Full wwPDB X-ray Structure Validation Report ⓘ

Aug 23, 2023 – 02:11 PM EDT

PDB ID	:	8EEE
Title	:	Crystal structure of a NHP anti-ZIKV neutralizing antibody rhMZ104-d in complex with ZIKV E glycoprotein
Authors	:	Sankhala, R.S.; Joyce, M.G.
Deposited on	:	2022-09-07
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:

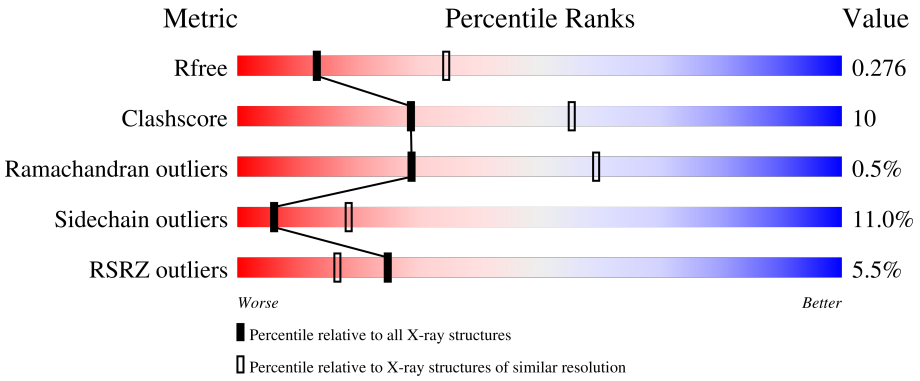
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

1 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	E	405	70% 23%
1	Z	405	4% 68% 24%
2	B	220	77% 20%
2	L	220	16% 37% 14% 48%
3	A	228	6% 71% 25%

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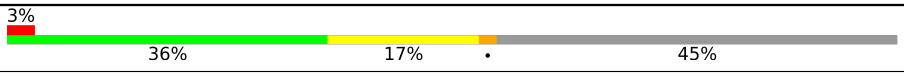
Mol	Chain	Length	Quality of chain
3	H	228	

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 11031 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 Envelope protein E.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	Z	393	Total	C	N	O	S	0	0	0
			2919	1826	499	569	25			
1	E	392	Total	C	N	O	S	0	0	0
			2929	1832	504	568	25			

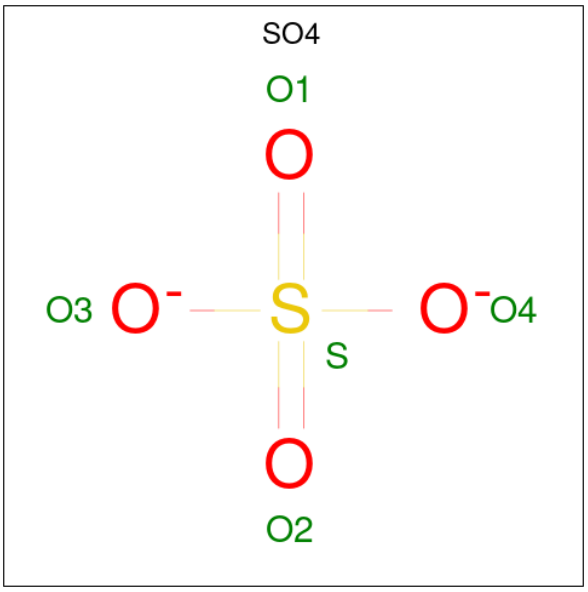
- Molecule 2 is a protein called rhMZ104-D antibody light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	L	115	Total	C	N	O	S	0	0	0
			874	553	143	175	3			
2	B	217	Total	C	N	O	S	0	0	0
			1634	1029	269	331	5			

- Molecule 3 is a protein called rhMZ104-D antibody heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	H	125	Total	C	N	O	S	0	0	0
			963	608	166	183	6			
3	A	226	Total	C	N	O	S	0	0	0
			1702	1071	289	334	8			

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



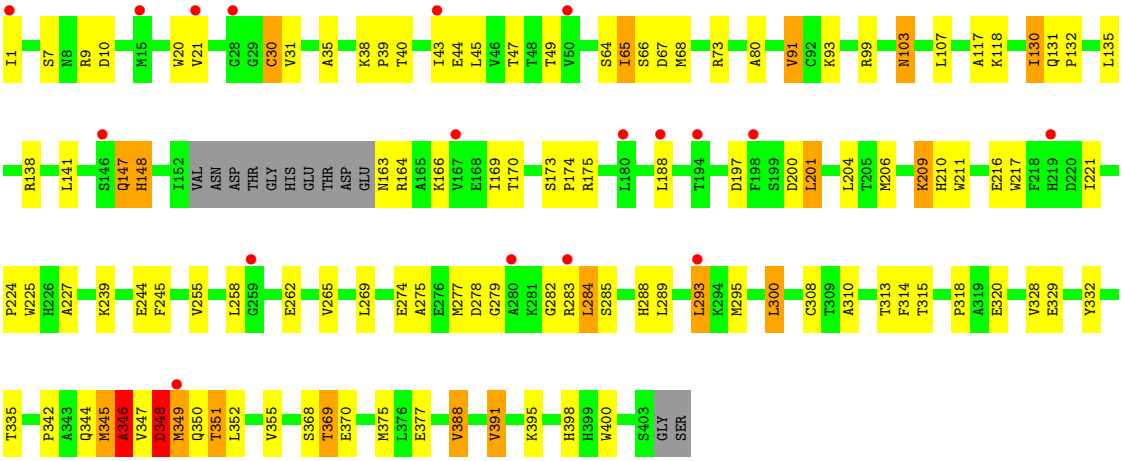
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	H	1	Total O S 5 4 1	0	0
4	A	1	Total O S 5 4 1	0	0

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

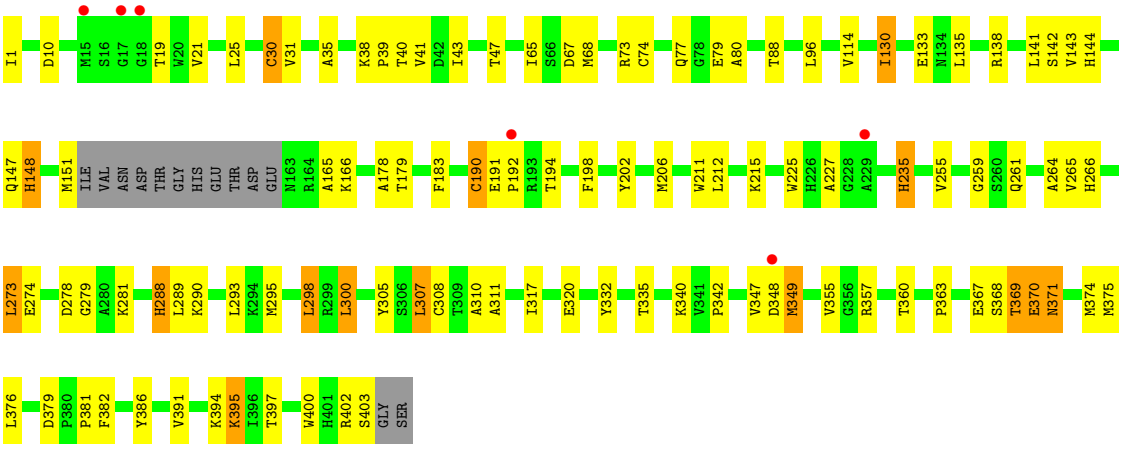
• Molecule 1: Envelope protein E

Chain Z:



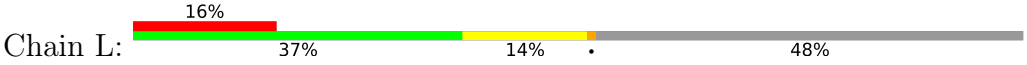
• Molecule 1: Envelope protein E

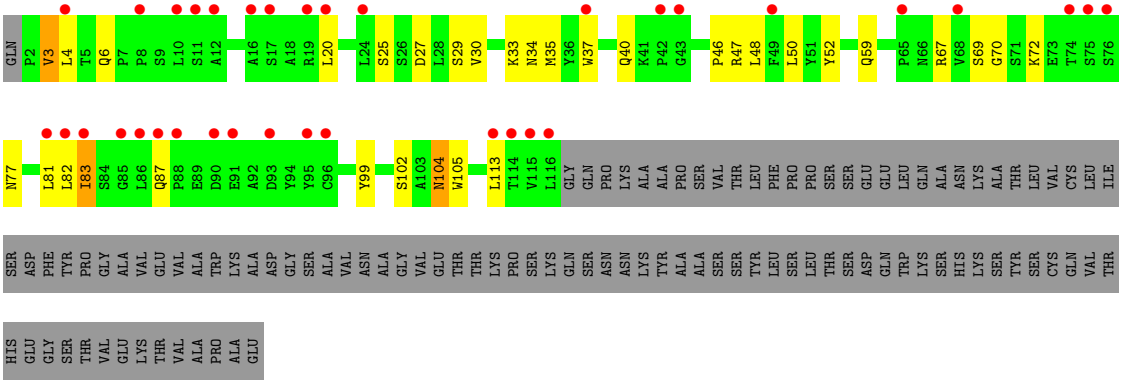
Chain E:



• Molecule 2: rhMZ104-D antibody light chain

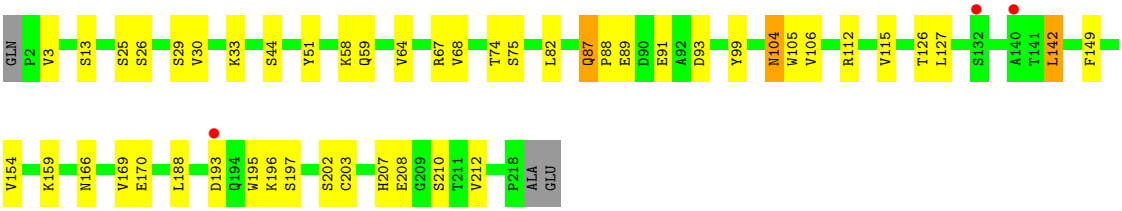
Chain L:





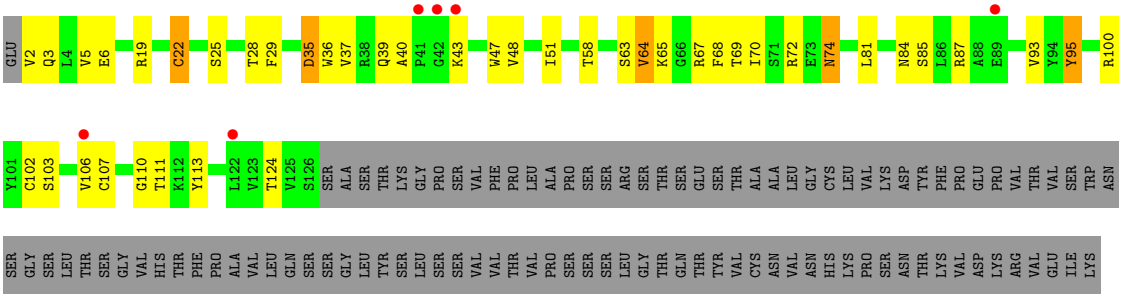
• Molecule 2: rhMZ104-D antibody light chain

Chain B:



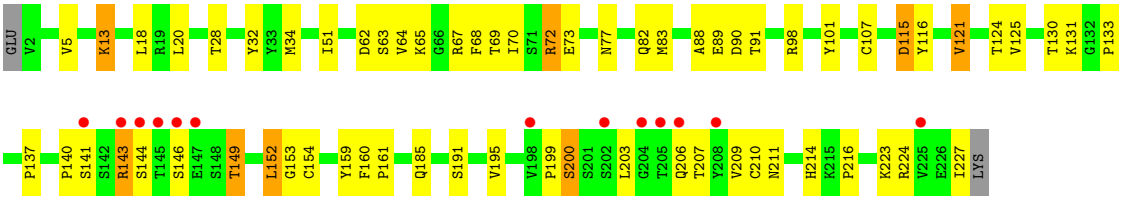
• Molecule 3: rhMZ104-D antibody heavy chain

Chain H:



• Molecule 3: rhMZ104-D antibody heavy chain

Chain A:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	85.32Å 130.42Å 109.71Å 90.00° 104.17° 90.00°	Depositor
Resolution (Å)	14.99 – 2.82 49.25 – 2.82	Depositor EDS
% Data completeness (in resolution range)	73.1 (14.99-2.82) 73.3 (49.25-2.82)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
$< I/\sigma(I) >$ [1]	3.76 (at 2.81Å)	Xtriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, R_{free}	0.217 , 0.275 0.221 , 0.276	Depositor DCC
R_{free} test set	2000 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å^2)	44.4	Xtriage
Anisotropy	0.044	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 30.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.86	EDS
Total number of atoms	11031	wwPDB-VP
Average B, all atoms (Å^2)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.56% of the height of the origin peak. No significant pseudotranslation is detected.*

[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

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	E	0.28	0/2992	0.56	0/4065
1	Z	0.29	0/2981	0.59	0/4053
2	B	0.27	0/1677	0.48	0/2289
2	L	0.27	0/898	0.50	0/1225
3	A	0.28	0/1743	0.50	0/2371
3	H	0.26	0/986	0.50	0/1333
All	All	0.28	0/11277	0.54	0/15336

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
1	E	0	2
1	Z	0	5
All	All	0	7

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	190	CYS	Peptide
1	E	349	MET	Peptide
1	Z	197	ASP	Peptide
1	Z	345	MET	Peptide
1	Z	346	ALA	Peptide

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Mol	Chain	Res	Type	Group
1	Z	348	ASP	Peptide
1	Z	351	THR	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	E	2929	0	2795	61	0
1	Z	2919	0	2777	65	0
2	B	1634	0	1576	18	0
2	L	874	0	838	18	0
3	A	1702	0	1647	32	0
3	H	963	0	916	27	0
4	A	5	0	0	0	0
4	H	5	0	0	0	0
All	All	11031	0	10549	210	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 (210) 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:88:THR:HG23	3:H:106:VAL:HG12	1.39	1.04
1:Z:30:CYS:SG	1:Z:31:VAL:N	2.53	0.80
1:Z:262:GLU:HG2	1:E:259:GLY:HA3	1.65	0.78
3:H:106:VAL:HG12	3:H:106:VAL:O	1.85	0.75
3:H:3:GLN:HE21	3:H:25:SER:HB2	1.53	0.73
1:E:225:TRP:HZ3	1:E:227:ALA:HB2	1.55	0.70
1:E:30:CYS:SG	1:E:31:VAL:N	2.65	0.69
1:Z:93:LYS:HD3	1:Z:245:PHE:HB2	1.76	0.68
2:L:40:GLN:HB2	2:L:46:PRO:HB3	1.76	0.68
1:E:320:GLU:HB2	1:E:400:TRP:HZ2	1.60	0.67
1:E:41:VAL:HG22	1:E:143:VAL:HG12	1.77	0.66
1:Z:318:PRO:HB3	1:Z:328:VAL:HG22	1.76	0.66
1:Z:35:ALA:HB3	1:Z:38:LYS:HB2	1.77	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:185:GLN:HG2	2:B:170:GLU:HG3	1.76	0.65
1:E:47:THR:HB	1:E:138:ARG:HB3	1.78	0.65
1:E:10:ASP:HB2	1:E:31:VAL:HG12	1.77	0.65
1:E:88:THR:HG23	3:H:106:VAL:CG1	2.22	0.65
1:E:347:VAL:HB	1:E:355:VAL:HG21	1.79	0.64
1:Z:244:GLU:HG3	1:Z:258:LEU:HD11	1.79	0.64
1:E:35:ALA:HB3	1:E:38:LYS:HB2	1.80	0.64
2:L:25:SER:O	2:L:77:ASN:ND2	2.30	0.64
1:Z:200:ASP:OD1	1:Z:201:LEU:N	2.27	0.63
3:H:74:ASN:N	3:H:74:ASN:OD1	2.29	0.63
2:L:30:VAL:HG22	2:L:72:LYS:HD2	1.78	0.63
1:Z:10:ASP:HB2	1:Z:31:VAL:HG12	1.80	0.63
1:E:39:PRO:HD3	1:E:300:LEU:HA	1.81	0.62
3:A:149:THR:HG22	3:A:199:PRO:HA	1.81	0.62
1:E:43:ILE:HG12	1:E:141:LEU:HD23	1.81	0.62
1:Z:47:THR:HB	1:Z:138:ARG:HB3	1.81	0.61
1:Z:225:TRP:HZ3	1:Z:227:ALA:HB2	1.65	0.61
1:Z:43:ILE:HG12	1:Z:141:LEU:HD12	1.83	0.61
1:Z:351:THR:HG23	1:Z:352:LEU:HB2	1.82	0.61
1:E:307:LEU:HD13	1:E:342:PRO:HG3	1.83	0.60
2:L:3:VAL:O	2:L:25:SER:OG	2.14	0.60
3:A:153:GLY:HA3	3:A:195:VAL:HG12	1.82	0.60
2:L:69:SER:HB3	2:L:82:LEU:HD13	1.83	0.60
1:E:273:LEU:HD23	1:E:273:LEU:H	1.66	0.59
1:Z:335:THR:HG23	1:Z:369:THR:HB	1.84	0.59
2:B:87:GLN:HG2	2:B:88:PRO:HD2	1.85	0.58
1:E:73:ARG:HD2	1:E:80:ALA:HA	1.85	0.58
2:L:33:LYS:NZ	2:L:99:TYR:O	2.37	0.57
3:A:115:ASP:HB3	3:A:116:TYR:HD2	1.69	0.57
1:E:311:ALA:HB2	1:E:394:LYS:HB3	1.86	0.57
2:B:3:VAL:H	2:B:25:SER:HB3	1.69	0.57
1:Z:348:ASP:OD1	1:Z:349:MET:N	2.37	0.57
1:Z:21:VAL:HG13	1:Z:293:LEU:HB2	1.86	0.56
1:Z:39:PRO:HD3	1:Z:300:LEU:HA	1.87	0.56
1:E:73:ARG:NH1	1:E:79:GLU:O	2.35	0.56
1:E:355:VAL:HG12	1:E:381:PRO:HG3	1.86	0.56
3:A:63:SER:O	3:A:67:ARG:NH2	2.38	0.56
1:Z:148:HIS:ND1	1:Z:329:GLU:OE1	2.39	0.56
2:B:207:HIS:CD2	2:B:208:GLU:HG2	2.41	0.56
3:H:6:GLU:HG2	3:H:22:CYS:HB2	1.88	0.56
1:Z:258:LEU:O	1:E:266:HIS:ND1	2.34	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:Z:275:ALA:HB1	1:Z:283:ARG:O	2.06	0.55
1:E:144:HIS:HB3	1:E:360:THR:HG23	1.89	0.55
1:Z:320:GLU:HB2	1:Z:400:TRP:CZ2	2.42	0.54
3:A:140:PRO:HD3	3:A:152:LEU:HB3	1.89	0.54
1:Z:66:SER:HB3	1:Z:118:LYS:HB3	1.88	0.54
1:Z:320:GLU:HB2	1:Z:400:TRP:HZ2	1.73	0.54
3:H:64:VAL:HG13	3:H:68:PHE:HB2	1.89	0.54
1:E:212:LEU:HB2	1:E:273:LEU:HG	1.89	0.54
3:H:39:GLN:OE1	3:H:95:TYR:OH	2.26	0.54
2:B:195:TRP:CD1	2:B:196:LYS:HG3	2.43	0.54
1:Z:130:ILE:HD13	1:Z:130:ILE:H	1.72	0.53
1:Z:209:LYS:HZ2	1:Z:209:LYS:HB2	1.73	0.53
1:E:147:GLN:HG2	1:E:148:HIS:H	1.74	0.53
1:E:206:MET:HB2	1:E:211:TRP:HZ3	1.72	0.53
1:Z:170:THR:HB	1:Z:173:SER:HB3	1.91	0.53
2:L:20:LEU:HB2	2:L:83:ILE:HD11	1.89	0.53
1:E:357:ARG:HG2	1:E:379:ASP:HB3	1.91	0.53
3:H:29:PHE:O	3:H:72:ARG:NH1	2.41	0.53
1:Z:9:ARG:NH2	1:Z:377:GLU:OE2	2.39	0.53
3:A:32:TYR:CE1	3:A:101:TYR:HB2	2.44	0.53
1:E:320:GLU:HB2	1:E:400:TRP:CZ2	2.42	0.52
3:A:51:ILE:HD13	3:A:72:ARG:HB3	1.91	0.52
1:Z:342:PRO:HG2	1:Z:391:VAL:HG13	1.92	0.52
1:E:194:THR:HA	1:E:288:HIS:O	2.10	0.52
1:E:261:GLN:HG3	1:E:264:ALA:HB3	1.92	0.52
1:Z:132:PRO:HA	1:Z:135:LEU:HD13	1.93	0.51
1:Z:344:GLN:HG3	1:Z:388:VAL:HG13	1.91	0.51
3:A:67:ARG:NH1	3:A:90:ASP:OD2	2.44	0.51
2:B:142:LEU:HB2	2:B:188:LEU:HB3	1.92	0.51
1:E:88:THR:HG23	3:H:106:VAL:O	2.11	0.51
3:H:67:ARG:HB3	3:H:84:ASN:O	2.11	0.51
3:A:130:THR:HG23	3:A:161:PRO:HG3	1.93	0.50
3:H:37:VAL:HA	3:H:48:VAL:HG23	1.93	0.50
1:Z:99:ARG:NE	1:Z:103:ASN:OD1	2.29	0.50
3:A:69:THR:HB	3:A:82:GLN:HB3	1.94	0.50
2:B:195:TRP:HD1	2:B:196:LYS:HG3	1.76	0.50
1:Z:30:CYS:HB2	1:Z:44:GLU:HB2	1.94	0.50
1:E:348:ASP:HB3	1:E:386:TYR:CD1	2.47	0.50
3:A:64:VAL:HG13	3:A:68:PHE:HB2	1.92	0.50
1:Z:91:VAL:HG22	1:Z:239:LYS:HD2	1.93	0.49
1:Z:335:THR:HA	1:Z:368:SER:O	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:144:SER:O	3:A:200:SER:OG	2.24	0.49
1:Z:225:TRP:CZ3	1:Z:227:ALA:HB2	2.47	0.49
1:E:88:THR:CG2	3:H:106:VAL:HG12	2.26	0.49
2:L:99:TYR:HB2	2:L:105:TRP:CZ3	2.48	0.48
1:Z:204:LEU:HD22	1:Z:211:TRP:HE3	1.78	0.48
3:H:51:ILE:HG13	3:H:58:THR:HG22	1.96	0.48
1:E:1:ILE:N	1:E:142:SER:OG	2.45	0.48
3:H:40:ALA:HB3	3:H:43:LYS:HB3	1.95	0.48
2:B:29:SER:O	2:B:33:LYS:HG2	2.14	0.48
2:B:91:GLU:HG2	2:B:115:VAL:HG23	1.96	0.47
1:E:202:TYR:CE2	1:E:215:LYS:HG2	2.49	0.47
3:A:32:TYR:O	3:A:72:ARG:NH2	2.47	0.47
1:Z:369:THR:HA	1:Z:370:GLU:HA	1.70	0.47
1:Z:206:MET:HG3	1:Z:211:TRP:HZ3	1.79	0.47
1:E:279:GLY:C	1:E:281:LYS:H	2.17	0.47
2:L:27:ASP:OD1	2:L:27:ASP:N	2.42	0.47
3:A:88:ALA:HA	3:A:125:VAL:HG22	1.96	0.47
3:A:209:VAL:HA	3:A:224:ARG:HA	1.97	0.47
2:B:64:VAL:HG12	2:B:68:VAL:HG11	1.96	0.47
3:A:62:ASP:HA	3:A:65:LYS:HD2	1.97	0.46
1:Z:210:HIS:NE2	1:Z:277:MET:HB3	2.31	0.46
1:E:395:LYS:H	1:E:395:LYS:HD3	1.80	0.46
1:Z:369:THR:OG1	1:Z:370:GLU:HB3	2.15	0.46
1:E:135:LEU:HD11	1:E:198:PHE:HE1	1.79	0.46
3:A:18:LEU:HB2	3:A:83:MET:HE2	1.97	0.46
1:Z:350:GLN:HA	1:Z:351:THR:HA	1.69	0.46
1:Z:348:ASP:CG	1:Z:349:MET:N	2.69	0.46
3:A:214:HIS:NE2	3:A:216:PRO:HG2	2.31	0.46
3:A:144:SER:HB2	3:A:203:LEU:HD12	1.97	0.46
1:Z:175:ARG:HA	1:Z:188:LEU:O	2.16	0.46
1:E:308:CYS:HB3	1:E:332:TYR:CE2	2.51	0.45
2:L:34:ASN:ND2	3:H:110:GLY:O	2.50	0.45
2:L:67:ARG:NH1	2:L:87:GLN:OE1	2.49	0.45
1:Z:209:LYS:HB2	1:Z:209:LYS:NZ	2.31	0.45
3:A:207:THR:HB	3:A:224:ARG:NH1	2.31	0.45
2:B:193:ASP:O	2:B:197:SER:OG	2.33	0.45
1:E:363:PRO:HB3	1:E:374:MET:HE1	1.98	0.45
3:H:63:SER:O	3:H:67:ARG:NH2	2.48	0.45
3:A:98:ARG:NH2	3:A:115:ASP:OD2	2.50	0.45
1:Z:169:ILE:HG23	1:Z:174:PRO:HA	1.98	0.45
1:E:370:GLU:OE2	1:E:371:ASN:HB2	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:25:LEU:HB2	1:E:289:LEU:HD23	1.99	0.44
3:H:111:THR:HB	3:H:113:TYR:CD1	2.52	0.44
3:A:143:ARG:HG3	3:A:146:SER:OG	2.17	0.44
1:E:165:ALA:HB1	1:E:178:ALA:HB1	2.00	0.44
3:H:102:CYS:HA	3:H:107:CYS:HB3	2.00	0.44
1:E:192:PRO:HD2	1:E:290:LYS:CB	2.48	0.44
3:H:106:VAL:O	3:H:106:VAL:CG1	2.57	0.44
2:B:99:TYR:HB2	2:B:105:TRP:CZ3	2.53	0.44
1:Z:346:ALA:HB3	1:Z:355:VAL:HG21	1.99	0.44
3:A:141:SER:O	3:A:141:SER:OG	2.33	0.44
1:Z:49:THR:HA	1:Z:282:GLY:O	2.17	0.44
1:E:369:THR:HA	1:E:370:GLU:HA	1.66	0.44
1:Z:314:PHE:CE2	1:Z:398:HIS:HB2	2.53	0.44
1:Z:103:ASN:H	1:Z:103:ASN:ND2	2.16	0.44
2:B:104:ASN:O	2:B:105:TRP:CG	2.71	0.44
1:Z:308:CYS:HB3	1:Z:332:TYR:CE1	2.52	0.43
1:E:190:CYS:O	1:E:191:GLU:HG3	2.18	0.43
1:Z:310:ALA:HB3	1:Z:332:TYR:CZ	2.53	0.43
2:L:48:LEU:HG	3:H:113:TYR:CE2	2.53	0.43
3:H:87:ARG:HA	3:H:87:ARG:HD2	1.84	0.43
1:Z:65:ILE:HD12	1:Z:65:ILE:HA	1.76	0.43
1:E:305:TYR:HB2	1:E:340:LYS:HG3	2.00	0.43
2:B:51:TYR:HB3	2:B:59:GLN:HB3	2.01	0.43
1:Z:217:TRP:CH2	1:Z:221:ILE:HD11	2.54	0.43
1:E:382:PHE:HA	1:E:402:ARG:HB3	2.00	0.43
2:L:50:LEU:HD23	2:L:81:LEU:HD12	2.00	0.43
1:E:403:SER:O	1:E:403:SER:OG	2.26	0.42
2:B:127:LEU:HD13	2:B:203:CYS:HB2	2.00	0.42
1:Z:45:LEU:HD22	1:Z:289:LEU:HD22	2.01	0.42
1:E:310:ALA:HB3	1:E:332:TYR:CZ	2.54	0.42
1:E:317:ILE:HD12	1:E:317:ILE:H	1.84	0.42
3:H:64:VAL:HA	3:H:67:ARG:NH2	2.34	0.42
1:Z:204:LEU:HD22	1:Z:211:TRP:CE3	2.54	0.42
3:A:98:ARG:O	3:A:115:ASP:N	2.51	0.42
1:Z:163:ASN:HB3	1:Z:164:ARG:H	1.41	0.42
1:E:74:CYS:HB2	1:E:77:GLN:HG3	2.02	0.42
1:E:278:ASP:HA	1:E:279:GLY:HA2	1.78	0.42
1:Z:274:GLU:HG2	1:Z:275:ALA:H	1.84	0.42
1:Z:265:VAL:O	1:Z:269:LEU:HD23	2.19	0.42
1:E:19:THR:CB	1:E:295:MET:H	2.32	0.42
1:E:225:TRP:CZ3	1:E:227:ALA:HB2	2.43	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:35:ASP:OD1	3:H:47:TRP:NE1	2.45	0.42
3:H:51:ILE:HD12	3:H:70:ILE:HG23	2.02	0.42
3:A:91:THR:HG23	3:A:124:THR:HA	2.01	0.42
3:A:137:PRO:HG3	3:A:223:LYS:HG2	2.02	0.42
1:Z:278:ASP:HA	1:Z:279:GLY:HA2	1.67	0.42
1:Z:284:LEU:HD23	1:Z:285:SER:H	1.85	0.42
3:A:34:MET:HE2	3:A:98:ARG:HG3	2.02	0.42
3:A:133:PRO:HB3	3:A:159:TYR:HB3	2.02	0.41
1:E:335:THR:HA	1:E:368:SER:O	2.21	0.41
2:L:37:TRP:CG	2:L:81:LEU:HD13	2.55	0.41
2:B:159:LYS:HB2	2:B:202:SER:OG	2.20	0.41
2:B:93:ASP:OD1	2:B:112:ARG:HD3	2.21	0.41
2:B:149:PHE:CE2	2:B:154:VAL:HG13	2.56	0.41
1:Z:147:GLN:HG2	1:Z:148:HIS:H	1.84	0.41
3:A:13:LYS:HB2	3:A:13:LYS:HE2	1.85	0.41
1:Z:65:ILE:HG13	1:Z:117:ALA:HB1	2.03	0.41
2:L:33:LYS:HA	2:L:33:LYS:HD2	1.78	0.41
1:Z:147:GLN:HG2	1:Z:148:HIS:N	2.36	0.41
1:E:183:PHE:O	1:E:298:LEU:HD23	2.20	0.41
3:A:20:LEU:HD22	3:A:121:VAL:HG21	2.03	0.41
1:Z:73:ARG:HG3	1:Z:80:ALA:HA	2.03	0.40
1:E:348:ASP:HB3	1:E:386:TYR:CE1	2.55	0.40
3:A:160:PHE:HB3	3:A:161:PRO:HD3	2.02	0.40
1:Z:65:ILE:HG12	1:Z:255:VAL:HG11	2.02	0.40
3:H:36:TRP:NE1	3:H:81:LEU:HB2	2.36	0.40
1:Z:224:PRO:HG3	1:Z:239:LYS:HA	2.03	0.40
1:E:88:THR:CG2	3:H:106:VAL:CG1	2.93	0.40
2:L:52:TYR:CD1	2:L:70:GLY:HA3	2.56	0.40
1:E:73:ARG:NH2	2:L:102:SER:HB2	2.36	0.40
1:E:130:ILE:H	1:E:130:ILE:HG12	1.77	0.40
1:E:235:HIS:C	1:E:235:HIS:ND1	2.74	0.40
1:E:374:MET:HE2	1:E:375:MET:O	2.21	0.40
2:L:104:ASN:O	2:L:105:TRP:CG	2.75	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	E	388/405 (96%)	344 (89%)	43 (11%)	1 (0%)	41 70
1	Z	389/405 (96%)	344 (88%)	39 (10%)	6 (2%)	10 31
2	B	215/220 (98%)	205 (95%)	10 (5%)	0	100 100
2	L	113/220 (51%)	103 (91%)	10 (9%)	0	100 100
3	A	224/228 (98%)	206 (92%)	18 (8%)	0	100 100
3	H	123/228 (54%)	112 (91%)	11 (9%)	0	100 100
All	All	1452/1706 (85%)	1314 (90%)	131 (9%)	7 (0%)	29 59

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	Z	347	VAL
1	Z	348	ASP
1	Z	300	LEU
1	Z	346	ALA
1	Z	349	MET
1	E	300	LEU
1	Z	131	GLN

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	E	312/338 (92%)	280 (90%)	32 (10%)	7 21

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	Z	310/338 (92%)	278 (90%)	32 (10%)	7 21
2	B	183/185 (99%)	164 (90%)	19 (10%)	7 20
2	L	98/185 (53%)	88 (90%)	10 (10%)	7 21
3	A	188/190 (99%)	166 (88%)	22 (12%)	5 16
3	H	98/190 (52%)	82 (84%)	16 (16%)	2 7
All	All	1189/1426 (83%)	1058 (89%)	131 (11%)	6 18

All (131) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	Z	1	ILE
1	Z	7	SER
1	Z	20	TRP
1	Z	30	CYS
1	Z	40	THR
1	Z	64	SER
1	Z	65	ILE
1	Z	67	ASP
1	Z	68	MET
1	Z	91	VAL
1	Z	103	ASN
1	Z	107	LEU
1	Z	130	ILE
1	Z	147	GLN
1	Z	148	HIS
1	Z	166	LYS
1	Z	201	LEU
1	Z	209	LYS
1	Z	216	GLU
1	Z	284	LEU
1	Z	288	HIS
1	Z	293	LEU
1	Z	295	MET
1	Z	313	THR
1	Z	315	THR
1	Z	345	MET
1	Z	348	ASP
1	Z	369	THR
1	Z	375	MET
1	Z	388	VAL

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Mol	Chain	Res	Type
1	Z	391	VAL
1	Z	395	LYS
1	E	21	VAL
1	E	30	CYS
1	E	40	THR
1	E	65	ILE
1	E	67	ASP
1	E	68	MET
1	E	96	LEU
1	E	114	VAL
1	E	130	ILE
1	E	133	GLU
1	E	148	HIS
1	E	151	MET
1	E	166	LYS
1	E	179	THR
1	E	235	HIS
1	E	255	VAL
1	E	265	VAL
1	E	273	LEU
1	E	274	GLU
1	E	288	HIS
1	E	293	LEU
1	E	298	LEU
1	E	307	LEU
1	E	349	MET
1	E	367	GLU
1	E	369	THR
1	E	370	GLU
1	E	371	ASN
1	E	376	LEU
1	E	391	VAL
1	E	395	LYS
1	E	397	THR
2	L	3	VAL
2	L	4	LEU
2	L	6	GLN
2	L	29	SER
2	L	35	MET
2	L	47	ARG
2	L	59	GLN
2	L	83	ILE

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Mol	Chain	Res	Type
2	L	104	ASN
2	L	113	LEU
3	H	2	VAL
3	H	5	VAL
3	H	19	ARG
3	H	22	CYS
3	H	28	THR
3	H	35	ASP
3	H	64	VAL
3	H	65	LYS
3	H	69	THR
3	H	74	ASN
3	H	85	SER
3	H	93	VAL
3	H	95	TYR
3	H	100	ARG
3	H	103	SER
3	H	124	THR
3	A	5	VAL
3	A	13	LYS
3	A	28	THR
3	A	70	ILE
3	A	72	ARG
3	A	73	GLU
3	A	77	ASN
3	A	89	GLU
3	A	107	CYS
3	A	115	ASP
3	A	121	VAL
3	A	131	LYS
3	A	143	ARG
3	A	149	THR
3	A	152	LEU
3	A	154	CYS
3	A	191	SER
3	A	200	SER
3	A	206	GLN
3	A	210	CYS
3	A	211	ASN
3	A	227	ILE
2	B	13	SER
2	B	26	SER

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Mol	Chain	Res	Type
2	B	30	VAL
2	B	44	SER
2	B	58	LYS
2	B	67	ARG
2	B	74	THR
2	B	75	SER
2	B	82	LEU
2	B	87	GLN
2	B	89	GLU
2	B	104	ASN
2	B	106	VAL
2	B	126	THR
2	B	142	LEU
2	B	166	ASN
2	B	169	VAL
2	B	210	SER
2	B	212	VAL

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

Mol	Chain	Res	Type
1	Z	331	GLN
3	H	3	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

2 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	SO4	H	301	-	4,4,4	0.14	0	6,6,6	0.05	0
4	SO4	A	301	-	4,4,4	0.14	0	6,6,6	0.06	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.

No monomer is involved in short contacts.

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	E	392/405 (96%)	-0.14	6 (1%) 73 67	15, 41, 84, 116	0
1	Z	393/405 (97%)	0.20	18 (4%) 32 22	15, 62, 102, 128	0
2	B	217/220 (98%)	-0.20	3 (1%) 75 69	12, 36, 68, 98	0
2	L	115/220 (52%)	1.41	35 (30%) 0 0	44, 98, 179, 199	0
3	A	226/228 (99%)	0.10	13 (5%) 23 15	13, 39, 93, 127	0
3	H	125/228 (54%)	0.27	6 (4%) 30 21	51, 79, 93, 113	0
All	All	1468/1706 (86%)	0.14	81 (5%) 25 16	12, 49, 105, 199	0

All (81) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	L	116	LEU	8.1
2	L	12	ALA	7.9
2	L	86	LEU	7.7
2	L	65	PRO	6.2
2	L	17	SER	5.1
2	L	11	SER	5.0
2	L	87	GLN	4.8
2	L	115	VAL	4.6
3	A	145	THR	4.4
1	E	192	PRO	4.4
1	Z	194	THR	4.4
2	L	95	TYR	4.3
2	L	113	LEU	4.3
2	L	114	THR	4.3
2	L	90	ASP	4.2
2	L	91	GLU	4.2
1	E	348	ASP	4.1
2	L	83	ILE	4.0
2	L	88	PRO	3.9

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Mol	Chain	Res	Type	RSRZ
3	H	41	PRO	3.7
3	A	141	SER	3.6
1	Z	349	MET	3.5
3	H	89	GLU	3.5
3	A	144	SER	3.5
2	L	49	PHE	3.4
3	A	205	THR	3.2
3	A	225	VAL	3.2
2	L	76	SER	3.2
2	L	74	THR	3.1
2	L	75	SER	3.1
3	A	143	ARG	3.0
2	L	42	PRO	2.9
1	Z	283	ARG	2.9
1	Z	1	ILE	2.9
2	L	43	GLY	2.9
2	L	85	GLY	2.9
3	A	147	GLU	2.9
1	Z	50	VAL	2.8
3	H	43	LYS	2.8
2	L	68	VAL	2.7
2	L	16	ALA	2.7
2	L	19	ARG	2.7
1	Z	15	MET	2.7
1	Z	21	VAL	2.7
3	H	42	GLY	2.7
2	L	96	CYS	2.6
2	L	37	TRP	2.6
1	Z	167	VAL	2.6
1	Z	219	HIS	2.6
3	H	106	VAL	2.5
2	L	8	PRO	2.5
2	B	140	ALA	2.5
2	L	93	ASP	2.5
3	H	122	LEU	2.5
1	E	229	ALA	2.4
3	A	146	SER	2.4
2	L	10	LEU	2.4
1	Z	180	LEU	2.3
1	Z	198	PHE	2.3
2	B	193	ASP	2.3
1	Z	28	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	Z	43	ILE	2.3
1	E	18	GLY	2.2
3	A	206	GLN	2.2
1	Z	146	SER	2.2
2	B	132	SER	2.2
1	Z	293	LEU	2.2
3	A	204	GLY	2.2
3	A	198	VAL	2.2
1	Z	188	LEU	2.2
2	L	82	LEU	2.2
1	E	17	GLY	2.1
2	L	20	LEU	2.1
3	A	202	SER	2.1
2	L	81	LEU	2.1
3	A	208	TYR	2.1
2	L	4	LEU	2.1
1	Z	280	ALA	2.1
2	L	24	LEU	2.0
1	E	15	MET	2.0
1	Z	259	GLY	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
4	SO4	H	301	5/5	0.96	0.13	90,91,93,94	0
4	SO4	A	301	5/5	0.96	0.11	68,68,72,73	0

6.5 Other polymers (i)

There are no such residues in this entry.