



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 04:27 AM UTC

PDB ID : 2DUM / pdb_00002dum
Title : Crystal structure of hypothetical protein, PH0823
Authors : Hosaka, T.; Kishishita, S.; Murayama, K.; Shirouzu, M.; RIKEN Structural Genomics/Proteomics Initiative (RSGI)
Deposited on : 2006-07-24
Resolution : 2.75 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

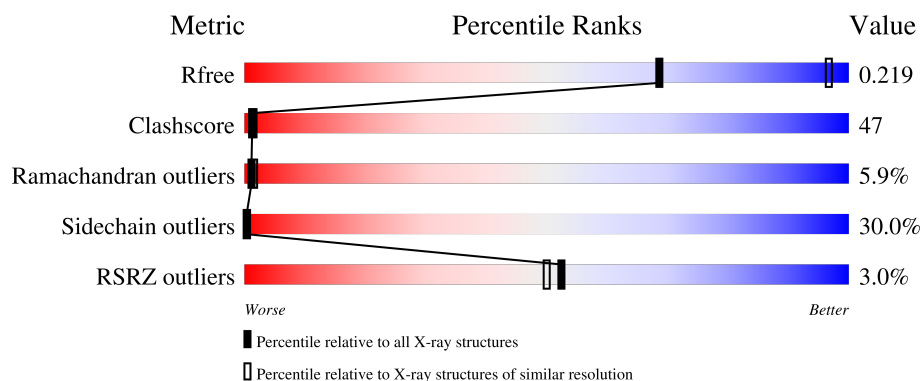
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.75 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}	180053	1009 (2.76-2.76)
Clashscore	190562	1044 (2.76-2.76)
Ramachandran outliers	187476	1024 (2.76-2.76)
Sidechain outliers	187428	1024 (2.76-2.76)
RSRZ outliers	180081	1009 (2.76-2.76)

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	170	3% 22% 35% 18% 8% 16%
1	B	170	2% 18% 37% 22% 5% 18%
1	C	170	3% 15% 39% 23% 9% 14%
1	D	170	2% 16% 37% 21% 8% 17%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 4687 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 Hypothetical protein PH0823.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	143	Total	C	N	O	S	0	0	0
			1171	750	203	214	4			
1	B	139	Total	C	N	O	S	0	0	0
			1143	733	197	209	4			
1	C	146	Total	C	N	O	S	0	0	0
			1193	763	206	220	4			
1	D	141	Total	C	N	O	S	0	0	0
			1152	738	200	210	4			

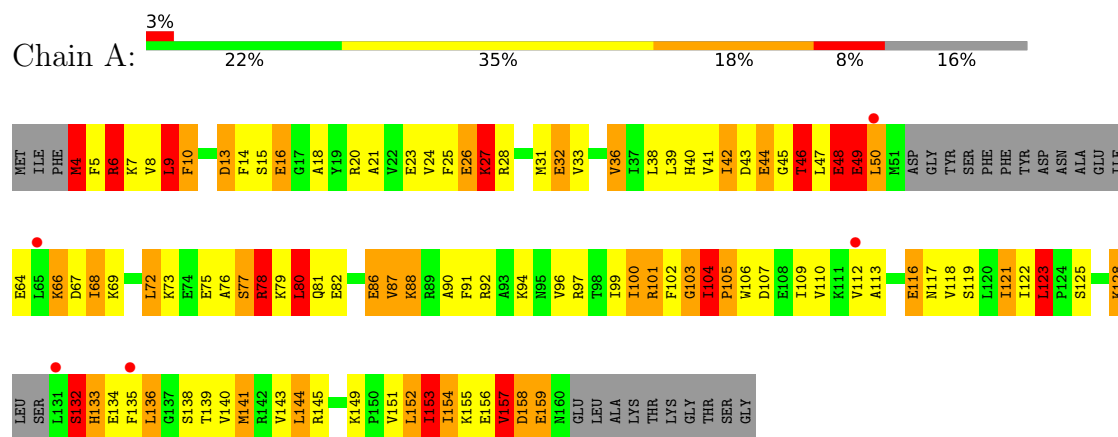
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	6	Total	O	0	0
			6	6		
2	B	8	Total	O	0	0
			8	8		
2	C	9	Total	O	0	0
			9	9		
2	D	5	Total	O	0	0
			5	5		

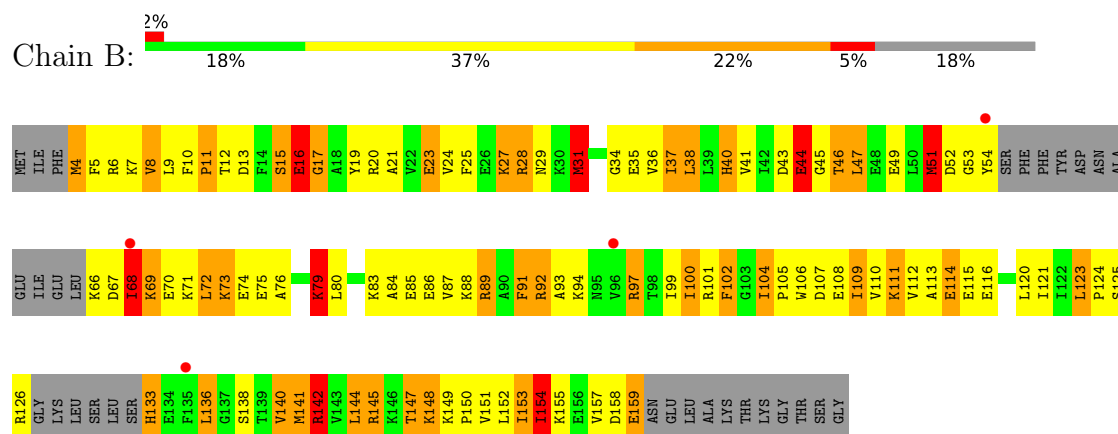
3 Residue-property plots [i](#)

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.

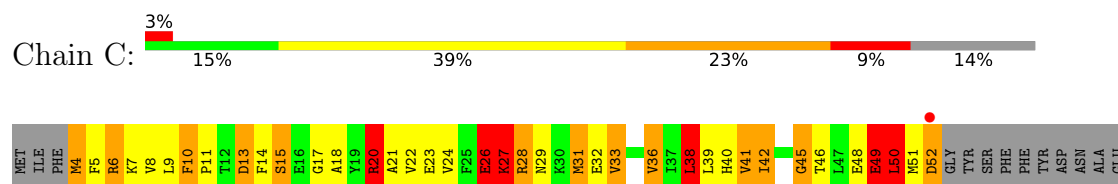
• Molecule 1: Hypothetical protein PH0823

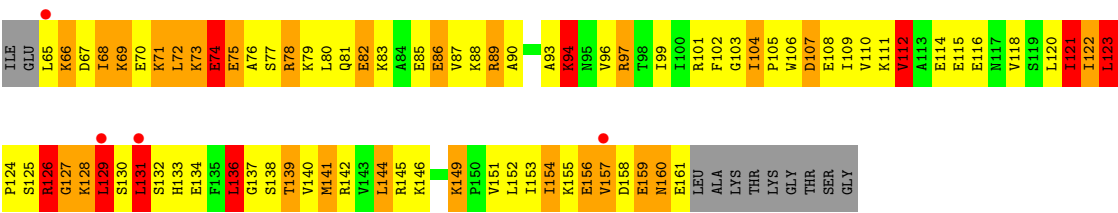


• Molecule 1: Hypothetical protein PH0823

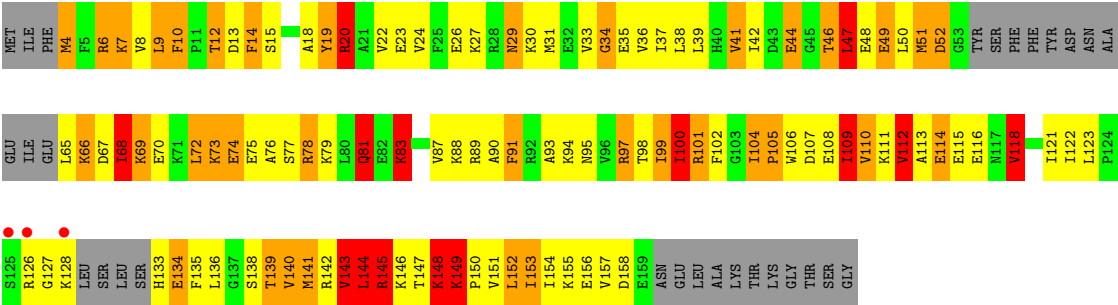


• Molecule 1: Hypothetical protein PH0823





● Molecule 1: Hypothetical protein PH0823



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	120.79Å 120.79Å 127.10Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	40.00 – 2.75 40.00 – 2.75	Depositor EDS
% Data completeness (in resolution range)	87.2 (40.00-2.75) 87.1 (40.00-2.75)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.53 (at 2.77Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.216 , 0.279 0.208 , 0.219	Depositor DCC
R_{free} test set	1856 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å ²)	55.5	Xtriage
Anisotropy	0.191	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 52.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k 0.000 for -l,-k,-h	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4687	wwPDB-VP
Average B, all atoms (Å ²)	58.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 61.28 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.3409e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

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

5 Model quality

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	1.87	19/1184 (1.6%)	1.89	38/1580 (2.4%)
1	B	1.85	19/1157 (1.6%)	1.94	44/1545 (2.8%)
1	C	1.98	24/1207 (2.0%)	1.83	28/1613 (1.7%)
1	D	1.89	17/1165 (1.5%)	1.86	32/1554 (2.1%)
All	All	1.90	79/4713 (1.7%)	1.88	142/6292 (2.3%)

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	1
1	C	0	2
All	All	0	3

All (79) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	121	ILE	CA-CB	8.96	1.64	1.54
1	D	42	ILE	C-O	8.68	1.32	1.24
1	A	80	LEU	CA-C	-8.52	1.42	1.53
1	C	9	LEU	CA-C	-8.21	1.42	1.52
1	A	157	VAL	CA-CB	7.92	1.65	1.54
1	C	131	LEU	N-CA	7.88	1.56	1.46
1	A	21	ALA	CA-CB	-7.85	1.40	1.53
1	B	4	MET	N-CA	7.39	1.60	1.46
1	A	104	ILE	CA-CB	7.29	1.61	1.53
1	A	42	ILE	CA-CB	7.23	1.62	1.54
1	D	47	LEU	N-CA	-7.14	1.37	1.46
1	D	112	VAL	CA-CB	-7.02	1.46	1.54
1	A	149	LYS	CA-C	6.96	1.61	1.52
1	A	6	ARG	CZ-NH1	6.87	1.42	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	41	VAL	CA-C	-6.87	1.44	1.52
1	C	123	LEU	CA-C	6.74	1.59	1.52
1	C	154	ILE	C-O	6.70	1.31	1.24
1	D	109	ILE	CA-CB	-6.66	1.46	1.54
1	D	118	VAL	CA-C	6.65	1.61	1.52
1	B	38	LEU	N-CA	-6.57	1.37	1.46
1	D	46	THR	CA-C	-6.48	1.44	1.52
1	B	147	THR	CA-C	-6.41	1.44	1.53
1	C	13	ASP	N-CA	6.35	1.53	1.46
1	A	49	GLU	CA-C	6.25	1.61	1.52
1	D	99	ILE	CA-CB	-6.22	1.46	1.54
1	C	26	GLU	N-CA	-6.16	1.39	1.46
1	C	112	VAL	CA-CB	-6.14	1.46	1.54
1	A	4	MET	N-CA	6.14	1.57	1.46
1	B	25	PHE	CA-C	-6.11	1.44	1.52
1	C	42	ILE	C-O	6.07	1.30	1.24
1	B	157	VAL	CA-CB	6.04	1.62	1.54
1	C	10	PHE	CA-CB	-6.02	1.44	1.52
1	C	126	ARG	NE-CZ	6.01	1.39	1.33
1	A	46	THR	CA-CB	5.98	1.62	1.53
1	B	100	ILE	CA-CB	-5.87	1.46	1.54
1	C	38	LEU	CA-C	-5.87	1.45	1.52
1	C	4	MET	N-CA	5.86	1.57	1.46
1	B	104	ILE	CA-C	-5.86	1.48	1.53
1	C	27	LYS	N-CA	5.84	1.53	1.46
1	B	40	HIS	CA-C	-5.81	1.45	1.52
1	A	27	LYS	N-CA	5.79	1.53	1.46
1	C	157	VAL	CA-CB	5.79	1.59	1.54
1	A	132	SER	N-CA	5.77	1.53	1.46
1	B	38	LEU	CA-CB	-5.77	1.45	1.53
1	D	83	LYS	CA-C	-5.75	1.45	1.52
1	D	152	LEU	CA-C	-5.72	1.45	1.52
1	D	141	MET	C-O	-5.67	1.16	1.24
1	C	85	GLU	CG-CD	5.62	1.66	1.52
1	B	85	GLU	CG-CD	5.59	1.66	1.52
1	B	153	ILE	CA-C	-5.54	1.46	1.52
1	D	29	ASN	N-CA	-5.51	1.39	1.46
1	C	18	ALA	CA-CB	-5.49	1.44	1.53
1	C	21	ALA	CA-CB	-5.46	1.44	1.53
1	D	148	LYS	CA-C	5.46	1.60	1.52
1	B	91	PHE	CB-CG	-5.44	1.38	1.50
1	B	141	MET	CG-SD	5.43	1.94	1.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	9	LEU	CA-C	-5.42	1.46	1.52
1	C	149	LYS	CA-C	5.40	1.59	1.52
1	D	7	LYS	CA-C	-5.40	1.48	1.53
1	C	103	GLY	CA-C	-5.38	1.46	1.52
1	C	103	GLY	N-CA	-5.37	1.39	1.45
1	B	140	VAL	N-CA	-5.35	1.39	1.46
1	A	86	GLU	CA-C	5.32	1.59	1.52
1	B	114	GLU	N-CA	-5.31	1.40	1.46
1	B	73	LYS	N-CA	-5.28	1.39	1.46
1	A	27	LYS	CG-CD	5.23	1.68	1.52
1	A	36	VAL	CA-C	5.21	1.58	1.52
1	C	114	GLU	C-O	-5.21	1.18	1.24
1	A	122	ILE	CA-C	-5.20	1.46	1.52
1	D	81	GLN	CG-CD	5.20	1.65	1.52
1	A	158	ASP	CA-C	5.19	1.59	1.52
1	B	154	ILE	CA-CB	5.14	1.63	1.55
1	D	90	ALA	CA-CB	-5.13	1.44	1.53
1	C	136	LEU	C-O	-5.11	1.18	1.24
1	C	49	GLU	CG-CD	5.07	1.64	1.52
1	B	140	VAL	CA-CB	-5.07	1.47	1.54
1	D	23	GLU	CA-C	-5.05	1.46	1.52
1	D	100	ILE	N-CA	5.04	1.51	1.46
1	B	11	PRO	N-CA	-5.02	1.40	1.47

All (142) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	68	ILE	N-CA-C	-11.14	97.02	112.50
1	C	126	ARG	N-CA-C	-10.65	97.64	112.45
1	D	10	PHE	CA-C-N	10.20	131.66	120.13
1	D	10	PHE	C-N-CA	10.20	131.66	120.13
1	C	74	GLU	N-CA-C	-9.17	101.86	113.23
1	D	153	ILE	CA-C-N	-8.80	110.70	122.94
1	D	153	ILE	C-N-CA	-8.80	110.70	122.94
1	A	152	LEU	CA-C-N	-8.79	111.41	122.93
1	A	152	LEU	C-N-CA	-8.79	111.41	122.93
1	A	42	ILE	CB-CA-C	8.74	121.31	111.08
1	D	91	PHE	CA-C-N	-8.66	105.00	121.54
1	D	91	PHE	C-N-CA	-8.66	105.00	121.54
1	C	94	LYS	CB-CA-C	-8.45	97.55	110.90
1	B	46	THR	N-CA-C	-8.18	103.44	113.50
1	C	50	LEU	N-CA-C	-8.17	101.61	112.72

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	81	GLN	N-CA-C	-8.08	103.22	113.23
1	C	26	GLU	N-CA-C	-7.80	102.78	111.28
1	B	104	ILE	N-CA-C	-7.75	99.09	107.77
1	C	107	ASP	N-CA-C	-7.75	102.75	112.90
1	C	87	VAL	N-CA-C	7.74	118.51	110.62
1	D	47	LEU	N-CA-C	-7.60	102.93	111.07
1	A	13	ASP	N-CA-C	-7.40	103.84	113.17
1	D	149	LYS	CA-C-N	-7.32	112.68	120.66
1	D	149	LYS	C-N-CA	-7.32	112.68	120.66
1	A	50	LEU	N-CA-C	-7.21	102.91	112.72
1	D	143	VAL	N-CA-C	-7.21	103.27	110.62
1	C	123	LEU	CA-C-N	7.19	126.95	119.76
1	C	123	LEU	C-N-CA	7.19	126.95	119.76
1	A	6	ARG	NE-CZ-NH2	-7.09	112.82	119.20
1	D	4	MET	N-CA-C	7.07	130.80	111.00
1	A	68	ILE	N-CA-C	-6.92	102.17	111.44
1	A	103	GLY	CA-C-N	-6.91	117.61	122.59
1	A	103	GLY	C-N-CA	-6.91	117.61	122.59
1	B	34	GLY	N-CA-C	6.86	120.46	112.50
1	C	121	ILE	CB-CA-C	6.84	119.24	110.96
1	C	71	LYS	N-CA-C	-6.75	104.91	113.01
1	D	23	GLU	N-CA-C	-6.74	103.40	111.69
1	B	8	VAL	CA-C-N	-6.73	113.56	123.11
1	B	8	VAL	C-N-CA	-6.73	113.56	123.11
1	B	51	MET	N-CA-C	-6.64	103.30	111.40
1	A	80	LEU	N-CA-C	-6.63	101.41	111.56
1	D	46	THR	N-CA-C	-6.53	96.89	110.80
1	A	31	MET	CA-C-N	-6.53	113.91	123.05
1	A	31	MET	C-N-CA	-6.53	113.91	123.05
1	B	141	MET	N-CA-C	-6.49	104.12	111.07
1	B	158	ASP	N-CA-C	6.48	121.49	107.49
1	A	10	PHE	CA-C-N	6.47	128.19	120.23
1	A	10	PHE	C-N-CA	6.47	128.19	120.23
1	B	37	ILE	CB-CA-C	6.46	118.93	110.91
1	B	7	LYS	CA-C-N	-6.40	112.33	122.64
1	B	7	LYS	C-N-CA	-6.40	112.33	122.64
1	B	10	PHE	CA-C-N	-6.39	111.85	119.84
1	B	10	PHE	C-N-CA	-6.39	111.85	119.84
1	C	36	VAL	CB-CA-C	-6.36	101.68	110.96
1	D	19	TYR	N-CA-C	6.35	119.02	111.71
1	B	140	VAL	N-CA-C	-6.34	104.09	111.00
1	D	112	VAL	N-CA-C	6.33	117.01	110.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	141	MET	CG-SD-CE	6.29	114.73	100.90
1	B	147	THR	CB-CA-C	-6.26	98.88	109.83
1	C	41	VAL	CB-CA-C	-6.24	103.33	111.25
1	B	68	ILE	N-CA-C	-6.21	103.12	111.44
1	B	147	THR	N-CA-CB	6.19	120.36	110.46
1	D	104	ILE	CA-C-N	-6.11	112.20	119.84
1	D	104	ILE	C-N-CA	-6.11	112.20	119.84
1	B	100	ILE	CB-CA-C	-6.08	101.17	110.95
1	A	27	LYS	N-CA-C	6.07	117.70	111.14
1	C	121	ILE	N-CA-CB	6.04	117.89	111.00
1	D	74	GLU	N-CA-C	6.01	117.50	111.07
1	D	114	GLU	N-CA-C	-6.00	104.37	111.03
1	B	8	VAL	N-CA-C	6.00	118.26	108.97
1	D	20	ARG	NE-CZ-NH2	5.97	124.58	119.20
1	C	123	LEU	N-CA-C	5.95	118.88	108.82
1	B	142	ARG	N-CA-C	5.92	117.74	111.28
1	A	16	GLU	CA-C-N	5.89	127.50	120.14
1	A	16	GLU	C-N-CA	5.89	127.50	120.14
1	C	20	ARG	N-CA-C	5.85	118.61	111.82
1	A	4	MET	N-CA-CB	5.84	120.42	110.50
1	A	87	VAL	N-CA-C	5.83	116.02	110.42
1	D	101	ARG	CG-CD-NE	-5.77	99.31	112.00
1	A	123	LEU	CB-CA-C	-5.76	99.40	108.91
1	A	132	SER	N-CA-C	5.75	123.04	110.80
1	D	36	VAL	CB-CA-C	-5.71	104.41	111.32
1	C	121	ILE	CA-CB-CG2	5.71	120.20	110.50
1	B	94	LYS	N-CA-C	5.68	117.47	111.28
1	A	38	LEU	N-CA-CB	-5.63	102.16	110.49
1	B	104	ILE	N-CA-CB	5.62	118.15	111.23
1	D	147	THR	N-CA-C	5.61	118.97	109.76
1	D	73	LYS	N-CA-C	-5.59	104.88	110.97
1	C	129	LEU	CA-CB-CG	5.59	135.85	116.30
1	B	16	GLU	N-CA-C	-5.58	106.31	113.23
1	A	36	VAL	CA-C-N	-5.56	115.79	122.90
1	A	36	VAL	C-N-CA	-5.56	115.79	122.90
1	D	109	ILE	CB-CA-C	-5.54	104.88	111.97
1	A	88	LYS	N-CA-C	-5.53	104.64	111.33
1	C	45	GLY	N-CA-C	5.51	120.46	113.24
1	B	37	ILE	CA-C-N	-5.50	114.43	122.19
1	B	37	ILE	C-N-CA	-5.50	114.43	122.19
1	B	4	MET	CG-SD-CE	5.49	112.98	100.90
1	C	144	LEU	N-CA-C	5.46	117.94	111.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	27	LYS	CA-C-N	5.45	131.96	121.54
1	B	27	LYS	C-N-CA	5.45	131.96	121.54
1	B	102	PHE	N-CA-C	5.43	117.61	107.99
1	C	38	LEU	CA-C-N	-5.43	114.12	122.87
1	C	38	LEU	C-N-CA	-5.43	114.12	122.87
1	C	102	PHE	CA-C-N	-5.43	113.42	120.91
1	C	102	PHE	C-N-CA	-5.43	113.42	120.91
1	B	150	PRO	CA-C-N	-5.42	115.41	122.94
1	B	150	PRO	C-N-CA	-5.42	115.41	122.94
1	D	78	ARG	NE-CZ-NH2	5.42	124.08	119.20
1	A	97	ARG	NE-CZ-NH1	-5.42	116.08	121.50
1	A	136	LEU	CA-CB-CG	-5.40	97.41	116.30
1	B	31	MET	N-CA-C	-5.36	100.29	108.76
1	B	144	LEU	N-CA-C	5.36	117.12	111.28
1	A	122	ILE	CB-CA-C	-5.33	102.74	110.63
1	A	13	ASP	N-CA-CB	-5.32	102.62	110.49
1	A	25	PHE	N-CA-C	-5.31	105.49	111.28
1	C	4	MET	N-CA-C	5.27	125.74	111.00
1	B	93	ALA	N-CA-C	5.25	118.37	109.76
1	D	110	VAL	N-CA-C	-5.25	104.49	111.05
1	A	41	VAL	CB-CA-C	-5.23	103.93	111.19
1	A	157	VAL	CB-CA-C	5.23	119.86	111.29
1	B	97	ARG	CB-CG-CD	-5.22	99.29	111.30
1	A	4	MET	CB-CA-C	-5.21	100.21	110.10
1	B	44	GLU	N-CA-C	-5.21	99.71	110.80
1	D	49	GLU	N-CA-C	-5.19	107.61	114.31
1	B	142	ARG	CG-CD-NE	-5.19	100.58	112.00
1	A	100	ILE	N-CA-C	-5.19	100.09	107.77
1	A	153	ILE	CB-CA-C	5.19	118.57	111.31
1	B	28	ARG	N-CA-C	5.19	121.85	110.80
1	B	17	GLY	N-CA-C	-5.17	100.92	113.18
1	A	81	GLN	CA-C-N	-5.17	112.84	122.09
1	A	81	GLN	C-N-CA	-5.17	112.84	122.09
1	A	135	PHE	N-CA-CB	5.14	117.64	109.51
1	D	143	VAL	CB-CA-C	-5.14	105.20	112.14
1	B	4	MET	CB-CG-SD	5.12	128.07	112.70
1	C	42	ILE	CB-CA-C	-5.09	103.29	111.59
1	C	89	ARG	NE-CZ-NH2	5.08	123.77	119.20
1	B	157	VAL	CA-C-N	-5.06	115.03	123.33
1	B	157	VAL	C-N-CA	-5.06	115.03	123.33
1	B	144	LEU	CB-CG-CD2	-5.04	95.58	110.70
1	D	145	ARG	N-CA-C	-5.03	100.08	110.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	71	LYS	N-CA-C	-5.01	105.26	111.33

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	48	GLU	Peptide
1	C	49	GLU	Peptide
1	C	50	LEU	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	1171	0	1233	116	0
1	B	1143	0	1194	111	0
1	C	1193	0	1254	139	0
1	D	1152	0	1212	117	0
2	A	6	0	0	1	0
2	B	8	0	0	2	0
2	C	9	0	0	10	0
2	D	5	0	0	7	0
All	All	4687	0	4893	451	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 47.

All (451) 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:C:13:ASP:OD1	1:C:15:SER:HB3	1.31	1.29
1:B:51:MET:HA	1:B:51:MET:CE	1.79	1.13
1:A:48:GLU:HA	1:A:48:GLU:OE2	1.56	1.04
1:A:66:LYS:HA	1:A:66:LYS:NZ	1.73	1.03
1:B:51:MET:HA	1:B:51:MET:HE3	1.38	1.01

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:133:HIS:CD2	1:D:148:LYS:HG3	1.99	0.97
1:C:67:ASP:HA	2:C:177:HOH:O	1.65	0.97
1:B:159:GLU:HB2	2:B:175:HOH:O	1.65	0.96
1:C:121:ILE:CD1	1:C:121:ILE:C	2.38	0.96
1:B:47:LEU:HD23	1:B:102:PHE:HZ	1.31	0.96
1:B:69:LYS:HD3	1:B:70:GLU:N	1.82	0.94
1:C:66:LYS:HD3	1:C:67:ASP:H	1.30	0.94
1:A:133:HIS:HD2	1:D:148:LYS:HG3	1.32	0.93
1:C:121:ILE:C	1:C:121:ILE:HD12	1.91	0.93
1:C:160:ASN:H	1:C:160:ASN:ND2	1.46	0.93
1:C:69:LYS:O	1:C:72:LEU:HB2	1.68	0.92
1:D:68:ILE:HD12	1:D:68:ILE:H	1.35	0.91
1:C:160:ASN:H	1:C:160:ASN:HD22	0.95	0.90
1:A:104:ILE:H	1:A:104:ILE:CD1	1.84	0.90
1:B:106:TRP:CG	1:B:142:ARG:HG2	2.05	0.90
1:B:31:MET:CE	1:C:31:MET:HE3	2.02	0.89
1:A:157:VAL:HG22	1:A:158:ASP:H	1.38	0.89
1:C:160:ASN:HD22	1:C:160:ASN:N	1.71	0.89
1:C:121:ILE:HD13	1:C:122:ILE:N	1.88	0.89
1:D:44:GLU:HB2	1:D:102:PHE:CE1	2.09	0.88
1:C:106:TRP:HD1	1:C:142:ARG:HH21	1.21	0.86
1:A:156:GLU:OE1	1:A:157:VAL:HG12	1.76	0.84
1:D:133:HIS:CD2	1:D:134:GLU:H	1.95	0.84
1:D:15:SER:HB3	1:D:18:ALA:H	1.43	0.83
1:C:128:LYS:HE3	1:C:138:SER:H	1.43	0.83
1:B:47:LEU:HD23	1:B:102:PHE:CZ	2.14	0.83
1:D:12:THR:CG2	1:D:12:THR:O	2.24	0.83
1:A:104:ILE:CD1	1:A:107:ASP:HB3	2.08	0.82
1:C:116:GLU:HA	1:C:116:GLU:OE1	1.76	0.82
1:B:31:MET:HE3	1:C:31:MET:HE3	1.59	0.82
1:B:51:MET:HG2	1:B:66:LYS:NZ	1.95	0.82
1:C:13:ASP:OD1	1:C:15:SER:CB	2.22	0.81
1:A:48:GLU:C	1:A:50:LEU:H	1.88	0.81
1:A:20:ARG:O	1:A:24:VAL:HG23	1.80	0.81
1:C:106:TRP:CD1	1:C:142:ARG:HH21	1.98	0.81
1:B:44:GLU:HB2	1:B:102:PHE:CE2	2.15	0.81
1:D:12:THR:O	1:D:12:THR:HG23	1.81	0.81
1:B:69:LYS:HD3	1:B:70:GLU:H	1.42	0.80
1:C:67:ASP:OD1	1:C:68:ILE:N	2.15	0.80
1:A:4:MET:N	1:A:6:ARG:HH12	1.80	0.79
1:C:49:GLU:C	2:C:174:HOH:O	2.26	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:20:ARG:HD2	1:A:23:GLU:OE1	1.84	0.78
1:B:20:ARG:HH12	1:B:27:LYS:HZ1	1.31	0.78
1:A:91:PHE:HD1	1:A:91:PHE:H	1.32	0.78
1:C:72:LEU:HD13	2:C:175:HOH:O	1.84	0.78
1:D:44:GLU:HB2	1:D:102:PHE:CZ	2.19	0.77
1:A:33:VAL:HG23	1:A:91:PHE:O	1.85	0.77
1:A:66:LYS:HA	1:A:66:LYS:HZ3	1.47	0.77
1:D:7:LYS:HD3	1:D:37:ILE:HD11	1.67	0.77
1:C:38:LEU:HD13	1:C:80:LEU:HD12	1.66	0.76
1:D:133:HIS:CD2	1:D:134:GLU:N	2.54	0.76
1:B:147:THR:HB	1:B:149:LYS:H	1.51	0.76
1:C:121:ILE:CD1	1:C:122:ILE:N	2.47	0.75
1:A:104:ILE:H	1:A:104:ILE:HD13	1.51	0.75
1:A:66:LYS:HA	1:A:66:LYS:CE	2.16	0.75
1:C:20:ARG:O	1:C:23:GLU:HB2	1.86	0.75
1:B:51:MET:HG2	1:B:66:LYS:HZ3	1.49	0.74
1:A:33:VAL:HG21	1:A:91:PHE:HB3	1.69	0.74
1:B:47:LEU:HD12	1:B:47:LEU:O	1.88	0.74
1:A:48:GLU:C	1:A:50:LEU:N	2.46	0.74
1:C:69:LYS:CE	1:C:69:LYS:HA	2.18	0.73
1:A:44:GLU:OE2	1:A:103:GLY:HA2	1.88	0.73
1:A:91:PHE:CD1	1:A:91:PHE:N	2.55	0.73
1:C:69:LYS:HA	1:C:69:LYS:NZ	2.03	0.73
1:D:33:VAL:O	1:D:93:ALA:HA	1.89	0.73
1:A:13:ASP:C	1:A:15:SER:H	1.97	0.72
1:C:66:LYS:HD3	1:C:67:ASP:N	2.03	0.72
1:C:20:ARG:HH11	1:C:20:ARG:HG2	1.54	0.72
1:C:45:GLY:O	1:C:48:GLU:HG2	1.90	0.72
1:C:4:MET:O	1:C:4:MET:HG3	1.89	0.72
1:A:73:LYS:O	1:A:76:ALA:HB3	1.90	0.71
1:C:7:LYS:HD2	1:C:118:VAL:HA	1.72	0.71
1:C:73:LYS:HG3	1:C:73:LYS:O	1.90	0.71
1:D:139:THR:O	1:D:143:VAL:HG22	1.91	0.71
1:C:86:GLU:OE1	1:C:86:GLU:HA	1.89	0.71
1:A:157:VAL:CG2	1:A:158:ASP:H	2.03	0.71
1:B:31:MET:HE2	1:C:31:MET:CE	2.21	0.71
1:B:106:TRP:CD2	1:B:142:ARG:HG2	2.26	0.70
1:B:51:MET:HA	1:B:51:MET:HE2	1.72	0.70
1:D:100:ILE:N	1:D:100:ILE:HD12	2.06	0.70
1:C:89:ARG:HG3	1:C:90:ALA:N	2.07	0.70
1:A:145:ARG:HG3	1:D:134:GLU:O	1.92	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:31:MET:HE2	1:C:31:MET:HE3	1.72	0.70
1:D:140:VAL:O	1:D:144:LEU:HB2	1.92	0.70
1:B:147:THR:O	1:C:155:LYS:NZ	2.22	0.69
1:A:27:LYS:HD2	1:A:27:LYS:O	1.93	0.69
1:C:67:ASP:O	1:C:69:LYS:N	2.26	0.69
1:D:48:GLU:C	2:D:174:HOH:O	2.35	0.69
1:B:51:MET:HE3	1:B:51:MET:CA	2.20	0.69
1:A:134:GLU:OE2	1:D:145:ARG:NH1	2.24	0.68
1:B:144:LEU:HG	1:C:136:LEU:HD11	1.75	0.67
1:B:31:MET:HE1	1:C:5:PHE:CD1	2.29	0.67
1:B:145:ARG:NH1	1:C:134:GLU:OE2	2.27	0.67
1:C:106:TRP:HB3	1:C:139:THR:HG22	1.75	0.67
1:B:68:ILE:HG22	1:B:72:LEU:HD22	1.77	0.67
1:C:106:TRP:HD1	1:C:142:ARG:NH2	1.93	0.67
1:D:157:VAL:HG12	1:D:158:ASP:H	1.59	0.67
1:B:20:ARG:NH2	1:B:23:GLU:OE1	2.26	0.67
1:A:39:LEU:HD12	1:A:40:HIS:H	1.60	0.66
1:C:72:LEU:C	2:C:176:HOH:O	2.38	0.66
1:B:47:LEU:HD11	1:B:66:LYS:HD2	1.77	0.66
1:A:101:ARG:NH2	1:A:101:ARG:HG3	2.11	0.66
1:D:20:ARG:HD2	1:D:156:GLU:OE2	1.96	0.65
1:A:101:ARG:HG3	1:A:101:ARG:HH21	1.61	0.65
1:A:6:ARG:HG2	1:A:6:ARG:HH11	1.61	0.65
1:A:101:ARG:HH21	1:A:101:ARG:CG	2.10	0.65
1:A:104:ILE:HD11	1:A:107:ASP:HB3	1.79	0.65
1:B:153:ILE:HD12	1:B:153:ILE:N	2.12	0.65
1:C:75:GLU:OE1	1:C:78:ARG:NH1	2.26	0.64
1:B:133:HIS:ND1	1:B:133:HIS:C	2.56	0.64
1:D:4:MET:CG	1:D:4:MET:O	2.46	0.64
1:A:104:ILE:H	1:A:104:ILE:HD12	1.59	0.64
1:C:39:LEU:HD12	1:C:40:HIS:N	2.12	0.64
1:B:66:LYS:O	1:B:69:LYS:HG3	1.98	0.64
1:A:4:MET:N	1:A:6:ARG:NH1	2.46	0.63
1:C:8:VAL:HG13	1:C:122:ILE:CG2	2.28	0.63
1:A:69:LYS:O	1:A:72:LEU:HB2	1.99	0.63
1:B:106:TRP:CD1	1:B:142:ARG:HG2	2.33	0.63
1:C:32:GLU:OE2	1:C:94:LYS:HD3	1.98	0.63
1:D:35:GLU:OE1	1:D:97:ARG:HD3	1.99	0.63
1:D:68:ILE:HD12	1:D:68:ILE:N	2.12	0.63
1:D:139:THR:HB	2:D:173:HOH:O	1.97	0.63
1:B:89:ARG:HH21	1:B:89:ARG:HB3	1.64	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:20:ARG:NH2	1:B:23:GLU:HB2	2.14	0.62
1:B:24:VAL:O	1:B:28:ARG:HB2	1.98	0.62
1:D:83:LYS:HG3	1:D:83:LYS:O	1.93	0.62
1:D:7:LYS:HE3	1:D:116:GLU:O	2.00	0.62
1:D:49:GLU:C	2:D:174:HOH:O	2.43	0.62
1:A:145:ARG:HH11	1:D:136:LEU:HD22	1.64	0.62
1:A:153:ILE:HD11	1:A:155:LYS:HE2	1.80	0.62
1:B:49:GLU:O	1:B:52:ASP:HB2	2.00	0.62
1:C:69:LYS:NZ	1:C:72:LEU:HG	2.14	0.62
1:B:67:ASP:OD2	1:B:69:LYS:HD2	1.99	0.62
1:B:136:LEU:HD12	1:B:141:MET:HG3	1.81	0.61
1:B:66:LYS:O	1:B:66:LYS:HG3	2.00	0.61
1:B:106:TRP:O	1:B:106:TRP:CE3	2.53	0.61
1:B:24:VAL:CG1	1:B:154:ILE:HD12	2.29	0.61
1:A:39:LEU:HD13	1:A:99:ILE:HB	1.81	0.61
1:C:26:GLU:CG	1:C:27:LYS:HE2	2.31	0.61
1:A:145:ARG:NH1	1:D:136:LEU:HD22	2.16	0.61
1:A:104:ILE:CD1	1:A:104:ILE:N	2.55	0.60
1:A:153:ILE:HD13	1:A:153:ILE:O	1.99	0.60
1:B:44:GLU:HB2	1:B:102:PHE:CZ	2.36	0.60
1:C:51:MET:O	1:C:52:ASP:OD1	2.20	0.60
1:C:39:LEU:HD12	1:C:40:HIS:H	1.65	0.60
1:B:125:SER:CB	1:B:155:LYS:HG2	2.30	0.60
1:C:129:LEU:HA	2:C:173:HOH:O	2.01	0.60
1:C:159:GLU:HB3	1:C:160:ASN:HD22	1.67	0.60
1:C:116:GLU:OE1	1:C:116:GLU:CA	2.47	0.60
1:D:66:LYS:HA	1:D:68:ILE:HD11	1.82	0.60
1:D:88:LYS:HE3	1:D:94:LYS:C	2.27	0.60
1:D:88:LYS:HE3	1:D:94:LYS:O	2.01	0.60
1:C:106:TRP:CZ3	1:C:146:LYS:HG3	2.36	0.60
1:D:49:GLU:N	2:D:174:HOH:O	2.34	0.60
1:A:105:PRO:O	1:A:109:ILE:HG12	2.02	0.60
1:C:40:HIS:CE1	1:C:42:ILE:HD13	2.36	0.60
1:C:160:ASN:ND2	1:C:160:ASN:N	2.28	0.59
1:A:73:LYS:C	1:A:73:LYS:HD2	2.28	0.59
1:A:13:ASP:C	1:A:15:SER:N	2.59	0.59
1:A:106:TRP:C	1:A:106:TRP:CD1	2.81	0.59
1:C:26:GLU:HG3	1:C:27:LYS:HE2	1.85	0.59
1:D:49:GLU:CA	2:D:174:HOH:O	2.50	0.59
1:C:38:LEU:HD13	1:C:80:LEU:CD1	2.32	0.59
1:D:112:VAL:HG12	1:D:113:ALA:N	2.18	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:75:GLU:OE1	1:C:75:GLU:HA	2.04	0.58
1:D:69:LYS:O	1:D:72:LEU:N	2.35	0.58
1:A:125:SER:HB3	1:A:155:LYS:HG3	1.84	0.58
1:D:4:MET:CE	1:D:150:PRO:HG2	2.34	0.57
1:B:106:TRP:CE3	1:B:106:TRP:C	2.82	0.57
1:C:13:ASP:O	1:C:14:PHE:C	2.46	0.57
1:A:9:LEU:HD13	1:A:10:PHE:N	2.20	0.57
1:A:42:ILE:HG23	1:A:102:PHE:CE2	2.39	0.57
1:C:20:ARG:HG2	1:C:20:ARG:NH1	2.20	0.57
1:C:67:ASP:C	1:C:69:LYS:H	2.11	0.57
1:C:67:ASP:C	1:C:69:LYS:N	2.63	0.57
1:B:20:ARG:HH12	1:B:27:LYS:NZ	2.00	0.57
1:A:145:ARG:O	1:D:134:GLU:HB2	2.04	0.57
1:A:154:ILE:HD11	1:D:4:MET:HE1	1.85	0.57
1:C:48:GLU:O	1:C:51:MET:N	2.38	0.57
1:A:48:GLU:O	1:A:50:LEU:N	2.21	0.56
1:B:19:TYR:CE1	1:B:83:LYS:HE3	2.40	0.56
1:A:106:TRP:O	1:A:110:VAL:HG23	2.06	0.56
1:B:31:MET:CE	1:C:31:MET:CE	2.78	0.56
1:D:47:LEU:HD11	1:D:68:ILE:HD13	1.87	0.56
1:D:107:ASP:O	1:D:111:LYS:HG3	2.04	0.56
1:C:96:VAL:HG22	1:C:97:ARG:N	2.20	0.56
1:C:24:VAL:CG1	1:C:28:ARG:HD2	2.35	0.56
1:D:75:GLU:HA	1:D:78:ARG:NH1	2.20	0.56
1:C:75:GLU:OE2	1:C:79:LYS:HE3	2.06	0.56
1:D:97:ARG:NH2	1:D:99:ILE:HD11	2.21	0.56
1:D:13:ASP:OD1	1:D:14:PHE:N	2.39	0.55
1:D:133:HIS:CG	1:D:134:GLU:N	2.73	0.55
1:C:77:SER:O	1:C:78:ARG:C	2.45	0.55
1:D:79:LYS:O	1:D:83:LYS:HB3	2.06	0.55
1:D:106:TRP:CD2	1:D:142:ARG:HG2	2.42	0.55
1:A:49:GLU:HG3	1:A:49:GLU:O	2.07	0.55
1:A:133:HIS:CD2	1:D:148:LYS:CG	2.84	0.55
1:B:110:VAL:HG22	1:B:147:THR:HG23	1.89	0.55
1:A:104:ILE:HD13	1:A:104:ILE:N	2.18	0.55
1:D:145:ARG:NH1	1:D:146:LYS:NZ	2.55	0.55
1:B:101:ARG:NH1	1:B:108:GLU:OE2	2.40	0.54
1:B:106:TRP:CD2	1:B:106:TRP:C	2.85	0.54
1:D:114:GLU:O	1:D:115:GLU:C	2.46	0.54
1:B:133:HIS:C	1:B:133:HIS:HD1	2.16	0.54
1:C:67:ASP:CA	2:C:177:HOH:O	2.36	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:24:VAL:HG12	1:A:28:ARG:HD2	1.89	0.54
1:A:134:GLU:HG2	1:D:145:ARG:O	2.06	0.54
1:D:51:MET:HE3	1:D:51:MET:HA	1.88	0.54
1:C:128:LYS:CE	1:C:138:SER:H	2.17	0.54
1:D:12:THR:O	1:D:12:THR:HG22	2.08	0.54
1:B:41:VAL:HG22	1:B:101:ARG:HB2	1.89	0.54
1:B:106:TRP:CE3	1:B:107:ASP:HA	2.42	0.54
1:A:33:VAL:CG2	1:A:91:PHE:O	2.54	0.54
1:A:101:ARG:NH2	1:A:101:ARG:CG	2.71	0.53
1:B:13:ASP:OD1	1:B:15:SER:HB3	2.06	0.53
1:B:106:TRP:O	1:B:106:TRP:HE3	1.89	0.53
1:B:107:ASP:O	1:B:111:LYS:HD3	2.09	0.53
1:D:133:HIS:CE1	1:D:134:GLU:HB3	2.43	0.53
1:A:104:ILE:O	1:A:105:PRO:C	2.50	0.53
1:C:46:THR:C	1:C:48:GLU:H	2.17	0.53
1:C:104:ILE:HG23	1:C:107:ASP:HB3	1.89	0.53
1:A:43:ASP:HB3	1:A:46:THR:OG1	2.08	0.53
1:A:132:SER:HB3	2:A:176:HOH:O	2.07	0.53
1:B:20:ARG:O	1:B:24:VAL:HG23	2.08	0.53
1:C:106:TRP:CD1	1:C:142:ARG:HD2	2.43	0.53
1:C:36:VAL:HG23	1:C:93:ALA:CB	2.39	0.53
1:C:66:LYS:CD	1:C:67:ASP:H	2.13	0.53
1:D:51:MET:N	2:D:174:HOH:O	2.41	0.53
1:B:4:MET:HG3	1:B:4:MET:O	2.09	0.52
1:D:7:LYS:HD3	1:D:37:ILE:CD1	2.39	0.52
1:D:100:ILE:HD12	1:D:100:ILE:H	1.73	0.52
1:D:8:VAL:HG11	1:D:122:ILE:CD1	2.39	0.52
1:D:13:ASP:O	1:D:14:PHE:HB2	2.09	0.52
1:D:126:ARG:HH12	1:D:155:LYS:HE2	1.73	0.52
1:A:16:GLU:OE1	1:A:16:GLU:HA	2.10	0.52
1:B:79:LYS:O	1:B:83:LYS:HB2	2.10	0.52
1:B:123:LEU:HD23	1:B:140:VAL:HG13	1.92	0.51
1:A:66:LYS:HA	1:A:66:LYS:HZ2	1.67	0.51
1:C:128:LYS:HE3	1:C:138:SER:N	2.20	0.51
1:D:75:GLU:HA	1:D:78:ARG:HH11	1.74	0.51
1:A:136:LEU:HD23	1:A:141:MET:SD	2.50	0.51
1:B:100:ILE:HG22	1:B:101:ARG:N	2.26	0.51
1:C:71:LYS:O	1:C:74:GLU:HG3	2.10	0.51
1:C:108:GLU:O	1:C:111:LYS:HB2	2.09	0.51
1:A:6:ARG:HG2	1:A:119:SER:HB3	1.91	0.51
1:C:49:GLU:C	1:C:51:MET:H	2.19	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:12:THR:CG2	1:B:12:THR:O	2.57	0.51
1:C:89:ARG:CG	1:C:90:ALA:N	2.72	0.51
1:D:142:ARG:O	1:D:142:ARG:HG3	2.09	0.51
1:D:156:GLU:HG3	1:D:157:VAL:H	1.76	0.51
1:C:105:PRO:O	1:C:109:ILE:HG13	2.11	0.51
1:C:156:GLU:OE1	1:C:157:VAL:HG12	2.11	0.51
1:B:5:PHE:HB2	1:C:31:MET:SD	2.50	0.50
1:D:9:LEU:HD23	1:D:121:ILE:HG12	1.93	0.50
1:D:88:LYS:CE	1:D:94:LYS:O	2.59	0.50
1:D:20:ARG:O	1:D:24:VAL:HG23	2.10	0.50
1:A:4:MET:HG3	1:D:29:ASN:HD22	1.77	0.50
1:D:27:LYS:HG3	1:D:157:VAL:HG21	1.93	0.50
1:A:42:ILE:HG23	1:A:102:PHE:CD2	2.47	0.50
1:B:87:VAL:O	1:B:88:LYS:C	2.54	0.50
1:D:10:PHE:O	1:D:38:LEU:HD12	2.12	0.50
1:A:39:LEU:HD12	1:A:99:ILE:O	2.12	0.50
1:A:116:GLU:O	1:A:117:ASN:C	2.55	0.49
1:C:13:ASP:CG	1:C:15:SER:HB3	2.27	0.49
1:C:41:VAL:HG11	1:C:105:PRO:HA	1.94	0.49
1:C:157:VAL:HG22	1:C:158:ASP:N	2.26	0.49
1:B:13:ASP:HA	1:B:40:HIS:HD2	1.77	0.49
1:C:14:PHE:CE1	1:C:40:HIS:CD2	3.00	0.49
1:B:12:THR:OG1	1:B:83:LYS:NZ	2.46	0.49
1:D:140:VAL:HG22	1:D:141:MET:N	2.28	0.48
1:A:112:VAL:O	1:A:113:ALA:C	2.56	0.48
1:C:86:GLU:O	1:C:89:ARG:HG2	2.13	0.48
1:A:27:LYS:HD2	1:A:27:LYS:C	2.38	0.48
1:A:101:ARG:HH21	1:A:101:ARG:CB	2.26	0.48
1:B:43:ASP:O	1:B:45:GLY:N	2.46	0.48
1:B:19:TYR:CD1	1:B:83:LYS:HE3	2.49	0.48
1:B:21:ALA:HB2	1:B:124:PRO:HB3	1.95	0.48
1:C:69:LYS:HA	1:C:69:LYS:HE2	1.95	0.48
1:A:13:ASP:O	1:A:15:SER:N	2.47	0.48
1:C:127:GLY:O	1:C:128:LYS:C	2.56	0.48
1:D:145:ARG:NH1	1:D:146:LYS:HZ2	2.12	0.48
1:B:73:LYS:O	1:B:76:ALA:HB3	2.14	0.47
1:C:159:GLU:HB3	1:C:160:ASN:ND2	2.29	0.47
1:A:66:LYS:O	1:A:67:ASP:OD2	2.32	0.47
1:B:38:LEU:HA	1:B:38:LEU:HD12	1.47	0.47
1:D:38:LEU:HD12	1:D:39:LEU:N	2.29	0.47
1:C:50:LEU:N	2:C:174:HOH:O	2.42	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:133:HIS:O	1:D:135:PHE:N	2.43	0.47
1:B:51:MET:HG2	1:B:66:LYS:HZ2	1.75	0.47
1:A:26:GLU:HB2	1:A:90:ALA:HB1	1.96	0.47
1:A:39:LEU:HD12	1:A:40:HIS:N	2.27	0.47
1:A:104:ILE:HG12	1:A:107:ASP:CB	2.44	0.47
1:A:151:VAL:O	1:D:152:LEU:HA	2.14	0.47
1:A:153:ILE:HD11	1:A:155:LYS:CE	2.45	0.47
1:C:69:LYS:HZ1	1:C:72:LEU:HG	1.79	0.47
1:D:133:HIS:C	1:D:135:PHE:H	2.22	0.47
1:A:75:GLU:OE1	1:A:75:GLU:HA	2.14	0.47
1:B:31:MET:HE1	1:C:5:PHE:CG	2.49	0.47
1:B:145:ARG:NH2	2:B:177:HOH:O	2.48	0.47
1:D:44:GLU:O	1:D:44:GLU:HG2	2.13	0.47
1:C:110:VAL:O	1:C:110:VAL:HG12	2.15	0.47
1:A:47:LEU:O	1:A:50:LEU:N	2.48	0.47
1:D:6:ARG:O	1:D:34:GLY:HA3	2.15	0.47
1:A:45:GLY:O	1:A:48:GLU:HB2	2.14	0.46
1:A:87:VAL:HG13	1:A:91:PHE:CE1	2.49	0.46
1:B:89:ARG:HB3	1:B:89:ARG:NH2	2.30	0.46
1:C:29:ASN:ND2	1:C:31:MET:O	2.34	0.46
1:D:133:HIS:NE2	1:D:134:GLU:HB3	2.30	0.46
1:C:140:VAL:O	1:C:141:MET:C	2.56	0.46
1:B:12:THR:O	1:B:12:THR:HG23	2.12	0.46
1:C:79:LYS:O	1:C:82:GLU:HB2	2.15	0.46
1:C:75:GLU:HB2	2:C:175:HOH:O	2.15	0.46
1:D:8:VAL:CG1	1:D:122:ILE:HD11	2.46	0.46
1:D:105:PRO:O	1:D:106:TRP:C	2.58	0.46
1:D:138:SER:HA	1:D:141:MET:HE2	1.98	0.46
1:A:104:ILE:CG1	1:A:107:ASP:HB3	2.46	0.46
1:D:7:LYS:HD2	1:D:118:VAL:HA	1.98	0.46
1:B:35:GLU:OE1	1:B:97:ARG:HD3	2.16	0.45
1:B:142:ARG:HE	1:B:142:ARG:HB2	1.23	0.45
1:D:8:VAL:CG1	1:D:122:ILE:CD1	2.94	0.45
1:B:24:VAL:HG12	1:B:28:ARG:HG3	1.98	0.45
1:C:49:GLU:C	1:C:51:MET:N	2.74	0.45
1:A:80:LEU:HD12	1:A:100:ILE:CD1	2.47	0.45
1:D:145:ARG:HH12	1:D:146:LYS:NZ	2.13	0.45
1:A:128:LYS:HE2	1:A:128:LYS:HB2	1.77	0.45
1:A:145:ARG:CZ	1:D:136:LEU:HB2	2.46	0.45
1:C:5:PHE:O	1:C:6:ARG:C	2.58	0.45
1:C:11:PRO:HA	1:C:39:LEU:O	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:122:ILE:HB	1:C:152:LEU:HB3	1.97	0.45
1:A:157:VAL:CG2	1:A:158:ASP:N	2.77	0.45
1:B:24:VAL:HG21	1:B:155:LYS:O	2.17	0.45
1:C:67:ASP:OD1	1:C:67:ASP:C	2.59	0.45
1:D:8:VAL:HG11	1:D:122:ILE:HD11	1.96	0.45
1:D:91:PHE:N	1:D:91:PHE:CD1	2.85	0.45
1:D:156:GLU:HG3	1:D:157:VAL:N	2.31	0.45
1:A:43:ASP:HA	1:A:103:GLY:O	2.17	0.45
1:B:20:ARG:NH1	1:B:27:LYS:HZ1	2.09	0.44
1:D:26:GLU:O	1:D:26:GLU:HG2	2.12	0.44
1:B:148:LYS:NZ	1:C:133:HIS:HB2	2.32	0.44
1:C:141:MET:O	1:C:145:ARG:HG3	2.17	0.44
1:B:121:ILE:HG22	1:B:123:LEU:HD13	1.99	0.44
1:C:68:ILE:HA	2:C:179:HOH:O	2.17	0.44
1:A:133:HIS:O	1:A:133:HIS:CG	2.70	0.44
1:B:67:ASP:HA	1:B:69:LYS:HD2	1.99	0.44
1:B:87:VAL:O	1:B:91:PHE:HB2	2.18	0.44
1:D:144:LEU:HD23	1:D:144:LEU:HA	1.76	0.44
1:A:23:GLU:O	1:A:26:GLU:N	2.51	0.44
1:A:32:GLU:O	1:A:32:GLU:HG3	2.15	0.44
1:B:37:ILE:HG21	1:B:99:ILE:HD12	1.99	0.44
1:C:69:LYS:HZ3	1:C:72:LEU:HG	1.81	0.43
1:D:41:VAL:HA	1:D:101:ARG:O	2.18	0.43
1:B:105:PRO:O	1:B:109:ILE:HG13	2.17	0.43
1:C:131:LEU:HB2	1:C:132:SER:H	1.58	0.43
1:D:81:GLN:C	1:D:83:LYS:H	2.26	0.43
1:D:47:LEU:C	1:D:47:LEU:HD12	2.43	0.43
1:D:89:ARG:O	1:D:91:PHE:O	2.37	0.43
1:B:112:VAL:O	1:B:113:ALA:C	2.60	0.43
1:D:29:ASN:OD1	1:D:31:MET:O	2.36	0.43
1:A:121:ILE:HD11	1:A:123:LEU:HD11	2.00	0.43
1:A:145:ARG:HD2	1:D:136:LEU:HD13	2.00	0.43
1:B:4:MET:HB2	1:C:29:ASN:HA	1.99	0.43
1:C:77:SER:O	1:C:78:ARG:O	2.36	0.43
1:A:6:ARG:HG3	1:A:7:LYS:N	2.32	0.43
1:C:20:ARG:HA	1:C:23:GLU:HG3	2.00	0.43
1:A:125:SER:CB	1:A:155:LYS:HG3	2.49	0.43
1:A:143:VAL:O	1:A:144:LEU:C	2.62	0.43
1:C:42:ILE:HD11	1:C:76:ALA:HB2	2.00	0.43
1:D:29:ASN:HD21	1:D:31:MET:HB2	1.84	0.43
1:D:94:LYS:HB2	1:D:94:LYS:HE3	1.90	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:48:GLU:OE2	1:C:48:GLU:HA	2.19	0.43
1:D:4:MET:HE1	1:D:150:PRO:HG2	2.00	0.43
1:B:5:PHE:HE2	1:B:120:LEU:CD2	2.32	0.42
1:B:5:PHE:HE2	1:B:120:LEU:HD22	1.83	0.42
1:B:75:GLU:O	1:B:75:GLU:HG3	2.19	0.42
1:D:4:MET:O	1:D:4:MET:HG3	2.18	0.42
1:D:109:ILE:O	1:D:110:VAL:C	2.60	0.42
1:D:157:VAL:HG12	1:D:158:ASP:N	2.28	0.42
1:A:23:GLU:O	1:A:24:VAL:C	2.61	0.42
1:C:70:GLU:C	1:C:72:LEU:N	2.75	0.42
1:D:74:GLU:O	1:D:75:GLU:C	2.60	0.42
1:A:78:ARG:NE	1:A:78:ARG:HA	2.34	0.42
1:B:69:LYS:HD3	1:B:69:LYS:C	2.41	0.42
1:B:106:TRP:CD2	1:B:142:ARG:CG	2.99	0.42
1:D:91:PHE:N	1:D:91:PHE:HD1	2.17	0.42
1:B:83:LYS:O	1:B:84:ALA:C	2.62	0.42
1:C:112:VAL:HA	1:C:115:GLU:HB2	2.01	0.42
1:B:16:GLU:H	1:B:16:GLU:HG3	1.53	0.42
1:B:17:GLY:O	1:B:21:ALA:N	2.45	0.42
1:B:53:GLY:O	1:B:54:TYR:CD1	2.73	0.42
1:D:105:PRO:O	1:D:108:GLU:N	2.53	0.42
1:D:140:VAL:O	1:D:143:VAL:HG23	2.20	0.42
1:D:149:LYS:HD2	1:D:149:LYS:HA	1.69	0.42
1:A:7:LYS:HD2	1:A:118:VAL:HA	2.02	0.42
1:A:104:ILE:HG12	1:A:107:ASP:HB2	2.02	0.42
1:C:49:GLU:HA	1:C:51:MET:H	1.84	0.42
1:C:89:ARG:CG	1:C:90:ALA:H	2.33	0.42
1:B:152:LEU:HD12	1:C:151:VAL:O	2.19	0.42
1:C:121:ILE:HD12	1:C:121:ILE:O	2.16	0.42
1:A:87:VAL:O	1:A:88:LYS:C	2.63	0.41
1:C:49:GLU:CA	1:C:51:MET:H	2.32	0.41
1:A:6:ARG:HG2	1:A:6:ARG:NH1	2.31	0.41
1:C:36:VAL:CG2	1:C:93:ALA:CB	2.98	0.41
1:B:20:ARG:HA	1:B:23:GLU:HG3	2.01	0.41
1:C:88:LYS:HD2	1:C:96:VAL:HG12	2.02	0.41
1:C:96:VAL:CG2	1:C:97:ARG:N	2.82	0.41
1:A:13:ASP:HB3	1:A:18:ALA:HB2	2.00	0.41
1:A:104:ILE:HG12	1:A:107:ASP:HB3	2.01	0.41
1:A:158:ASP:HB3	1:A:159:GLU:H	1.66	0.41
1:D:35:GLU:HA	1:D:95:ASN:O	2.20	0.41
1:D:104:ILE:HB	1:D:107:ASP:HB3	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:126:ARG:O	1:D:127:GLY:C	2.63	0.41
1:A:42:ILE:CG2	1:A:102:PHE:CE2	3.03	0.41
1:B:108:GLU:O	1:B:112:VAL:HG23	2.20	0.41
1:C:23:GLU:O	1:C:24:VAL:C	2.64	0.41
1:D:6:ARG:HE	1:D:6:ARG:HB3	1.73	0.41
1:D:76:ALA:O	1:D:78:ARG:N	2.53	0.41
1:C:126:ARG:O	1:C:128:LYS:N	2.53	0.41
1:C:17:GLY:HA3	1:C:127:GLY:HA2	2.02	0.41
1:C:33:VAL:HG11	1:C:36:VAL:HG22	2.03	0.41
1:C:42:ILE:N	1:C:101:ARG:O	2.53	0.41
1:A:24:VAL:HG12	1:A:28:ARG:HG3	2.02	0.41
1:B:29:ASN:HA	1:C:4:MET:HB2	2.02	0.41
1:B:136:LEU:HB3	1:C:145:ARG:NH1	2.36	0.41
1:C:123:LEU:CB	1:C:124:PRO:HD2	2.51	0.41
1:A:5:PHE:HD2	1:D:31:MET:SD	2.43	0.41
1:A:99:ILE:CG2	1:A:101:ARG:HD3	2.51	0.41
1:D:19:TYR:O	1:D:22:VAL:HG12	2.21	0.41
1:B:24:VAL:HG11	1:B:154:ILE:HD12	2.00	0.41
1:B:125:SER:HB2	1:B:155:LYS:HG2	2.01	0.41
1:B:153:ILE:HD12	1:B:153:ILE:H	1.85	0.40
1:C:13:ASP:OD1	1:C:13:ASP:C	2.64	0.40
1:C:144:LEU:HD23	1:C:144:LEU:HA	1.54	0.40
1:D:106:TRP:HD1	2:D:173:HOH:O	2.04	0.40
1:A:6:ARG:HH11	1:A:6:ARG:CG	2.30	0.40
1:B:92:ARG:O	1:B:92:ARG:CG	2.69	0.40
1:B:110:VAL:O	1:B:110:VAL:HG12	2.19	0.40
1:D:4:MET:O	1:D:4:MET:HG2	2.19	0.40
1:A:68:ILE:O	1:A:72:LEU:HD22	2.21	0.40
1:B:100:ILE:CG2	1:B:101:ARG:N	2.83	0.40
1:C:67:ASP:CB	2:C:177:HOH:O	2.67	0.40
1:A:76:ALA:O	1:A:78:ARG:N	2.54	0.40
1:A:157:VAL:HG22	1:A:158:ASP:N	2.19	0.40
1:B:24:VAL:HG12	1:B:154:ILE:HD12	2.01	0.40
1:D:67:ASP:C	1:D:69:LYS:N	2.74	0.40
1:B:144:LEU:HD11	1:C:153:ILE:HG13	2.03	0.40
1:C:10:PHE:HA	1:C:11:PRO:HD3	1.90	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	137/170 (81%)	108 (79%)	20 (15%)	9 (7%)	1	1
1	B	133/170 (78%)	108 (81%)	22 (16%)	3 (2%)	5	9
1	C	142/170 (84%)	110 (78%)	23 (16%)	9 (6%)	1	1
1	D	135/170 (79%)	104 (77%)	20 (15%)	11 (8%)	1	0
All	All	547/680 (80%)	430 (79%)	85 (16%)	32 (6%)	1	1

All (32) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	14	PHE
1	A	49	GLU
1	B	116	GLU
1	C	68	ILE
1	C	128	LYS
1	C	130	SER
1	D	66	LYS
1	D	77	SER
1	D	134	GLU
1	A	77	SER
1	B	79	LYS
1	C	73	LYS
1	C	127	GLY
1	D	34	GLY
1	D	52	ASP
1	D	118	VAL
1	A	141	MET
1	C	125	SER
1	C	137	GLY
1	D	14	PHE
1	D	69	LYS
1	D	144	LEU

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Mol	Chain	Res	Type
1	A	78	ARG
1	C	49	GLU
1	C	78	ARG
1	D	105	PRO
1	D	145	ARG
1	A	132	SER
1	B	11	PRO
1	A	105	PRO
1	A	140	VAL
1	A	157	VAL

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	130/152 (86%)	90 (69%)	40 (31%)	0	0
1	B	126/152 (83%)	89 (71%)	37 (29%)	0	0
1	C	133/152 (88%)	91 (68%)	42 (32%)	0	0
1	D	127/152 (84%)	91 (72%)	36 (28%)	0	0
All	All	516/608 (85%)	361 (70%)	155 (30%)	0	0

All (155) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	MET
1	A	6	ARG
1	A	8	VAL
1	A	9	LEU
1	A	26	GLU
1	A	27	LYS
1	A	32	GLU
1	A	36	VAL
1	A	44	GLU
1	A	46	THR
1	A	48	GLU

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Mol	Chain	Res	Type
1	A	49	GLU
1	A	64	GLU
1	A	66	LYS
1	A	72	LEU
1	A	77	SER
1	A	78	ARG
1	A	79	LYS
1	A	80	LEU
1	A	82	GLU
1	A	86	GLU
1	A	92	ARG
1	A	94	LYS
1	A	96	VAL
1	A	101	ARG
1	A	104	ILE
1	A	116	GLU
1	A	121	ILE
1	A	123	LEU
1	A	128	LYS
1	A	132	SER
1	A	133	HIS
1	A	138	SER
1	A	139	THR
1	A	144	LEU
1	A	152	LEU
1	A	153	ILE
1	A	154	ILE
1	A	157	VAL
1	A	159	GLU
1	B	6	ARG
1	B	8	VAL
1	B	9	LEU
1	B	15	SER
1	B	16	GLU
1	B	23	GLU
1	B	31	MET
1	B	36	VAL
1	B	44	GLU
1	B	46	THR
1	B	47	LEU
1	B	51	MET
1	B	68	ILE

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Mol	Chain	Res	Type
1	B	69	LYS
1	B	72	LEU
1	B	74	GLU
1	B	79	LYS
1	B	80	LEU
1	B	86	GLU
1	B	89	ARG
1	B	92	ARG
1	B	104	ILE
1	B	109	ILE
1	B	111	LYS
1	B	114	GLU
1	B	115	GLU
1	B	123	LEU
1	B	126	ARG
1	B	133	HIS
1	B	136	LEU
1	B	138	SER
1	B	142	ARG
1	B	145	ARG
1	B	148	LYS
1	B	151	VAL
1	B	154	ILE
1	B	159	GLU
1	C	6	ARG
1	C	15	SER
1	C	20	ARG
1	C	22	VAL
1	C	26	GLU
1	C	27	LYS
1	C	28	ARG
1	C	31	MET
1	C	33	VAL
1	C	38	LEU
1	C	50	LEU
1	C	52	ASP
1	C	65	LEU
1	C	66	LYS
1	C	69	LYS
1	C	72	LEU
1	C	74	GLU
1	C	75	GLU

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Mol	Chain	Res	Type
1	C	82	GLU
1	C	83	LYS
1	C	86	GLU
1	C	94	LYS
1	C	97	ARG
1	C	99	ILE
1	C	104	ILE
1	C	112	VAL
1	C	120	LEU
1	C	121	ILE
1	C	122	ILE
1	C	123	LEU
1	C	126	ARG
1	C	129	LEU
1	C	131	LEU
1	C	136	LEU
1	C	139	THR
1	C	141	MET
1	C	149	LYS
1	C	154	ILE
1	C	156	GLU
1	C	159	GLU
1	C	160	ASN
1	C	161	GLU
1	D	6	ARG
1	D	9	LEU
1	D	12	THR
1	D	20	ARG
1	D	30	LYS
1	D	41	VAL
1	D	44	GLU
1	D	46	THR
1	D	47	LEU
1	D	50	LEU
1	D	51	MET
1	D	52	ASP
1	D	65	LEU
1	D	68	ILE
1	D	70	GLU
1	D	72	LEU
1	D	73	LYS
1	D	81	GLN

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Mol	Chain	Res	Type
1	D	83	LYS
1	D	87	VAL
1	D	97	ARG
1	D	98	THR
1	D	100	ILE
1	D	109	ILE
1	D	112	VAL
1	D	123	LEU
1	D	128	LYS
1	D	139	THR
1	D	140	VAL
1	D	143	VAL
1	D	144	LEU
1	D	148	LYS
1	D	149	LYS
1	D	151	VAL
1	D	153	ILE
1	D	154	ILE

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	117	ASN
1	A	133	HIS
1	B	40	HIS
1	C	40	HIS
1	C	117	ASN
1	C	160	ASN
1	D	29	ASN
1	D	133	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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [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	143/170 (84%)	0.12	5 (3%)	47	44	28, 57, 101, 120	0
1	B	139/170 (81%)	-0.05	4 (2%)	53	52	27, 52, 98, 106	0
1	C	146/170 (85%)	-0.02	5 (3%)	48	46	30, 52, 96, 113	0
1	D	141/170 (82%)	-0.23	3 (2%)	63	61	29, 53, 88, 105	0
All	All	569/680 (83%)	-0.04	17 (2%)	52	50	27, 54, 98, 120	0

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	135	PHE	3.5
1	B	54	TYR	3.4
1	A	135	PHE	3.3
1	A	65	LEU	3.2
1	D	125	SER	3.2
1	C	129	LEU	3.1
1	C	52	ASP	2.9
1	C	131	LEU	2.8
1	A	131	LEU	2.7
1	B	96	VAL	2.4
1	D	128	LYS	2.4
1	A	50	LEU	2.2
1	C	157	VAL	2.2
1	D	126	ARG	2.1
1	B	68	ILE	2.1
1	C	65	LEU	2.0
1	A	112	VAL	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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.