



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 12:20 PM UTC

PDB ID : 6KRP / pdb_00006krp
Title : Peroxiredoxin from Aeropyrum pernix K1 (ApPrx) 0Cys W88A mutant
Authors : Himiyama, T.; Nakamura, T.
Deposited on : 2019-08-22
Resolution : 1.89 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:

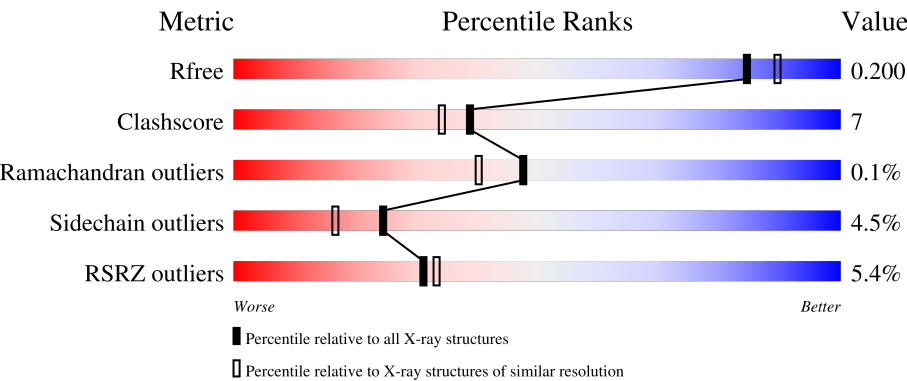
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.89 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.



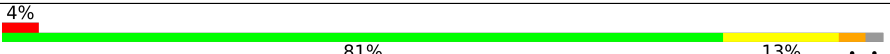
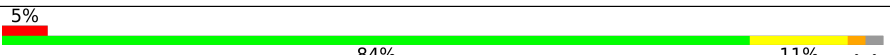
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R _{free}	180053	7789 (1.90-1.90)
Clashscore	190562	8410 (1.90-1.90)
Ramachandran outliers	187476	8333 (1.90-1.90)
Sidechain outliers	187428	8333 (1.90-1.90)
RSRZ outliers	180081	7790 (1.90-1.90)

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	250	5% 80% 15% ..
1	B	250	5% 84% 11% ..
1	C	250	7% 84% 11% ...
1	D	250	4% 81% 14% ..
1	E	250	5% 84% 13% ..

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Mol	Chain	Length	Quality of chain
1	F	250	
1	G	250	
1	H	250	
1	I	250	
1	J	250	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	CIT	D	301	-	X	-	-
2	CIT	F	301	-	X	-	-

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 21385 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 Peroxiredoxin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	242	Total	C	N	O	S	0	0	0
			1953	1253	344	352	4			
1	B	244	Total	C	N	O	S	0	0	0
			1964	1260	346	354	4			
1	C	244	Total	C	N	O	S	0	0	0
			1964	1260	346	354	4			
1	D	244	Total	C	N	O	S	0	0	0
			1964	1260	346	354	4			
1	E	244	Total	C	N	O	S	0	0	0
			1964	1260	346	354	4			
1	F	243	Total	C	N	O	S	0	0	0
			1957	1255	345	353	4			
1	G	244	Total	C	N	O	S	0	0	0
			1964	1260	346	354	4			
1	H	244	Total	C	N	O	S	0	0	0
			1964	1260	346	354	4			
1	I	244	Total	C	N	O	S	0	0	0
			1964	1260	346	354	4			
1	J	244	Total	C	N	O	S	0	0	0
			1964	1260	346	354	4			

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	50	SER	CYS	engineered mutation	UNP Q9Y9L0
A	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
A	207	SER	CYS	engineered mutation	UNP Q9Y9L0
A	213	SER	CYS	engineered mutation	UNP Q9Y9L0
B	50	SER	CYS	engineered mutation	UNP Q9Y9L0
B	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
B	207	SER	CYS	engineered mutation	UNP Q9Y9L0
B	213	SER	CYS	engineered mutation	UNP Q9Y9L0
C	50	SER	CYS	engineered mutation	UNP Q9Y9L0

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Chain	Residue	Modelled	Actual	Comment	Reference
C	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
C	207	SER	CYS	engineered mutation	UNP Q9Y9L0
C	213	SER	CYS	engineered mutation	UNP Q9Y9L0
D	50	SER	CYS	engineered mutation	UNP Q9Y9L0
D	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
D	207	SER	CYS	engineered mutation	UNP Q9Y9L0
D	213	SER	CYS	engineered mutation	UNP Q9Y9L0
E	50	SER	CYS	engineered mutation	UNP Q9Y9L0
E	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
E	207	SER	CYS	engineered mutation	UNP Q9Y9L0
E	213	SER	CYS	engineered mutation	UNP Q9Y9L0
F	50	SER	CYS	engineered mutation	UNP Q9Y9L0
F	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
F	207	SER	CYS	engineered mutation	UNP Q9Y9L0
F	213	SER	CYS	engineered mutation	UNP Q9Y9L0
G	50	SER	CYS	engineered mutation	UNP Q9Y9L0
G	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
G	207	SER	CYS	engineered mutation	UNP Q9Y9L0
G	213	SER	CYS	engineered mutation	UNP Q9Y9L0
H	50	SER	CYS	engineered mutation	UNP Q9Y9L0
H	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
H	207	SER	CYS	engineered mutation	UNP Q9Y9L0
H	213	SER	CYS	engineered mutation	UNP Q9Y9L0
I	50	SER	CYS	engineered mutation	UNP Q9Y9L0
I	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
I	207	SER	CYS	engineered mutation	UNP Q9Y9L0
I	213	SER	CYS	engineered mutation	UNP Q9Y9L0
J	50	SER	CYS	engineered mutation	UNP Q9Y9L0
J	88	ALA	TRP	engineered mutation	UNP Q9Y9L0
J	207	SER	CYS	engineered mutation	UNP Q9Y9L0
J	213	SER	CYS	engineered mutation	UNP Q9Y9L0

- Molecule 2 is CITRIC ACID (CCD ID: CIT) (formula: C₆H₈O₇).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			13	6	7		
2	B	1	Total	C	O	0	0
			13	6	7		
2	C	1	Total	C	O	0	0
			13	6	7		
2	D	1	Total	C	O	0	0
			13	6	7		
2	E	1	Total	C	O	0	0
			13	6	7		
2	F	1	Total	C	O	0	0
			13	6	7		
2	G	1	Total	C	O	0	0
			13	6	7		
2	H	1	Total	C	O	0	0
			13	6	7		
2	I	1	Total	C	O	0	0
			13	6	7		
2	J	1	Total	C	O	0	0
			13	6	7		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	169	Total	O	0	0
			169	169		
3	B	169	Total	O	0	0
			169	169		

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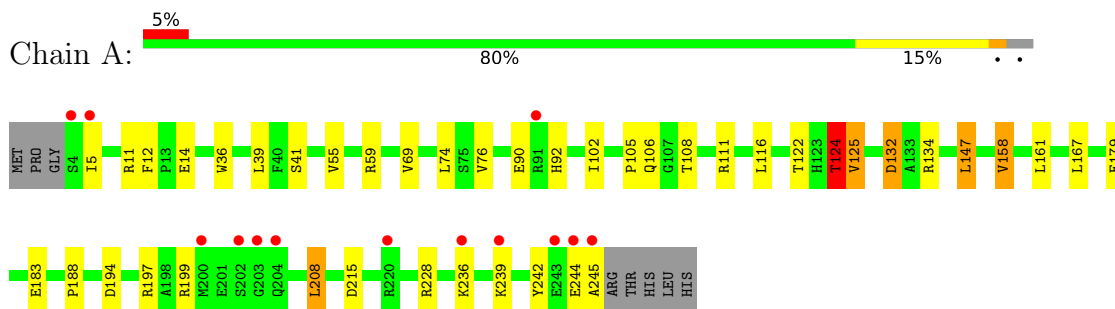
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	153	Total 153	O 153	0	0
3	D	156	Total 156	O 156	0	0
3	E	190	Total 190	O 190	0	0
3	F	167	Total 167	O 167	0	0
3	G	144	Total 144	O 144	0	0
3	H	175	Total 175	O 175	0	0
3	I	162	Total 162	O 162	0	0
3	J	148	Total 148	O 148	0	0

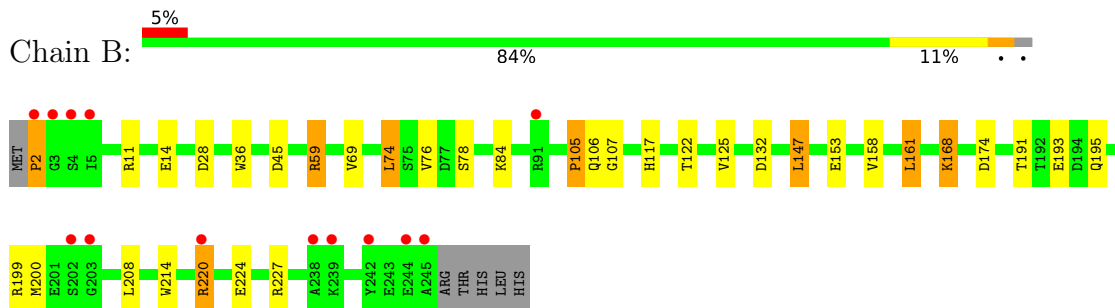
3 Residue-property plots [i](#)

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.

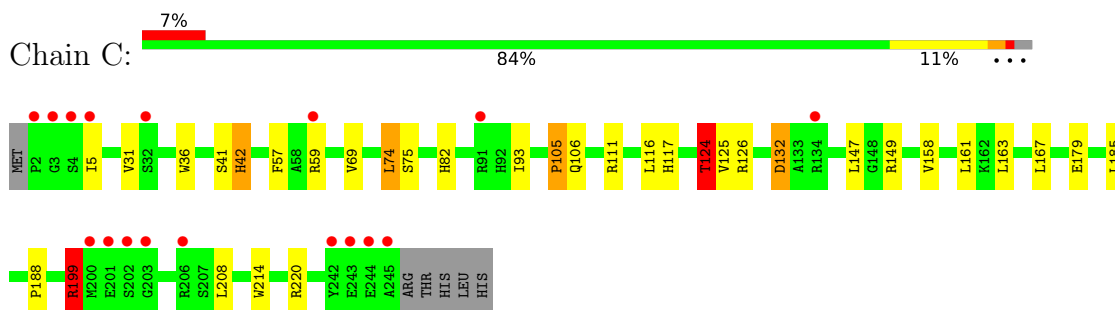
- Molecule 1: Peroxiredoxin



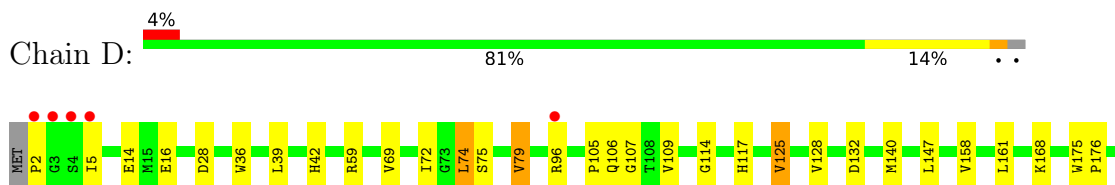
- Molecule 1: Peroxiredoxin



- Molecule 1: Peroxiredoxin

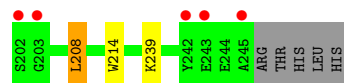
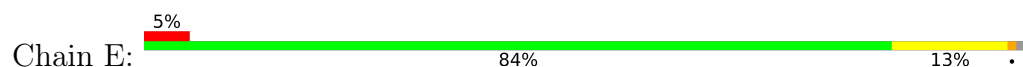


- Molecule 1: Peroxiredoxin

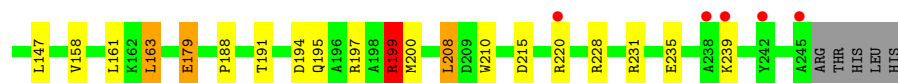
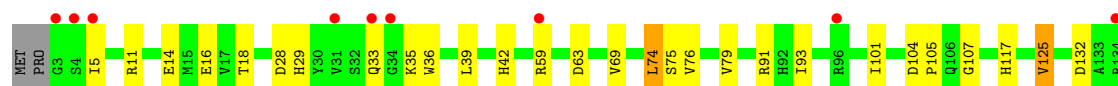
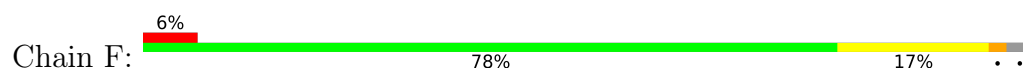




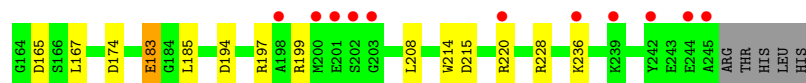
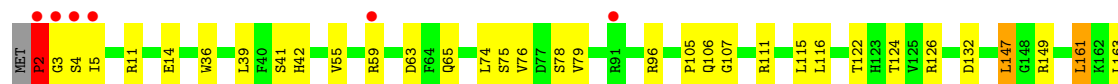
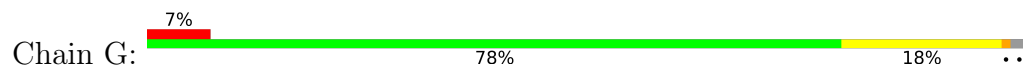
● Molecule 1: Peroxiredoxin



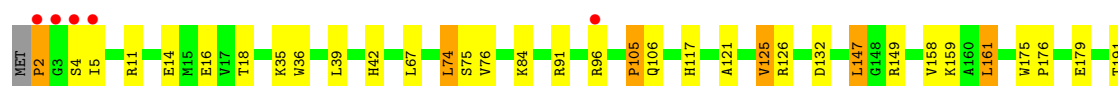
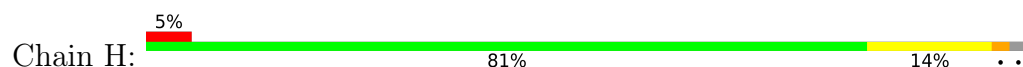
● Molecule 1: Peroxiredoxin



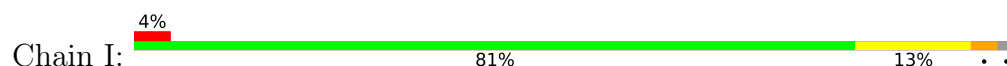
● Molecule 1: Peroxiredoxin

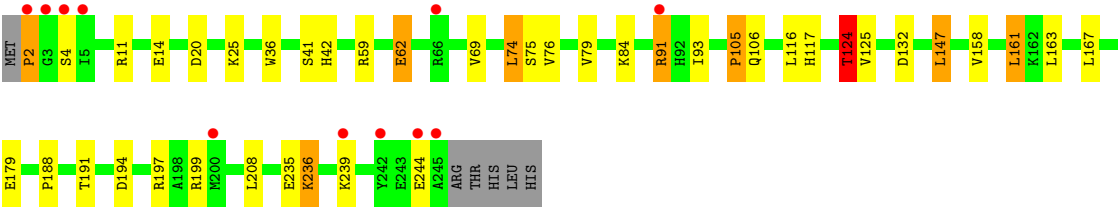


● Molecule 1: Peroxiredoxin

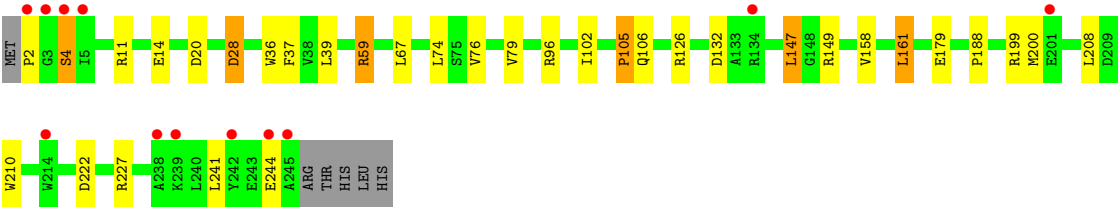
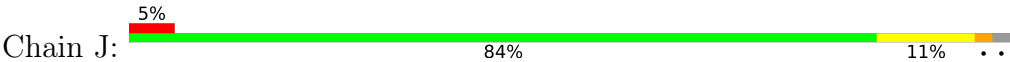


● Molecule 1: Peroxiredoxin





● Molecule 1: Peroxiredoxin



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	76.24Å 103.28Å 105.13Å 105.78° 105.25° 92.45°	Depositor
Resolution (Å)	49.37 – 1.89 49.37 – 1.89	Depositor EDS
% Data completeness (in resolution range)	97.4 (49.37-1.89) 97.4 (49.37-1.89)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.63 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.8.0257	Depositor
R, R_{free}	0.164 , 0.188 0.179 , 0.200	Depositor DCC
R_{free} test set	11796 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	22.5	Xtriage
Anisotropy	0.016	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 42.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	21385	wwPDB-VP
Average B, all atoms (Å ²)	30.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.03% 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: CIT

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	1.19	4/2005 (0.2%)	1.39	10/2725 (0.4%)
1	B	1.12	0/2017	1.35	7/2741 (0.3%)
1	C	1.17	5/2017 (0.2%)	1.37	10/2741 (0.4%)
1	D	1.21	4/2017 (0.2%)	1.39	6/2741 (0.2%)
1	E	1.16	0/2017	1.33	0/2741
1	F	1.24	3/2009 (0.1%)	1.32	4/2730 (0.1%)
1	G	1.14	1/2017 (0.0%)	1.36	3/2741 (0.1%)
1	H	1.15	1/2017 (0.0%)	1.32	4/2741 (0.1%)
1	I	1.13	0/2017	1.37	7/2741 (0.3%)
1	J	1.12	0/2017	1.34	4/2741 (0.1%)
All	All	1.16	18/20150 (0.1%)	1.35	55/27383 (0.2%)

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	179	GLU	CD-OE2	9.77	1.44	1.25
1	C	179	GLU	CD-OE2	8.72	1.42	1.25
1	D	179	GLU	CD-OE2	8.52	1.41	1.25
1	A	179	GLU	CD-OE2	7.98	1.40	1.25
1	F	101	ILE	C-O	7.80	1.32	1.24
1	D	96	ARG	CD-NE	6.39	1.55	1.46
1	D	96	ARG	NE-CZ	5.72	1.39	1.33
1	C	42	HIS	CE1-NE2	5.51	1.38	1.32
1	G	215	ASP	C-O	5.49	1.30	1.24
1	A	158	VAL	C-O	5.33	1.30	1.24
1	C	57	PHE	C-O	5.23	1.30	1.24
1	A	125	VAL	C-O	5.19	1.30	1.24
1	F	215	ASP	C-O	5.16	1.29	1.23
1	C	31	VAL	C-O	5.13	1.29	1.24
1	A	215	ASP	C-O	5.12	1.28	1.24
1	H	121	ALA	C-O	-5.09	1.17	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	82	HIS	CE1-NE2	5.05	1.37	1.32
1	D	72	ILE	C-O	5.02	1.29	1.24

All (55) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	96	ARG	CB-CG-CD	8.98	131.96	111.30
1	A	124	THR	N-CA-CB	-8.69	97.26	110.04
1	C	124	THR	N-CA-CB	-7.93	98.75	110.17
1	I	124	THR	N-CA-CB	-7.84	98.52	110.04
1	I	124	THR	CB-CA-C	7.17	122.44	109.62
1	C	105	PRO	CA-C-N	-6.93	110.63	122.56
1	C	105	PRO	C-N-CA	-6.93	110.63	122.56
1	I	2	PRO	CA-N-CD	-6.83	102.43	112.00
1	D	199	ARG	CG-CD-NE	-6.82	97.00	112.00
1	B	28	ASP	CA-CB-CG	6.82	119.42	112.60
1	A	124	THR	CA-CB-OG1	6.73	119.70	109.60
1	F	199	ARG	CG-CD-NE	-6.64	97.39	112.00
1	A	124	THR	CB-CA-C	6.49	121.24	109.62
1	C	105	PRO	O-C-N	-6.42	114.41	122.17
1	D	96	ARG	N-CA-CB	6.36	119.67	110.06
1	H	18	THR	CA-CB-OG1	-6.20	100.29	109.60
1	A	108	THR	CA-CB-OG1	-6.10	100.44	109.60
1	F	18	THR	CA-CB-OG1	-6.04	100.55	109.60
1	J	222	ASP	CA-CB-CG	6.01	118.61	112.60
1	D	231	ARG	NE-CZ-NH1	-6.01	115.49	121.50
1	H	105	PRO	CA-C-N	-5.88	112.84	122.54
1	H	105	PRO	C-N-CA	-5.88	112.84	122.54
1	I	124	THR	OG1-CB-CG2	5.83	120.95	109.30
1	F	93	ILE	N-CA-C	-5.77	108.23	113.71
1	C	93	ILE	N-CA-C	-5.74	107.91	113.53
1	J	37	PHE	CA-CB-CG	5.72	119.52	113.80
1	B	2	PRO	CA-N-CD	-5.68	104.04	112.00
1	I	105	PRO	CA-C-N	-5.68	113.56	122.65
1	I	105	PRO	C-N-CA	-5.68	113.56	122.65
1	C	124	THR	CA-CB-OG1	5.63	118.04	109.60
1	C	199	ARG	CG-CD-NE	-5.57	99.75	112.00
1	B	45	ASP	CA-CB-CG	5.53	118.13	112.60
1	B	105	PRO	CA-C-N	-5.47	113.91	122.65
1	B	105	PRO	C-N-CA	-5.47	113.91	122.65
1	D	79	VAL	N-CA-CB	-5.45	103.13	110.54
1	A	12	PHE	O-C-N	-5.45	116.91	121.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	124	THR	CB-CA-C	5.40	119.47	109.54
1	A	124	THR	OG1-CB-CG2	5.34	119.98	109.30
1	D	109	VAL	N-CA-C	-5.33	105.52	110.53
1	G	199	ARG	CG-CD-NE	-5.31	100.31	112.00
1	B	147	LEU	CA-C-N	5.24	125.08	120.10
1	B	147	LEU	C-N-CA	5.24	125.08	120.10
1	J	105	PRO	CA-C-N	-5.23	114.29	122.65
1	J	105	PRO	C-N-CA	-5.23	114.29	122.65
1	H	179	GLU	CB-CG-CD	5.19	121.42	112.60
1	C	132	ASP	CA-CB-CG	5.14	117.74	112.60
1	A	132	ASP	CA-CB-CG	5.10	117.70	112.60
1	G	2	PRO	CA-N-CD	-5.10	104.86	112.00
1	A	90	GLU	CA-C-N	5.10	127.06	120.44
1	A	90	GLU	C-N-CA	5.10	127.06	120.44
1	C	93	ILE	CB-CA-C	5.09	115.64	110.65
1	F	199	ARG	NE-CZ-NH2	-5.07	114.64	119.20
1	I	93	ILE	N-CA-C	-5.03	108.60	113.53
1	G	165	ASP	CA-CB-CG	5.02	117.62	112.60
1	A	208	LEU	N-CA-C	-5.02	106.33	112.90

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	1953	0	1943	30	0
1	B	1964	0	1954	31	0
1	C	1964	0	1954	19	0
1	D	1964	0	1954	29	0
1	E	1964	0	1954	34	0
1	F	1957	0	1946	36	0
1	G	1964	0	1954	43	0
1	H	1964	0	1954	32	0
1	I	1964	0	1954	34	0
1	J	1964	0	1954	27	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	13	0	5	0	0
2	B	13	0	5	0	0
2	C	13	0	5	0	0
2	D	13	0	5	0	0
2	E	13	0	5	0	0
2	F	13	0	5	1	0
2	G	13	0	5	0	0
2	H	13	0	5	0	0
2	I	13	0	5	0	0
2	J	13	0	5	0	0
3	A	169	0	0	7	0
3	B	169	0	0	5	0
3	C	153	0	0	1	0
3	D	156	0	0	3	0
3	E	190	0	0	11	1
3	F	167	0	0	10	0
3	G	144	0	0	13	0
3	H	175	0	0	5	0
3	I	162	0	0	3	1
3	J	148	0	0	2	0
All	All	21385	0	19571	267	1

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 7.

All (267) 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:F:76:VAL:HG12	3:F:498:HOH:O	1.26	1.30
1:E:76:VAL:HG12	3:E:515:HOH:O	1.39	1.19
1:E:16:GLU:HG2	3:E:554:HOH:O	1.42	1.19
1:G:76:VAL:HG12	3:G:495:HOH:O	1.49	1.09
1:A:236:LYS:HE2	3:A:458:HOH:O	1.50	1.08
1:G:124:THR:HB	3:G:439:HOH:O	0.91	1.08
1:F:63:ASP:CG	1:F:228:ARG:HH22	1.68	1.01
1:G:220:ARG:NH2	3:G:401:HOH:O	1.94	1.00
1:I:79:VAL:HB	3:I:518:HOH:O	0.82	0.98
1:F:63:ASP:OD2	1:F:228:ARG:NH2	2.00	0.94
1:F:14:GLU:OE1	1:F:28:ASP:OD1	1.86	0.92
1:G:107:GLY:HA3	1:J:106:GLN:HE22	1.43	0.84
1:G:183:GLU:OE1	3:G:402:HOH:O	1.95	0.84

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:11:ARG:NH1	1:H:14:GLU:OE2	2.11	0.83
1:E:197:ARG:NH1	1:H:96:ARG:NH2	2.28	0.82
1:F:29:HIS:O	1:F:33:GLN:NE2	2.12	0.81
3:E:452:HOH:O	1:F:59:ARG:HB3	1.80	0.81
1:H:67:LEU:HD13	1:H:158:VAL:HG23	1.60	0.81
1:E:70:ASP:HB3	3:E:525:HOH:O	1.83	0.79
1:B:200:MET:HA	1:B:200:MET:HE2	1.62	0.78
1:I:59:ARG:NH2	1:J:179:GLU:OE1	2.18	0.76
1:D:200:MET:HE2	1:D:200:MET:HA	1.66	0.74
1:B:11:ARG:NH1	1:B:14:GLU:OE2	2.20	0.74
1:G:236:LYS:HE3	3:G:407:HOH:O	1.88	0.74
1:D:228:ARG:HH11	1:D:228:ARG:HG3	1.53	0.73
1:H:67:LEU:HD21	1:H:159:LYS:HD3	1.70	0.73
1:F:76:VAL:CG1	3:F:498:HOH:O	1.99	0.73
1:E:96:ARG:HD2	3:E:422:HOH:O	1.88	0.72
1:E:179:GLU:OE1	1:F:59:ARG:HG3	1.90	0.72
1:C:188:PRO:O	1:C:199:ARG:NH2	2.22	0.71
1:B:220:ARG:HD2	1:B:224:GLU:OE2	1.91	0.71
1:F:105:PRO:O	1:H:105:PRO:O	2.09	0.71
1:A:11:ARG:NH1	1:A:14:GLU:OE1	2.22	0.71
1:G:79:VAL:HG11	1:I:191:THR:O	1.91	0.70
1:C:105:PRO:O	1:E:105:PRO:O	2.09	0.69
1:E:76:VAL:CG1	3:E:515:HOH:O	2.14	0.69
1:A:236:LYS:CE	3:A:458:HOH:O	2.22	0.69
1:G:65:GLN:HG2	3:G:510:HOH:O	1.91	0.68
1:A:5:ILE:O	1:B:2:PRO:HA	1.92	0.68
1:B:105:PRO:O	1:D:105:PRO:O	2.12	0.67
1:I:179:GLU:OE2	1:J:59:ARG:HG2	1.94	0.67
1:H:200:MET:HE2	1:H:200:MET:HA	1.76	0.67
1:F:107:GLY:HA3	1:H:106:GLN:HE22	1.59	0.66
1:F:200:MET:HE2	1:F:200:MET:HA	1.78	0.66
1:G:124:THR:HG22	3:G:462:HOH:O	1.96	0.66
1:G:220:ARG:CZ	3:G:401:HOH:O	2.39	0.65
1:E:59:ARG:HH12	1:F:179:GLU:HB3	1.60	0.65
1:B:107:GLY:HA3	1:D:106:GLN:HE22	1.60	0.65
1:G:96:ARG:NH1	3:G:403:HOH:O	2.30	0.64
1:D:191:THR:O	1:E:79:VAL:HG11	1.98	0.64
1:B:106:GLN:HE22	1:D:107:GLY:HA3	1.62	0.64
1:C:5:ILE:O	1:D:2:PRO:HA	1.99	0.62
1:F:220:ARG:HD2	3:F:474:HOH:O	1.99	0.61
1:A:105:PRO:O	1:I:105:PRO:O	2.18	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:59:ARG:NH1	3:D:403:HOH:O	2.34	0.61
1:G:76:VAL:CG1	3:G:495:HOH:O	2.25	0.61
1:H:35:LYS:NZ	3:H:401:HOH:O	1.92	0.61
1:F:11:ARG:NH1	1:F:14:GLU:OE2	2.26	0.61
1:I:161:LEU:HD13	1:J:147:LEU:HG	1.81	0.60
1:C:74:LEU:C	1:C:74:LEU:HD13	2.26	0.60
1:G:4:SER:HA	1:H:4:SER:HA	1.84	0.60
1:G:5:ILE:O	1:H:2:PRO:HA	2.02	0.60
1:E:197:ARG:NH1	1:H:96:ARG:HH22	1.98	0.60
1:E:11:ARG:NH1	1:E:14:GLU:OE1	2.31	0.60
1:A:5:ILE:HD11	3:B:511:HOH:O	2.01	0.59
1:I:62:GLU:HG3	3:I:556:HOH:O	2.02	0.58
1:D:74:LEU:HD13	1:D:74:LEU:C	2.30	0.57
1:D:228:ARG:HH11	1:D:228:ARG:CG	2.16	0.57
1:G:41:SER:HB2	1:G:124:THR:HG21	1.84	0.57
1:A:183:GLU:HG2	3:B:405:HOH:O	2.03	0.57
1:J:200:MET:HE2	1:J:200:MET:HA	1.85	0.57
1:F:74:LEU:HD13	1:F:74:LEU:C	2.29	0.57
1:G:106:GLN:HE22	1:J:76:VAL:HG11	1.70	0.57
1:E:70:ASP:CB	3:E:525:HOH:O	2.46	0.57
1:E:197:ARG:HH12	1:H:96:ARG:NH2	2.02	0.56
1:G:2:PRO:HA	3:H:535:HOH:O	2.05	0.56
1:I:36:TRP:CD2	1:I:132:ASP:HA	2.39	0.56
1:G:194:ASP:OD1	1:G:197:ARG:NH2	2.37	0.56
1:A:236:LYS:HD2	1:B:227:ARG:NH2	2.21	0.56
1:D:69:VAL:HG21	1:D:158:VAL:HG11	1.88	0.56
1:I:179:GLU:OE1	1:J:241:LEU:HD11	2.04	0.56
1:C:106:GLN:NE2	1:E:76:VAL:HG11	2.20	0.56
1:D:36:TRP:CD2	1:D:132:ASP:HA	2.41	0.56
1:D:188:PRO:O	1:D:199:ARG:NH2	2.37	0.56
1:A:74:LEU:HD23	1:A:102:ILE:CG2	2.37	0.55
1:A:239:LYS:NZ	1:A:244:GLU:OE2	2.37	0.55
1:C:106:GLN:O	1:C:111:ARG:NH2	2.38	0.55
1:J:74:LEU:HD23	1:J:102:ILE:HB	1.89	0.55
1:G:105:PRO:O	1:J:105:PRO:O	2.26	0.54
1:G:11:ARG:NH1	1:G:14:GLU:OE1	2.35	0.54
1:E:174:ASP:HB3	3:F:465:HOH:O	2.07	0.54
1:B:208:LEU:HD13	1:B:214:TRP:HZ3	1.73	0.54
1:F:194:ASP:OD1	1:F:197:ARG:NH2	2.38	0.53
1:B:74:LEU:HD13	1:B:74:LEU:C	2.33	0.53
1:H:117:HIS:CG	1:H:125:VAL:HG11	2.44	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:134:ARG:NH2	3:A:407:HOH:O	2.41	0.53
1:B:69:VAL:HG21	1:B:158:VAL:HG11	1.89	0.53
1:J:67:LEU:HD13	1:J:158:VAL:HG23	1.91	0.53
1:B:191:THR:H	1:B:195:GLN:NE2	2.07	0.53
1:E:36:TRP:CD2	1:E:132:ASP:HA	2.44	0.53
1:J:11:ARG:NH1	1:J:14:GLU:OE2	2.38	0.52
1:B:200:MET:HA	1:B:200:MET:CE	2.36	0.52
1:C:36:TRP:CD2	1:C:132:ASP:HA	2.45	0.52
1:A:188:PRO:O	1:A:199:ARG:NH2	2.43	0.52
1:H:117:HIS:HB2	1:H:125:VAL:CG1	2.39	0.52
1:D:14:GLU:OE1	1:D:28:ASP:OD1	2.28	0.52
1:F:35:LYS:HE3	3:F:556:HOH:O	2.08	0.52
1:F:39:LEU:C	1:F:39:LEU:HD23	2.34	0.52
1:G:106:GLN:NE2	1:J:76:VAL:HG11	2.24	0.51
1:E:74:LEU:C	1:E:74:LEU:HD13	2.36	0.51
1:I:91:ARG:HD3	3:I:537:HOH:O	2.09	0.51
1:I:117:HIS:HB2	1:I:125:VAL:CG1	2.41	0.51
1:E:179:GLU:CD	1:F:59:ARG:HG3	2.35	0.51
1:H:36:TRP:CD2	1:H:132:ASP:HA	2.46	0.51
1:G:11:ARG:HG2	1:G:11:ARG:HH11	1.75	0.51
1:E:11:ARG:HD2	3:E:424:HOH:O	2.11	0.50
1:E:194:ASP:OD1	1:E:197:ARG:NH2	2.43	0.50
1:G:63:ASP:CG	1:G:228:ARG:HH12	2.20	0.50
1:H:74:LEU:C	1:H:74:LEU:HD13	2.37	0.50
3:C:532:HOH:O	1:D:2:PRO:HG2	2.11	0.50
1:G:65:GLN:CG	3:G:510:HOH:O	2.55	0.50
1:A:74:LEU:HD23	1:A:102:ILE:HB	1.93	0.50
1:D:39:LEU:C	1:D:39:LEU:HD23	2.37	0.50
1:H:67:LEU:HD13	1:H:158:VAL:CG2	2.36	0.50
1:C:41:SER:HB2	1:C:124:THR:HG21	1.94	0.50
1:G:161:LEU:HD13	1:H:147:LEU:HG	1.94	0.50
1:G:126:ARG:HB3	1:G:149:ARG:CZ	2.42	0.49
1:I:117:HIS:HB2	1:I:125:VAL:HG11	1.94	0.49
1:A:147:LEU:HG	1:B:161:LEU:HD13	1.94	0.49
1:B:191:THR:O	1:I:79:VAL:HG11	2.11	0.49
1:D:191:THR:H	1:D:195:GLN:NE2	2.10	0.49
1:G:36:TRP:CD2	1:G:132:ASP:HA	2.47	0.49
1:G:147:LEU:HG	1:H:161:LEU:HD13	1.94	0.49
1:C:69:VAL:HG21	1:C:158:VAL:HG11	1.94	0.49
1:I:41:SER:HB2	1:I:124:THR:HG21	1.94	0.49
1:F:74:LEU:HD13	1:F:75:SER:N	2.27	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:111:ARG:NH2	3:G:406:HOH:O	2.45	0.49
1:I:147:LEU:HG	1:J:161:LEU:HD13	1.93	0.49
1:A:5:ILE:CG2	3:A:411:HOH:O	2.61	0.49
3:E:507:HOH:O	1:F:5:ILE:HD11	2.13	0.49
1:I:74:LEU:HD13	1:I:74:LEU:C	2.38	0.49
1:A:36:TRP:CD2	1:A:132:ASP:HA	2.48	0.49
1:A:106:GLN:NE2	1:I:76:VAL:HG11	2.29	0.48
1:G:39:LEU:C	1:G:39:LEU:HD23	2.38	0.48
1:B:117:HIS:HB2	1:B:125:VAL:CG1	2.44	0.48
1:D:200:MET:HA	1:D:200:MET:CE	2.39	0.48
1:H:39:LEU:C	1:H:39:LEU:HD23	2.38	0.48
1:A:122:THR:HB	1:I:105:PRO:HG2	1.95	0.48
1:H:126:ARG:HB3	1:H:149:ARG:CZ	2.43	0.48
1:D:222:ASP:OD2	3:D:401:HOH:O	2.20	0.47
1:F:235:GLU:HG3	3:F:475:HOH:O	2.14	0.47
2:F:301:CIT:O3	2:F:301:CIT:O2	2.33	0.47
1:H:84:LYS:NZ	3:H:402:HOH:O	2.47	0.47
1:I:11:ARG:NH1	1:I:14:GLU:OE1	2.44	0.47
1:A:76:VAL:HG11	1:I:106:GLN:NE2	2.30	0.47
1:E:197:ARG:HD2	3:E:401:HOH:O	2.15	0.47
1:F:200:MET:HE3	1:F:210:TRP:HA	1.97	0.47
1:H:191:THR:H	1:H:195:GLN:NE2	2.13	0.47
1:A:106:GLN:HE22	1:I:76:VAL:HG11	1.80	0.46
1:I:11:ARG:HH11	1:I:11:ARG:HG2	1.79	0.46
1:I:69:VAL:HG21	1:I:158:VAL:HG11	1.96	0.46
1:H:76:VAL:O	1:H:105:PRO:HA	2.15	0.46
1:E:14:GLU:OE2	1:E:25:LYS:HE2	2.16	0.46
1:B:122:THR:HB	1:D:105:PRO:HG2	1.97	0.46
1:F:42:HIS:CE1	1:F:75:SER:HB3	2.50	0.46
1:H:175:TRP:CG	1:H:176:PRO:HA	2.51	0.46
1:J:39:LEU:HD23	1:J:39:LEU:C	2.41	0.46
1:A:69:VAL:HG21	1:A:158:VAL:HG11	1.97	0.46
1:C:106:GLN:OE1	1:E:107:GLY:HA3	2.16	0.46
1:F:36:TRP:CD2	1:F:132:ASP:HA	2.51	0.46
1:G:3:GLY:O	1:H:5:ILE:N	2.42	0.46
1:G:74:LEU:C	1:G:74:LEU:HD23	2.41	0.46
1:G:174:ASP:HB3	3:H:458:HOH:O	2.16	0.46
1:B:59:ARG:HG3	3:B:468:HOH:O	2.16	0.46
1:B:36:TRP:CD2	1:B:132:ASP:HA	2.51	0.45
1:B:69:VAL:CG2	1:B:158:VAL:HG11	2.46	0.45
1:E:208:LEU:HD13	1:E:214:TRP:HZ3	1.81	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:28:ASP:OD1	1:J:28:ASP:N	2.48	0.45
1:J:74:LEU:HD23	1:J:102:ILE:CG2	2.46	0.45
1:A:92:HIS:O	1:A:245:ALA:HB1	2.15	0.45
1:J:11:ARG:NH2	3:J:403:HOH:O	2.49	0.45
1:A:55:VAL:O	1:A:59:ARG:HG3	2.17	0.45
1:F:228:ARG:NH2	3:F:406:HOH:O	2.49	0.45
1:I:236:LYS:HD3	1:J:227:ARG:NH2	2.32	0.45
1:B:168:LYS:HE3	3:B:413:HOH:O	2.16	0.45
1:E:69:VAL:HG21	1:E:158:VAL:HG11	1.99	0.45
1:B:208:LEU:HD13	1:B:214:TRP:CZ3	2.51	0.45
1:A:74:LEU:HD13	1:A:74:LEU:C	2.41	0.45
1:D:5:ILE:HG22	1:D:114:GLY:HA3	1.99	0.45
1:B:220:ARG:HD2	1:B:224:GLU:CD	2.42	0.45
1:I:42:HIS:CE1	1:I:75:SER:HB3	2.52	0.45
1:F:188:PRO:O	1:F:199:ARG:NH2	2.49	0.44
1:A:41:SER:HB2	1:A:124:THR:HG21	1.99	0.44
1:C:106:GLN:HE21	1:E:76:VAL:HG11	1.83	0.44
1:I:11:ARG:NH1	1:I:11:ARG:HG2	2.33	0.44
1:G:55:VAL:O	1:G:59:ARG:HG3	2.18	0.44
1:I:4:SER:HA	1:J:4:SER:HA	2.00	0.44
1:A:194:ASP:OD1	1:A:197:ARG:NH2	2.50	0.43
1:C:185:LEU:O	1:C:214:TRP:HB2	2.17	0.43
1:D:74:LEU:HD13	1:D:75:SER:N	2.34	0.43
1:H:228:ARG:HG3	3:H:475:HOH:O	2.18	0.43
1:J:14:GLU:OE1	1:J:28:ASP:OD1	2.36	0.43
1:J:188:PRO:O	1:J:199:ARG:NH2	2.52	0.43
1:C:59:ARG:HH11	1:D:179:GLU:HB3	1.83	0.43
1:D:128:VAL:O	1:D:140:MET:HA	2.19	0.43
1:J:200:MET:HE3	1:J:210:TRP:HA	2.01	0.43
1:C:42:HIS:O	1:C:124:THR:HG22	2.19	0.43
1:E:2:PRO:HG2	3:F:539:HOH:O	2.18	0.43
1:G:78:SER:HB3	3:J:485:HOH:O	2.18	0.43
1:A:39:LEU:C	1:A:39:LEU:HD23	2.43	0.43
1:F:104:ASP:N	1:F:105:PRO:HD3	2.34	0.43
1:A:5:ILE:HG22	3:A:411:HOH:O	2.18	0.43
1:D:42:HIS:CE1	1:D:75:SER:HB3	2.54	0.42
1:G:42:HIS:CE1	1:G:75:SER:HB3	2.53	0.42
1:H:67:LEU:CD1	1:H:158:VAL:HG23	2.40	0.42
1:A:124:THR:HG23	1:A:125:VAL:O	2.19	0.42
1:F:231:ARG:O	1:F:235:GLU:HG3	2.19	0.42
1:G:115:LEU:HB3	1:G:124:THR:OG1	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:193:GLU:OE1	1:I:20:ASP:OD2	2.38	0.42
1:B:199:ARG:NH2	3:B:411:HOH:O	2.52	0.42
1:B:11:ARG:CZ	1:B:14:GLU:OE2	2.68	0.42
1:C:117:HIS:HB2	1:C:125:VAL:CG1	2.50	0.42
1:E:42:HIS:CE1	1:E:75:SER:HB3	2.54	0.42
1:H:42:HIS:CE1	1:H:75:SER:HB3	2.54	0.42
1:I:188:PRO:O	1:I:199:ARG:NH2	2.53	0.42
1:B:117:HIS:HB2	1:B:125:VAL:HG11	2.02	0.42
1:E:197:ARG:NH1	1:H:96:ARG:HH21	2.11	0.42
1:F:69:VAL:HG21	1:F:158:VAL:HG11	2.02	0.42
1:D:69:VAL:CG2	1:D:158:VAL:HG11	2.48	0.42
1:E:104:ASP:N	1:E:105:PRO:HD3	2.35	0.42
1:I:42:HIS:O	1:I:124:THR:HG22	2.20	0.42
1:J:74:LEU:C	1:J:74:LEU:HD13	2.45	0.42
1:F:191:THR:H	1:F:195:GLN:NE2	2.17	0.41
1:I:74:LEU:HD13	1:I:75:SER:N	2.35	0.41
1:J:36:TRP:CD2	1:J:132:ASP:HA	2.55	0.41
1:B:153:GLU:OE1	1:B:153:GLU:HA	2.20	0.41
1:E:96:ARG:NE	3:E:406:HOH:O	2.53	0.41
1:C:124:THR:HG23	1:C:125:VAL:O	2.20	0.41
1:D:175:TRP:CG	1:D:176:PRO:HA	2.55	0.41
1:F:200:MET:HA	1:F:200:MET:CE	2.50	0.41
1:G:5:ILE:O	1:H:2:PRO:CA	2.66	0.41
1:G:122:THR:HA	1:J:106:GLN:HG2	2.02	0.41
1:F:163:LEU:HD23	1:F:163:LEU:HA	1.94	0.41
1:I:41:SER:HB2	1:I:124:THR:CG2	2.51	0.41
1:A:111:ARG:NH1	3:A:404:HOH:O	2.29	0.41
1:C:74:LEU:HD13	1:C:75:SER:N	2.35	0.41
1:B:76:VAL:O	1:B:105:PRO:HA	2.21	0.41
1:B:78:SER:HB3	3:D:505:HOH:O	2.21	0.41
1:C:126:ARG:HB3	1:C:149:ARG:CZ	2.51	0.41
1:E:208:LEU:HD13	1:E:214:TRP:CZ3	2.56	0.41
1:I:69:VAL:CG2	1:I:158:VAL:HG11	2.51	0.41
1:I:194:ASP:OD1	1:I:197:ARG:NH2	2.51	0.41
1:D:117:HIS:HB2	1:D:125:VAL:CG1	2.51	0.41
1:G:3:GLY:HA3	3:G:513:HOH:O	2.20	0.41
1:F:117:HIS:HB2	1:F:125:VAL:CG1	2.50	0.40
1:H:212:PHE:C	1:H:212:PHE:CD1	2.99	0.40
1:D:117:HIS:CG	1:D:125:VAL:HG11	2.56	0.40
1:F:239:LYS:CE	3:F:451:HOH:O	2.69	0.40
1:J:20:ASP:HA	1:J:79:VAL:CG2	2.51	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:444:HOH:O	1:B:174:ASP:HB3	2.21	0.40
1:G:76:VAL:O	1:G:105:PRO:HA	2.22	0.40
1:E:5:ILE:HD11	3:F:439:HOH:O	2.21	0.40
1:G:185:LEU:O	1:G:214:TRP:HB2	2.21	0.40
1:C:208:LEU:HD13	1:C:214:TRP:HZ3	1.87	0.40
1:F:208:LEU:HD12	1:F:208:LEU:HA	1.94	0.40
1:G:11:ARG:NH1	1:G:11:ARG:HG2	2.37	0.40
1:J:126:ARG:HB3	1:J:149:ARG:CZ	2.52	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:477:HOH:O	3:I:477:HOH:O[1_554]	2.02	0.18

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	240/250 (96%)	235 (98%)	5 (2%)	0	100	100
1	B	242/250 (97%)	239 (99%)	3 (1%)	0	100	100
1	C	242/250 (97%)	239 (99%)	3 (1%)	0	100	100
1	D	242/250 (97%)	236 (98%)	5 (2%)	1 (0%)	30	22
1	E	242/250 (97%)	239 (99%)	3 (1%)	0	100	100
1	F	241/250 (96%)	235 (98%)	5 (2%)	1 (0%)	30	22
1	G	242/250 (97%)	238 (98%)	4 (2%)	0	100	100
1	H	242/250 (97%)	238 (98%)	3 (1%)	1 (0%)	30	22
1	I	242/250 (97%)	238 (98%)	4 (2%)	0	100	100
1	J	242/250 (97%)	238 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	2417/2500 (97%)	2375 (98%)	39 (2%)	3 (0%)	48	40

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	125	VAL
1	D	125	VAL
1	F	125	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	208/215 (97%)	200 (96%)	8 (4%)	29	21
1	B	209/215 (97%)	202 (97%)	7 (3%)	33	26
1	C	209/215 (97%)	200 (96%)	9 (4%)	26	18
1	D	209/215 (97%)	200 (96%)	9 (4%)	26	18
1	E	209/215 (97%)	200 (96%)	9 (4%)	26	18
1	F	208/215 (97%)	199 (96%)	9 (4%)	26	18
1	G	209/215 (97%)	201 (96%)	8 (4%)	29	21
1	H	209/215 (97%)	200 (96%)	9 (4%)	26	18
1	I	209/215 (97%)	192 (92%)	17 (8%)	11	5
1	J	209/215 (97%)	200 (96%)	9 (4%)	26	18
All	All	2088/2150 (97%)	1994 (96%)	94 (4%)	24	17

All (94) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	116	LEU
1	A	124	THR
1	A	147	LEU
1	A	161	LEU

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Mol	Chain	Res	Type
1	A	167	LEU
1	A	208	LEU
1	A	228	ARG
1	A	242	TYR
1	B	59	ARG
1	B	74	LEU
1	B	84	LYS
1	B	147	LEU
1	B	161	LEU
1	B	168	LYS
1	B	220	ARG
1	C	74	LEU
1	C	116	LEU
1	C	124	THR
1	C	147	LEU
1	C	161	LEU
1	C	163	LEU
1	C	167	LEU
1	C	199	ARG
1	C	220	ARG
1	D	16	GLU
1	D	74	LEU
1	D	79	VAL
1	D	147	LEU
1	D	161	LEU
1	D	168	LYS
1	D	199	ARG
1	D	208	LEU
1	D	228	ARG
1	E	4	SER
1	E	74	LEU
1	E	116	LEU
1	E	147	LEU
1	E	161	LEU
1	E	163	LEU
1	E	167	LEU
1	E	208	LEU
1	E	239	LYS
1	F	16	GLU
1	F	74	LEU
1	F	79	VAL
1	F	91	ARG

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Mol	Chain	Res	Type
1	F	147	LEU
1	F	161	LEU
1	F	163	LEU
1	F	199	ARG
1	F	208	LEU
1	G	2	PRO
1	G	116	LEU
1	G	147	LEU
1	G	161	LEU
1	G	163	LEU
1	G	167	LEU
1	G	183	GLU
1	G	208	LEU
1	H	2	PRO
1	H	16	GLU
1	H	74	LEU
1	H	91	ARG
1	H	147	LEU
1	H	161	LEU
1	H	208	LEU
1	H	235	GLU
1	H	243	GLU
1	I	2	PRO
1	I	25	LYS
1	I	62	GLU
1	I	74	LEU
1	I	84	LYS
1	I	91	ARG
1	I	116	LEU
1	I	124	THR
1	I	147	LEU
1	I	161	LEU
1	I	163	LEU
1	I	167	LEU
1	I	208	LEU
1	I	235	GLU
1	I	236	LYS
1	I	239	LYS
1	I	244	GLU
1	J	2	PRO
1	J	4	SER
1	J	28	ASP

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Mol	Chain	Res	Type
1	J	59	ARG
1	J	96	ARG
1	J	147	LEU
1	J	161	LEU
1	J	208	LEU
1	J	244	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (26) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	204	GLN
1	B	65	GLN
1	B	106	GLN
1	B	123	HIS
1	B	195	GLN
1	B	204	GLN
1	C	204	GLN
1	D	65	GLN
1	D	106	GLN
1	D	123	HIS
1	D	195	GLN
1	D	204	GLN
1	E	204	GLN
1	F	65	GLN
1	F	106	GLN
1	F	195	GLN
1	G	204	GLN
1	H	106	GLN
1	H	123	HIS
1	H	195	GLN
1	H	204	GLN
1	I	21	HIS
1	I	204	GLN
1	J	106	GLN
1	J	123	HIS
1	J	204	GLN

5.3.3 RNA ⓘ

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](#)

10 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$
2	CIT	C	301	-	12,12,12	2.16	5 (41%)	17,17,17	1.40	3 (17%)
2	CIT	B	301	-	12,12,12	1.89	4 (33%)	17,17,17	1.34	3 (17%)
2	CIT	F	301	-	12,12,12	1.90	4 (33%)	17,17,17	1.94	5 (29%)
2	CIT	E	301	-	12,12,12	2.11	5 (41%)	17,17,17	2.04	5 (29%)
2	CIT	G	301	-	12,12,12	2.03	6 (50%)	17,17,17	1.23	2 (11%)
2	CIT	H	301	-	12,12,12	1.60	3 (25%)	17,17,17	1.67	2 (11%)
2	CIT	D	301	-	12,12,12	1.61	2 (16%)	17,17,17	2.29	8 (47%)
2	CIT	I	301	-	12,12,12	2.16	5 (41%)	17,17,17	1.57	4 (23%)
2	CIT	A	301	-	12,12,12	2.06	4 (33%)	17,17,17	1.56	3 (17%)
2	CIT	J	301	-	12,12,12	1.93	4 (33%)	17,17,17	1.41	4 (23%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	CIT	C	301	-	-	6/16/16/16	-
2	CIT	B	301	-	-	5/16/16/16	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	CIT	F	301	-	-	11/16/16/16	-
2	CIT	E	301	-	-	4/16/16/16	-
2	CIT	G	301	-	-	3/16/16/16	-
2	CIT	H	301	-	-	6/16/16/16	-
2	CIT	D	301	-	-	8/16/16/16	-
2	CIT	I	301	-	-	3/16/16/16	-
2	CIT	A	301	-	-	5/16/16/16	-
2	CIT	J	301	-	-	3/16/16/16	-

All (42) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	301	CIT	C3-C6	5.10	1.58	1.53
2	C	301	CIT	C3-C6	4.86	1.58	1.53
2	I	301	CIT	C3-C6	4.48	1.58	1.53
2	E	301	CIT	C3-C6	4.33	1.58	1.53
2	B	301	CIT	C3-C6	4.02	1.57	1.53
2	F	301	CIT	C3-C6	3.87	1.57	1.53
2	J	301	CIT	C3-C6	3.56	1.57	1.53
2	G	301	CIT	C3-C6	3.53	1.57	1.53
2	G	301	CIT	O1-C1	3.47	1.33	1.22
2	H	301	CIT	C3-C6	3.42	1.57	1.53
2	E	301	CIT	C4-C3	-3.39	1.49	1.54
2	D	301	CIT	C3-C6	3.36	1.56	1.53
2	C	301	CIT	O2-C1	-3.01	1.20	1.30
2	I	301	CIT	O2-C1	-2.97	1.21	1.30
2	J	301	CIT	O1-C1	2.94	1.31	1.22
2	I	301	CIT	C2-C3	-2.94	1.50	1.54
2	B	301	CIT	O2-C1	-2.87	1.21	1.30
2	F	301	CIT	O6-C6	-2.84	1.20	1.30
2	F	301	CIT	C2-C3	-2.82	1.50	1.54
2	J	301	CIT	O2-C1	-2.75	1.21	1.30
2	H	301	CIT	O2-C1	-2.75	1.21	1.30
2	I	301	CIT	O1-C1	2.74	1.31	1.22
2	D	301	CIT	C4-C3	-2.69	1.50	1.54
2	B	301	CIT	O1-C1	2.62	1.30	1.22
2	J	301	CIT	C2-C3	-2.54	1.50	1.54
2	E	301	CIT	O4-C5	-2.54	1.22	1.30
2	C	301	CIT	C2-C3	-2.53	1.50	1.54
2	A	301	CIT	O2-C1	-2.48	1.22	1.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	301	CIT	C2-C3	-2.47	1.50	1.54
2	I	301	CIT	O6-C6	-2.47	1.21	1.30
2	C	301	CIT	O1-C1	2.46	1.30	1.22
2	E	301	CIT	O3-C5	2.44	1.30	1.22
2	C	301	CIT	O6-C6	-2.31	1.22	1.30
2	F	301	CIT	O4-C5	-2.31	1.23	1.30
2	E	301	CIT	O2-C1	-2.28	1.23	1.30
2	A	301	CIT	O6-C6	-2.27	1.22	1.30
2	G	301	CIT	O2-C1	-2.25	1.23	1.30
2	G	301	CIT	O3-C5	2.21	1.29	1.22
2	A	301	CIT	C4-C3	-2.09	1.51	1.54
2	B	301	CIT	O6-C6	-2.06	1.23	1.30
2	G	301	CIT	O6-C6	-2.06	1.23	1.30
2	H	301	CIT	C4-C3	-2.02	1.51	1.54

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	301	CIT	O1-C1-C2	-4.99	108.81	122.95
2	H	301	CIT	O3-C5-C4	-4.67	109.72	122.95
2	D	301	CIT	O5-C6-C3	-4.32	113.72	122.09
2	D	301	CIT	O3-C5-C4	-4.29	110.79	122.95
2	E	301	CIT	O6-C6-C3	4.17	121.14	113.14
2	D	301	CIT	O6-C6-C3	4.12	121.05	113.14
2	A	301	CIT	O3-C5-C4	-3.85	112.03	122.95
2	E	301	CIT	C4-C3-C2	-3.79	99.58	109.31
2	F	301	CIT	O2-C1-C2	3.48	125.37	114.35
2	E	301	CIT	O5-C6-C3	-3.44	115.44	122.09
2	H	301	CIT	O4-C5-C4	3.31	124.83	114.35
2	D	301	CIT	O4-C5-C4	3.30	124.79	114.35
2	E	301	CIT	C2-C3-C6	3.18	117.07	110.03
2	I	301	CIT	O3-C5-C4	-3.14	114.07	122.95
2	A	301	CIT	O4-C5-C4	2.86	123.40	114.35
2	I	301	CIT	C4-C3-C2	-2.78	102.18	109.31
2	J	301	CIT	O3-C5-C4	-2.69	115.32	122.95
2	G	301	CIT	C4-C3-C2	-2.65	102.50	109.31
2	C	301	CIT	C4-C3-C2	-2.65	102.52	109.31
2	B	301	CIT	C4-C3-C2	-2.64	102.53	109.31
2	I	301	CIT	O4-C5-C4	2.53	122.37	114.35
2	C	301	CIT	O3-C5-C4	-2.52	115.82	122.95
2	E	301	CIT	O7-C3-C2	2.51	115.10	109.38
2	A	301	CIT	C2-C3-C6	2.51	115.58	110.03

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	301	CIT	O7-C3-C2	-2.48	103.71	109.38
2	I	301	CIT	C4-C3-C6	2.46	115.47	110.03
2	F	301	CIT	C4-C3-C6	2.45	115.44	110.03
2	B	301	CIT	O3-C5-C4	-2.44	116.04	122.95
2	D	301	CIT	O7-C3-C2	2.28	114.58	109.38
2	D	301	CIT	C4-C3-C2	-2.24	103.56	109.31
2	B	301	CIT	O7-C3-C4	2.20	114.40	109.38
2	J	301	CIT	O7-C3-C2	-2.20	104.36	109.38
2	J	301	CIT	C4-C3-C6	2.20	114.90	110.03
2	C	301	CIT	C4-C3-C6	2.18	114.85	110.03
2	F	301	CIT	C4-C3-C2	-2.11	103.90	109.31
2	D	301	CIT	C2-C3-C6	2.11	114.69	110.03
2	D	301	CIT	O7-C3-C4	-2.10	104.58	109.38
2	G	301	CIT	O7-C3-C4	2.03	114.00	109.38
2	J	301	CIT	C4-C3-C2	-2.02	104.12	109.31

There are no chirality outliers.

All (54) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301	CIT	C1-C2-C3-O7
2	A	301	CIT	C1-C2-C3-C6
2	B	301	CIT	O7-C3-C4-C5
2	B	301	CIT	C6-C3-C4-C5
2	C	301	CIT	O7-C3-C4-C5
2	C	301	CIT	C6-C3-C4-C5
2	D	301	CIT	C1-C2-C3-O7
2	D	301	CIT	C1-C2-C3-C6
2	E	301	CIT	C1-C2-C3-O7
2	E	301	CIT	C1-C2-C3-C6
2	F	301	CIT	O7-C3-C4-C5
2	F	301	CIT	C6-C3-C4-C5
2	F	301	CIT	O7-C3-C6-O5
2	G	301	CIT	O7-C3-C4-C5
2	G	301	CIT	C6-C3-C4-C5
2	H	301	CIT	C1-C2-C3-O7
2	H	301	CIT	C1-C2-C3-C6
2	I	301	CIT	O7-C3-C4-C5
2	I	301	CIT	C6-C3-C4-C5
2	J	301	CIT	O7-C3-C4-C5
2	J	301	CIT	C6-C3-C4-C5
2	A	301	CIT	C1-C2-C3-C4

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Mol	Chain	Res	Type	Atoms
2	B	301	CIT	C2-C3-C4-C5
2	C	301	CIT	C2-C3-C4-C5
2	D	301	CIT	C1-C2-C3-C4
2	E	301	CIT	C1-C2-C3-C4
2	F	301	CIT	C2-C3-C4-C5
2	G	301	CIT	C2-C3-C4-C5
2	H	301	CIT	C1-C2-C3-C4
2	I	301	CIT	C2-C3-C4-C5
2	J	301	CIT	C2-C3-C4-C5
2	A	301	CIT	C3-C4-C5-O4
2	D	301	CIT	O7-C3-C6-O6
2	F	301	CIT	O7-C3-C6-O6
2	B	301	CIT	C1-C2-C3-C6
2	B	301	CIT	C1-C2-C3-C4
2	A	301	CIT	C3-C4-C5-O3
2	F	301	CIT	O2-C1-C2-C3
2	F	301	CIT	C2-C3-C6-O5
2	F	301	CIT	C4-C3-C6-O5
2	D	301	CIT	C3-C4-C5-O4
2	D	301	CIT	C3-C4-C5-O3
2	F	301	CIT	O1-C1-C2-C3
2	C	301	CIT	C2-C3-C6-O5
2	F	301	CIT	C2-C3-C6-O6
2	F	301	CIT	C4-C3-C6-O6
2	H	301	CIT	C3-C4-C5-O3
2	H	301	CIT	C3-C4-C5-O4
2	D	301	CIT	C4-C3-C6-O6
2	C	301	CIT	O7-C3-C6-O5
2	D	301	CIT	O7-C3-C6-O5
2	C	301	CIT	C2-C3-C6-O6
2	E	301	CIT	C6-C3-C4-C5
2	H	301	CIT	C6-C3-C4-C5

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	F	301	CIT	1	0

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	242/250 (96%)	0.06	13 (5%)	31	33	18, 25, 48, 91	0
1	B	244/250 (97%)	0.06	13 (5%)	32	34	18, 25, 56, 102	0
1	C	244/250 (97%)	0.15	17 (6%)	22	24	19, 25, 55, 142	0
1	D	244/250 (97%)	0.16	10 (4%)	41	44	19, 26, 52, 92	0
1	E	244/250 (97%)	0.01	12 (4%)	35	37	16, 23, 56, 107	0
1	F	243/250 (97%)	0.11	14 (5%)	29	30	16, 24, 49, 97	0
1	G	244/250 (97%)	0.24	17 (6%)	22	24	19, 27, 54, 110	0
1	H	244/250 (97%)	0.09	12 (4%)	35	37	18, 25, 54, 85	0
1	I	244/250 (97%)	0.11	11 (4%)	38	40	19, 26, 52, 94	0
1	J	244/250 (97%)	0.19	12 (4%)	35	37	19, 27, 55, 95	0
All	All	2437/2500 (97%)	0.12	131 (5%)	31	33	16, 25, 55, 142	0

All (131) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	2	PRO	10.7
1	D	2	PRO	8.1
1	E	245	ALA	8.0
1	B	2	PRO	8.0
1	B	3	GLY	7.4
1	G	2	PRO	7.4
1	C	3	GLY	7.3
1	J	245	ALA	7.2
1	H	5	ILE	7.0
1	C	245	ALA	6.9
1	E	2	PRO	6.7
1	I	2	PRO	6.6
1	H	2	PRO	6.4

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Mol	Chain	Res	Type	RSRZ
1	J	2	PRO	6.3
1	B	5	ILE	6.2
1	F	245	ALA	6.1
1	I	5	ILE	6.0
1	A	245	ALA	6.0
1	D	245	ALA	5.7
1	F	3	GLY	5.6
1	D	5	ILE	5.5
1	A	5	ILE	5.5
1	G	5	ILE	5.4
1	C	5	ILE	5.4
1	G	245	ALA	5.4
1	F	5	ILE	5.3
1	B	245	ALA	5.2
1	D	3	GLY	5.2
1	D	4	SER	5.2
1	E	3	GLY	5.2
1	C	4	SER	5.1
1	J	5	ILE	5.0
1	H	3	GLY	5.0
1	I	245	ALA	4.6
1	A	4	SER	4.5
1	E	200	MET	4.5
1	I	242	TYR	4.4
1	H	4	SER	4.3
1	E	4	SER	4.1
1	I	200	MET	4.0
1	A	200	MET	4.0
1	B	4	SER	4.0
1	J	242	TYR	4.0
1	J	3	GLY	4.0
1	H	245	ALA	4.0
1	E	242	TYR	4.0
1	C	242	TYR	3.9
1	G	3	GLY	3.8
1	G	242	TYR	3.8
1	G	4	SER	3.8
1	F	4	SER	3.7
1	G	236	LYS	3.7
1	E	5	ILE	3.6
1	H	242	TYR	3.6
1	I	4	SER	3.6

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Mol	Chain	Res	Type	RSRZ
1	G	200	MET	3.6
1	F	239	LYS	3.4
1	J	4	SER	3.4
1	F	96	ARG	3.3
1	E	201	GLU	3.3
1	D	242	TYR	3.2
1	D	96	ARG	3.1
1	G	203	GLY	3.1
1	A	203	GLY	3.0
1	G	239	LYS	3.0
1	A	91	ARG	3.0
1	A	220	ARG	3.0
1	I	3	GLY	2.9
1	A	239	LYS	2.9
1	F	242	TYR	2.9
1	C	243	GLU	2.8
1	J	238	ALA	2.8
1	C	244	GLU	2.8
1	G	244	GLU	2.8
1	H	201	GLU	2.8
1	C	91	ARG	2.7
1	J	239	LYS	2.7
1	A	236	LYS	2.7
1	G	91	ARG	2.7
1	I	91	ARG	2.7
1	I	244	GLU	2.6
1	E	59	ARG	2.5
1	D	244	GLU	2.5
1	E	243	GLU	2.4
1	C	59	ARG	2.4
1	E	202	SER	2.4
1	J	244	GLU	2.4
1	F	34	GLY	2.4
1	H	202	SER	2.3
1	G	59	ARG	2.3
1	J	201	GLU	2.3
1	C	200	MET	2.3
1	B	202	SER	2.3
1	F	238	ALA	2.3
1	H	238	ALA	2.3
1	B	220	ARG	2.3
1	D	202	SER	2.3

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Mol	Chain	Res	Type	RSRZ
1	C	202	SER	2.2
1	B	242	TYR	2.2
1	J	134	ARG	2.2
1	H	208	LEU	2.2
1	B	203	GLY	2.2
1	F	134	ARG	2.2
1	H	96	ARG	2.2
1	A	202	SER	2.2
1	I	239	LYS	2.2
1	A	244	GLU	2.1
1	A	204	GLN	2.1
1	J	214	TRP	2.1
1	G	202	SER	2.1
1	E	203	GLY	2.1
1	B	239	LYS	2.1
1	C	206	ARG	2.1
1	A	243	GLU	2.1
1	C	201	GLU	2.1
1	G	201	GLU	2.1
1	B	91	ARG	2.1
1	G	220	ARG	2.1
1	B	238	ALA	2.1
1	F	33	GLN	2.1
1	C	203	GLY	2.1
1	F	31	VAL	2.1
1	G	198	ALA	2.1
1	C	134	ARG	2.1
1	B	244	GLU	2.0
1	C	32	SER	2.0
1	D	203	GLY	2.0
1	F	59	ARG	2.0
1	F	220	ARG	2.0
1	H	220	ARG	2.0
1	I	66	ARG	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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	CIT	B	301	13/13	0.92	0.10	24,33,40,45	0
2	CIT	E	301	13/13	0.92	0.10	18,28,38,40	0
2	CIT	D	301	13/13	0.93	0.09	21,29,40,42	0
2	CIT	A	301	13/13	0.93	0.09	21,32,41,44	0
2	CIT	G	301	13/13	0.93	0.09	23,30,40,40	0
2	CIT	F	301	13/13	0.94	0.08	19,30,39,43	0
2	CIT	C	301	13/13	0.94	0.09	20,31,39,39	0
2	CIT	H	301	13/13	0.94	0.09	22,32,45,50	0
2	CIT	I	301	13/13	0.94	0.09	22,31,39,40	0
2	CIT	J	301	13/13	0.94	0.09	23,36,44,49	0

6.5 Other polymers [i](#)

There are no such residues in this entry.