Full wwPDB X-ray Structure Validation Report ⓘ

Oct 11, 2023 – 04:43 AM EDT

PDB ID	:	7N5J
Title	:	PCNA from Thermococcus gammatolerans: crystal I, collection 5, 2.82 A, 89.1 MGy
Authors	:	Marin-Tovar, Y.; Rudino-Pinera, E.
Deposited on	:	2021-06-05
Resolution	:	2.82 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:

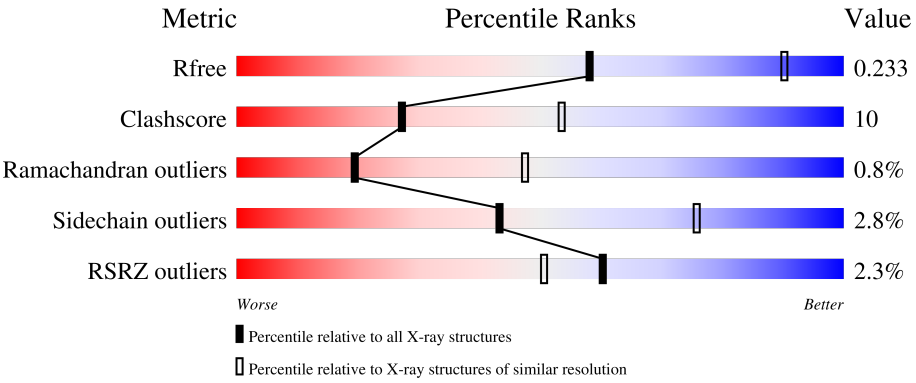
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.82 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	3617 (2.84-2.80)
Clashscore	141614	4060 (2.84-2.80)
Ramachandran outliers	138981	3978 (2.84-2.80)
Sidechain outliers	138945	3980 (2.84-2.80)
RSRZ outliers	127900	3552 (2.84-2.80)

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 <=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	265	77% 17% 6%
1	B	265	% 68% 25% • 7%
1	C	265	3% 70% 22% • 7%
1	D	265	5% 72% 20% • 6%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	GOL	A	305	-	-	-	X
2	GOL	B	301	-	-	-	X
2	GOL	D	303	-	-	-	X

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 8541 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 DNA polymerase sliding clamp.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	248	Total	C	N	O	S	0	5	0
			2009	1285	315	400	9			
1	B	247	Total	C	N	O	S	0	6	0
			2005	1282	313	401	9			
1	C	247	Total	C	N	O	S	0	6	0
			2007	1283	313	403	8			
1	D	248	Total	C	N	O	S	0	4	0
			2002	1282	314	398	8			

There are 64 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-15	MET	-	expression tag	UNP C5A5N6
A	-14	ASN	-	expression tag	UNP C5A5N6
A	-13	HIS	-	expression tag	UNP C5A5N6
A	-12	LYS	-	expression tag	UNP C5A5N6
A	-11	VAL	-	expression tag	UNP C5A5N6
A	-10	HIS	-	expression tag	UNP C5A5N6
A	-9	HIS	-	expression tag	UNP C5A5N6
A	-8	HIS	-	expression tag	UNP C5A5N6
A	-7	HIS	-	expression tag	UNP C5A5N6
A	-6	HIS	-	expression tag	UNP C5A5N6
A	-5	HIS	-	expression tag	UNP C5A5N6
A	-4	ILE	-	expression tag	UNP C5A5N6
A	-3	GLU	-	expression tag	UNP C5A5N6
A	-2	GLY	-	expression tag	UNP C5A5N6
A	-1	ARG	-	expression tag	UNP C5A5N6
A	0	HIS	-	expression tag	UNP C5A5N6
B	-15	MET	-	expression tag	UNP C5A5N6
B	-14	ASN	-	expression tag	UNP C5A5N6
B	-13	HIS	-	expression tag	UNP C5A5N6
B	-12	LYS	-	expression tag	UNP C5A5N6
B	-11	VAL	-	expression tag	UNP C5A5N6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-10	HIS	-	expression tag	UNP C5A5N6
B	-9	HIS	-	expression tag	UNP C5A5N6
B	-8	HIS	-	expression tag	UNP C5A5N6
B	-7	HIS	-	expression tag	UNP C5A5N6
B	-6	HIS	-	expression tag	UNP C5A5N6
B	-5	HIS	-	expression tag	UNP C5A5N6
B	-4	ILE	-	expression tag	UNP C5A5N6
B	-3	GLU	-	expression tag	UNP C5A5N6
B	-2	GLY	-	expression tag	UNP C5A5N6
B	-1	ARG	-	expression tag	UNP C5A5N6
B	0	HIS	-	expression tag	UNP C5A5N6
C	-15	MET	-	expression tag	UNP C5A5N6
C	-14	ASN	-	expression tag	UNP C5A5N6
C	-13	HIS	-	expression tag	UNP C5A5N6
C	-12	LYS	-	expression tag	UNP C5A5N6
C	-11	VAL	-	expression tag	UNP C5A5N6
C	-10	HIS	-	expression tag	UNP C5A5N6
C	-9	HIS	-	expression tag	UNP C5A5N6
C	-8	HIS	-	expression tag	UNP C5A5N6
C	-7	HIS	-	expression tag	UNP C5A5N6
C	-6	HIS	-	expression tag	UNP C5A5N6
C	-5	HIS	-	expression tag	UNP C5A5N6
C	-4	ILE	-	expression tag	UNP C5A5N6
C	-3	GLU	-	expression tag	UNP C5A5N6
C	-2	GLY	-	expression tag	UNP C5A5N6
C	-1	ARG	-	expression tag	UNP C5A5N6
C	0	HIS	-	expression tag	UNP C5A5N6
D	-15	MET	-	expression tag	UNP C5A5N6
D	-14	ASN	-	expression tag	UNP C5A5N6
D	-13	HIS	-	expression tag	UNP C5A5N6
D	-12	LYS	-	expression tag	UNP C5A5N6
D	-11	VAL	-	expression tag	UNP C5A5N6
D	-10	HIS	-	expression tag	UNP C5A5N6
D	-9	HIS	-	expression tag	UNP C5A5N6
D	-8	HIS	-	expression tag	UNP C5A5N6
D	-7	HIS	-	expression tag	UNP C5A5N6
D	-6	HIS	-	expression tag	UNP C5A5N6
D	-5	HIS	-	expression tag	UNP C5A5N6
D	-4	ILE	-	expression tag	UNP C5A5N6
D	-3	GLU	-	expression tag	UNP C5A5N6
D	-2	GLY	-	expression tag	UNP C5A5N6
D	-1	ARG	-	expression tag	UNP C5A5N6

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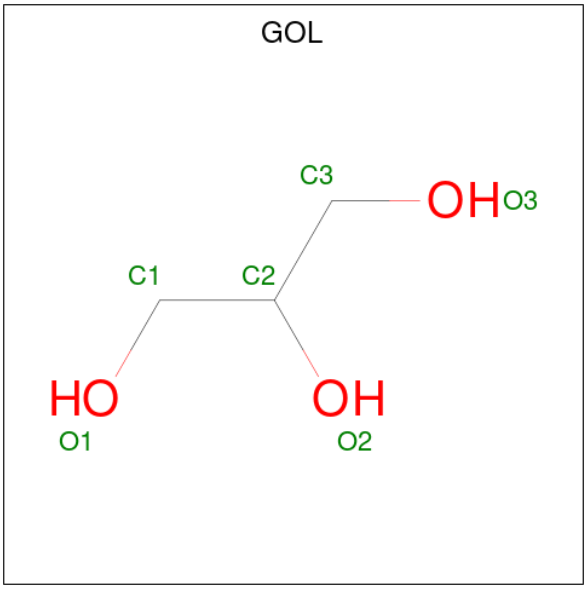
Chain	Residue	Modelled	Actual	Comment	Reference
D	0	HIS	-	expression tag	UNP C5A5N6

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

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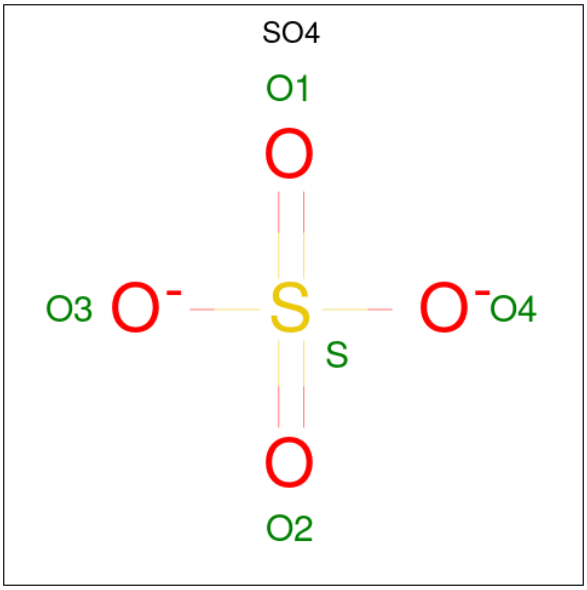
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	C	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0

- Molecule 4 is water.

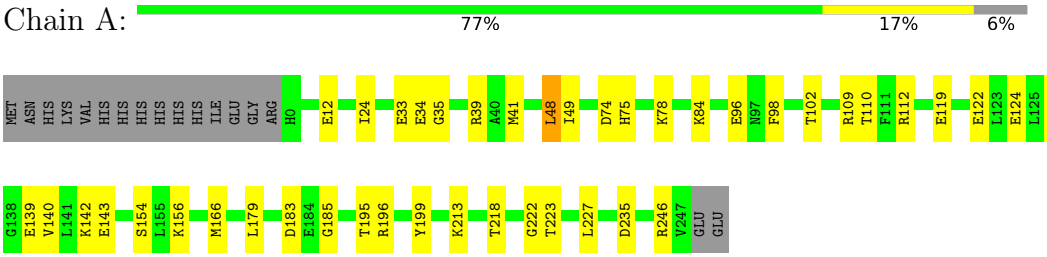
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	93	Total O 93 93	0	0
4	B	71	Total O 71 71	0	0
4	C	72	Total O 72 72	0	0
4	D	84	Total O 84 84	0	0

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.

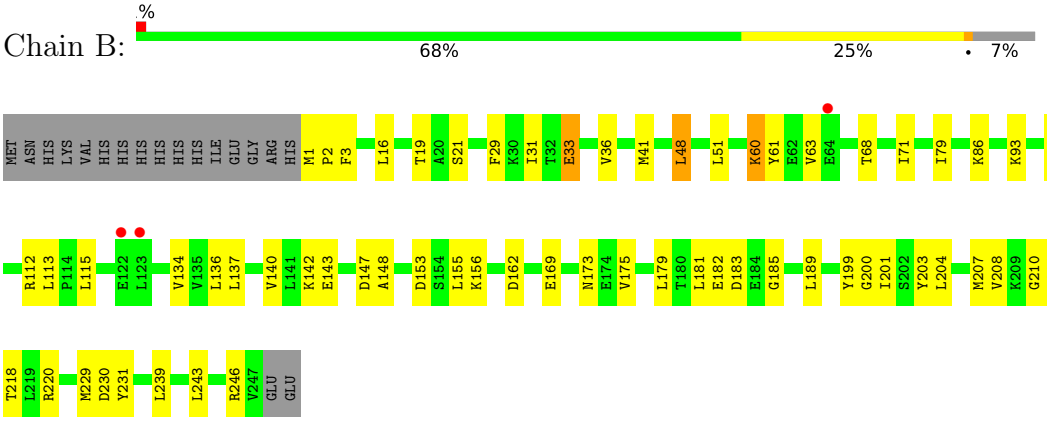
• Molecule 1: DNA polymerase sliding clamp

Chain A:



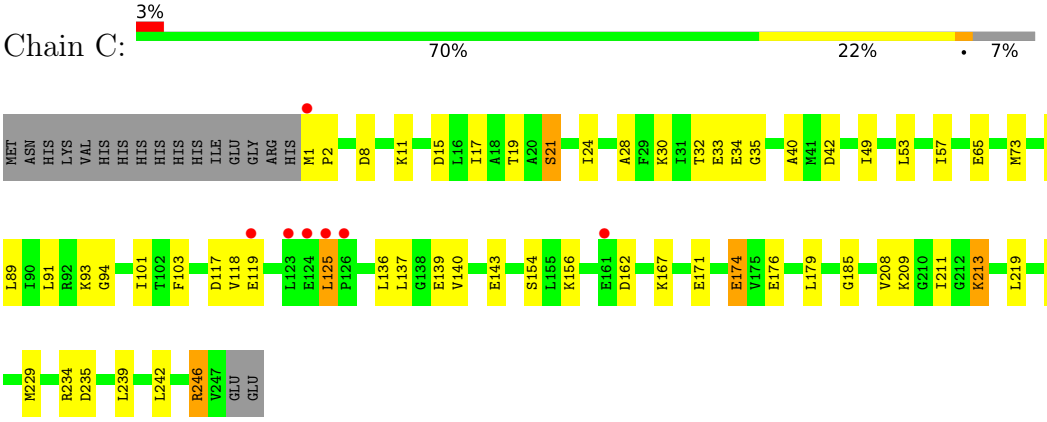
• Molecule 1: DNA polymerase sliding clamp

Chain B:



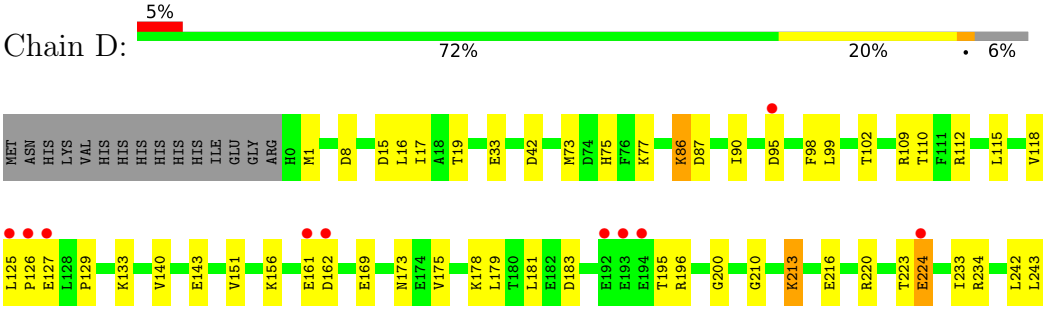
• Molecule 1: DNA polymerase sliding clamp

Chain C:



• Molecule 1: DNA polymerase sliding clamp

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 63	Depositor
Cell constants a, b, c, α, β, γ	187.87Å 187.87Å 64.31Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	37.33 – 2.82 45.12 – 2.82	Depositor EDS
% Data completeness (in resolution range)	99.8 (37.33-2.82) 99.9 (45.12-2.82)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.37 (at 2.81Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.170 , 0.233 0.171 , 0.233	Depositor DCC
R_{free} test set	1581 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	69.3	Xtriage
Anisotropy	0.259	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 63.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.024 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	8541	wwPDB-VP
Average B, all atoms (Å^2)	72.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 24.03 % 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 4.1463e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, 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	0.46	0/2039	0.62	0/2746
1	B	0.50	0/2034	0.68	0/2739
1	C	0.49	0/2036	0.68	1/2742 (0.0%)
1	D	0.47	0/2032	0.65	1/2737 (0.0%)
All	All	0.48	0/8141	0.66	2/10964 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	125	LEU	CA-CB-CG	7.56	132.69	115.30
1	D	123	LEU	CA-CB-CG	5.89	128.85	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2009	0	2021	34	0
1	B	2005	0	2018	56	0
1	C	2007	0	2017	40	0
1	D	2002	0	2017	39	0
2	A	30	0	40	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	36	0	48	9	0
2	C	12	0	16	0	0
2	D	30	0	40	4	0
3	A	25	0	0	0	0
3	B	20	0	0	1	0
3	C	25	0	0	0	0
3	D	20	0	0	0	0
4	A	93	0	0	6	0
4	B	71	0	0	8	0
4	C	72	0	0	5	0
4	D	84	0	0	10	0
All	All	8541	0	8217	167	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 (167) 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:41[B]:MET:SD	1:A:48:LEU:HD12	1.86	1.15
1:B:142:LYS:NZ	1:B:211:ILE:O	2.12	0.82
1:B:33:GLU:HG2	1:B:63:VAL:HG22	1.65	0.78
1:C:143[B]:GLU:OE2	4:C:401:HOH:O	2.06	0.73
1:B:41[B]:MET:SD	1:B:48:LEU:HD12	2.28	0.73
1:D:183:ASP:OD2	4:D:401:HOH:O	2.06	0.72
1:A:143[B]:GLU:OE1	2:A:304:GOL:O2	2.08	0.70
1:A:34:GLU:OE1	4:A:401:HOH:O	2.10	0.70
1:C:28:ALA:O	4:C:402:HOH:O	2.09	0.69
1:B:60:LYS:HE3	1:B:61:TYR:H	1.57	0.68
1:C:33:GLU:OE1	4:C:403:HOH:O	2.10	0.68
1:A:183:ASP:OD2	4:A:402:HOH:O	2.10	0.67
1:D:112:ARG:HH11	1:D:112:ARG:HG3	1.59	0.67
1:C:171:GLU:N	1:C:171:GLU:OE2	2.27	0.67
1:B:61:TYR:O	4:B:401:HOH:O	2.12	0.66
1:C:208:VAL:HA	1:C:211:ILE:HD12	1.78	0.66
1:A:136:LEU:HD21	1:A:179:LEU:HD13	1.78	0.66
1:B:143[B]:GLU:OE2	4:B:403:HOH:O	2.15	0.64
1:D:19:THR:HG22	1:D:210:GLY:HA3	1.80	0.64
1:D:118:VAL:H	2:D:305:GOL:H11	1.63	0.64
1:B:204:LEU:HD23	1:B:207:MET:HE1	1.80	0.62
1:C:82:ARG:NH1	4:C:407:HOH:O	2.30	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:161:GLU:N	1:D:161:GLU:OE2	2.31	0.61
1:D:196:ARG:H	1:D:223:THR:HG22	1.63	0.61
1:D:151:VAL:HG21	1:D:175[B]:VAL:HG13	1.83	0.61
1:D:181:LEU:HD12	4:D:403:HOH:O	2.00	0.61
1:B:143[A]:GLU:OE2	2:B:303:GOL:O2	2.19	0.61
1:D:112:ARG:NH1	4:D:405:HOH:O	2.33	0.61
1:D:169:GLU:N	1:D:169:GLU:OE1	2.34	0.60
1:A:122:GLU:OE1	1:A:122:GLU:N	2.31	0.60
1:B:213:LYS:HG2	2:B:305:GOL:O2	2.02	0.60
1:D:127:GLU:HB2	1:D:129:PRO:HD3	1.84	0.60
1:A:98:PHE:CZ	1:A:112:ARG:HD3	2.37	0.59
1:D:15:ASP:O	1:D:19:THR:HG23	2.02	0.59
1:A:137:LEU:HD12	1:A:185:GLY:HA2	1.84	0.59
1:A:102:THR:HG23	1:A:110:THR:HG22	1.86	0.58
1:B:220:ARG:NH1	3:B:307:SO4:O1	2.36	0.58
1:A:140:VAL:HG21	1:A:185:GLY:HA3	1.86	0.58
1:B:208:VAL:HA	1:B:211:ILE:HD12	1.85	0.57
1:C:140:VAL:HG11	1:C:179:LEU:HD11	1.87	0.57
1:A:74:ASP:O	1:A:78:LYS:HG3	2.05	0.57
1:A:98:PHE:CE1	1:A:112:ARG:HD3	2.40	0.57
1:B:162:ASP:O	4:B:405:HOH:O	2.18	0.57
1:D:140:VAL:HG21	1:D:179:LEU:HD21	1.87	0.57
1:D:73:MET:O	1:D:77:LYS:HG3	2.05	0.56
1:A:96:GLU:HG3	1:A:98:PHE:CZ	2.40	0.56
1:D:224:GLU:O	1:D:224:GLU:HG2	2.05	0.56
1:B:68:THR:HG22	2:B:304:GOL:H31	1.87	0.56
1:B:93:LYS:NZ	1:B:96:GLU:O	2.33	0.56
1:B:142:LYS:HD2	2:B:303:GOL:H12	1.86	0.55
1:C:24:ILE:HG22	1:C:73:MET:HG3	1.88	0.55
1:C:154:SER:HB2	1:C:246:ARG:HD2	1.88	0.55
1:B:203:TYR:O	1:B:207:MET:HE3	2.06	0.55
1:B:98:PHE:CD2	1:B:112:ARG:HG2	2.41	0.55
1:B:231:TYR:CE1	1:B:239:LEU:HD23	2.41	0.55
1:D:118:VAL:O	2:D:305:GOL:O1	2.19	0.55
1:B:99:LEU:HB2	1:B:115:LEU:HD21	1.88	0.54
1:A:24:ILE:HD11	1:A:49:ILE:HD13	1.89	0.54
1:D:99:LEU:HB2	1:D:115:LEU:HD21	1.90	0.53
1:B:97:ASN:O	1:B:97:ASN:OD1	2.26	0.52
1:D:151:VAL:HG22	1:D:173:ASN:HB3	1.91	0.52
1:D:243:LEU:HD11	2:D:302:GOL:H12	1.90	0.52
1:C:223:THR:HG22	1:C:224:GLU:HG3	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:200:GLY:N	2:B:302:GOL:O1	2.31	0.52
1:B:246:ARG:HB2	2:B:302:GOL:H2	1.91	0.52
1:B:2:PRO:HD2	1:B:93:LYS:O	2.11	0.51
1:C:213:LYS:N	1:C:213:LYS:HD3	2.26	0.51
1:D:8:ASP:O	1:D:234:ARG:NH2	2.39	0.51
1:D:112:ARG:HG3	1:D:112:ARG:NH1	2.26	0.50
1:D:156:LYS:HZ1	1:D:169:GLU:CD	2.15	0.50
1:A:124:GLU:O	1:A:126:PRO:HD3	2.11	0.50
1:D:200:GLY:H	2:D:302:GOL:H11	1.76	0.50
1:B:183:ASP:OD2	4:B:406:HOH:O	2.19	0.50
1:A:154:SER:HB2	1:A:246:ARG:HD2	1.94	0.49
1:C:137:LEU:HD12	1:C:185:GLY:HA2	1.94	0.49
1:C:53:LEU:HB3	1:C:57:ILE:HD11	1.94	0.49
1:D:86:LYS:HD2	4:D:470:HOH:O	2.12	0.49
1:B:212:GLY:HA3	2:B:305:GOL:H2	1.95	0.49
1:D:16:LEU:HD12	1:D:233:ILE:HG21	1.93	0.49
1:B:207:MET:CE	1:B:243:LEU:HD22	2.43	0.48
1:B:155:LEU:HD21	1:B:204:LEU:CD1	2.43	0.48
1:B:1:MET:HB2	1:B:2:PRO:HD3	1.95	0.48
1:A:142:LYS:NZ	4:A:409:HOH:O	2.43	0.48
1:B:86:LYS:HB2	4:B:417:HOH:O	2.13	0.48
1:B:148:ALA:HA	1:B:175:VAL:HG11	1.96	0.48
1:D:213:LYS:NZ	4:D:411:HOH:O	2.47	0.48
1:B:203:TYR:C	1:B:207:MET:HE3	2.34	0.47
1:B:19[B]:THR:HG23	1:B:210:GLY:HA3	1.96	0.47
1:A:119:GLU:HG2	1:D:216:GLU:OE1	2.14	0.47
1:D:143[A]:GLU:OE1	4:D:402:HOH:O	2.20	0.47
1:C:167:LYS:HG3	1:C:176:GLU:HG2	1.97	0.47
1:C:30:LYS:NZ	4:C:402:HOH:O	2.46	0.47
1:B:134:VAL:HG12	1:B:136:LEU:HD22	1.96	0.46
1:B:156:LYS:HE3	1:B:169:GLU:OE1	2.16	0.46
1:C:93:LYS:NZ	1:C:94:GLY:O	2.44	0.46
1:B:140:VAL:HG21	1:B:179:LEU:HD21	1.97	0.46
1:B:212:GLY:CA	2:B:305:GOL:H2	2.46	0.46
1:D:33:GLU:HG2	4:D:462:HOH:O	2.16	0.46
1:C:139:GLU:O	1:C:143[B]:GLU:HB2	2.16	0.46
1:C:49:ILE:HD11	1:C:239:LEU:HD11	1.97	0.46
1:B:199:TYR:HB3	1:B:243:LEU:HD21	1.97	0.45
1:C:17:ILE:HG23	1:C:73:MET:HE3	1.99	0.45
1:C:219:LEU:CD2	1:C:229:MET:HG3	2.46	0.45
1:B:31:ILE:HG23	1:B:36:VAL:HG22	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:65:GLU:N	1:C:65:GLU:OE2	2.49	0.45
1:B:29:PHE:CD1	1:B:71:ILE:HD12	2.52	0.45
1:A:139:GLU:O	1:A:143[A]:GLU:HB2	2.17	0.45
1:B:3:PHE:CE2	1:B:31:ILE:HD12	2.51	0.45
1:B:142:LYS:HZ3	2:B:306:GOL:H2	1.82	0.45
1:A:195:THR:HG21	1:A:222:GLY:HA2	1.97	0.45
1:C:21[A]:SER:HB2	1:C:73:MET:HB3	1.99	0.45
1:D:133:LYS:HE2	1:D:220:ARG:NH1	2.31	0.45
1:A:218:THR:HG21	2:A:305:GOL:H31	1.99	0.44
1:C:32:THR:HG23	1:C:34:GLU:H	1.81	0.44
1:C:154:SER:HB2	1:C:246:ARG:CD	2.47	0.44
1:A:75[B]:HIS:HE1	4:B:458:HOH:O	1.99	0.44
1:A:199:TYR:CZ	1:A:227:LEU:HB2	2.52	0.44
1:D:87:ASP:OD2	1:D:109:ARG:NH2	2.51	0.44
1:D:98:PHE:HA	1:D:115:LEU:HG	1.99	0.44
1:D:110:THR:HG23	4:D:474:HOH:O	2.18	0.43
1:B:79:ILE:HD12	1:B:113:LEU:HD13	2.00	0.43
1:D:178:LYS:NZ	4:D:401:HOH:O	2.29	0.43
1:D:242:LEU:HD23	1:D:242:LEU:HA	1.90	0.43
1:D:90:ILE:HB	1:D:102:THR:HB	2.01	0.43
1:B:218:THR:O	1:B:229:MET:HA	2.18	0.43
1:A:41[A]:MET:HG2	1:A:48:LEU:HD12	1.99	0.43
1:B:137:LEU:CD1	1:B:185:GLY:HA2	2.49	0.43
1:C:15:ASP:O	1:C:19[B]:THR:OG1	2.30	0.43
1:B:207:MET:HE1	1:B:243:LEU:HD22	2.00	0.43
1:C:226:PRO:HB2	1:C:242:LEU:HD11	2.01	0.42
1:B:3:PHE:CZ	1:B:93:LYS:HB2	2.53	0.42
1:B:162:ASP:N	1:B:162:ASP:OD1	2.52	0.42
1:A:156:LYS:O	1:A:166:MET:HA	2.19	0.42
1:C:93:LYS:HG3	1:C:94:GLY:O	2.19	0.42
1:A:12:GLU:HG3	4:A:443:HOH:O	2.20	0.42
1:C:28:ALA:HB2	1:C:118:VAL:CG2	2.50	0.42
1:C:234:ARG:O	1:C:235:ASP:HB2	2.20	0.42
1:D:17:ILE:HD13	1:D:17:ILE:HA	1.82	0.42
1:A:96:GLU:HG3	1:A:98:PHE:CE2	2.54	0.42
1:C:32:THR:HG22	1:C:35:GLY:O	2.18	0.42
1:A:39:ARG:NH1	1:A:124:GLU:HA	2.35	0.41
1:A:140:VAL:HG11	1:A:179:LEU:HD11	2.02	0.41
1:C:17:ILE:HD13	1:C:17:ILE:HA	1.93	0.41
1:C:125:LEU:HD12	1:C:125:LEU:O	2.20	0.41
1:A:33:GLU:HG2	4:A:450:HOH:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:1:MET:N	1:C:2:PRO:CD	2.84	0.41
1:C:219:LEU:HD23	1:C:229:MET:HG3	2.02	0.41
1:D:195:THR:HA	1:D:223:THR:HG22	2.02	0.41
1:A:75[B]:HIS:CE1	4:B:458:HOH:O	2.73	0.41
1:A:109:ARG:HD2	1:B:147:ASP:OD2	2.21	0.41
1:B:3:PHE:HB2	1:B:63:VAL:HG12	2.03	0.41
1:C:11:LYS:HB3	1:C:85:SER:HA	2.02	0.41
1:C:167:LYS:HE3	1:C:174[A]:GLU:OE2	2.20	0.41
1:A:196:ARG:O	1:A:223:THR:HA	2.20	0.41
1:B:155:LEU:HD22	1:B:201:ILE:HG12	2.03	0.41
1:C:24:ILE:HG12	1:C:40:ALA:HB3	2.02	0.41
1:A:35:GLY:HA3	2:A:303:GOL:H31	2.03	0.40
4:A:463:HOH:O	1:B:173:ASN:HB3	2.20	0.40
1:B:182:GLU:H	1:B:182:GLU:HG2	1.69	0.40
1:C:89:LEU:HD13	1:C:103:PHE:CE1	2.57	0.40
1:C:91:LEU:CD2	1:C:101:ILE:HG12	2.51	0.40
1:C:32:THR:HG23	1:C:34:GLU:N	2.36	0.40
1:B:153:ASP:OD2	1:B:153:ASP:N	2.49	0.40
1:D:162:ASP:O	4:D:403:HOH:O	2.22	0.40
1:B:16:LEU:HD11	1:B:51:LEU:HD11	2.04	0.40
1:B:134:VAL:HG22	1:B:189:LEU:HD13	2.03	0.40
1:B:181:LEU:HD12	4:B:405:HOH:O	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	251/265 (95%)	244 (97%)	6 (2%)	1 (0%)	34	64
1	B	251/265 (95%)	241 (96%)	10 (4%)	0	100	100
1	C	251/265 (95%)	241 (96%)	9 (4%)	1 (0%)	34	64

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	D	250/265 (94%)	233 (93%)	11 (4%)	6 (2%)	6 19
All	All	1003/1060 (95%)	959 (96%)	36 (4%)	8 (1%)	19 47

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	124	GLU
1	D	125	LEU
1	C	119	GLU
1	D	123	LEU
1	D	1	MET
1	D	126	PRO
1	D	224	GLU
1	A	235	ASP

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	222/233 (95%)	219 (99%)	3 (1%)	67 89
1	B	222/233 (95%)	216 (97%)	6 (3%)	44 77
1	C	222/233 (95%)	209 (94%)	13 (6%)	19 47
1	D	221/233 (95%)	215 (97%)	6 (3%)	44 77
All	All	887/932 (95%)	859 (97%)	28 (3%)	43 71

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	48	LEU
1	A	84	LYS
1	A	213	LYS
1	B	21[A]	SER
1	B	21[B]	SER
1	B	33	GLU

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Mol	Chain	Res	Type
1	B	48	LEU
1	B	60	LYS
1	B	230	ASP
1	C	8	ASP
1	C	21[A]	SER
1	C	21[B]	SER
1	C	42	ASP
1	C	117	ASP
1	C	136	LEU
1	C	156	LYS
1	C	162	ASP
1	C	174[A]	GLU
1	C	174[B]	GLU
1	C	209	LYS
1	C	213	LYS
1	C	246	ARG
1	D	42	ASP
1	D	75[A]	HIS
1	D	75[B]	HIS
1	D	86	LYS
1	D	95	ASP
1	D	213	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)

36 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	$\#\|Z\| > 2$
3	SO4	B	309	-	4,4,4	0.18	0	6,6,6	0.19	0
3	SO4	D	308	-	4,4,4	0.15	0	6,6,6	0.32	0
2	GOL	A	305	-	5,5,5	1.02	0	5,5,5	1.00	0
3	SO4	D	309	-	4,4,4	0.19	0	6,6,6	0.16	0
3	SO4	C	305	-	4,4,4	0.13	0	6,6,6	0.14	0
3	SO4	C	303	-	4,4,4	0.15	0	6,6,6	0.07	0
2	GOL	B	305	-	5,5,5	0.95	0	5,5,5	0.99	0
3	SO4	A	306	-	4,4,4	0.19	0	6,6,6	0.17	0
3	SO4	A	309	-	4,4,4	0.19	0	6,6,6	0.19	0
2	GOL	B	303	-	5,5,5	0.87	0	5,5,5	0.97	0
2	GOL	A	303	-	5,5,5	1.28	1 (20%)	5,5,5	0.78	0
3	SO4	C	304	-	4,4,4	0.18	0	6,6,6	0.09	0
2	GOL	B	301	-	5,5,5	1.06	0	5,5,5	0.88	0
2	GOL	A	302	-	5,5,5	0.62	0	5,5,5	1.16	0
2	GOL	A	304	-	5,5,5	1.14	0	5,5,5	0.75	0
2	GOL	D	301	-	5,5,5	0.96	0	5,5,5	0.97	0
2	GOL	D	305	-	5,5,5	0.70	0	5,5,5	1.14	0
3	SO4	C	306	-	4,4,4	0.17	0	6,6,6	0.20	0
3	SO4	B	307	-	4,4,4	0.17	0	6,6,6	0.30	0
2	GOL	C	302	-	5,5,5	0.71	0	5,5,5	1.15	0
2	GOL	D	303	-	5,5,5	0.65	0	5,5,5	1.13	0
2	GOL	D	302	-	5,5,5	0.98	0	5,5,5	1.01	0
3	SO4	A	307	-	4,4,4	0.25	0	6,6,6	0.22	0
2	GOL	B	302	-	5,5,5	0.82	0	5,5,5	1.09	0
2	GOL	B	304	-	5,5,5	0.91	0	5,5,5	0.96	0
3	SO4	A	310	-	4,4,4	0.21	0	6,6,6	0.14	0
3	SO4	D	307	-	4,4,4	0.17	0	6,6,6	0.16	0
3	SO4	B	310	-	4,4,4	0.21	0	6,6,6	0.14	0
2	GOL	D	304	-	5,5,5	1.28	1 (20%)	5,5,5	0.72	0
3	SO4	C	307	-	4,4,4	0.17	0	6,6,6	0.17	0
2	GOL	A	301	-	5,5,5	1.05	0	5,5,5	0.99	0
2	GOL	C	301	-	5,5,5	0.99	0	5,5,5	0.98	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	SO4	B	308	-	4,4,4	0.19	0	6,6,6	0.29	0
3	SO4	D	306	-	4,4,4	0.17	0	6,6,6	0.18	0
2	GOL	B	306	-	5,5,5	1.19	0	5,5,5	1.03	0
3	SO4	A	308	-	4,4,4	0.17	0	6,6,6	0.22	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	B	301	-	-	2/4/4/4	-
2	GOL	D	304	-	-	2/4/4/4	-
2	GOL	A	302	-	-	2/4/4/4	-
2	GOL	A	305	-	-	3/4/4/4	-
2	GOL	B	305	-	-	1/4/4/4	-
2	GOL	A	304	-	-	1/4/4/4	-
2	GOL	D	303	-	-	0/4/4/4	-
2	GOL	A	301	-	-	0/4/4/4	-
2	GOL	C	301	-	-	2/4/4/4	-
2	GOL	D	301	-	-	4/4/4/4	-
2	GOL	D	305	-	-	1/4/4/4	-
2	GOL	B	303	-	-	0/4/4/4	-
2	GOL	C	302	-	-	4/4/4/4	-
2	GOL	D	302	-	-	0/4/4/4	-
2	GOL	A	303	-	-	4/4/4/4	-
2	GOL	B	302	-	-	4/4/4/4	-
2	GOL	B	304	-	-	2/4/4/4	-
2	GOL	B	306	-	-	0/4/4/4	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	304	GOL	C1-C2	2.16	1.60	1.51
2	A	303	GOL	C1-C2	2.06	1.60	1.51

There are no bond angle outliers.

There are no chirality outliers.

All (32) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	302	GOL	C1-C2-C3-O3
2	A	303	GOL	O1-C1-C2-O2
2	A	303	GOL	C1-C2-C3-O3
2	A	305	GOL	C1-C2-C3-O3
2	B	302	GOL	O1-C1-C2-O2
2	B	302	GOL	O1-C1-C2-C3
2	B	302	GOL	C1-C2-C3-O3
2	B	304	GOL	O1-C1-C2-C3
2	C	302	GOL	C1-C2-C3-O3
2	D	301	GOL	O1-C1-C2-C3
2	D	304	GOL	O1-C1-C2-C3
2	B	301	GOL	O1-C1-C2-O2
2	A	303	GOL	O1-C1-C2-C3
2	A	304	GOL	C1-C2-C3-O3
2	B	301	GOL	O1-C1-C2-C3
2	C	301	GOL	O1-C1-C2-C3
2	A	302	GOL	O2-C2-C3-O3
2	A	305	GOL	O2-C2-C3-O3
2	C	301	GOL	O1-C1-C2-O2
2	C	302	GOL	O2-C2-C3-O3
2	D	301	GOL	O1-C1-C2-O2
2	D	304	GOL	O1-C1-C2-O2
2	A	303	GOL	O2-C2-C3-O3
2	B	302	GOL	O2-C2-C3-O3
2	B	304	GOL	O1-C1-C2-O2
2	D	301	GOL	O2-C2-C3-O3
2	C	302	GOL	O1-C1-C2-O2
2	C	302	GOL	O1-C1-C2-C3
2	D	305	GOL	O1-C1-C2-O2
2	A	305	GOL	O1-C1-C2-O2
2	D	301	GOL	C1-C2-C3-O3
2	B	305	GOL	O2-C2-C3-O3

There are no ring outliers.

11 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	305	GOL	1	0
2	B	305	GOL	3	0
2	B	303	GOL	2	0
2	A	303	GOL	1	0
2	A	304	GOL	1	0
2	D	305	GOL	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	307	SO4	1	0
2	D	302	GOL	2	0
2	B	302	GOL	2	0
2	B	304	GOL	1	0
2	B	306	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

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, 95^{th} 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	248/265 (93%)	-0.25	0 100 100	43, 66, 98, 121	0
1	B	247/265 (93%)	-0.21	3 (1%) 79 73	43, 69, 104, 126	0
1	C	247/265 (93%)	-0.14	7 (2%) 53 43	46, 69, 109, 128	0
1	D	248/265 (93%)	-0.10	13 (5%) 27 18	47, 68, 107, 134	0
All	All	990/1060 (93%)	-0.18	23 (2%) 60 50	43, 68, 105, 134	0

All (23) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	125	LEU	7.8
1	D	161	GLU	4.4
1	D	127	GLU	3.9
1	C	1	MET	3.8
1	B	122	GLU	3.8
1	D	124	GLU	3.5
1	C	123	LEU	3.3
1	D	122	GLU	3.1
1	D	126	PRO	3.0
1	C	161	GLU	2.9
1	D	123	LEU	2.9
1	C	126	PRO	2.9
1	B	64	GLU	2.8
1	C	119	GLU	2.6
1	D	193	GLU	2.6
1	D	95	ASP	2.4
1	D	192	GLU	2.4
1	D	162	ASP	2.4
1	D	125	LEU	2.3
1	D	194	GLU	2.3
1	B	123	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	124	GLU	2.2
1	D	224	GLU	2.1

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

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

6.3 Carbohydrates (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, 95^{th} 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	A	305	6/6	0.58	0.44	87,94,105,106	0
2	GOL	B	301	6/6	0.65	0.50	95,101,101,103	0
2	GOL	D	303	6/6	0.74	0.49	79,88,97,101	0
2	GOL	D	304	6/6	0.74	0.40	89,96,99,101	0
2	GOL	D	305	6/6	0.78	0.32	90,101,105,106	0
3	SO4	D	307	5/5	0.79	0.22	108,120,133,149	0
2	GOL	A	304	6/6	0.81	0.41	96,97,100,106	0
2	GOL	A	301	6/6	0.82	0.28	91,99,103,103	0
2	GOL	B	304	6/6	0.82	0.41	91,96,109,126	0
3	SO4	C	307	5/5	0.85	0.41	123,131,136,149	0
2	GOL	C	301	6/6	0.85	0.39	94,97,100,103	0
2	GOL	C	302	6/6	0.87	0.23	59,70,80,98	0
2	GOL	A	303	6/6	0.87	0.51	71,74,81,84	0
3	SO4	A	310	5/5	0.88	0.32	118,125,142,161	0
2	GOL	D	301	6/6	0.88	0.26	89,99,102,103	0
2	GOL	B	303	6/6	0.88	0.41	100,102,105,108	0
3	SO4	A	307	5/5	0.90	0.43	97,100,119,135	0
3	SO4	B	310	5/5	0.90	0.39	92,108,127,154	0
3	SO4	C	303	5/5	0.91	0.15	105,110,125,138	0
3	SO4	B	308	5/5	0.91	0.26	95,104,128,144	0
3	SO4	D	306	5/5	0.91	0.13	114,117,137,144	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	SO4	B	307	5/5	0.91	0.11	114,117,127,142	0
2	GOL	B	306	6/6	0.92	0.61	96,106,111,111	0
2	GOL	B	302	6/6	0.92	0.18	62,76,84,92	0
3	SO4	C	304	5/5	0.93	0.17	94,101,130,137	0
3	SO4	A	309	5/5	0.93	0.27	89,102,121,145	0
2	GOL	A	302	6/6	0.93	0.17	50,75,80,90	0
2	GOL	B	305	6/6	0.93	0.30	102,105,108,109	0
3	SO4	A	306	5/5	0.94	0.14	102,112,123,127	0
3	SO4	D	309	5/5	0.94	0.26	91,96,123,137	0
3	SO4	D	308	5/5	0.95	0.25	102,104,121,124	0
3	SO4	C	306	5/5	0.95	0.15	89,99,119,138	0
2	GOL	D	302	6/6	0.96	0.17	65,67,75,80	0
3	SO4	A	308	5/5	0.96	0.22	101,101,126,139	0
3	SO4	B	309	5/5	0.96	0.15	96,111,115,129	0
3	SO4	C	305	5/5	0.97	0.26	100,107,115,121	0

6.5 Other polymers (i)

There are no such residues in this entry.