



Full wwPDB X-ray Structure Validation Report

May 25, 2020 – 05:03 am BST


PDB ID : 3N9R
Title : Class II fructose-1,6-bisphosphate aldolase from helicobacter pylori in complex with N-(4-hydroxybutyl)-phosphoglycolohydroxamic acid, a competitive inhibitor
Authors : Coincon, M.; Sygusch, S.
Deposited on : 2010-05-31
Resolution : 1.80 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 : 2.11
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) : 2.11

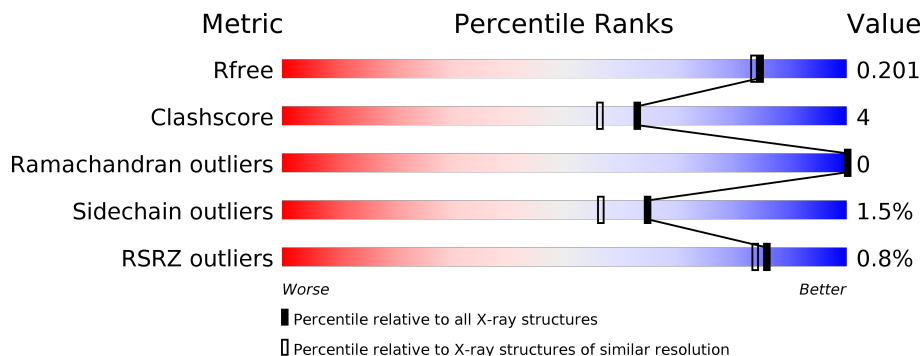
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.80 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	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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 on 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	307	
1	B	307	
1	K	307	
1	P	307	
1	U	307	
1	Z	307	

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Mol	Chain	Length	Quality of chain
1	e	307	
1	j	307	

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
4	CL	A	310	-	-	X	-
4	CL	B	310	-	-	X	-
4	CL	K	310	-	-	X	-
4	CL	P	310	-	-	X	-
4	CL	U	310	-	-	X	-
4	CL	Z	310	-	-	X	-

2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 39794 atoms, of which 18531 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 Fructose-bisphosphate aldolase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	297	4609	1463	2317	392	425	12	0	0	0
1	B	297	4608	1463	2316	392	425	12	0	0	0
1	K	297	4608	1463	2316	392	425	12	0	0	0
1	P	297	4609	1463	2317	392	425	12	0	0	0
1	U	297	4608	1463	2316	392	425	12	0	0	0
1	Z	297	4608	1463	2316	392	425	12	0	0	0
1	e	297	4609	1463	2317	392	425	12	0	0	0
1	j	297	4608	1463	2316	392	425	12	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	218	ASN	ASP	CONFLICT	UNP D0IR47
B	218	ASN	ASP	CONFLICT	UNP D0IR47
K	218	ASN	ASP	CONFLICT	UNP D0IR47
P	218	ASN	ASP	CONFLICT	UNP D0IR47
U	218	ASN	ASP	CONFLICT	UNP D0IR47
Z	218	ASN	ASP	CONFLICT	UNP D0IR47
e	218	ASN	ASP	CONFLICT	UNP D0IR47
j	218	ASN	ASP	CONFLICT	UNP D0IR47

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	P	1	Total Zn 1 1	0	0
2	j	1	Total Zn 1 1	0	0
2	K	1	Total Zn 1 1	0	0
2	e	1	Total Zn 1 1	0	0
2	B	1	Total Zn 1 1	0	0
2	Z	1	Total Zn 1 1	0	0
2	A	1	Total Zn 1 1	0	0
2	U	1	Total Zn 1 1	0	0

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	P	1	Total Na 1 1	0	0
3	j	1	Total Na 1 1	0	0
3	K	1	Total Na 1 1	0	0
3	e	1	Total Na 1 1	0	0
3	B	1	Total Na 1 1	0	0
3	Z	1	Total Na 1 1	0	0
3	A	1	Total Na 1 1	0	0
3	U	1	Total Na 1 1	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

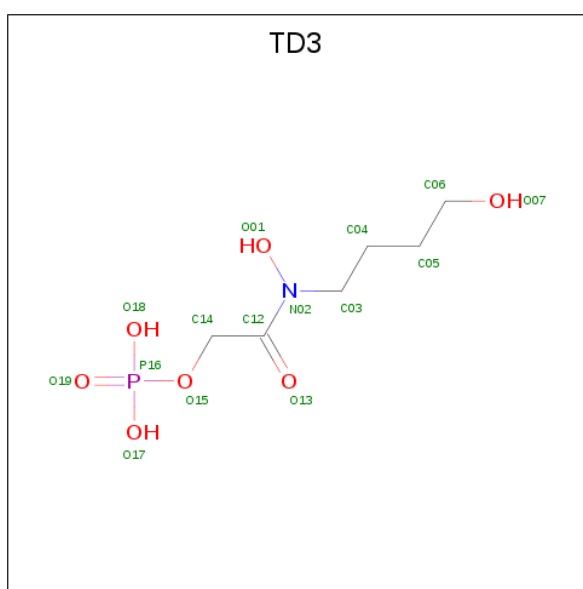
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	P	1	Total Cl 1 1	0	0
4	j	1	Total Cl 1 1	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	K	1	Total Cl 1 1	0	0
4	e	1	Total Cl 1 1	0	0
4	B	1	Total Cl 1 1	0	0
4	Z	1	Total Cl 1 1	0	0
4	A	1	Total Cl 1 1	0	0
4	U	1	Total Cl 1 1	0	0

- Molecule 5 is 2-[hydroxy(4-hydroxybutyl)amino]-2-oxoethyl dihydrogen phosphate (three-letter code: TD3) (formula: C₆H₁₄NO₇P).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C N O P 15 6 1 7 1	0	0
5	B	1	Total C N O P 15 6 1 7 1	0	0
5	K	1	Total C N O P 15 6 1 7 1	0	0
5	P	1	Total C N O P 15 6 1 7 1	0	0
5	U	1	Total C N O P 15 6 1 7 1	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	Z	1	Total	C	N	O	P	0	0
			15	6	1	7	1		
5	e	1	Total	C	N	O	P	0	0
			15	6	1	7	1		
5	j	1	Total	C	N	O	P	0	0
			15	6	1	7	1		

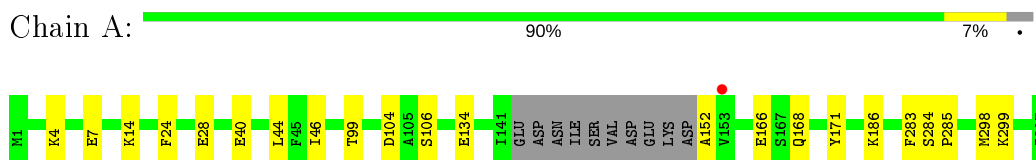
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	394	Total	O	0	0
			394	394		
6	B	403	Total	O	0	0
			403	403		
6	K	417	Total	O	0	0
			417	417		
6	P	417	Total	O	0	0
			417	417		
6	U	261	Total	O	0	0
			261	261		
6	Z	314	Total	O	0	0
			314	314		
6	e	276	Total	O	0	0
			276	276		
6	j	301	Total	O	0	0
			301	301		

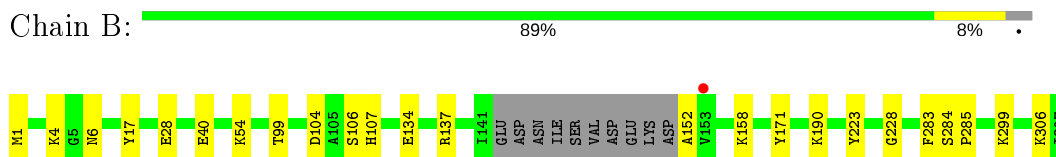
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

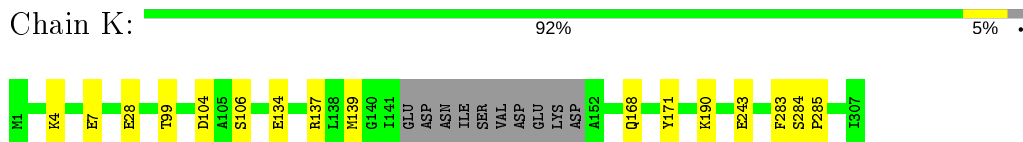
- Molecule 1: Fructose-bisphosphate aldolase



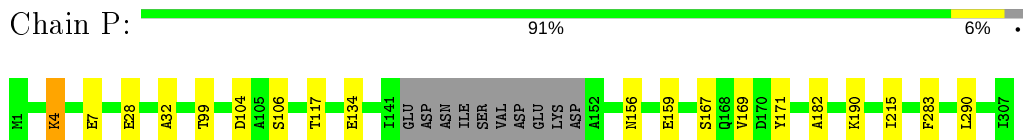
- Molecule 1: Fructose-bisphosphate aldolase



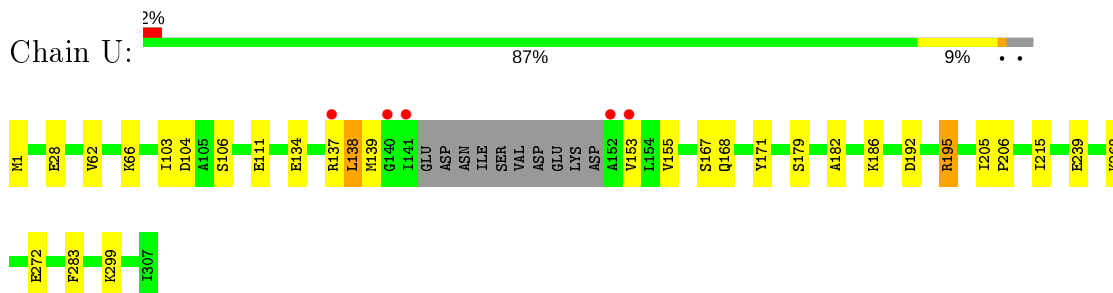
- Molecule 1: Fructose-bisphosphate aldolase



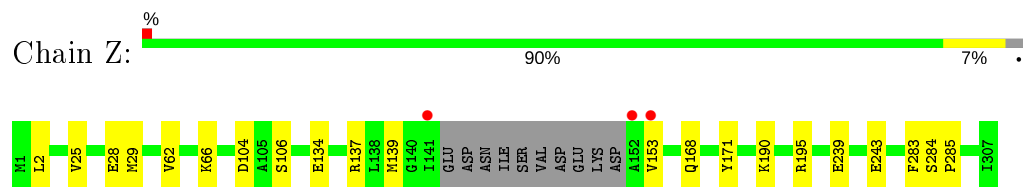
- Molecule 1: Fructose-bisphosphate aldolase



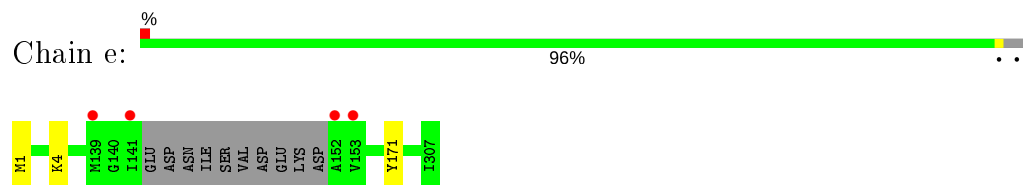
- Molecule 1: Fructose-bisphosphate aldolase



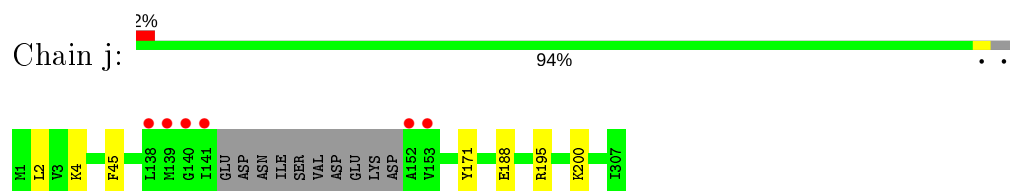
- Molecule 1: Fructose-bisphosphate aldolase



- Molecule 1: Fructose-bisphosphate aldolase



- Molecule 1: Fructose-bisphosphate aldolase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	51.40 Å 104.40 Å 111.90 Å 98.50° 90.00° 90.00°	Depositor
Resolution (Å)	41.53 – 1.80 46.62 – 1.80	Depositor EDS
% Data completeness (in resolution range)	93.5 (41.53-1.80) 95.5 (46.62-1.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.52 (at 1.79 Å)	Xtrriage
Refinement program	PHENIX dev_378	Depositor
R, R_{free}	0.158 , 0.203 0.158 , 0.201	Depositor DCC
R_{free} test set	16300 reflections (8.00%)	wwPDB-VP
Wilson B-factor (Å ²)	17.7	Xtrriage
Anisotropy	0.386	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.41 , 45.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.470 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.98	EDS
Total number of atoms	39794	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 90.43 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.3013e-08. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: TD3, NA, ZN, CL

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	0.40	0/2332	0.50	0/3134
1	B	0.38	0/2332	0.50	0/3134
1	K	0.38	0/2332	0.50	0/3134
1	P	0.40	0/2332	0.51	0/3134
1	U	0.33	0/2332	0.47	0/3134
1	Z	0.33	0/2332	0.47	0/3134
1	e	0.33	0/2332	0.47	0/3134
1	j	0.33	0/2332	0.48	0/3134
All	All	0.36	0/18656	0.49	0/25072

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	2292	2317	2325	18	0
1	B	2292	2316	2325	22	0
1	K	2292	2316	2325	12	0
1	P	2292	2317	2325	14	0
1	U	2292	2316	2325	20	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	Z	2292	2316	2325	14	0
1	e	2292	2317	2325	0	0
1	j	2292	2316	2325	0	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	K	1	0	0	0	0
2	P	1	0	0	0	0
2	U	1	0	0	0	0
2	Z	1	0	0	0	0
2	e	1	0	0	0	0
2	j	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	K	1	0	0	0	0
3	P	1	0	0	0	0
3	U	1	0	0	0	0
3	Z	1	0	0	0	0
3	e	1	0	0	0	0
3	j	1	0	0	0	0
4	A	1	0	0	8	0
4	B	1	0	0	9	0
4	K	1	0	0	9	0
4	P	1	0	0	8	0
4	U	1	0	0	4	0
4	Z	1	0	0	8	0
4	e	1	0	0	0	0
4	j	1	0	0	0	0
5	A	15	0	11	1	0
5	B	15	0	11	1	0
5	K	15	0	11	0	0
5	P	15	0	11	0	0
5	U	15	0	11	1	0
5	Z	15	0	11	1	0
5	e	15	0	11	0	0
5	j	15	0	11	0	0
6	A	394	0	0	8	0
6	B	403	0	0	9	0
6	K	417	0	0	4	0
6	P	417	0	0	4	0
6	U	261	0	0	1	0
6	Z	314	0	0	5	0
6	e	276	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	j	301	0	0	0	0
All	All	21263	18531	18688	119	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 4.

All (119) 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:P:167:SER:OG	1:P:169:VAL:HG23	1.74	0.86
4:P:310:CL:CL	6:P:339:HOH:O	2.33	0.82
1:B:107:HIS:HB2	1:K:243:GLU:HG3	1.62	0.80
1:B:306:LYS:HD3	6:B:2231:HOH:O	1.80	0.79
1:K:134:GLU:OE1	4:K:310:CL:CL	2.37	0.79
4:K:310:CL:CL	6:K:330:HOH:O	2.39	0.77
1:A:104:ASP:OD2	4:A:310:CL:CL	2.40	0.76
1:U:134:GLU:OE1	4:U:310:CL:CL	2.40	0.76
4:A:310:CL:CL	6:A:328:HOH:O	2.38	0.76
1:K:104:ASP:OD2	4:K:310:CL:CL	2.42	0.74
1:B:104:ASP:OD2	4:B:310:CL:CL	2.42	0.74
1:B:134:GLU:OE1	4:B:310:CL:CL	2.44	0.73
1:P:104:ASP:OD2	4:P:310:CL:CL	2.44	0.73
1:Z:104:ASP:OD2	4:Z:310:CL:CL	2.43	0.73
4:Z:310:CL:CL	6:Z:324:HOH:O	2.44	0.72
1:A:134:GLU:OE1	4:A:310:CL:CL	2.45	0.72
1:P:134:GLU:OE1	4:P:310:CL:CL	2.44	0.72
4:P:310:CL:CL	6:P:1789:HOH:O	2.45	0.71
1:Z:134:GLU:OE1	4:Z:310:CL:CL	2.46	0.71
4:Z:310:CL:CL	6:Z:1875:HOH:O	2.46	0.71
4:B:310:CL:CL	6:B:336:HOH:O	2.47	0.70
4:A:310:CL:CL	6:A:657:HOH:O	2.48	0.68
1:K:106:SER:OG	4:K:310:CL:CL	2.45	0.68
1:P:104:ASP:OD1	4:P:310:CL:CL	2.49	0.68
4:K:310:CL:CL	6:K:1565:HOH:O	2.48	0.68
1:Z:104:ASP:OD1	4:Z:310:CL:CL	2.50	0.67
4:A:310:CL:CL	6:A:1126:HOH:O	2.50	0.66
1:K:104:ASP:OD1	4:K:310:CL:CL	2.51	0.66
1:A:104:ASP:OD1	4:A:310:CL:CL	2.51	0.66
1:B:104:ASP:OD1	4:B:310:CL:CL	2.51	0.65
1:B:17:TYR:CE2	1:B:306:LYS:HE2	2.32	0.65
1:Z:106:SER:OG	4:Z:310:CL:CL	2.52	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:4:LYS:HA	1:K:99:THR:HB	1.82	0.62
1:P:106:SER:OG	4:P:310:CL:CL	2.52	0.61
1:A:106:SER:OG	4:A:310:CL:CL	2.51	0.61
1:A:4:LYS:HG3	1:A:7:GLU:HG3	1.82	0.61
1:U:182:ALA:HA	1:U:215:ILE:HD11	1.83	0.61
4:Z:310:CL:CL	6:Z:1520:HOH:O	2.54	0.59
1:A:104:ASP:CG	4:A:310:CL:CL	2.78	0.58
4:B:310:CL:CL	6:B:814:HOH:O	2.53	0.58
4:B:310:CL:CL	6:B:1010:HOH:O	2.54	0.57
1:K:104:ASP:CG	4:K:310:CL:CL	2.79	0.57
4:P:310:CL:CL	6:P:397:HOH:O	2.54	0.57
1:A:40:GLU:OE1	1:A:299:LYS:HE3	2.04	0.57
1:Z:104:ASP:CG	4:Z:310:CL:CL	2.80	0.57
1:Z:137:ARG:NH2	1:Z:139:MET:HG3	2.19	0.57
1:P:104:ASP:CG	4:P:310:CL:CL	2.79	0.57
1:B:104:ASP:CG	4:B:310:CL:CL	2.80	0.57
1:U:167:SER:O	1:U:168:GLN:HB2	2.04	0.57
1:P:4:LYS:HG3	1:P:7:GLU:HG3	1.87	0.56
1:A:166:GLU:HB3	6:A:2400:HOH:O	2.06	0.56
1:Z:62:VAL:CG1	1:Z:66:LYS:HE2	2.36	0.55
1:A:24:PHE:CD2	1:A:46:ILE:HD11	2.41	0.55
4:K:310:CL:CL	6:K:589:HOH:O	2.56	0.54
1:B:28:GLU:HG2	1:B:283:PHE:HB3	1.90	0.54
1:Z:137:ARG:HB3	1:Z:153:VAL:HG13	1.90	0.54
1:B:40:GLU:OE1	1:B:299:LYS:HE3	2.08	0.53
1:B:54:LYS:HE3	6:B:2032:HOH:O	2.09	0.52
1:U:138:LEU:HD22	1:U:179:SER:HA	1.90	0.52
1:Z:168:GLN:HG3	6:Z:1444:HOH:O	2.10	0.52
1:B:106:SER:OG	4:B:310:CL:CL	2.53	0.52
1:Z:62:VAL:HG12	1:Z:66:LYS:HE2	1.93	0.51
1:K:28:GLU:HG2	1:K:283:PHE:HB3	1.93	0.51
1:K:4:LYS:HG2	1:K:7:GLU:HG3	1.93	0.51
1:U:62:VAL:CG1	1:U:66:LYS:HE2	2.41	0.51
1:P:117:THR:HG21	1:P:169:VAL:HG21	1.93	0.50
1:B:4:LYS:HA	1:B:99:THR:HB	1.94	0.50
4:B:310:CL:CL	6:B:971:HOH:O	2.57	0.49
1:Z:239:GLU:O	1:Z:243:GLU:HG2	2.13	0.49
1:P:182:ALA:HA	1:P:215:ILE:HD11	1.95	0.49
1:U:137:ARG:NH2	1:U:139:MET:HG3	2.28	0.49
1:A:168:GLN:NE2	6:A:370:HOH:O	2.43	0.48
4:K:310:CL:CL	6:K:1424:HOH:O	2.57	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:284:SER:HB2	1:A:285:PRO:HD3	1.96	0.48
1:B:306:LYS:HA	1:B:306:LYS:HD2	1.65	0.48
1:U:28:GLU:HG2	1:U:283:PHE:HB3	1.95	0.48
1:U:155:VAL:HG12	1:U:195:ARG:HD3	1.95	0.48
1:B:137:ARG:HD2	1:K:243:GLU:OE1	2.14	0.48
1:B:40:GLU:CD	1:B:299:LYS:HE3	2.34	0.48
6:P:2035:HOH:O	1:U:299:LYS:HE2	2.14	0.47
1:A:152:ALA:HB3	6:A:2429:HOH:O	2.16	0.46
1:A:28:GLU:HG2	1:A:283:PHE:HB3	1.98	0.46
1:P:32:ALA:HB3	1:P:290:LEU:HD22	1.97	0.46
5:B:311:TD3:H203	5:B:311:TD3:H114	1.83	0.46
1:U:137:ARG:HB3	1:U:153:VAL:HG13	1.98	0.45
1:K:137:ARG:HH12	1:K:139:MET:HG3	1.81	0.45
1:P:167:SER:CB	1:P:169:VAL:HG23	2.47	0.44
1:U:106:SER:OG	4:U:310:CL:CL	2.69	0.44
1:K:284:SER:N	1:K:285:PRO:CD	2.81	0.44
1:U:192:ASP:OD2	1:U:195:ARG:NH1	2.51	0.44
1:A:4:LYS:HA	1:A:99:THR:HB	2.00	0.44
1:A:284:SER:N	1:A:285:PRO:CD	2.81	0.43
1:B:284:SER:N	1:B:285:PRO:CD	2.80	0.43
1:U:239:GLU:CD	1:U:239:GLU:H	2.21	0.43
5:Z:311:TD3:H114	5:Z:311:TD3:H203	1.67	0.43
1:B:158:LYS:HE3	6:Z:348:HOH:O	2.19	0.43
1:B:1:MET:HE3	6:B:2052:HOH:O	2.19	0.43
1:U:104:ASP:OD2	4:U:310:CL:CL	2.74	0.43
1:P:4:LYS:HA	1:P:99:THR:HB	2.01	0.43
1:Z:284:SER:HB2	1:Z:285:PRO:HD3	2.00	0.43
1:B:152:ALA:HB3	6:B:2541:HOH:O	2.18	0.43
5:U:311:TD3:H105	5:U:311:TD3:H114	2.00	0.43
5:A:311:TD3:H114	5:A:311:TD3:H203	1.87	0.42
1:P:28:GLU:HG2	1:P:283:PHE:HB3	2.02	0.42
1:U:104:ASP:OD1	4:U:310:CL:CL	2.74	0.42
1:U:62:VAL:HG12	1:U:66:LYS:HE2	2.02	0.42
1:P:156:ASN:HB3	1:P:159:GLU:HB2	2.02	0.42
1:U:103:ILE:HG23	1:U:103:ILE:O	2.19	0.41
1:B:223:TYR:CE2	1:B:228:GLY:HA3	2.56	0.41
1:Z:25:VAL:HG22	1:Z:29:MET:SD	2.60	0.41
1:Z:28:GLU:HG2	1:Z:283:PHE:HB3	2.02	0.41
1:B:134:GLU:CD	6:B:1459:HOH:O	2.58	0.41
1:U:205:ILE:HB	1:U:206:PRO:HD2	2.03	0.41
1:U:268:LYS:HE3	1:U:272:GLU:OE2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:44:LEU:HD21	1:A:298:MET:CE	2.52	0.40
1:B:54:LYS:HE2	1:B:54:LYS:HB2	1.89	0.40
1:A:14:LYS:HE3	6:A:2409:HOH:O	2.22	0.40
1:A:186:LYS:NZ	6:A:1677:HOH:O	2.54	0.40
1:U:1:MET:HB3	6:U:2002:HOH:O	2.22	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	293/307 (95%)	288 (98%)	5 (2%)	0	100	100
1	B	293/307 (95%)	288 (98%)	5 (2%)	0	100	100
1	K	293/307 (95%)	288 (98%)	5 (2%)	0	100	100
1	P	293/307 (95%)	288 (98%)	5 (2%)	0	100	100
1	U	293/307 (95%)	288 (98%)	5 (2%)	0	100	100
1	Z	293/307 (95%)	290 (99%)	3 (1%)	0	100	100
1	e	293/307 (95%)	287 (98%)	6 (2%)	0	100	100
1	j	293/307 (95%)	287 (98%)	6 (2%)	0	100	100
All	All	2344/2456 (95%)	2304 (98%)	40 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	244/254 (96%)	243 (100%)	1 (0%)	91	89
1	B	244/254 (96%)	241 (99%)	3 (1%)	71	65
1	K	244/254 (96%)	241 (99%)	3 (1%)	71	65
1	P	244/254 (96%)	241 (99%)	3 (1%)	71	65
1	U	244/254 (96%)	239 (98%)	5 (2%)	55	44
1	Z	244/254 (96%)	240 (98%)	4 (2%)	62	54
1	e	244/254 (96%)	241 (99%)	3 (1%)	71	65
1	j	244/254 (96%)	237 (97%)	7 (3%)	42	29
All	All	1952/2032 (96%)	1923 (98%)	29 (2%)	65	56

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	171	TYR
1	B	6	ASN
1	B	171	TYR
1	B	190	LYS
1	K	168	GLN
1	K	171	TYR
1	K	190	LYS
1	P	4	LYS
1	P	171	TYR
1	P	190	LYS
1	U	111	GLU
1	U	138	LEU
1	U	171	TYR
1	U	186	LYS
1	U	195	ARG
1	Z	2	LEU
1	Z	171	TYR
1	Z	190	LYS
1	Z	195	ARG
1	e	1	MET
1	e	4	LYS
1	e	171	TYR
1	j	2	LEU
1	j	4	LYS

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Mol	Chain	Res	Type
1	j	45	PHE
1	j	171	TYR
1	j	188	GLU
1	j	195	ARG
1	j	200	LYS

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

Mol	Chain	Res	Type
1	A	126	ASN
1	K	38	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 32 ligands modelled in this entry, 24 are monoatomic - leaving 8 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$
5	TD3	A	311	2	14,14,14	2.85	4 (28%)	13,18,18	1.18	1 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	TD3	e	311	2	14,14,14	2.69	4 (28%)	13,18,18	1.35	2 (15%)
5	TD3	Z	311	2	14,14,14	2.67	4 (28%)	13,18,18	1.19	1 (7%)
5	TD3	K	311	2	14,14,14	2.83	3 (21%)	13,18,18	1.29	1 (7%)
5	TD3	B	311	2	14,14,14	2.75	4 (28%)	13,18,18	1.36	2 (15%)
5	TD3	U	311	2	14,14,14	2.71	4 (28%)	13,18,18	1.22	2 (15%)
5	TD3	j	311	2	14,14,14	2.61	4 (28%)	13,18,18	1.13	0
5	TD3	P	311	2	14,14,14	2.85	4 (28%)	13,18,18	1.23	2 (15%)

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
5	TD3	A	311	2	-	7/15/15/15	-
5	TD3	e	311	2	-	6/15/15/15	-
5	TD3	Z	311	2	-	8/15/15/15	-
5	TD3	K	311	2	-	7/15/15/15	-
5	TD3	B	311	2	-	8/15/15/15	-
5	TD3	U	311	2	-	4/15/15/15	-
5	TD3	j	311	2	-	9/15/15/15	-
5	TD3	P	311	2	-	7/15/15/15	-

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	K	311	TD3	C12-N02	8.68	1.46	1.34
5	A	311	TD3	C12-N02	8.43	1.46	1.34
5	P	311	TD3	C12-N02	8.30	1.46	1.34
5	B	311	TD3	C12-N02	8.30	1.46	1.34
5	Z	311	TD3	C12-N02	8.21	1.45	1.34
5	U	311	TD3	C12-N02	8.19	1.45	1.34
5	e	311	TD3	C12-N02	8.09	1.45	1.34
5	j	311	TD3	C12-N02	7.91	1.45	1.34
5	P	311	TD3	O15-C14	-5.14	1.39	1.43
5	A	311	TD3	O15-C14	-5.02	1.39	1.43
5	B	311	TD3	O15-C14	-4.62	1.39	1.43
5	K	311	TD3	O15-C14	-4.54	1.40	1.43
5	U	311	TD3	O15-C14	-3.88	1.40	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	e	311	TD3	O15-C14	-3.84	1.40	1.43
5	Z	311	TD3	O15-C14	-3.68	1.40	1.43
5	j	311	TD3	O15-C14	-3.66	1.40	1.43
5	U	311	TD3	P16-O18	2.51	1.64	1.54
5	e	311	TD3	P16-O18	2.46	1.64	1.54
5	U	311	TD3	P16-O17	2.45	1.64	1.54
5	P	311	TD3	P16-O18	2.44	1.64	1.54
5	e	311	TD3	P16-O17	2.40	1.64	1.54
5	j	311	TD3	P16-O18	2.36	1.63	1.54
5	Z	311	TD3	P16-O18	2.32	1.63	1.54
5	A	311	TD3	P16-O18	2.31	1.63	1.54
5	Z	311	TD3	P16-O17	2.28	1.63	1.54
5	j	311	TD3	P16-O17	2.25	1.63	1.54
5	B	311	TD3	P16-O17	2.24	1.63	1.54
5	K	311	TD3	P16-O18	2.20	1.63	1.54
5	A	311	TD3	P16-O17	2.16	1.63	1.54
5	P	311	TD3	P16-O17	2.08	1.62	1.54
5	B	311	TD3	P16-O18	2.03	1.62	1.54

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	K	311	TD3	C04-C03-N02	3.36	118.04	111.06
5	B	311	TD3	C04-C03-N02	3.28	117.86	111.06
5	e	311	TD3	C04-C03-N02	3.25	117.81	111.06
5	P	311	TD3	C04-C03-N02	2.75	116.76	111.06
5	Z	311	TD3	C04-C03-N02	2.73	116.72	111.06
5	A	311	TD3	C04-C03-N02	2.65	116.56	111.06
5	U	311	TD3	C04-C03-N02	2.60	116.45	111.06
5	e	311	TD3	O01-N02-C03	2.46	119.75	113.59
5	U	311	TD3	O01-N02-C03	2.21	119.11	113.59
5	B	311	TD3	O01-N02-C03	2.13	118.93	113.59
5	P	311	TD3	O01-N02-C03	2.11	118.86	113.59

There are no chirality outliers.

All (56) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	e	311	TD3	C14-O15-P16-O17
5	e	311	TD3	C14-O15-P16-O18
5	Z	311	TD3	N02-C03-C04-C05
5	Z	311	TD3	C14-O15-P16-O17

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Mol	Chain	Res	Type	Atoms
5	Z	311	TD3	C14-O15-P16-O18
5	Z	311	TD3	C14-O15-P16-O19
5	K	311	TD3	N02-C03-C04-C05
5	K	311	TD3	C14-O15-P16-O17
5	K	311	TD3	C14-O15-P16-O18
5	K	311	TD3	C14-O15-P16-O19
5	B	311	TD3	C14-C12-N02-O01
5	B	311	TD3	N02-C03-C04-C05
5	B	311	TD3	C14-O15-P16-O17
5	B	311	TD3	C14-O15-P16-O18
5	B	311	TD3	C14-O15-P16-O19
5	U	311	TD3	C14-O15-P16-O17
5	P	311	TD3	N02-C03-C04-C05
5	P	311	TD3	C14-O15-P16-O17
5	P	311	TD3	C14-O15-P16-O18
5	P	311	TD3	C14-O15-P16-O19
5	j	311	TD3	N02-C03-C04-C05
5	j	311	TD3	C14-O15-P16-O17
5	j	311	TD3	C14-O15-P16-O18
5	j	311	TD3	C14-O15-P16-O19
5	A	311	TD3	N02-C03-C04-C05
5	A	311	TD3	C14-O15-P16-O17
5	A	311	TD3	C14-O15-P16-O18
5	A	311	TD3	C14-O15-P16-O19
5	Z	311	TD3	C03-C04-C05-C06
5	e	311	TD3	C03-C04-C05-C06
5	U	311	TD3	C03-C04-C05-C06
5	j	311	TD3	C03-C04-C05-C06
5	e	311	TD3	C04-C05-C06-O07
5	j	311	TD3	N02-C12-C14-O15
5	B	311	TD3	C04-C05-C06-O07
5	j	311	TD3	C04-C05-C06-O07
5	U	311	TD3	C04-C05-C06-O07
5	P	311	TD3	C04-C05-C06-O07
5	A	311	TD3	C04-C05-C06-O07
5	K	311	TD3	O13-C12-C14-O15
5	B	311	TD3	O13-C12-C14-O15
5	P	311	TD3	O13-C12-C14-O15
5	A	311	TD3	O13-C12-C14-O15
5	Z	311	TD3	N02-C12-C14-O15
5	j	311	TD3	O13-C12-C14-O15
5	Z	311	TD3	O13-C12-C14-O15

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Mol	Chain	Res	Type	Atoms
5	K	311	TD3	C04-C05-C06-O07
5	e	311	TD3	C04-C03-N02-O01
5	e	311	TD3	O13-C12-N02-O01
5	Z	311	TD3	O13-C12-N02-O01
5	K	311	TD3	O13-C12-N02-O01
5	B	311	TD3	O13-C12-N02-O01
5	U	311	TD3	O13-C12-N02-O01
5	P	311	TD3	O13-C12-N02-O01
5	j	311	TD3	O13-C12-N02-O01
5	A	311	TD3	O13-C12-N02-O01

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	311	TD3	1	0
5	Z	311	TD3	1	0
5	B	311	TD3	1	0
5	U	311	TD3	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	297/307 (96%)	-0.85	1 (0%) 94 92	10, 17, 33, 72	0
1	B	297/307 (96%)	-0.84	1 (0%) 94 92	11, 18, 35, 68	0
1	K	297/307 (96%)	-0.87	0 100 100	11, 18, 35, 61	0
1	P	297/307 (96%)	-0.88	0 100 100	10, 17, 32, 63	0
1	U	297/307 (96%)	-0.61	5 (1%) 70 66	11, 26, 63, 99	0
1	Z	297/307 (96%)	-0.67	3 (1%) 82 80	12, 23, 54, 102	0
1	e	297/307 (96%)	-0.60	4 (1%) 77 74	11, 26, 62, 109	0
1	j	297/307 (96%)	-0.64	6 (2%) 65 61	12, 23, 55, 101	0
All	All	2376/2456 (96%)	-0.75	20 (0%) 86 84	10, 21, 51, 109	0

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	e	153	VAL	7.0
1	j	152	ALA	5.1
1	e	152	ALA	5.0
1	Z	153	VAL	5.0
1	U	141	ILE	5.0
1	Z	152	ALA	4.5
1	j	153	VAL	4.1
1	U	153	VAL	3.9
1	e	141	ILE	3.8
1	U	152	ALA	3.8
1	j	141	ILE	3.8
1	Z	141	ILE	3.6
1	j	139	MET	2.8
1	j	140	GLY	2.6
1	B	153	VAL	2.5
1	e	139	MET	2.5

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Mol	Chain	Res	Type	RSRZ
1	U	140	GLY	2.4
1	A	153	VAL	2.4
1	U	137	ARG	2.3
1	j	138	LEU	2.1

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
3	NA	Z	309	1/1	0.91	0.08	34,34,34,34	0
3	NA	K	309	1/1	0.94	0.07	26,26,26,26	0
3	NA	e	309	1/1	0.94	0.07	36,36,36,36	0
5	TD3	e	311	15/15	0.97	0.12	22,34,45,47	0
3	NA	j	309	1/1	0.97	0.06	33,33,33,33	0
3	NA	U	309	1/1	0.97	0.07	39,39,39,39	0
5	TD3	U	311	15/15	0.97	0.10	19,35,44,45	0
3	NA	B	309	1/1	0.97	0.07	25,25,25,25	0
5	TD3	Z	311	15/15	0.98	0.11	21,32,52,57	0
5	TD3	P	311	15/15	0.98	0.08	12,19,38,40	0
5	TD3	K	311	15/15	0.98	0.09	13,22,37,41	0
5	TD3	j	311	15/15	0.98	0.10	21,32,49,52	0
3	NA	A	309	1/1	0.98	0.07	27,27,27,27	0
5	TD3	A	311	15/15	0.98	0.09	13,19,43,45	0
5	TD3	B	311	15/15	0.98	0.09	13,18,39,43	0
4	CL	e	310	1/1	0.98	0.06	39,39,39,39	0
4	CL	U	310	1/1	0.98	0.07	39,39,39,39	0
4	CL	j	310	1/1	0.99	0.08	27,27,27,27	0
2	ZN	e	308	1/1	0.99	0.05	26,26,26,26	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	CL	A	310	1/1	0.99	0.06	13,13,13,13	0
4	CL	Z	310	1/1	0.99	0.08	27,27,27,27	0
3	NA	P	309	1/1	0.99	0.12	30,30,30,30	0
4	CL	P	310	1/1	1.00	0.06	13,13,13,13	0
2	ZN	B	308	1/1	1.00	0.09	14,14,14,14	0
4	CL	K	310	1/1	1.00	0.07	13,13,13,13	0
2	ZN	U	308	1/1	1.00	0.04	27,27,27,27	0
2	ZN	j	308	1/1	1.00	0.04	24,24,24,24	0
2	ZN	P	308	1/1	1.00	0.08	13,13,13,13	0
4	CL	B	310	1/1	1.00	0.07	14,14,14,14	0
2	ZN	Z	308	1/1	1.00	0.04	23,23,23,23	0
2	ZN	A	308	1/1	1.00	0.09	15,15,15,15	0
2	ZN	K	308	1/1	1.00	0.08	17,17,17,17	0

6.5 Other polymers [i](#)

There are no such residues in this entry.