



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 24, 2024 – 07:36 AM EDT

PDB ID : 6GB7
Title : Structure of H-2Db with scoop loop from tapasin
Authors : Hafstrand, I.; Sandalova, T.; Achour, A.
Deposited on : 2018-04-13
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 : 2.37.1
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) : 2.37.1

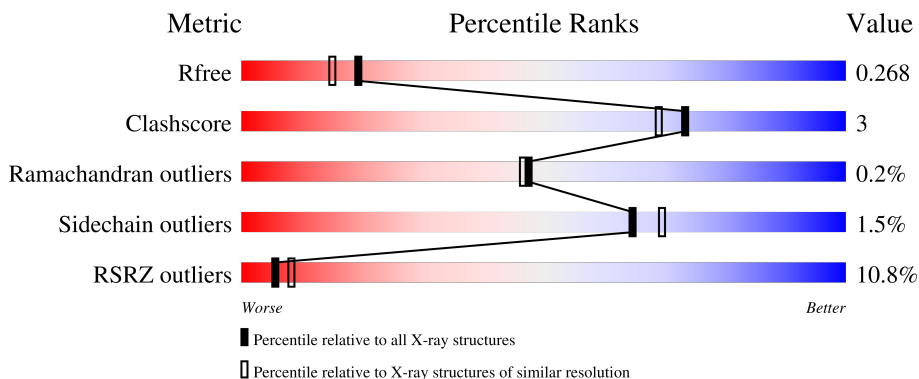
1 Overall quality at a glance

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	338	
1	C	338	
1	E	338	
1	G	338	
2	B	100	

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Mol	Chain	Length	Quality of chain
2	D	100	<p>5% 88% 11%</p>
2	H	100	<p>3% 95% 5%</p>
3	F	99	<p>7% 91% 9%</p>
4	I	7	<p>86% 14%</p>
4	J	7	<p>100%</p>
4	K	7	<p>100%</p>
4	L	7	<p>100%</p>
5	P	10	<p>40% 20% 20% 60%</p>
5	R	10	<p>50% 10% 10% 30% 50%</p>

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 13275 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 H-2 class I histocompatibility antigen, D-B alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	271	2219	1400	391	419	9	0	1	0
1	C	273	2226	1406	394	417	9	0	0	0
1	E	270	2207	1391	392	415	9	0	1	0
1	G	270	2182	1382	382	409	9	0	0	0

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	100	833	531	140	154	8	0	1	0
2	D	100	821	523	138	153	7	0	0	0
2	H	100	836	534	140	154	8	0	2	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	GLY	ALA	cloning artifact	UNP P01887
B	85	ASP	ALA	variant	UNP P01887
D	0	GLY	ALA	cloning artifact	UNP P01887
D	85	ASP	ALA	variant	UNP P01887
H	0	GLY	ALA	cloning artifact	UNP P01887
H	85	ASP	ALA	variant	UNP P01887

- Molecule 3 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	F	99	821	524	138	152	7	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	85	ASP	ALA	variant	UNP P01887

- Molecule 4 is a protein called PHE-ALA-PRO-GLY-ASN-TYR-PRO.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	I	7	55	37	8	10	0	0	0	
4	J	7	55	37	8	10	0	0	0	
4	K	7	55	37	8	10	0	0	0	
4	L	7	55	37	8	10	0	0	0	

- Molecule 5 is a protein called GLY-GLY-LEU-SER.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	P	4	18	11	4	3	0	0	1	
5	R	5	32	19	6	7	0	0	0	

- Molecule 6 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	O	S	0	0
			5	4	1		
6	C	1	Total	O	S	0	0
			5	4	1		
6	F	1	Total	O	S	0	0
			5	4	1		
6	G	1	Total	O	S	0	0
			5	4	1		

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	121	Total O 121 121	0	0
8	B	61	Total O 61 61	0	0
8	C	143	Total O 143 143	0	0
8	D	51	Total O 51 51	0	0
8	E	124	Total O 124 124	0	0
8	F	65	Total O 65 65	0	0
8	G	115	Total O 115 115	0	0
8	H	76	Total O 76 76	0	0
8	I	5	Total O 5 5	0	0

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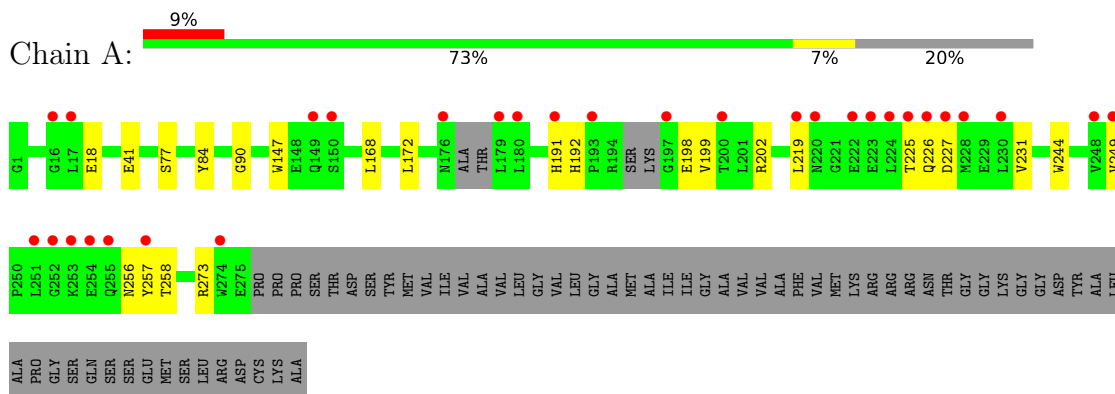
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	J	2	Total O 2 2	0	0
8	K	2	Total O 2 2	0	0
8	L	6	Total O 6 6	0	0
8	P	1	Total O 1 1	0	0
8	R	2	Total O 2 2	0	0

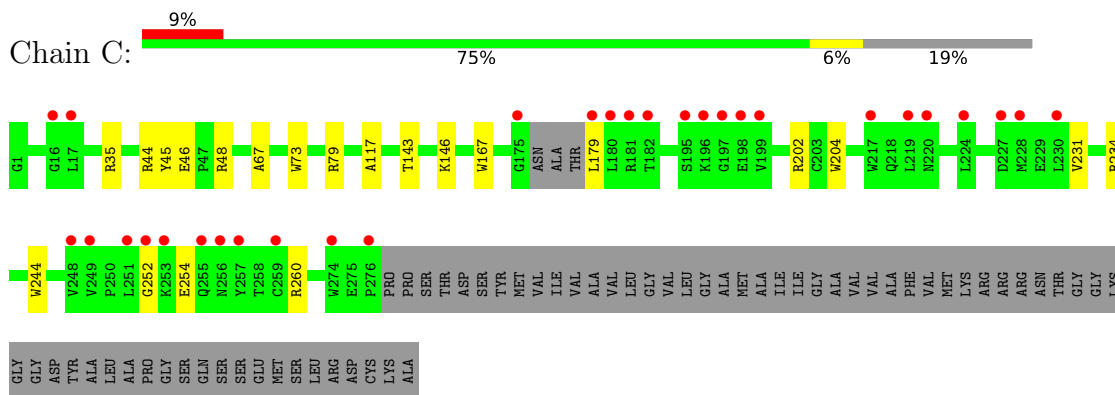
3 Residue-property plots [i](#)

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.

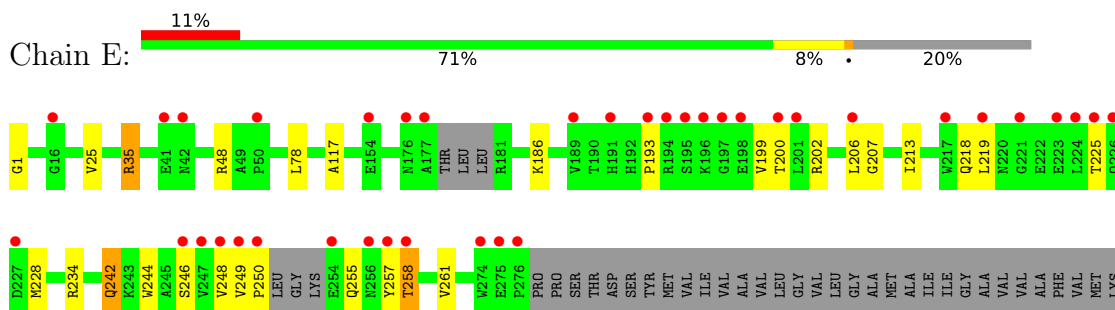
- Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain



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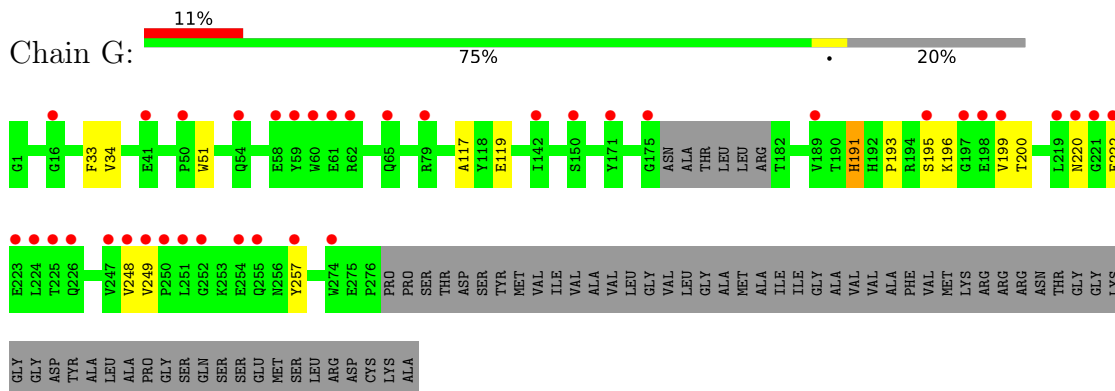


- Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain

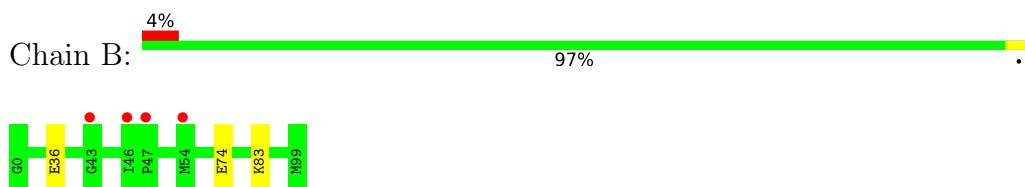


ARG ARG ARG ASN THR GLY LYS LYS LYS LYS ASP ASP TYR ALA LEU ALA ALA LEU PRO GLY GLY GLN SER SER SER SER SER SER MET MET MET MET LEU LEU ARG ARG CYS CYS LYS LYS ALA ALA

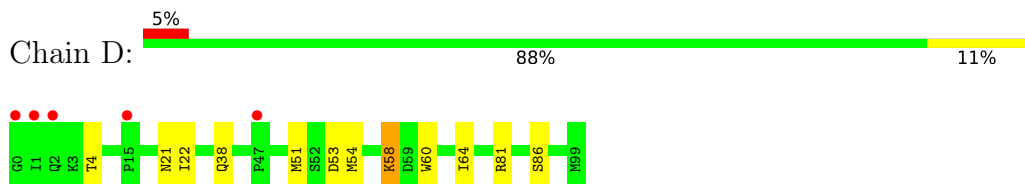
- Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain



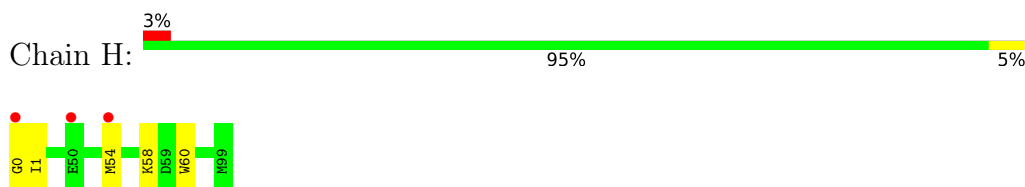
- Molecule 2: Beta-2-microglobulin



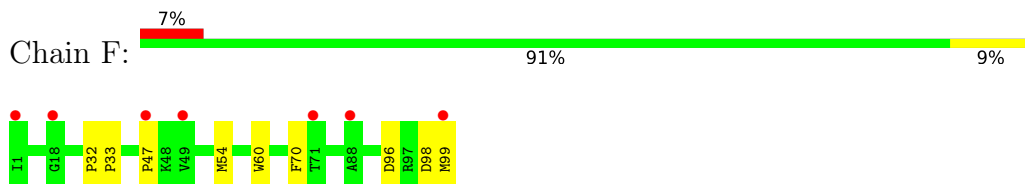
- Molecule 2: Beta-2-microglobulin



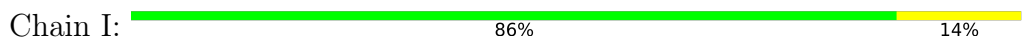
- Molecule 2: Beta-2-microglobulin



- Molecule 3: Beta-2-microglobulin



- Molecule 4: PHE-ALA-PRO-GLY-ASN-TYR-PRO





- Molecule 4: PHE-ALA-PRO-GLY-ASN-TYR-PRO

Chain J: 100%

There are no outlier residues recorded for this chain.

- Molecule 4: PHE-ALA-PRO-GLY-ASN-TYR-PRO

Chain K: 100%

There are no outlier residues recorded for this chain.

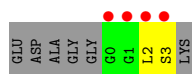
- Molecule 4: PHE-ALA-PRO-GLY-ASN-TYR-PRO

Chain L: 100%

There are no outlier residues recorded for this chain.

- Molecule 5: GLY-GLY-LEU-SER

Chain P: 40%
20% 20% 60%



- Molecule 5: GLY-GLY-LEU-SER

Chain R: 50%
10% 10% 30% 50%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	92.70Å 123.86Å 100.11Å 90.00° 103.66° 90.00°	Depositor
Resolution (Å)	52.24 – 2.15 52.24 – 2.15	Depositor EDS
% Data completeness (in resolution range)	98.2 (52.24-2.15) 98.3 (52.24-2.15)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.25 (at 2.16Å)	Xtrriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.239 , 0.266 0.242 , 0.268	Depositor DCC
R_{free} test set	5821 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å ²)	30.3	Xtrriage
Anisotropy	0.037	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 48.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	13275	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 32.75 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 8.9273e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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, 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	0.28	0/2283	0.47	0/3100
1	C	0.29	0/2292	0.48	0/3112
1	E	0.28	0/2275	0.48	0/3090
1	G	0.28	0/2248	0.46	0/3058
2	B	0.27	0/859	0.48	0/1163
2	D	0.28	0/847	0.48	0/1149
2	H	0.28	0/865	0.48	0/1171
3	F	0.28	0/847	0.49	0/1148
4	I	0.35	0/58	0.38	0/78
4	J	0.36	0/58	0.37	0/78
4	K	0.34	0/58	0.36	0/78
4	L	0.34	0/58	0.41	0/78
5	P	0.69	0/17	0.91	0/21
5	R	0.60	0/31	1.18	0/37
All	All	0.28	0/12796	0.48	0/17361

There are no bond length outliers.

There are no bond angle outliers.

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	2219	0	2058	17	0
1	C	2226	0	2075	17	0
1	E	2207	0	2047	21	0
1	G	2182	0	2024	11	0
2	B	833	0	807	2	0
2	D	821	0	788	8	0
2	H	836	0	811	3	0
3	F	821	0	796	6	0
4	I	55	0	48	1	0
4	J	55	0	48	0	0
4	K	55	0	48	0	0
4	L	55	0	48	0	0
5	P	18	0	20	5	0
5	R	32	0	37	7	0
6	A	5	0	0	0	0
6	C	5	0	0	0	0
6	F	5	0	0	0	0
6	G	5	0	0	0	0
7	A	24	0	32	1	0
7	B	18	0	24	0	0
7	C	6	0	8	0	0
7	D	6	0	8	0	0
7	G	12	0	16	0	0
8	A	121	0	0	0	0
8	B	61	0	0	1	0
8	C	143	0	0	4	0
8	D	51	0	0	0	0
8	E	124	0	0	2	0
8	F	65	0	0	0	0
8	G	115	0	0	1	0
8	H	76	0	0	0	0
8	I	5	0	0	0	0
8	J	2	0	0	0	0
8	K	2	0	0	0	0
8	L	6	0	0	0	0
8	P	1	0	0	0	0
8	R	2	0	0	0	0
All	All	13275	0	11743	80	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 3.

All (80) 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)
5:R:2:LEU:N	5:R:3:SER:O	2.06	0.87
1:G:191:HIS:CD2	1:G:199:VAL:HG21	2.26	0.71
2:D:38:GLN:OE1	2:D:81:ARG:NH2	2.25	0.69
1:C:143:THR:HG23	5:R:2:LEU:C	2.17	0.65
1:E:1:GLY:N	8:E:403:HOH:O	2.29	0.60
3:F:96:ASP:O	3:F:99:MET:N	2.28	0.59
3:F:32:PRO:HB2	3:F:33:PRO:HD2	1.88	0.55
1:C:44:ARG:NH2	8:C:508:HOH:O	2.40	0.55
1:G:51:TRP:N	8:G:503:HOH:O	2.38	0.55
1:A:191:HIS:CD2	1:A:199:VAL:HG21	2.42	0.54
1:C:35:ARG:NH2	2:D:54:MET:O	2.28	0.54
1:G:193:PRO:HA	1:G:199:VAL:HG23	1.90	0.53
1:C:146:LYS:CB	5:R:3:SER:HB2	2.38	0.53
1:E:25:VAL:HG22	1:E:35:ARG:HG3	1.91	0.52
1:C:179:LEU:N	8:C:513:HOH:O	2.43	0.52
1:E:35:ARG:NH2	3:F:54:MET:O	2.31	0.52
1:E:200:THR:HG22	1:E:248:VAL:HG12	1.92	0.52
5:R:1:GLY:HA3	5:R:4:LYS:HA	1.91	0.51
1:C:143:THR:OG1	5:R:2:LEU:O	2.27	0.51
1:E:186:LYS:NZ	1:E:207:GLY:O	2.43	0.51
1:C:73:TRP:CH2	5:R:2:LEU:CD1	2.94	0.50
1:G:200:THR:HG22	1:G:248:VAL:HG12	1.94	0.50
1:G:119:GLU:HB3	2:H:0:GLY:HA2	1.93	0.49
1:C:260:ARG:N	8:C:502:HOH:O	2.45	0.49
1:E:228:MET:HA	1:E:246:SER:O	2.12	0.49
2:D:58:LYS:H	2:D:58:LYS:HD2	1.77	0.48
1:C:202:ARG:HD3	1:C:244:TRP:CE3	2.49	0.48
1:A:202:ARG:HD2	1:A:244:TRP:CD2	2.48	0.48
1:A:249:VAL:HG23	1:A:257:TYR:CE1	2.49	0.48
5:R:2:LEU:N	5:R:3:SER:C	2.66	0.48
2:D:21:ASN:OD1	2:D:22:ILE:N	2.42	0.47
1:E:206:LEU:HD23	1:E:242:GLN:HB3	1.96	0.47
1:E:202:ARG:HH22	3:F:98:ASP:HB3	1.80	0.46
1:A:231:VAL:HG13	1:A:244:TRP:CZ2	2.51	0.46
1:A:147:TRP:HZ2	5:P:2:LEU:HD23	1.81	0.46
1:E:218:GLN:HG3	1:E:258:THR:HG23	1.98	0.46
2:H:54[B]:MET:HE3	2:H:54[B]:MET:HA	1.98	0.46
1:C:48:ARG:NH2	2:D:53:ASP:OD2	2.43	0.45
1:E:202:ARG:HD2	1:E:244:TRP:CE3	2.52	0.45
1:C:117:ALA:HB2	2:D:60:TRP:CE2	2.51	0.45
1:C:45:TYR:CE2	1:C:67:ALA:HB2	2.51	0.45
1:E:35:ARG:NH1	8:E:411:HOH:O	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:252:GLY:N	1:C:254:GLU:OE1	2.50	0.45
1:A:225:THR:O	1:A:227:ASP:N	2.50	0.45
2:D:51:MET:HG3	2:D:64:ILE:HD11	1.99	0.45
1:E:249:VAL:HG13	1:E:250:PRO:HD2	1.99	0.44
1:A:258:THR:HG22	1:A:273:ARG:CG	2.48	0.44
1:E:186:LYS:HD2	1:E:186:LYS:N	2.33	0.44
1:E:193:PRO:HA	1:E:199:VAL:HG23	2.00	0.44
2:B:36:GLU:HB2	2:B:83:LYS:HB2	2.00	0.43
1:E:35:ARG:HD2	1:E:48:ARG:HH11	1.83	0.43
1:A:41:GLU:H	1:A:41:GLU:CD	2.22	0.43
1:E:234:ARG:HH12	3:F:99:MET:HB3	1.84	0.43
1:G:249:VAL:HG22	1:G:257:TYR:CZ	2.54	0.42
1:A:192:HIS:C	1:A:199:VAL:HG23	2.40	0.42
1:E:117:ALA:HB2	3:F:60:TRP:CE2	2.54	0.42
1:A:258:THR:HG22	1:A:273:ARG:HG3	2.01	0.42
1:A:84:TYR:HE2	5:P:2:LEU:O	2.03	0.42
1:A:90:GLY:H	7:A:403:GOL:H2	1.85	0.42
1:C:231:VAL:HG13	1:C:244:TRP:CZ2	2.55	0.42
1:G:117:ALA:HB2	2:H:60:TRP:CE2	2.54	0.42
1:A:147:TRP:CZ2	5:P:2:LEU:HD23	2.55	0.42
1:G:199:VAL:HG22	1:G:200:THR:N	2.35	0.41
2:D:4:THR:HA	2:D:86:SER:OG	2.20	0.41
1:G:195:SER:OG	1:G:196:LYS:N	2.53	0.41
1:C:202:ARG:HG2	1:C:204:TRP:NE1	2.36	0.41
1:E:213:ILE:HD11	1:E:261:VAL:CG1	2.51	0.41
2:B:74:GLU:OE2	8:B:201:HOH:O	2.21	0.41
1:E:202:ARG:HG2	1:E:246:SER:CB	2.50	0.41
1:A:219:LEU:CD1	1:A:256:ASN:HB3	2.50	0.41
1:E:225:THR:HG23	1:E:225:THR:O	2.21	0.41
1:G:191:HIS:NE2	1:G:199:VAL:HG21	2.35	0.41
1:A:168:LEU:O	1:A:172:LEU:HG	2.21	0.41
1:A:191:HIS:NE2	1:A:199:VAL:HG21	2.36	0.41
5:P:2:LEU:N	5:P:3:SER:CA	2.83	0.41
1:A:77:SER:HB3	5:P:2:LEU:HD12	2.03	0.40
1:C:44:ARG:NE	8:C:522:HOH:O	2.54	0.40
1:G:33:PHE:CD2	1:G:34:VAL:HG13	2.56	0.40
1:C:167:TRP:CG	4:I:1:PHE:HB2	2.56	0.40
1:E:219:LEU:HD22	1:E:257:TYR:CE2	2.56	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	266/338 (79%)	259 (97%)	6 (2%)	1 (0%)	34	29
1	C	269/338 (80%)	263 (98%)	6 (2%)	0	100	100
1	E	265/338 (78%)	257 (97%)	8 (3%)	0	100	100
1	G	266/338 (79%)	256 (96%)	10 (4%)	0	100	100
2	B	99/100 (99%)	96 (97%)	3 (3%)	0	100	100
2	D	98/100 (98%)	96 (98%)	2 (2%)	0	100	100
2	H	100/100 (100%)	96 (96%)	4 (4%)	0	100	100
3	F	97/99 (98%)	95 (98%)	1 (1%)	1 (1%)	15	9
4	I	5/7 (71%)	5 (100%)	0	0	100	100
4	J	5/7 (71%)	5 (100%)	0	0	100	100
4	K	5/7 (71%)	5 (100%)	0	0	100	100
4	L	5/7 (71%)	5 (100%)	0	0	100	100
5	P	2/10 (20%)	0	2 (100%)	0	100	100
5	R	3/10 (30%)	1 (33%)	1 (33%)	1 (33%)	0	0
All	All	1485/1799 (82%)	1439 (97%)	43 (3%)	3 (0%)	47	46

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	F	47	PRO
1	A	226	GLN
5	R	3	SER

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	226/280 (81%)	224 (99%)	2 (1%)	78	83
1	C	226/280 (81%)	223 (99%)	3 (1%)	69	74
1	E	225/280 (80%)	220 (98%)	5 (2%)	52	55
1	G	221/280 (79%)	218 (99%)	3 (1%)	67	72
2	B	95/94 (101%)	95 (100%)	0	100	100
2	D	93/94 (99%)	92 (99%)	1 (1%)	73	78
2	H	95/94 (101%)	93 (98%)	2 (2%)	53	57
3	F	94/94 (100%)	93 (99%)	1 (1%)	73	78
4	I	5/5 (100%)	5 (100%)	0	100	100
4	J	5/5 (100%)	5 (100%)	0	100	100
4	K	5/5 (100%)	5 (100%)	0	100	100
4	L	5/5 (100%)	5 (100%)	0	100	100
5	P	1/5 (20%)	1 (100%)	0	100	100
5	R	3/5 (60%)	1 (33%)	2 (67%)	0	0
All	All	1299/1526 (85%)	1280 (98%)	19 (2%)	65	69

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	GLU
1	A	198	GLU
1	C	46	GLU
1	C	79	ARG
1	C	234	ARG
2	D	58	LYS
1	E	35	ARG
1	E	78	LEU
1	E	242	GLN
1	E	255	GLN
1	E	258	THR
3	F	70	PHE
1	G	191	HIS
1	G	220	ASN
1	G	222	GLU
2	H	1	ILE

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Mol	Chain	Res	Type
2	H	58	LYS
5	R	2	LEU
5	R	4	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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](#)

15 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	$\# Z > 2$
6	SO4	F	101	-	4,4,4	0.14	0	6,6,6	0.07	0
6	SO4	A	401	-	4,4,4	0.15	0	6,6,6	0.05	0
7	GOL	C	402	-	5,5,5	0.35	0	5,5,5	0.27	0
7	GOL	G	403	-	5,5,5	0.40	0	5,5,5	0.20	0
7	GOL	B	103	-	5,5,5	0.37	0	5,5,5	0.30	0
7	GOL	A	404	-	5,5,5	1.13	0	5,5,5	2.76	3 (60%)
7	GOL	A	402	-	5,5,5	0.30	0	5,5,5	0.53	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	GOL	D	101	-	5,5,5	0.39	0	5,5,5	0.20	0
7	GOL	G	402	-	5,5,5	0.40	0	5,5,5	0.29	0
6	SO4	C	401	-	4,4,4	0.14	0	6,6,6	0.08	0
7	GOL	B	101	-	5,5,5	0.36	0	5,5,5	0.20	0
6	SO4	G	401	-	4,4,4	0.14	0	6,6,6	0.07	0
7	GOL	A	403	-	5,5,5	0.41	0	5,5,5	0.29	0
7	GOL	B	102	-	5,5,5	0.39	0	5,5,5	0.16	0
7	GOL	A	405	-	5,5,5	0.40	0	5,5,5	0.21	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
7	GOL	C	402	-	-	2/4/4/4	-
7	GOL	G	403	-	-	2/4/4/4	-
7	GOL	B	103	-	-	0/4/4/4	-
7	GOL	A	404	-	-	2/4/4/4	-
7	GOL	A	402	-	-	4/4/4/4	-
7	GOL	D	101	-	-	4/4/4/4	-
7	GOL	G	402	-	-	2/4/4/4	-
7	GOL	B	101	-	-	0/4/4/4	-
7	GOL	A	403	-	-	2/4/4/4	-
7	GOL	B	102	-	-	2/4/4/4	-
7	GOL	A	405	-	-	4/4/4/4	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	404	GOL	C3-C2-C1	4.59	129.53	111.70
7	A	404	GOL	O2-C2-C1	-2.92	96.27	109.12
7	A	404	GOL	O1-C1-C2	-2.48	98.30	110.20

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	402	GOL	O1-C1-C2-C3
7	A	402	GOL	C1-C2-C3-O3
7	A	404	GOL	O1-C1-C2-C3
7	A	405	GOL	O1-C1-C2-C3
7	A	405	GOL	C1-C2-C3-O3
7	B	102	GOL	C1-C2-C3-O3
7	D	101	GOL	O1-C1-C2-C3
7	G	403	GOL	O1-C1-C2-C3
7	G	403	GOL	O1-C1-C2-O2
7	A	403	GOL	C1-C2-C3-O3
7	C	402	GOL	O1-C1-C2-C3
7	A	402	GOL	O1-C1-C2-O2
7	A	402	GOL	O2-C2-C3-O3
7	A	405	GOL	O1-C1-C2-O2
7	B	102	GOL	O2-C2-C3-O3
7	D	101	GOL	O1-C1-C2-O2
7	A	404	GOL	O1-C1-C2-O2
7	A	405	GOL	O2-C2-C3-O3
7	D	101	GOL	O2-C2-C3-O3
7	G	402	GOL	O2-C2-C3-O3
7	D	101	GOL	C1-C2-C3-O3
7	G	402	GOL	C1-C2-C3-O3
7	A	403	GOL	O2-C2-C3-O3
7	C	402	GOL	O1-C1-C2-O2

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	403	GOL	1	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	271/338 (80%)	0.74	30 (11%) 5 7	17, 39, 96, 128	0
1	C	273/338 (80%)	0.68	30 (10%) 5 8	18, 39, 85, 106	0
1	E	270/338 (79%)	0.91	38 (14%) 2 3	20, 42, 102, 133	0
1	G	270/338 (79%)	0.87	38 (14%) 2 3	19, 44, 104, 131	0
2	B	100/100 (100%)	0.56	4 (4%) 38 47	22, 36, 56, 72	0
2	D	100/100 (100%)	0.68	5 (5%) 28 37	22, 41, 67, 79	0
2	H	100/100 (100%)	0.46	3 (3%) 50 59	21, 32, 50, 62	0
3	F	99/99 (100%)	0.57	7 (7%) 16 22	22, 37, 54, 81	0
4	I	7/7 (100%)	0.76	0 100 100	26, 31, 42, 43	0
4	J	7/7 (100%)	1.12	0 100 100	42, 46, 57, 65	0
4	K	7/7 (100%)	0.51	0 100 100	29, 30, 40, 44	0
4	L	7/7 (100%)	0.66	0 100 100	30, 34, 39, 49	0
5	P	4/10 (40%)	3.58	4 (100%) 0 0	76, 78, 80, 80	0
5	R	5/10 (50%)	3.99	5 (100%) 0 0	88, 93, 102, 104	0
All	All	1520/1799 (84%)	0.75	164 (10%) 5 8	17, 40, 93, 133	0

All (164) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	249	VAL	8.2
1	E	197	GLY	7.6
1	C	197	GLY	7.4
1	E	196	LYS	6.9
1	C	16	GLY	6.9
5	R	3	SER	6.8
1	G	251	LEU	6.6
1	G	252	GLY	6.6

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Mol	Chain	Res	Type	RSRZ
1	E	276	PRO	6.5
3	F	1	ILE	5.9
1	A	16	GLY	5.8
1	A	219	LEU	5.6
1	E	16	GLY	5.4
1	G	254	GLU	5.2
1	G	197	GLY	5.2
1	E	227	ASP	5.1
5	R	2	LEU	5.1
1	A	220	ASN	4.8
1	C	17	LEU	4.8
1	C	220	ASN	4.7
5	P	2	LEU	4.7
1	G	221	GLY	4.7
1	C	179	LEU	4.6
1	G	225	THR	4.5
1	A	17	LEU	4.5
1	A	227	ASP	4.5
1	E	193	PRO	4.5
1	C	180	LEU	4.4
2	D	1	ILE	4.4
1	A	193	PRO	4.3
5	P	1	GLY	4.3
2	B	47	PRO	4.2
1	E	250	PRO	4.2
1	C	227	ASP	4.2
1	A	274	TRP	4.2
1	A	225	THR	4.1
1	A	226	GLN	4.1
1	A	180	LEU	4.0
1	G	248	VAL	4.0
1	E	224	LEU	3.9
1	C	255	GLN	3.9
1	A	191	HIS	3.9
1	G	220	ASN	3.9
1	G	224	LEU	3.8
1	A	249	VAL	3.8
1	E	257	TYR	3.8
1	C	252	GLY	3.8
1	A	179	LEU	3.8
1	E	191	HIS	3.8
1	G	249	VAL	3.7

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Mol	Chain	Res	Type	RSRZ
1	G	199	VAL	3.6
1	E	248	VAL	3.6
1	A	200	THR	3.6
2	D	47	PRO	3.6
1	G	226	GLN	3.6
1	E	219	LEU	3.5
1	G	219	LEU	3.5
1	C	276	PRO	3.5
1	E	274	TRP	3.5
1	G	195	SER	3.4
1	G	250	PRO	3.4
1	C	198	GLU	3.4
1	A	197	GLY	3.4
5	R	1	GLY	3.4
1	E	225	THR	3.3
1	G	255	GLN	3.3
1	G	274	TRP	3.3
1	G	16	GLY	3.3
1	G	257	TYR	3.3
2	D	0	GLY	3.3
1	A	255	GLN	3.2
1	A	252	GLY	3.2
1	E	275	GLU	3.2
1	E	201	LEU	3.2
1	E	256	ASN	3.1
1	G	247	VAL	3.1
1	C	274	TRP	3.0
1	A	224	LEU	3.0
1	G	59	TYR	3.0
1	C	219	LEU	3.0
1	E	217	TRP	3.0
1	G	189	VAL	2.9
1	A	222	GLU	2.9
1	E	258	THR	2.9
1	E	206	LEU	2.9
2	B	54[A]	MET	2.9
1	A	253	LYS	2.9
1	E	189	VAL	2.9
3	F	49	VAL	2.9
1	E	195	SER	2.9
5	P	0	GLY	2.8
1	A	257	TYR	2.8

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Mol	Chain	Res	Type	RSRZ
1	E	198	GLU	2.8
1	G	223	GLU	2.8
1	E	177	ALA	2.7
1	E	254	GLU	2.7
1	G	60	TRP	2.7
5	R	0	GLY	2.7
1	A	251	LEU	2.7
1	C	224	LEU	2.7
2	H	54[A]	MET	2.7
2	H	50	GLU	2.6
1	A	149	GLN	2.6
1	E	226	GLN	2.6
1	C	228	MET	2.6
1	C	182	THR	2.6
1	E	50	PRO	2.6
1	G	58	GLU	2.6
3	F	88	ALA	2.6
1	G	222	GLU	2.6
1	E	41	GLU	2.6
1	C	199	VAL	2.5
1	C	257	TYR	2.5
1	C	259	CYS	2.5
1	G	65	GLN	2.5
1	C	217	TRP	2.5
1	E	246	SER	2.5
2	D	2	GLN	2.5
1	G	50	PRO	2.5
5	P	3	SER	2.5
1	G	61	GLU	2.5
1	C	195	SER	2.5
1	C	248	VAL	2.5
1	G	54	GLN	2.4
3	F	18	GLY	2.4
1	E	247	VAL	2.4
2	D	15	PRO	2.4
1	A	230	LEU	2.4
1	G	175	GLY	2.4
1	A	176	ASN	2.3
1	C	181	ARG	2.3
1	E	223	GLU	2.3
3	F	47	PRO	2.3
1	E	200	THR	2.3

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Mol	Chain	Res	Type	RSRZ
1	G	41	GLU	2.3
1	E	176	ASN	2.3
1	G	79	ARG	2.2
2	H	0	GLY	2.2
1	E	154	GLU	2.2
2	B	46	ILE	2.2
1	C	249	VAL	2.2
1	C	253	LYS	2.2
1	C	230	LEU	2.2
1	G	142	ILE	2.1
1	A	248	VAL	2.1
1	A	228	MET	2.1
5	R	4	LYS	2.1
3	F	99	MET	2.1
1	C	175	GLY	2.1
1	G	150	SER	2.1
1	A	150	SER	2.1
1	A	254	GLU	2.1
1	C	256	ASN	2.1
1	C	196	LYS	2.1
1	G	198	GLU	2.0
1	E	42	ASN	2.0
1	E	194	ARG	2.0
1	A	223	GLU	2.0
1	E	221	GLY	2.0
1	G	171	TYR	2.0
2	B	43	GLY	2.0
1	C	251	LEU	2.0
3	F	71	THR	2.0
1	G	62	ARG	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
7	GOL	A	403	6/6	0.61	0.24	66,66,67,67	0
7	GOL	B	102	6/6	0.65	0.19	57,57,58,58	0
7	GOL	A	404	6/6	0.70	0.20	53,53,54,56	0
7	GOL	B	103	6/6	0.73	0.17	57,57,58,58	0
7	GOL	D	101	6/6	0.75	0.17	57,57,57,58	0
7	GOL	B	101	6/6	0.76	0.19	55,57,57,58	0
7	GOL	C	402	6/6	0.77	0.27	58,58,61,62	0
7	GOL	G	402	6/6	0.81	0.17	50,50,50,50	0
6	SO4	A	401	5/5	0.85	0.22	76,76,76,76	0
7	GOL	A	402	6/6	0.86	0.19	56,56,57,58	0
6	SO4	F	101	5/5	0.89	0.23	91,91,92,92	0
7	GOL	G	403	6/6	0.90	0.20	50,50,50,51	0
7	GOL	A	405	6/6	0.92	0.16	42,43,44,46	0
6	SO4	C	401	5/5	0.96	0.13	68,68,69,69	0
6	SO4	G	401	5/5	0.97	0.15	54,54,55,55	0

6.5 Other polymers [i](#)

There are no such residues in this entry.