



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 28, 2024 – 08:07 pm BST

PDB ID : 5KC1
Title : Structure of the C-terminal dimerization domain of Atg38
Authors : Ohashi, Y.; Soler, N.; Garcia-Ortegon, M.; Zhang, L.; Perisic, O.; Masson, G.R.; Johnson, C.M.; Williams, R.J.
Deposited on : 2016-06-04
Resolution : 2.20 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 : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36.2
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) : 2.36.2

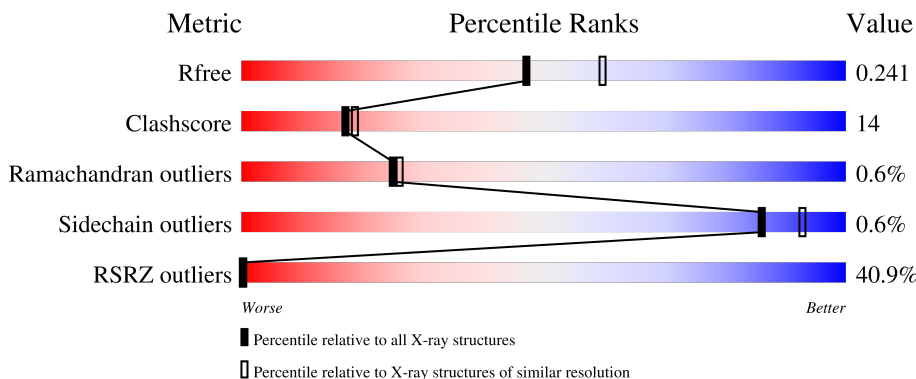
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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.









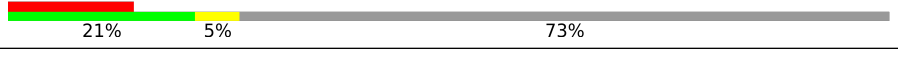
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	226	
1	B	226	
1	C	226	
1	D	226	
1	E	226	

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Mol	Chain	Length	Quality of chain
1	F	226	
1	G	226	
1	H	226	
1	I	226	
1	J	226	
1	K	226	
1	L	226	

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NA	B	301	-	-	-	X
2	NA	D	301	-	-	-	X
2	NA	F	302	-	-	-	X
2	NA	I	301	-	-	-	X
2	NA	K	302	-	-	-	X
4	EDO	I	305	-	-	X	-
4	EDO	J	303	-	-	-	X

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 4567 atoms, of which 8 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 Autophagy-related protein 38.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	C	33	271	171	45	54	1	0	0	0
1	D	51	447	287	79	79	2	0	0	0
1	A	29	243	154	43	45	1	0	1	0
1	B	57	493	312	88	91	2	0	0	0
1	G	33	263	164	45	53	1	0	0	0
1	H	53	461	296	81	82	2	0	0	0
1	K	24	194	122	34	37	1	0	0	0
1	L	60	515	327	90	96	2	0	0	0
1	E	30	239	151	41	46	1	0	0	0
1	F	61	520	330	91	97	2	0	0	0
1	I	29	234	148	40	45	1	0	0	0
1	J	58	500	319	88	91	2	0	0	0

- Molecule 2 is SODIUM ION (three-letter code: NA) (formula: Na).

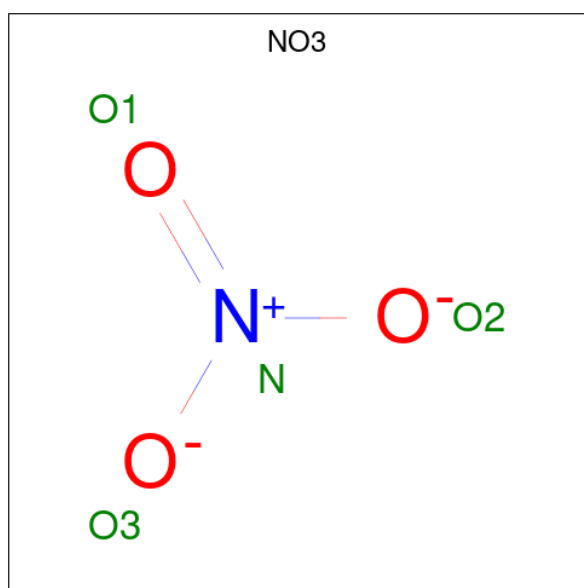
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	C	1	Total	Na	0	0
			1	1		
2	D	2	Total	Na	0	0
			2	2		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total	Na	0	0
			1	1		
2	K	3	Total	Na	0	0
			3	3		
2	E	1	Total	Na	0	0
			1	1		
2	F	4	Total	Na	0	0
			4	4		
2	I	2	Total	Na	0	0
			2	2		

- Molecule 3 is NITRATE ION (three-letter code: NO3) (formula: NO₃).



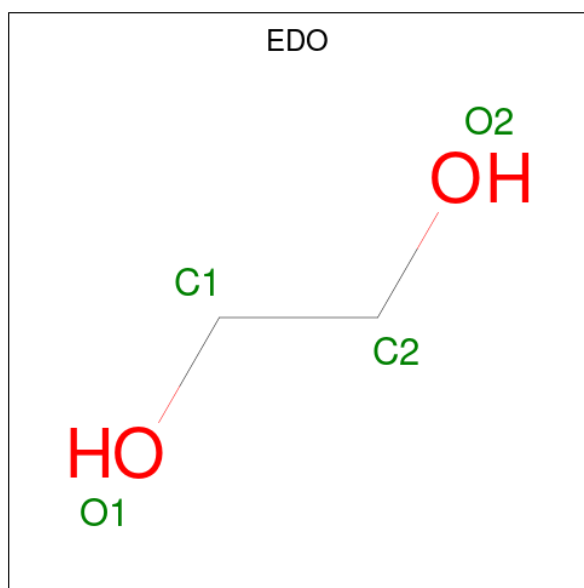
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	C	1	Total	N	O	0	0
			4	1	3		
3	D	1	Total	N	O	0	0
			4	1	3		
3	D	1	Total	N	O	0	0
			4	1	3		
3	A	1	Total	N	O	0	0
			4	1	3		
3	A	1	Total	N	O	0	0
			4	1	3		
3	B	1	Total	N	O	0	0
			4	1	3		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	G	1	Total	N	O	0	0
			4	1	3		
3	G	1	Total	N	O	0	0
			4	1	3		
3	G	1	Total	N	O	0	0
			4	1	3		
3	G	1	Total	N	O	0	0
			4	1	3		
3	H	1	Total	N	O	0	0
			4	1	3		
3	K	1	Total	N	O	0	0
			4	1	3		
3	K	1	Total	N	O	0	0
			4	1	3		
3	K	1	Total	N	O	0	0
			4	1	3		
3	F	1	Total	N	O	0	0
			4	1	3		
3	I	1	Total	N	O	0	0
			4	1	3		
3	I	1	Total	N	O	0	0
			4	1	3		
3	J	1	Total	N	O	0	0
			4	1	3		

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).

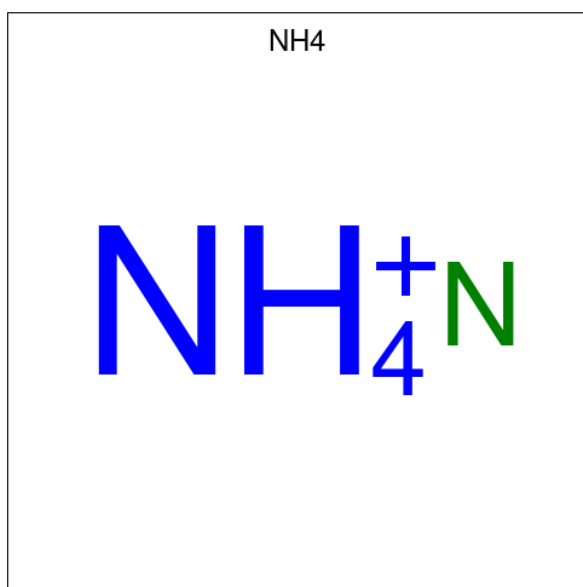


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	K	1	Total C O 4 2 2	0	0
4	L	1	Total C O 4 2 2	0	0
4	I	1	Total C O 4 2 2	0	0
4	J	1	Total C O 4 2 2	0	0
4	J	1	Total C O 4 2 2	0	0

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

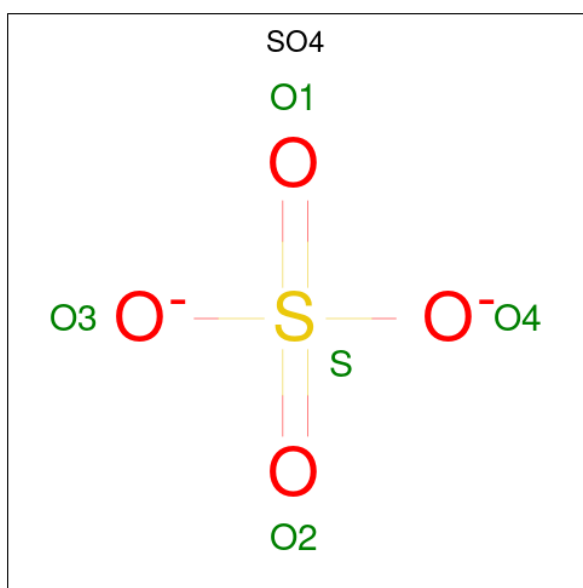
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	D	2	Total Cl 2 2	0	0
5	E	2	Total Cl 2 2	0	0
5	F	2	Total Cl 2 2	0	0

- Molecule 6 is AMMONIUM ION (three-letter code: NH4) (formula: H₄N).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	K	1	Total	H	N	0	0
			5	4	1		
6	J	1	Total	H	N	0	0
			5	4	1		

- Molecule 7 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	K	1	Total	O	S	0	0
			5	4	1		

- Molecule 8 is IODIDE ION (three-letter code: IOD) (formula: I).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	E	1	Total I 1 1	0	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	C	3	Total O 3 3	0	0
9	D	1	Total O 1 1	0	0
9	A	9	Total O 9 9	0	0
9	B	1	Total O 1 1	0	0
9	G	7	Total O 7 7	0	0
9	H	3	Total O 3 3	0	0
9	K	4	Total O 4 4	0	0
9	L	2	Total O 2 2	0	0
9	E	4	Total O 4 4	0	0
9	F	2	Total O 2 2	0	0
9	I	3	Total O 3 3	0	0
9	J	4	Total O 4 4	0	0

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	81.38Å 249.38Å 50.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	58.00 – 2.20 58.15 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.6 (58.00-2.20) 99.6 (58.15-2.10)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.62 (at 2.10Å)	Xtrriage
Refinement program	PHENIX dev_1810	Depositor
R, R_{free}	0.205 , 0.241 0.206 , 0.241	Depositor DCC
R_{free} test set	2862 reflections (4.72%)	wwPDB-VP
Wilson B-factor (Å ²)	42.4	Xtrriage
Anisotropy	0.706	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 76.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	4567	wwPDB-VP
Average B, all atoms (Å ²)	83.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.22% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NH4, CL, NO3, NA, IOD, EDO, 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	0.36	0/248	0.49	0/335
1	B	0.28	0/498	0.40	0/657
1	C	0.34	0/274	0.44	0/372
1	D	0.27	0/452	0.38	0/596
1	E	0.34	0/241	0.48	0/326
1	F	0.29	0/525	0.40	0/694
1	G	0.37	0/265	0.53	0/359
1	H	0.30	0/466	0.40	0/615
1	I	0.34	0/236	0.50	0/320
1	J	0.29	0/505	0.39	0/667
1	K	0.37	0/196	0.47	0/266
1	L	0.30	0/520	0.39	0/687
All	All	0.31	0/4426	0.43	0/5894

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	243	0	257	21	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	493	0	513	16	0
1	C	271	0	272	6	0
1	D	447	0	472	16	0
1	E	239	0	247	15	0
1	F	520	0	543	21	0
1	G	263	0	266	7	0
1	H	461	0	488	23	0
1	I	234	0	242	12	0
1	J	500	0	527	16	0
1	K	194	0	196	9	0
1	L	515	0	538	14	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	2	0	0	0	0
2	E	1	0	0	0	0
2	F	4	0	0	0	0
2	I	2	0	0	0	0
2	K	3	0	0	0	0
3	A	8	0	0	0	0
3	B	4	0	0	0	0
3	C	4	0	0	0	0
3	D	8	0	0	0	0
3	F	4	0	0	1	0
3	G	16	0	0	0	0
3	H	4	0	0	0	0
3	I	8	0	0	0	0
3	J	4	0	0	0	0
3	K	12	0	0	2	0
4	A	8	0	12	3	0
4	C	8	0	12	3	0
4	I	4	0	6	7	0
4	J	8	0	12	0	0
4	K	4	0	6	1	0
4	L	4	0	6	0	0
5	D	2	0	0	0	0
5	E	2	0	0	0	0
5	F	2	0	0	0	0
6	J	1	4	0	0	0
6	K	1	4	0	0	0
7	K	5	0	0	1	0
8	E	1	0	0	1	0
9	A	9	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	B	1	0	0	0	0
9	C	3	0	0	0	0
9	D	1	0	0	0	0
9	E	4	0	0	0	0
9	F	2	0	0	0	0
9	G	7	0	0	1	0
9	H	3	0	0	0	0
9	I	3	0	0	1	0
9	J	4	0	0	0	0
9	K	4	0	0	0	0
9	L	2	0	0	0	0
All	All	4559	8	4615	127	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 14.

All (127) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:123:LEU:HD13	1:A:126:ILE:HA	1.33	1.09
1:L:203:ILE:HD12	1:J:199:LEU:HD13	1.61	0.82
1:G:135:LEU:HD21	1:F:174:LEU:CD2	2.14	0.78
1:E:124:SER:H	1:E:125:PRO:CD	1.98	0.76
4:I:305:EDO:H12	1:J:170:PHE:HB2	1.67	0.76
1:E:149:LYS:HE2	1:F:159:SER:HB2	1.70	0.74
1:E:149:LYS:CE	1:F:159:SER:HB2	2.18	0.73
1:I:138:LEU:CA	4:I:305:EDO:H11	2.18	0.73
1:D:205:ARG:O	1:D:209:ARG:HG2	1.90	0.71
1:J:188:LYS:HE3	1:J:192:ILE:HD11	1.73	0.71
1:G:135:LEU:HD21	1:F:174:LEU:HD23	1.75	0.69
1:F:202:GLU:HA	1:F:205:ARG:HG2	1.75	0.68
1:K:127:ASN:H	4:K:308:EDO:H21	1.59	0.68
1:C:146:ILE:HD13	1:B:163:ILE:HD13	1.76	0.68
1:C:135:LEU:HD21	1:B:174:LEU:HD23	1.76	0.67
1:K:132:MET:HA	1:K:132:MET:HE2	1.76	0.66
1:H:175:VAL:HG22	1:E:125:PRO:CG	2.25	0.66
1:E:124:SER:H	1:E:125:PRO:HD2	1.61	0.66
1:H:175:VAL:HG22	1:E:125:PRO:HG2	1.78	0.65
1:G:135:LEU:HD21	1:F:174:LEU:HD22	1.78	0.65
4:A:303:EDO:H12	1:G:126:ILE:HD12	1.78	0.65
1:H:192:ILE:HG22	1:F:192:ILE:HG22	1.78	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:141:ASN:HB3	1:J:166:ARG:HD3	1.80	0.64
1:H:203:ILE:HG12	1:F:203:ILE:HD11	1.80	0.64
1:H:203:ILE:HD11	1:F:203:ILE:HD12	1.80	0.63
1:A:124:SER:OG	1:A:125:PRO:HD3	1.98	0.62
1:D:161:MET:HG3	1:D:162:LYS:H	1.66	0.61
1:I:138:LEU:N	4:I:305:EDO:H11	2.16	0.61
1:C:135:LEU:HD21	1:B:174:LEU:CD2	2.31	0.60
1:L:192:ILE:HG22	1:J:192:ILE:HG22	1.82	0.60
1:F:188:LYS:HE3	1:F:192:ILE:HD11	1.83	0.60
1:L:164:ASN:O	1:L:168:GLU:HG2	2.02	0.60
1:B:203:ILE:O	1:B:207:ARG:HG3	2.02	0.59
1:I:144:ASN:O	1:I:148:LEU:HD13	2.03	0.59
4:C:304:EDO:C1	1:B:171:LYS:HZ2	2.17	0.58
1:A:123:LEU:CD1	1:A:126:ILE:HA	2.22	0.57
1:H:192:ILE:HD13	1:F:193:THR:HG22	1.86	0.57
1:I:138:LEU:HB2	4:I:305:EDO:H11	1.86	0.57
1:A:123:LEU:HD12	1:A:123:LEU:O	2.03	0.57
1:L:192:ILE:HD13	1:J:193:THR:HG22	1.87	0.57
1:A:123:LEU:HB2	1:A:127:ASN:H	1.67	0.57
4:C:304:EDO:H11	1:B:171:LYS:HZ2	1.70	0.56
1:H:167:LEU:HD12	1:E:139:GLN:HB2	1.87	0.56
1:J:195:GLU:O	1:J:199:LEU:HD23	2.04	0.56
1:A:149:LYS:HE3	1:B:156:SER:HA	1.86	0.56
1:H:178:GLU:OE1	1:E:125:PRO:HB3	2.06	0.55
1:F:205:ARG:HG3	1:F:206:LEU:N	2.20	0.55
1:I:132:MET:HG2	9:I:403:HOH:O	2.07	0.55
1:L:202:GLU:HG2	1:L:205:ARG:HH12	1.72	0.55
1:H:192:ILE:HG22	1:F:192:ILE:CG2	2.36	0.54
1:E:124:SER:N	1:E:125:PRO:CD	2.70	0.54
1:C:150:THR:HG21	1:A:149:LYS:HE2	1.89	0.54
1:E:139:GLN:HG2	8:E:304:IOD:I	2.77	0.54
1:B:202:GLU:O	1:B:206:LEU:HG	2.08	0.54
1:L:167:LEU:O	1:L:171:LYS:HG3	2.08	0.53
1:A:126:ILE:HG23	1:A:131:LEU:HD23	1.90	0.52
1:I:145:ASP:OD2	1:J:166:ARG:HD2	2.08	0.52
1:A:123:LEU:HD13	1:A:126:ILE:CA	2.24	0.52
1:A:123:LEU:CB	1:A:127:ASN:H	2.22	0.52
1:L:192:ILE:HG22	1:J:192:ILE:CG2	2.39	0.52
1:I:138:LEU:HB2	4:I:305:EDO:C1	2.40	0.51
1:J:190:ASP:O	1:J:194:LYS:HG3	2.11	0.51
1:D:193:THR:O	1:D:197:LYS:HG3	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:138:LEU:CB	4:I:305:EDO:H11	2.40	0.51
1:A:149:LYS:HD2	1:B:159:SER:OG	2.11	0.51
1:D:192:ILE:HG22	1:B:192:ILE:HG22	1.93	0.51
1:B:194:LYS:HE2	1:B:198:LYS:HE3	1.93	0.50
1:H:189:ILE:O	1:H:193:THR:HG23	2.11	0.50
1:H:195:GLU:O	1:H:199:LEU:HG	2.10	0.50
1:D:195:GLU:O	1:D:199:LEU:HG	2.12	0.50
1:L:202:GLU:O	1:L:206:LEU:HG	2.12	0.50
1:J:162:LYS:O	1:J:166:ARG:HG2	2.11	0.50
1:K:146:ILE:HG21	1:L:163:ILE:HG12	1.94	0.49
9:G:401:HOH:O	1:I:137:ARG:HD3	2.13	0.49
1:E:149:LYS:HE3	1:F:159:SER:HB2	1.92	0.49
1:E:137:ARG:NH2	3:F:305:NO3:O2	2.42	0.49
1:D:189:ILE:O	1:D:193:THR:HG23	2.12	0.49
1:J:202:GLU:O	1:J:206:LEU:HD13	2.12	0.49
1:I:124:SER:OG	1:I:126:ILE:HG22	2.13	0.49
1:I:138:LEU:HA	4:I:305:EDO:H11	1.94	0.49
1:J:180:LYS:O	1:J:184:GLU:HG3	2.12	0.48
1:A:137[A]:ARG:HD3	9:A:408:HOH:O	2.12	0.48
1:H:170:PHE:HZ	1:F:174:LEU:CD2	2.27	0.48
1:H:171:LYS:HG2	1:E:135:LEU:HD13	1.96	0.48
1:A:123:LEU:HD22	1:A:128:ASP:H	1.79	0.48
1:D:163:ILE:HD11	1:A:142:LEU:HB2	1.96	0.47
1:D:163:ILE:CD1	1:A:142:LEU:HD12	2.44	0.47
1:H:203:ILE:CD1	1:F:203:ILE:HD12	2.45	0.47
1:L:193:THR:O	1:L:197:LYS:HG3	2.15	0.47
1:D:202:GLU:O	1:D:206:LEU:HG	2.15	0.47
1:B:167:LEU:O	1:B:171:LYS:HG3	2.14	0.47
1:K:137:ARG:HD2	7:K:309:SO4:O1	2.15	0.47
1:H:167:LEU:O	1:H:171:LYS:HG3	2.15	0.46
1:H:170:PHE:HZ	1:F:174:LEU:HD22	1.81	0.46
1:D:170:PHE:HZ	1:B:174:LEU:CD2	2.29	0.46
1:G:136:ASN:OD1	1:J:172:LYS:HE2	2.16	0.46
1:K:146:ILE:O	1:K:147:GLN:HB2	2.16	0.46
1:J:166:ARG:NH1	1:J:169:GLN:OE1	2.49	0.46
1:K:139:GLN:HG2	3:K:304:NO3:O3	2.16	0.45
1:K:146:ILE:HG22	1:K:147:GLN:N	2.31	0.45
1:L:202:GLU:HG2	1:L:205:ARG:NH1	2.30	0.45
1:E:124:SER:O	1:E:128:ASP:HB2	2.16	0.45
1:D:161:MET:CG	1:D:162:LYS:H	2.29	0.45
1:E:124:SER:N	1:E:125:PRO:HD2	2.31	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:191:GLU:O	1:H:195:GLU:HG3	2.17	0.44
1:D:163:ILE:CD1	1:A:142:LEU:HB2	2.47	0.44
1:B:157:LYS:O	1:B:161:MET:HG3	2.18	0.43
1:K:137:ARG:NH2	3:K:306:NO3:O1	2.39	0.43
4:A:303:EDO:H12	1:G:126:ILE:CD1	2.45	0.43
4:C:304:EDO:H11	1:B:171:LYS:NZ	2.33	0.43
1:H:181:LYS:HA	1:H:181:LYS:HD2	1.82	0.43
1:H:193:THR:HG22	1:F:192:ILE:HD13	2.01	0.43
1:K:146:ILE:HG21	1:L:163:ILE:CG1	2.49	0.43
1:L:192:ILE:CG2	1:J:192:ILE:HG22	2.47	0.43
1:H:207:ARG:HH21	1:F:206:LEU:HD11	1.85	0.42
1:H:192:ILE:CG2	1:F:192:ILE:HG22	2.48	0.42
1:L:205:ARG:HG3	1:L:206:LEU:N	2.34	0.42
1:D:167:LEU:O	1:D:171:LYS:HG3	2.20	0.42
1:A:129:PRO:HD2	1:F:180:LYS:HD2	2.03	0.41
1:C:150:THR:HG21	1:A:149:LYS:CE	2.51	0.41
1:H:162:LYS:HE3	1:H:162:LYS:HB2	1.92	0.41
1:D:163:ILE:HD13	1:A:142:LEU:CB	2.51	0.41
1:D:209:ARG:HH11	1:D:209:ARG:HG3	1.86	0.41
1:D:167:LEU:HD12	1:A:139:GLN:HB2	2.03	0.41
1:C:146:ILE:CD1	1:B:163:ILE:HD13	2.48	0.40
1:G:123:LEU:O	1:H:181:LYS:HE3	2.21	0.40
1:A:127:ASN:CG	4:A:303:EDO:H22	2.41	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	28/226 (12%)	25 (89%)	2 (7%)	1 (4%)	3 1
1	B	55/226 (24%)	55 (100%)	0	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	31/226 (14%)	31 (100%)	0	0	100	100
1	D	49/226 (22%)	49 (100%)	0	0	100	100
1	E	28/226 (12%)	26 (93%)	0	2 (7%)	1	0
1	F	59/226 (26%)	59 (100%)	0	0	100	100
1	G	31/226 (14%)	31 (100%)	0	0	100	100
1	H	51/226 (23%)	51 (100%)	0	0	100	100
1	I	27/226 (12%)	27 (100%)	0	0	100	100
1	J	56/226 (25%)	56 (100%)	0	0	100	100
1	K	22/226 (10%)	18 (82%)	4 (18%)	0	100	100
1	L	58/226 (26%)	58 (100%)	0	0	100	100
All	All	495/2712 (18%)	486 (98%)	6 (1%)	3 (1%)	25	26

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	124	SER
1	E	125	PRO
1	A	126	ILE

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	30/206 (15%)	30 (100%)	0	100	100
1	B	54/206 (26%)	54 (100%)	0	100	100
1	C	33/206 (16%)	33 (100%)	0	100	100
1	D	48/206 (23%)	48 (100%)	0	100	100
1	E	29/206 (14%)	29 (100%)	0	100	100
1	F	57/206 (28%)	57 (100%)	0	100	100
1	G	32/206 (16%)	32 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	H	50/206 (24%)	50 (100%)	0	100	100
1	I	29/206 (14%)	28 (97%)	1 (3%)	37	47
1	J	55/206 (27%)	53 (96%)	2 (4%)	35	45
1	K	24/206 (12%)	24 (100%)	0	100	100
1	L	57/206 (28%)	57 (100%)	0	100	100
All	All	498/2472 (20%)	495 (99%)	3 (1%)	86	93

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	I	137	ARG
1	J	166	ARG
1	J	174	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 51 ligands modelled in this entry, 21 are monoatomic and 2 are modelled with single atom - leaving 28 for Mogul analysis.

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	EDO	L	301	-	3,3,3	0.51	0	2,2,2	0.30	0
3	NO3	C	302	-	1,3,3	0.65	0	0,3,3	-	-
4	EDO	K	308	-	3,3,3	0.49	0	2,2,2	0.31	0
4	EDO	C	304	-	3,3,3	0.53	0	2,2,2	0.26	0
3	NO3	A	301	-	1,3,3	0.67	0	0,3,3	-	-
3	NO3	H	301	-	1,3,3	0.81	0	0,3,3	-	-
3	NO3	G	301	-	1,3,3	0.63	0	0,3,3	-	-
3	NO3	G	304	-	1,3,3	0.70	0	0,3,3	-	-
3	NO3	D	304	-	1,3,3	0.70	0	0,3,3	-	-
3	NO3	K	306	-	1,3,3	0.79	0	0,3,3	-	-
3	NO3	G	303	-	1,3,3	0.78	0	0,3,3	-	-
3	NO3	I	304	-	1,3,3	0.77	0	0,3,3	-	-
4	EDO	J	304	-	3,3,3	0.60	0	2,2,2	0.15	0
3	NO3	A	302	-	1,3,3	0.74	0	0,3,3	-	-
3	NO3	D	303	-	1,3,3	0.89	0	0,3,3	-	-
4	EDO	I	305	-	3,3,3	0.43	0	2,2,2	0.42	0
3	NO3	K	305	2	1,3,3	0.72	0	0,3,3	-	-
3	NO3	G	302	-	1,3,3	0.72	0	0,3,3	-	-
3	NO3	F	305	-	1,3,3	0.91	0	0,3,3	-	-
4	EDO	A	304	-	3,3,3	0.46	0	2,2,2	0.36	0
3	NO3	J	301	-	1,3,3	0.69	0	0,3,3	-	-
3	NO3	I	303	-	1,3,3	0.64	0	0,3,3	-	-
4	EDO	J	303	-	3,3,3	0.48	0	2,2,2	0.30	0
4	EDO	A	303	-	3,3,3	0.49	0	2,2,2	0.31	0
4	EDO	C	303	-	3,3,3	0.50	0	2,2,2	0.29	0
3	NO3	K	304	-	1,3,3	0.74	0	0,3,3	-	-
3	NO3	B	302	-	1,3,3	0.74	0	0,3,3	-	-
7	SO4	K	309	2	4,4,4	0.19	0	6,6,6	0.32	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	L	301	-	-	0/1/1/1	-
4	EDO	K	308	-	-	1/1/1/1	-
4	EDO	J	304	-	-	0/1/1/1	-
4	EDO	C	304	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	J	303	-	-	0/1/1/1	-
4	EDO	A	303	-	-	0/1/1/1	-
4	EDO	C	303	-	-	1/1/1/1	-
4	EDO	A	304	-	-	0/1/1/1	-
4	EDO	I	305	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	303	EDO	O1-C1-C2-O2
4	K	308	EDO	O1-C1-C2-O2

There are no ring outliers.

8 monomers are involved in 18 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	K	308	EDO	1	0
4	C	304	EDO	3	0
3	K	306	NO3	1	0
4	I	305	EDO	7	0
3	F	305	NO3	1	0
4	A	303	EDO	3	0
3	K	304	NO3	1	0
7	K	309	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, 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	29/226 (12%)	2.13	13 (44%) 0 0	33, 45, 116, 120	0
1	B	57/226 (25%)	2.88	28 (49%) 0 0	42, 86, 160, 174	0
1	C	33/226 (14%)	1.68	8 (24%) 0 0	39, 55, 117, 152	0
1	D	51/226 (22%)	2.38	22 (43%) 0 0	43, 80, 162, 173	0
1	E	30/226 (13%)	2.69	14 (46%) 0 0	34, 48, 124, 139	0
1	F	61/226 (26%)	3.21	27 (44%) 0 0	38, 94, 161, 169	0
1	G	33/226 (14%)	1.57	7 (21%) 0 0	38, 47, 91, 135	0
1	H	53/226 (23%)	2.32	19 (35%) 0 0	42, 83, 152, 163	0
1	I	29/226 (12%)	1.94	9 (31%) 0 0	36, 55, 105, 127	0
1	J	58/226 (25%)	2.49	27 (46%) 0 0	41, 88, 163, 168	0
1	K	24/226 (10%)	1.66	7 (29%) 0 0	35, 46, 87, 122	0
1	L	60/226 (26%)	3.53	31 (51%) 0 0	38, 98, 152, 163	0
All	All	518/2712 (19%)	2.52	212 (40%) 0 0	33, 72, 157, 174	0

All (212) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	210	TRP	21.7
1	L	210	TRP	16.8
1	H	210	TRP	15.2
1	F	215	GLU	11.8
1	B	203	ILE	11.5
1	F	212	SER	11.1
1	L	203	ILE	10.9
1	F	203	ILE	10.8
1	F	209	ARG	10.6
1	L	212	SER	10.4
1	L	215	GLU	9.4

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Mol	Chain	Res	Type	RSRZ
1	L	208	GLU	9.3
1	E	125	PRO	9.0
1	I	123	LEU	8.7
1	L	209	ARG	8.5
1	D	207	ARG	8.5
1	L	205	ARG	8.4
1	J	210	TRP	8.3
1	L	214	VAL	8.1
1	D	203	ILE	8.0
1	B	209	ARG	7.9
1	B	205	ARG	7.8
1	C	120	GLN	7.7
1	L	213	LEU	7.6
1	I	122	THR	7.5
1	E	150	THR	7.5
1	F	205	ARG	7.5
1	B	210	TRP	7.5
1	H	211	ASP	7.4
1	B	208	GLU	7.4
1	F	207	ARG	7.4
1	E	152	GLY	7.4
1	J	199	LEU	7.3
1	L	206	LEU	7.3
1	L	204	GLY	7.2
1	F	208	GLU	7.2
1	F	214	VAL	7.1
1	D	204	GLY	7.0
1	C	119	TYR	7.0
1	A	123	LEU	6.9
1	J	213	LEU	6.9
1	B	204	GLY	6.9
1	B	201	ASN	6.9
1	L	216	SER	6.7
1	D	210	TRP	6.7
1	F	216	SER	6.6
1	H	203	ILE	6.4
1	L	207	ARG	6.3
1	H	207	ARG	6.0
1	L	200	ALA	6.0
1	L	201	ASN	5.9
1	J	209	ARG	5.9
1	F	213	LEU	5.9

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Mol	Chain	Res	Type	RSRZ
1	L	211	ASP	5.9
1	D	211	ASP	5.8
1	B	202	GLU	5.8
1	J	206	LEU	5.7
1	B	198	LYS	5.7
1	F	211	ASP	5.6
1	B	156	SER	5.6
1	L	202	GLU	5.6
1	D	199	LEU	5.5
1	E	149	LYS	5.4
1	D	208	GLU	5.3
1	B	200	ALA	5.3
1	H	212	SER	5.3
1	H	209	ARG	5.2
1	J	208	GLU	5.1
1	G	152	GLY	5.1
1	B	206	LEU	5.1
1	J	212	SER	5.0
1	D	202	GLU	5.0
1	L	198	LYS	5.0
1	F	199	LEU	5.0
1	B	211	ASP	4.9
1	L	199	LEU	4.9
1	J	203	ILE	4.9
1	L	196	ASN	4.8
1	E	123	LEU	4.8
1	J	207	ARG	4.8
1	G	120	GLN	4.8
1	J	159	SER	4.7
1	F	206	LEU	4.7
1	E	151	GLU	4.7
1	F	217	ALA	4.5
1	D	205	ARG	4.4
1	B	157	LYS	4.4
1	B	155	ASN	4.3
1	J	200	ALA	4.2
1	E	124	SER	4.2
1	A	124	SER	4.2
1	A	150	THR	4.2
1	H	206	LEU	4.1
1	F	196	ASN	4.1
1	F	201	ASN	4.1

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Mol	Chain	Res	Type	RSRZ
1	J	211	ASP	4.0
1	L	194	LYS	4.0
1	H	205	ARG	3.9
1	J	201	ASN	3.9
1	J	192	ILE	3.9
1	D	200	ALA	3.9
1	H	192	ILE	3.9
1	K	124	SER	3.9
1	A	149	LYS	3.8
1	H	196	ASN	3.8
1	B	194	LYS	3.8
1	F	198	LYS	3.8
1	H	201	ASN	3.7
1	F	194	LYS	3.7
1	J	214	VAL	3.7
1	L	197	LYS	3.6
1	E	126	ILE	3.5
1	I	148	LEU	3.4
1	B	174	LEU	3.4
1	J	198	LYS	3.4
1	D	196	ASN	3.4
1	B	207	ARG	3.3
1	B	196	ASN	3.3
1	J	196	ASN	3.2
1	D	193	THR	3.2
1	H	213	LEU	3.2
1	K	146	ILE	3.2
1	H	187	MET	3.2
1	D	201	ASN	3.1
1	E	135	LEU	3.1
1	B	187	MET	3.1
1	D	192	ILE	3.0
1	I	147	GLN	3.0
1	J	158	ASN	3.0
1	C	151	GLU	3.0
1	D	209	ARG	3.0
1	A	151	GLU	2.9
1	B	197	LYS	2.9
1	D	195	GLU	2.9
1	J	157	LYS	2.9
1	D	206	LEU	2.9
1	B	199	LEU	2.9

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Mol	Chain	Res	Type	RSRZ
1	D	189	ILE	2.8
1	J	202	GLU	2.8
1	J	205	ARG	2.8
1	E	133	SER	2.8
1	B	176	LEU	2.8
1	I	131	LEU	2.8
1	K	125	PRO	2.8
1	H	202	GLU	2.7
1	D	198	LYS	2.7
1	F	174	LEU	2.7
1	D	191	GLU	2.7
1	A	134	ILE	2.7
1	K	134	ILE	2.7
1	H	199	LEU	2.7
1	D	187	MET	2.7
1	B	175	VAL	2.6
1	B	158	ASN	2.6
1	K	138	LEU	2.6
1	L	193	THR	2.6
1	L	174	LEU	2.6
1	A	132	MET	2.6
1	K	135	LEU	2.6
1	E	132	MET	2.6
1	J	175	VAL	2.6
1	J	193	THR	2.5
1	E	146	ILE	2.5
1	A	133	SER	2.5
1	F	167	LEU	2.5
1	J	194	LYS	2.5
1	F	192	ILE	2.4
1	L	158	ASN	2.4
1	F	202	GLU	2.4
1	L	167	LEU	2.4
1	E	138	LEU	2.4
1	K	132	MET	2.4
1	J	195	GLU	2.4
1	A	135	LEU	2.4
1	J	174	LEU	2.4
1	C	121	ASP	2.4
1	I	121	ASP	2.4
1	J	176	LEU	2.4
1	G	140	PHE	2.4

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Mol	Chain	Res	Type	RSRZ
1	G	142	LEU	2.3
1	E	131	LEU	2.3
1	L	189	ILE	2.3
1	A	137[A]	ARG	2.3
1	C	140	PHE	2.3
1	B	190	ASP	2.3
1	L	159	SER	2.3
1	L	192	ILE	2.3
1	I	146	ILE	2.3
1	C	135	LEU	2.2
1	H	197	LYS	2.2
1	D	190	ASP	2.2
1	A	125	PRO	2.2
1	H	180	LYS	2.2
1	H	200	ALA	2.2
1	B	191	GLU	2.2
1	H	208	GLU	2.2
1	F	175	VAL	2.1
1	A	131	LEU	2.1
1	A	138	LEU	2.1
1	I	130	LEU	2.1
1	B	189	ILE	2.1
1	G	151	GLU	2.1
1	F	170	PHE	2.1
1	C	122	THR	2.1
1	G	131	LEU	2.1
1	F	176	LEU	2.1
1	I	141	ASN	2.1
1	L	163	ILE	2.0
1	F	204	GLY	2.0
1	L	175	VAL	2.0
1	C	138	LEU	2.0
1	G	132	MET	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
5	CL	D	306	1/1	0.33	0.25	90,90,90,90	0
6	NH4	J	302	1/1	0.39	0.26	111,133,133,133	0
4	EDO	J	304	4/4	0.46	0.30	54,57,65,68	0
4	EDO	J	303	4/4	0.52	0.45	85,98,99,103	0
4	EDO	A	304	4/4	0.52	0.30	103,104,109,110	0
4	EDO	K	308	4/4	0.59	0.34	68,69,82,95	0
2	NA	I	301	1/1	0.64	0.49	78,78,78,78	0
3	NO3	G	303	4/4	0.64	0.24	68,69,81,98	0
3	NO3	G	304	4/4	0.64	0.30	78,82,93,99	0
2	NA	B	301	1/1	0.65	0.41	87,87,87,87	0
3	NO3	I	304	4/4	0.65	0.26	79,87,91,106	0
5	CL	E	302	1/1	0.68	0.28	107,107,107,107	0
5	CL	E	303	1/1	0.69	0.11	116,116,116,116	0
2	NA	F	302	1/1	0.70	0.96	98,98,98,98	0
3	NO3	D	303	4/4	0.70	0.22	64,69,81,88	0
3	NO3	K	305	4/4	0.70	0.21	83,89,93,104	0
3	NO3	H	301	4/4	0.71	0.20	63,67,81,99	0
4	EDO	A	303	4/4	0.75	0.26	75,85,89,89	0
2	NA	F	304	1/1	0.77	0.30	66,66,66,66	0
2	NA	D	301	1/1	0.78	0.57	93,93,93,93	0
2	NA	K	302	1/1	0.78	0.42	76,76,76,76	0
4	EDO	L	301	4/4	0.78	0.24	61,68,75,83	0
2	NA	E	301	1/1	0.79	0.20	69,69,69,69	0
5	CL	F	306	1/1	0.80	0.10	124,124,124,124	0
3	NO3	A	302	4/4	0.80	0.26	74,76,84,91	0
4	EDO	C	303	4/4	0.81	0.30	68,80,85,99	0
2	NA	D	302	1/1	0.81	0.32	94,94,94,94	0
3	NO3	F	305	4/4	0.82	0.32	47,50,61,81	0
4	EDO	C	304	4/4	0.83	0.28	50,62,81,84	0
6	NH4	K	307	1/1	0.84	0.84	82,99,99,99	0
2	NA	I	302	1/1	0.84	0.77	86,86,86,86	0
2	NA	F	303	1/1	0.86	0.75	90,90,90,90	0
2	NA	K	301	1/1	0.86	0.13	63,63,63,63	0
5	CL	F	307	1/1	0.87	0.26	100,100,100,100	0
8	IOD	E	304	1/1	0.87	0.49	192,192,192,192	0
3	NO3	K	306	4/4	0.88	0.27	50,56,60,84	0
3	NO3	J	301	4/4	0.88	0.16	98,99,108,110	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	CL	D	305	1/1	0.90	0.21	87,87,87,87	0
3	NO3	C	302	4/4	0.91	0.22	58,59,59,69	0
2	NA	C	301	1/1	0.92	0.64	74,74,74,74	0
3	NO3	A	301	4/4	0.92	0.24	55,59,62,67	0
3	NO3	B	302	4/4	0.94	0.25	50,52,62,77	0
3	NO3	K	304	4/4	0.94	0.18	68,77,80,81	0
4	EDO	I	305	4/4	0.95	0.43	49,53,56,59	0
3	NO3	I	303	4/4	0.95	0.24	50,51,61,67	0
2	NA	F	301	1/1	0.95	0.27	50,50,50,50	0
2	NA	K	303	1/1	0.95	0.37	73,73,73,73	0
3	NO3	D	304	4/4	0.96	0.24	56,66,83,86	0
3	NO3	G	302	4/4	0.96	0.22	54,55,57,60	0
7	SO4	K	309	5/5	0.97	0.27	52,54,65,77	0
3	NO3	G	301	4/4	0.98	0.29	40,40,48,50	0

6.5 Other polymers [i](#)

There are no such residues in this entry.