



Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2020 – 04:02 am BST

PDB ID : 4GLV
Title : OBody AM3L09 bound to hen egg-white lysozyme
Authors : Steemson, J.D.
Deposited on : 2012-08-15
Resolution : 2.57 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

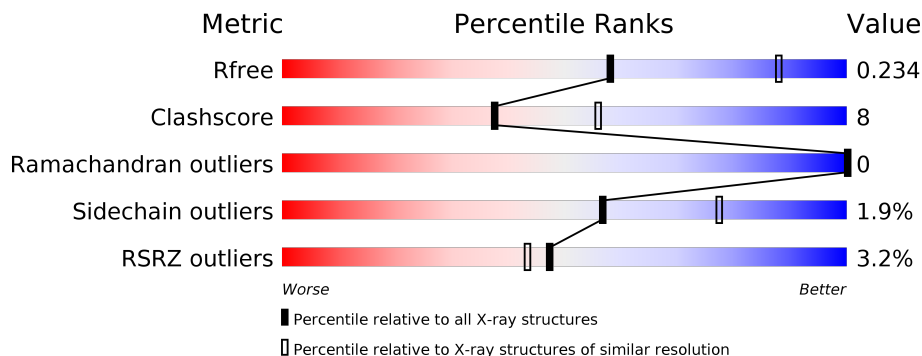
MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

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 2.57 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	3676 (2.60-2.56)
Clashscore	141614	4049 (2.60-2.56)
Ramachandran outliers	138981	3979 (2.60-2.56)
Sidechain outliers	138945	3979 (2.60-2.56)
RSRZ outliers	127900	3614 (2.60-2.56)

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 on 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	129	 5% 81% 18% •
1	C	129	 2% 81% 19%
1	E	129	 5% 80% 19% •
1	G	129	 8% 81% 18% •
2	B	107	 % 83% 16% •
2	D	107	 % 84% 15% •

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Mol	Chain	Length	Quality of chain
2	F	107	<p>2% 84% 14% ..</p>
2	H	107	<p>86% 13% .</p>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	GOL	C	203	-	-	-	X

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7893 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 Lysozyme C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	129	1006	618	193	185	10	3	1	0
1	C	129	1001	613	193	185	10	5	0	0
1	E	129	991	607	189	185	10	5	0	0
1	G	129	1001	613	193	185	10	6	0	0

- Molecule 2 is a protein called OBody AM3L09.

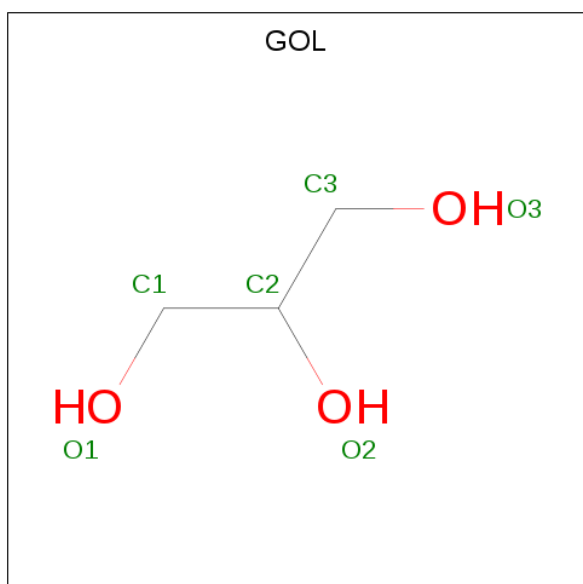
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	B	106	832	537	142	153	4	1	0
2	D	106	830	535	144	151	2	1	0
2	F	106	826	533	142	151	6	0	0
2	H	107	833	538	143	152	6	0	0

- Molecule 3 is PHOSPHATE ION (three-letter code: PO4) (formula: O₄P).



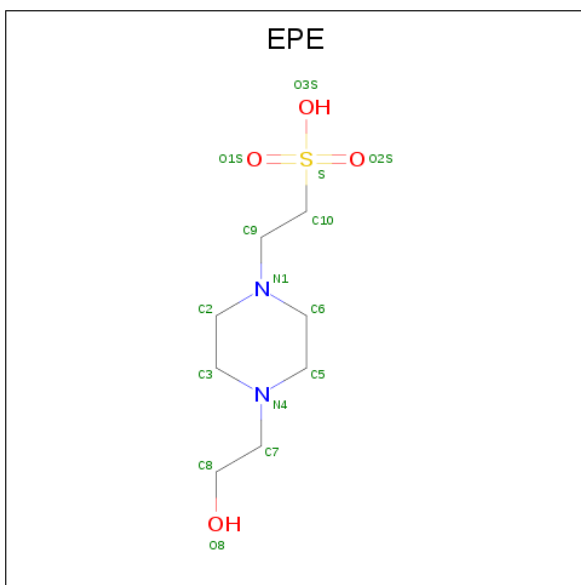
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O P 5 4 1	0	0
3	A	1	Total O P 5 4 1	0	0
3	F	1	Total O P 5 4 1	0	0
3	G	1	Total O P 5 4 1	0	0
3	H	1	Total O P 5 4 1	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



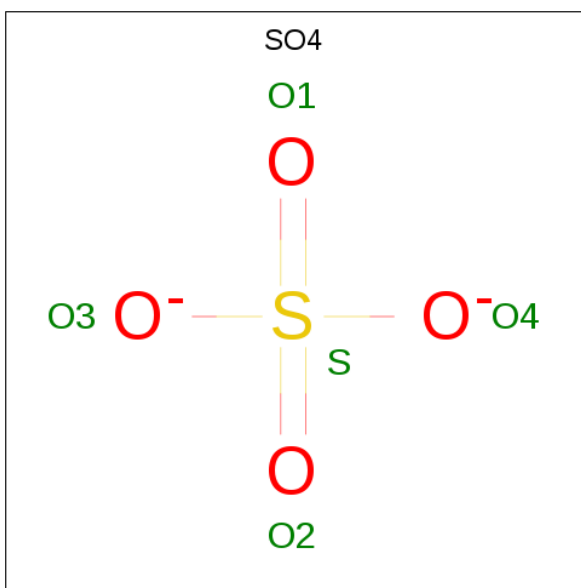
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	D	1	Total	C	O	0	0
			6	3	3		
4	E	1	Total	C	O	0	0
			6	3	3		
4	E	1	Total	C	O	0	0
			6	3	3		
4	F	1	Total	C	O	0	0
			6	3	3		
4	F	1	Total	C	O	0	0
			6	3	3		
4	F	1	Total	C	O	0	0
			6	3	3		
4	F	1	Total	C	O	0	0
			6	3	3		
4	F	1	Total	C	O	0	0
			6	3	3		
4	F	1	Total	C	O	0	0
			6	3	3		
4	G	1	Total	C	O	0	0
			6	3	3		
4	H	1	Total	C	O	0	0
			6	3	3		
4	H	1	Total	C	O	0	0
			6	3	3		
4	H	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: C₈H₁₈N₂O₄S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
5	C	1	15	8	2	4	1	0	0

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



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

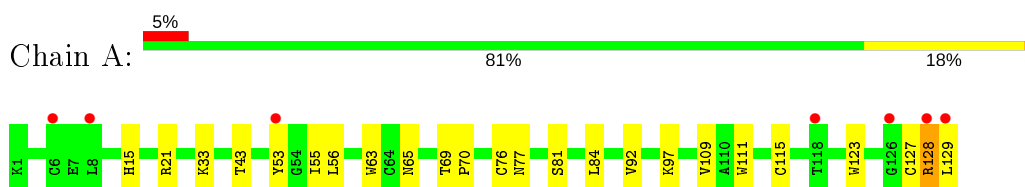
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	55	Total 55	O 55	0	0
7	B	54	Total 54	O 54	0	0
7	C	73	Total 73	O 73	0	0
7	D	38	Total 38	O 38	0	0
7	E	51	Total 51	O 51	0	0
7	F	49	Total 49	O 49	0	0
7	G	44	Total 44	O 44	0	0
7	H	44	Total 44	O 44	0	0

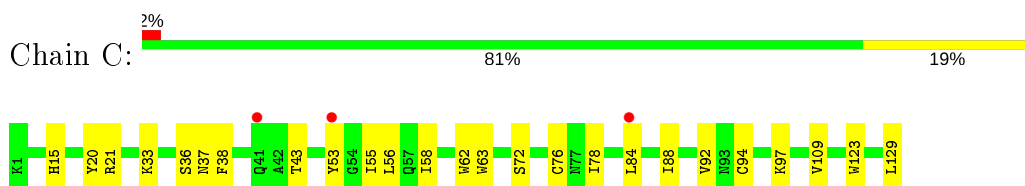
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

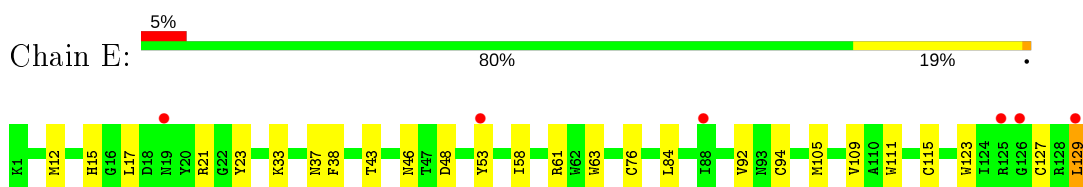
- Molecule 1: Lysozyme C



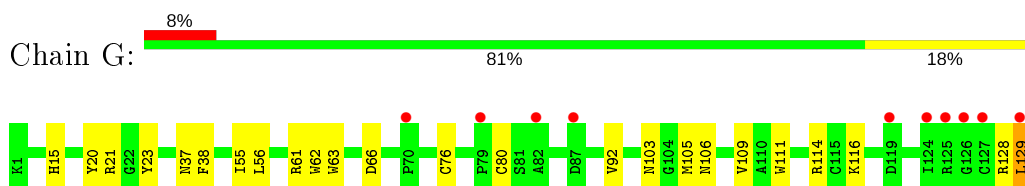
- Molecule 1: Lysozyme C



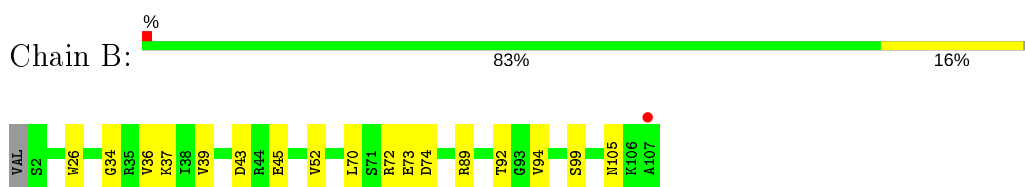
- Molecule 1: Lysozyme C



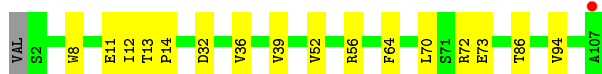
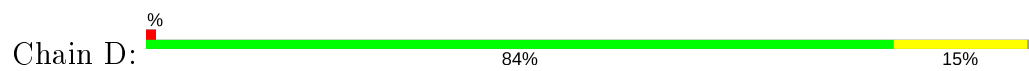
- Molecule 1: Lysozyme C



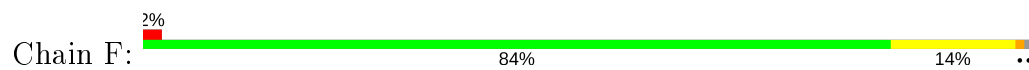
- Molecule 2: OBody AM3L09



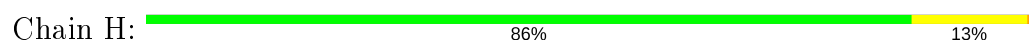
- Molecule 2: OBody AM3L09



- Molecule 2: OBody AM3L09



- Molecule 2: OBody AM3L09



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	59.00Å 69.38Å 76.36Å 72.17° 69.46° 77.55°	Depositor
Resolution (Å)	44.83 – 2.57 48.01 – 2.57	Depositor EDS
% Data completeness (in resolution range)	93.8 (44.83-2.57) 96.2 (48.01-2.57)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.97 (at 2.58Å)	Xtrriage
Refinement program	PHENIX 1.6.1_357	Depositor
R, R_{free}	0.201 , 0.245 0.190 , 0.234	Depositor DCC
R_{free} test set	1657 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	31.2	Xtrriage
Anisotropy	0.290	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 59.2	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	0.92	EDS
Total number of atoms	7893	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.95% 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, PO4, EPE, 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	0.23	0/1029	0.41	0/1391
1	C	0.23	0/1021	0.42	0/1379
1	E	0.23	0/1011	0.40	0/1368
1	G	0.23	0/1021	0.66	1/1379 (0.1%)
2	B	0.24	0/856	0.45	0/1168
2	D	0.24	0/854	0.45	0/1166
2	F	0.28	0/847	0.46	0/1156
2	H	0.24	0/854	0.43	0/1166
All	All	0.24	0/7493	0.47	1/10173 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	129	LEU	CA-C-O	19.21	160.44	120.10

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	1006	0	970	19	0
1	C	1001	0	959	25	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	E	991	0	937	19	0
1	G	1001	0	959	15	0
2	B	832	0	832	10	0
2	D	830	0	828	10	0
2	F	826	0	826	15	0
2	H	833	0	838	10	0
3	A	10	0	0	0	0
3	F	5	0	0	0	0
3	G	5	0	0	0	0
3	H	5	0	0	0	0
4	A	6	0	8	0	0
4	B	12	0	16	0	0
4	C	30	0	40	2	0
4	D	6	0	8	0	0
4	E	12	0	16	0	0
4	F	30	0	40	3	0
4	G	6	0	8	0	0
4	H	18	0	24	0	0
5	C	15	0	17	2	0
6	E	5	0	0	0	0
7	A	55	0	0	0	0
7	B	54	0	0	2	0
7	C	73	0	0	0	0
7	D	38	0	0	0	0
7	E	51	0	0	1	0
7	F	49	0	0	1	0
7	G	44	0	0	0	0
7	H	44	0	0	1	0
All	All	7893	0	7326	113	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 8.

All (113) 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)
2:F:53:TYR:CE2	2:F:55:GLU:HB2	1.70	1.27
1:C:21:ARG:H	5:C:206:EPE:H52	1.17	1.03
2:F:53:TYR:HE2	2:F:55:GLU:CB	1.76	0.98
1:C:53:TYR:HD2	1:C:84:LEU:HD21	1.32	0.93
2:F:53:TYR:HE2	2:F:55:GLU:HB2	0.80	0.92

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:53:TYR:CD2	1:C:84:LEU:HD21	2.14	0.81
1:A:53:TYR:HD2	1:A:84:LEU:HD21	1.45	0.78
2:F:86:THR:H	4:F:206:GOL:H11	1.55	0.71
1:A:53:TYR:CD2	1:A:84:LEU:HD21	2.26	0.69
1:C:21:ARG:H	5:C:206:EPE:C5	2.01	0.69
2:B:43:ASP:OD2	7:B:308:HOH:O	2.10	0.68
2:H:12:ILE:HG22	2:H:94:VAL:HG21	1.76	0.67
2:B:39:VAL:HG13	2:B:52:VAL:HB	1.76	0.67
1:G:128:ARG:O	1:G:129:LEU:HB2	1.99	0.63
1:C:97:LYS:NZ	1:C:97:LYS:HB2	2.14	0.62
2:F:95:GLU:OE1	7:F:312:HOH:O	2.16	0.62
2:D:39:VAL:HG13	2:D:52:VAL:HB	1.80	0.61
2:H:39:VAL:HG13	2:H:52:VAL:HB	1.81	0.61
2:D:12:ILE:HG22	2:D:94:VAL:HG21	1.83	0.60
1:C:38:PHE:HA	1:C:55:ILE:HD11	1.85	0.57
1:E:63:TRP:O	1:E:76:CYS:HB2	2.04	0.57
1:C:36:SER:O	4:C:203:GOL:H12	2.04	0.57
1:A:55:ILE:HG23	1:A:56:LEU:HG	1.87	0.57
1:C:43:THR:OG1	1:C:53:TYR:CE2	2.55	0.55
1:E:53:TYR:CD2	1:E:84:LEU:HD21	2.41	0.55
1:E:53:TYR:HD2	1:E:84:LEU:HD21	1.70	0.55
1:A:128:ARG:HE	1:A:128:ARG:N	2.05	0.55
2:B:72:ARG:O	2:B:73:GLU:HB2	2.06	0.55
2:H:72:ARG:O	2:H:73:GLU:HB2	2.06	0.55
1:A:63:TRP:O	1:A:76:CYS:HB2	2.08	0.54
1:G:23:TYR:CE2	1:G:105:MET:HG3	2.42	0.54
2:F:72:ARG:O	2:F:73:GLU:HB2	2.10	0.52
1:E:127:CYS:HB2	1:E:129:LEU:HD21	1.90	0.52
1:C:43:THR:HG1	1:C:53:TYR:HE2	1.49	0.52
1:G:66:ASP:HB3	1:G:80:CYS:SG	2.50	0.52
2:F:53:TYR:CD2	2:F:97:PHE:CE1	2.98	0.52
1:E:111:TRP:CD1	1:E:115:CYS:HB2	2.45	0.51
1:E:109:VAL:HB	2:F:36:VAL:HG23	1.91	0.51
2:D:56:ARG:HD3	2:D:64:PHE:CZ	2.46	0.51
1:G:20:TYR:CD2	1:G:21:ARG:HG2	2.46	0.51
1:C:20:TYR:CD2	1:C:21:ARG:HG2	2.46	0.51
2:H:2:SER:HB2	2:H:3:PRO:HD2	1.93	0.51
2:D:56:ARG:HD3	2:D:64:PHE:CE1	2.46	0.50
1:A:127:CYS:HB2	1:A:129:LEU:HD21	1.92	0.50
1:G:109:VAL:HB	2:H:36:VAL:HG23	1.95	0.49
1:G:55:ILE:HG23	1:G:56:LEU:HG	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:89:ARG:NH1	2:H:60:PRO:HG3	2.28	0.48
1:C:63:TRP:O	1:C:76:CYS:HB2	2.13	0.48
1:E:15:HIS:HB3	1:E:92:VAL:HG11	1.96	0.48
1:A:111:TRP:CD1	1:A:115:CYS:HB2	2.49	0.47
1:C:97:LYS:HZ3	1:C:97:LYS:HB2	1.79	0.47
1:C:43:THR:HG23	1:C:53:TYR:CZ	2.49	0.47
1:E:109:VAL:HB	2:F:36:VAL:CG2	2.44	0.47
2:H:72:ARG:O	2:H:73:GLU:CB	2.61	0.47
1:A:127:CYS:HB2	1:A:129:LEU:CD2	2.44	0.47
1:E:43:THR:OG1	1:E:53:TYR:CE2	2.66	0.47
1:C:62:TRP:CD2	2:D:32:ASP:HB3	2.50	0.47
1:C:88:ILE:H	4:C:205:GOL:H32	1.80	0.46
2:F:105:ASN:HA	4:F:205:GOL:O1	2.14	0.46
1:A:53:TYR:CE2	1:A:84:LEU:HD11	2.49	0.46
1:E:12:MET:HG2	1:E:17:LEU:HD12	1.96	0.46
1:A:128:ARG:H	1:A:128:ARG:HE	1.64	0.46
1:A:33:LYS:HG2	1:A:123:TRP:CH2	2.51	0.46
1:E:129:LEU:HD22	1:E:129:LEU:N	2.30	0.46
1:A:15:HIS:HB3	1:A:92:VAL:HG11	1.98	0.45
2:B:99:SER:CB	7:B:324:HOH:O	2.63	0.45
2:D:8:TRP:O	2:D:11:GLU:HB2	2.17	0.45
2:H:92:THR:HG22	2:H:94:VAL:HG12	1.98	0.45
1:C:109:VAL:HB	2:D:36:VAL:HG23	1.99	0.45
1:A:77:ASN:ND2	2:F:87:VAL:HG22	2.32	0.45
1:E:58:ILE:HD13	1:E:94:CYS:SG	2.56	0.45
2:F:82:VAL:HG13	2:F:94:VAL:HG22	1.99	0.44
1:C:15:HIS:HB3	1:C:92:VAL:HG11	1.98	0.44
1:E:61:ARG:HB3	7:E:315:HOH:O	2.16	0.44
2:F:72:ARG:O	2:F:73:GLU:CB	2.64	0.44
1:C:37:ASN:O	1:C:38:PHE:HB2	2.18	0.44
2:H:73:GLU:HB3	2:H:107:ALA:HB2	2.00	0.44
1:A:109:VAL:HB	2:B:36:VAL:HG23	2.00	0.43
1:E:23:TYR:CE2	1:E:105:MET:HG3	2.53	0.43
1:E:53:TYR:CE2	1:E:84:LEU:HD11	2.54	0.43
2:H:55:GLU:OE1	7:H:343:HOH:O	2.21	0.43
1:A:97:LYS:HE3	1:A:97:LYS:HB2	1.73	0.43
1:G:23:TYR:CZ	1:G:105:MET:HG3	2.54	0.42
2:D:13:THR:HB	2:D:14:PRO:HD2	2.02	0.42
1:E:21:ARG:HA	1:E:21:ARG:HD3	1.87	0.42
2:F:26:TRP:HA	2:F:74:ASP:O	2.20	0.42
1:C:58:ILE:HD13	1:C:94:CYS:SG	2.59	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:63:TRP:O	1:G:76:CYS:HB2	2.19	0.42
1:E:33:LYS:HG2	1:E:123:TRP:CH2	2.54	0.42
1:C:33:LYS:HG2	1:C:123:TRP:CH2	2.55	0.42
1:G:38:PHE:HA	1:G:55:ILE:HD11	2.01	0.42
1:G:61:ARG:HG3	1:G:62:TRP:HD1	1.84	0.42
1:A:65:ASN:HD22	4:F:206:GOL:C1	2.33	0.41
1:C:55:ILE:HG23	1:C:56:LEU:HG	2.02	0.41
1:C:53:TYR:CE2	1:C:84:LEU:HD11	2.54	0.41
1:G:111:TRP:CZ3	1:G:116:LYS:HD2	2.56	0.41
2:B:92:THR:HG22	2:B:94:VAL:HG22	2.02	0.41
2:F:74:ASP:OD1	2:F:107:ALA:N	2.53	0.41
1:G:103:ASN:O	1:G:106:ASN:HB2	2.21	0.41
1:G:15:HIS:HB3	1:G:92:VAL:HG11	2.03	0.41
1:A:43:THR:OG1	1:A:53:TYR:CE2	2.72	0.41
2:B:26:TRP:HA	2:B:74:ASP:O	2.20	0.41
2:B:45:GLU:OE1	1:G:114:ARG:CZ	2.69	0.41
1:C:21:ARG:HD3	1:C:21:ARG:HA	1.91	0.41
1:E:37:ASN:O	1:E:38:PHE:HB2	2.21	0.41
1:E:46:ASN:HB2	1:E:48:ASP:OD1	2.21	0.41
1:A:69:THR:HA	1:A:70:PRO:HD3	1.91	0.40
1:C:62:TRP:CE2	2:D:32:ASP:HB3	2.56	0.40
1:A:21:ARG:HA	1:A:21:ARG:HD3	1.92	0.40
2:B:34:GLY:O	2:B:37:LYS:HE2	2.21	0.40
1:C:78:ILE:O	1:C:78:ILE:HD12	2.22	0.40
1:G:37:ASN:O	1:G:38:PHE:HB2	2.21	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	128/129 (99%)	126 (98%)	2 (2%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	127/129 (98%)	126 (99%)	1 (1%)	0	100	100
1	E	127/129 (98%)	127 (100%)	0	0	100	100
1	G	127/129 (98%)	127 (100%)	0	0	100	100
2	B	105/107 (98%)	103 (98%)	2 (2%)	0	100	100
2	D	105/107 (98%)	103 (98%)	2 (2%)	0	100	100
2	F	104/107 (97%)	101 (97%)	3 (3%)	0	100	100
2	H	105/107 (98%)	103 (98%)	2 (2%)	0	100	100
All	All	928/944 (98%)	916 (99%)	12 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	106/105 (101%)	104 (98%)	2 (2%)	57	77
1	C	105/105 (100%)	103 (98%)	2 (2%)	57	77
1	E	103/105 (98%)	102 (99%)	1 (1%)	76	89
1	G	105/105 (100%)	105 (100%)	0	100	100
2	B	89/90 (99%)	87 (98%)	2 (2%)	52	74
2	D	88/90 (98%)	84 (96%)	4 (4%)	27	50
2	F	88/90 (98%)	86 (98%)	2 (2%)	50	73
2	H	89/90 (99%)	86 (97%)	3 (3%)	37	60
All	All	773/780 (99%)	757 (98%)	16 (2%)	57	75

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	81	SER
1	A	128	ARG

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Mol	Chain	Res	Type
2	B	70	LEU
2	B	105	ASN
1	C	72	SER
1	C	129	LEU
2	D	70	LEU
2	D	72[A]	ARG
2	D	72[B]	ARG
2	D	86	THR
1	E	129	LEU
2	F	70	LEU
2	F	94	VAL
2	H	70	LEU
2	H	73	GLU
2	H	83	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	65	ASN
1	G	41	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

27 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
4	GOL	H	203	-	5,5,5	0.33	0	5,5,5	0.25	0
3	PO4	A	202	-	4,4,4	0.87	0	6,6,6	0.44	0
3	PO4	F	201	-	4,4,4	0.91	0	6,6,6	0.50	0
4	GOL	C	203	-	5,5,5	0.36	0	5,5,5	0.29	0
3	PO4	G	201	-	4,4,4	0.92	0	6,6,6	0.44	0
4	GOL	G	202	-	5,5,5	0.36	0	5,5,5	0.28	0
4	GOL	E	202	-	5,5,5	0.39	0	5,5,5	0.15	0
4	GOL	C	201	-	5,5,5	0.36	0	5,5,5	0.27	0
4	GOL	B	201	-	5,5,5	0.35	0	5,5,5	0.31	0
4	GOL	C	205	-	5,5,5	0.38	0	5,5,5	0.28	0
4	GOL	B	202	-	5,5,5	0.37	0	5,5,5	0.24	0
4	GOL	H	202	-	5,5,5	0.35	0	5,5,5	0.35	0
4	GOL	F	203	-	5,5,5	0.31	0	5,5,5	0.31	0
4	GOL	E	201	-	5,5,5	0.37	0	5,5,5	0.20	0
4	GOL	F	205	-	5,5,5	0.37	0	5,5,5	0.29	0
4	GOL	D	201	-	5,5,5	0.36	0	5,5,5	0.25	0
4	GOL	F	206	-	5,5,5	0.54	0	5,5,5	0.84	0
4	GOL	F	204	-	5,5,5	0.36	0	5,5,5	0.24	0
4	GOL	C	202	-	5,5,5	0.36	0	5,5,5	0.28	0
4	GOL	H	204	-	5,5,5	0.34	0	5,5,5	0.38	0
3	PO4	H	201	-	4,4,4	0.88	0	6,6,6	0.55	0
6	SO4	E	203	-	4,4,4	0.13	0	6,6,6	0.09	0
4	GOL	F	202	-	5,5,5	0.38	0	5,5,5	0.22	0
4	GOL	C	204	-	5,5,5	0.36	0	5,5,5	0.30	0
4	GOL	A	203	-	5,5,5	0.33	0	5,5,5	0.35	0
3	PO4	A	201	-	4,4,4	0.96	0	6,6,6	0.45	0
5	EPE	C	206	-	15,15,15	0.86	1 (6%)	18,20,20	1.78	6 (33%)

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	GOL	F	204	-	-	2/4/4/4	-
4	GOL	C	202	-	-	4/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	H	203	-	-	4/4/4/4	-
4	GOL	G	202	-	-	2/4/4/4	-
4	GOL	E	202	-	-	2/4/4/4	-
4	GOL	C	201	-	-	2/4/4/4	-
4	GOL	E	201	-	-	2/4/4/4	-
4	GOL	F	205	-	-	3/4/4/4	-
4	GOL	C	205	-	-	2/4/4/4	-
4	GOL	D	201	-	-	2/4/4/4	-
4	GOL	B	202	-	-	2/4/4/4	-
4	GOL	F	203	-	-	2/4/4/4	-
4	GOL	H	202	-	-	2/4/4/4	-
4	GOL	F	202	-	-	2/4/4/4	-
4	GOL	F	206	-	-	1/4/4/4	-
4	GOL	C	203	-	-	2/4/4/4	-
4	GOL	C	204	-	-	2/4/4/4	-
4	GOL	A	203	-	-	2/4/4/4	-
5	EPE	C	206	-	-	3/9/19/19	0/1/1/1
4	GOL	B	201	-	-	2/4/4/4	-
4	GOL	H	204	-	-	2/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	206	EPE	C10-S	2.90	1.81	1.77

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	206	EPE	C5-N4-C3	4.39	118.71	108.83
5	C	206	EPE	C7-N4-C3	2.88	118.61	111.23
5	C	206	EPE	O2S-S-C10	2.59	110.03	106.92
5	C	206	EPE	C7-N4-C5	2.30	117.12	111.23
5	C	206	EPE	O3S-S-C10	2.28	109.45	105.77
5	C	206	EPE	O1S-S-C10	2.01	109.34	106.92

There are no chirality outliers.

All (47) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	H	203	GOL	O1-C1-C2-C3
4	C	203	GOL	O1-C1-C2-O2
4	C	203	GOL	O1-C1-C2-C3
4	G	202	GOL	O1-C1-C2-C3
4	E	202	GOL	O1-C1-C2-C3
4	B	201	GOL	O1-C1-C2-C3
4	C	205	GOL	O1-C1-C2-C3
4	B	202	GOL	O1-C1-C2-C3
4	H	202	GOL	O1-C1-C2-C3
4	F	203	GOL	O1-C1-C2-C3
4	E	201	GOL	O1-C1-C2-C3
4	F	205	GOL	C1-C2-C3-O3
4	F	204	GOL	C1-C2-C3-O3
4	F	204	GOL	O2-C2-C3-O3
4	C	202	GOL	O1-C1-C2-C3
4	C	202	GOL	C1-C2-C3-O3
4	C	202	GOL	O2-C2-C3-O3
4	H	204	GOL	O1-C1-C2-C3
4	C	204	GOL	O1-C1-C2-C3
4	H	203	GOL	C1-C2-C3-O3
4	C	201	GOL	C1-C2-C3-O3
4	D	201	GOL	O1-C1-C2-C3
4	A	203	GOL	O1-C1-C2-C3
4	H	203	GOL	O1-C1-C2-O2
4	C	201	GOL	O2-C2-C3-O3
4	B	201	GOL	O1-C1-C2-O2
4	B	202	GOL	O1-C1-C2-O2
4	H	202	GOL	O1-C1-C2-O2
4	F	203	GOL	O1-C1-C2-O2
4	D	201	GOL	O1-C1-C2-O2
4	C	202	GOL	O1-C1-C2-O2
4	C	204	GOL	O1-C1-C2-O2
5	C	206	EPE	N4-C7-C8-O8
4	G	202	GOL	O1-C1-C2-O2
4	E	202	GOL	O1-C1-C2-O2
4	C	205	GOL	O1-C1-C2-O2
4	E	201	GOL	O1-C1-C2-O2
4	H	204	GOL	O1-C1-C2-O2
4	F	205	GOL	O2-C2-C3-O3
4	A	203	GOL	O1-C1-C2-O2
4	F	202	GOL	O1-C1-C2-C3
5	C	206	EPE	C9-C10-S-O1S
5	C	206	EPE	C9-C10-S-O3S

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Mol	Chain	Res	Type	Atoms
4	F	202	GOL	O1-C1-C2-O2
4	H	203	GOL	O2-C2-C3-O3
4	F	205	GOL	O1-C1-C2-C3
4	F	206	GOL	O1-C1-C2-O2

There are no ring outliers.

5 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	203	GOL	1	0
4	C	205	GOL	1	0
4	F	205	GOL	1	0
4	F	206	GOL	2	0
5	C	206	EPE	2	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ > 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q < 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ > 2	OWAB(Å ²)	Q < 0.9
1	A	129/129 (100%)	0.44	7 (5%) 25 22	14, 26, 41, 73	2 (1%)
1	C	129/129 (100%)	0.35	3 (2%) 60 57	14, 26, 36, 43	1 (0%)
1	E	129/129 (100%)	0.42	6 (4%) 31 28	14, 28, 42, 58	2 (1%)
1	G	129/129 (100%)	0.61	10 (7%) 13 10	16, 29, 43, 65	1 (0%)
2	B	106/107 (99%)	0.17	1 (0%) 84 83	14, 24, 38, 52	2 (1%)
2	D	106/107 (99%)	0.17	1 (0%) 84 83	16, 25, 42, 58	1 (0%)
2	F	106/107 (99%)	0.24	2 (1%) 66 64	15, 22, 37, 51	3 (2%)
2	H	107/107 (100%)	0.10	0 100 100	16, 23, 38, 45	3 (2%)
All	All	941/944 (99%)	0.33	30 (3%) 47 43	14, 26, 40, 73	15 (1%)

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	F	107	ALA	7.6
1	A	53	TYR	5.9
1	C	53	TYR	5.7
2	F	53	TYR	5.6
1	A	126	GLY	4.8
1	G	126	GLY	4.7
2	B	107	ALA	4.0
1	E	53	TYR	3.9
1	E	19	ASN	3.9
1	A	128	ARG	3.5
1	G	129	LEU	3.4
1	G	70	PRO	3.1
1	G	125	ARG	3.1
1	G	127	CYS	2.6
1	E	129	LEU	2.5
1	G	119	ASP	2.5

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Mol	Chain	Res	Type	RSRZ
1	G	87	ASP	2.5
1	E	125	ARG	2.4
1	G	124	ILE	2.4
1	C	41	GLN	2.4
1	A	6	CYS	2.3
1	G	82	ALA	2.3
1	E	88	ILE	2.2
1	A	118	THR	2.2
2	D	107	ALA	2.2
1	A	8	LEU	2.2
1	E	126	GLY	2.1
1	G	79	PRO	2.1
1	C	84	LEU	2.1
1	A	129	LEU	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 carbohydrates 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
4	GOL	B	201	6/6	0.63	0.24	43,45,48,60	0
4	GOL	H	203	6/6	0.69	0.33	29,35,40,42	0
4	GOL	H	204	6/6	0.69	0.21	34,38,47,54	0
4	GOL	C	203	6/6	0.71	0.42	41,48,50,51	0
4	GOL	F	203	6/6	0.74	0.20	28,33,35,40	0
4	GOL	E	202	6/6	0.76	0.30	42,43,46,50	0
4	GOL	A	203	6/6	0.78	0.27	45,52,53,55	0
4	GOL	F	202	6/6	0.79	0.20	34,38,42,43	0
4	GOL	C	202	6/6	0.79	0.22	32,44,46,50	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	EPE	C	206	15/15	0.80	0.30	27,34,52,55	15
4	GOL	F	204	6/6	0.81	0.19	37,45,46,51	0
4	GOL	H	202	6/6	0.84	0.21	43,49,50,53	0
4	GOL	C	204	6/6	0.86	0.19	44,52,60,61	0
4	GOL	E	201	6/6	0.86	0.24	33,49,54,55	0
4	GOL	D	201	6/6	0.86	0.21	27,29,36,39	0
4	GOL	G	202	6/6	0.87	0.33	47,51,58,65	0
3	PO4	A	202	5/5	0.87	0.27	36,48,61,74	0
3	PO4	A	201	5/5	0.90	0.27	35,47,51,62	5
4	GOL	F	205	6/6	0.90	0.15	32,38,42,43	0
4	GOL	C	205	6/6	0.91	0.19	34,38,47,51	0
4	GOL	B	202	6/6	0.93	0.19	36,38,41,44	0
4	GOL	F	206	6/6	0.94	0.27	3,13,21,39	0
3	PO4	G	201	5/5	0.94	0.19	36,41,49,64	0
4	GOL	C	201	6/6	0.94	0.23	25,30,31,40	0
6	SO4	E	203	5/5	0.95	0.16	46,51,54,64	0
3	PO4	F	201	5/5	0.96	0.20	28,38,46,49	0
3	PO4	H	201	5/5	0.97	0.13	23,35,44,44	0

6.5 Other polymers

There are no such residues in this entry.