



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 12, 2026 – 07:45 AM UTC

PDB ID : 1ZQH / pdb_00001zqh
Title : DNA POLYMERASE BETA (POL B) (E.C.2.7.7.7) COMPLEXED WITH SEVEN BASE PAIRS OF DNA; SOAKED IN THE PRESENCE OF A SODIUM-FREE ARTIFICIAL MOTHER LIQUOR AT PH 7.5
Authors : Pelletier, H.; Sawaya, M.R.
Deposited on : 1996-04-12
Resolution : 3.10 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	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

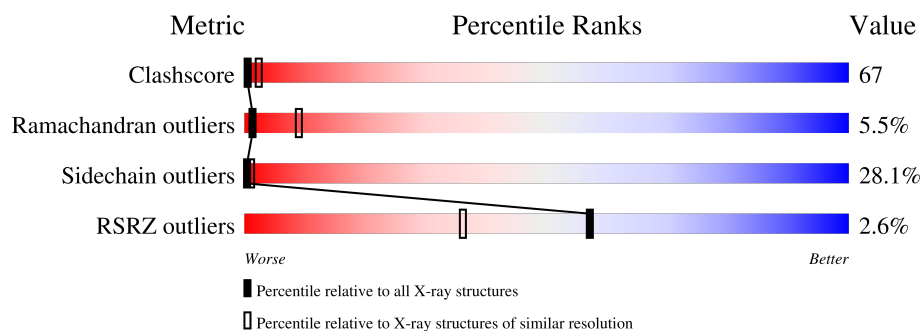
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 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))
Clashscore	190562	1539 (3.10-3.10)
Ramachandran outliers	187476	1467 (3.10-3.10)
Sidechain outliers	187428	1467 (3.10-3.10)
RSRZ outliers	180081	1456 (3.10-3.10)

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	T	8	12% 12% 25% 62%
2	P	7	29% 71%
3	A	335	2% 17% 41% 34% 5%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 3059 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 DNA chain called DNA (5'-D(*CP*AP*TP*TP*AP*GP*AP*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	T	8	Total	C	N	O	P	0	0	0
			145	69	27	42	7			

- Molecule 2 is a DNA chain called DNA (5'-D(*TP*CP*TP*AP*AP*TP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	P	7	Total	C	N	O	P	0	0	0
			144	69	24	44	7			

- Molecule 3 is a protein called PROTEIN (DNA POLYMERASE BETA (E.C.2.7.7.7)).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	327	Total	C	N	O	S	18	0	0
			2623	1657	458	499	9			

- Molecule 4 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Na	0	0
			2	2		

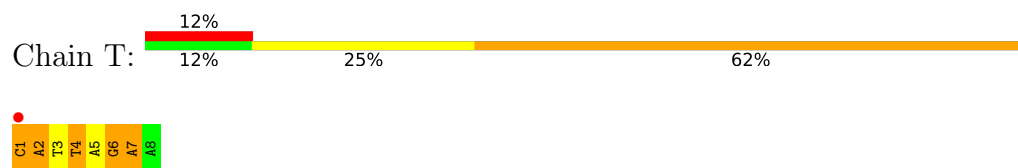
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	T	11	Total	O	0	0
			11	11		
5	P	22	Total	O	0	0
			22	22		
5	A	112	Total	O	0	0
			112	112		

3 Residue-property plots

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

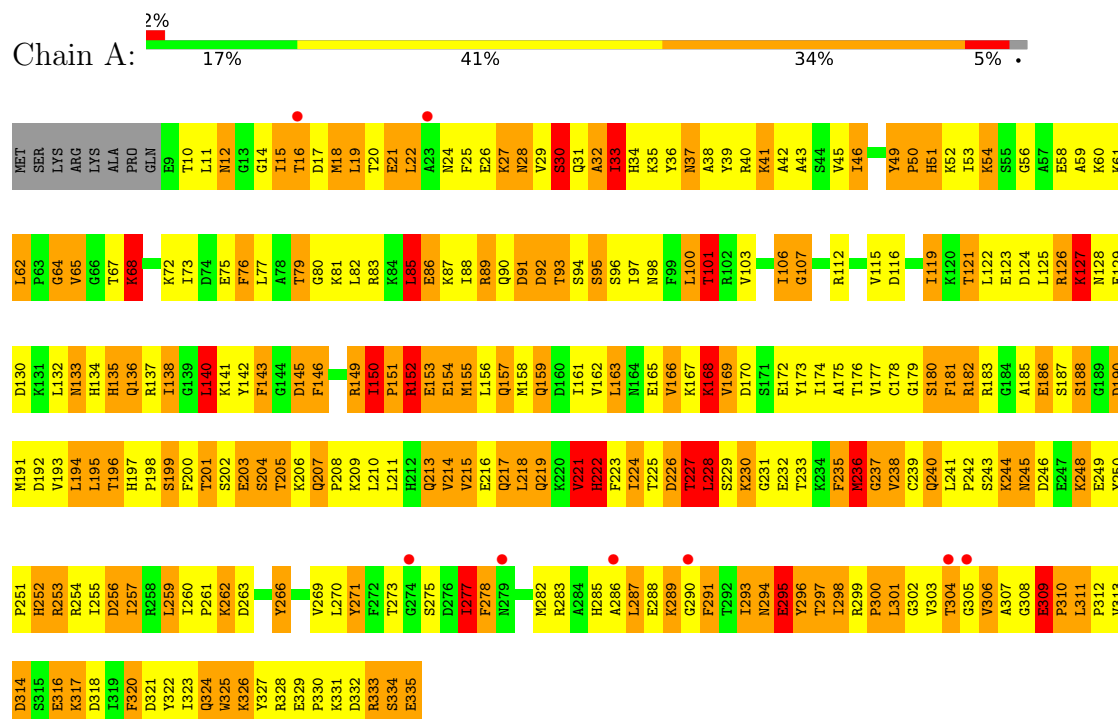
- Molecule 1: DNA (5'-D(*CP*AP*TP*TP*AP*GP*AP*A)-3')



- Molecule 2: DNA (5'-D(*TP*CP*TP*AP*AP*TP*G)-3')



- Molecule 3: PROTEIN (DNA POLYMERASE BETA (E.C.2.7.7.7))



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	178.01 Å 58.50 Å 48.70 Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 3.10 20.00 – 3.10	Depositor EDS
% Data completeness (in resolution range)	90.0 (20.00-3.10) 89.5 (20.00-3.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.07 (at 2.38 Å)	Xtriage
Refinement program	TNT 5-D	Depositor
R, R_{free}	0.229 , (Not available) 0.224 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	20.6	Xtriage
Anisotropy	1.092	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.22 , 192.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	3059	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.34% 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:
NA

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	T	0.92	0/162	3.77	14/249 (5.6%)
2	P	1.14	1/160 (0.6%)	4.38	15/243 (6.2%)
3	A	1.50	17/2672 (0.6%)	2.22	127/3590 (3.5%)
All	All	1.45	18/2994 (0.6%)	2.52	156/4082 (3.8%)

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
3	A	4	0

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	326	LYS	CE-NZ	13.99	1.91	1.49
3	A	240	GLN	CA-C	-7.07	1.44	1.52
2	P	1	DT	OP3-P	6.62	1.61	1.48
3	A	252	HIS	C-N	5.73	1.40	1.33
3	A	176	THR	CA-C	-5.62	1.46	1.52
3	A	65	VAL	N-CA	-5.57	1.39	1.47
3	A	135	HIS	CE1-NE2	5.41	1.38	1.32
3	A	221	VAL	CA-CB	-5.35	1.47	1.54
3	A	226	ASP	CG-OD1	5.29	1.35	1.25
3	A	299	ARG	C-N	5.21	1.38	1.33
3	A	195	LEU	CA-C	-5.21	1.46	1.52
3	A	193	VAL	CA-CB	-5.20	1.47	1.54
3	A	151	PRO	N-CA	-5.16	1.40	1.47
3	A	269	VAL	CA-CB	-5.14	1.48	1.54
3	A	192	ASP	CA-C	-5.10	1.47	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	177	VAL	CA-CB	-5.06	1.47	1.53
3	A	256	ASP	CG-OD2	5.02	1.34	1.25
3	A	140	LEU	C-N	-5.01	1.26	1.33

All (156) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	P	1	DT	C6-N1-C1'	-28.72	76.28	119.35
2	P	1	DT	C2-N1-C1'	27.31	160.31	119.35
1	T	7	DA	C8-N9-C1'	22.78	161.22	127.05
1	T	7	DA	C4-N9-C1'	-22.76	92.90	127.05
1	T	4	DT	C6-N1-C1'	-21.88	86.54	119.35
1	T	4	DT	C2-N1-C1'	21.35	151.37	119.35
2	P	7	DG	C8-N9-C1'	20.11	157.16	127.00
2	P	7	DG	C4-N9-C1'	-19.89	97.17	127.00
1	T	6	DG	C8-N9-C1'	17.25	152.88	127.00
2	P	5	DA	C4-N9-C1'	16.88	152.37	127.05
1	T	6	DG	C4-N9-C1'	-16.67	102.00	127.00
2	P	2	DC	C2-N1-C1'	16.06	143.79	119.70
2	P	5	DA	C8-N9-C1'	-15.94	103.14	127.05
2	P	3	DT	C6-N1-C1'	-15.54	96.04	119.35
2	P	2	DC	C6-N1-C1'	-14.88	97.38	119.70
2	P	3	DT	C2-N1-C1'	14.54	141.16	119.35
3	A	49	TYR	CA-C-N	12.81	135.85	119.84
3	A	49	TYR	C-N-CA	12.81	135.85	119.84
1	T	2	DA	C8-N9-C1'	12.19	145.34	127.05
3	A	318	ASP	CA-CB-CG	-11.87	100.73	112.60
1	T	2	DA	C4-N9-C1'	-11.79	109.37	127.05
3	A	65	VAL	CB-CA-C	11.59	125.89	112.68
3	A	150	ILE	N-CA-CB	11.56	124.63	112.37
3	A	157	GLN	N-CA-CB	10.90	125.79	109.98
3	A	227	THR	N-CA-CB	10.44	127.81	110.47
3	A	28	ASN	CA-CB-CG	-10.26	102.34	112.60
3	A	252	HIS	CA-CB-CG	-10.07	103.73	113.80
3	A	326	LYS	CD-CE-NZ	-9.68	80.92	111.90
3	A	116	ASP	CA-CB-CG	-9.28	103.33	112.60
3	A	271	TYR	N-CA-C	8.87	121.83	111.02
3	A	215	VAL	N-CA-CB	8.72	122.40	110.54
3	A	49	TYR	O-C-N	8.23	130.78	121.32
3	A	149	ARG	CA-C-N	-8.03	116.35	123.33
3	A	149	ARG	C-N-CA	-8.03	116.35	123.33
3	A	222	HIS	N-CA-CB	8.01	124.02	110.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	256	ASP	CA-CB-CG	7.99	120.59	112.60
3	A	168	LYS	N-CA-CB	7.83	121.63	110.12
3	A	176	THR	CB-CA-C	-7.46	99.35	110.24
3	A	297	THR	N-CA-CB	-7.27	97.81	110.76
3	A	166	VAL	N-CA-CB	7.17	118.14	110.62
3	A	16	THR	N-CA-CB	-7.05	99.00	110.14
3	A	115	VAL	CA-C-N	-7.00	109.03	120.72
3	A	115	VAL	C-N-CA	-7.00	109.03	120.72
3	A	277	ILE	N-CA-CB	6.90	122.09	110.56
3	A	177	VAL	N-CA-CB	-6.87	104.11	111.46
3	A	146	PHE	CA-CB-CG	-6.84	106.96	113.80
3	A	224	ILE	CA-CB-CG1	-6.83	98.79	110.40
3	A	68	LYS	N-CA-C	6.82	118.41	110.97
3	A	12	ASN	N-CA-CB	6.69	120.72	110.61
3	A	209	LYS	N-CA-CB	6.67	119.87	109.94
3	A	155	MET	O-C-N	6.65	128.94	122.03
3	A	140	LEU	CB-CA-C	-6.62	100.70	110.95
3	A	34	HIS	N-CA-C	6.59	118.12	111.07
3	A	252	HIS	CA-C-O	-6.58	113.79	121.16
3	A	16	THR	CA-CB-CG2	-6.55	99.36	110.50
3	A	219	GLN	CB-CA-C	-6.55	100.59	110.88
3	A	40	ARG	N-CA-CB	6.48	119.47	110.07
3	A	266	TYR	CA-CB-CG	-6.46	102.27	113.90
3	A	12	ASN	CB-CA-C	6.42	121.02	110.17
3	A	72	LYS	CB-CA-C	6.41	120.95	110.88
3	A	316	GLU	CA-C-N	6.40	128.75	120.44
3	A	316	GLU	C-N-CA	6.40	128.75	120.44
3	A	52	LYS	N-CA-CB	6.36	120.32	110.21
3	A	193	VAL	N-CA-C	6.36	117.28	108.89
3	A	68	LYS	N-CA-CB	6.32	119.13	109.91
3	A	64	GLY	CA-C-O	6.30	125.97	119.10
3	A	17	ASP	CB-CA-C	6.24	122.11	110.70
3	A	226	ASP	CA-CB-CG	6.20	118.80	112.60
2	P	5	DA	O5'-C5'-C4'	6.19	120.08	110.80
3	A	127	LYS	CA-C-N	-6.14	112.88	123.25
3	A	127	LYS	C-N-CA	-6.14	112.88	123.25
3	A	21	GLU	CB-CA-C	-6.11	101.03	110.81
3	A	242	PRO	N-CA-CB	6.10	108.62	103.25
3	A	333	ARG	N-CA-C	-6.07	105.92	113.15
3	A	228	LEU	N-CA-C	-6.06	106.02	113.41
3	A	106	ILE	N-CA-C	-6.03	99.73	108.17
3	A	297	THR	N-CA-C	6.03	116.05	108.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	256	ASP	N-CA-CB	6.03	120.30	110.90
3	A	237	GLY	N-CA-C	6.02	121.41	111.59
3	A	312	PRO	N-CA-C	6.01	120.07	110.21
1	T	4	DT	C5'-C4'-O4'	5.97	118.35	109.40
2	P	3	DT	N1-C1'-C2'	5.95	122.42	113.50
3	A	177	VAL	CB-CA-C	-5.95	104.87	111.35
3	A	224	ILE	CB-CA-C	5.89	121.19	111.59
3	A	190	ASP	CA-CB-CG	-5.85	106.75	112.60
3	A	291	PHE	N-CA-C	5.85	117.11	108.86
3	A	278	PHE	CA-CB-CG	-5.84	107.96	113.80
3	A	314	ASP	N-CA-CB	5.84	119.23	110.65
3	A	126	ARG	N-CA-CB	5.83	118.47	110.01
3	A	35	LYS	N-CA-C	-5.80	104.95	111.28
2	P	1	DT	C1'-O4'-C4'	-5.79	101.01	109.70
3	A	209	LYS	CA-C-O	-5.78	114.71	120.90
3	A	35	LYS	CB-CA-C	-5.77	101.21	110.79
3	A	140	LEU	CA-C-O	5.71	126.78	120.90
3	A	138	ILE	N-CA-C	-5.69	104.82	110.62
3	A	30	SER	O-C-N	-5.69	116.24	122.84
1	T	1	DC	C6-N1-C1'	-5.67	111.19	119.70
2	P	1	DT	P-O5'-C5'	-5.67	111.50	120.00
3	A	329	GLU	N-CA-C	-5.66	101.98	109.84
3	A	300	PRO	N-CA-CB	5.65	107.02	103.23
3	A	320	PHE	N-CA-CB	5.64	118.15	109.91
3	A	24	ASN	CA-CB-CG	-5.63	106.97	112.60
3	A	116	ASP	CA-C-O	-5.62	112.47	119.38
3	A	191	MET	CB-CA-C	5.60	118.98	109.80
3	A	169	VAL	N-CA-CB	5.59	116.97	110.65
3	A	309	GLU	CA-C-N	5.59	126.83	119.84
3	A	309	GLU	C-N-CA	5.59	126.83	119.84
3	A	65	VAL	CA-CB-CG2	-5.57	100.93	110.40
3	A	295	GLU	N-CA-C	5.57	122.66	110.80
3	A	85	LEU	N-CA-C	-5.54	104.64	111.40
3	A	313	VAL	N-CA-C	5.52	116.25	108.36
3	A	33	ILE	CA-C-N	5.51	127.61	120.44
3	A	33	ILE	C-N-CA	5.51	127.61	120.44
3	A	50	PRO	CB-CA-C	-5.51	102.47	111.56
3	A	236	MET	CA-C-N	-5.48	112.95	120.57
3	A	236	MET	C-N-CA	-5.48	112.95	120.57
3	A	246	ASP	CA-CB-CG	-5.48	107.12	112.60
3	A	146	PHE	N-CA-CB	5.46	119.46	110.39
3	A	91	ASP	N-CA-CB	5.45	119.71	110.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	64	GLY	N-CA-C	-5.44	108.14	115.21
1	T	6	DG	O4'-C1'-C2'	-5.44	98.25	106.40
2	P	6	DT	C6-N1-C1'	-5.43	111.20	119.35
3	A	253	ARG	N-CA-C	5.43	117.28	108.26
3	A	154	GLU	N-CA-CB	5.41	118.44	110.33
3	A	209	LYS	O-C-N	5.40	127.70	122.09
3	A	98	ASN	CA-CB-CG	-5.38	107.22	112.60
3	A	107	GLY	N-CA-C	-5.38	101.36	112.34
1	T	1	DC	P-O3'-C3'	5.37	128.25	120.20
3	A	17	ASP	CA-CB-CG	-5.36	107.24	112.60
3	A	317	LYS	N-CA-C	5.32	116.76	111.07
3	A	152	ARG	N-CA-C	-5.32	105.40	111.14
1	T	7	DA	P-O5'-C5'	-5.30	112.05	120.00
3	A	127	LYS	CA-C-O	5.26	125.73	119.10
3	A	192	ASP	N-CA-C	5.24	117.17	107.73
3	A	100	LEU	CA-C-O	5.24	126.29	120.63
3	A	168	LYS	CB-CA-C	5.24	119.48	110.79
3	A	150	ILE	O-C-N	5.22	126.38	121.11
3	A	192	ASP	CA-C-N	-5.22	114.46	121.66
3	A	192	ASP	C-N-CA	-5.22	114.46	121.66
3	A	196	THR	CB-CA-C	-5.20	100.96	110.62
3	A	157	GLN	CB-CA-C	5.19	118.99	110.95
3	A	181	PHE	N-CA-C	-5.16	105.73	111.36
3	A	194	LEU	N-CA-C	-5.16	101.30	109.96
3	A	101	THR	CA-CB-CG2	5.14	119.25	110.50
3	A	200	PHE	CA-CB-CG	5.14	118.94	113.80
1	T	4	DT	N1-C1'-C2'	5.12	121.17	113.50
3	A	14	GLY	N-CA-C	-5.11	106.60	112.83
3	A	51	HIS	N-CA-CB	-5.08	103.19	111.22
3	A	21	GLU	N-CA-C	-5.08	105.02	111.11
3	A	39	TYR	CA-C-N	-5.06	113.56	120.44
3	A	39	TYR	C-N-CA	-5.06	113.56	120.44
3	A	91	ASP	N-CA-C	5.04	121.54	110.80
3	A	334	SER	CB-CA-C	5.03	119.24	110.68
3	A	30	SER	CA-C-N	-5.02	114.70	122.49
3	A	30	SER	C-N-CA	-5.02	114.70	122.49
3	A	225	THR	CB-CA-C	-5.02	101.11	109.75

All (4) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	A	12	ASN	CA

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Mol	Chain	Res	Type	Atom
3	A	157	GLN	CA
3	A	222	HIS	CA
3	A	227	THR	CA

There are no planarity outliers.

5.2 Too-close contacts

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	T	145	0	80	8	0
2	P	144	0	81	19	0
3	A	2623	0	2641	357	0
4	A	2	0	0	0	0
5	A	112	0	0	18	0
5	P	22	0	0	4	0
5	T	11	0	0	2	0
All	All	3059	0	2802	381	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 67.

All (381) 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:A:326:LYS:NZ	3:A:326:LYS:CE	1.91	1.32
2:P:5:DA:H2''	2:P:6:DT:H5''	1.18	1.18
3:A:245:ASN:HD22	3:A:245:ASN:N	1.52	1.05
3:A:15:ILE:HB	3:A:46:ILE:HD11	1.37	1.04
3:A:157:GLN:HE22	3:A:244:LYS:NZ	1.55	1.02
3:A:326:LYS:NZ	3:A:326:LYS:CD	2.22	1.02
3:A:245:ASN:H	3:A:245:ASN:ND2	1.54	0.99
3:A:165:GLU:HB3	3:A:217:GLN:HG3	1.45	0.97
1:T:6:DG:H2''	1:T:7:DA:C8	2.01	0.94
3:A:270:LEU:HD21	3:A:282:MET:HE1	1.50	0.94
3:A:286:ALA:HB2	3:A:323:ILE:HG21	1.50	0.93

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:31:GLN:HE21	3:A:112:ARG:HH12	1.12	0.92
3:A:41:LYS:HE2	3:A:64:GLY:HA3	1.51	0.91
3:A:286:ALA:HB1	3:A:291:PHE:HB2	1.51	0.91
3:A:11:LEU:HD23	3:A:11:LEU:H	1.37	0.90
3:A:158:MET:HG3	3:A:241:LEU:HD21	1.54	0.89
3:A:22:LEU:HD13	3:A:85:LEU:HD11	1.55	0.88
3:A:150:ILE:HD13	3:A:253:ARG:HG2	1.56	0.88
3:A:326:LYS:NZ	3:A:326:LYS:HD2	1.87	0.88
3:A:157:GLN:HE22	3:A:244:LYS:HZ1	0.87	0.87
3:A:27:LYS:HG3	3:A:28:ASN:ND2	1.90	0.87
3:A:103:VAL:CB	3:A:106:ILE:HD12	2.05	0.87
3:A:103:VAL:HB	3:A:106:ILE:HD12	1.57	0.86
2:P:5:DA:C2'	2:P:6:DT:H5''	2.05	0.86
3:A:157:GLN:NE2	3:A:244:LYS:HZ1	1.72	0.85
3:A:73:ILE:HG22	3:A:77:LEU:HD22	1.59	0.84
3:A:82:LEU:CD2	3:A:85:LEU:HD22	2.07	0.84
3:A:197:HIS:CD2	3:A:198:PRO:HD2	2.13	0.83
3:A:282:MET:HB2	3:A:325:TRP:CZ3	2.14	0.82
3:A:226:ASP:HB2	3:A:238:VAL:HG23	1.61	0.82
3:A:226:ASP:HB2	3:A:238:VAL:CG2	2.10	0.82
3:A:293:ILE:CD1	3:A:298:ILE:HG13	2.09	0.82
3:A:330:PRO:HA	3:A:333:ARG:HG3	1.62	0.82
3:A:60:LYS:HA	3:A:65:VAL:HG12	1.63	0.81
3:A:162:VAL:O	3:A:166:VAL:HG23	1.82	0.80
3:A:278:PHE:CE2	3:A:333:ARG:HD2	2.16	0.80
3:A:158:MET:O	3:A:162:VAL:HG23	1.83	0.79
3:A:15:ILE:HG22	3:A:19:LEU:HD22	1.65	0.79
3:A:154:GLU:O	3:A:158:MET:HE2	1.83	0.79
3:A:197:HIS:CG	3:A:198:PRO:HD2	2.17	0.79
3:A:157:GLN:NE2	3:A:244:LYS:NZ	2.30	0.79
3:A:330:PRO:HA	3:A:333:ARG:CG	2.12	0.79
2:P:1:DT:H2'	2:P:2:DC:C5	2.19	0.78
3:A:31:GLN:NE2	3:A:112:ARG:HH12	1.81	0.78
2:P:1:DT:H2''	2:P:2:DC:H5'	1.66	0.78
3:A:15:ILE:CG2	3:A:19:LEU:HD22	2.15	0.77
3:A:82:LEU:HD23	3:A:85:LEU:HD22	1.66	0.75
3:A:150:ILE:HG23	3:A:253:ARG:NE	2.01	0.75
3:A:323:ILE:O	3:A:324:GLN:HG2	1.85	0.75
3:A:26:GLU:HA	3:A:30:SER:OG	1.87	0.75
3:A:197:HIS:CE1	3:A:199:SER:HB3	2.22	0.74
2:P:5:DA:H2''	2:P:6:DT:C5'	2.09	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:286:ALA:CB	3:A:293:ILE:HD11	2.18	0.74
3:A:327:TYR:HE1	3:A:333:ARG:HH21	1.35	0.73
3:A:123:GLU:O	3:A:127:LYS:HG2	1.88	0.73
3:A:216:GLU:O	3:A:219:GLN:HB2	1.88	0.73
3:A:306:VAL:HG22	5:A:650:HOH:O	1.87	0.73
3:A:243:SER:HB3	3:A:249:GLU:HA	1.71	0.72
3:A:18:MET:CE	3:A:82:LEU:HD13	2.18	0.72
3:A:289:LYS:HD3	3:A:289:LYS:N	2.04	0.72
3:A:15:ILE:CB	3:A:46:ILE:HD11	2.16	0.71
3:A:293:ILE:HD12	3:A:298:ILE:HG13	1.73	0.71
3:A:103:VAL:CG1	3:A:106:ILE:HD12	2.19	0.70
3:A:217:GLN:NE2	3:A:217:GLN:HA	2.07	0.70
3:A:150:ILE:CD1	3:A:253:ARG:HG2	2.21	0.70
3:A:277:ILE:HD11	3:A:335:GLU:HB3	1.73	0.70
3:A:286:ALA:CB	3:A:323:ILE:HG21	2.20	0.69
3:A:217:GLN:O	3:A:221:VAL:HG13	1.93	0.69
3:A:53:ILE:HG21	3:A:59:ALA:HB2	1.75	0.69
3:A:270:LEU:HD21	3:A:282:MET:CE	2.23	0.69
3:A:133:ASN:H	3:A:136:GLN:HE21	1.40	0.68
3:A:163:LEU:HD23	3:A:163:LEU:N	2.08	0.68
3:A:320:PHE:CE2	3:A:328:ARG:HG3	2.28	0.68
3:A:327:TYR:HD1	3:A:328:ARG:N	1.90	0.68
3:A:175:ALA:HB2	3:A:195:LEU:CD1	2.23	0.68
3:A:277:ILE:HD11	3:A:335:GLU:CB	2.23	0.68
3:A:81:LYS:NZ	3:A:86:GLU:HB2	2.08	0.68
3:A:82:LEU:HD22	3:A:85:LEU:HD22	1.74	0.68
2:P:1:DT:H2''	2:P:2:DC:C5'	2.23	0.67
3:A:28:ASN:HD22	3:A:28:ASN:N	1.88	0.67
3:A:237:GLY:O	3:A:254:ARG:NH1	2.28	0.67
3:A:76:PHE:HD1	3:A:77:LEU:HD12	1.59	0.67
3:A:73:ILE:HG22	3:A:77:LEU:CD2	2.24	0.67
3:A:103:VAL:HG11	3:A:106:ILE:HD12	1.76	0.66
3:A:203:GLU:O	3:A:205:THR:N	2.29	0.66
3:A:18:MET:HE2	3:A:82:LEU:HD22	1.76	0.66
3:A:133:ASN:O	3:A:137:ARG:HG3	1.96	0.66
3:A:150:ILE:HG23	3:A:253:ARG:HE	1.61	0.66
3:A:27:LYS:C	3:A:28:ASN:HD22	2.04	0.65
3:A:277:ILE:CG1	3:A:335:GLU:HB2	2.27	0.65
3:A:293:ILE:HD13	3:A:298:ILE:HG13	1.77	0.65
3:A:125:LEU:HD22	3:A:132:LEU:HD21	1.79	0.65
3:A:182:ARG:NH1	3:A:273:THR:OG1	2.30	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:278:PHE:HB2	3:A:333:ARG:O	1.97	0.65
3:A:294:ASN:O	3:A:296:TYR:N	2.28	0.65
3:A:165:GLU:HA	3:A:168:LYS:HG2	1.79	0.65
3:A:173:TYR:OH	3:A:213:GLN:NE2	2.30	0.65
3:A:295:GLU:N	3:A:295:GLU:OE1	2.30	0.65
3:A:328:ARG:O	3:A:333:ARG:NE	2.28	0.65
3:A:133:ASN:ND2	3:A:135:HIS:H	1.94	0.65
2:P:4:DA:H5''	5:A:614:HOH:O	1.96	0.65
3:A:240:GLN:NE2	3:A:250:TYR:O	2.29	0.64
3:A:260:ILE:HG23	3:A:261:PRO:HD2	1.79	0.64
3:A:68:LYS:HB2	3:A:68:LYS:NZ	2.12	0.64
3:A:150:ILE:O	3:A:188:SER:N	2.28	0.64
3:A:286:ALA:O	3:A:291:PHE:N	2.29	0.64
3:A:183:ARG:NH1	3:A:275:SER:HB3	2.13	0.64
3:A:182:ARG:HH11	3:A:182:ARG:CG	2.10	0.64
3:A:73:ILE:O	3:A:77:LEU:HD13	1.98	0.63
3:A:38:ALA:O	3:A:41:LYS:HD3	1.98	0.63
2:P:5:DA:O5'	3:A:107:GLY:HA3	1.99	0.63
3:A:201:THR:HA	3:A:261:PRO:HB3	1.79	0.63
3:A:146:PHE:CE2	3:A:254:ARG:HD3	2.33	0.62
3:A:119:ILE:CG2	3:A:124:ASP:HB3	2.29	0.62
1:T:1:DC:H2''	1:T:2:DA:OP2	2.00	0.62
3:A:180:SER:HB3	3:A:183:ARG:HH21	1.64	0.62
3:A:215:VAL:O	3:A:219:GLN:HG3	1.99	0.62
3:A:26:GLU:HB3	3:A:32:ALA:HB3	1.80	0.62
3:A:28:ASN:ND2	3:A:28:ASN:N	2.46	0.62
3:A:141:LYS:HE2	3:A:142:TYR:CZ	2.34	0.62
3:A:236:MET:HG3	3:A:256:ASP:OD1	2.00	0.62
3:A:190:ASP:N	3:A:190:ASP:OD1	2.29	0.61
3:A:41:LYS:HE2	3:A:64:GLY:CA	2.27	0.61
3:A:260:ILE:CG2	3:A:261:PRO:HD2	2.30	0.61
3:A:19:LEU:HB3	3:A:43:ALA:HB2	1.82	0.61
3:A:178:CYS:SG	3:A:194:LEU:HD22	2.41	0.60
3:A:248:LYS:O	3:A:248:LYS:HG2	2.02	0.60
3:A:208:PRO:HB3	3:A:232:GLU:HB2	1.83	0.60
3:A:83:ARG:O	3:A:87:LYS:N	2.34	0.59
3:A:93:THR:HG22	3:A:94:SER:N	2.17	0.59
3:A:149:ARG:NH2	3:A:188:SER:HA	2.17	0.59
3:A:218:LEU:O	3:A:221:VAL:HG22	2.03	0.59
3:A:218:LEU:HD13	3:A:218:LEU:H	1.66	0.59
3:A:254:ARG:NH1	3:A:255:ILE:H	2.00	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:18:MET:HE3	3:A:76:PHE:HB2	1.85	0.59
3:A:291:PHE:HD2	3:A:323:ILE:HG22	1.67	0.59
3:A:151:PRO:HB2	3:A:153:GLU:HG2	1.85	0.58
3:A:253:ARG:NH1	5:A:503:HOH:O	2.36	0.58
3:A:49:TYR:CD1	3:A:50:PRO:HD2	2.37	0.58
3:A:232:GLU:HG3	3:A:233:THR:HG23	1.84	0.58
3:A:132:LEU:HB2	3:A:137:ARG:HG2	1.86	0.58
1:T:3:DT:H2''	5:T:663:HOH:O	2.02	0.58
3:A:210:LEU:HB2	3:A:259:LEU:HD21	1.86	0.58
3:A:211:LEU:HD12	3:A:211:LEU:O	2.03	0.58
3:A:243:SER:CB	3:A:249:GLU:HA	2.33	0.58
3:A:150:ILE:HG13	3:A:188:SER:O	2.03	0.57
3:A:62:LEU:HD13	3:A:62:LEU:N	2.18	0.57
3:A:42:ALA:O	3:A:46:ILE:HG23	2.03	0.57
1:T:6:DG:O6	2:P:2:DC:N3	2.37	0.57
3:A:210:LEU:CB	3:A:259:LEU:HD21	2.33	0.57
3:A:330:PRO:HA	3:A:333:ARG:HG2	1.85	0.57
3:A:282:MET:HB2	3:A:325:TRP:HZ3	1.64	0.57
3:A:254:ARG:HH11	3:A:254:ARG:HA	1.70	0.57
2:P:5:DA:H1'	5:A:565:HOH:O	2.05	0.56
2:P:6:DT:H2'	2:P:7:DG:C8	2.40	0.56
3:A:182:ARG:NH2	3:A:316:GLU:OE2	2.31	0.56
3:A:218:LEU:CB	3:A:224:ILE:HD12	2.35	0.56
3:A:56:GLY:O	3:A:59:ALA:HB3	2.05	0.56
3:A:76:PHE:HA	3:A:81:LYS:O	2.06	0.56
3:A:150:ILE:HG23	3:A:253:ARG:CZ	2.35	0.56
3:A:332:ASP:C	3:A:334:SER:H	2.12	0.56
3:A:11:LEU:HD23	3:A:11:LEU:N	2.12	0.56
3:A:205:THR:HA	5:A:624:HOH:O	2.06	0.56
3:A:291:PHE:CD2	3:A:323:ILE:HG22	2.40	0.56
2:P:1:DT:H2'	2:P:2:DC:C6	2.40	0.56
3:A:81:LYS:HZ3	3:A:86:GLU:HB2	1.71	0.56
3:A:254:ARG:HH12	3:A:255:ILE:H	1.51	0.56
3:A:293:ILE:HD13	3:A:293:ILE:N	2.21	0.56
3:A:288:GLU:C	3:A:290:GLY:H	2.14	0.55
3:A:300:PRO:HD2	3:A:309:GLU:O	2.06	0.55
3:A:317:LYS:HD2	3:A:317:LYS:O	2.05	0.55
3:A:302:GLY:N	3:A:307:ALA:HB2	2.21	0.55
3:A:119:ILE:HA	3:A:124:ASP:HB3	1.88	0.55
2:P:5:DA:H8	5:P:510:HOH:O	1.89	0.55
3:A:18:MET:HE2	3:A:82:LEU:CD2	2.36	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:15:ILE:HB	3:A:46:ILE:CD1	2.25	0.54
3:A:121:THR:HG23	3:A:124:ASP:CG	2.32	0.54
3:A:271:TYR:HB2	5:A:592:HOH:O	2.05	0.54
1:T:4:DT:O2	2:P:4:DA:H2	1.91	0.54
3:A:149:ARG:O	3:A:253:ARG:NH2	2.40	0.54
3:A:58:GLU:O	3:A:61:LYS:HG3	2.07	0.54
3:A:302:GLY:HA3	3:A:307:ALA:HB2	1.89	0.54
1:T:6:DG:H2''	1:T:7:DA:H8	1.67	0.54
3:A:300:PRO:HD3	3:A:311:LEU:HD22	1.90	0.54
3:A:245:ASN:HD22	3:A:245:ASN:H	0.71	0.53
3:A:183:ARG:HH11	3:A:275:SER:HB3	1.72	0.53
3:A:207:GLN:HB3	3:A:210:LEU:HG	1.91	0.53
3:A:327:TYR:HE1	3:A:333:ARG:NH2	2.06	0.53
3:A:150:ILE:N	3:A:188:SER:O	2.42	0.52
3:A:308:GLY:HA3	5:A:610:HOH:O	2.09	0.52
3:A:295:GLU:HA	5:A:592:HOH:O	2.09	0.52
3:A:33:ILE:O	3:A:36:TYR:HD2	1.92	0.52
3:A:296:TYR:C	3:A:297:THR:HG23	2.35	0.52
3:A:49:TYR:CE2	3:A:51:HIS:HB2	2.45	0.52
3:A:127:LYS:HB2	3:A:128:ASN:ND2	2.24	0.52
3:A:146:PHE:N	3:A:146:PHE:HD1	2.07	0.52
3:A:156:LEU:HD23	3:A:181:PHE:CE1	2.44	0.52
3:A:81:LYS:HZ2	3:A:86:GLU:HB2	1.74	0.51
3:A:18:MET:CE	3:A:76:PHE:HB2	2.40	0.51
3:A:154:GLU:HB3	5:A:521:HOH:O	2.08	0.51
3:A:79:THR:C	3:A:81:LYS:H	2.18	0.51
3:A:181:PHE:HD1	5:A:530:HOH:O	1.94	0.51
3:A:89:ARG:HD3	3:A:89:ARG:C	2.36	0.51
3:A:271:TYR:CE1	3:A:283:ARG:NH2	2.78	0.51
3:A:326:LYS:O	3:A:328:ARG:HG2	2.11	0.51
3:A:218:LEU:HD13	3:A:218:LEU:N	2.26	0.51
3:A:49:TYR:CZ	3:A:51:HIS:HB2	2.46	0.50
3:A:218:LEU:HB2	3:A:224:ILE:HD12	1.93	0.50
3:A:243:SER:O	3:A:244:LYS:O	2.30	0.50
3:A:196:THR:OG1	3:A:197:HIS:N	2.42	0.50
3:A:26:GLU:O	3:A:30:SER:O	2.29	0.50
3:A:130:ASP:HA	3:A:137:ARG:HH21	1.76	0.50
2:P:6:DT:H2''	2:P:7:DG:H5''	1.94	0.50
3:A:199:SER:O	3:A:199:SER:OG	2.29	0.50
3:A:31:GLN:N	5:A:641:HOH:O	2.30	0.50
3:A:142:TYR:CZ	3:A:252:HIS:CD2	3.00	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:145:ASP:HB3	3:A:251:PRO:HB2	1.93	0.50
3:A:303:VAL:O	3:A:305:GLY:N	2.44	0.50
3:A:59:ALA:O	3:A:62:LEU:HD22	2.11	0.50
3:A:186:GLU:O	3:A:187:SER:HB3	2.11	0.50
3:A:323:ILE:C	3:A:324:GLN:HG2	2.37	0.50
3:A:27:LYS:HG3	3:A:28:ASN:HD21	1.71	0.49
3:A:291:PHE:O	3:A:301:LEU:HD22	2.12	0.49
3:A:266:TYR:N	5:A:508:HOH:O	2.44	0.49
3:A:302:GLY:CA	3:A:307:ALA:HB2	2.42	0.49
3:A:133:ASN:HD22	3:A:134:HIS:N	2.11	0.49
3:A:262:LYS:O	3:A:262:LYS:HG3	2.11	0.49
3:A:282:MET:HG3	3:A:323:ILE:CD1	2.42	0.49
3:A:182:ARG:HH11	3:A:182:ARG:HG2	1.77	0.49
3:A:119:ILE:HG23	3:A:124:ASP:HB3	1.94	0.49
3:A:175:ALA:HB2	3:A:195:LEU:HD12	1.93	0.49
3:A:18:MET:HE1	3:A:82:LEU:HD13	1.94	0.49
3:A:119:ILE:HG22	3:A:124:ASP:CB	2.43	0.49
3:A:12:ASN:HA	5:A:553:HOH:O	2.13	0.48
3:A:207:GLN:HB2	5:A:625:HOH:O	2.13	0.48
3:A:22:LEU:CD1	3:A:85:LEU:HD11	2.35	0.48
3:A:135:HIS:HB2	5:A:596:HOH:O	2.14	0.48
3:A:29:VAL:HA	3:A:97:ILE:HD12	1.96	0.48
3:A:121:THR:O	3:A:124:ASP:HB2	2.14	0.48
3:A:174:ILE:HB	3:A:196:THR:CG2	2.44	0.48
2:P:4:DA:H2"	5:P:510:HOH:O	2.13	0.47
3:A:97:ILE:O	3:A:101:THR:HB	2.14	0.47
3:A:165:GLU:CB	3:A:217:GLN:HG3	2.30	0.47
3:A:180:SER:HA	3:A:183:ARG:HE	1.79	0.47
3:A:183:ARG:NH1	3:A:275:SER:CB	2.77	0.47
3:A:214:VAL:O	3:A:218:LEU:HD22	2.14	0.47
3:A:182:ARG:HH11	3:A:182:ARG:HG3	1.78	0.47
3:A:227:THR:HG22	3:A:229:SER:N	2.29	0.47
3:A:91:ASP:O	3:A:95:SER:HB2	2.14	0.47
3:A:302:GLY:N	3:A:307:ALA:CB	2.78	0.47
3:A:277:ILE:HG13	3:A:335:GLU:HB2	1.94	0.47
3:A:210:LEU:HB2	3:A:259:LEU:CD2	2.45	0.47
3:A:211:LEU:HD12	3:A:211:LEU:C	2.38	0.47
3:A:277:ILE:HD11	3:A:335:GLU:HB2	1.95	0.47
3:A:127:LYS:HB3	3:A:127:LYS:HE3	1.83	0.46
3:A:218:LEU:N	3:A:218:LEU:CD1	2.78	0.46
3:A:303:VAL:C	3:A:305:GLY:H	2.22	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:309:GLU:O	3:A:311:LEU:HD13	2.15	0.46
3:A:36:TYR:CD2	3:A:37:ASN:N	2.83	0.46
3:A:79:THR:O	3:A:81:LYS:N	2.49	0.46
3:A:259:LEU:HD12	3:A:259:LEU:HA	1.57	0.46
3:A:156:LEU:CD2	3:A:181:PHE:HE1	2.28	0.46
3:A:75:GLU:OE2	3:A:82:LEU:HA	2.16	0.46
3:A:103:VAL:HB	3:A:106:ILE:CD1	2.38	0.46
3:A:150:ILE:CG2	3:A:253:ARG:HE	2.29	0.46
3:A:81:LYS:HB3	3:A:82:LEU:H	1.32	0.46
3:A:155:MET:HA	3:A:158:MET:CE	2.45	0.46
3:A:309:GLU:N	3:A:309:GLU:OE1	2.48	0.46
3:A:287:LEU:HD13	3:A:287:LEU:HA	1.49	0.46
3:A:16:THR:O	3:A:20:THR:HG23	2.16	0.45
3:A:146:PHE:N	3:A:146:PHE:CD1	2.83	0.45
3:A:259:LEU:O	3:A:260:ILE:HG12	2.16	0.45
3:A:77:LEU:N	3:A:77:LEU:CD1	2.79	0.45
3:A:286:ALA:HB1	3:A:293:ILE:HD11	1.94	0.45
3:A:311:LEU:HD13	3:A:311:LEU:N	2.31	0.45
3:A:158:MET:CG	3:A:241:LEU:HD21	2.36	0.45
3:A:172:GLU:HG2	3:A:198:PRO:HG2	1.98	0.45
3:A:300:PRO:O	3:A:307:ALA:HB3	2.16	0.45
3:A:27:LYS:HD2	3:A:27:LYS:O	2.16	0.45
3:A:16:THR:H	3:A:16:THR:HG23	1.29	0.45
3:A:282:MET:SD	3:A:323:ILE:HD11	2.57	0.45
2:P:6:DT:H5'	5:P:567:HOH:O	2.17	0.45
3:A:56:GLY:O	3:A:59:ALA:N	2.50	0.45
3:A:129:GLU:HG2	3:A:137:ARG:HD3	1.99	0.45
3:A:270:LEU:HD12	5:A:584:HOH:O	2.16	0.45
3:A:285:HIS:HD2	3:A:323:ILE:HD12	1.82	0.45
3:A:327:TYR:CE1	3:A:333:ARG:NH2	2.83	0.45
3:A:22:LEU:HD13	3:A:85:LEU:CD1	2.37	0.45
3:A:303:VAL:C	3:A:305:GLY:N	2.75	0.45
3:A:311:LEU:HB3	3:A:322:TYR:CE2	2.52	0.45
3:A:93:THR:O	3:A:96:SER:HB2	2.17	0.45
3:A:146:PHE:CE2	3:A:254:ARG:CD	2.98	0.45
3:A:301:LEU:HD12	3:A:301:LEU:HA	1.66	0.45
3:A:179:GLY:O	3:A:182:ARG:HB3	2.16	0.44
3:A:91:ASP:OD1	3:A:92:ASP:N	2.50	0.44
3:A:170:ASP:HB3	3:A:173:TYR:CD2	2.52	0.44
3:A:174:ILE:O	3:A:195:LEU:HD12	2.17	0.44
3:A:201:THR:O	3:A:203:GLU:N	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:22:LEU:HA	3:A:22:LEU:HD12	1.06	0.44
3:A:154:GLU:OE2	3:A:250:TYR:HE2	1.99	0.44
3:A:204:SER:O	3:A:206:LYS:N	2.51	0.44
2:P:4:DA:H1'	5:P:595:HOH:O	2.16	0.44
3:A:133:ASN:ND2	3:A:135:HIS:N	2.65	0.44
3:A:230:LYS:HG2	3:A:231:GLY:N	2.31	0.44
3:A:330:PRO:CA	3:A:333:ARG:HG2	2.45	0.44
3:A:159:GLN:O	3:A:163:LEU:HG	2.16	0.44
3:A:25:PHE:CG	3:A:88:ILE:HD13	2.52	0.44
3:A:75:GLU:O	3:A:75:GLU:HG2	2.18	0.44
3:A:83:ARG:O	3:A:86:GLU:N	2.51	0.44
3:A:54:LYS:HD2	3:A:54:LYS:HA	1.81	0.44
3:A:133:ASN:HD22	3:A:135:HIS:H	1.65	0.44
3:A:215:VAL:O	3:A:215:VAL:HG12	2.17	0.44
3:A:241:LEU:HD12	3:A:250:TYR:CD2	2.53	0.44
3:A:11:LEU:H	3:A:11:LEU:CD2	2.19	0.43
3:A:217:GLN:HA	3:A:217:GLN:HE21	1.82	0.43
3:A:277:ILE:CD1	3:A:335:GLU:HB2	2.48	0.43
3:A:311:LEU:HD12	3:A:311:LEU:HA	1.61	0.43
3:A:18:MET:HE2	3:A:82:LEU:HD13	1.97	0.43
3:A:119:ILE:HG22	3:A:124:ASP:HB3	1.98	0.43
3:A:273:THR:O	3:A:273:THR:HG22	2.17	0.43
3:A:149:ARG:HH22	3:A:188:SER:HA	1.79	0.43
3:A:221:VAL:HG13	3:A:221:VAL:H	1.11	0.43
3:A:227:THR:CG2	3:A:228:LEU:N	2.81	0.43
3:A:282:MET:HG3	3:A:323:ILE:HD11	2.00	0.43
1:T:1:DC:H1'	1:T:2:DA:C8	2.53	0.43
3:A:127:LYS:HG2	3:A:127:LYS:H	1.49	0.43
3:A:332:ASP:C	3:A:334:SER:N	2.76	0.43
3:A:142:TYR:HE2	3:A:226:ASP:OD2	2.02	0.43
3:A:327:TYR:C	3:A:327:TYR:CD1	2.97	0.43
1:T:5:DA:H4'	5:T:513:HOH:O	2.19	0.43
2:P:1:DT:C2'	2:P:2:DC:C6	3.01	0.43
3:A:79:THR:C	3:A:81:LYS:N	2.77	0.43
3:A:140:LEU:HA	3:A:140:LEU:HD12	1.47	0.43
3:A:150:ILE:HD13	3:A:150:ILE:HG21	1.66	0.43
3:A:150:ILE:HG23	3:A:253:ARG:NH2	2.34	0.43
3:A:196:THR:O	3:A:196:THR:HG23	2.17	0.43
3:A:244:LYS:H	3:A:244:LYS:HG2	1.67	0.43
3:A:18:MET:CE	3:A:82:LEU:HD22	2.48	0.42
3:A:221:VAL:CG2	3:A:222:HIS:N	2.81	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:287:LEU:HB3	3:A:288:GLU:OE2	2.19	0.42
3:A:291:PHE:C	3:A:301:LEU:HD22	2.44	0.42
3:A:158:MET:HB2	3:A:158:MET:HE3	1.49	0.42
3:A:327:TYR:HD1	3:A:327:TYR:C	2.27	0.42
3:A:309:GLU:HA	3:A:310:PRO:HD2	1.53	0.42
3:A:223:PHE:CZ	3:A:239:CYS:SG	3.09	0.42
3:A:138:ILE:HD13	3:A:226:ASP:HB3	2.01	0.42
3:A:156:LEU:HD23	3:A:156:LEU:HA	1.75	0.42
3:A:172:GLU:HB3	3:A:197:HIS:NE2	2.35	0.42
3:A:133:ASN:ND2	3:A:133:ASN:C	2.78	0.42
3:A:92:ASP:HB3	5:A:647:HOH:O	2.20	0.42
3:A:142:TYR:HB3	3:A:146:PHE:CE1	2.55	0.42
3:A:235:PHE:CD1	3:A:257:ILE:HG13	2.54	0.42
3:A:297:THR:HA	5:A:578:HOH:O	2.20	0.42
3:A:82:LEU:HD23	3:A:85:LEU:HD13	2.02	0.41
3:A:201:THR:HG1	3:A:263:ASP:CG	2.23	0.41
3:A:244:LYS:HB3	3:A:245:ASN:ND2	2.35	0.41
3:A:271:TYR:CD2	3:A:271:TYR:C	2.98	0.41
3:A:11:LEU:HD12	3:A:51:HIS:C	2.45	0.41
3:A:41:LYS:HD3	3:A:42:ALA:H	1.85	0.41
3:A:156:LEU:CD2	3:A:181:PHE:CE1	3.01	0.41
3:A:41:LYS:HD3	3:A:42:ALA:N	2.36	0.41
3:A:87:LYS:O	3:A:90:GLN:HB2	2.19	0.41
3:A:126:ARG:C	3:A:128:ASN:N	2.78	0.41
3:A:270:LEU:HD13	3:A:316:GLU:OE1	2.19	0.41
3:A:143:PHE:CD1	3:A:143:PHE:C	2.98	0.41
3:A:201:THR:HA	3:A:261:PRO:CB	2.47	0.41
3:A:245:ASN:N	3:A:245:ASN:ND2	2.27	0.41
3:A:259:LEU:C	3:A:260:ILE:HG12	2.45	0.41
3:A:112:ARG:H	3:A:112:ARG:HG3	1.68	0.41
3:A:32:ALA:O	3:A:36:TYR:HB3	2.21	0.41
3:A:89:ARG:HD3	3:A:89:ARG:O	2.20	0.41
3:A:132:LEU:HB3	3:A:136:GLN:HB2	2.02	0.41
3:A:151:PRO:CG	3:A:154:GLU:HG3	2.51	0.40
3:A:152:ARG:O	3:A:155:MET:N	2.55	0.40
3:A:298:ILE:O	3:A:298:ILE:HG23	2.20	0.40
3:A:130:ASP:HA	3:A:137:ARG:NH2	2.35	0.40
3:A:302:GLY:H	3:A:307:ALA:CB	2.33	0.40
3:A:317:LYS:HE3	3:A:321:ASP:OD1	2.21	0.40
3:A:133:ASN:C	3:A:137:ARG:HG3	2.47	0.40
3:A:85:LEU:HD12	3:A:85:LEU:HA	1.65	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:207:GLN:OE1	3:A:210:LEU:HD21	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
3	A	325/335 (97%)	257 (79%)	50 (15%)	18 (6%)	1 9

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	32	ALA
3	A	202	SER
3	A	204	SER
3	A	205	THR
3	A	207	GLN
3	A	222	HIS
3	A	244	LYS
3	A	295	GLU
3	A	186	GLU
3	A	304	THR
3	A	185	ALA
3	A	289	LYS
3	A	309	GLU
3	A	80	GLY
3	A	262	LYS
3	A	143	PHE
3	A	310	PRO
3	A	15	ILE

5.3.2 Protein sidechains ⓘ

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
3	A	288/295 (98%)	207 (72%)	81 (28%)	0 1

All (81) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	A	10	THR
3	A	18	MET
3	A	19	LEU
3	A	21	GLU
3	A	22	LEU
3	A	27	LYS
3	A	30	SER
3	A	33	ILE
3	A	37	ASN
3	A	41	LYS
3	A	45	VAL
3	A	46	ILE
3	A	54	LYS
3	A	62	LEU
3	A	67	THR
3	A	68	LYS
3	A	76	PHE
3	A	79	THR
3	A	85	LEU
3	A	86	GLU
3	A	89	ARG
3	A	92	ASP
3	A	93	THR
3	A	95	SER
3	A	100	LEU
3	A	101	THR
3	A	119	ILE
3	A	121	THR
3	A	122	LEU
3	A	127	LYS

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Mol	Chain	Res	Type
3	A	133	ASN
3	A	136	GLN
3	A	140	LEU
3	A	145	ASP
3	A	150	ILE
3	A	152	ARG
3	A	153	GLU
3	A	159	GLN
3	A	161	ILE
3	A	163	LEU
3	A	167	LYS
3	A	168	LYS
3	A	169	VAL
3	A	180	SER
3	A	182	ARG
3	A	188	SER
3	A	199	SER
3	A	201	THR
3	A	203	GLU
3	A	213	GLN
3	A	214	VAL
3	A	217	GLN
3	A	218	LEU
3	A	221	VAL
3	A	227	THR
3	A	228	LEU
3	A	230	LYS
3	A	235	PHE
3	A	236	MET
3	A	238	VAL
3	A	245	ASN
3	A	248	LYS
3	A	257	ILE
3	A	259	LEU
3	A	277	ILE
3	A	287	LEU
3	A	293	ILE
3	A	294	ASN
3	A	295	GLU
3	A	296	TYR
3	A	298	ILE
3	A	301	LEU

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Mol	Chain	Res	Type
3	A	304	THR
3	A	306	VAL
3	A	309	GLU
3	A	311	LEU
3	A	314	ASP
3	A	324	GLN
3	A	325	TRP
3	A	331	LYS
3	A	335	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
3	A	12	ASN
3	A	28	ASN
3	A	31	GLN
3	A	98	ASN
3	A	128	ASN
3	A	133	ASN
3	A	136	GLN
3	A	157	GLN
3	A	213	GLN
3	A	240	GLN
3	A	245	ASN
3	A	252	HIS
3	A	264	GLN
3	A	294	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

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	T	8/8 (100%)	0.80	1 (12%) 8 5	11, 30, 94, 99	0
2	P	7/7 (100%)	0.39	0 100 100	6, 16, 37, 79	0
3	A	325/335 (97%)	0.20	8 (2%) 58 37	2, 35, 89, 100	0
All	All	340/350 (97%)	0.22	9 (2%) 57 36	2, 35, 90, 100	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	A	290	GLY	3.4
3	A	286	ALA	3.2
3	A	274	GLY	2.6
3	A	305	GLY	2.6
3	A	16	THR	2.5
1	T	1	DC	2.4
3	A	23	ALA	2.3
3	A	279	ASN	2.2
3	A	304	THR	2.2

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 oligosaccharides 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($\text{\AA}^2$)	Q<0.9
4	NA	A	341	1/1	0.98	0.07	1,1,1,1	0
4	NA	A	342	1/1	0.98	0.12	3,3,3,3	0

6.5 Other polymers [i](#)

There are no such residues in this entry.