



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 2, 2021 – 11:06 AM EDT

PDB ID : 3L7Z
Title : Crystal structure of the *S. solfataricus* archaeal exosome
Authors : Lu, C.; Ding, F.; Ke, A.
Deposited on : 2009-12-29
Resolution : 2.41 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.23.2
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) : 2.23.2

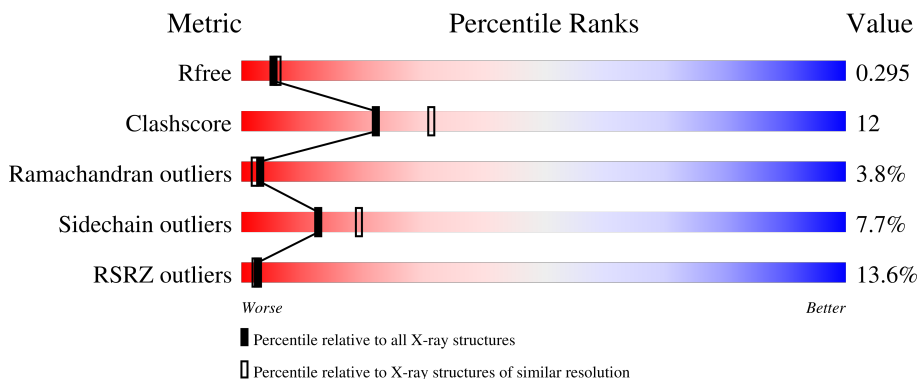
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.41 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.



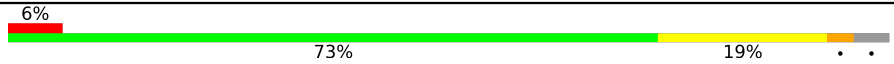

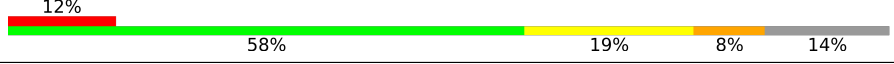
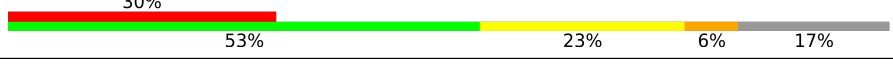
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4647 (2.44-2.40)
Clashscore	141614	5161 (2.44-2.40)
Ramachandran outliers	138981	5073 (2.44-2.40)
Sidechain outliers	138945	5074 (2.44-2.40)
RSRZ outliers	127900	4543 (2.44-2.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	271	
1	D	271	
1	G	271	
2	B	245	
2	E	245	

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Mol	Chain	Length	Quality of chain
2	H	245	
3	C	249	
3	F	249	
3	I	249	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 16393 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 Probable exosome complex exonuclease 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	251	Total 1926	C 1229	N 314	O 378	S 5	0	0	0
1	D	261	Total 1974	C 1260	N 321	O 388	S 5	0	0	0
1	G	270	Total 2082	C 1328	N 338	O 411	S 5	0	0	0

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	96	THR	GLU	engineered mutation	UNP Q9UXC0
A	?	-	HIS	deletion	UNP Q9UXC0
A	?	-	SER	deletion	UNP Q9UXC0
A	?	-	ASN	deletion	UNP Q9UXC0
A	?	-	GLY	deletion	UNP Q9UXC0
D	96	THR	GLU	engineered mutation	UNP Q9UXC0
D	?	-	HIS	deletion	UNP Q9UXC0
D	?	-	SER	deletion	UNP Q9UXC0
D	?	-	ASN	deletion	UNP Q9UXC0
D	?	-	GLY	deletion	UNP Q9UXC0
G	96	THR	GLU	engineered mutation	UNP Q9UXC0
G	?	-	HIS	deletion	UNP Q9UXC0
G	?	-	SER	deletion	UNP Q9UXC0
G	?	-	ASN	deletion	UNP Q9UXC0
G	?	-	GLY	deletion	UNP Q9UXC0

- Molecule 2 is a protein called Probable exosome complex exonuclease 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	232	Total 1774	C 1122	N 309	O 334	S 9	0	0	0

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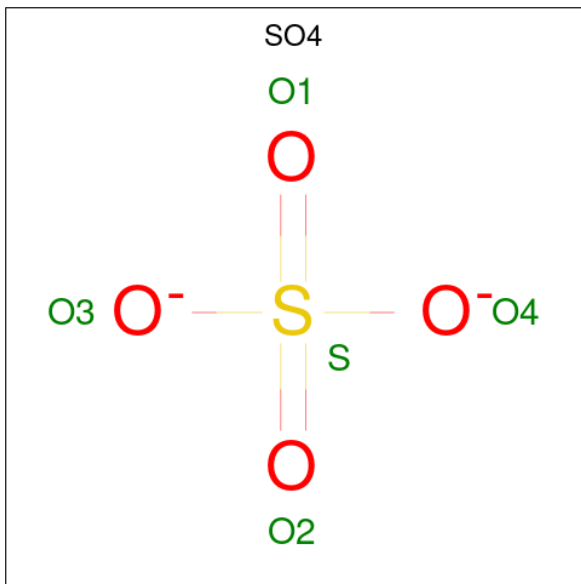
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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	237	Total	C	N	O	S	0	0	0
			1832	1157	319	346	10			
2	H	234	Total	C	N	O	S	0	0	0
			1810	1142	316	342	10			

- Molecule 3 is a protein called Probable exosome complex RNA-binding protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	222	Total	C	N	O	S	0	0	0
			1697	1096	279	319	3			
3	F	215	Total	C	N	O	S	0	0	0
			1705	1104	281	316	4			
3	I	206	Total	C	N	O	S	0	0	0
			1578	1029	250	296	3			

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O₄S).

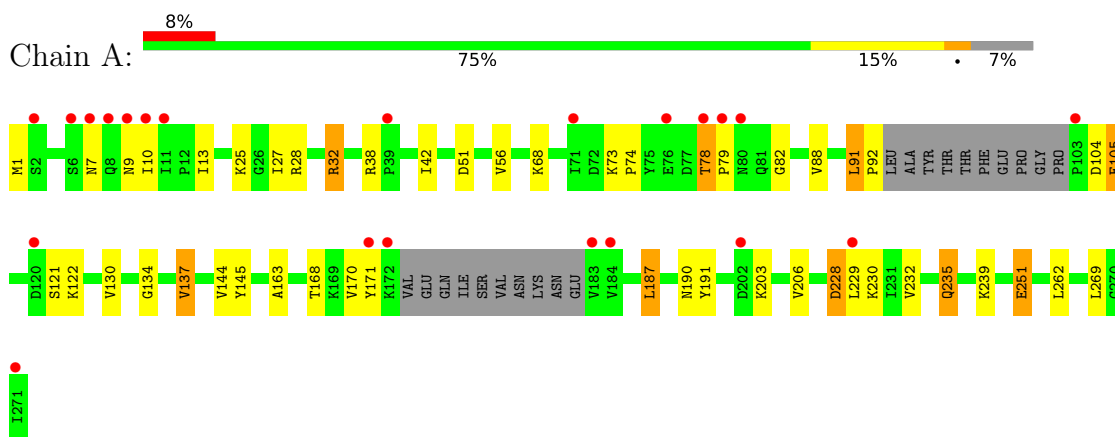


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	O	S	0	0
			5	4	1		
4	E	1	Total	O	S	0	0
			5	4	1		
4	H	1	Total	O	S	0	0
			5	4	1		

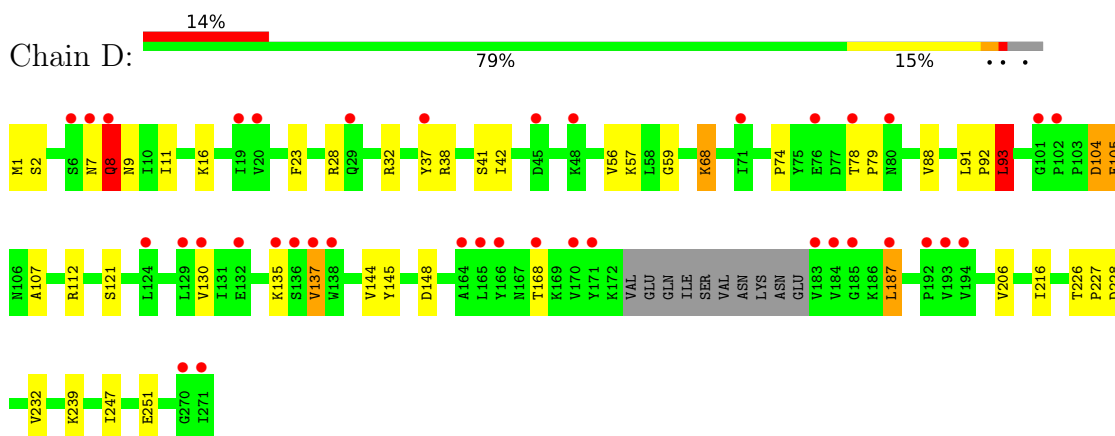
3 Residue-property plots [i](#)

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.

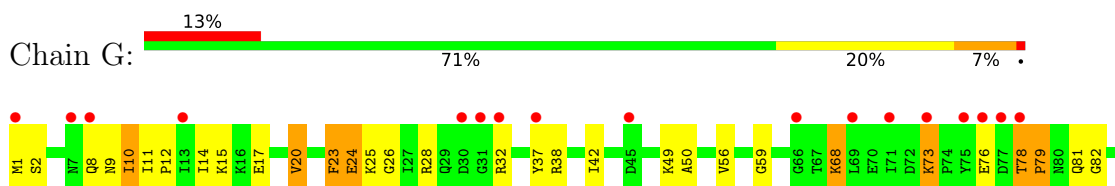
- Molecule 1: Probable exosome complex exonuclease 2

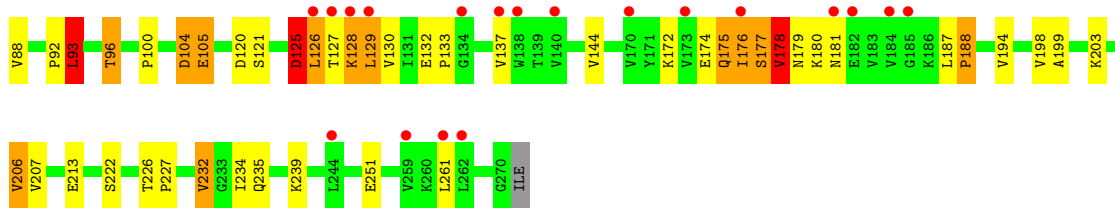


- Molecule 1: Probable exosome complex exonuclease 2

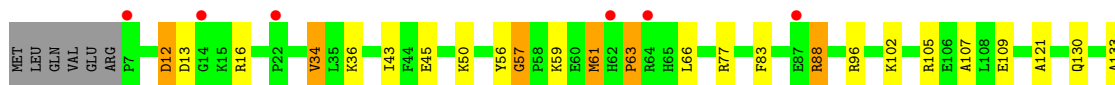
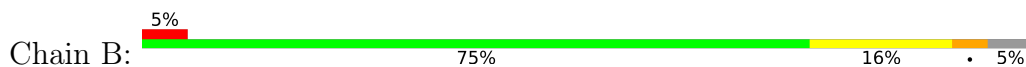


- Molecule 1: Probable exosome complex exonuclease 2

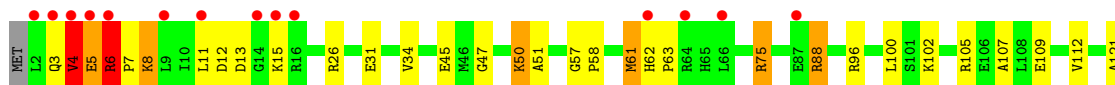
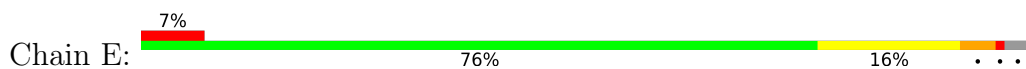




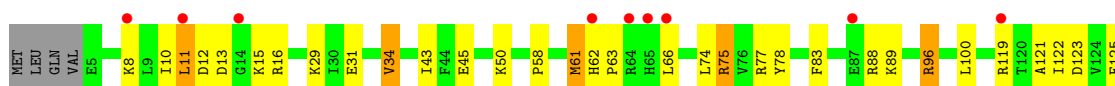
- Molecule 2: Probable exosome complex exonuclease 1



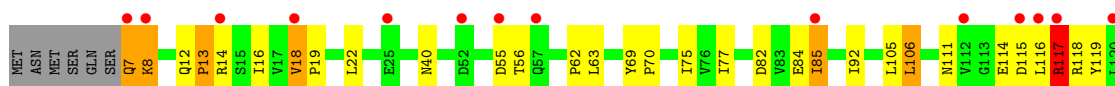
- Molecule 2: Probable exosome complex exonuclease 1

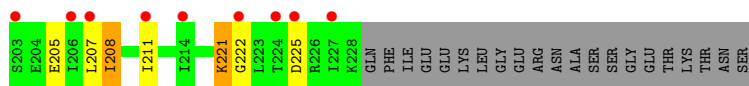


- Molecule 2: Probable exosome complex exonuclease 1

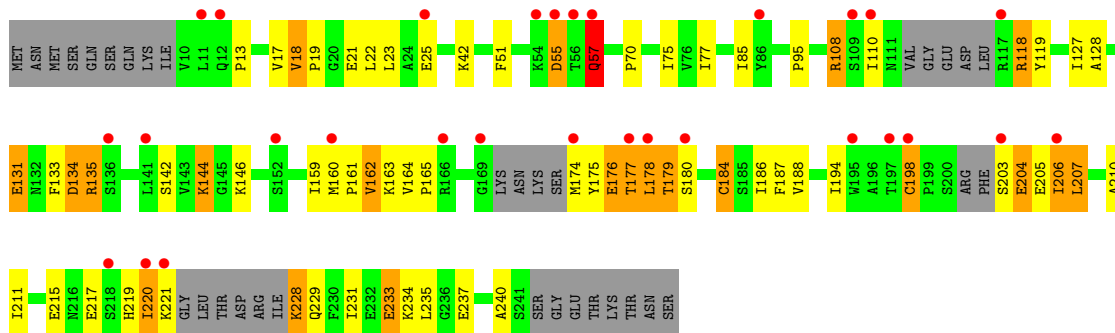


- Molecule 3: Probable exosome complex RNA-binding protein 1

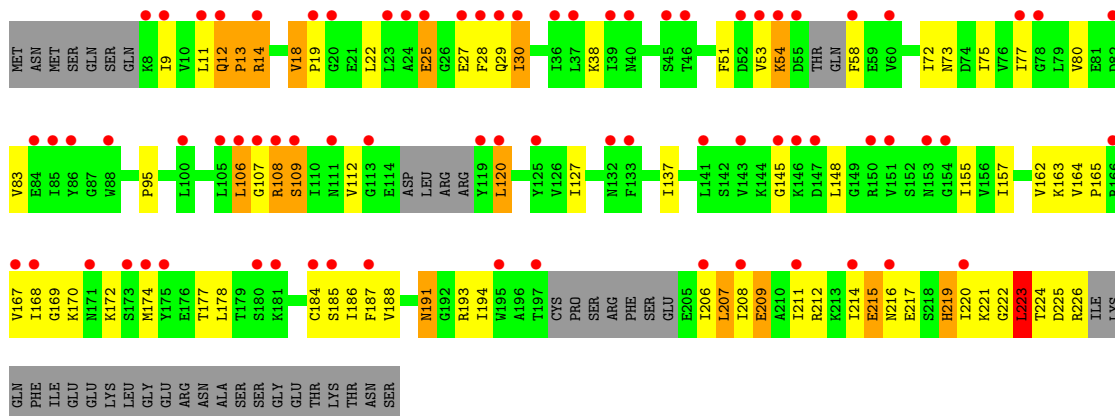




● Molecule 3: Probable exosome complex RNA-binding protein 1



● Molecule 3: Probable exosome complex RNA-binding protein 1



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	151.12Å 145.48Å 97.25Å 90.00° 93.79° 90.00°	Depositor
Resolution (Å)	20.00 – 2.41 20.00 – 2.41	Depositor EDS
% Data completeness (in resolution range)	92.4 (20.00-2.41) 92.4 (20.00-2.41)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.58 (at 2.41Å)	Xtrriage
Refinement program	REFMAC 5.4.0066	Depositor
R, R_{free}	0.263 , 0.289 0.263 , 0.295	Depositor DCC
R_{free} test set	7505 reflections (10.11%)	wwPDB-VP
Wilson B-factor (Å ²)	39.7	Xtrriage
Anisotropy	0.046	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 41.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	16393	wwPDB-VP
Average B, all atoms (Å ²)	59.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.42% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

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	0.34	0/1952	0.54	0/2646
1	D	0.32	0/2004	0.53	1/2724 (0.0%)
1	G	0.35	0/2114	0.60	0/2873
2	B	0.35	0/1802	0.56	0/2439
2	E	0.37	0/1859	0.59	1/2512 (0.0%)
2	H	0.36	0/1838	0.57	0/2484
3	C	0.37	0/1732	0.62	0/2362
3	F	0.37	0/1737	0.58	0/2351
3	I	0.38	0/1609	0.62	0/2188
All	All	0.36	0/16647	0.58	2/22579 (0.0%)

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	G	0	2
2	H	0	1
All	All	0	3

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	236	LYS	N-CA-C	-5.37	96.49	111.00
1	D	93	LEU	CA-CB-CG	5.25	127.38	115.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	G	125	ASP	Peptide
1	G	76	GLU	Peptide
2	H	11	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	1926	0	1997	29	0
1	D	1974	0	2008	28	0
1	G	2082	0	2151	65	0
2	B	1774	0	1801	36	0
2	E	1832	0	1882	34	0
2	H	1810	0	1850	49	0
3	C	1697	0	1667	54	0
3	F	1705	0	1733	54	0
3	I	1578	0	1555	76	0
4	B	5	0	0	0	0
4	E	5	0	0	0	0
4	H	5	0	0	0	0
All	All	16393	0	16644	388	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 12.

All (388) 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)
3:I:221:LYS:HB3	3:I:222:GLY:HA2	1.21	1.18
3:I:224:THR:HB	3:I:225:ASP:HB3	1.25	1.18
3:C:221:LYS:HG3	3:C:222:GLY:HA2	1.28	1.14
2:H:236:LYS:O	2:H:237:TYR:CD2	2.02	1.12
3:I:208:ILE:N	3:I:209:GLU:HB3	1.67	1.10
1:G:125:ASP:HB3	1:G:127:THR:HA	1.34	1.09
3:I:224:THR:HB	3:I:225:ASP:CB	1.83	1.08
1:G:127:THR:CB	1:G:128:LYS:HB2	1.86	1.05
2:H:237:TYR:HD2	3:I:219:HIS:CD2	1.76	1.02

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:237:TYR:CD2	3:I:219:HIS:NE2	2.28	1.02
3:C:117:ARG:HD3	3:C:118:ARG:H	1.22	1.00
2:H:237:TYR:CD2	3:I:219:HIS:CD2	2.50	1.00
1:G:127:THR:HB	1:G:128:LYS:CB	1.92	0.99
1:D:7:ASN:CA	1:D:8:GLN:HB2	1.92	0.98
3:I:224:THR:HB	3:I:225:ASP:CA	1.93	0.98
1:G:127:THR:HB	1:G:128:LYS:HB2	0.99	0.96
3:I:224:THR:CB	3:I:225:ASP:HB3	1.96	0.96
3:F:134:ASP:CG	3:F:135:ARG:H	1.69	0.94
1:G:1:MET:N	2:H:77:ARG:HH12	1.65	0.94
1:A:235:GLN:HE22	2:B:201:GLN:HE21	1.16	0.93
3:I:221:LYS:CB	3:I:222:GLY:HA2	2.01	0.90
3:F:178:LEU:O	3:F:180:SER:N	2.05	0.88
3:I:221:LYS:HB3	3:I:222:GLY:CA	2.06	0.85
3:I:53:VAL:HG22	3:I:54:LYS:H	1.40	0.84
1:G:174:GLU:O	1:G:175:GLN:HB2	1.76	0.84
1:G:1:MET:H1	2:H:77:ARG:HH12	1.22	0.83
2:B:88:ARG:HH11	2:B:88:ARG:CG	1.92	0.82
2:B:59:LYS:NZ	1:G:96:THR:HG22	1.93	0.82
1:G:126:LEU:O	1:G:129:LEU:HG	1.78	0.82
1:G:125:ASP:CB	1:G:127:THR:HA	2.08	0.82
3:I:18:VAL:HG22	3:I:19:PRO:HD2	1.63	0.81
2:E:45:GLU:HG2	2:E:50:LYS:HG3	1.61	0.80
3:C:221:LYS:CG	3:C:222:GLY:HA2	2.12	0.79
3:F:75:ILE:HG12	3:F:187:PHE:HZ	1.48	0.79
3:I:208:ILE:N	3:I:209:GLU:CB	2.46	0.79
1:G:73:LYS:HE2	1:G:73:LYS:H	1.48	0.78
3:C:18:VAL:HG22	3:C:19:PRO:HD2	1.64	0.78
3:I:224:THR:HB	3:I:225:ASP:HA	1.64	0.77
2:E:88:ARG:HH11	2:E:88:ARG:HG2	1.49	0.77
3:F:134:ASP:CG	3:F:135:ARG:N	2.40	0.75
3:I:222:GLY:O	3:I:223:LEU:HB3	1.86	0.75
3:C:198:CYS:SG	3:C:205:GLU:HB3	2.27	0.75
1:G:127:THR:OG1	1:G:188:PRO:CB	2.35	0.74
3:I:108:ARG:O	3:I:109:SER:HB2	1.88	0.74
3:C:85:ILE:HG12	3:I:137:ILE:HG22	1.67	0.74
3:F:18:VAL:HG22	3:F:19:PRO:HD2	1.69	0.74
1:D:130:VAL:HA	1:D:137:VAL:HG23	1.68	0.74
3:F:220:ILE:HG22	3:F:221:LYS:H	1.52	0.73
3:F:75:ILE:HD11	3:F:127:ILE:HG22	1.71	0.73
3:C:205:GLU:O	3:C:205:GLU:HG2	1.89	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:75:ILE:H	3:C:190:ASN:HD22	1.36	0.72
3:I:72:ILE:O	3:I:73:ASN:HB2	1.88	0.72
3:C:221:LYS:HG3	3:C:222:GLY:CA	2.16	0.72
1:A:1:MET:HG2	2:B:77:ARG:HG3	1.71	0.71
2:B:59:LYS:HZ1	1:G:96:THR:HG22	1.53	0.71
1:G:1:MET:N	2:H:77:ARG:NH1	2.39	0.71
3:F:203:SER:O	3:F:204:GLU:HB2	1.90	0.71
1:G:176:ILE:O	1:G:177:SER:O	2.08	0.70
3:C:184:CYS:CB	3:C:185:SER:HA	2.20	0.70
1:A:228:ASP:O	1:A:229:LEU:HB2	1.90	0.70
2:H:11:LEU:HB3	2:H:12:ASP:HB2	1.74	0.70
2:E:88:ARG:HH11	2:E:88:ARG:CG	2.04	0.70
3:I:53:VAL:HA	3:I:58:PHE:HA	1.72	0.70
1:G:127:THR:OG1	1:G:188:PRO:HB3	1.93	0.69
3:C:157:ILE:HD12	3:C:194:ILE:HD11	1.73	0.69
2:E:161:VAL:HG22	2:E:222:ILE:HG13	1.76	0.68
2:B:63:PRO:HG2	2:B:66:LEU:HD12	1.75	0.68
3:F:204:GLU:HG3	3:F:205:GLU:H	1.58	0.67
3:I:188:VAL:HA	3:I:194:ILE:HG22	1.76	0.67
3:I:208:ILE:H	3:I:209:GLU:HB3	1.53	0.67
3:I:216:ASN:O	3:I:219:HIS:CE1	2.48	0.67
1:D:121:SER:HA	1:D:232:VAL:HG21	1.77	0.67
2:H:161:VAL:HG22	2:H:222:ILE:HG13	1.75	0.67
3:F:159:ILE:HG21	3:F:211:ILE:HG22	1.75	0.66
1:A:91:LEU:N	1:A:92:PRO:HD2	2.10	0.66
1:A:91:LEU:HD11	1:A:145:TYR:HD2	1.60	0.66
3:C:152:SER:O	3:C:153:ASN:HB3	1.94	0.66
2:E:75:ARG:HH11	2:E:75:ARG:HG2	1.59	0.66
1:G:127:THR:OG1	1:G:188:PRO:HB2	1.94	0.66
2:B:88:ARG:HH11	2:B:88:ARG:HG2	1.62	0.65
3:I:217:GLU:HA	3:I:219:HIS:HE1	1.60	0.65
2:H:11:LEU:CA	2:H:12:ASP:HB2	2.26	0.65
1:D:88:VAL:HG22	1:D:144:VAL:HB	1.79	0.64
3:C:199:PRO:HB2	3:C:200:SER:HA	1.79	0.64
2:H:75:ARG:HG2	2:H:75:ARG:HH11	1.62	0.64
2:H:236:LYS:O	2:H:237:TYR:CG	2.50	0.64
1:G:127:THR:H	1:G:128:LYS:HB3	1.62	0.64
1:D:104:ASP:O	1:D:105:GLU:HB2	1.98	0.63
3:C:117:ARG:CD	3:C:118:ARG:H	2.05	0.63
2:B:88:ARG:HH11	2:B:88:ARG:HG3	1.64	0.63
3:I:211:ILE:O	3:I:215:GLU:HB2	1.98	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:182:SER:HB2	3:C:183:GLY:HA3	1.81	0.62
3:C:75:ILE:H	3:C:190:ASN:ND2	1.97	0.62
1:G:92:PRO:O	1:G:93:LEU:HD12	1.98	0.62
1:G:121:SER:HA	1:G:232:VAL:HG21	1.80	0.62
3:I:217:GLU:HA	3:I:219:HIS:CE1	2.35	0.62
3:F:75:ILE:HG12	3:F:187:PHE:CZ	2.34	0.62
3:I:174:MET:HE2	3:I:214:ILE:HD12	1.80	0.62
2:H:11:LEU:HA	2:H:12:ASP:HB2	1.80	0.62
3:I:207:LEU:C	3:I:209:GLU:HB3	2.20	0.62
2:B:105:ARG:O	2:B:109:GLU:HG2	2.00	0.61
3:I:53:VAL:HG22	3:I:54:LYS:N	2.13	0.61
3:I:208:ILE:H	3:I:209:GLU:CB	2.11	0.61
3:I:174:MET:CE	3:I:214:ILE:HD12	2.29	0.61
1:D:105:GLU:HG2	2:E:102:LYS:HD2	1.83	0.61
2:E:58:PRO:HB2	3:F:95:PRO:HB3	1.82	0.61
3:I:164:VAL:HB	3:I:165:PRO:HD3	1.82	0.60
1:D:7:ASN:CA	1:D:8:GLN:CB	2.70	0.60
1:A:122:LYS:O	1:A:190:ASN:ND2	2.33	0.59
2:E:4:VAL:O	2:E:4:VAL:HG13	2.02	0.59
3:C:199:PRO:N	3:C:200:SER:HB2	2.17	0.59
1:G:1:MET:H1	2:H:77:ARG:NH1	1.95	0.59
3:F:188:VAL:HA	3:F:194:ILE:HG22	1.83	0.59
1:A:121:SER:HA	1:A:232:VAL:HG21	1.84	0.59
1:G:17:GLU:O	1:G:20:VAL:HG12	2.02	0.59
1:A:74:PRO:HB2	1:A:79:PRO:HA	1.85	0.59
1:G:1:MET:H2	2:H:77:ARG:HH12	1.48	0.59
3:F:144:LYS:O	3:F:144:LYS:HG2	2.02	0.59
3:I:157:ILE:HD12	3:I:194:ILE:HD11	1.84	0.59
2:E:6:ARG:HB3	2:E:7:PRO:HA	1.85	0.58
1:D:226:THR:HB	1:D:227:PRO:HD2	1.84	0.58
3:F:161:PRO:O	3:F:162:VAL:HB	2.03	0.58
1:G:8:GLN:C	1:G:10:ILE:H	2.07	0.58
2:H:123:ASP:HB3	2:H:125:PHE:CE1	2.38	0.58
1:D:91:LEU:C	1:D:93:LEU:H	2.06	0.58
3:I:224:THR:CB	3:I:225:ASP:CB	2.68	0.58
2:H:16:ARG:HD3	2:H:178:GLU:OE2	2.03	0.58
1:G:226:THR:HB	1:G:227:PRO:HD2	1.86	0.57
1:A:28:ARG:NH1	1:A:206:VAL:HG13	2.20	0.57
1:A:91:LEU:HD11	1:A:145:TYR:CD2	2.39	0.57
3:C:117:ARG:HD3	3:C:118:ARG:N	2.07	0.57
2:E:4:VAL:O	2:E:5:GLU:HB2	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:105:ARG:O	2:E:109:GLU:HG2	2.05	0.57
1:G:23:PHE:O	1:G:25:LYS:N	2.38	0.57
2:H:63:PRO:HG2	2:H:66:LEU:HD12	1.85	0.57
3:F:176:GLU:O	3:F:178:LEU:N	2.38	0.57
1:G:172:LYS:HE3	1:G:174:GLU:HB3	1.87	0.57
3:C:62:PRO:HB2	3:C:162:VAL:HG21	1.88	0.56
1:D:104:ASP:O	1:D:105:GLU:CB	2.54	0.56
2:B:16:ARG:HD3	2:B:178:GLU:OE2	2.05	0.56
2:B:61:MET:HG2	2:B:121:ALA:HB2	1.88	0.56
1:A:130:VAL:HA	1:A:137:VAL:HG23	1.87	0.56
1:G:82:GLY:HA3	1:G:129:LEU:HB3	1.86	0.56
2:E:107:ALA:HB1	2:E:198:THR:HG23	1.88	0.56
3:F:77:ILE:HG22	3:F:127:ILE:HG23	1.86	0.56
1:D:1:MET:HG3	1:D:2:SER:H	1.72	0.55
1:A:42:ILE:HG12	1:A:56:VAL:HG22	1.87	0.55
3:F:118:ARG:H	3:F:118:ARG:CD	2.20	0.55
2:H:11:LEU:CB	2:H:12:ASP:HB2	2.35	0.55
3:C:188:VAL:HA	3:C:194:ILE:HG22	1.89	0.55
2:H:61:MET:HG2	2:H:121:ALA:HB2	1.89	0.55
1:D:91:LEU:HD11	1:D:145:TYR:HD2	1.72	0.54
3:F:194:ILE:HD11	3:F:211:ILE:HD13	1.88	0.54
3:F:159:ILE:HG21	3:F:211:ILE:CG2	2.37	0.54
1:G:82:GLY:HA2	1:G:137:VAL:HG13	1.89	0.54
2:E:26:ARG:HD2	2:E:47:GLY:HA3	1.88	0.54
1:A:88:VAL:HG22	1:A:144:VAL:HB	1.90	0.54
3:C:176:GLU:HA	3:C:179:THR:HB	1.88	0.54
1:G:28:ARG:HD3	1:G:213:GLU:OE2	2.08	0.54
1:G:127:THR:CB	1:G:128:LYS:CB	2.67	0.54
3:C:184:CYS:CB	3:C:185:SER:CA	2.86	0.54
2:E:3:GLN:O	2:E:4:VAL:HB	2.08	0.54
2:E:62:HIS:CB	2:E:63:PRO:HD3	2.38	0.53
1:A:51:ASP:HB3	1:A:168:THR:HG23	1.90	0.53
2:B:238:VAL:HA	3:C:16:ILE:HG13	1.91	0.53
1:D:68:LYS:HG2	2:H:88:ARG:HB2	1.91	0.53
3:F:118:ARG:H	3:F:118:ARG:HD2	1.73	0.53
3:F:210:ALA:HB2	3:F:235:LEU:HD21	1.91	0.53
3:I:162:VAL:HG12	3:I:163:LYS:HD2	1.91	0.53
2:B:161:VAL:HG22	2:B:222:ILE:HG13	1.91	0.52
3:F:17:VAL:HG21	3:F:23:LEU:HD21	1.90	0.52
2:B:209:ASP:O	2:B:213:GLN:HG3	2.09	0.52
3:C:199:PRO:HB2	3:C:200:SER:CA	2.39	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:45:GLU:HG2	2:H:50:LYS:HG3	1.92	0.52
1:A:91:LEU:N	1:A:92:PRO:CD	2.72	0.52
2:B:190:MET:HG2	2:B:222:ILE:HD13	1.92	0.52
2:H:58:PRO:HB2	3:I:95:PRO:HB3	1.92	0.52
3:I:53:VAL:CG2	3:I:54:LYS:H	2.17	0.52
3:I:225:ASP:O	3:I:226:ARG:HB2	2.10	0.52
3:I:174:MET:O	3:I:177:THR:HG22	2.09	0.52
3:C:205:GLU:C	3:C:207:LEU:H	2.14	0.51
1:A:163:ALA:HA	1:A:269:LEU:HD21	1.91	0.51
3:F:220:ILE:HG22	3:F:221:LYS:N	2.23	0.51
1:G:125:ASP:HB3	1:G:126:LEU:CA	2.40	0.51
3:C:164:VAL:HG11	3:C:190:ASN:HA	1.92	0.51
1:D:91:LEU:HD13	2:H:127:GLU:HG3	1.93	0.51
2:B:234:LYS:C	2:B:236:LYS:H	2.12	0.51
1:G:82:GLY:HA3	1:G:129:LEU:HD12	1.93	0.51
3:I:212:ARG:CA	3:I:215:GLU:HB2	2.40	0.51
2:E:61:MET:HG2	2:E:121:ALA:HB2	1.93	0.51
3:I:174:MET:O	3:I:178:LEU:HD12	2.10	0.51
3:I:221:LYS:CB	3:I:222:GLY:CA	2.78	0.51
2:E:231:GLU:HA	2:E:234:LYS:HB2	1.92	0.51
2:B:45:GLU:HG2	2:B:50:LYS:HG3	1.92	0.51
1:D:41:SER:HB3	1:D:57:LYS:HB2	1.92	0.51
3:F:177:THR:HB	3:F:179:THR:OG1	2.10	0.50
3:C:14:ARG:O	3:C:14:ARG:HG2	2.10	0.50
1:A:235:GLN:NE2	2:B:201:GLN:HE21	1.96	0.50
2:E:190:MET:HG2	2:E:222:ILE:HD13	1.94	0.50
1:G:92:PRO:HG3	1:G:100:PRO:HB3	1.94	0.50
3:C:179:THR:HG23	3:C:184:CYS:CB	2.42	0.50
1:D:74:PRO:HB2	1:D:79:PRO:HA	1.94	0.50
3:F:184:CYS:HB2	3:F:186:ILE:HD11	1.94	0.50
1:G:49:LYS:O	1:G:68:LYS:HE3	2.12	0.50
3:C:157:ILE:HG21	3:C:211:ILE:HG21	1.95	0.49
1:D:104:ASP:H	1:D:107:ALA:HB3	1.76	0.49
2:B:186:MET:HE2	2:B:202:LEU:HD13	1.94	0.49
2:E:88:ARG:CG	2:E:88:ARG:NH1	2.71	0.49
2:H:237:TYR:HB2	3:I:220:ILE:HD13	1.94	0.49
2:B:56:TYR:CD2	1:G:96:THR:HG23	2.47	0.49
2:B:59:LYS:HZ3	1:G:96:THR:HG22	1.74	0.49
2:B:164:GLY:HA3	2:B:174:LEU:HD21	1.95	0.49
3:F:108:ARG:NH1	3:F:110:ILE:H	2.10	0.49
1:G:194:VAL:HB	1:G:261:LEU:HD23	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:34:VAL:HG21	2:H:43:ILE:HG13	1.94	0.49
3:I:145:GLY:H	3:I:148:LEU:HD12	1.77	0.49
3:I:224:THR:CB	3:I:225:ASP:HA	2.35	0.49
1:D:91:LEU:HD11	1:D:145:TYR:CD2	2.47	0.49
2:E:4:VAL:O	2:E:5:GLU:CB	2.61	0.49
3:F:204:GLU:HG3	3:F:205:GLU:N	2.25	0.49
3:I:80:VAL:HG21	3:I:120:LEU:HD13	1.94	0.49
3:C:186:ILE:HG13	3:C:194:ILE:HD13	1.94	0.49
3:F:75:ILE:HD12	3:F:128:ALA:O	2.13	0.49
3:I:14:ARG:HB3	3:I:51:PHE:O	2.13	0.49
2:H:190:MET:HB3	2:H:197:VAL:HA	1.95	0.49
3:C:154:GLY:O	1:G:14:ILE:HD11	2.12	0.48
1:G:125:ASP:CG	1:G:127:THR:HG23	2.34	0.48
3:C:157:ILE:HB	3:C:194:ILE:HG13	1.96	0.48
3:F:178:LEU:C	3:F:180:SER:H	2.09	0.48
2:E:237:TYR:O	2:E:237:TYR:CG	2.66	0.48
1:G:38:ARG:HD2	1:G:59:GLY:HA3	1.94	0.48
2:H:186:MET:HE2	2:H:202:LEU:HD13	1.96	0.48
3:C:106:LEU:HD11	3:C:119:TYR:CZ	2.49	0.48
3:C:201:ARG:HA	3:C:202:PHE:HA	1.67	0.48
2:E:31:GLU:HG3	2:E:34:VAL:HG13	1.95	0.47
2:H:237:TYR:C	3:I:220:ILE:HD11	2.34	0.47
3:I:211:ILE:HA	3:I:214:ILE:HG22	1.95	0.47
2:E:8:LYS:HG2	2:E:11:LEU:HD23	1.95	0.47
3:I:208:ILE:HA	3:I:211:ILE:HG22	1.96	0.47
2:E:161:VAL:HG13	2:E:225:ILE:HD12	1.95	0.47
3:I:29:GLN:CA	3:I:30:ILE:HB	2.45	0.47
3:I:223:LEU:HG	3:I:224:THR:HG23	1.95	0.47
2:B:50:LYS:HB2	2:B:130:GLN:HB2	1.95	0.47
1:G:1:MET:H2	2:H:77:ARG:NH1	2.08	0.47
1:A:25:LYS:HE2	1:A:27:ILE:HG21	1.97	0.47
1:A:79:PRO:HB2	1:A:134:GLY:HA2	1.96	0.47
3:C:168:ILE:HG22	3:C:172:LYS:HA	1.97	0.47
1:D:38:ARG:HD2	1:D:59:GLY:HA3	1.97	0.47
3:F:142:SER:HB2	3:F:144:LYS:HD2	1.97	0.47
1:G:199:ALA:HB3	1:G:206:VAL:HG12	1.97	0.47
3:F:217:GLU:C	3:F:219:HIS:H	2.18	0.46
2:B:88:ARG:CG	2:B:88:ARG:NH1	2.63	0.46
3:C:7:GLN:O	3:C:8:LYS:HG3	2.15	0.46
1:G:12:PRO:HB2	1:G:15:LYS:HB2	1.97	0.46
1:G:121:SER:HB3	1:G:232:VAL:HG11	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:77:ILE:HD11	3:I:193:ARG:HB3	1.97	0.46
3:F:221:LYS:HD3	3:F:228:LYS:HE3	1.98	0.46
2:H:230:ARG:HG2	3:I:18:VAL:HG11	1.97	0.46
3:I:224:THR:CB	3:I:225:ASP:CA	2.74	0.46
1:A:32:ARG:CZ	1:A:38:ARG:HG3	2.46	0.46
2:E:51:ALA:HB3	2:E:138:VAL:HG12	1.98	0.46
3:I:184:CYS:O	3:I:186:ILE:N	2.49	0.46
3:C:205:GLU:O	3:C:205:GLU:CG	2.63	0.46
3:F:110:ILE:HG21	3:F:119:TYR:CE2	2.51	0.46
3:F:164:VAL:N	3:F:165:PRO:HD2	2.31	0.46
3:F:23:LEU:HD22	3:F:51:PHE:CD1	2.51	0.45
2:H:78:TYR:CE2	2:H:100:LEU:HD12	2.52	0.45
3:I:106:LEU:HB3	3:I:107:GLY:H	1.35	0.45
3:F:70:PRO:HB2	3:F:133:PHE:CD2	2.50	0.45
1:G:8:GLN:C	1:G:10:ILE:N	2.68	0.45
1:G:24:GLU:C	1:G:26:GLY:N	2.70	0.45
1:G:42:ILE:HG12	1:G:56:VAL:HG22	1.99	0.45
3:I:28:PHE:CD2	3:I:58:PHE:HE2	2.35	0.45
3:I:29:GLN:HA	3:I:30:ILE:HB	1.96	0.45
2:B:107:ALA:HB1	2:B:198:THR:HG23	1.97	0.45
3:F:108:ARG:HH12	3:F:110:ILE:H	1.63	0.45
3:C:69:TYR:HA	3:C:70:PRO:HD3	1.79	0.45
3:C:105:LEU:HD23	3:C:143:VAL:HG21	1.98	0.45
2:E:50:LYS:HD3	2:E:130:GLN:CD	2.36	0.45
1:G:32:ARG:CZ	1:G:38:ARG:HG3	2.47	0.45
2:H:237:TYR:O	3:I:220:ILE:HD11	2.17	0.45
3:I:77:ILE:HG22	3:I:127:ILE:HG12	1.98	0.45
3:C:92:ILE:O	3:C:191:ASN:ND2	2.44	0.45
1:G:132:GLU:HA	1:G:133:PRO:HD3	1.84	0.45
1:G:104:ASP:O	1:G:105:GLU:HB2	2.17	0.45
2:H:234:LYS:O	2:H:236:LYS:N	2.40	0.45
1:D:42:ILE:HG12	1:D:56:VAL:HG22	1.98	0.45
3:I:157:ILE:HB	3:I:194:ILE:HG13	1.99	0.45
3:I:219:HIS:ND1	3:I:219:HIS:N	2.64	0.45
3:F:131:GLU:HG3	3:F:142:SER:HB3	1.98	0.44
2:H:10:ILE:HD13	2:H:166:ALA:HB3	2.00	0.44
2:B:165:LYS:HE3	2:B:168:GLY:HA2	1.98	0.44
2:E:6:ARG:HB3	2:E:7:PRO:CA	2.47	0.44
2:E:11:LEU:HB3	2:E:12:ASP:H	1.65	0.44
1:G:222:SER:O	1:G:234:ILE:HA	2.17	0.44
3:C:77:ILE:HG22	3:C:127:ILE:HG12	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:32:ARG:CZ	1:D:38:ARG:HG3	2.48	0.44
1:G:82:GLY:HA2	1:G:137:VAL:CG1	2.48	0.44
2:H:156:ASP:HB3	2:H:191:MET:HB3	2.00	0.44
1:G:28:ARG:NH2	1:G:207:VAL:O	2.39	0.44
3:C:84:GLU:HG2	3:C:85:ILE:H	1.83	0.44
3:F:25:GLU:HG2	3:F:42:LYS:HG2	1.99	0.44
1:G:12:PRO:C	1:G:14:ILE:H	2.21	0.44
1:G:78:THR:HA	1:G:79:PRO:HD3	1.52	0.44
3:I:29:GLN:N	3:I:30:ILE:HB	2.33	0.44
1:A:251:GLU:OE2	2:B:212:ARG:NH2	2.51	0.44
3:F:219:HIS:HB2	3:F:220:ILE:HD12	2.00	0.44
1:A:168:THR:HB	1:A:187:LEU:CD2	2.48	0.43
1:G:127:THR:CA	1:G:128:LYS:CB	2.97	0.43
2:B:34:VAL:HG21	2:B:43:ILE:HG13	1.99	0.43
3:C:205:GLU:C	3:C:207:LEU:N	2.71	0.43
1:G:88:VAL:HG22	1:G:144:VAL:HB	1.99	0.43
3:I:224:THR:OG1	3:I:225:ASP:HB3	2.16	0.43
1:A:228:ASP:HB2	1:A:230:LYS:HB2	1.99	0.43
1:A:105:GLU:HG2	2:B:102:LYS:HD2	2.01	0.43
2:E:112:VAL:HA	2:E:154:MET:HG2	1.99	0.43
3:F:198:CYS:HB3	3:F:205:GLU:HB3	1.99	0.43
3:F:217:GLU:C	3:F:219:HIS:N	2.71	0.43
2:E:197:VAL:HG11	2:E:200:PHE:HD1	1.84	0.43
2:H:29:LYS:HB3	2:H:45:GLU:HB2	1.99	0.43
2:H:62:HIS:CB	2:H:63:PRO:HD3	2.48	0.43
3:I:107:GLY:O	3:I:108:ARG:HB2	2.19	0.43
1:D:121:SER:CA	1:D:232:VAL:HG21	2.46	0.43
1:G:127:THR:H	1:G:128:LYS:CB	2.31	0.43
3:I:169:GLY:HA2	3:I:170:LYS:CG	2.48	0.43
2:E:100:LEU:HD21	2:E:136:ARG:CZ	2.49	0.43
3:F:186:ILE:HD12	3:F:207:LEU:HD11	2.01	0.43
3:I:168:ILE:C	3:I:174:MET:HB2	2.39	0.43
3:I:187:PHE:O	3:I:194:ILE:HA	2.19	0.43
1:G:28:ARG:CZ	1:G:206:VAL:HG22	2.48	0.43
2:H:8:LYS:HE3	2:H:11:LEU:HD23	2.00	0.43
3:C:208:ILE:O	3:C:211:ILE:HG22	2.18	0.42
3:F:18:VAL:HG12	3:F:21:GLU:HB2	2.00	0.42
3:F:75:ILE:HD11	3:F:127:ILE:CG2	2.45	0.42
1:G:178:VAL:HG12	1:G:179:ASN:H	1.84	0.42
3:C:116:LEU:C	3:C:117:ARG:HG3	2.39	0.42
2:H:96:ARG:O	2:H:100:LEU:HG	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:11:LEU:HB2	3:I:12:GLN:HE21	1.83	0.42
3:C:12:GLN:HA	3:C:13:PRO:HD3	1.88	0.42
3:F:206:ILE:O	3:F:206:ILE:HG23	2.18	0.42
1:G:198:VAL:HG22	1:G:207:VAL:HG22	2.00	0.42
3:I:167:VAL:HG12	3:I:167:VAL:O	2.19	0.42
2:B:163:VAL:HB	2:B:218:ALA:HB2	2.01	0.42
3:I:167:VAL:HA	3:I:214:ILE:HD13	2.01	0.42
3:C:82:ASP:OD1	2:H:119:ARG:NH2	2.52	0.42
2:B:236:LYS:HE3	3:C:63:LEU:HB3	2.00	0.42
3:C:164:VAL:HB	3:C:165:PRO:HD3	2.02	0.42
1:G:82:GLY:HA3	1:G:129:LEU:CD1	2.49	0.42
2:H:10:ILE:HG23	2:H:11:LEU:O	2.19	0.42
2:B:83:PHE:HB2	1:G:50:ALA:HB2	2.02	0.42
3:F:57:GLN:HE21	3:F:57:GLN:HB3	1.63	0.42
3:I:9:ILE:HG23	3:I:25:GLU:OE2	2.19	0.42
1:D:112:ARG:HH22	2:E:96:ARG:NH1	2.18	0.42
3:I:211:ILE:O	3:I:215:GLU:CB	2.68	0.42
1:D:168:THR:HB	1:D:187:LEU:HD22	2.00	0.41
3:C:16:ILE:HD12	3:C:63:LEU:HD11	2.02	0.41
1:D:11:ILE:HG21	1:D:216:ILE:CG2	2.50	0.41
2:H:74:LEU:HD23	2:H:122:ILE:HB	2.02	0.41
2:B:57:GLY:HA2	2:B:152:ILE:HD11	2.02	0.41
3:C:111:ASN:HB2	3:C:114:GLU:HG3	2.02	0.41
1:D:121:SER:HA	1:D:232:VAL:CG2	2.48	0.41
1:G:121:SER:CA	1:G:232:VAL:HG21	2.49	0.41
2:H:31:GLU:HG3	2:H:34:VAL:HG13	2.02	0.41
2:H:162:ALA:HA	2:H:187:PRO:HA	2.02	0.41
2:H:231:GLU:HA	2:H:234:LYS:HB2	2.02	0.41
1:A:1:MET:CG	2:B:77:ARG:HG3	2.44	0.41
3:I:13:PRO:HB2	3:I:14:ARG:H	1.72	0.41
2:B:234:LYS:C	2:B:236:LYS:N	2.74	0.41
3:F:17:VAL:HG21	3:F:23:LEU:CD2	2.51	0.41
3:F:110:ILE:HG21	3:F:119:TYR:HE2	1.84	0.41
3:F:179:THR:HG23	3:F:186:ILE:HG12	2.01	0.41
3:C:189:ALA:C	3:C:191:ASN:H	2.24	0.41
1:D:68:LYS:HD3	2:H:83:PHE:HA	2.02	0.41
1:A:78:THR:HA	1:A:79:PRO:HD3	1.91	0.41
2:H:236:LYS:C	2:H:237:TYR:CD2	2.87	0.41
1:A:51:ASP:CB	1:A:168:THR:HG23	2.51	0.41
3:C:137:ILE:HG22	3:F:85:ILE:HG21	2.03	0.41
3:F:163:LYS:HD2	3:F:215:GLU:OE2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:191:ASN:HD22	3:I:191:ASN:HA	1.64	0.41
2:B:36:LYS:HD3	2:B:36:LYS:HA	1.92	0.41
2:H:190:MET:HG2	2:H:222:ILE:HD13	2.03	0.41
1:A:82:GLY:HA2	1:A:137:VAL:HG22	2.03	0.40
1:A:170:VAL:HG12	1:A:171:TYR:N	2.36	0.40
1:D:23:PHE:HE1	1:D:28:ARG:HG2	1.86	0.40
3:F:233:GLU:O	3:F:237:GLU:HB3	2.20	0.40
3:C:133:PHE:CD1	3:C:139:PRO:HG3	2.56	0.40
2:E:165:LYS:HE3	2:E:168:GLY:HA2	2.04	0.40
2:E:4:VAL:O	2:E:4:VAL:CG1	2.69	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	245/271 (90%)	229 (94%)	12 (5%)	4 (2%)	9	12
1	D	257/271 (95%)	242 (94%)	10 (4%)	5 (2%)	8	9
1	G	268/271 (99%)	238 (89%)	13 (5%)	17 (6%)	1	0
2	B	230/245 (94%)	212 (92%)	12 (5%)	6 (3%)	5	5
2	E	235/245 (96%)	219 (93%)	9 (4%)	7 (3%)	4	3
2	H	232/245 (95%)	215 (93%)	12 (5%)	5 (2%)	6	7
3	C	220/249 (88%)	184 (84%)	24 (11%)	12 (6%)	2	1
3	F	205/249 (82%)	169 (82%)	24 (12%)	12 (6%)	1	0
3	I	198/249 (80%)	163 (82%)	24 (12%)	11 (6%)	2	1
All	All	2090/2295 (91%)	1871 (90%)	140 (7%)	79 (4%)	3	2

All (79) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	105	GLU
2	B	13	ASP
3	C	8	LYS
3	C	182	SER
1	D	8	GLN
1	D	78	THR
2	E	4	VAL
2	E	5	GLU
2	E	13	ASP
2	E	236	LYS
3	F	162	VAL
3	F	177	THR
3	F	179	THR
3	F	204	GLU
3	F	220	ILE
1	G	23	PHE
1	G	105	GLU
1	G	126	LEU
1	G	175	GLN
1	G	177	SER
2	H	13	ASP
2	H	236	LYS
2	H	237	TYR
3	I	13	PRO
3	I	108	ARG
3	I	112	VAL
3	I	185	SER
3	I	206	ILE
3	I	209	GLU
3	I	223	LEU
1	A	10	ILE
3	C	13	PRO
3	C	117	ARG
3	C	208	ILE
1	D	16	LYS
1	D	105	GLU
3	F	13	PRO
3	F	57	GLN
1	G	24	GLU
1	G	78	THR
1	G	93	LEU
1	G	128	LYS
1	G	180	LYS

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Mol	Chain	Res	Type
3	I	54	LYS
2	B	12	ASP
2	B	235	SER
3	C	40	ASN
3	C	115	ASP
3	C	145	GLY
3	C	200	SER
2	E	57	GLY
3	F	55	ASP
3	F	160	MET
3	F	240	ALA
1	G	2	SER
1	G	79	PRO
1	G	176	ILE
2	H	235	SER
3	I	109	SER
2	B	57	GLY
2	B	133	ALA
2	B	237	TYR
3	C	134	ASP
3	C	153	ASN
2	E	133	ALA
3	F	108	ARG
1	G	10	ILE
3	I	172	LYS
1	A	78	THR
3	C	199	PRO
2	E	6	ARG
3	F	206	ILE
2	H	133	ALA
1	G	9	ASN
3	I	30	ILE
1	G	188	PRO
1	G	178	VAL
1	A	91	LEU
1	D	92	PRO

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	218/239 (91%)	202 (93%)	16 (7%)	14	21
1	D	217/239 (91%)	202 (93%)	15 (7%)	15	24
1	G	237/239 (99%)	215 (91%)	22 (9%)	9	12
2	B	187/205 (91%)	177 (95%)	10 (5%)	22	36
2	E	197/205 (96%)	186 (94%)	11 (6%)	21	32
2	H	194/205 (95%)	184 (95%)	10 (5%)	23	37
3	C	180/222 (81%)	165 (92%)	15 (8%)	11	16
3	F	190/222 (86%)	168 (88%)	22 (12%)	5	7
3	I	167/222 (75%)	150 (90%)	17 (10%)	7	10
All	All	1787/1998 (89%)	1649 (92%)	138 (8%)	13	19

All (138) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	ASN
1	A	9	ASN
1	A	13	ILE
1	A	32	ARG
1	A	68	LYS
1	A	73	LYS
1	A	104	ASP
1	A	137	VAL
1	A	187	LEU
1	A	191	TYR
1	A	203	LYS
1	A	228	ASP
1	A	235	GLN
1	A	239	LYS
1	A	251	GLU
1	A	262	LEU
2	B	12	ASP
2	B	34	VAL
2	B	61	MET
2	B	63	PRO
2	B	88	ARG
2	B	96	ARG
2	B	161	VAL

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Mol	Chain	Res	Type
2	B	198	THR
2	B	215	PHE
2	B	238	VAL
3	C	7	GLN
3	C	18	VAL
3	C	22	LEU
3	C	55	ASP
3	C	56	THR
3	C	85	ILE
3	C	106	LEU
3	C	117	ARG
3	C	135	ARG
3	C	158	ASP
3	C	162	VAL
3	C	163	LYS
3	C	191	ASN
3	C	221	LYS
3	C	225	ASP
1	D	8	GLN
1	D	9	ASN
1	D	37	TYR
1	D	68	LYS
1	D	93	LEU
1	D	104	ASP
1	D	135	LYS
1	D	137	VAL
1	D	148	ASP
1	D	187	LEU
1	D	206	VAL
1	D	228	ASP
1	D	239	LYS
1	D	247	ILE
1	D	251	GLU
2	E	4	VAL
2	E	6	ARG
2	E	8	LYS
2	E	15	LYS
2	E	50	LYS
2	E	61	MET
2	E	75	ARG
2	E	88	ARG
2	E	161	VAL

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Mol	Chain	Res	Type
2	E	198	THR
2	E	237	TYR
3	F	18	VAL
3	F	22	LEU
3	F	55	ASP
3	F	57	GLN
3	F	118	ARG
3	F	131	GLU
3	F	134	ASP
3	F	135	ARG
3	F	144	LYS
3	F	146	LYS
3	F	174	MET
3	F	175	TYR
3	F	176	GLU
3	F	178	LEU
3	F	184	CYS
3	F	198	CYS
3	F	207	LEU
3	F	228	LYS
3	F	229	GLN
3	F	231	ILE
3	F	233	GLU
3	F	234	LYS
1	G	11	ILE
1	G	20	VAL
1	G	37	TYR
1	G	68	LYS
1	G	73	LYS
1	G	81	GLN
1	G	93	LEU
1	G	96	THR
1	G	104	ASP
1	G	120	ASP
1	G	125	ASP
1	G	129	LEU
1	G	130	VAL
1	G	178	VAL
1	G	181	ASN
1	G	187	LEU
1	G	203	LYS
1	G	206	VAL

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Mol	Chain	Res	Type
1	G	232	VAL
1	G	235	GLN
1	G	239	LYS
1	G	251	GLU
2	H	15	LYS
2	H	34	VAL
2	H	61	MET
2	H	75	ARG
2	H	89	LYS
2	H	96	ARG
2	H	132	ASP
2	H	161	VAL
2	H	174	LEU
2	H	215	PHE
3	I	12	GLN
3	I	14	ARG
3	I	18	VAL
3	I	22	LEU
3	I	25	GLU
3	I	27	GLU
3	I	38	LYS
3	I	75	ILE
3	I	83	VAL
3	I	106	LEU
3	I	120	LEU
3	I	155	ILE
3	I	191	ASN
3	I	207	LEU
3	I	215	GLU
3	I	219	HIS
3	I	223	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	235	GLN
1	A	249	GLN
3	C	7	GLN
3	C	190	ASN
1	D	235	GLN
3	F	57	GLN
1	G	9	ASN

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Mol	Chain	Res	Type
1	G	235	GLN
2	H	130	GLN
3	I	12	GLN
3	I	190	ASN

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](#)

3 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	B	246	-	4,4,4	0.16	0	6,6,6	0.12	0
4	SO4	E	246	-	4,4,4	0.14	0	6,6,6	0.18	0
4	SO4	H	246	-	4,4,4	0.15	0	6,6,6	0.10	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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	251/271 (92%)	0.26	22 (8%) 10 8	25, 42, 77, 90	0
1	D	261/271 (96%)	0.85	38 (14%) 2 2	28, 57, 112, 137	0
1	G	270/271 (99%)	0.72	36 (13%) 3 2	31, 55, 98, 114	0
2	B	232/245 (94%)	0.19	12 (5%) 27 25	20, 43, 91, 100	0
2	E	237/245 (96%)	0.40	17 (7%) 15 13	20, 40, 91, 106	0
2	H	234/245 (95%)	0.38	15 (6%) 19 17	25, 50, 80, 104	0
3	C	222/249 (89%)	1.13	45 (20%) 1 0	31, 64, 120, 144	0
3	F	215/249 (86%)	0.83	29 (13%) 3 2	28, 59, 84, 93	0
3	I	206/249 (82%)	1.56	75 (36%) 0 0	39, 85, 120, 131	0
All	All	2128/2295 (92%)	0.69	289 (13%) 3 2	20, 53, 109, 144	0

All (289) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	237	TYR	8.7
3	I	145	GLY	7.6
1	D	270	GLY	7.3
3	C	116	LEU	6.7
3	C	199	PRO	6.5
2	H	62	HIS	6.4
1	D	7	ASN	6.3
1	A	271	ILE	6.2
2	E	2	LEU	6.2
3	F	110	ILE	6.0
3	C	135	ARG	5.9
1	G	127	THR	5.7
1	D	138	TRP	5.6
2	E	4	VAL	5.6
1	D	184	VAL	5.6

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Mol	Chain	Res	Type	RSRZ
2	H	180	MET	5.6
3	F	203	SER	5.5
2	H	238	VAL	5.4
1	G	126	LEU	5.4
3	C	185	SER	5.3
1	D	132	GLU	5.2
3	C	171	ASN	5.2
2	E	6	ARG	5.2
1	G	78	THR	5.2
2	E	14	GLY	5.1
2	E	3	GLN	5.0
1	G	184	VAL	4.9
1	A	9	ASN	4.9
1	A	103	PRO	4.8
2	B	238	VAL	4.7
2	B	181	TRP	4.7
3	F	180	SER	4.7
3	I	181	LYS	4.7
1	D	185	GLY	4.6
3	C	203	SER	4.5
3	C	200	SER	4.5
1	D	165	LEU	4.5
1	G	138	TRP	4.4
1	G	173	VAL	4.4
2	H	166	ALA	4.4
1	D	101	GLY	4.3
2	H	65	HIS	4.2
1	D	271	ILE	4.2
1	G	176	ILE	4.1
3	I	106	LEU	4.1
3	F	198	CYS	4.1
3	I	85	ILE	4.1
2	B	14	GLY	4.1
2	E	5	GLU	4.1
3	C	169	GLY	4.0
1	G	259	VAL	4.0
1	A	171	TYR	4.0
3	C	227	ILE	4.0
1	A	183	VAL	4.0
1	G	181	ASN	4.0
1	G	8	GLN	3.9
3	F	141	LEU	3.9

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Mol	Chain	Res	Type	RSRZ
1	A	78	THR	3.9
3	I	175	TYR	3.9
3	I	8	LYS	3.9
3	F	197	THR	3.9
3	I	84	GLU	3.9
2	B	237	TYR	3.9
2	E	181	TRP	3.9
3	F	11	LEU	3.9
1	D	19	ILE	3.9
3	I	141	LEU	3.9
3	I	153	ASN	3.9
2	B	87	GLU	3.8
3	I	40	ASN	3.8
1	G	185	GLY	3.8
2	H	64	ARG	3.8
1	D	170	VAL	3.7
1	A	8	GLN	3.7
3	I	171	ASN	3.6
3	C	186	ILE	3.6
3	I	208	ILE	3.6
1	G	75	TYR	3.6
3	C	117	ARG	3.5
3	I	53	VAL	3.5
3	I	86	TYR	3.5
3	I	109	SER	3.5
3	I	39	ILE	3.5
2	H	181	TRP	3.5
1	D	6	SER	3.5
1	A	184	VAL	3.5
3	I	60	VAL	3.5
2	H	8	LYS	3.5
2	E	64	ARG	3.4
3	I	185	SER	3.4
1	A	6	SER	3.4
3	C	115	ASP	3.4
3	F	220	ILE	3.4
3	I	220	ILE	3.4
1	G	7	ASN	3.4
1	D	78	THR	3.3
3	I	214	ILE	3.3
3	C	25	GLU	3.3
3	C	14	ARG	3.3

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Mol	Chain	Res	Type	RSRZ
1	D	164	ALA	3.3
2	H	87	GLU	3.3
3	F	174	MET	3.3
1	G	1	MET	3.3
3	C	178	LEU	3.2
3	C	202	PHE	3.2
1	D	129	LEU	3.2
2	E	9	LEU	3.2
2	H	11	LEU	3.2
3	I	197	THR	3.2
3	F	12	GLN	3.2
3	I	133	PHE	3.2
3	F	218	SER	3.2
3	I	45	SER	3.2
3	C	211	ILE	3.2
3	I	58	PHE	3.2
1	D	135	LYS	3.2
3	I	27	GLU	3.1
3	I	151	VAL	3.1
1	A	10	ILE	3.1
3	C	131	GLU	3.1
1	D	8	GLN	3.1
1	G	30	ASP	3.1
1	D	137	VAL	3.1
3	C	224	THR	3.1
2	B	236	LYS	3.1
2	E	66	LEU	3.1
3	I	12	GLN	3.0
1	G	244	LEU	3.0
3	I	146	LYS	3.0
1	A	120	ASP	3.0
1	G	128	LYS	3.0
3	C	176	GLU	3.0
3	C	170	LYS	2.9
3	F	109	SER	2.9
3	F	136	SER	2.9
1	D	37	TYR	2.9
3	C	55	ASP	2.9
3	C	184	CYS	2.9
3	I	132	ASN	2.9
3	I	168	ILE	2.9
1	G	76	GLU	2.9

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Mol	Chain	Res	Type	RSRZ
3	F	25	GLU	2.9
2	H	14	GLY	2.8
3	I	107	GLY	2.8
1	D	130	VAL	2.8
3	F	169	GLY	2.8
1	A	229	LEU	2.8
3	I	173	SER	2.8
2	B	215	PHE	2.8
3	I	24	ALA	2.8
3	F	56	THR	2.8
2	B	180	MET	2.8
1	G	182	GLU	2.7
3	F	166	ARG	2.7
1	A	2	SER	2.7
3	I	52	ASP	2.7
3	F	117	ARG	2.7
3	I	120	LEU	2.7
3	C	154	GLY	2.7
2	E	237	TYR	2.7
1	G	73	LYS	2.7
3	C	120	LEU	2.7
2	B	64	ARG	2.7
3	I	184	CYS	2.7
1	G	129	LEU	2.7
3	I	25	GLU	2.6
1	D	193	VAL	2.6
2	H	119	ARG	2.6
3	I	19	PRO	2.6
3	I	119	TYR	2.6
1	G	31	GLY	2.6
3	I	143	VAL	2.6
3	C	198	CYS	2.6
3	F	57	GLN	2.6
1	G	32	ARG	2.6
1	A	79	PRO	2.6
3	F	195	TRP	2.6
3	I	30	ILE	2.6
1	D	76	GLU	2.6
2	E	87	GLU	2.6
3	C	7	GLN	2.6
3	I	206	ILE	2.6
1	A	172	LYS	2.6

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Mol	Chain	Res	Type	RSRZ
3	C	52	ASP	2.6
3	C	18	VAL	2.5
3	I	46	THR	2.5
3	I	28	PHE	2.5
1	D	194	VAL	2.5
2	B	62	HIS	2.5
1	A	7	ASN	2.5
3	I	36	ILE	2.5
3	C	225	ASP	2.5
1	D	80	ASN	2.5
3	C	153	ASN	2.5
1	G	37	TYR	2.5
3	F	206	ILE	2.5
3	I	20	GLY	2.5
3	I	78	GLY	2.5
2	E	62	HIS	2.4
2	E	11	LEU	2.4
3	C	207	LEU	2.4
3	I	23	LEU	2.4
3	I	166	ARG	2.4
3	I	113	GLY	2.4
2	H	66	LEU	2.4
1	D	187	LEU	2.4
3	I	11	LEU	2.4
1	A	76	GLU	2.4
3	I	105	LEU	2.4
1	D	171	TYR	2.4
1	G	13	ILE	2.4
3	I	29	GLN	2.4
3	I	54	LYS	2.4
1	A	80	ASN	2.4
1	D	183	VAL	2.4
3	I	77	ILE	2.4
1	D	29	GLN	2.4
1	A	71	ILE	2.3
1	G	261	LEU	2.3
2	B	22	PRO	2.3
3	I	154	GLY	2.3
3	C	201	ARG	2.3
2	E	171	ILE	2.3
3	I	108	ARG	2.3
3	F	55	ASP	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	20	VAL	2.3
3	C	214	ILE	2.3
1	G	66	GLY	2.3
3	C	177	THR	2.3
3	C	222	GLY	2.3
2	H	132	ASP	2.3
3	I	55	ASP	2.3
1	D	48	LYS	2.3
3	C	189	ALA	2.3
3	I	167	VAL	2.3
3	I	216	ASN	2.3
1	D	71	ILE	2.3
3	I	187	PHE	2.3
3	I	195	TRP	2.3
1	G	69	LEU	2.3
3	F	178	LEU	2.3
1	A	39	PRO	2.2
3	I	111	ASN	2.2
3	C	174	MET	2.2
3	I	180	SER	2.2
3	I	9	ILE	2.2
1	D	168	THR	2.2
1	G	140	VAL	2.2
1	A	11	ILE	2.2
1	G	71	ILE	2.2
3	I	14	ARG	2.2
3	I	125	TYR	2.2
1	A	202	ASP	2.2
3	I	147	ASP	2.2
1	G	170	VAL	2.2
3	C	112	VAL	2.2
3	I	174	MET	2.2
3	I	150	ARG	2.2
3	C	206	ILE	2.2
3	C	152	SER	2.2
3	F	152	SER	2.2
3	I	82	ASP	2.1
2	E	16	ARG	2.1
3	I	100	LEU	2.1
3	C	8	LYS	2.1
3	F	221	LYS	2.1
1	G	134	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
3	F	54	LYS	2.1
2	B	7	PRO	2.1
3	I	88	TRP	2.1
3	F	160	MET	2.1
1	D	166	TYR	2.1
3	F	177	THR	2.1
3	I	211	ILE	2.1
1	D	45	ASP	2.1
3	C	85	ILE	2.1
1	G	77	ASP	2.1
3	F	86	TYR	2.1
1	G	137	VAL	2.0
3	C	175	TYR	2.0
1	D	124	LEU	2.0
1	D	102	PRO	2.0
1	D	136	SER	2.0
3	I	37	LEU	2.0
1	D	192	PRO	2.0
2	E	15	LYS	2.0
3	C	57	GLN	2.0
1	G	262	LEU	2.0
1	G	45	ASP	2.0

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

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

6.3 Carbohydrates [\(i\)](#)

There are no monosaccharides in this entry.

6.4 Ligands [\(i\)](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	SO4	E	246	5/5	0.97	0.09	45,45,46,46	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	SO4	B	246	5/5	0.98	0.09	45,45,46,46	0
4	SO4	H	246	5/5	0.99	0.06	49,49,50,50	0

6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.