



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 07:30 PM UTC

PDB ID : 3HM7 / pdb_00003hm7
Title : Crystal structure of allantoinase from *Bacillus halodurans* C-125
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Deposited on : 2009-05-28
Resolution : 2.60 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

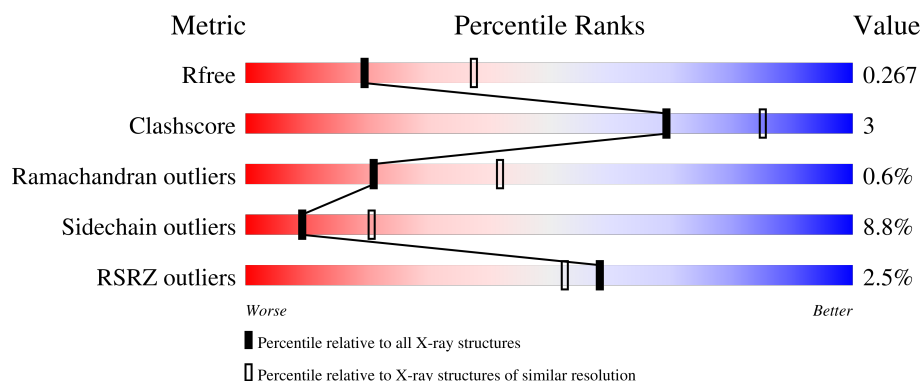
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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	448	4% 80% 15% ..
1	B	448	% 81% 15% ..
1	C	448	8% 77% 18% ..
1	D	448	81% 15% ..
1	E	448	% 87% 10% ..

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Mol	Chain	Length	Quality of chain
1	F	448	83% 13% ..

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 20901 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 Allantoinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	436	Total	C	N	O	S	0	4	0
			3425	2166	593	649	17			
1	B	437	Total	C	N	O	S	0	5	0
			3437	2173	594	653	17			
1	C	435	Total	C	N	O	S	0	3	0
			3410	2154	588	651	17			
1	D	436	Total	C	N	O	S	0	2	0
			3415	2157	591	650	17			
1	E	436	Total	C	N	O	S	0	2	0
			3412	2156	590	649	17			
1	F	436	Total	C	N	O	S	0	4	0
			3425	2165	592	651	17			

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	expression tag	UNP Q9KAH8
A	0	SER	-	expression tag	UNP Q9KAH8
A	1	LEU	-	expression tag	UNP Q9KAH8
A	439	GLU	-	expression tag	UNP Q9KAH8
A	440	GLY	-	expression tag	UNP Q9KAH8
A	441	HIS	-	expression tag	UNP Q9KAH8
A	442	HIS	-	expression tag	UNP Q9KAH8
A	443	HIS	-	expression tag	UNP Q9KAH8
A	444	HIS	-	expression tag	UNP Q9KAH8
A	445	HIS	-	expression tag	UNP Q9KAH8
A	446	HIS	-	expression tag	UNP Q9KAH8
B	-1	MET	-	expression tag	UNP Q9KAH8
B	0	SER	-	expression tag	UNP Q9KAH8
B	1	LEU	-	expression tag	UNP Q9KAH8
B	439	GLU	-	expression tag	UNP Q9KAH8
B	440	GLY	-	expression tag	UNP Q9KAH8
B	441	HIS	-	expression tag	UNP Q9KAH8

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Chain	Residue	Modelled	Actual	Comment	Reference
B	442	HIS	-	expression tag	UNP Q9KAH8
B	443	HIS	-	expression tag	UNP Q9KAH8
B	444	HIS	-	expression tag	UNP Q9KAH8
B	445	HIS	-	expression tag	UNP Q9KAH8
B	446	HIS	-	expression tag	UNP Q9KAH8
C	-1	MET	-	expression tag	UNP Q9KAH8
C	0	SER	-	expression tag	UNP Q9KAH8
C	1	LEU	-	expression tag	UNP Q9KAH8
C	439	GLU	-	expression tag	UNP Q9KAH8
C	440	GLY	-	expression tag	UNP Q9KAH8
C	441	HIS	-	expression tag	UNP Q9KAH8
C	442	HIS	-	expression tag	UNP Q9KAH8
C	443	HIS	-	expression tag	UNP Q9KAH8
C	444	HIS	-	expression tag	UNP Q9KAH8
C	445	HIS	-	expression tag	UNP Q9KAH8
C	446	HIS	-	expression tag	UNP Q9KAH8
D	-1	MET	-	expression tag	UNP Q9KAH8
D	0	SER	-	expression tag	UNP Q9KAH8
D	1	LEU	-	expression tag	UNP Q9KAH8
D	439	GLU	-	expression tag	UNP Q9KAH8
D	440	GLY	-	expression tag	UNP Q9KAH8
D	441	HIS	-	expression tag	UNP Q9KAH8
D	442	HIS	-	expression tag	UNP Q9KAH8
D	443	HIS	-	expression tag	UNP Q9KAH8
D	444	HIS	-	expression tag	UNP Q9KAH8
D	445	HIS	-	expression tag	UNP Q9KAH8
D	446	HIS	-	expression tag	UNP Q9KAH8
E	-1	MET	-	expression tag	UNP Q9KAH8
E	0	SER	-	expression tag	UNP Q9KAH8
E	1	LEU	-	expression tag	UNP Q9KAH8
E	439	GLU	-	expression tag	UNP Q9KAH8
E	440	GLY	-	expression tag	UNP Q9KAH8
E	441	HIS	-	expression tag	UNP Q9KAH8
E	442	HIS	-	expression tag	UNP Q9KAH8
E	443	HIS	-	expression tag	UNP Q9KAH8
E	444	HIS	-	expression tag	UNP Q9KAH8
E	445	HIS	-	expression tag	UNP Q9KAH8
E	446	HIS	-	expression tag	UNP Q9KAH8
F	-1	MET	-	expression tag	UNP Q9KAH8
F	0	SER	-	expression tag	UNP Q9KAH8
F	1	LEU	-	expression tag	UNP Q9KAH8
F	439	GLU	-	expression tag	UNP Q9KAH8

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Chain	Residue	Modelled	Actual	Comment	Reference
F	440	GLY	-	expression tag	UNP Q9KAH8
F	441	HIS	-	expression tag	UNP Q9KAH8
F	442	HIS	-	expression tag	UNP Q9KAH8
F	443	HIS	-	expression tag	UNP Q9KAH8
F	444	HIS	-	expression tag	UNP Q9KAH8
F	445	HIS	-	expression tag	UNP Q9KAH8
F	446	HIS	-	expression tag	UNP Q9KAH8

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Zn 1 1	0	0
2	B	1	Total Zn 1 1	0	0
2	C	1	Total Zn 1 1	0	0
2	D	1	Total Zn 1 1	0	0
2	E	1	Total Zn 1 1	0	0
2	F	1	Total Zn 1 1	0	0

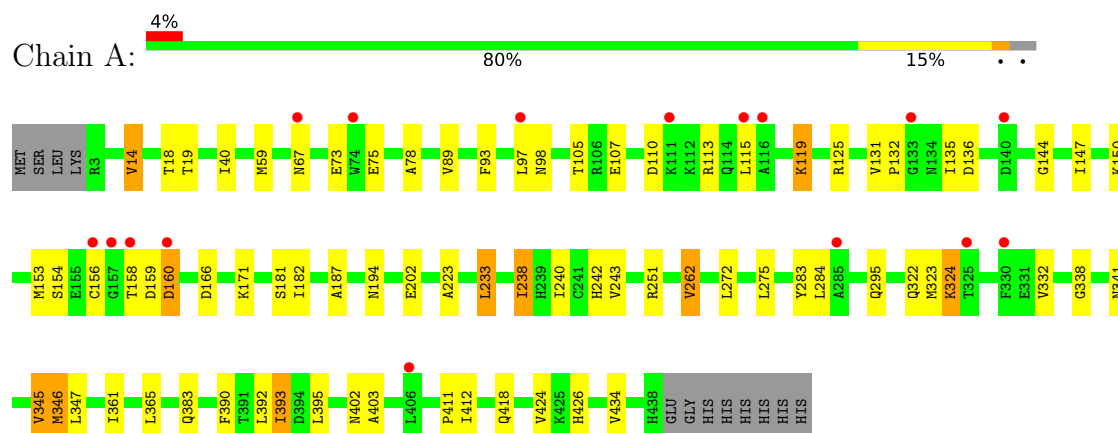
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	53	Total O 53 53	0	0
3	B	69	Total O 69 69	0	0
3	C	39	Total O 39 39	0	0
3	D	47	Total O 47 47	0	0
3	E	74	Total O 74 74	0	0
3	F	89	Total O 89 89	0	0

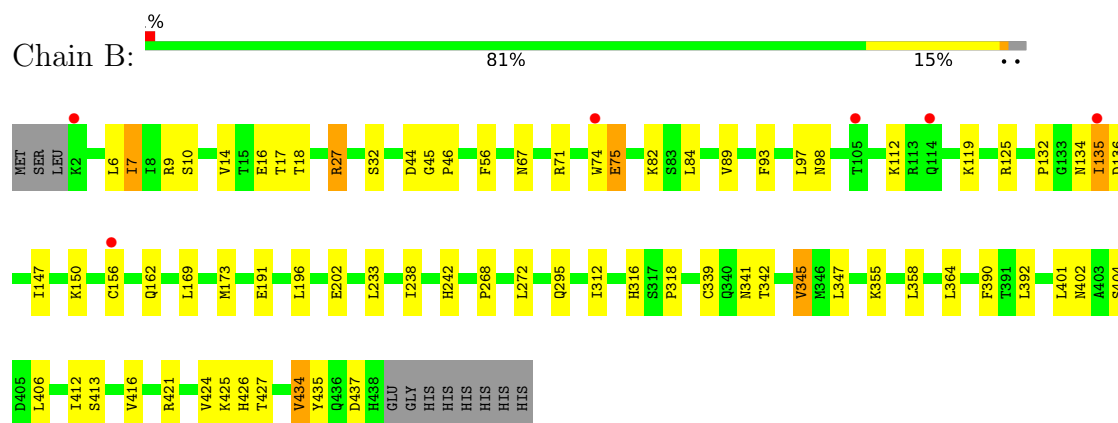
3 Residue-property plots [i](#)

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

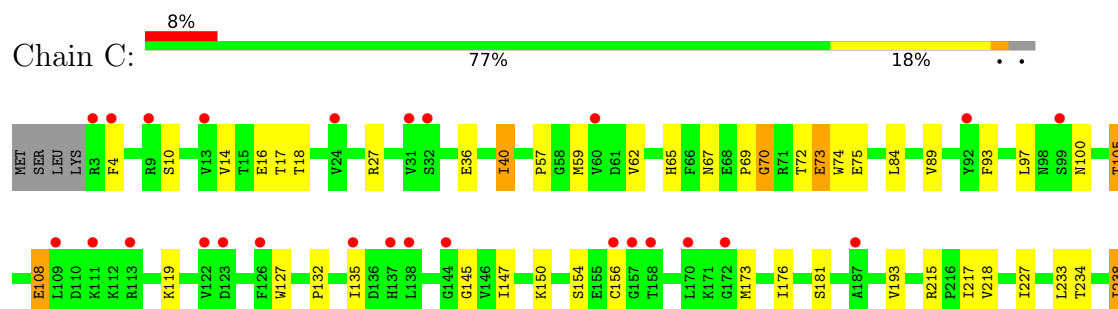
• Molecule 1: Allantoinase

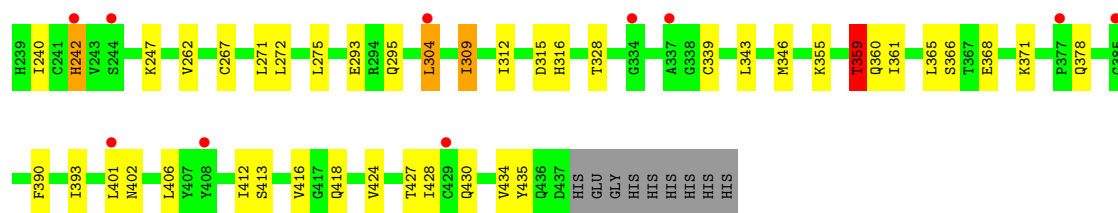


• Molecule 1: Allantoinase



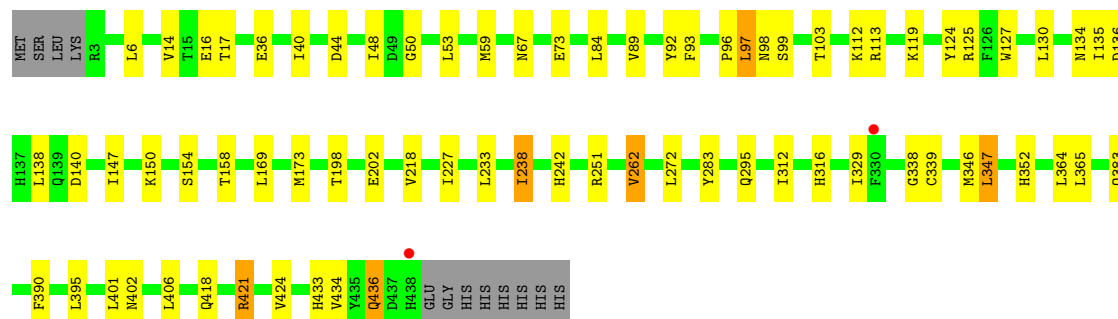
• Molecule 1: Allantoinase





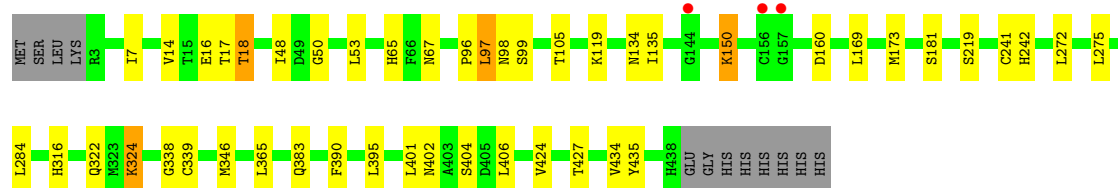
● Molecule 1: Allantoinase

Chain D: 81% 15% . .



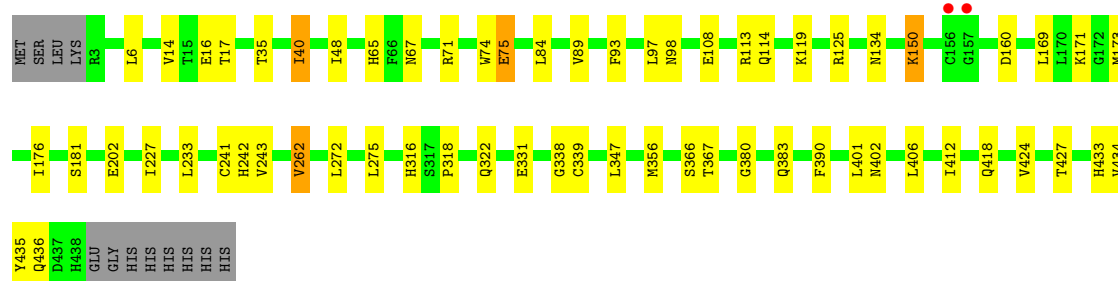
● Molecule 1: Allantoinase

Chain E: 87% 10% . .



● Molecule 1: Allantoinase

Chain F: 83% 13% . .



4 Data and refinement statistics

Property	Value	Source
Space group	P 61 2 2	Depositor
Cell constants a, b, c, α , β , γ	157.66Å 157.66Å 418.03Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	20.00 – 2.60 20.00 – 2.60	Depositor EDS
% Data completeness (in resolution range)	100.0 (20.00-2.60) 99.7 (20.00-2.60)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.94 (at 2.61Å)	Xtrriage
Refinement program	REFMAC 5.3.0034	Depositor
R, R_{free}	0.240 , 0.267 0.240 , 0.267	Depositor DCC
R_{free} test set	2853 reflections (3.01%)	wwPDB-VP
Wilson B-factor (Å ²)	41.8	Xtrriage
Anisotropy	0.393	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 53.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.27$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	20901	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 69.84 % 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 3.4571e-06. 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

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	A	0.54	0/3507	0.92	5/4749 (0.1%)
1	B	0.60	0/3523	0.91	5/4770 (0.1%)
1	C	0.59	0/3485	0.95	3/4720 (0.1%)
1	D	0.57	0/3488	0.90	1/4724 (0.0%)
1	E	0.56	0/3488	0.89	1/4724 (0.0%)
1	F	0.53	0/3508	0.88	1/4752 (0.0%)
All	All	0.57	0/20999	0.91	16/28439 (0.1%)

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	2

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	70	GLY	N-CA-C	7.73	122.00	112.73
1	C	10	SER	N-CA-C	6.49	120.78	112.86
1	B	134	ASN	N-CA-C	6.44	119.80	112.97
1	A	346	MET	CA-C-N	6.25	128.66	120.28
1	A	346	MET	C-N-CA	6.25	128.66	120.28
1	F	262	VAL	CB-CA-C	-5.75	101.65	110.50
1	A	131	VAL	CA-C-N	5.49	126.70	119.84
1	A	131	VAL	C-N-CA	5.49	126.70	119.84
1	D	97	LEU	N-CA-C	5.45	117.69	109.41
1	E	18	THR	N-CA-C	5.43	117.05	108.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	7	ILE	N-CA-C	5.39	116.03	108.17
1	B	45	GLY	CA-C-N	5.37	125.30	119.76
1	B	45	GLY	C-N-CA	5.37	125.30	119.76
1	C	359	THR	N-CA-C	-5.32	105.14	111.69
1	B	434	VAL	CB-CA-C	5.21	115.65	111.06
1	A	262	VAL	CB-CA-C	-5.20	102.87	110.62

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	159	ASP	Peptide
1	A	160	ASP	Peptide

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	3425	0	3404	27	0
1	B	3437	0	3411	25	0
1	C	3410	0	3376	33	0
1	D	3415	0	3379	30	0
1	E	3412	0	3380	16	0
1	F	3425	0	3393	20	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
3	A	53	0	0	0	0
3	B	69	0	0	0	0
3	C	39	0	0	0	0
3	D	47	0	0	0	0
3	E	74	0	0	0	0
3	F	89	0	0	0	0
All	All	20901	0	20343	141	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 3.

All (141) 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:D:67:ASN:ND2	1:D:98:ASN:HB2	1.96	0.80
1:F:75:GLU:HG2	1:F:318:PRO:HG3	1.69	0.73
1:B:75:GLU:HG2	1:B:318:PRO:HG3	1.76	0.68
1:E:67:ASN:ND2	1:E:98:ASN:HB2	2.09	0.67
1:F:67:ASN:ND2	1:F:98:ASN:HB2	2.09	0.67
1:B:67:ASN:ND2	1:B:98:ASN:HB2	2.10	0.67
1:D:96:PRO:HD3	1:D:127:TRP:HB2	1.76	0.67
1:D:97:LEU:O	1:D:98:ASN:HB2	1.94	0.66
1:A:393:ILE:HG22	1:A:395:LEU:HD23	1.78	0.63
1:D:283:TYR:HE1	1:D:329:ILE:HA	1.63	0.62
1:C:70:GLY:HA3	1:C:100:ASN:H	1.64	0.62
1:F:16[B]:GLU:HG3	1:F:17:THR:HG23	1.83	0.61
1:C:359:THR:HG22	1:C:360:GLN:N	2.16	0.60
1:A:18:THR:HG21	1:E:383:GLN:HE22	1.67	0.60
1:B:18:THR:HG21	1:F:383:GLN:HE22	1.67	0.60
1:D:67:ASN:ND2	1:D:98:ASN:CB	2.64	0.59
1:B:316:HIS:HB2	1:B:339:CYS:HB3	1.85	0.58
1:D:97:LEU:C	1:D:99:SER:H	2.12	0.58
1:A:14:VAL:HG12	1:A:19:THR:HG22	1.86	0.58
1:E:16[B]:GLU:HG3	1:E:17:THR:HG23	1.86	0.57
1:C:359:THR:CG2	1:C:360:GLN:N	2.67	0.57
1:E:65:HIS:HB3	1:E:67:ASN:HD21	1.69	0.57
1:C:18:THR:HG21	1:D:383:GLN:HE22	1.68	0.57
1:D:346:MET:HG3	1:D:365:LEU:HD11	1.88	0.55
1:D:283:TYR:CE1	1:D:329:ILE:HA	2.40	0.55
1:E:169:LEU:HB3	1:E:173:MET:HE2	1.88	0.55
1:B:84:LEU:HB3	1:B:89:VAL:HB	1.87	0.55
1:B:9:ARG:O	1:B:10:SER:HB2	2.07	0.55
1:C:62:VAL:HA	1:C:93:PHE:HB2	1.89	0.54
1:B:392:LEU:HB2	1:B:426:HIS:HB2	1.90	0.54
1:A:153:MET:HE2	1:A:187:ALA:HA	1.90	0.54
1:F:427:THR:HB	1:F:435:TYR:HB3	1.91	0.53
1:A:18:THR:HG21	1:E:383:GLN:NE2	2.23	0.53
1:B:56:PHE:HZ	1:B:358:LEU:HD22	1.73	0.53
1:B:268:PRO:HG3	1:B:342:THR:HG23	1.91	0.53
1:C:238:ILE:HD11	1:C:240:ILE:HD11	1.91	0.53
1:D:316:HIS:HB2	1:D:339:CYS:HB3	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:433:HIS:HE1	1:F:436:GLN:HB2	1.73	0.52
1:C:4:PHE:HE2	1:C:40:ILE:HG12	1.75	0.52
1:D:84:LEU:HB3	1:D:89:VAL:HB	1.90	0.52
1:C:346:MET:HG3	1:C:365:LEU:HD11	1.91	0.52
1:F:65:HIS:HB3	1:F:67:ASN:HD21	1.75	0.52
1:C:368:GLU:HA	1:C:371:LYS:HB2	1.92	0.51
1:D:50:GLY:HA2	1:D:53:LEU:HD12	1.91	0.51
1:A:166:ASP:HB2	1:B:191:GLU:HG3	1.93	0.51
1:D:59:MET:HB2	1:D:89:VAL:HG22	1.93	0.51
1:A:403:ALA:HB1	1:A:411:PRO:HB2	1.93	0.51
1:D:96:PRO:HD3	1:D:127:TRP:CB	2.41	0.50
1:C:65:HIS:HB3	1:C:67:ASN:HD21	1.77	0.50
1:C:401:LEU:HD21	1:C:406:LEU:HD21	1.94	0.50
1:D:401:LEU:HD21	1:D:406:LEU:HD21	1.92	0.50
1:C:16[A]:GLU:HG2	1:C:17:THR:HG23	1.93	0.50
1:F:93:PHE:CD1	1:F:125:ARG:HB2	2.47	0.49
1:D:16[B]:GLU:HG3	1:D:17:THR:HG23	1.94	0.49
1:A:383:GLN:NE2	1:E:18:THR:HG21	2.28	0.49
1:A:78:ALA:HB2	1:A:119:LYS:HG3	1.95	0.48
1:A:341:ASN:O	1:A:345:VAL:HG12	2.13	0.48
1:E:346:MET:HG3	1:E:365:LEU:HD11	1.96	0.48
1:B:16[B]:GLU:HG3	1:B:17:THR:HG23	1.95	0.47
1:C:173:MET:HB3	1:C:234:THR:HG21	1.96	0.47
1:C:271:LEU:HD11	1:C:304:LEU:HD13	1.97	0.47
1:F:176:ILE:HG23	1:F:181:SER:HB3	1.97	0.47
1:C:217:ILE:HG21	1:C:247:LYS:HD2	1.96	0.47
1:A:110:ASP:HA	1:A:113:ARG:HB3	1.97	0.47
1:A:153:MET:CE	1:A:223:ALA:HB1	2.45	0.47
1:B:169:LEU:HB3	1:B:173:MET:HE3	1.96	0.47
1:C:267:CYS:SG	1:C:315:ASP:HB2	2.54	0.47
1:E:316:HIS:HB2	1:E:339:CYS:HB3	1.97	0.46
1:A:233:LEU:HD21	1:B:196:LEU:HD11	1.96	0.46
1:C:427:THR:HB	1:C:435:TYR:HB3	1.98	0.46
1:F:316:HIS:HB2	1:F:339:CYS:HB3	1.97	0.46
1:A:93:PHE:CD1	1:A:125:ARG:HB2	2.51	0.46
1:A:383:GLN:HE22	1:E:18:THR:HG21	1.81	0.46
1:C:59:MET:HA	1:C:366:SER:HB2	1.98	0.46
1:F:401:LEU:HD21	1:F:406:LEU:HD21	1.96	0.46
1:A:181:SER:OG	1:A:182:ILE:N	2.49	0.46
1:D:130:LEU:HD13	1:D:138:LEU:HD11	1.98	0.46
1:F:169:LEU:HB3	1:F:173:MET:HE3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:150:LYS:NZ	1:F:241:CYS:SG	2.89	0.45
1:C:304:LEU:HD12	1:C:309:ILE:HD12	1.99	0.45
1:D:6:LEU:HD11	1:D:48:ILE:HG12	1.99	0.45
1:E:401:LEU:HD21	1:E:406:LEU:HD21	1.98	0.45
1:D:352:HIS:CD2	1:D:421:ARG:HB3	2.52	0.45
1:C:84:LEU:HB3	1:C:89:VAL:HB	1.99	0.45
1:A:238:ILE:HD11	1:A:240:ILE:HD11	1.99	0.45
1:B:135:ILE:H	1:B:135:ILE:HG13	1.56	0.45
1:B:312:ILE:HG12	1:B:364:LEU:HB3	1.99	0.44
1:A:392:LEU:HB2	1:A:426:HIS:HB2	2.00	0.44
1:B:427:THR:HB	1:B:435:TYR:HB3	2.00	0.44
1:D:84:LEU:HD22	1:D:89:VAL:HG11	1.99	0.44
1:E:284:LEU:HD23	1:E:324:LYS:HG2	2.00	0.44
1:B:27:ARG:HB2	1:B:32:SER:HB2	1.99	0.44
1:F:84:LEU:HB3	1:F:89:VAL:HB	1.99	0.44
1:C:105:THR:HG23	1:C:108:GLU:HB2	2.00	0.43
1:E:150:LYS:NZ	1:E:241:CYS:SG	2.89	0.43
1:B:18:THR:HG21	1:F:383:GLN:NE2	2.32	0.43
1:D:312:ILE:HG12	1:D:364:LEU:HB3	1.99	0.43
1:A:346:MET:HG3	1:A:365:LEU:HD11	1.99	0.43
1:B:401:LEU:HD21	1:B:406:LEU:HD21	1.99	0.43
1:C:93:PHE:HB3	1:C:127:TRP:NE1	2.34	0.43
1:C:14:VAL:O	1:C:57:PRO:HD3	2.19	0.43
1:A:284:LEU:HD23	1:A:324:LYS:HE3	2.01	0.43
1:C:275:LEU:HB2	1:C:293:GLU:HA	2.01	0.43
1:A:275:LEU:HD12	1:A:275:LEU:HA	1.94	0.42
1:A:283:TYR:CD1	1:A:332:VAL:HG21	2.53	0.42
1:F:35:THR:HG21	1:F:40:ILE:HD13	2.01	0.42
1:D:92:TYR:CZ	1:D:124:TYR:HB3	2.54	0.42
1:D:251:ARG:HA	1:D:251:ARG:HD2	1.85	0.42
1:E:96:PRO:HD2	1:E:97:LEU:HD23	2.02	0.42
1:B:413:SER:HB3	1:B:416:VAL:HG23	2.02	0.42
1:E:427:THR:HB	1:E:435:TYR:HB3	2.00	0.42
1:B:71:ARG:HD3	1:B:74:TRP:CZ2	2.54	0.42
1:F:6:LEU:HD11	1:F:48:ILE:HG12	2.01	0.42
1:B:425:LYS:HA	1:B:437:ASP:HB2	2.02	0.42
1:D:93:PHE:CD1	1:D:125:ARG:HB2	2.55	0.42
1:C:72:THR:C	1:C:74:TRP:H	2.28	0.42
1:A:59:MET:HB2	1:A:89:VAL:HG22	2.01	0.41
1:A:113:ARG:NH1	1:A:144:GLY:O	2.53	0.41
1:D:433:HIS:HE1	1:D:436:GLN:HG3	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:18:THR:HG21	1:D:383:GLN:NE2	2.35	0.41
1:F:71:ARG:HD3	1:F:74:TRP:CZ2	2.55	0.41
1:B:6:LEU:HD12	1:B:46:PRO:HB2	2.01	0.41
1:C:193:VAL:HG22	1:C:215:ARG:HA	2.01	0.41
1:C:316:HIS:HB2	1:C:339:CYS:HB3	2.01	0.41
1:A:67:ASN:ND2	1:A:98:ASN:HB3	2.35	0.41
1:C:176:ILE:HG23	1:C:181:SER:HB3	2.01	0.41
1:D:238:ILE:HG23	1:D:262:VAL:HG13	2.02	0.41
1:E:50:GLY:HA2	1:E:53:LEU:HD12	2.03	0.41
1:A:251:ARG:HA	1:A:251:ARG:HD2	1.94	0.41
1:C:413:SER:HB3	1:C:416:VAL:HG23	2.02	0.41
1:D:97:LEU:C	1:D:99:SER:N	2.78	0.41
1:D:347:LEU:HD12	1:D:347:LEU:HA	1.86	0.41
1:F:16[B]:GLU:CD	1:F:367:THR:HG21	2.46	0.41
1:C:65:HIS:HE1	1:C:97:LEU:HD21	1.86	0.41
1:B:93:PHE:CD1	1:B:125:ARG:HB2	2.56	0.40
1:D:169:LEU:HB3	1:D:173:MET:HE3	2.02	0.40
1:B:341:ASN:O	1:B:345:VAL:HG12	2.21	0.40
1:C:16[B]:GLU:HG3	1:C:17:THR:HG23	2.02	0.40
1:C:73:GLU:H	1:C:73:GLU:HG2	1.66	0.40
1:A:283:TYR:CE1	1:A:332:VAL:HG21	2.57	0.40
1:F:366:SER:OG	1:F:380:GLY:HA2	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	438/448 (98%)	410 (94%)	25 (6%)	3 (1%)	18	38
1	B	440/448 (98%)	425 (97%)	13 (3%)	2 (0%)	24	46
1	C	436/448 (97%)	397 (91%)	35 (8%)	4 (1%)	14	30

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	436/448 (97%)	416 (95%)	18 (4%)	2 (0%)	24	46
1	E	436/448 (97%)	419 (96%)	15 (3%)	2 (0%)	24	46
1	F	438/448 (98%)	424 (97%)	12 (3%)	2 (0%)	24	46
All	All	2624/2688 (98%)	2491 (95%)	118 (4%)	15 (1%)	21	42

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	132	PRO
1	A	242	HIS
1	B	242	HIS
1	C	242	HIS
1	D	242	HIS
1	E	242	HIS
1	F	242	HIS
1	D	338	GLY
1	F	338	GLY
1	C	145	GLY
1	E	338	GLY
1	B	132	PRO
1	C	132	PRO
1	A	338	GLY
1	C	69	PRO

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	375/382 (98%)	336 (90%)	39 (10%)	7	14
1	B	377/382 (99%)	347 (92%)	30 (8%)	11	25
1	C	373/382 (98%)	334 (90%)	39 (10%)	6	14
1	D	373/382 (98%)	338 (91%)	35 (9%)	8	18
1	E	373/382 (98%)	350 (94%)	23 (6%)	16	36

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	F	375/382 (98%)	346 (92%)	29 (8%)	12	27
All	All	2246/2292 (98%)	2051 (91%)	195 (9%)	9	21

All (195) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	14	VAL
1	A	40	ILE
1	A	73	GLU
1	A	75	GLU
1	A	97	LEU
1	A	105	THR
1	A	107	GLU
1	A	115	LEU
1	A	119	LYS
1	A	135	ILE
1	A	136	ASP
1	A	147	ILE
1	A	150	LYS
1	A	154	SER
1	A	156	CYS
1	A	158	THR
1	A	160	ASP
1	A	171	LYS
1	A	194	ASN
1	A	202	GLU
1	A	233	LEU
1	A	238	ILE
1	A	243	VAL
1	A	262	VAL
1	A	272	LEU
1	A	295	GLN
1	A	322	GLN
1	A	323	MET
1	A	324	LYS
1	A	345	VAL
1	A	347	LEU
1	A	361	ILE
1	A	390	PHE
1	A	393	ILE
1	A	402	ASN
1	A	412	ILE

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Mol	Chain	Res	Type
1	A	418	GLN
1	A	424	VAL
1	A	434	VAL
1	B	7	ILE
1	B	14	VAL
1	B	27	ARG
1	B	44	ASP
1	B	75	GLU
1	B	82	LYS
1	B	97	LEU
1	B	112	LYS
1	B	119	LYS
1	B	135	ILE
1	B	136	ASP
1	B	147	ILE
1	B	150	LYS
1	B	156	CYS
1	B	162	GLN
1	B	202	GLU
1	B	233	LEU
1	B	238	ILE
1	B	272	LEU
1	B	295	GLN
1	B	345	VAL
1	B	347	LEU
1	B	355	LYS
1	B	390	PHE
1	B	402	ASN
1	B	404	SER
1	B	412	ILE
1	B	421	ARG
1	B	424	VAL
1	B	434	VAL
1	C	27	ARG
1	C	36	GLU
1	C	40	ILE
1	C	73	GLU
1	C	75	GLU
1	C	105	THR
1	C	108	GLU
1	C	119	LYS
1	C	135	ILE

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Mol	Chain	Res	Type
1	C	147	ILE
1	C	150	LYS
1	C	154	SER
1	C	156	CYS
1	C	218	VAL
1	C	227	ILE
1	C	233	LEU
1	C	238	ILE
1	C	242	HIS
1	C	262	VAL
1	C	272	LEU
1	C	295	GLN
1	C	304	LEU
1	C	309	ILE
1	C	312	ILE
1	C	328	THR
1	C	343	LEU
1	C	355	LYS
1	C	359	THR
1	C	361	ILE
1	C	378	GLN
1	C	390	PHE
1	C	393	ILE
1	C	402	ASN
1	C	412	ILE
1	C	418	GLN
1	C	424	VAL
1	C	428	ILE
1	C	430	GLN
1	C	434	VAL
1	D	14	VAL
1	D	36	GLU
1	D	40	ILE
1	D	44	ASP
1	D	73	GLU
1	D	103	THR
1	D	112	LYS
1	D	113	ARG
1	D	119	LYS
1	D	134	ASN
1	D	135	ILE
1	D	136	ASP

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Mol	Chain	Res	Type
1	D	140	ASP
1	D	147	ILE
1	D	150	LYS
1	D	154	SER
1	D	158	THR
1	D	198	THR
1	D	202	GLU
1	D	218	VAL
1	D	227	ILE
1	D	233	LEU
1	D	238	ILE
1	D	262	VAL
1	D	272	LEU
1	D	295	GLN
1	D	347	LEU
1	D	390	PHE
1	D	395	LEU
1	D	402	ASN
1	D	418	GLN
1	D	421	ARG
1	D	424	VAL
1	D	434	VAL
1	D	436	GLN
1	E	7	ILE
1	E	14	VAL
1	E	48	ILE
1	E	97	LEU
1	E	99	SER
1	E	105	THR
1	E	119	LYS
1	E	134	ASN
1	E	135	ILE
1	E	150	LYS
1	E	160	ASP
1	E	181	SER
1	E	219	SER
1	E	272	LEU
1	E	275	LEU
1	E	322	GLN
1	E	324	LYS
1	E	390	PHE
1	E	395	LEU

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Mol	Chain	Res	Type
1	E	402	ASN
1	E	404	SER
1	E	424	VAL
1	E	434	VAL
1	F	14	VAL
1	F	40	ILE
1	F	75	GLU
1	F	97	LEU
1	F	108	GLU
1	F	113	ARG
1	F	114	GLN
1	F	119	LYS
1	F	134	ASN
1	F	150	LYS
1	F	160	ASP
1	F	171	LYS
1	F	202	GLU
1	F	227	ILE
1	F	233	LEU
1	F	243	VAL
1	F	262	VAL
1	F	272	LEU
1	F	275	LEU
1	F	322	GLN
1	F	331	GLU
1	F	347	LEU
1	F	356	MET
1	F	390	PHE
1	F	402	ASN
1	F	412	ILE
1	F	418	GLN
1	F	424	VAL
1	F	434	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (47) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	28	ASN
1	A	98	ASN
1	A	114	GLN
1	A	165	HIS
1	A	341	ASN

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Mol	Chain	Res	Type
1	A	378	GLN
1	A	383	GLN
1	B	67	ASN
1	B	100	ASN
1	B	137	HIS
1	B	242	HIS
1	B	322	GLN
1	B	378	GLN
1	B	418	GLN
1	C	28	ASN
1	C	67	ASN
1	C	98	ASN
1	C	114	GLN
1	C	341	ASN
1	C	363	GLN
1	C	378	GLN
1	C	418	GLN
1	D	28	ASN
1	D	67	ASN
1	D	137	HIS
1	D	162	GLN
1	D	242	HIS
1	D	341	ASN
1	D	352	HIS
1	D	378	GLN
1	D	418	GLN
1	D	433	HIS
1	E	28	ASN
1	E	54	HIS
1	E	67	ASN
1	E	117	ASN
1	E	142	HIS
1	E	352	HIS
1	E	378	GLN
1	F	67	ASN
1	F	137	HIS
1	F	142	HIS
1	F	194	ASN
1	F	322	GLN
1	F	383	GLN
1	F	430	GLN
1	F	436	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](#)

Of 6 ligands modelled in this entry, 6 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 [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	436/448 (97%)	0.32	16 (3%) 45 39	19, 38, 54, 77	4 (0%)
1	B	437/448 (97%)	0.20	6 (1%) 73 69	18, 37, 52, 66	5 (1%)
1	C	435/448 (97%)	0.88	36 (8%) 17 13	16, 39, 51, 74	3 (0%)
1	D	436/448 (97%)	0.05	2 (0%) 87 85	17, 38, 53, 70	2 (0%)
1	E	436/448 (97%)	-0.16	3 (0%) 84 82	19, 37, 47, 68	2 (0%)
1	F	436/448 (97%)	-0.16	2 (0%) 87 85	16, 37, 48, 64	4 (0%)
All	All	2616/2688 (97%)	0.19	65 (2%) 58 52	16, 37, 52, 77	20 (0%)

All (65) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	157	GLY	6.8
1	B	156	CYS	4.7
1	C	156	CYS	3.9
1	C	144	GLY	3.3
1	C	122	VAL	3.2
1	E	157	GLY	3.2
1	A	97	LEU	3.0
1	A	160	ASP	3.0
1	A	133	GLY	2.9
1	C	60	VAL	2.9
1	F	157	GLY	2.8
1	A	158	THR	2.8
1	A	111	LYS	2.8
1	C	157	GLY	2.8
1	C	126	PHE	2.8
1	B	2	LYS	2.7
1	C	123[A]	ASP	2.7
1	C	31	VAL	2.7
1	C	401	LEU	2.7

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Mol	Chain	Res	Type	RSRZ
1	C	158	THR	2.7
1	C	92	TYR	2.7
1	A	406	LEU	2.7
1	C	187	ALA	2.7
1	C	135	ILE	2.6
1	A	116	ALA	2.6
1	C	4	PHE	2.6
1	A	330	PHE	2.6
1	C	32	SER	2.6
1	C	170	LEU	2.6
1	C	304	LEU	2.6
1	C	172	GLY	2.6
1	A	140	ASP	2.5
1	C	113	ARG	2.5
1	B	74	TRP	2.5
1	C	334	GLY	2.4
1	C	111	LYS	2.4
1	C	377	PRO	2.4
1	C	3	ARG	2.4
1	F	156	CYS	2.4
1	C	109	LEU	2.3
1	B	105	THR	2.3
1	C	244	SER	2.3
1	B	114	GLN	2.3
1	B	135	ILE	2.3
1	C	385	GLY	2.3
1	A	156	CYS	2.2
1	A	325	THR	2.2
1	C	99	SER	2.2
1	C	429	CYS	2.2
1	C	24	VAL	2.2
1	C	137	HIS	2.2
1	C	138	LEU	2.1
1	A	285	ALA	2.1
1	A	74	TRP	2.1
1	A	115	LEU	2.1
1	C	9[A]	ARG	2.1
1	C	337	ALA	2.1
1	C	408	TYR	2.1
1	A	67	ASN	2.0
1	E	144	GLY	2.0
1	C	13	VAL	2.0

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Mol	Chain	Res	Type	RSRZ
1	E	156	CYS	2.0
1	D	330	PHE	2.0
1	C	242	HIS	2.0
1	D	438	HIS	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
2	ZN	D	447	1/1	0.82	0.17	40,40,40,40	1
2	ZN	B	447	1/1	0.91	0.13	39,39,39,39	1
2	ZN	C	447	1/1	0.92	0.22	50,50,50,50	1
2	ZN	F	447	1/1	0.94	0.13	39,39,39,39	1
2	ZN	E	447	1/1	0.95	0.11	39,39,39,39	1
2	ZN	A	447	1/1	0.97	0.12	43,43,43,43	1

6.5 Other polymers [i](#)

There are no such residues in this entry.