Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2024 – 04:10 PM JST

PDB ID	:	8JRB
Title	:	Structure of DNA polymerase 1 from Aquifex pyrophilus
Authors	:	Clement, P.; Nair, D.T.
Deposited on	:	2023-06-16
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:

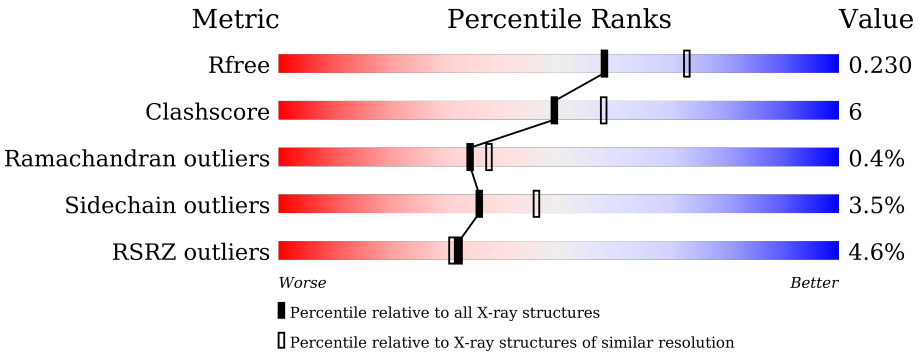
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance (i)

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 <=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	597	4% 82% 12%
1	B	597	5% 79% 15%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 9698 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 DNA polymerase I.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	574	Total	C	N	O	S	0	0	0
			4642	2980	799	853	10			
1	B	574	Total	C	N	O	S	0	0	0
			4645	2981	800	854	10			

There are 50 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-22	MET	-	initiating methionine	UNP Q8GHE9
A	-21	HIS	-	expression tag	UNP Q8GHE9
A	-20	HIS	-	expression tag	UNP Q8GHE9
A	-19	HIS	-	expression tag	UNP Q8GHE9
A	-18	HIS	-	expression tag	UNP Q8GHE9
A	-17	HIS	-	expression tag	UNP Q8GHE9
A	-16	HIS	-	expression tag	UNP Q8GHE9
A	-15	LEU	-	expression tag	UNP Q8GHE9
A	-14	GLU	-	expression tag	UNP Q8GHE9
A	-13	VAL	-	expression tag	UNP Q8GHE9
A	-12	LEU	-	expression tag	UNP Q8GHE9
A	-11	PHE	-	expression tag	UNP Q8GHE9
A	-10	GLN	-	expression tag	UNP Q8GHE9
A	-9	GLY	-	expression tag	UNP Q8GHE9
A	-8	PRO	-	expression tag	UNP Q8GHE9
A	-7	LEU	-	expression tag	UNP Q8GHE9
A	-6	GLY	-	expression tag	UNP Q8GHE9
A	-5	SER	-	expression tag	UNP Q8GHE9
A	-4	GLU	-	expression tag	UNP Q8GHE9
A	-3	PHE	-	expression tag	UNP Q8GHE9
A	-2	ARG	-	expression tag	UNP Q8GHE9
A	-1	ALA	-	expression tag	UNP Q8GHE9
A	0	GLY	-	expression tag	UNP Q8GHE9
A	28	ALA	ASP	conflict	UNP Q8GHE9
A	30	ALA	GLU	conflict	UNP Q8GHE9

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-22	MET	-	initiating methionine	UNP Q8GHE9
B	-21	HIS	-	expression tag	UNP Q8GHE9
B	-20	HIS	-	expression tag	UNP Q8GHE9
B	-19	HIS	-	expression tag	UNP Q8GHE9
B	-18	HIS	-	expression tag	UNP Q8GHE9
B	-17	HIS	-	expression tag	UNP Q8GHE9
B	-16	HIS	-	expression tag	UNP Q8GHE9
B	-15	LEU	-	expression tag	UNP Q8GHE9
B	-14	GLU	-	expression tag	UNP Q8GHE9
B	-13	VAL	-	expression tag	UNP Q8GHE9
B	-12	LEU	-	expression tag	UNP Q8GHE9
B	-11	PHE	-	expression tag	UNP Q8GHE9
B	-10	GLN	-	expression tag	UNP Q8GHE9
B	-9	GLY	-	expression tag	UNP Q8GHE9
B	-8	PRO	-	expression tag	UNP Q8GHE9
B	-7	LEU	-	expression tag	UNP Q8GHE9
B	-6	GLY	-	expression tag	UNP Q8GHE9
B	-5	SER	-	expression tag	UNP Q8GHE9
B	-4	GLU	-	expression tag	UNP Q8GHE9
B	-3	PHE	-	expression tag	UNP Q8GHE9
B	-2	ARG	-	expression tag	UNP Q8GHE9
B	-1	ALA	-	expression tag	UNP Q8GHE9
B	0	GLY	-	expression tag	UNP Q8GHE9
B	28	ALA	ASP	conflict	UNP Q8GHE9
B	30	ALA	GLU	conflict	UNP Q8GHE9

- Molecule 2 is water.

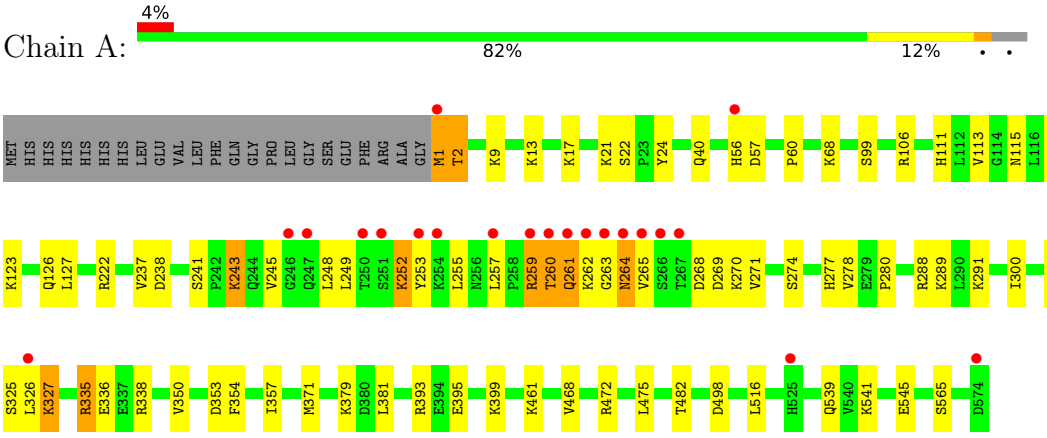
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	244	Total O 244 244	0	0
2	B	167	Total O 167 167	0	0

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.

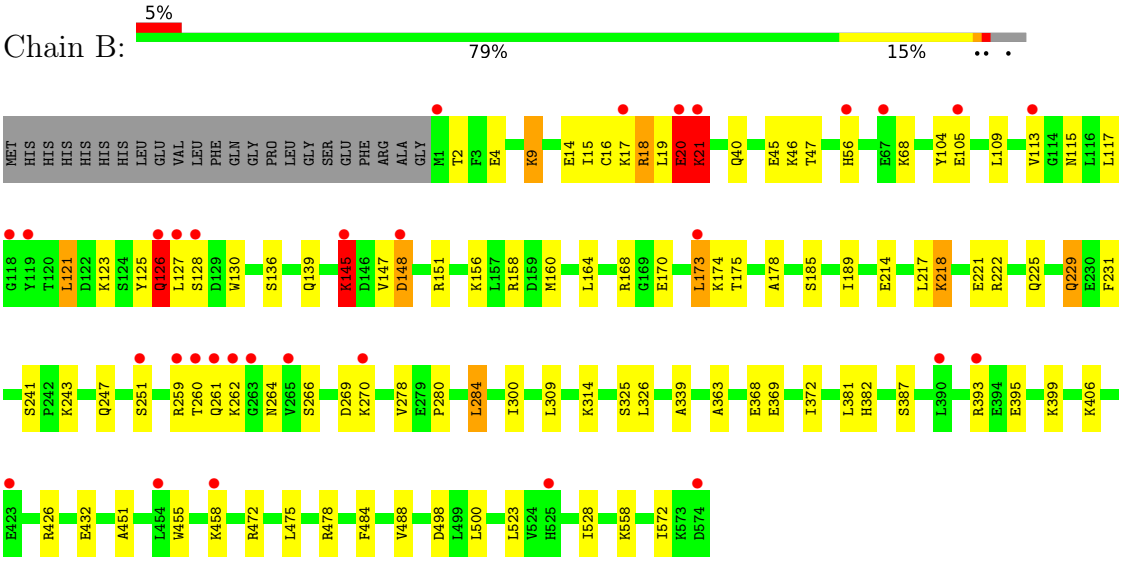
• Molecule 1: DNA polymerase I

Chain A:



• Molecule 1: DNA polymerase I

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	178.83Å 74.72Å 129.56Å 90.00° 108.25° 90.00°	Depositor
Resolution (Å)	46.26 – 2.20 46.26 – 2.20	Depositor EDS
% Data completeness (in resolution range)	94.3 (46.26-2.20) 97.2 (46.26-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.26 (at 2.20Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.191 , 0.233 0.190 , 0.230	Depositor DCC
R_{free} test set	4085 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	44.0	Xtriage
Anisotropy	0.215	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 42.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	9698	wwPDB-VP
Average B, all atoms (Å^2)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.04% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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	0/4719	0.66	6/6344 (0.1%)
1	B	0.40	2/4722 (0.0%)	0.75	20/6348 (0.3%)
All	All	0.38	2/9441 (0.0%)	0.71	26/12692 (0.2%)

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	A	0	4
1	B	0	5
All	All	0	9

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	270	LYS	CD-CE	-6.46	1.35	1.51
1	B	21	LYS	CD-CE	5.32	1.64	1.51

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	327	LYS	CA-CB-CG	11.56	138.82	113.40
1	B	21	LYS	CD-CE-NZ	10.88	136.72	111.70
1	B	270	LYS	CD-CE-NZ	-10.17	88.32	111.70
1	B	21	LYS	CA-CB-CG	9.94	135.26	113.40
1	B	314	LYS	CD-CE-NZ	9.74	134.11	111.70
1	B	21	LYS	CB-CG-CD	9.45	136.17	111.60
1	A	327	LYS	CB-CA-C	-9.14	92.12	110.40
1	B	123	LYS	CD-CE-NZ	8.70	131.71	111.70
1	B	21	LYS	CG-CD-CE	-7.95	88.05	111.90
1	B	314	LYS	CG-CD-CE	-7.92	88.14	111.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	252	LYS	CB-CG-CD	7.52	131.15	111.60
1	B	314	LYS	CA-CB-CG	7.49	129.89	113.40
1	B	314	LYS	CB-CG-CD	7.38	130.79	111.60
1	B	270	LYS	CB-CG-CD	7.09	130.04	111.60
1	B	270	LYS	CG-CD-CE	6.72	132.06	111.90
1	B	270	LYS	CA-CB-CG	-6.01	100.18	113.40
1	A	259	ARG	CB-CG-CD	6.00	127.19	111.60
1	B	369	GLU	CA-CB-CG	5.91	126.40	113.40
1	B	127	LEU	CB-CG-CD2	5.81	120.88	111.00
1	B	284	LEU	CA-CB-CG	5.57	128.11	115.30
1	A	259	ARG	CG-CD-NE	-5.44	100.38	111.80
1	B	20	GLU	C-N-CA	-5.31	108.43	121.70
1	B	145	LYS	CA-CB-CG	5.28	125.02	113.40
1	B	19	LEU	CA-CB-CG	5.18	127.22	115.30
1	B	18	ARG	CB-CA-C	5.18	120.76	110.40
1	A	259	ARG	CA-CB-CG	5.00	124.41	113.40

There are no chirality outliers.

All (9) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	222	ARG	Sidechain
1	A	259	ARG	Peptide
1	A	263	GLY	Peptide
1	A	264	ASN	Peptide
1	B	126	GLN	Peptide
1	B	145	LYS	Peptide
1	B	20	GLU	Peptide
1	B	21	LYS	Peptide
1	B	269	ASP	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	4642	0	4816	49	0
1	B	4645	0	4820	63	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	244	0	0	7	0
2	B	167	0	0	5	0
All	All	9698	0	9636	111	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 6.

All (111) 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:B:145:LYS:HD2	1:B:148:ASP:HB2	1.47	0.96
1:B:218:LYS:NZ	2:B:601:HOH:O	2.06	0.89
1:A:270:LYS:H	1:A:270:LYS:HD2	1.44	0.82
1:B:178:ALA:HB2	1:B:189:ILE:HD13	1.64	0.79
1:B:126:GLN:HA	1:B:128:SER:H	1.48	0.78
1:A:9:LYS:HE3	1:A:57:ASP:H	1.49	0.78
1:B:9:LYS:HD2	1:B:9:LYS:H	1.52	0.74
1:A:475:LEU:HD12	1:A:498:ASP:HB3	1.70	0.72
1:B:475:LEU:HD12	1:B:498:ASP:HB3	1.71	0.71
1:B:21:LYS:HB3	1:B:68:LYS:HZ1	1.57	0.69
1:B:455:TRP:O	1:B:458:LYS:HB3	1.93	0.69
1:B:20:GLU:O	1:B:68:LYS:NZ	2.24	0.68
1:A:289:LYS:NZ	2:A:603:HOH:O	2.24	0.68
1:B:17:LYS:HA	1:B:20:GLU:HG3	1.76	0.67
1:A:270:LYS:HD2	1:A:270:LYS:N	2.10	0.67
1:A:106:ARG:NH2	2:A:606:HOH:O	2.29	0.66
1:B:368:GLU:HB2	1:B:451:ALA:HB3	1.79	0.64
1:B:4:GLU:OE2	2:B:602:HOH:O	2.15	0.64
1:B:170:GLU:O	1:B:173:LEU:HB2	1.96	0.63
1:B:164:LEU:HD22	1:B:478:ARG:HE	1.64	0.63
1:B:21:LYS:HB3	1:B:68:LYS:NZ	2.14	0.62
1:A:393:ARG:NH1	1:A:395:GLU:OE2	2.32	0.62
1:B:113:VAL:HG12	1:B:117:LEU:HD12	1.81	0.62
1:A:123:LYS:O	1:A:126:GLN:HG2	1.99	0.61
1:B:214:GLU:O	1:B:218:LYS:HE2	2.01	0.61
1:B:136:SER:OG	1:B:139:GLN:HG3	2.01	0.60
1:A:237:VAL:HG21	1:A:248:LEU:HD22	1.83	0.60
1:A:335:ARG:NH1	1:A:338:ARG:HH11	2.00	0.60
1:A:252:LYS:HB3	1:A:253:TYR:CD1	2.37	0.59
1:B:156:LYS:O	1:B:160:MET:HG3	2.03	0.59
1:B:229:GLN:NE2	2:B:605:HOH:O	2.35	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:185:SER:O	1:B:189:ILE:HG13	2.03	0.58
1:B:363:ALA:O	1:B:372:ILE:HD11	2.05	0.57
1:B:104:TYR:HE2	1:B:115:ASN:HD22	1.52	0.56
1:A:13:LYS:HE2	1:A:60:PRO:HG3	1.87	0.56
1:B:14:GLU:O	1:B:18:ARG:HB2	2.06	0.56
1:B:47:THR:OG1	1:B:148:ASP:OD1	2.22	0.56
1:B:113:VAL:HG21	1:B:121:LEU:HG	1.88	0.56
1:A:126:GLN:HG3	1:A:127:LEU:HD22	1.88	0.55
1:A:9:LYS:NZ	2:A:614:HOH:O	2.36	0.55
1:B:14:GLU:HG3	1:B:18:ARG:CZ	2.36	0.55
1:A:260:THR:OG1	1:A:261:GLN:N	2.39	0.55
1:B:387:SER:HB2	1:B:393:ARG:HA	1.90	0.53
1:B:426:ARG:HH21	1:B:432:GLU:CD	2.10	0.53
1:A:541:LYS:HE2	1:A:565:SER:OG	2.07	0.53
1:A:300:ILE:HG23	1:A:309:LEU:HD11	1.92	0.52
1:A:461:LYS:HE2	2:A:609:HOH:O	2.09	0.52
1:B:125:TYR:O	1:B:126:GLN:HG3	2.09	0.52
1:A:268:ASP:OD1	1:A:271:VAL:HG23	2.09	0.51
1:B:9:LYS:HG2	1:B:56:HIS:CE1	2.46	0.51
1:B:148:ASP:HB3	1:B:151:ARG:NH1	2.26	0.51
1:B:259:ARG:HD3	1:B:264:ASN:C	2.32	0.51
1:B:109:LEU:O	1:B:113:VAL:HG22	2.11	0.50
1:B:164:LEU:CD2	1:B:478:ARG:HE	2.24	0.50
1:B:125:TYR:C	1:B:126:GLN:HG3	2.32	0.49
1:B:126:GLN:HG2	1:B:130:TRP:HZ2	1.77	0.49
1:B:217:LEU:HD23	2:B:601:HOH:O	2.13	0.49
1:A:353:ASP:OD2	2:A:601:HOH:O	2.20	0.49
1:A:371:MET:HG2	1:A:381:LEU:HD21	1.93	0.49
1:B:372:ILE:HG21	1:B:558:LYS:HB3	1.94	0.49
1:A:106:ARG:NH1	1:A:111:HIS:HB2	2.28	0.49
1:B:221:GLU:O	1:B:225:GLN:HG3	2.14	0.48
1:B:260:THR:HG22	1:B:264:ASN:O	2.14	0.48
1:A:325:SER:O	1:A:326:LEU:HD23	2.14	0.48
1:A:303:ASN:OD1	1:B:125:TYR:OH	2.22	0.48
1:B:9:LYS:H	1:B:9:LYS:CD	2.24	0.48
1:B:278:VAL:HG12	1:B:280:PRO:HD2	1.96	0.48
1:A:326:LEU:O	1:A:327:LYS:HB2	2.14	0.47
1:B:174:LYS:O	1:B:178:ALA:HB3	2.15	0.47
1:B:168:ARG:HG2	1:B:168:ARG:HH11	1.80	0.46
1:B:241:SER:OG	1:B:243:LYS:HG3	2.15	0.46
1:B:147:VAL:HG12	1:B:148:ASP:OD1	2.14	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:523:LEU:CD1	1:B:528:ILE:HG12	2.45	0.46
1:B:300:ILE:HG23	1:B:309:LEU:HD11	1.98	0.46
1:A:238:ASP:HB3	1:A:241:SER:HB3	1.97	0.46
1:A:278:VAL:HG12	1:A:280:PRO:HD2	1.98	0.46
1:A:354:PHE:HB3	1:A:357:ILE:HB	1.98	0.46
1:A:516:LEU:HD11	1:A:539:GLN:HG2	1.98	0.45
1:A:336:GLU:H	1:A:336:GLU:CD	2.20	0.45
1:A:277:HIS:CD2	1:A:277:HIS:H	2.33	0.45
1:B:484:PHE:O	1:B:488:VAL:HG22	2.17	0.45
1:A:1:MET:HB3	1:A:2:THR:H	1.61	0.45
1:B:126:GLN:HG2	1:B:130:TRP:CZ2	2.51	0.44
1:B:247:GLN:O	1:B:251:SER:HB3	2.17	0.44
1:A:249:LEU:HB3	1:A:255:LEU:HD12	1.99	0.44
1:B:231:PHE:CE2	1:B:284:LEU:HD12	2.53	0.44
1:B:382:HIS:CD2	1:B:406:LYS:HG3	2.53	0.43
1:B:393:ARG:NH2	1:B:395:GLU:HB2	2.32	0.43
1:A:379:LYS:NZ	2:A:628:HOH:O	2.51	0.43
1:A:113:VAL:HG13	1:A:117:LEU:HD12	2.01	0.43
1:A:270:LYS:H	1:A:270:LYS:CD	2.23	0.43
1:A:9:LYS:HE2	1:A:56:HIS:CE1	2.54	0.43
1:A:9:LYS:HE3	1:A:57:ASP:N	2.25	0.42
1:B:325:SER:O	1:B:326:LEU:HD22	2.19	0.42
1:B:46:LYS:HD3	2:B:602:HOH:O	2.19	0.42
1:A:241:SER:OG	1:A:243:LYS:HD3	2.20	0.42
1:B:500:LEU:HD23	1:B:500:LEU:HA	1.85	0.42
1:A:248:LEU:HD12	1:A:252:LYS:HB2	2.01	0.41
1:A:241:SER:O	1:A:245:VAL:HG22	2.21	0.41
1:A:350:VAL:HG11	1:A:541:LYS:HA	2.02	0.41
1:A:545:GLU:OE2	1:A:565:SER:OG	2.27	0.41
1:A:269:ASP:OD1	1:A:288:ARG:NH1	2.44	0.41
1:A:291:LYS:HD2	1:A:291:LYS:HA	1.84	0.41
1:B:104:TYR:HE2	1:B:115:ASN:ND2	2.17	0.41
1:B:145:LYS:HB2	1:B:148:ASP:H	1.86	0.41
1:A:22:SER:O	1:A:68:LYS:NZ	2.46	0.41
1:B:339:ALA:HB2	1:B:572:ILE:HD11	2.03	0.40
1:B:15:ILE:HG13	1:B:16:CYS:N	2.36	0.40
1:A:21:LYS:HB2	1:A:21:LYS:HE2	1.76	0.40
1:A:338:ARG:NH2	2:A:632:HOH:O	2.54	0.40
1:A:468:VAL:HG12	1:A:482:THR:HG22	2.04	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	572/597 (96%)	562 (98%)	8 (1%)	2 (0%)	41	46
1	B	572/597 (96%)	557 (97%)	12 (2%)	3 (0%)	29	31
All	All	1144/1194 (96%)	1119 (98%)	20 (2%)	5 (0%)	34	37

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	265	VAL
1	A	264	ASN
1	B	126	GLN
1	B	261	GLN
1	B	175	THR

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	502/522 (96%)	486 (97%)	16 (3%)	39	50
1	B	503/522 (96%)	484 (96%)	19 (4%)	33	42
All	All	1005/1044 (96%)	970 (96%)	35 (4%)	36	46

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET

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Mol	Chain	Res	Type
1	A	2	THR
1	A	17	LYS
1	A	24	TYR
1	A	40	GLN
1	A	99	SER
1	A	115	ASN
1	A	243	LYS
1	A	257	LEU
1	A	260	THR
1	A	261	GLN
1	A	262	LYS
1	A	274	SER
1	A	335	ARG
1	A	399	LYS
1	A	472	ARG
1	B	2	THR
1	B	9	LYS
1	B	21	LYS
1	B	40	GLN
1	B	45	GLU
1	B	105	GLU
1	B	121	LEU
1	B	126	GLN
1	B	148	ASP
1	B	158	ARG
1	B	173	LEU
1	B	218	LYS
1	B	222	ARG
1	B	229	GLN
1	B	262	LYS
1	B	266	SER
1	B	381	LEU
1	B	399	LYS
1	B	472	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	40	GLN
1	A	111	HIS
1	A	256	ASN
1	A	277	HIS

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Mol	Chain	Res	Type
1	A	550	GLN
1	B	115	ASN
1	B	225	GLN
1	B	277	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

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

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	574/597 (96%)	0.21	22 (3%)	40	38	32, 47, 78, 158	1 (0%)
1	B	574/597 (96%)	0.22	31 (5%)	25	24	33, 58, 93, 139	1 (0%)
All	All	1148/1194 (96%)	0.21	53 (4%)	32	31	32, 51, 89, 158	2 (0%)

All (53) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	260	THR	10.2
1	A	263	GLY	7.7
1	A	259	ARG	7.7
1	B	127	LEU	7.1
1	A	262	LYS	6.5
1	B	126	GLN	5.8
1	B	262	LYS	5.7
1	A	261	GLN	5.6
1	B	525	HIS	5.3
1	A	247	GLN	5.2
1	B	261	GLN	5.2
1	B	260	THR	5.2
1	B	1	MET	4.4
1	A	56	HIS	4.3
1	A	525	HIS	4.0
1	B	128	SER	4.0
1	B	270	LYS	4.0
1	B	119	TYR	3.8
1	B	118	GLY	3.7
1	B	173	LEU	3.7
1	B	263	GLY	3.7
1	A	246	GLY	3.6
1	A	265	VAL	3.5
1	B	105	GLU	3.5

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Mol	Chain	Res	Type	RSRZ
1	B	56	HIS	3.4
1	B	259	ARG	3.4
1	B	458	LYS	3.3
1	A	257	LEU	3.1
1	B	148	ASP	2.9
1	A	251	SER	2.9
1	B	20	GLU	2.9
1	A	119	TYR	2.9
1	A	267	THR	2.8
1	B	21	LYS	2.7
1	B	67	GLU	2.7
1	A	326	LEU	2.6
1	A	574	ASP	2.6
1	A	250	THR	2.5
1	B	423	GLU	2.5
1	B	113	VAL	2.4
1	B	145	LYS	2.4
1	B	390	LEU	2.4
1	B	17	LYS	2.4
1	A	253	TYR	2.3
1	A	264	ASN	2.3
1	B	393	ARG	2.3
1	A	266	SER	2.3
1	B	265	VAL	2.3
1	B	454	LEU	2.2
1	A	1	MET	2.1
1	B	574	ASP	2.0
1	A	254	LYS	2.0
1	B	251	SER	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)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.