



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 13, 2018 – 11:51 am GMT

PDB ID : 3U36  
Title : Crystal Structure of PG9 Fab  
Authors : McLellan, J.S.; Kwong, P.D.  
Deposited on : 2011-10-04  
Resolution : 3.28 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](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.7.3 (157068), CSD as539be (2018)  
Xtriage (Phenix) : 1.13  
EDS : trunk31020  
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)  
Refmac : 5.8.0158  
CCP4 : 7.0 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk31020

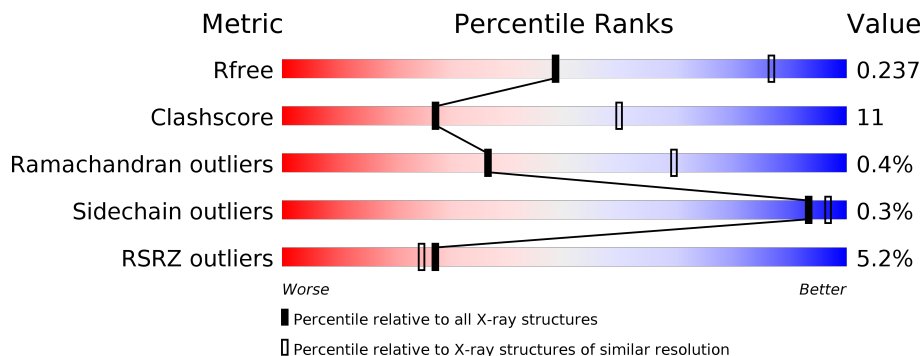
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.28 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.



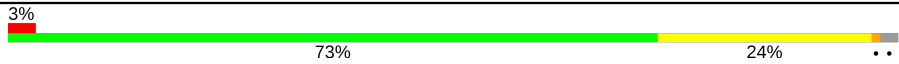

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	111664	1138 (3.34-3.22)
Clashscore	122126	1055 (3.32-3.24)
Ramachandran outliers	120053	1037 (3.32-3.24)
Sidechain outliers	120020	1036 (3.32-3.24)
RSRZ outliers	108989	1104 (3.34-3.22)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	248	<p>7% 71% 16% 13%</p>
1	C	248	<p>5% 71% 17% 13%</p>
1	E	248	<p>4% 69% 18% 13%</p>
1	H	248	<p>7% 68% 19% 13%</p>
2	B	216	<p>6% 71% 25% 13%</p>
2	D	216	<p>3% 72% 25% 13%</p>

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Mol	Chain	Length	Quality of chain
2	F	216	
2	L	216	

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 12854 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 PG9 Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	H	216	Total 1642	C 1037	N 279	O 319	S 7	0	0	0
1	A	216	Total 1642	C 1037	N 279	O 319	S 7	0	0	0
1	C	216	Total 1642	C 1037	N 279	O 319	S 7	0	0	0
1	E	215	Total 1634	C 1033	N 278	O 316	S 7	0	0	0

- Molecule 2 is a protein called PG9 Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	211	Total 1566	C 974	N 267	O 321	S 4	0	0	0
2	B	211	Total 1566	C 974	N 267	O 321	S 4	0	0	0
2	D	211	Total 1566	C 974	N 267	O 321	S 4	0	0	0
2	F	211	Total 1566	C 974	N 267	O 321	S 4	0	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).

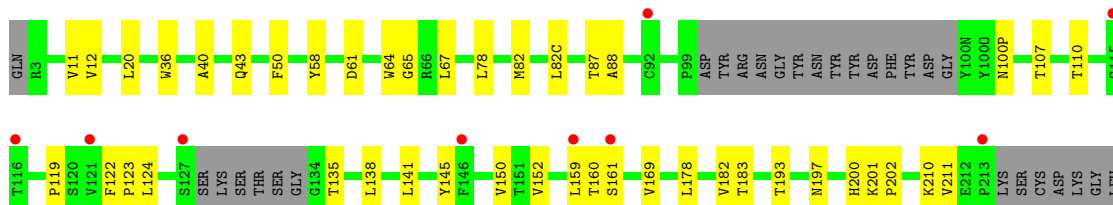


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	L	1	Total	O	S	0	0
			5	4	1		
3	L	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		

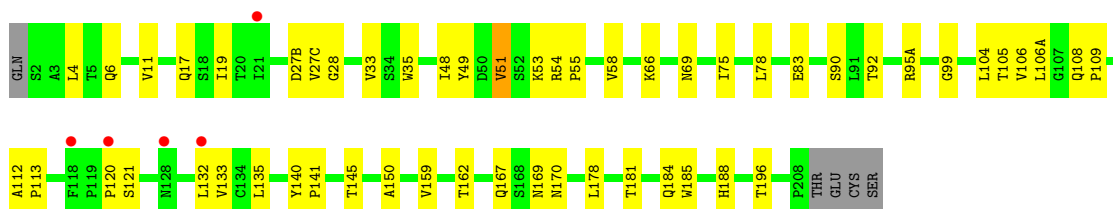
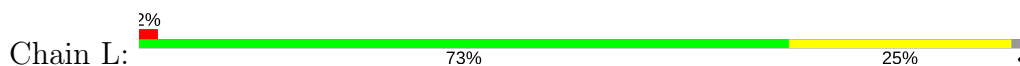


LEU  
PHE  
GLN

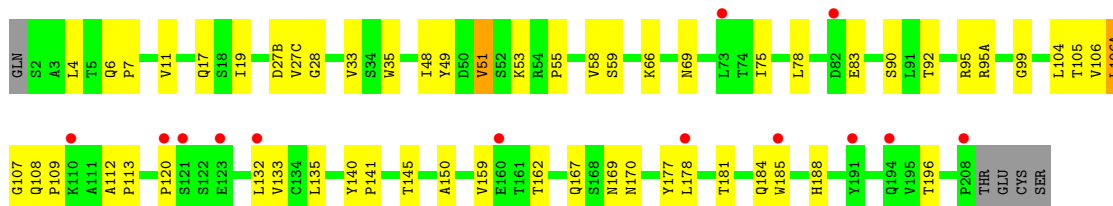
- Molecule 1: PG9 Fab heavy chain

GLU  
VAL  
LEU  
PHE  
GLN

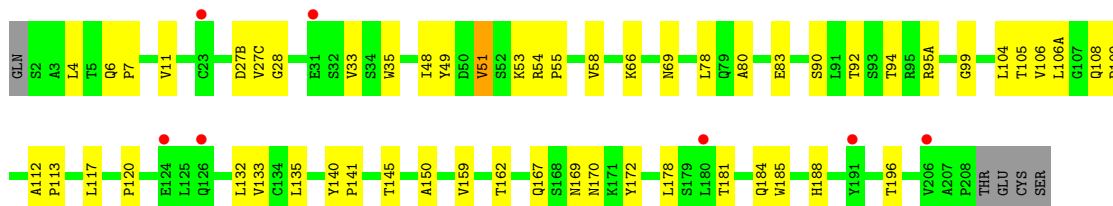
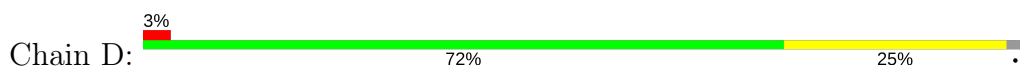
- Molecule 2: PG9 Fab light chain



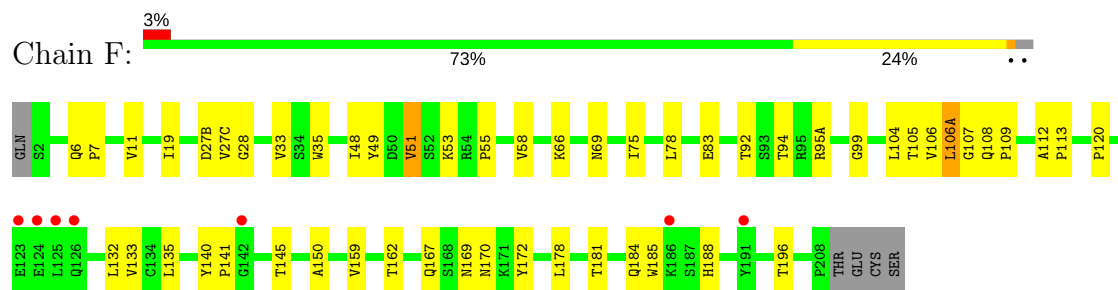
- Molecule 2: PG9 Fab light chain



- Molecule 2: PG9 Fab light chain



- Molecule 2: PG9 Fab light chain





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	71.59Å 81.04Å 91.69Å 107.23° 90.13° 107.96°	Depositor
Resolution (Å)	38.48 – 3.28 38.48 – 3.28	Depositor EDS
% Data completeness (in resolution range)	87.8 (38.48-3.28) 87.9 (38.48-3.28)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.44 (at 3.25Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.7.1_743)	Depositor
R, $R_{free}$	0.214 , 0.249 0.204 , 0.237	Depositor DCC
$R_{free}$ test set	1270 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	83.1	Xtrriage
Anisotropy	0.603	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.27 , 67.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	12854	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	125.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.99% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0/1684	0.46	0/2291
1	C	0.27	0/1684	0.45	0/2291
1	E	0.27	0/1676	0.46	0/2280
1	H	0.27	0/1684	0.45	0/2291
2	B	0.29	0/1601	0.54	0/2180
2	D	0.28	0/1601	0.51	0/2180
2	F	0.29	0/1601	0.54	0/2180
2	L	0.29	0/1601	0.51	0/2180
All	All	0.28	0/13132	0.49	0/17873

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	1
2	F	0	1
All	All	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	106(A)	LEU	Peptide
2	F	106(A)	LEU	Peptide

## 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1642	0	1579	31	0
1	C	1642	0	1579	31	0
1	E	1634	0	1575	33	0
1	H	1642	0	1579	35	0
2	B	1566	0	1533	46	0
2	D	1566	0	1533	45	0
2	F	1566	0	1533	41	0
2	L	1566	0	1533	41	0
3	B	10	0	0	1	0
3	D	5	0	0	1	0
3	F	5	0	0	1	0
3	L	10	0	0	0	0
All	All	12854	0	12444	275	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 11.

All (275) 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:E:61:ASP:OD2	2:F:95(A):ARG:NH1	1.88	1.04
1:H:61:ASP:OD2	2:L:95(A):ARG:NH1	1.96	0.99
2:D:94:THR:OG1	3:D:213:SO4:O1	1.81	0.99
2:D:33:VAL:HB	2:D:51:VAL:HG22	1.48	0.95
2:L:33:VAL:HB	2:L:51:VAL:HG22	1.49	0.94
2:F:33:VAL:HB	2:F:51:VAL:HG22	1.51	0.92
2:B:33:VAL:HB	2:B:51:VAL:HG22	1.52	0.90
1:C:61:ASP:OD2	2:D:95(A):ARG:NH1	2.04	0.89
1:E:61:ASP:CG	2:F:95(A):ARG:HH12	1.80	0.85
1:A:11:VAL:HG22	1:A:110:THR:HB	1.68	0.75
1:A:61:ASP:OD2	2:B:95(A):ARG:NH1	2.20	0.75
1:H:11:VAL:HG22	1:H:110:THR:HB	1.67	0.75
2:B:108:GLN:HB2	2:B:109:PRO:HD2	1.67	0.74
1:E:11:VAL:HG22	1:E:110:THR:HB	1.69	0.73
2:L:132:LEU:HD12	2:L:178:LEU:HD23	1.72	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:108:GLN:HB2	2:F:109:PRO:HD2	1.70	0.72
2:L:108:GLN:HB2	2:L:109:PRO:HD2	1.71	0.72
2:D:132:LEU:HD12	2:D:178:LEU:HD23	1.72	0.71
2:D:108:GLN:HB2	2:D:109:PRO:HD2	1.73	0.71
1:A:82:MET:HB3	1:A:82(C):LEU:HD21	1.73	0.70
1:C:82:MET:HB3	1:C:82(C):LEU:HD21	1.74	0.70
1:E:82:MET:HB3	1:E:82(C):LEU:HD21	1.75	0.69
2:L:106(A):LEU:HD22	2:L:140:TYR:HE2	1.57	0.69
2:D:106(A):LEU:HD22	2:D:140:TYR:HE2	1.57	0.68
2:B:132:LEU:HD12	2:B:178:LEU:HD23	1.74	0.68
1:H:82:MET:HB3	1:H:82(C):LEU:HD21	1.75	0.68
1:C:61:ASP:CG	2:D:95(A):ARG:HH12	1.98	0.67
1:H:159:LEU:HD21	1:H:182:VAL:HG21	1.74	0.67
2:B:59:SER:OG	3:B:213:SO4:O3	2.11	0.67
1:C:11:VAL:HG22	1:C:110:THR:HB	1.74	0.67
2:B:145:THR:HB	2:B:196:THR:HB	1.75	0.67
2:F:132:LEU:HD12	2:F:178:LEU:HD23	1.75	0.66
2:D:145:THR:HB	2:D:196:THR:HB	1.76	0.66
1:E:159:LEU:HD21	1:E:182:VAL:HG21	1.78	0.66
2:F:145:THR:HB	2:F:196:THR:HB	1.75	0.66
1:H:61:ASP:CG	2:L:95(A):ARG:HH12	1.98	0.66
2:B:106(A):LEU:HD22	2:B:140:TYR:HE2	1.60	0.66
2:L:145:THR:HB	2:L:196:THR:HB	1.76	0.66
1:C:159:LEU:HD21	1:C:182:VAL:HG21	1.76	0.66
2:F:106(A):LEU:HD22	2:F:140:TYR:HE2	1.60	0.66
2:F:6:GLN:OE1	2:F:99:GLY:HA3	1.96	0.66
1:A:159:LEU:HD21	1:A:182:VAL:HG21	1.78	0.65
2:D:27(B):ASP:HB3	2:D:92:THR:HG22	1.78	0.65
2:L:105:THR:HG22	2:L:106(A):LEU:HD23	1.79	0.65
2:D:35:TRP:HB2	2:D:48:ILE:HB	1.79	0.65
2:B:27(B):ASP:OD1	2:B:27(C):VAL:N	2.30	0.64
2:F:105:THR:HG22	2:F:106(A):LEU:HD23	1.79	0.63
2:B:159:VAL:HG22	2:B:178:LEU:HD13	1.79	0.63
2:B:35:TRP:HB2	2:B:48:ILE:HB	1.80	0.63
2:D:6:GLN:OE1	2:D:99:GLY:HA3	1.98	0.63
1:A:65:GLY:HA2	2:F:170:ASN:OD1	1.98	0.63
2:L:159:VAL:HG22	2:L:178:LEU:HD13	1.81	0.63
2:F:35:TRP:HB2	2:F:48:ILE:HB	1.80	0.62
2:L:35:TRP:HB2	2:L:48:ILE:HB	1.81	0.62
2:F:159:VAL:HG22	2:F:178:LEU:HD13	1.81	0.62
2:B:132:LEU:HD21	2:B:185:TRP:CZ3	2.34	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:27(B):ASP:OD1	2:F:27(C):VAL:N	2.32	0.62
2:D:159:VAL:HG22	2:D:178:LEU:HD13	1.82	0.61
2:L:132:LEU:HD21	2:L:185:TRP:CZ3	2.36	0.61
2:D:105:THR:HG22	2:D:106(A):LEU:HD23	1.83	0.61
2:B:105:THR:HG22	2:B:106(A):LEU:HD23	1.81	0.61
2:F:132:LEU:HD21	2:F:185:TRP:CZ3	2.36	0.61
2:L:27(B):ASP:HB3	2:L:92:THR:HG22	1.83	0.60
2:L:6:GLN:OE1	2:L:99:GLY:HA3	2.00	0.60
2:D:132:LEU:HD21	2:D:185:TRP:CZ3	2.37	0.60
2:F:27(B):ASP:HB3	2:F:92:THR:HG22	1.82	0.60
1:A:52:LYS:NZ	1:E:161:SER:OG	2.35	0.59
2:F:49:TYR:O	2:F:53:LYS:HB2	2.03	0.58
2:B:27(B):ASP:HB3	2:B:92:THR:HG22	1.83	0.58
2:D:49:TYR:O	2:D:53:LYS:HB2	2.04	0.58
2:B:6:GLN:OE1	2:B:99:GLY:HA3	2.03	0.58
1:A:193:THR:HG23	1:A:210:LYS:HE3	1.86	0.57
2:L:27(B):ASP:OD1	2:L:27(C):VAL:N	2.33	0.57
1:H:124:LEU:HD21	1:H:141:LEU:HB2	1.87	0.57
1:A:124:LEU:HD21	1:A:141:LEU:HB2	1.87	0.56
2:D:27(B):ASP:OD1	2:D:27(C):VAL:N	2.33	0.56
1:A:150:VAL:HG12	1:A:200:HIS:CD2	2.40	0.56
1:A:67:LEU:HD22	1:A:82:MET:HA	1.86	0.56
1:C:193:THR:HG23	1:C:210:LYS:HE3	1.87	0.56
1:H:193:THR:HG23	1:H:210:LYS:HE3	1.87	0.56
1:A:20:LEU:HD22	1:A:107:THR:HG21	1.87	0.56
1:E:150:VAL:HG12	1:E:200:HIS:CD2	2.40	0.56
2:B:167:GLN:NE2	2:B:169:ASN:OD1	2.36	0.56
1:E:124:LEU:HD21	1:E:141:LEU:HB2	1.88	0.55
2:L:167:GLN:NE2	2:L:169:ASN:OD1	2.36	0.55
1:H:67:LEU:HD22	1:H:82:MET:HA	1.88	0.55
1:E:193:THR:HG23	1:E:210:LYS:HE3	1.88	0.55
1:C:124:LEU:HD21	1:C:141:LEU:HB2	1.88	0.55
2:B:95:ARG:HD3	1:E:160:THR:HG21	1.87	0.55
2:L:49:TYR:O	2:L:53:LYS:HB2	2.07	0.55
2:D:167:GLN:NE2	2:D:169:ASN:OD1	2.36	0.55
1:A:40:ALA:HB3	1:A:43:GLN:HB2	1.89	0.55
1:E:20:LEU:HD22	1:E:107:THR:HG21	1.89	0.54
1:C:150:VAL:HG12	1:C:200:HIS:CD2	2.41	0.54
1:C:20:LEU:HD22	1:C:107:THR:HG21	1.88	0.54
1:H:150:VAL:HG12	1:H:200:HIS:CD2	2.42	0.54
2:L:150:ALA:HB1	2:L:188:HIS:ND1	2.23	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:150:ALA:HB1	2:B:188:HIS:ND1	2.23	0.54
1:E:40:ALA:HB3	1:E:43:GLN:HB2	1.90	0.53
2:F:150:ALA:HB1	2:F:188:HIS:ND1	2.24	0.53
2:D:150:ALA:HB1	2:D:188:HIS:ND1	2.24	0.53
2:F:169:ASN:O	2:F:170:ASN:HB2	2.08	0.53
1:C:67:LEU:HD22	1:C:82:MET:HA	1.91	0.53
1:A:169:VAL:HG12	2:B:162:THR:HG23	1.91	0.53
2:D:169:ASN:O	2:D:170:ASN:HB2	2.09	0.52
1:A:64:TRP:HH2	2:F:172:TYR:CE1	2.28	0.52
1:H:40:ALA:HB3	1:H:43:GLN:HB2	1.92	0.52
2:F:55:PRO:HD2	2:F:58:VAL:HG21	1.91	0.52
2:F:167:GLN:NE2	2:F:169:ASN:OD1	2.37	0.52
1:H:20:LEU:HD22	1:H:107:THR:HG21	1.90	0.52
2:B:95:ARG:HD3	1:E:160:THR:CG2	2.40	0.51
2:D:55:PRO:HD2	2:D:58:VAL:HG21	1.92	0.51
2:F:78:LEU:HD13	2:F:106:VAL:HG22	1.92	0.51
2:L:55:PRO:HD2	2:L:58:VAL:HG21	1.92	0.51
2:B:108:GLN:NE2	2:B:170:ASN:O	2.44	0.51
2:L:108:GLN:NE2	2:L:170:ASN:O	2.42	0.50
2:B:49:TYR:O	2:B:53:LYS:HB2	2.11	0.50
2:D:78:LEU:HD13	2:D:106:VAL:HG22	1.92	0.50
2:F:106(A):LEU:HD22	2:F:140:TYR:CE2	2.45	0.50
1:E:67:LEU:HD23	1:E:67:LEU:N	2.27	0.50
2:B:112:ALA:HB1	2:B:113:PRO:HD2	1.95	0.49
1:A:67:LEU:N	1:A:67:LEU:HD23	2.27	0.49
2:B:105:THR:HG21	2:B:141:PRO:HB3	1.94	0.49
2:B:55:PRO:HD2	2:B:58:VAL:HG21	1.93	0.49
1:H:82(B):SER:HB3	2:D:80:ALA:HB2	1.95	0.49
2:D:108:GLN:NE2	2:D:170:ASN:O	2.45	0.49
1:H:65:GLY:HA2	2:D:170:ASN:OD1	2.12	0.49
1:A:159:LEU:HD12	1:A:161:SER:H	1.77	0.49
2:B:17:GLN:HB2	1:C:12:VAL:HG12	1.94	0.49
2:F:112:ALA:HB1	2:F:113:PRO:HD2	1.95	0.49
2:B:78:LEU:HD13	2:B:106:VAL:HG22	1.94	0.48
1:C:40:ALA:HB3	1:C:43:GLN:HB2	1.95	0.48
2:L:169:ASN:O	2:L:170:ASN:HB2	2.13	0.48
1:E:67:LEU:HD22	1:E:82:MET:HA	1.94	0.48
2:F:105:THR:HG21	2:F:141:PRO:HB3	1.96	0.48
1:A:169:VAL:CG1	2:B:162:THR:HG23	2.44	0.48
1:A:138:LEU:HD13	1:A:211:VAL:HG11	1.95	0.47
2:L:78:LEU:HD13	2:L:106:VAL:HG22	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:159:LEU:HD12	1:C:161:SER:H	1.80	0.47
1:H:159:LEU:HD12	1:H:161:SER:H	1.79	0.47
1:C:67:LEU:HD23	1:C:67:LEU:N	2.30	0.47
2:D:112:ALA:HB1	2:D:113:PRO:HD2	1.97	0.47
2:B:17:GLN:HA	1:C:12:VAL:HA	1.96	0.47
1:A:40:ALA:HB3	1:A:43:GLN:CG	2.45	0.47
1:C:200:HIS:CD2	1:C:202:PRO:HD2	2.49	0.47
2:D:83:GLU:HG3	2:D:104:LEU:O	2.15	0.47
1:H:200:HIS:CD2	1:H:202:PRO:HD2	2.49	0.47
2:L:105:THR:HG21	2:L:141:PRO:HB3	1.97	0.47
2:B:169:ASN:O	2:B:170:ASN:HB2	2.15	0.47
2:D:11:VAL:HG23	2:D:104:LEU:HD13	1.97	0.47
2:F:108:GLN:NE2	2:F:170:ASN:O	2.48	0.47
1:E:40:ALA:HB3	1:E:43:GLN:CG	2.45	0.46
1:H:36:TRP:HE1	1:H:78:LEU:HG	1.79	0.46
2:L:112:ALA:HB1	2:L:113:PRO:HD2	1.97	0.46
2:D:28:GLY:HA3	2:D:69:ASN:OD1	2.15	0.46
2:B:140:TYR:CD2	2:B:140:TYR:C	2.89	0.46
1:C:135:THR:CG2	1:C:183:THR:HG23	2.45	0.46
1:C:178:LEU:C	1:C:178:LEU:HD12	2.36	0.46
2:D:106(A):LEU:HD22	2:D:140:TYR:CE2	2.45	0.46
1:E:201:LYS:HB3	1:E:202:PRO:HD3	1.96	0.46
2:L:104:LEU:HD12	2:L:105:THR:N	2.30	0.46
2:D:27(C):VAL:O	2:D:66:LYS:HD2	2.16	0.46
2:B:28:GLY:HA3	2:B:69:ASN:OD1	2.16	0.46
2:F:94:THR:OG1	3:F:213:SO4:O4	2.33	0.46
2:L:106(A):LEU:HD22	2:L:140:TYR:CE2	2.45	0.46
1:A:200:HIS:CD2	1:A:202:PRO:HD2	2.50	0.46
1:H:67:LEU:HD23	1:H:67:LEU:N	2.31	0.46
2:B:104:LEU:HD12	2:B:105:THR:N	2.31	0.45
1:E:159:LEU:HD12	1:E:161:SER:H	1.81	0.45
2:B:83:GLU:HG3	2:B:104:LEU:O	2.15	0.45
1:E:36:TRP:HE1	1:E:78:LEU:HG	1.81	0.45
1:H:135:THR:CG2	1:H:183:THR:HG23	2.47	0.45
2:D:105:THR:HG21	2:D:141:PRO:HB3	1.99	0.45
1:E:135:THR:CG2	1:E:183:THR:HG23	2.46	0.45
1:A:135:THR:CG2	1:A:183:THR:HG23	2.46	0.45
1:C:201:LYS:HB3	1:C:202:PRO:HD3	1.98	0.45
2:F:6:GLN:HB3	2:F:7:PRO:HD2	1.98	0.45
1:H:40:ALA:HB3	1:H:43:GLN:CG	2.46	0.45
1:A:201:LYS:HB3	1:A:202:PRO:HD3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:4:LEU:HD11	2:D:90:SER:HB3	1.99	0.45
2:F:11:VAL:HG23	2:F:104:LEU:HD13	1.99	0.45
2:F:83:GLU:HG3	2:F:104:LEU:O	2.16	0.45
2:L:11:VAL:HG23	2:L:104:LEU:HD13	1.99	0.45
1:A:178:LEU:HD12	1:A:178:LEU:C	2.37	0.44
2:B:11:VAL:HG23	2:B:104:LEU:HD13	1.99	0.44
2:F:104:LEU:HD12	2:F:105:THR:N	2.32	0.44
1:E:119:PRO:HB3	1:E:145:TYR:HB3	1.99	0.44
1:H:201:LYS:HB3	1:H:202:PRO:HD3	1.98	0.44
2:L:27(C):VAL:O	2:L:66:LYS:HD2	2.18	0.44
2:F:28:GLY:HA3	2:F:69:ASN:OD1	2.18	0.44
2:D:140:TYR:CD2	2:D:140:TYR:C	2.91	0.44
1:A:36:TRP:HE1	1:A:78:LEU:HG	1.82	0.44
1:E:178:LEU:HD12	1:E:178:LEU:C	2.37	0.44
1:E:200:HIS:CD2	1:E:202:PRO:HD2	2.52	0.44
1:H:119:PRO:HB3	1:H:145:TYR:HB3	1.99	0.44
2:L:133:VAL:HG12	2:L:135:LEU:HG	2.00	0.44
2:B:108:GLN:HB2	2:B:109:PRO:CD	2.43	0.43
1:C:119:PRO:HB3	1:C:145:TYR:HB3	1.99	0.43
1:C:169:VAL:HG12	2:D:162:THR:HG23	2.01	0.43
2:F:27(C):VAL:O	2:F:66:LYS:HD2	2.18	0.43
1:H:138:LEU:HD13	1:H:211:VAL:HG11	2.00	0.43
2:F:133:VAL:HG12	2:F:135:LEU:HG	2.00	0.43
1:E:138:LEU:HD13	1:E:211:VAL:HG11	2.00	0.43
1:H:122:PHE:HA	1:H:123:PRO:HD3	1.82	0.43
2:L:28:GLY:HA3	2:L:69:ASN:OD1	2.18	0.43
2:D:104:LEU:HD12	2:D:105:THR:N	2.33	0.43
2:D:132:LEU:HB2	2:D:178:LEU:HB3	2.00	0.43
1:A:119:PRO:HB3	1:A:145:TYR:HB3	2.00	0.43
2:B:133:VAL:HG12	2:B:135:LEU:HG	2.01	0.43
2:B:4:LEU:HD11	2:B:90:SER:HB3	2.01	0.43
1:E:169:VAL:CG1	2:F:162:THR:HG23	2.48	0.43
1:H:178:LEU:C	1:H:178:LEU:HD12	2.38	0.43
1:H:64:TRP:HH2	2:D:172:TYR:CE1	2.36	0.43
2:F:140:TYR:CD2	2:F:140:TYR:C	2.92	0.42
2:L:83:GLU:HG3	2:L:104:LEU:O	2.19	0.42
1:A:122:PHE:HA	1:A:123:PRO:HD3	1.83	0.42
1:A:169:VAL:HG11	2:B:177:TYR:CD2	2.54	0.42
1:C:138:LEU:HD13	1:C:211:VAL:HG11	2.01	0.42
2:D:6:GLN:HB3	2:D:7:PRO:HD2	2.00	0.42
1:E:122:PHE:HA	1:E:123:PRO:HD3	1.82	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:64:TRP:CE3	1:E:65:GLY:N	2.87	0.42
2:F:19:ILE:HD11	2:F:75:ILE:HD12	2.00	0.42
2:L:4:LEU:HD11	2:L:90:SER:HB3	2.01	0.42
1:E:152:VAL:HA	1:E:197:ASN:O	2.19	0.42
2:B:132:LEU:HB2	2:B:178:LEU:HB3	2.00	0.42
2:L:108:GLN:HB2	2:L:109:PRO:CD	2.46	0.42
2:L:140:TYR:C	2:L:140:TYR:CD2	2.92	0.42
2:L:132:LEU:HB2	2:L:178:LEU:HB3	2.01	0.42
1:A:169:VAL:HG11	2:B:177:TYR:HD2	1.85	0.42
2:D:133:VAL:HG12	2:D:135:LEU:HG	2.02	0.42
1:C:122:PHE:HA	1:C:123:PRO:HD3	1.83	0.42
1:C:135:THR:HG23	1:C:183:THR:HG23	2.02	0.42
2:B:106(A):LEU:HD22	2:B:140:TYR:CE2	2.47	0.42
1:C:169:VAL:CG1	2:D:162:THR:HG23	2.49	0.42
1:H:64:TRP:HA	1:H:65:GLY:HA2	1.83	0.42
1:H:87:THR:O	1:H:88:ALA:HB2	2.20	0.41
2:L:54:ARG:HA	2:L:55:PRO:HD3	1.83	0.41
1:A:135:THR:HG23	1:A:183:THR:HG23	2.02	0.41
2:B:181:THR:OG1	2:B:184:GLN:HG3	2.20	0.41
1:E:50:PHE:HD2	1:E:58:TYR:HD2	1.68	0.41
2:F:181:THR:OG1	2:F:184:GLN:HG3	2.20	0.41
1:H:51:ILE:HD11	1:H:54:GLY:HA2	2.02	0.41
1:H:169:VAL:HG12	2:L:162:THR:HG23	2.02	0.41
1:H:64:TRP:CE3	1:H:65:GLY:N	2.88	0.41
2:L:19:ILE:HD11	2:L:75:ILE:HD12	2.02	0.41
1:C:40:ALA:HB3	1:C:43:GLN:CG	2.49	0.41
1:E:135:THR:HG23	1:E:183:THR:HG23	2.03	0.41
2:B:6:GLN:HB3	2:B:7:PRO:HD2	2.03	0.41
1:C:36:TRP:HE1	1:C:78:LEU:HG	1.84	0.41
1:C:64:TRP:CE3	1:C:65:GLY:N	2.88	0.41
2:F:108:GLN:HB2	2:F:109:PRO:CD	2.46	0.41
2:F:120:PRO:HD3	2:F:132:LEU:HD23	2.02	0.41
1:H:50:PHE:HD2	1:H:58:TYR:HD2	1.68	0.41
2:D:181:THR:OG1	2:D:184:GLN:HG3	2.20	0.41
2:D:54:ARG:HA	2:D:55:PRO:HD3	1.84	0.41
2:L:181:THR:OG1	2:L:184:GLN:HG3	2.20	0.41
2:B:19:ILE:HD11	2:B:75:ILE:HD12	2.02	0.41
1:H:64:TRP:CE2	2:D:170:ASN:HA	2.56	0.41
1:E:64:TRP:HA	1:E:65:GLY:HA2	1.85	0.41
2:L:120:PRO:HD3	2:L:132:LEU:HD23	2.03	0.41
1:A:50:PHE:HD2	1:A:58:TYR:HD2	1.68	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:64:TRP:HA	1:C:65:GLY:HA2	1.84	0.40
1:E:87:THR:O	1:E:88:ALA:HB2	2.21	0.40
2:B:120:PRO:HD3	2:B:132:LEU:HD23	2.02	0.40
1:C:50:PHE:HD2	1:C:58:TYR:HD2	1.68	0.40
1:H:152:VAL:HA	1:H:197:ASN:O	2.21	0.40
1:H:38:ARG:NH1	1:H:86:ASP:HA	2.37	0.40
2:B:27(C):VAL:O	2:B:66:LYS:HD2	2.22	0.40
1:C:51:ILE:HD11	1:C:54:GLY:HA2	2.03	0.40
2:L:17:GLN:HA	1:E:12:VAL:HA	2.03	0.40
1:H:123:PRO:O	2:L:121:SER:HB3	2.21	0.40
1:A:64:TRP:HA	1:A:65:GLY:HA2	1.84	0.40
2:D:117:LEU:HD12	2:D:133:VAL:O	2.22	0.40
2:D:120:PRO:HD3	2:D:132:LEU:HD23	2.04	0.40
2:F:132:LEU:HB2	2:F:178:LEU:HB3	2.02	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	210/248 (85%)	208 (99%)	2 (1%)	0	100	100
1	C	210/248 (85%)	208 (99%)	2 (1%)	0	100	100
1	E	209/248 (84%)	207 (99%)	2 (1%)	0	100	100
1	H	210/248 (85%)	208 (99%)	2 (1%)	0	100	100
2	B	209/216 (97%)	203 (97%)	4 (2%)	2 (1%)	17	52
2	D	209/216 (97%)	203 (97%)	5 (2%)	1 (0%)	31	65
2	F	209/216 (97%)	202 (97%)	5 (2%)	2 (1%)	17	52
2	L	209/216 (97%)	204 (98%)	4 (2%)	1 (0%)	31	65
All	All	1675/1856 (90%)	1643 (98%)	26 (2%)	6 (0%)	36	69

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	L	51	VAL
2	B	51	VAL
2	D	51	VAL
2	F	51	VAL
2	B	107	GLY
2	F	107	GLY

### 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	182/210 (87%)	181 (100%)	1 (0%)	90	94
1	C	182/210 (87%)	181 (100%)	1 (0%)	90	94
1	E	181/210 (86%)	180 (99%)	1 (1%)	87	93
1	H	182/210 (87%)	180 (99%)	2 (1%)	76	87
2	B	178/183 (97%)	178 (100%)	0	100	100
2	D	178/183 (97%)	178 (100%)	0	100	100
2	F	178/183 (97%)	178 (100%)	0	100	100
2	L	178/183 (97%)	178 (100%)	0	100	100
All	All	1439/1572 (92%)	1434 (100%)	5 (0%)	93	97

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	100(P)	ASN
1	H	150	VAL
1	A	100(P)	ASN
1	C	100(P)	ASN
1	E	100(P)	ASN

Some 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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

6 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	213	-	4,4,4	0.17	0	6,6,6	0.09	0
3	SO4	B	214	-	4,4,4	0.15	0	6,6,6	0.16	0
3	SO4	D	213	-	4,4,4	0.12	0	6,6,6	0.21	0
3	SO4	F	213	-	4,4,4	0.14	0	6,6,6	0.17	0
3	SO4	L	213	-	4,4,4	0.18	0	6,6,6	0.12	0
3	SO4	L	214	-	4,4,4	0.15	0	6,6,6	0.13	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	SO4	B	213	-	-	0/0/0/0	0/0/0/0
3	SO4	B	214	-	-	0/0/0/0	0/0/0/0
3	SO4	D	213	-	-	0/0/0/0	0/0/0/0
3	SO4	F	213	-	-	0/0/0/0	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	SO4	L	213	-	-	0/0/0/0	0/0/0/0
3	SO4	L	214	-	-	0/0/0/0	0/0/0/0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	213	SO4	1	0
3	D	213	SO4	1	0
3	F	213	SO4	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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	216/248 (87%)	0.18	17 (7%) 12 12	74, 124, 198, 227	0
1	C	216/248 (87%)	0.24	12 (5%) 24 22	75, 123, 196, 229	0
1	E	215/248 (86%)	0.11	9 (4%) 36 34	75, 122, 195, 227	0
1	H	216/248 (87%)	0.37	18 (8%) 11 11	73, 122, 196, 228	0
2	B	211/216 (97%)	0.10	13 (6%) 20 19	71, 114, 191, 251	0
2	D	211/216 (97%)	0.09	7 (3%) 46 44	71, 114, 191, 251	0
2	F	211/216 (97%)	-0.03	7 (3%) 46 44	75, 113, 191, 251	0
2	L	211/216 (97%)	0.04	5 (2%) 59 56	69, 113, 190, 251	0
All	All	1707/1856 (91%)	0.14	88 (5%) 27 25	69, 117, 195, 251	0

All (88) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	161	SER	6.9
1	A	158	ALA	6.6
1	C	161	SER	6.1
1	A	194	TYR	6.1
1	A	76	ASP	5.7
1	C	157	GLY	5.4
2	D	191	TYR	5.0
2	F	124	GLU	5.0
1	C	127	SER	4.8
2	B	132	LEU	4.8
2	B	121	SER	4.7
1	C	158	ALA	4.5
1	A	157	GLY	4.4
2	F	123	GLU	4.3
1	H	208	ASP	4.3
1	A	159	LEU	4.2

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	193	THR	4.2
1	H	127	SER	4.1
2	F	126	GLN	4.1
1	A	208	ASP	4.0
2	L	132	LEU	3.9
1	A	126	PRO	3.9
2	D	180	LEU	3.9
1	C	156	SER	3.7
1	H	178	LEU	3.7
1	E	127	SER	3.7
2	B	160	GLU	3.6
1	E	115	SER	3.6
1	H	177	SER	3.5
1	E	146	PHE	3.5
2	D	126	GLN	3.4
2	B	178	LEU	3.4
2	L	120	PRO	3.4
1	A	192	GLN	3.4
1	H	193	THR	3.4
1	A	127	SER	3.3
1	A	162	GLY	3.3
2	B	82	ASP	3.3
1	H	161	SER	3.2
1	H	142	VAL	3.2
1	A	188	SER	3.0
2	B	191	TYR	2.9
1	C	208	ASP	2.9
1	C	162	GLY	2.9
2	B	185	TRP	2.8
1	E	92	CYS	2.7
2	B	73	LEU	2.7
1	A	163	VAL	2.7
2	D	206	VAL	2.7
2	B	110	LYS	2.6
1	H	76	ASP	2.6
1	E	116	THR	2.6
2	B	120	PRO	2.6
2	F	142	GLY	2.5
1	H	187	SER	2.5
2	L	128	ASN	2.5
2	D	23	CYS	2.5
1	C	138	LEU	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	125	ALA	2.4
1	A	209	LYS	2.4
1	C	68	SER	2.4
1	H	140	CYS	2.4
1	H	72	ASP	2.4
1	C	126	PRO	2.4
1	E	213	PRO	2.3
2	F	191	TYR	2.3
1	H	175	LEU	2.3
2	B	208	PRO	2.3
1	H	156	SER	2.3
1	C	204	ASN	2.3
1	A	212	GLU	2.3
2	D	124	GLU	2.2
2	B	123	GLU	2.2
1	H	68	SER	2.2
1	C	125	ALA	2.2
2	B	194	GLN	2.2
1	H	189	LEU	2.2
2	D	31	GLU	2.2
1	A	24	ALA	2.2
1	E	159	LEU	2.2
1	E	121	VAL	2.1
1	H	162	GLY	2.1
2	L	21	ILE	2.1
1	H	116	THR	2.1
2	F	125	LEU	2.1
1	H	194	TYR	2.1
2	L	118	PHE	2.0
2	F	186	LYS	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
3	SO4	L	214	5/5	0.76	0.11	174,176,185,192	0
3	SO4	F	213	5/5	0.86	0.21	139,161,167,176	0
3	SO4	D	213	5/5	0.90	0.18	145,165,170,171	0
3	SO4	B	214	5/5	0.93	0.12	116,155,157,175	0
3	SO4	B	213	5/5	0.95	0.28	155,156,166,172	0
3	SO4	L	213	5/5	0.96	0.10	132,150,155,156	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.