



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 07:00 PM UTC

PDB ID : 1AVQ / pdb_00001avq
Title : TOROIDAL STRUCTURE OF LAMBDA EXONUCLEASE DETERMINED
AT 2.4 ANGSTROMS
Authors : Kovall, R.A.; Matthews, B.W.
Deposited on : 1997-09-18
Resolution : 2.40 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
Mogul : 2022.3.0, CSD as543be (2022)
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

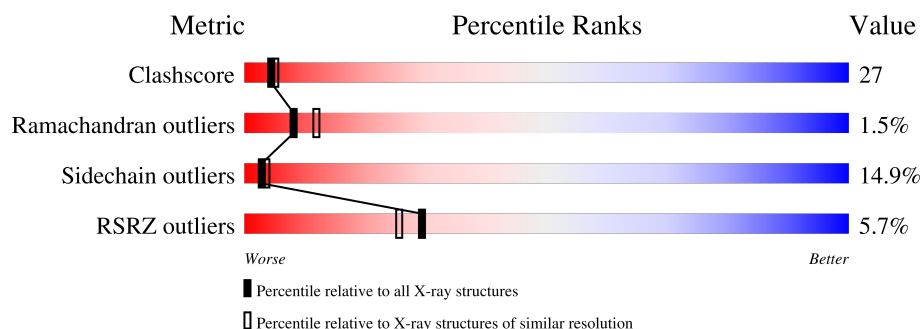
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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

Mol	Chain	Length	Quality of chain
1	A	228	
1	B	228	
1	C	228	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5933 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 LAMBDA EXONUCLEASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	228	Total	C	N	O	S	0	0	0
			1837	1169	313	341	14			
1	B	228	Total	C	N	O	S	0	0	0
			1837	1169	313	341	14			
1	C	225	Total	C	N	O	S	0	0	0
			1812	1155	308	336	13			

- Molecule 2 is PHOSPHATE ION (CCD ID: PO4) (formula: O₄P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	P	0	0
			5	4	1		
2	B	1	Total	O	P	0	0
			5	4	1		
2	C	1	Total	O	P	0	0
			5	4	1		

- Molecule 3 is ACETATE ION (CCD ID: ACT) (formula: $\text{C}_2\text{H}_3\text{O}_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		
3	B	1	Total	C	O	0	0
			4	2	2		
3	C	1	Total	C	O	0	0
			4	2	2		
3	C	1	Total	C	O	0	0
			4	2	2		

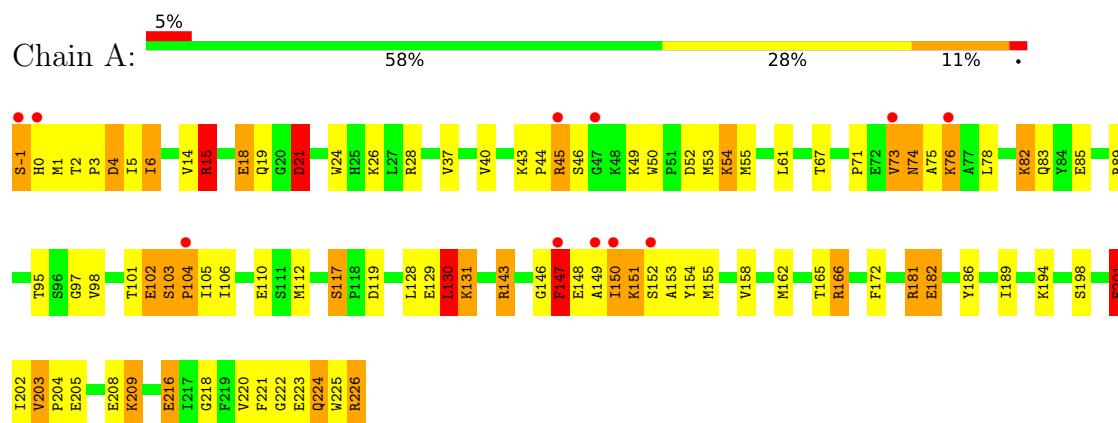
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	169	Total	O	0	0
			169	169		
4	B	131	Total	O	0	0
			131	131		
4	C	116	Total	O	0	0
			116	116		

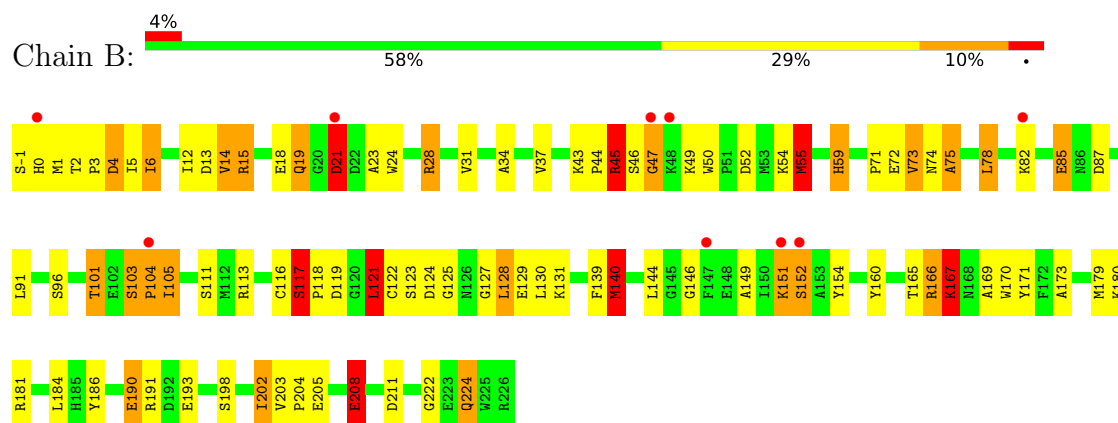
3 Residue-property plots [i](#)

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.

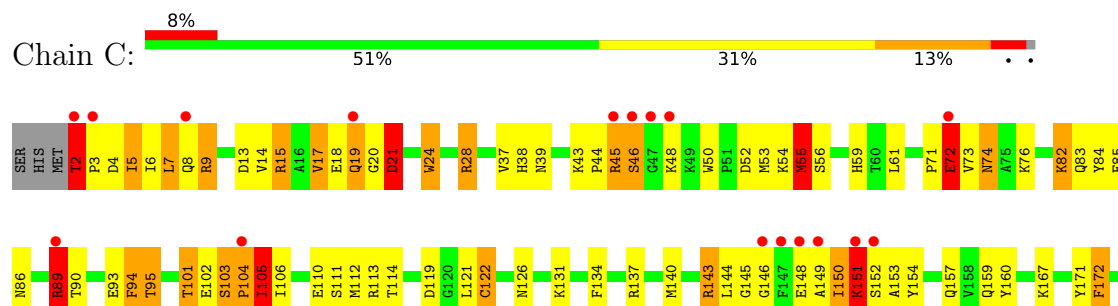
• Molecule 1: LAMBDA EXONUCLEASE

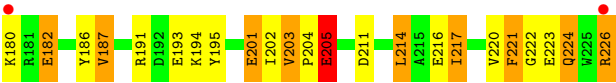


• Molecule 1: LAMBDA EXONUCLEASE



• Molecule 1: LAMBDA EXONUCLEASE





4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	156.70Å 156.70Å 131.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.40 30.00 – 2.40	Depositor EDS
% Data completeness (in resolution range)	97.0 (30.00-2.40) 98.1 (30.00-2.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.31 (at 2.42Å)	Xtriage
Refinement program	TNT 5E, XTALVIEW	Depositor
R, R_{free}	0.198 , (Not available) 0.193 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	28.7	Xtriage
Anisotropy	0.663	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 109.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5933	wwPDB-VP
Average B, all atoms (Å ²)	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.53% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PO4, ACT

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	1.48	7/1883 (0.4%)	1.88	44/2542 (1.7%)
1	B	1.42	3/1883 (0.2%)	1.85	37/2542 (1.5%)
1	C	1.50	9/1857 (0.5%)	1.90	43/2509 (1.7%)
All	All	1.47	19/5623 (0.3%)	1.88	124/7593 (1.6%)

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	189	ILE	CA-CB	-7.96	1.45	1.54
1	C	56	SER	N-CA	-6.21	1.38	1.46
1	C	72	GLU	CD-OE1	6.18	1.37	1.25
1	C	90	THR	C-N	-5.77	1.26	1.33
1	C	55	MET	C-N	-5.64	1.26	1.33
1	B	208	GLU	CD-OE2	5.47	1.35	1.25
1	C	52	ASP	CG-OD1	5.47	1.35	1.25
1	C	59	HIS	ND1-CE1	5.45	1.38	1.32
1	C	28	ARG	NE-CZ	5.37	1.39	1.33
1	A	201	GLU	CD-OE2	5.22	1.35	1.25
1	A	129	GLU	CD-OE1	5.16	1.35	1.25
1	C	89	ARG	NE-CZ	5.12	1.38	1.33
1	A	203	VAL	CA-CB	-5.11	1.51	1.54
1	A	54	LYS	N-CA	-5.11	1.40	1.46
1	A	216	GLU	CD-OE1	5.11	1.35	1.25
1	C	226	ARG	NE-CZ	5.07	1.38	1.33
1	A	182	GLU	CD-OE1	5.03	1.34	1.25
1	B	184	LEU	C-O	-5.02	1.18	1.23
1	B	6	ILE	C-N	-5.01	1.27	1.33

All (124) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	21	ASP	CB-CA-C	-8.99	92.53	110.42
1	C	216	GLU	CA-C-N	-8.82	109.75	122.28
1	C	216	GLU	C-N-CA	-8.82	109.75	122.28
1	B	0	HIS	CA-CB-CG	-8.79	105.01	113.80
1	A	203	VAL	CA-C-O	8.64	124.48	118.69
1	A	130	LEU	CB-CA-C	-8.63	96.84	110.74
1	A	147	PHE	N-CA-CB	-8.32	96.42	110.49
1	A	182	GLU	CB-CA-C	-8.29	99.96	111.73
1	A	97	GLY	CA-C-N	-8.18	113.24	122.48
1	A	97	GLY	C-N-CA	-8.18	113.24	122.48
1	B	103	SER	C-N-CD	-7.99	92.23	125.00
1	B	73	VAL	N-CA-C	7.91	121.62	108.81
1	C	151	LYS	N-CA-C	7.56	121.67	110.48
1	B	52	ASP	CA-CB-CG	7.26	119.86	112.60
1	B	121	LEU	N-CA-CB	7.25	121.94	110.57
1	C	95	THR	N-CA-C	7.21	118.93	111.14
1	A	83	GLN	N-CA-C	7.20	119.13	111.28
1	C	83	GLN	N-CA-C	7.09	119.01	111.28
1	B	128	LEU	N-CA-C	6.89	119.64	108.34
1	A	189	ILE	CA-CB-CG1	-6.76	98.91	110.40
1	A	21	ASP	CA-CB-CG	6.73	119.33	112.60
1	A	153	ALA	O-C-N	6.69	129.21	122.12
1	A	103	SER	C-N-CD	-6.68	97.59	125.00
1	B	193	GLU	N-CA-C	6.63	119.52	111.82
1	A	131	LYS	CB-CA-C	-6.63	98.30	109.50
1	A	71	PRO	CB-CA-C	-6.60	102.30	110.95
1	A	52	ASP	CA-CB-CG	6.53	119.13	112.60
1	C	150	ILE	CA-CB-CG2	6.52	121.59	110.50
1	C	211	ASP	CA-C-N	-6.43	112.08	120.44
1	C	211	ASP	C-N-CA	-6.43	112.08	120.44
1	C	94	PHE	CA-CB-CG	-6.39	107.41	113.80
1	A	103	SER	N-CA-CB	6.34	119.70	111.40
1	A	166	ARG	NE-CZ-NH2	-6.29	113.54	119.20
1	C	17	VAL	N-CA-C	6.26	118.19	109.55
1	B	211	ASP	CA-CB-CG	6.23	118.83	112.60
1	C	203	VAL	CA-C-O	6.16	123.39	118.71
1	B	208	GLU	CB-CG-CD	6.15	123.06	112.60
1	A	67	THR	N-CA-C	-6.12	106.36	113.88
1	C	7	LEU	CA-C-O	6.09	126.97	120.70
1	A	82	LYS	CB-CA-C	6.06	121.15	110.85
1	C	122	CYS	N-CA-C	6.05	120.12	109.96
1	C	5	ILE	CB-CA-C	-6.04	104.23	111.97
1	A	4	ASP	CA-CB-CG	-6.03	106.57	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	6	ILE	CA-C-O	6.00	127.19	120.95
1	C	59	HIS	CA-CB-CG	-6.00	107.80	113.80
1	C	102	GLU	N-CA-C	5.99	119.15	110.28
1	C	82	LYS	N-CA-C	-5.95	104.80	111.28
1	A	89	ARG	NE-CZ-NH2	-5.94	113.86	119.20
1	C	187	VAL	CA-C-N	-5.92	115.85	123.19
1	C	187	VAL	C-N-CA	-5.92	115.85	123.19
1	A	202	ILE	N-CA-C	5.90	116.68	110.72
1	B	75	ALA	N-CA-C	5.88	117.69	111.28
1	C	202	ILE	N-CA-C	5.83	116.48	110.82
1	B	47	GLY	N-CA-C	-5.83	105.34	112.68
1	A	103	SER	O-C-N	5.72	125.85	121.27
1	A	186	TYR	N-CA-C	5.72	117.48	108.96
1	A	162	MET	N-CA-CB	5.68	118.57	110.16
1	C	55	MET	CA-C-O	5.63	126.46	120.10
1	A	102	GLU	CG-CD-OE2	-5.62	105.47	118.40
1	B	167	LYS	N-CA-C	5.61	118.73	110.59
1	B	55	MET	CA-C-O	5.61	126.49	120.55
1	C	95	THR	CB-CA-C	-5.60	102.05	110.90
1	A	98	VAL	N-CA-CB	5.60	118.72	112.34
1	B	4	ASP	CA-CB-CG	-5.59	107.01	112.60
1	A	15	ARG	N-CA-CB	5.58	119.81	110.32
1	A	221	PHE	CA-C-N	-5.58	116.83	123.08
1	A	221	PHE	C-N-CA	-5.58	116.83	123.08
1	C	106	ILE	N-CA-CB	-5.57	103.39	111.52
1	C	171	TYR	CB-CA-C	-5.57	100.34	109.53
1	B	6	ILE	CA-C-O	5.56	126.74	120.95
1	B	59	HIS	CA-CB-CG	-5.47	108.33	113.80
1	C	214	LEU	CA-C-O	5.47	126.35	120.55
1	B	117	SER	CA-C-N	5.46	125.46	119.89
1	B	117	SER	C-N-CA	5.46	125.46	119.89
1	A	15	ARG	CA-C-N	-5.45	113.55	122.54
1	A	15	ARG	C-N-CA	-5.45	113.55	122.54
1	C	2	THR	CA-C-N	5.43	124.61	118.97
1	C	2	THR	C-N-CA	5.43	124.61	118.97
1	B	73	VAL	O-C-N	-5.42	116.82	123.00
1	C	172	PHE	CA-CB-CG	-5.41	108.39	113.80
1	A	181	ARG	CA-C-O	-5.41	115.67	121.45
1	B	202	ILE	N-CA-C	5.39	115.60	110.53
1	B	23	ALA	O-C-N	5.38	128.29	122.15
1	C	134	PHE	CA-CB-CG	-5.37	108.43	113.80
1	B	14	VAL	CA-C-N	-5.35	113.11	120.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	14	VAL	C-N-CA	-5.35	113.11	120.28
1	B	140	MET	N-CA-CB	5.32	117.94	110.12
1	B	139	PHE	CA-CB-CG	-5.29	108.51	113.80
1	B	31	VAL	N-CA-C	5.28	116.90	108.87
1	B	118	PRO	CB-CA-C	-5.26	104.66	111.39
1	C	84	TYR	N-CA-C	5.25	120.55	113.72
1	C	95	THR	CA-CB-CG2	-5.25	101.57	110.50
1	A	37	VAL	CA-C-O	5.25	126.39	120.03
1	C	6	ILE	CA-C-O	5.24	126.40	120.95
1	A	-1	SER	CA-C-N	5.24	128.29	120.95
1	A	-1	SER	C-N-CA	5.24	128.29	120.95
1	C	4	ASP	N-CA-CB	5.22	117.72	109.94
1	B	12	ILE	N-CA-C	5.18	116.42	108.71
1	C	143	ARG	CB-CA-C	-5.17	101.89	110.68
1	B	6	ILE	CA-C-N	-5.16	112.97	120.29
1	B	6	ILE	C-N-CA	-5.16	112.97	120.29
1	C	119	ASP	CA-CB-CG	-5.15	107.45	112.60
1	C	19	GLN	N-CA-C	-5.14	102.59	110.30
1	B	28	ARG	NE-CZ-NH1	5.13	126.63	121.50
1	B	21	ASP	N-CA-CB	-5.11	102.95	110.26
1	C	217	ILE	CA-C-N	-5.10	113.75	121.51
1	C	217	ILE	C-N-CA	-5.10	113.75	121.51
1	B	37	VAL	N-CA-C	5.10	118.21	111.17
1	C	205	GLU	N-CA-CB	5.10	117.71	110.16
1	A	55	MET	CA-C-O	5.10	125.95	120.55
1	B	21	ASP	CB-CA-C	-5.09	99.11	109.65
1	C	103	SER	CA-C-N	5.07	126.17	119.84
1	C	103	SER	C-N-CA	5.07	126.17	119.84
1	A	85	GLU	CA-CB-CG	-5.05	103.99	114.10
1	A	143	ARG	NE-CZ-NH2	-5.05	114.65	119.20
1	C	221	PHE	CA-CB-CG	-5.05	108.75	113.80
1	A	40	VAL	CA-C-N	-5.05	112.89	121.97
1	A	40	VAL	C-N-CA	-5.05	112.89	121.97
1	A	218	GLY	CA-C-N	-5.04	114.35	122.81
1	A	218	GLY	C-N-CA	-5.04	114.35	122.81
1	B	208	GLU	N-CA-CB	5.04	117.31	110.01
1	B	85	GLU	CA-C-N	-5.02	114.03	120.65
1	B	85	GLU	C-N-CA	-5.02	114.03	120.65
1	C	24	TRP	CA-C-O	5.00	126.52	120.92

There are no chirality outliers.

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	A	1837	0	1784	84	0
1	B	1837	0	1784	104	0
1	C	1812	0	1760	100	0
2	A	5	0	0	0	0
2	B	5	0	0	1	0
2	C	5	0	0	0	0
3	A	4	0	3	0	0
3	B	4	0	3	0	0
3	C	8	0	6	1	0
4	A	169	0	0	5	0
4	B	131	0	0	4	0
4	C	116	0	0	4	0
All	All	5933	0	5340	288	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 27.

All (288) 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:45:ARG:NH1	1:A:45:ARG:H	1.45	1.14
1:A:45:ARG:HH11	1:A:45:ARG:N	1.47	1.12
1:C:45:ARG:HH11	1:C:45:ARG:HB3	1.18	1.08
1:B:75:ALA:HA	1:B:78:LEU:HD12	1.35	1.06
1:B:224:GLN:HE21	1:B:224:GLN:N	1.61	0.98
1:A:222:GLY:H	1:A:224:GLN:HE22	1.14	0.95
1:B:224:GLN:H	1:B:224:GLN:NE2	1.65	0.94
1:B:21:ASP:HB2	1:B:24:TRP:HB2	1.51	0.93
1:C:151:LYS:HG2	1:C:153:ALA:H	1.34	0.93
1:A:224:GLN:H	1:A:224:GLN:HE21	1.05	0.91
1:C:224:GLN:H	1:C:224:GLN:HE21	1.20	0.88
1:C:151:LYS:HE3	1:C:154:TYR:CD2	2.10	0.87
1:C:15:ARG:HG2	1:C:15:ARG:HH11	1.40	0.85
1:C:222:GLY:H	1:C:224:GLN:HE22	1.25	0.84
1:C:103:SER:OG	1:C:104:PRO:HD2	1.77	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1:MET:HE2	1:B:6:ILE:CD1	2.09	0.83
1:B:45:ARG:HD2	1:B:45:ARG:N	1.95	0.81
1:B:1:MET:CE	1:B:5:ILE:HB	2.10	0.81
1:C:15:ARG:HG2	1:C:15:ARG:NH1	1.94	0.80
1:A:1:MET:HE2	1:A:6:ILE:HG13	1.64	0.79
1:B:73:VAL:O	1:B:78:LEU:HD11	1.83	0.78
1:C:45:ARG:HH11	1:C:45:ARG:CB	1.93	0.78
1:A:224:GLN:H	1:A:224:GLN:NE2	1.81	0.78
1:A:15:ARG:HG2	1:A:15:ARG:HH11	1.49	0.78
1:C:103:SER:HB2	1:C:121:LEU:CD1	2.15	0.77
1:C:45:ARG:N	1:C:45:ARG:HD2	2.00	0.77
1:C:55:MET:HE3	1:C:55:MET:HA	1.67	0.76
1:A:154:TYR:O	1:A:158:VAL:HG23	1.86	0.76
1:B:1:MET:HE2	1:B:6:ILE:HG13	1.67	0.76
1:A:1:MET:CE	1:A:6:ILE:HG13	2.16	0.76
1:C:2:THR:N	1:C:3:PRO:HD3	2.01	0.76
1:B:15:ARG:HH11	1:B:15:ARG:HG2	1.50	0.76
1:A:103:SER:OG	1:A:104:PRO:HD2	1.87	0.74
1:A:75:ALA:O	1:A:78:LEU:HB2	1.87	0.74
1:A:45:ARG:HD2	1:A:46:SER:H	1.52	0.74
1:B:91:LEU:HD12	1:B:91:LEU:O	1.88	0.73
1:B:28:ARG:NH1	1:B:117:SER:HB2	2.04	0.73
1:B:1:MET:HE2	1:B:6:ILE:CG1	2.19	0.73
1:C:50:TRP:CE2	1:C:54:LYS:HE2	2.24	0.73
1:A:147:PHE:O	1:A:150:ILE:HG13	1.90	0.72
1:B:45:ARG:HH11	1:B:45:ARG:H	1.37	0.72
1:B:203:VAL:HB	1:B:204:PRO:HD3	1.69	0.72
1:A:155:MET:HA	1:A:155:MET:HE2	1.71	0.72
1:C:50:TRP:CD2	1:C:54:LYS:HE2	2.25	0.72
1:B:1:MET:HE3	1:B:5:ILE:HB	1.71	0.71
1:B:224:GLN:HE21	1:B:224:GLN:H	0.80	0.71
1:B:103:SER:HB2	1:B:121:LEU:HD12	1.73	0.70
1:B:204:PRO:O	1:B:208:GLU:HG2	1.91	0.70
1:A:45:ARG:N	1:A:45:ARG:HD2	2.06	0.70
1:B:222:GLY:H	1:B:224:GLN:HE22	1.39	0.70
1:C:73:VAL:HG12	1:C:74:ASN:CG	2.16	0.69
1:C:151:LYS:HD3	1:C:153:ALA:HB3	1.75	0.69
1:C:45:ARG:HB3	1:C:45:ARG:NH1	2.01	0.68
1:C:222:GLY:H	1:C:224:GLN:NE2	1.91	0.68
1:A:203:VAL:HB	1:A:204:PRO:HD3	1.74	0.68
1:C:151:LYS:HD2	1:C:154:TYR:H	1.59	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:28:ARG:HH12	1:B:117:SER:HB2	1.58	0.67
1:A:222:GLY:N	1:A:224:GLN:HE22	1.92	0.67
1:B:103:SER:HB2	1:B:121:LEU:CD1	2.24	0.66
1:A:45:ARG:NH1	1:A:45:ARG:HB3	2.11	0.66
1:B:1:MET:CE	1:B:6:ILE:HG13	2.25	0.66
1:A:224:GLN:HE21	1:A:224:GLN:N	1.87	0.66
1:C:151:LYS:HG2	1:C:152:SER:N	2.09	0.65
1:B:1:MET:HE2	1:B:6:ILE:HD12	1.77	0.65
1:B:1:MET:HE1	1:B:5:ILE:HB	1.79	0.65
1:A:112:MET:HE2	1:A:225:TRP:CH2	2.32	0.65
1:B:119:ASP:OD2	1:B:130:LEU:N	2.29	0.64
1:A:74:ASN:HA	1:A:76:LYS:NZ	2.13	0.64
1:B:146:GLY:O	1:B:149:ALA:HB3	1.97	0.64
1:A:21:ASP:HB2	1:A:24:TRP:HB2	1.79	0.64
1:C:73:VAL:HG12	1:C:74:ASN:OD1	1.97	0.64
1:A:43:LYS:HB3	1:A:44:PRO:HD2	1.78	0.63
1:A:1:MET:HE2	1:A:6:ILE:CG1	2.27	0.63
1:C:18:GLU:O	1:C:21:ASP:HB2	1.98	0.63
1:B:1:MET:HE3	1:B:2:THR:O	1.97	0.63
1:A:146:GLY:O	1:A:149:ALA:HB3	1.98	0.63
1:B:13:ASP:OD1	1:B:15:ARG:HD2	1.99	0.62
1:C:71:PRO:HD2	4:C:322:HOH:O	2.00	0.62
1:A:6:ILE:HD13	1:A:14:VAL:HG11	1.82	0.61
1:B:21:ASP:CB	1:B:24:TRP:HB2	2.27	0.61
1:C:45:ARG:CD	1:C:46:SER:H	2.13	0.61
1:A:45:ARG:CD	1:A:46:SER:H	2.13	0.61
1:A:15:ARG:HG2	1:A:15:ARG:NH1	2.12	0.61
1:C:9:ARG:NH2	1:C:110:GLU:O	2.28	0.61
1:A:1:MET:HE2	1:A:6:ILE:CD1	2.30	0.61
1:C:45:ARG:HD2	1:C:46:SER:H	1.65	0.61
1:B:3:PRO:HD3	4:B:318:HOH:O	2.02	0.60
1:A:155:MET:HE2	1:A:155:MET:CA	2.30	0.60
1:C:55:MET:HE3	1:C:55:MET:CA	2.31	0.60
1:C:9:ARG:HD2	4:C:263:HOH:O	2.02	0.59
1:A:45:ARG:H	1:A:45:ARG:HH11	0.70	0.59
1:B:55:MET:CA	1:B:55:MET:HE3	2.31	0.59
1:B:140:MET:HE1	1:B:144:LEU:HG	1.85	0.59
1:B:15:ARG:HH11	1:B:15:ARG:CG	2.15	0.59
1:C:151:LYS:CD	1:C:153:ALA:HB3	2.33	0.58
1:A:143:ARG:HD2	1:A:143:ARG:O	2.03	0.58
1:A:222:GLY:H	1:A:224:GLN:NE2	1.94	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:19:GLN:HG2	4:A:342:HOH:O	2.03	0.58
1:B:74:ASN:O	1:B:78:LEU:HG	2.03	0.57
1:C:103:SER:HB2	1:C:121:LEU:HD12	1.85	0.57
1:A:1:MET:HE3	1:A:5:ILE:HB	1.86	0.57
1:C:50:TRP:CG	1:C:54:LYS:HE2	2.38	0.57
1:A:201:GLU:O	1:A:205:GLU:HG3	2.04	0.57
1:A:181:ARG:HA	4:A:312:HOH:O	2.04	0.57
1:C:103:SER:HB2	1:C:121:LEU:HD11	1.86	0.57
1:B:55:MET:HE3	1:B:55:MET:HA	1.87	0.57
1:B:119:ASP:HB2	1:B:128:LEU:O	2.04	0.56
1:C:146:GLY:O	1:C:149:ALA:HB3	2.06	0.56
1:B:21:ASP:HB3	1:B:24:TRP:H	1.70	0.56
1:A:220:VAL:O	1:A:223:GLU:HG3	2.06	0.56
1:A:4:ASP:HB2	4:A:274:HOH:O	2.05	0.56
1:B:71:PRO:HD2	4:B:230:HOH:O	2.05	0.55
1:B:165:THR:O	1:B:166:ARG:HB2	2.06	0.55
1:C:151:LYS:HG2	1:C:153:ALA:N	2.14	0.55
1:B:104:PRO:HB2	1:B:105:ILE:HG22	1.88	0.55
1:B:44:PRO:HG3	1:B:49:LYS:O	2.07	0.55
1:C:18:GLU:O	1:C:21:ASP:N	2.35	0.55
1:B:21:ASP:O	1:B:24:TRP:HB3	2.06	0.55
1:B:45:ARG:HD2	1:B:46:SER:H	1.72	0.55
1:C:131:LYS:HE3	1:C:154:TYR:CZ	2.42	0.55
1:C:20:GLY:O	1:C:21:ASP:C	2.50	0.55
1:C:194:LYS:HB3	3:C:228:ACT:H3	1.89	0.55
1:C:104:PRO:O	1:C:105:ILE:HB	2.05	0.55
1:C:151:LYS:CG	1:C:153:ALA:H	2.15	0.54
1:A:45:ARG:HH11	1:A:45:ARG:CB	2.20	0.54
1:C:50:TRP:CD1	1:C:54:LYS:HE2	2.42	0.54
1:C:151:LYS:HE3	1:C:154:TYR:CE2	2.42	0.54
1:C:143:ARG:HH21	1:C:182:GLU:HG3	1.73	0.54
1:B:122:CYS:O	1:B:125:GLY:N	2.34	0.53
1:B:21:ASP:HB2	1:B:24:TRP:CB	2.32	0.53
1:B:101:THR:O	1:B:121:LEU:N	2.29	0.53
1:A:103:SER:O	1:A:104:PRO:C	2.50	0.53
1:C:85:GLU:HG3	1:C:86:ASN:N	2.23	0.53
1:C:71:PRO:HD2	4:C:258:HOH:O	2.09	0.53
1:B:151:LYS:HG2	1:B:154:TYR:CD2	2.44	0.53
1:B:18:GLU:O	1:B:21:ASP:HB2	2.09	0.53
1:C:24:TRP:O	1:C:28:ARG:HG3	2.09	0.52
1:C:104:PRO:HG2	1:C:105:ILE:H	1.75	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:73:VAL:HG12	1:B:74:ASN:ND2	2.24	0.52
1:A:1:MET:HE3	1:A:2:THR:O	2.10	0.52
1:B:50:TRP:CG	1:B:54:LYS:HD3	2.44	0.52
1:B:103:SER:O	1:B:104:PRO:C	2.52	0.52
1:C:93:GLU:O	1:C:94:PHE:C	2.53	0.52
1:C:143:ARG:O	1:C:143:ARG:HG3	2.07	0.52
1:A:45:ARG:HH11	1:A:45:ARG:CA	2.21	0.51
1:B:127:GLY:HA3	1:B:170:TRP:CZ3	2.45	0.51
1:B:45:ARG:CD	1:B:46:SER:N	2.73	0.51
1:B:71:PRO:HG2	4:B:347:HOH:O	2.10	0.51
1:A:151:LYS:O	1:A:154:TYR:N	2.44	0.51
1:B:75:ALA:HA	1:B:78:LEU:CD1	2.25	0.51
1:B:103:SER:OG	1:B:104:PRO:HD2	2.11	0.51
1:B:140:MET:HE1	1:B:144:LEU:CG	2.41	0.51
1:B:34:ALA:HA	1:B:160:TYR:CD2	2.46	0.50
1:B:151:LYS:O	1:B:152:SER:C	2.53	0.50
1:A:45:ARG:HH11	1:A:45:ARG:HB3	1.77	0.50
1:A:45:ARG:HD3	1:A:46:SER:OG	2.12	0.50
1:B:45:ARG:CD	1:B:46:SER:H	2.24	0.50
1:A:21:ASP:HB2	1:A:24:TRP:CB	2.41	0.50
1:B:91:LEU:HD12	1:B:91:LEU:C	2.36	0.50
1:C:39:ASN:O	1:C:54:LYS:HB2	2.12	0.50
1:C:89:ARG:HG3	1:C:89:ARG:HH11	1.76	0.50
1:A:45:ARG:CD	1:A:46:SER:N	2.76	0.49
1:C:21:ASP:O	1:C:24:TRP:HB3	2.12	0.49
1:C:151:LYS:O	1:C:154:TYR:N	2.46	0.49
1:C:95:THR:O	1:C:95:THR:HG22	2.11	0.49
1:A:73:VAL:O	1:A:74:ASN:C	2.53	0.49
1:B:167:LYS:O	1:B:191:ARG:HD2	2.12	0.49
1:C:151:LYS:O	1:C:154:TYR:HB2	2.13	0.49
1:C:17:VAL:HG12	1:C:18:GLU:N	2.27	0.48
1:B:129:GLU:HA	1:B:129:GLU:OE1	2.13	0.48
1:A:209:LYS:HA	1:A:209:LYS:HD2	1.32	0.48
1:B:14:VAL:HG13	1:B:15:ARG:N	2.27	0.48
1:B:103:SER:HA	1:B:104:PRO:HD3	1.54	0.48
1:A:21:ASP:HB3	1:A:24:TRP:H	1.77	0.48
1:A:74:ASN:HA	1:A:76:LYS:HZ1	1.79	0.48
1:A:181:ARG:O	1:A:182:GLU:HB2	2.13	0.48
1:B:151:LYS:HE3	4:B:338:HOH:O	2.14	0.47
1:A:18:GLU:HG3	4:A:392:HOH:O	2.14	0.47
1:B:140:MET:CE	1:B:144:LEU:HG	2.44	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:96:SER:HA	1:B:186:TYR:OH	2.13	0.47
1:A:1:MET:HE1	1:A:5:ILE:HG22	1.96	0.47
1:B:128:LEU:HD12	1:B:171:TYR:HB2	1.97	0.47
1:A:45:ARG:CG	1:A:46:SER:N	2.78	0.47
1:A:74:ASN:HA	1:A:76:LYS:HZ2	1.80	0.47
1:A:203:VAL:N	1:A:204:PRO:CD	2.77	0.47
1:C:101:THR:HG23	1:C:121:LEU:O	2.15	0.47
1:C:151:LYS:HD2	1:C:154:TYR:N	2.29	0.47
1:C:55:MET:CA	1:C:55:MET:CE	2.93	0.47
1:B:73:VAL:CG1	1:B:74:ASN:N	2.78	0.46
1:C:13:ASP:OD1	1:C:15:ARG:HG3	2.15	0.46
1:B:73:VAL:O	1:B:74:ASN:C	2.48	0.46
1:B:111:SER:OG	1:B:113:ARG:HG2	2.16	0.46
1:A:50:TRP:CE2	1:A:54:LYS:HE2	2.51	0.46
1:A:226:ARG:HD2	1:A:226:ARG:HA	1.50	0.46
1:C:193:GLU:HB3	4:C:259:HOH:O	2.15	0.46
1:B:19:GLN:HA	1:B:24:TRP:CD1	2.50	0.46
1:C:103:SER:HA	1:C:104:PRO:HD3	1.84	0.46
1:A:78:LEU:HD23	1:A:78:LEU:HA	1.64	0.46
1:B:15:ARG:CG	1:B:15:ARG:NH1	2.77	0.46
1:B:18:GLU:O	1:B:19:GLN:C	2.51	0.46
1:A:119:ASP:HB3	1:A:130:LEU:HD22	1.97	0.46
1:C:9:ARG:O	1:C:9:ARG:HG3	2.15	0.46
1:C:122:CYS:HB2	1:C:126:ASN:O	2.16	0.46
1:B:202:ILE:HA	1:B:205:GLU:OE1	2.16	0.46
1:C:104:PRO:CG	1:C:105:ILE:H	2.28	0.46
1:C:140:MET:CE	1:C:144:LEU:HD11	2.45	0.46
1:C:201:GLU:O	1:C:205:GLU:HG3	2.16	0.46
1:C:17:VAL:CG1	1:C:18:GLU:N	2.79	0.45
1:C:113:ARG:C	1:C:114:THR:HG23	2.41	0.45
1:A:128:LEU:HD11	1:A:130:LEU:HD13	1.97	0.45
1:A:1:MET:CE	1:A:5:ILE:HB	2.45	0.45
1:B:73:VAL:HG12	1:B:74:ASN:HD22	1.81	0.45
1:C:151:LYS:HE3	1:C:154:TYR:CG	2.50	0.45
1:A:28:ARG:NH1	1:A:117:SER:HB2	2.32	0.45
1:A:203:VAL:CB	1:A:204:PRO:HD3	2.45	0.45
1:C:111:SER:O	1:C:112:MET:HB2	2.16	0.45
1:B:82:LYS:HD2	1:B:85:GLU:OE1	2.16	0.45
1:B:127:GLY:HA3	1:B:170:TRP:CE3	2.52	0.45
1:C:15:ARG:HG3	1:C:15:ARG:H	1.55	0.45
1:B:140:MET:HE1	1:B:144:LEU:CD1	2.47	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:45:ARG:CG	1:C:46:SER:N	2.79	0.45
1:C:72:GLU:C	1:C:73:VAL:HG23	2.41	0.45
1:B:55:MET:HE2	1:B:59:HIS:CE1	2.52	0.44
1:B:18:GLU:HB2	1:B:21:ASP:OD1	2.16	0.44
1:B:116:CYS:HA	2:B:227:PO4:O3	2.18	0.44
1:C:37:VAL:HG11	1:C:160:TYR:HB2	1.99	0.44
1:A:104:PRO:HB2	1:A:105:ILE:HG22	1.99	0.44
1:C:113:ARG:HD2	1:C:221:PHE:CE2	2.52	0.44
1:B:208:GLU:HG2	1:B:208:GLU:H	1.68	0.44
1:A:165:THR:O	1:A:166:ARG:HB2	2.18	0.44
1:B:55:MET:HE2	1:B:55:MET:HB3	1.76	0.44
1:B:1:MET:HE1	1:B:5:ILE:CB	2.46	0.43
1:B:130:LEU:HD13	1:B:173:ALA:HB3	2.00	0.43
1:C:7:LEU:O	1:C:8:GLN:C	2.58	0.43
1:C:45:ARG:CD	1:C:46:SER:N	2.80	0.43
1:C:103:SER:CB	1:C:121:LEU:HD11	2.46	0.43
1:C:186:TYR:C	1:C:187:VAL:HG13	2.42	0.43
1:C:21:ASP:HB2	1:C:24:TRP:HB2	2.00	0.43
1:B:222:GLY:H	1:B:224:GLN:NE2	2.10	0.43
1:A:1:MET:HG3	1:A:2:THR:N	2.32	0.43
1:B:82:LYS:HD2	1:B:82:LYS:HA	1.93	0.43
1:B:169:ALA:HB2	1:B:190:GLU:OE1	2.19	0.43
1:C:220:VAL:O	1:C:221:PHE:C	2.62	0.43
1:A:226:ARG:HH11	1:A:226:ARG:HD3	1.65	0.43
1:B:18:GLU:N	1:B:21:ASP:OD1	2.45	0.43
1:B:73:VAL:HG12	1:B:74:ASN:N	2.33	0.43
1:B:101:THR:N	1:B:121:LEU:O	2.42	0.43
1:C:203:VAL:HB	1:C:204:PRO:HD3	2.01	0.43
1:B:173:ALA:CB	1:B:186:TYR:HB3	2.49	0.42
1:C:167:LYS:O	1:C:191:ARG:HD2	2.19	0.42
1:B:205:GLU:HA	1:B:208:GLU:HG3	2.00	0.42
1:B:72:GLU:C	1:B:73:VAL:HG23	2.44	0.42
1:A:2:THR:HB	1:A:3:PRO:HD2	2.02	0.42
1:A:143:ARG:HD2	1:A:143:ARG:C	2.43	0.42
1:A:43:LYS:HB3	1:A:44:PRO:CD	2.48	0.42
1:A:104:PRO:HB2	1:A:105:ILE:H	1.42	0.42
1:C:50:TRP:CE2	1:C:54:LYS:CE	2.98	0.42
1:C:50:TRP:NE1	1:C:54:LYS:HE2	2.34	0.42
1:B:173:ALA:HB2	1:B:186:TYR:HB3	2.00	0.42
1:B:122:CYS:HB3	1:B:124:ASP:OD1	2.20	0.42
1:A:150:ILE:HG21	1:A:172:PHE:CE1	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:140:MET:CE	1:C:144:LEU:CD1	2.98	0.41
1:C:172:PHE:CD1	1:C:172:PHE:C	2.98	0.41
1:A:45:ARG:N	1:A:45:ARG:CD	2.79	0.41
1:C:18:GLU:H	1:C:21:ASP:CG	2.28	0.41
1:C:44:PRO:C	1:C:46:SER:N	2.76	0.41
1:C:214:LEU:HD23	1:C:214:LEU:HA	1.92	0.41
1:A:45:ARG:NH1	1:A:45:ARG:N	2.29	0.41
1:C:37:VAL:O	1:C:38:HIS:C	2.62	0.41
1:C:94:PHE:C	1:C:94:PHE:CD2	2.98	0.41
1:A:1:MET:HE1	1:A:6:ILE:HG13	1.96	0.41
1:A:-1:SER:HB3	1:A:110:GLU:HG2	2.03	0.41
1:A:95:THR:HG21	4:A:370:HOH:O	2.19	0.41
1:A:6:ILE:HG21	1:A:14:VAL:HG13	2.03	0.41
1:C:159:GLN:HG3	1:C:195:TYR:CD2	2.56	0.41
1:C:222:GLY:O	1:C:223:GLU:C	2.60	0.41
1:B:14:VAL:CG1	1:B:15:ARG:N	2.82	0.41
1:B:44:PRO:HG2	1:B:47:GLY:O	2.21	0.41
1:B:179:MET:HB3	1:B:181:ARG:O	2.21	0.41
1:C:151:LYS:HE2	1:C:151:LYS:HB3	1.40	0.41
1:A:45:ARG:HD2	1:A:46:SER:N	2.28	0.40
1:C:145:GLY:HA3	1:C:149:ALA:HB2	2.02	0.40
1:A:105:ILE:HG13	1:A:106:ILE:N	2.36	0.40
1:C:137:ARG:HH11	1:C:137:ARG:HD3	1.75	0.40
1:A:203:VAL:N	1:A:204:PRO:HD2	2.36	0.40
1:B:82:LYS:HE3	1:B:85:GLU:OE1	2.22	0.40
1:B:203:VAL:CB	1:B:204:PRO:HD3	2.43	0.40
1:C:73:VAL:HG12	1:C:74:ASN:ND2	2.36	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	226/228 (99%)	220 (97%)	3 (1%)	3 (1%)	9	14
1	B	226/228 (99%)	218 (96%)	5 (2%)	3 (1%)	9	14
1	C	223/228 (98%)	210 (94%)	9 (4%)	4 (2%)	6	9
All	All	675/684 (99%)	648 (96%)	17 (2%)	10 (2%)	8	12

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	21	ASP
1	A	104	PRO
1	B	104	PRO
1	B	45	ARG
1	C	105	ILE
1	A	152	SER
1	B	123	SER
1	C	21	ASP
1	C	104	PRO
1	C	150	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	
1	A	194/194 (100%)	164 (84%)	30 (16%)	2	3
1	B	194/194 (100%)	169 (87%)	25 (13%)	4	6
1	C	191/194 (98%)	160 (84%)	31 (16%)	2	3
All	All	579/582 (100%)	493 (85%)	86 (15%)	3	3

All (86) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	0	HIS
1	A	15	ARG
1	A	18	GLU

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Mol	Chain	Res	Type
1	A	21	ASP
1	A	26	LYS
1	A	45	ARG
1	A	49	LYS
1	A	53	MET
1	A	61	LEU
1	A	73	VAL
1	A	74	ASN
1	A	76	LYS
1	A	82	LYS
1	A	101	THR
1	A	102	GLU
1	A	117	SER
1	A	130	LEU
1	A	131	LYS
1	A	147	PHE
1	A	148	GLU
1	A	150	ILE
1	A	151	LYS
1	A	194	LYS
1	A	198	SER
1	A	201	GLU
1	A	208	GLU
1	A	209	LYS
1	A	216	GLU
1	A	224	GLN
1	A	226	ARG
1	B	-1	SER
1	B	4	ASP
1	B	15	ARG
1	B	19	GLN
1	B	21	ASP
1	B	43	LYS
1	B	45	ARG
1	B	55	MET
1	B	78	LEU
1	B	87	ASP
1	B	101	THR
1	B	105	ILE
1	B	117	SER
1	B	121	LEU
1	B	131	LYS

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Mol	Chain	Res	Type
1	B	140	MET
1	B	151	LYS
1	B	152	SER
1	B	166	ARG
1	B	167	LYS
1	B	180	LYS
1	B	190	GLU
1	B	198	SER
1	B	208	GLU
1	B	224	GLN
1	C	2	THR
1	C	5	ILE
1	C	9	ARG
1	C	14	VAL
1	C	15	ARG
1	C	19	GLN
1	C	21	ASP
1	C	43	LYS
1	C	45	ARG
1	C	46	SER
1	C	48	LYS
1	C	53	MET
1	C	55	MET
1	C	61	LEU
1	C	72	GLU
1	C	74	ASN
1	C	76	LYS
1	C	82	LYS
1	C	89	ARG
1	C	101	THR
1	C	105	ILE
1	C	148	GLU
1	C	151	LYS
1	C	157	GLN
1	C	180	LYS
1	C	182	GLU
1	C	201	GLU
1	C	205	GLU
1	C	217	ILE
1	C	224	GLN
1	C	226	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13)

such sidechains are listed below:

Mol	Chain	Res	Type
1	A	25	HIS
1	A	74	ASN
1	A	174	ASN
1	A	224	GLN
1	B	19	GLN
1	B	25	HIS
1	B	38	HIS
1	B	74	ASN
1	B	185	HIS
1	B	224	GLN
1	C	157	GLN
1	C	174	ASN
1	C	224	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

7 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	ACT	B	228	-	3,3,3	0.99	0	3,3,3	1.02	0
2	PO4	A	227	-	4,4,4	2.29	3 (75%)	6,6,6	0.92	0
2	PO4	C	227	-	4,4,4	1.80	1 (25%)	6,6,6	1.10	1 (16%)
3	ACT	A	228	-	3,3,3	0.77	0	3,3,3	1.38	0
3	ACT	C	229	-	3,3,3	0.87	0	3,3,3	0.94	0
2	PO4	B	227	-	4,4,4	2.28	2 (50%)	6,6,6	0.82	0
3	ACT	C	228	-	3,3,3	0.72	0	3,3,3	1.35	0

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	227	PO4	P-O4	-2.95	1.46	1.54
2	A	227	PO4	P-O1	-2.75	1.44	1.50
2	B	227	PO4	P-O2	-2.55	1.47	1.54
2	C	227	PO4	P-O3	-2.47	1.47	1.54
2	A	227	PO4	P-O2	-2.32	1.47	1.54
2	A	227	PO4	P-O3	-2.02	1.48	1.54

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	227	PO4	O3-P-O2	2.01	114.16	107.91

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	227	PO4	1	0
3	C	228	ACT	1	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

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

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	228/228 (100%)	-0.21	11 (4%) 35 32	19, 30, 71, 100	0
1	B	228/228 (100%)	0.09	9 (3%) 43 39	23, 38, 73, 100	0
1	C	225/228 (98%)	0.02	19 (8%) 17 14	16, 35, 77, 98	0
All	All	681/684 (99%)	-0.03	39 (5%) 29 25	16, 34, 75, 100	0

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	2	THR	6.6
1	B	104	PRO	6.3
1	C	149	ALA	4.9
1	B	47	GLY	4.0
1	A	147	PHE	4.0
1	C	147	PHE	3.8
1	C	48	LYS	3.7
1	A	104	PRO	3.7
1	A	152	SER	3.4
1	C	104	PRO	3.4
1	C	151	LYS	3.3
1	C	3	PRO	3.2
1	C	152	SER	3.2
1	B	152	SER	3.0
1	C	46	SER	2.9
1	A	149	ALA	2.9
1	C	226	ARG	2.8
1	C	146	GLY	2.8
1	A	150	ILE	2.7
1	A	73	VAL	2.7
1	A	0	HIS	2.7
1	B	21	ASP	2.6
1	C	47	GLY	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	82	LYS	2.4
1	A	45	ARG	2.4
1	C	148	GLU	2.4
1	B	0	HIS	2.3
1	A	-1	SER	2.3
1	B	48	LYS	2.3
1	C	180	LYS	2.3
1	A	47	GLY	2.3
1	C	45	ARG	2.2
1	A	76	LYS	2.2
1	B	147	PHE	2.2
1	C	72	GLU	2.1
1	C	8	GLN	2.1
1	C	19	GLN	2.1
1	B	151	LYS	2.1
1	C	89	ARG	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 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
3	ACT	B	228	4/4	0.70	0.33	70,70,70,70	4
3	ACT	C	228	4/4	0.79	0.25	73,73,73,73	0
3	ACT	A	228	4/4	0.85	0.23	40,40,40,40	4
3	ACT	C	229	4/4	0.95	0.12	42,42,42,42	0
2	PO4	B	227	5/5	0.99	0.04	25,30,46,62	0
2	PO4	C	227	5/5	0.99	0.06	27,35,47,55	0
2	PO4	A	227	5/5	0.99	0.06	27,42,44,47	0

6.5 Other polymers [i](#)

There are no such residues in this entry.