB3	1:A:351:ARG:HG3	2.00	0.42
1:B:475:HIS:CG	1:B:476:PRO:HD2	2.54	0.42
1:A:354[B]:MET:HA	1:A:355[B]:PRO:HD3	1.48	0.42
1:C:347:ALA:HB3	1:C:351:ARG:HG3	2.01	0.42
1:D:164:LEU:HB2	1:D:181:THR:HB	2.01	0.42
1:B:164:LEU:HB2	1:B:181:THR:HB	2.02	0.42
3:B:704:GOL:HO2	3:B:704:GOL:HO1	1.58	0.42
1:B:337:ARG:NH1	1:B:378:GLU:OE2	2.53	0.41
1:B:503:ILE:N	1:B:504:PRO:CD	2.84	0.41
1:D:183:LEU:HB3	1:D:210:MET:HE2	2.01	0.41
1:C:94:ARG:HD2	5:C:1054:HOH:O	2.19	0.41
1:B:638:TYR:CE2	1:B:640:ALA:HA	2.55	0.41
1:B:630:PRO:HG3	1:B:686:PHE:CD1	2.56	0.41
1:D:401:LEU:O	1:D:405:GLN:CG	2.69	0.41
1:B:498:GLY:O	3:B:704:GOL:H32	2.21	0.41
1:D:347:ALA:HB3	1:D:351:ARG:HG3	2.02	0.41
1:D:630:PRO:HG3	1:D:686:PHE:CD1	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:503:ILE:N	1:D:504:PRO:CD	2.85	0.40
1:A:354[B]:MET:SD	1:A:355[B]:PRO:CD	3.08	0.40
1:D:337:ARG:NH1	1:D:378:GLU:OE2	2.54	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:664:ARG:NH2	1:D:292:THR:O[4_545]	2.09	0.11

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	698/717 (97%)	676 (97%)	20 (3%)	2 (0%)	41	37
1	B	691/717 (96%)	674 (98%)	15 (2%)	2 (0%)	41	37
1	C	677/717 (94%)	661 (98%)	14 (2%)	2 (0%)	41	37
1	D	678/717 (95%)	662 (98%)	14 (2%)	2 (0%)	41	37
All	All	2744/2868 (96%)	2673 (97%)	63 (2%)	8 (0%)	41	37

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	485	ARG
1	A	485	ARG
1	C	485	ARG
1	D	485	ARG
1	B	549	PRO
1	A	549	PRO
1	C	549	PRO

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Mol	Chain	Res	Type
1	D	549	PRO

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	595/622 (96%)	591 (99%)	4 (1%)	84	89
1	B	585/622 (94%)	580 (99%)	5 (1%)	78	83
1	C	579/622 (93%)	574 (99%)	5 (1%)	78	83
1	D	575/622 (92%)	571 (99%)	4 (1%)	84	89
All	All	2334/2488 (94%)	2316 (99%)	18 (1%)	81	86

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	22	ARG
1	B	58	PHE
1	B	304	ASN
1	B	345	TRP
1	B	354	MET
1	A	22	ARG
1	A	58	PHE
1	A	304	ASN
1	A	345	TRP
1	C	58	PHE
1	C	91	LEU
1	C	345	TRP
1	C	354	MET
1	C	508	GLN
1	D	22	ARG
1	D	58	PHE
1	D	207	GLN
1	D	345	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such

sidechains are listed below:

Mol	Chain	Res	Type
1	C	304	ASN
1	D	36	ASN
1	D	207	GLN
1	D	304	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 [i](#)

Of 24 ligands modelled in this entry, 4 are monoatomic - leaving 20 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	$\# Z > 2$
4	BMA	C	703	-	12,12,12	0.50	0	17,17,17	0.85	1 (5%)
3	GOL	A	707	-	5,5,5	0.36	0	5,5,5	0.67	0
3	GOL	D	701	2	5,5,5	0.74	0	5,5,5	0.95	0
3	GOL	D	702	-	5,5,5	0.83	0	5,5,5	0.52	0
3	GOL	A	706	-	5,5,5	0.33	0	5,5,5	0.33	0
3	GOL	A	705	-	5,5,5	0.22	0	5,5,5	0.33	0
3	GOL	A	701	2	5,5,5	0.98	0	5,5,5	1.07	0
3	GOL	A	702	-	5,5,5	0.39	0	5,5,5	0.75	0
3	GOL	D	703	-	5,5,5	0.53	0	5,5,5	0.58	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	B	705	-	5,5,5	0.27	0	5,5,5	0.48	0
3	GOL	A	704	-	5,5,5	0.58	0	5,5,5	0.34	0
3	GOL	B	702	2	5,5,5	1.07	0	5,5,5	0.96	0
4	BMA	A	708	-	12,12,12	0.68	0	17,17,17	1.84	3 (17%)
3	GOL	C	701	2	5,5,5	0.29	0	5,5,5	0.77	0
3	GOL	A	703	-	5,5,5	0.42	0	5,5,5	0.67	0
3	GOL	C	702	-	5,5,5	0.53	0	5,5,5	0.78	0
4	BMA	B	706	-	12,12,12	0.53	0	17,17,17	1.15	2 (11%)
4	BMA	D	704	-	12,12,12	0.58	0	17,17,17	1.10	1 (5%)
3	GOL	B	704	-	5,5,5	0.24	0	5,5,5	0.56	0
3	GOL	B	703	-	5,5,5	0.41	0	5,5,5	0.74	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
4	BMA	C	703	-	-	0/2/22/22	0/1/1/1
3	GOL	A	707	-	-	4/4/4/4	-
3	GOL	D	701	2	-	2/4/4/4	-
3	GOL	D	702	-	-	0/4/4/4	-
3	GOL	A	706	-	-	4/4/4/4	-
3	GOL	A	705	-	-	3/4/4/4	-
3	GOL	A	701	2	-	2/4/4/4	-
3	GOL	A	702	-	-	0/4/4/4	-
3	GOL	D	703	-	-	2/4/4/4	-
3	GOL	B	705	-	-	2/4/4/4	-
3	GOL	A	704	-	-	3/4/4/4	-
3	GOL	B	702	2	-	2/4/4/4	-
4	BMA	A	708	-	-	0/2/22/22	0/1/1/1
3	GOL	C	701	2	-	4/4/4/4	-
3	GOL	A	703	-	-	3/4/4/4	-
3	GOL	C	702	-	-	2/4/4/4	-
4	BMA	B	706	-	-	2/2/22/22	0/1/1/1
4	BMA	D	704	-	-	0/2/22/22	0/1/1/1
3	GOL	B	704	-	-	4/4/4/4	-
3	GOL	B	703	-	-	2/4/4/4	-

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	708	BMA	O1-C1-C2	4.88	122.77	109.03
4	A	708	BMA	O5-C1-C2	3.35	116.27	110.28
4	B	706	BMA	O5-C1-C2	-2.77	105.35	110.28
4	D	704	BMA	C3-C4-C5	2.75	115.15	110.24
4	A	708	BMA	O1-C1-O5	2.60	118.17	110.38
4	B	706	BMA	C1-O5-C5	-2.46	109.02	113.66
4	C	703	BMA	O3-C3-C2	-2.44	104.71	110.35

There are no chirality outliers.

All (41) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	702	GOL	C1-C2-C3-O3
3	B	704	GOL	C1-C2-C3-O3
3	B	704	GOL	O2-C2-C3-O3
3	A	703	GOL	O1-C1-C2-O2
3	A	703	GOL	O1-C1-C2-C3
3	A	704	GOL	C1-C2-C3-O3
3	A	707	GOL	C1-C2-C3-O3
3	C	701	GOL	O1-C1-C2-C3
3	C	701	GOL	C1-C2-C3-O3
3	C	702	GOL	O1-C1-C2-C3
3	D	701	GOL	O1-C1-C2-C3
3	D	703	GOL	C1-C2-C3-O3
4	B	706	BMA	C4-C5-C6-O6
3	C	701	GOL	O2-C2-C3-O3
3	B	703	GOL	C1-C2-C3-O3
3	B	705	GOL	C1-C2-C3-O3
3	A	701	GOL	C1-C2-C3-O3
3	A	704	GOL	O1-C1-C2-C3
3	A	706	GOL	O1-C1-C2-C3
3	B	705	GOL	O2-C2-C3-O3
3	A	704	GOL	O2-C2-C3-O3
3	C	701	GOL	O1-C1-C2-O2
3	D	701	GOL	O1-C1-C2-O2
4	B	706	BMA	O5-C5-C6-O6
3	B	702	GOL	O2-C2-C3-O3
3	A	707	GOL	O2-C2-C3-O3
3	D	703	GOL	O2-C2-C3-O3
3	A	706	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
3	B	703	GOL	O2-C2-C3-O3
3	B	704	GOL	O1-C1-C2-O2
3	A	701	GOL	O2-C2-C3-O3
3	A	705	GOL	O1-C1-C2-O2
3	B	704	GOL	O1-C1-C2-C3
3	A	706	GOL	C1-C2-C3-O3
3	A	707	GOL	O1-C1-C2-C3
3	A	706	GOL	O2-C2-C3-O3
3	C	702	GOL	O1-C1-C2-O2
3	A	707	GOL	O1-C1-C2-O2
3	A	703	GOL	C1-C2-C3-O3
3	A	705	GOL	O1-C1-C2-C3
3	A	705	GOL	C1-C2-C3-O3

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	707	GOL	1	0
3	B	705	GOL	1	0
3	B	704	GOL	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 [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	692/717 (96%)	-0.16	12 (1%) 70 76	18, 30, 49, 72	0
1	B	693/717 (96%)	-0.15	10 (1%) 75 80	22, 33, 55, 84	0
1	C	680/717 (94%)	-0.02	14 (2%) 63 71	19, 33, 59, 81	0
1	D	681/717 (94%)	0.27	35 (5%) 28 36	21, 40, 62, 86	0
All	All	2746/2868 (95%)	-0.01	71 (2%) 56 64	18, 34, 57, 86	0

All (71) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	355[A]	PRO	6.5
1	A	354[A]	MET	5.3
1	A	353[A]	MET	4.5
1	D	471	GLN	4.3
1	C	477	ASP	4.1
1	C	476	PRO	4.0
1	C	475	HIS	3.9
1	C	443	ILE	3.7
1	D	355	PRO	3.7
1	D	477	ASP	3.7
1	D	402	ALA	3.6
1	D	472	GLY	3.6
1	D	384	LEU	3.6
1	D	282	SER	3.6
1	B	473	ASN	3.5
1	D	476	PRO	3.4
1	B	476	PRO	3.4
1	A	441	ILE	3.2
1	C	485	ARG	3.1
1	A	475	HIS	3.1
1	D	174	LYS	3.0

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Mol	Chain	Res	Type	RSRZ
1	D	172	THR	3.0
1	D	353	MET	3.0
1	D	407	LEU	3.0
1	D	196	ALA	3.0
1	D	283	GLY	2.9
1	D	475	HIS	2.8
1	D	470	ASN	2.8
1	C	471	GLN	2.8
1	C	414	HIS	2.8
1	D	439	GLU	2.8
1	C	441	ILE	2.8
1	D	443	ILE	2.7
1	C	413	ASP	2.7
1	D	446	THR	2.7
1	D	381	GLN	2.7
1	D	86	LEU	2.7
1	B	477	ASP	2.6
1	D	561	PHE	2.6
1	A	442	GLU	2.6
1	C	470	ASN	2.6
1	C	412	THR	2.5
1	B	309	THR	2.5
1	D	415	HIS	2.5
1	A	392	PRO	2.5
1	D	409	TYR	2.4
1	A	470	ASN	2.4
1	A	310	PHE	2.4
1	B	475	HIS	2.4
1	D	408	GLY	2.4
1	B	441	ILE	2.4
1	C	407	LEU	2.3
1	D	341	PHE	2.3
1	B	442	GLU	2.3
1	D	445	GLU	2.3
1	B	511	GLY	2.3
1	D	92	PHE	2.2
1	A	439	GLU	2.2
1	D	438	LEU	2.2
1	B	310	PHE	2.2
1	C	439	GLU	2.2
1	D	205	SER	2.1
1	A	413	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	224	ILE	2.1
1	D	284	GLN	2.1
1	D	280	ASN	2.1
1	A	312	THR	2.1
1	C	405	GLN	2.1
1	D	377	GLY	2.1
1	D	207	GLN	2.0
1	B	204	ALA	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
3	GOL	D	702	6/6	0.74	0.20	47,51,52,56	0
3	GOL	B	702	6/6	0.80	0.28	35,40,43,44	0
3	GOL	A	707	6/6	0.82	0.21	54,57,58,62	0
3	GOL	A	704	6/6	0.86	0.17	51,52,53,54	0
3	GOL	A	705	6/6	0.86	0.14	60,62,63,65	0
3	GOL	B	705	6/6	0.87	0.33	51,59,62,62	0
3	GOL	D	703	6/6	0.87	0.16	55,60,60,62	0
3	GOL	A	702	6/6	0.88	0.30	40,40,41,42	0
3	GOL	B	704	6/6	0.88	0.31	46,50,52,54	0
3	GOL	D	701	6/6	0.89	0.18	36,40,43,45	0
3	GOL	A	701	6/6	0.90	0.22	28,34,35,38	0
3	GOL	A	706	6/6	0.90	0.24	54,58,59,60	0
3	GOL	C	701	6/6	0.91	0.19	35,45,50,53	0
3	GOL	A	703	6/6	0.92	0.17	37,42,44,46	0
4	BMA	A	708	12/12	0.92	0.12	27,33,35,39	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	BMA	C	703	12/12	0.92	0.12	31,37,38,43	0
4	BMA	B	706	12/12	0.93	0.09	36,43,46,48	0
3	GOL	B	703	6/6	0.94	0.14	45,47,50,54	0
3	GOL	C	702	6/6	0.94	0.10	42,45,47,48	0
4	BMA	D	704	12/12	0.94	0.09	38,42,44,46	0
2	CA	D	705	1/1	0.97	0.12	27,27,27,27	0
2	CA	B	701	1/1	0.99	0.13	23,23,23,23	0
2	CA	A	709	1/1	0.99	0.14	17,17,17,17	0
2	CA	C	704	1/1	0.99	0.10	24,24,24,24	0

6.5 Other polymers [i](#)

There are no such residues in this entry.