Full wwPDB X-ray Structure Validation Report ⓘ

Nov 13, 2023 – 09:01 PM JST

PDB ID	:	5Y3X
Title	:	Crystal structure of endo-1,4-beta-xylanase from Caldicellulosiruptor owensensis
Authors	:	Liu, X.; Sun, L.C.; Zhang, Y.B.; Liu, T.F.; Xin, F.J.
Deposited on	:	2017-07-31
Resolution	:	2.10 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

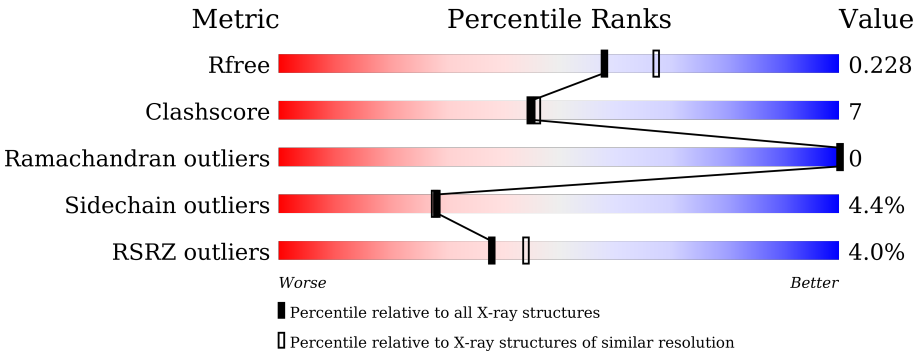
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.10 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	357	3% 78% 12% • 8%
1	B	357	2% 79% 11% • 8%
1	C	357	3% 78% 13% • 8%
1	D	357	6% 76% 15% • 8%
1	E	357	4% 80% 11% • 8%
1	F	357	4% 76% 15% • 8%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 17755 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 Beta-xylanase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	329	Total	C	N	O	S	0	0	0
			2771	1787	464	510	10			
1	B	329	Total	C	N	O	S	0	0	0
			2771	1787	464	510	10			
1	C	329	Total	C	N	O	S	0	0	0
			2771	1787	464	510	10			
1	D	329	Total	C	N	O	S	0	1	0
			2779	1792	467	510	10			
1	E	329	Total	C	N	O	S	0	0	0
			2771	1787	464	510	10			
1	F	329	Total	C	N	O	S	0	0	0
			2771	1787	464	510	10			

There are 120 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP E4Q2A4
A	-18	GLY	-	expression tag	UNP E4Q2A4
A	-17	SER	-	expression tag	UNP E4Q2A4
A	-16	SER	-	expression tag	UNP E4Q2A4
A	-15	HIS	-	expression tag	UNP E4Q2A4
A	-14	HIS	-	expression tag	UNP E4Q2A4
A	-13	HIS	-	expression tag	UNP E4Q2A4
A	-12	HIS	-	expression tag	UNP E4Q2A4
A	-11	HIS	-	expression tag	UNP E4Q2A4
A	-10	HIS	-	expression tag	UNP E4Q2A4
A	-9	SER	-	expression tag	UNP E4Q2A4
A	-8	SER	-	expression tag	UNP E4Q2A4
A	-7	GLY	-	expression tag	UNP E4Q2A4
A	-6	LEU	-	expression tag	UNP E4Q2A4
A	-5	VAL	-	expression tag	UNP E4Q2A4
A	-4	PRO	-	expression tag	UNP E4Q2A4
A	-3	ARG	-	expression tag	UNP E4Q2A4

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP E4Q2A4
A	-1	SER	-	expression tag	UNP E4Q2A4
A	0	HIS	-	expression tag	UNP E4Q2A4
B	-19	MET	-	expression tag	UNP E4Q2A4
B	-18	GLY	-	expression tag	UNP E4Q2A4
B	-17	SER	-	expression tag	UNP E4Q2A4
B	-16	SER	-	expression tag	UNP E4Q2A4
B	-15	HIS	-	expression tag	UNP E4Q2A4
B	-14	HIS	-	expression tag	UNP E4Q2A4
B	-13	HIS	-	expression tag	UNP E4Q2A4
B	-12	HIS	-	expression tag	UNP E4Q2A4
B	-11	HIS	-	expression tag	UNP E4Q2A4
B	-10	HIS	-	expression tag	UNP E4Q2A4
B	-9	SER	-	expression tag	UNP E4Q2A4
B	-8	SER	-	expression tag	UNP E4Q2A4
B	-7	GLY	-	expression tag	UNP E4Q2A4
B	-6	LEU	-	expression tag	UNP E4Q2A4
B	-5	VAL	-	expression tag	UNP E4Q2A4
B	-4	PRO	-	expression tag	UNP E4Q2A4
B	-3	ARG	-	expression tag	UNP E4Q2A4
B	-2	GLY	-	expression tag	UNP E4Q2A4
B	-1	SER	-	expression tag	UNP E4Q2A4
B	0	HIS	-	expression tag	UNP E4Q2A4
C	-19	MET	-	expression tag	UNP E4Q2A4
C	-18	GLY	-	expression tag	UNP E4Q2A4
C	-17	SER	-	expression tag	UNP E4Q2A4
C	-16	SER	-	expression tag	UNP E4Q2A4
C	-15	HIS	-	expression tag	UNP E4Q2A4
C	-14	HIS	-	expression tag	UNP E4Q2A4
C	-13	HIS	-	expression tag	UNP E4Q2A4
C	-12	HIS	-	expression tag	UNP E4Q2A4
C	-11	HIS	-	expression tag	UNP E4Q2A4
C	-10	HIS	-	expression tag	UNP E4Q2A4
C	-9	SER	-	expression tag	UNP E4Q2A4
C	-8	SER	-	expression tag	UNP E4Q2A4
C	-7	GLY	-	expression tag	UNP E4Q2A4
C	-6	LEU	-	expression tag	UNP E4Q2A4
C	-5	VAL	-	expression tag	UNP E4Q2A4
C	-4	PRO	-	expression tag	UNP E4Q2A4
C	-3	ARG	-	expression tag	UNP E4Q2A4
C	-2	GLY	-	expression tag	UNP E4Q2A4
C	-1	SER	-	expression tag	UNP E4Q2A4

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Chain	Residue	Modelled	Actual	Comment	Reference
C	0	HIS	-	expression tag	UNP E4Q2A4
D	-19	MET	-	expression tag	UNP E4Q2A4
D	-18	GLY	-	expression tag	UNP E4Q2A4
D	-17	SER	-	expression tag	UNP E4Q2A4
D	-16	SER	-	expression tag	UNP E4Q2A4
D	-15	HIS	-	expression tag	UNP E4Q2A4
D	-14	HIS	-	expression tag	UNP E4Q2A4
D	-13	HIS	-	expression tag	UNP E4Q2A4
D	-12	HIS	-	expression tag	UNP E4Q2A4
D	-11	HIS	-	expression tag	UNP E4Q2A4
D	-10	HIS	-	expression tag	UNP E4Q2A4
D	-9	SER	-	expression tag	UNP E4Q2A4
D	-8	SER	-	expression tag	UNP E4Q2A4
D	-7	GLY	-	expression tag	UNP E4Q2A4
D	-6	LEU	-	expression tag	UNP E4Q2A4
D	-5	VAL	-	expression tag	UNP E4Q2A4
D	-4	PRO	-	expression tag	UNP E4Q2A4
D	-3	ARG	-	expression tag	UNP E4Q2A4
D	-2	GLY	-	expression tag	UNP E4Q2A4
D	-1	SER	-	expression tag	UNP E4Q2A4
D	0	HIS	-	expression tag	UNP E4Q2A4
E	-19	MET	-	expression tag	UNP E4Q2A4
E	-18	GLY	-	expression tag	UNP E4Q2A4
E	-17	SER	-	expression tag	UNP E4Q2A4
E	-16	SER	-	expression tag	UNP E4Q2A4
E	-15	HIS	-	expression tag	UNP E4Q2A4
E	-14	HIS	-	expression tag	UNP E4Q2A4
E	-13	HIS	-	expression tag	UNP E4Q2A4
E	-12	HIS	-	expression tag	UNP E4Q2A4
E	-11	HIS	-	expression tag	UNP E4Q2A4
E	-10	HIS	-	expression tag	UNP E4Q2A4
E	-9	SER	-	expression tag	UNP E4Q2A4
E	-8	SER	-	expression tag	UNP E4Q2A4
E	-7	GLY	-	expression tag	UNP E4Q2A4
E	-6	LEU	-	expression tag	UNP E4Q2A4
E	-5	VAL	-	expression tag	UNP E4Q2A4
E	-4	PRO	-	expression tag	UNP E4Q2A4
E	-3	ARG	-	expression tag	UNP E4Q2A4
E	-2	GLY	-	expression tag	UNP E4Q2A4
E	-1	SER	-	expression tag	UNP E4Q2A4
E	0	HIS	-	expression tag	UNP E4Q2A4
F	-19	MET	-	expression tag	UNP E4Q2A4

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Chain	Residue	Modelled	Actual	Comment	Reference
F	-18	GLY	-	expression tag	UNP E4Q2A4
F	-17	SER	-	expression tag	UNP E4Q2A4
F	-16	SER	-	expression tag	UNP E4Q2A4
F	-15	HIS	-	expression tag	UNP E4Q2A4
F	-14	HIS	-	expression tag	UNP E4Q2A4
F	-13	HIS	-	expression tag	UNP E4Q2A4
F	-12	HIS	-	expression tag	UNP E4Q2A4
F	-11	HIS	-	expression tag	UNP E4Q2A4
F	-10	HIS	-	expression tag	UNP E4Q2A4
F	-9	SER	-	expression tag	UNP E4Q2A4
F	-8	SER	-	expression tag	UNP E4Q2A4
F	-7	GLY	-	expression tag	UNP E4Q2A4
F	-6	LEU	-	expression tag	UNP E4Q2A4
F	-5	VAL	-	expression tag	UNP E4Q2A4
F	-4	PRO	-	expression tag	UNP E4Q2A4
F	-3	ARG	-	expression tag	UNP E4Q2A4
F	-2	GLY	-	expression tag	UNP E4Q2A4
F	-1	SER	-	expression tag	UNP E4Q2A4
F	0	HIS	-	expression tag	UNP E4Q2A4

- Molecule 2 is water.

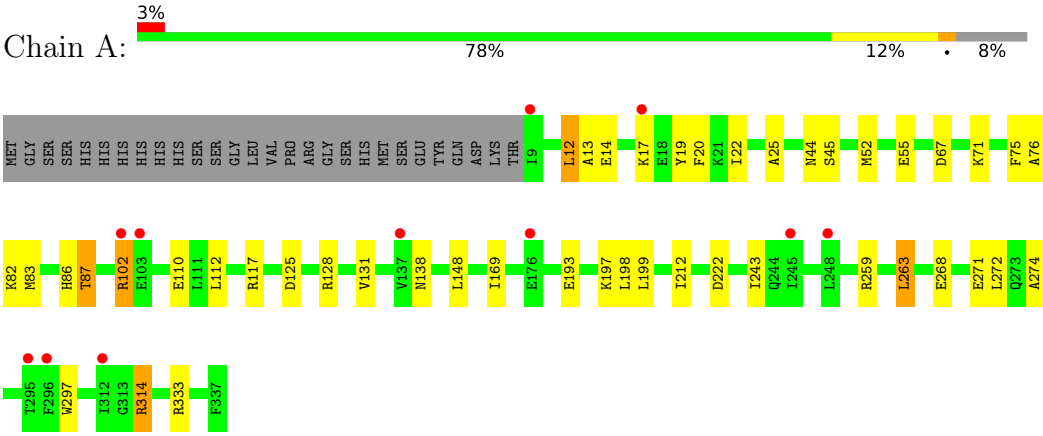
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	211	Total O 211 211	0	0
2	B	220	Total O 220 220	0	0
2	C	200	Total O 200 200	0	0
2	D	160	Total O 160 160	0	0
2	E	168	Total O 168 168	0	0
2	F	162	Total O 162 162	0	0

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.

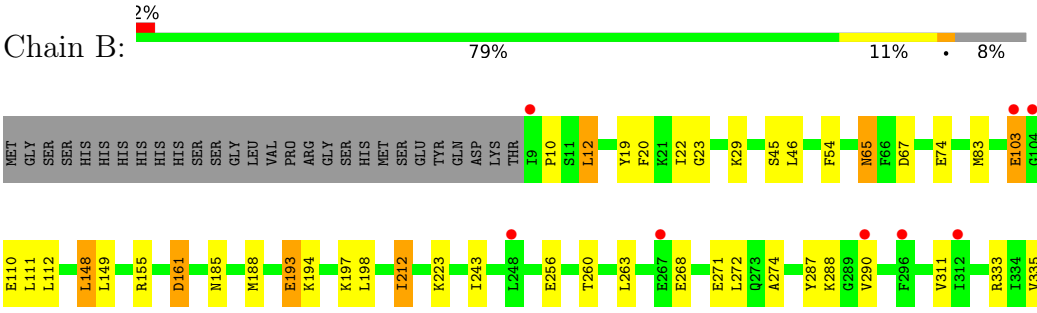
• Molecule 1: Beta-xylanase

Chain A:



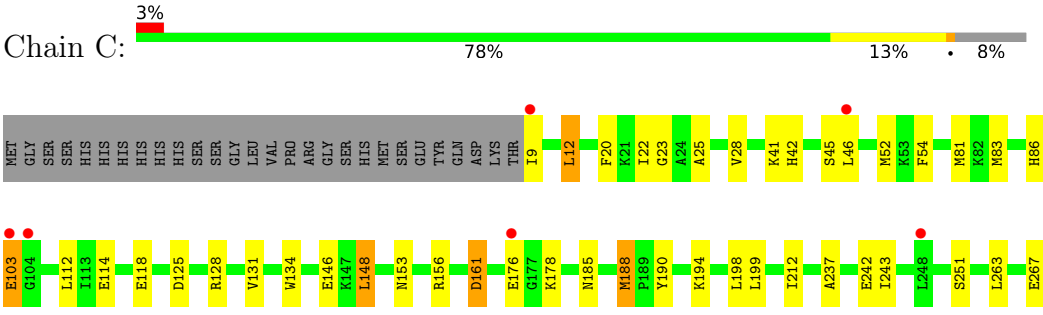
• Molecule 1: Beta-xylanase

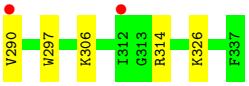
Chain B:



• Molecule 1: Beta-xylanase

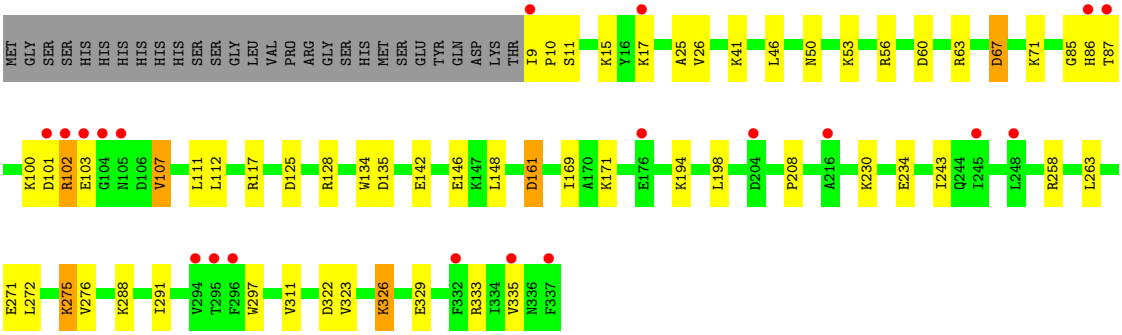
Chain C:





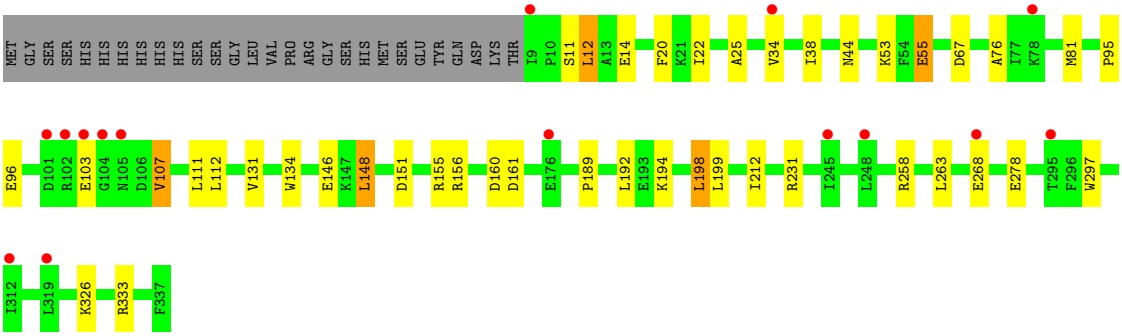
• Molecule 1: Beta-xylanase

Chain D:



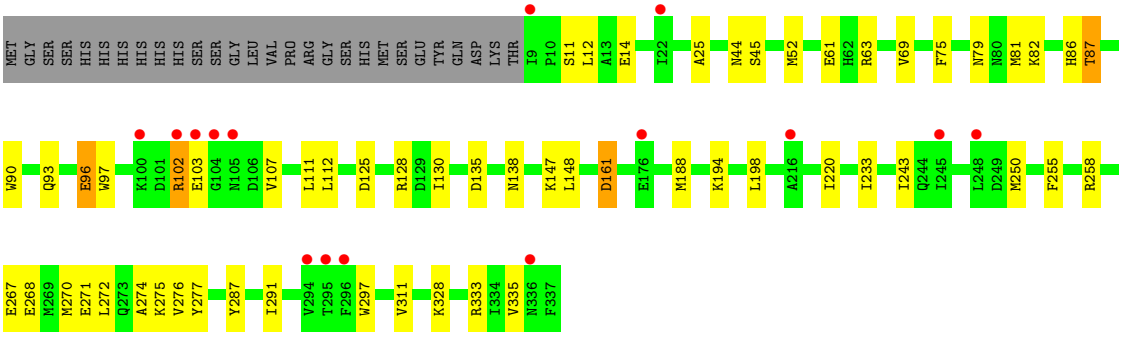
• Molecule 1: Beta-xylanase

Chain E:



• Molecule 1: Beta-xylanase

Chain F:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	126.65Å 74.07Å 137.74Å 90.00° 90.44° 90.00°	Depositor
Resolution (Å)	29.11 – 2.10 29.11 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.5 (29.11-2.10) 99.7 (29.11-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.83 (at 2.10Å)	Xtriage
Refinement program	PHENIX 1.11_2567	Depositor
R, R_{free}	0.190 , 0.229 0.190 , 0.228	Depositor DCC
R_{free} test set	7464 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	28.3	Xtriage
Anisotropy	0.624	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 54.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.016 for h,-k,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	17755	wwPDB-VP
Average B, all atoms (Å^2)	36.0	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 52.89 % 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 4.5610e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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	0.49	0/2840	0.62	0/3831
1	B	0.50	0/2840	0.64	0/3831
1	C	0.48	0/2840	0.62	0/3831
1	D	0.49	0/2851	0.64	0/3845
1	E	0.47	0/2840	0.61	0/3831
1	F	0.44	0/2840	0.60	0/3831
All	All	0.48	0/17051	0.62	0/23000

There are no bond length outliers.

There are no bond angle outliers.

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	2771	0	2717	33	0
1	B	2771	0	2717	41	0
1	C	2771	0	2717	41	0
1	D	2779	0	2730	44	0
1	E	2771	0	2717	25	0
1	F	2771	0	2717	42	0
2	A	211	0	0	2	0
2	B	220	0	0	3	0
2	C	200	0	0	5	3
2	D	160	0	0	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	E	168	0	0	4	3
2	F	162	0	0	3	0
All	All	17755	0	16315	215	3

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 (215) 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:46:LEU:HD21	1:C:83:MET:HG2	1.25	1.16
1:C:46:LEU:CD2	1:C:83:MET:HG2	1.91	1.01
1:F:102:ARG:NH1	1:F:102:ARG:HA	1.87	0.89
1:B:197:LYS:CE	1:D:323:VAL:HG12	2.06	0.86
1:D:86:HIS:O	1:D:135:ASP:HB2	1.75	0.86
1:F:147:LYS:O	1:F:194:LYS:HE2	1.76	0.84
1:B:197:LYS:HE3	1:D:323:VAL:HG12	1.58	0.84
1:C:9:ILE:HG13	1:C:41:LYS:NZ	1.95	0.80
1:A:87:THR:HG21	1:A:138:ASN:HB2	1.63	0.79
1:D:102:ARG:H	1:D:102:ARG:HD3	1.47	0.77
1:C:9:ILE:HG13	1:C:41:LYS:HZ3	1.50	0.76
1:C:103:GLU:HA	1:C:103:GLU:OE1	1.87	0.75
1:F:79:ASN:HB2	1:F:81:MET:HE2	1.69	0.74
1:A:259:ARG:O	1:A:314:ARG:NH1	2.23	0.72
1:D:101:ASP:HB2	1:D:102:ARG:HD3	1.73	0.70
1:C:46:LEU:HD21	1:C:83:MET:CG	2.15	0.69
1:C:199:LEU:HD11	1:C:212:ILE:HD12	1.74	0.68
1:B:274:ALA:HB1	1:B:333:ARG:HD3	1.75	0.68
1:D:63:ARG:HD2	1:E:146:GLU:HG3	1.76	0.67
1:C:188:MET:HE2	1:C:190:TYR:HE1	1.59	0.67
1:E:268:GLU:HB2	2:E:422:HOH:O	1.95	0.66
1:F:87:THR:HG21	1:F:138:ASN:HB2	1.77	0.66
1:B:197:LYS:NZ	1:D:323:VAL:HG12	2.10	0.66
1:E:326:LYS:HA	1:E:326:LYS:HE2	1.77	0.66
1:B:197:LYS:HD3	1:D:323:VAL:HG11	1.76	0.66
1:C:188:MET:CE	1:C:190:TYR:HE1	2.08	0.65
1:C:267:GLU:H	1:C:267:GLU:CD	2.00	0.65
1:A:44:ASN:HA	1:A:81:MET:HG2	1.78	0.65
1:E:199:LEU:HD11	1:E:212:ILE:HD12	1.78	0.64
1:D:103:GLU:HG2	1:D:103:GLU:O	1.97	0.64
1:A:102:ARG:HE	1:A:102:ARG:H	1.45	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:197:LYS:NZ	1:D:323:VAL:CG1	2.61	0.64
1:D:102:ARG:HD3	1:D:102:ARG:N	2.14	0.63
1:F:267:GLU:CD	1:F:267:GLU:H	2.03	0.62
1:F:274:ALA:HB1	1:F:333:ARG:HD3	1.82	0.62
1:D:102:ARG:H	1:D:102:ARG:CD	2.09	0.61
1:B:197:LYS:CE	1:D:323:VAL:CG1	2.77	0.60
1:F:271:GLU:HG2	1:F:275:LYS:HE2	1.83	0.60
1:F:102:ARG:HA	1:F:102:ARG:CZ	2.32	0.59
1:A:102:ARG:N	1:A:102:ARG:HD2	2.17	0.59
1:D:107:VAL:HG22	1:D:111:LEU:HD23	1.86	0.58
1:B:107:VAL:HG22	1:B:111:LEU:HB3	1.86	0.58
1:C:96:GLU:H	1:C:96:GLU:CD	2.06	0.58
1:A:52:MET:HB3	1:A:86:HIS:O	2.03	0.58
1:F:220:ILE:HA	1:F:250:MET:HE3	1.86	0.57
1:B:148:LEU:HD23	1:B:194:LYS:HG2	1.87	0.57
1:A:199:LEU:HD11	1:A:212:ILE:HD12	1.86	0.56
1:E:53:LYS:NZ	2:E:402:HOH:O	2.28	0.56
1:A:271:GLU:OE2	1:A:333:ARG:NH1	2.32	0.56
1:C:28:VAL:HG23	2:C:409:HOH:O	2.04	0.56
1:D:15:LYS:HG2	1:D:335:VAL:HG23	1.88	0.56
1:D:87:THR:HG23	2:D:501:HOH:O	2.05	0.56
1:B:271:GLU:OE2	1:B:333:ARG:NH1	2.39	0.56
1:C:114:GLU:O	1:C:118:GLU:HG3	2.06	0.56
1:C:176:GLU:H	1:C:176:GLU:CD	2.09	0.56
1:F:87:THR:HG22	1:F:135:ASP:O	2.06	0.56
1:E:278:GLU:OE1	1:E:333:ARG:HD3	2.05	0.56
1:D:161:ASP:HB2	2:D:453:HOH:O	2.05	0.55
1:B:103:GLU:OE1	1:B:105:ASN:ND2	2.37	0.55
1:B:12:LEU:HD13	1:B:22:ILE:HG21	1.89	0.55
1:D:10:PRO:HG2	1:D:335:VAL:HG21	1.88	0.55
1:F:79:ASN:HB2	1:F:81:MET:CE	2.37	0.55
1:F:161:ASP:HB2	2:F:455:HOH:O	2.07	0.55
1:C:46:LEU:O	1:C:46:LEU:HD23	2.06	0.55
1:A:102:ARG:H	1:A:102:ARG:NE	2.04	0.55
1:C:96:GLU:HG2	2:C:402:HOH:O	2.06	0.54
1:F:107:VAL:HG22	1:F:111:LEU:HD23	1.89	0.54
1:C:243:ILE:HG12	1:C:290:VAL:HG12	1.89	0.54
1:A:125:ASP:OD1	1:A:128:ARG:NH1	2.41	0.54
2:A:407:HOH:O	1:B:290:VAL:HG12	2.07	0.54
1:E:107:VAL:HG22	1:E:111:LEU:HD23	1.89	0.54
1:C:185:ASN:HB3	1:C:188:MET:HE2	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:102:ARG:N	1:D:102:ARG:CD	2.72	0.53
1:A:76:ALA:HA	1:A:81:MET:HE2	1.90	0.53
1:B:268:GLU:OE1	1:B:268:GLU:N	2.31	0.53
1:C:9:ILE:HG13	1:C:41:LYS:HZ1	1.72	0.53
1:F:270:MET:HE3	1:F:328:LYS:HE3	1.90	0.53
1:A:14:GLU:HA	1:A:17:LYS:HG2	1.90	0.52
1:D:230:LYS:O	1:D:234:GLU:HG3	2.09	0.52
1:A:102:ARG:N	1:A:102:ARG:CD	2.71	0.52
1:D:60:ASP:OD2	1:D:63:ARG:NH2	2.42	0.52
1:D:194:LYS:HE3	2:D:467:HOH:O	2.10	0.52
1:A:76:ALA:HA	1:A:81:MET:CE	2.38	0.52
1:C:12:LEU:HD13	1:C:22:ILE:HG21	1.92	0.52
1:E:96:GLU:H	1:E:96:GLU:CD	2.13	0.52
1:B:197:LYS:HZ2	1:D:323:VAL:CG1	2.22	0.52
1:F:188:MET:HE3	2:F:522:HOH:O	2.10	0.51
1:F:12:LEU:HD23	1:F:335:VAL:HG12	1.93	0.51
1:B:10:PRO:HG2	1:B:335:VAL:HG11	1.93	0.51
1:A:75:PHE:CD1	1:A:81:MET:HE1	2.45	0.51
1:F:52:MET:HB3	1:F:86:HIS:O	2.11	0.51
1:F:75:PHE:CD2	1:F:81:MET:HE3	2.46	0.51
1:E:189:PRO:HG3	1:E:231:ARG:HH22	1.76	0.50
1:E:44:ASN:HA	1:E:81:MET:HG2	1.93	0.50
1:D:67:ASP:O	1:D:71:LYS:HG3	2.12	0.50
1:F:255:PHE:O	1:F:258:ARG:NH1	2.44	0.50
1:A:12:LEU:HD13	1:A:22:ILE:HG21	1.94	0.50
1:E:12:LEU:HD13	1:E:22:ILE:HG21	1.94	0.50
1:B:212:ILE:CD1	1:B:243:ILE:HG13	2.41	0.49
1:B:103:GLU:CD	1:B:105:ASN:HD21	2.15	0.49
1:D:142:GLU:O	1:D:194:LYS:NZ	2.45	0.49
1:A:117:ARG:HA	1:A:169:ILE:HG21	1.95	0.49
1:B:260:THR:HG22	1:B:311:VAL:HG11	1.94	0.49
1:C:131:VAL:HG11	1:C:134:TRP:CE2	2.48	0.49
1:D:50:ASN:HA	1:D:53:LYS:HD3	1.94	0.49
1:D:117:ARG:HA	1:D:169:ILE:HG21	1.94	0.49
1:C:153:ASN:OD1	1:C:156:ARG:NH2	2.36	0.49
1:E:34:VAL:O	1:E:38:ILE:HG13	2.13	0.49
1:D:26:VAL:HG11	1:D:46:LEU:HD22	1.95	0.48
1:F:147:LYS:O	1:F:194:LYS:CE	2.54	0.48
1:B:110:GLU:HG2	2:B:425:HOH:O	2.13	0.48
1:B:185:ASN:CG	1:B:188:MET:HE3	2.33	0.48
1:C:161:ASP:HB2	2:C:479:HOH:O	2.12	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:185:ASN:CG	1:B:188:MET:CE	2.82	0.48
1:B:193:GLU:OE2	1:B:197:LYS:HE2	2.14	0.47
1:D:258:ARG:HD3	1:D:311:VAL:CG2	2.44	0.47
1:C:178:LYS:HE3	1:C:178:LYS:HB2	1.70	0.47
1:E:131:VAL:HG11	1:E:134:TRP:CE2	2.50	0.47
1:C:52:MET:HB3	1:C:86:HIS:O	2.14	0.47
1:C:41:LYS:HG2	1:C:42:HIS:CD2	2.50	0.46
1:A:13:ALA:O	1:A:17:LYS:HG2	2.16	0.46
1:C:185:ASN:HB3	1:C:188:MET:HG3	1.97	0.46
1:F:87:THR:HG23	1:F:135:ASP:HB2	1.98	0.46
1:A:263:LEU:HG	1:E:198:LEU:HD23	1.97	0.46
1:D:171:LYS:HD3	1:D:208:PRO:HB2	1.98	0.46
1:F:243:ILE:O	1:F:291:ILE:HA	2.16	0.46
1:A:19:TYR:HA	1:A:288:LYS:HG3	1.98	0.46
1:A:67:ASP:O	1:A:71:LYS:HG3	2.15	0.46
1:C:146:GLU:CD	1:C:146:GLU:H	2.20	0.46
1:B:185:ASN:HB3	1:B:188:MET:HE3	1.97	0.46
1:F:25:ALA:HB2	1:F:297:TRP:CE3	2.50	0.46
1:F:250:MET:HE2	1:F:276:VAL:HB	1.96	0.46
1:C:314:ARG:O	1:C:314:ARG:HG3	2.16	0.46
1:F:271:GLU:O	1:F:275:LYS:HG3	2.16	0.46
1:D:329:GLU:OE1	1:D:333:ARG:NH1	2.48	0.45
1:F:61:GLU:HG3	1:F:97:TRP:CZ3	2.52	0.45
1:A:274:ALA:HB1	1:A:333:ARG:HD3	1.98	0.45
1:B:19:TYR:HA	1:B:288:LYS:HG3	1.97	0.45
1:C:148:LEU:HD23	1:C:194:LYS:HG3	1.98	0.45
1:A:222:ASP:OD1	2:A:401:HOH:O	2.21	0.45
1:F:272:LEU:HA	1:F:275:LYS:HE3	1.99	0.45
1:A:14:GLU:HA	1:A:17:LYS:CG	2.46	0.45
1:F:268:GLU:OE2	1:F:268:GLU:N	2.36	0.45
1:A:14:GLU:HA	1:A:17:LYS:HE2	1.98	0.45
1:A:25:ALA:HB2	1:A:297:TRP:CE3	2.51	0.45
1:C:125:ASP:OD1	1:C:128:ARG:NH2	2.50	0.45
1:B:74:GLU:HG3	2:B:524:HOH:O	2.16	0.45
1:E:148:LEU:HD21	1:E:198:LEU:HB2	2.00	0.44
1:F:258:ARG:HD2	1:F:311:VAL:CG2	2.47	0.44
1:B:103:GLU:OE1	1:B:105:ASN:OD1	2.35	0.44
1:C:326:LYS:NZ	2:C:401:HOH:O	2.29	0.44
1:D:56:ARG:NH1	2:D:408:HOH:O	2.50	0.44
1:E:11:SER:HB3	1:E:14:GLU:HB2	1.99	0.44
1:F:125:ASP:OD1	1:F:128:ARG:NH1	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:161:ASP:HB2	2:E:490:HOH:O	2.18	0.44
1:C:188:MET:HE2	1:C:190:TYR:CE1	2.48	0.44
1:E:25:ALA:HB2	1:E:297:TRP:CE3	2.52	0.44
1:F:81:MET:O	1:F:130:ILE:HD11	2.18	0.44
1:B:46:LEU:CD1	1:B:83:MET:HG2	2.48	0.44
1:F:45:SER:HA	1:F:82:LYS:O	2.18	0.44
1:A:110:GLU:H	1:A:110:GLU:CD	2.18	0.44
1:E:192:LEU:HD23	1:E:231:ARG:NH1	2.33	0.44
1:B:103:GLU:O	1:B:103:GLU:HG3	2.18	0.43
1:B:110:GLU:HG2	2:B:564:HOH:O	2.18	0.43
1:D:243:ILE:O	1:D:291:ILE:HA	2.18	0.43
1:F:11:SER:OG	1:F:14:GLU:HB2	2.18	0.43
1:A:67:ASP:OD2	1:A:71:LYS:NZ	2.52	0.43
1:B:103:GLU:CG	1:B:105:ASN:ND2	2.81	0.43
1:C:178:LYS:HD2	1:C:242:GLU:OE2	2.19	0.43
1:F:102:ARG:H	1:F:102:ARG:HG2	1.56	0.43
1:C:81:MET:HE2	2:C:427:HOH:O	2.19	0.43
1:F:82:LYS:HA	1:F:130:ILE:HG13	2.00	0.43
1:F:233:ILE:HG21	1:F:287:TYR:CG	2.54	0.43
1:C:237:ALA:HB2	1:C:290:VAL:HG11	2.01	0.43
1:C:23:GLY:HA2	1:C:45:SER:O	2.19	0.43
1:F:90:TRP:CE3	1:F:93:GLN:HG3	2.53	0.43
1:B:149:LEU:O	1:B:155:ARG:NH1	2.52	0.43
1:B:161:ASP:HB2	2:D:479:HOH:O	2.19	0.43
1:D:100:LYS:HD3	1:D:100:LYS:HA	1.79	0.42
1:D:85:GLY:HA3	1:D:134:TRP:CE3	2.54	0.42
1:E:55:GLU:HA	1:E:95:PRO:HD3	2.01	0.42
1:B:83:MET:HE3	1:B:83:MET:HB3	1.92	0.42
1:B:10:PRO:CG	1:B:335:VAL:HG11	2.49	0.42
1:D:63:ARG:CD	1:E:146:GLU:HG3	2.49	0.42
1:D:322:ASP:OD2	1:D:326:LYS:HB2	2.19	0.42
1:F:69:VAL:HG23	2:F:493:HOH:O	2.19	0.42
1:B:185:ASN:ND2	1:B:188:MET:CE	2.82	0.42
1:C:25:ALA:HB2	1:C:297:TRP:CE3	2.55	0.42
1:E:76:ALA:HA	1:E:81:MET:HE2	2.01	0.42
1:E:155:ARG:HD2	1:E:160:ASP:OD1	2.20	0.42
1:D:146:GLU:OE1	1:D:146:GLU:N	2.34	0.42
1:A:193:GLU:OE1	1:A:197:LYS:HE2	2.19	0.41
1:D:125:ASP:OD1	1:D:128[B]:ARG:NH2	2.53	0.41
1:F:44:ASN:HA	1:F:81:MET:HG2	2.02	0.41
1:D:9:ILE:HG13	1:D:41:LYS:NZ	2.35	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:130:ILE:HG13	1:F:130:ILE:O	2.21	0.41
1:A:45:SER:HA	1:A:82:LYS:O	2.21	0.41
1:B:23:GLY:HA2	1:B:45:SER:O	2.21	0.41
1:E:76:ALA:HA	1:E:81:MET:CE	2.51	0.41
1:F:96:GLU:H	1:F:96:GLU:CD	2.23	0.41
1:A:83:MET:O	1:A:131:VAL:HA	2.21	0.41
1:B:223:LYS:HE2	1:B:223:LYS:HA	2.02	0.41
1:B:65:ASN:HD22	1:B:65:ASN:C	2.23	0.41
1:B:287:TYR:HB3	1:B:290:VAL:HG22	2.02	0.41
1:B:271:GLU:OE1	1:C:28:VAL:HG11	2.20	0.40
1:D:271:GLU:H	1:D:271:GLU:CD	2.24	0.40
1:D:275:LYS:HE3	1:D:276:VAL:HG22	2.02	0.40
1:C:251:SER:HB2	1:C:306:LYS:HE3	2.03	0.40
1:D:11:SER:HB2	1:D:41:LYS:O	2.21	0.40
1:A:75:PHE:CE1	1:A:81:MET:HE1	2.57	0.40
1:A:86:HIS:CE1	1:A:87:THR:HG1	2.39	0.40
1:C:9:ILE:CG1	1:C:41:LYS:NZ	2.77	0.40
1:F:220:ILE:CA	1:F:250:MET:HE3	2.50	0.40
1:D:25:ALA:HB2	1:D:297:TRP:CE3	2.57	0.40
1:E:194:LYS:HE3	2:E:425:HOH:O	2.20	0.40

All (3) 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)
2:C:565:HOH:O	2:E:520:HOH:O[2_444]	1.95	0.25
2:C:570:HOH:O	2:E:484:HOH:O[1_556]	2.08	0.12
2:C:559:HOH:O	2:E:558:HOH:O[2_454]	2.18	0.02

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	327/357 (92%)	321 (98%)	6 (2%)	0	100	100
1	B	327/357 (92%)	320 (98%)	7 (2%)	0	100	100
1	C	327/357 (92%)	319 (98%)	8 (2%)	0	100	100
1	D	328/357 (92%)	316 (96%)	12 (4%)	0	100	100
1	E	327/357 (92%)	317 (97%)	10 (3%)	0	100	100
1	F	327/357 (92%)	315 (96%)	12 (4%)	0	100	100
All	All	1963/2142 (92%)	1908 (97%)	55 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	298/323 (92%)	283 (95%)	15 (5%)	24	23
1	B	298/323 (92%)	282 (95%)	16 (5%)	22	20
1	C	298/323 (92%)	286 (96%)	12 (4%)	31	32
1	D	299/323 (93%)	286 (96%)	13 (4%)	29	29
1	E	298/323 (92%)	285 (96%)	13 (4%)	28	28
1	F	298/323 (92%)	288 (97%)	10 (3%)	37	39
All	All	1789/1938 (92%)	1710 (96%)	79 (4%)	28	28

All (79) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	12	LEU
1	A	20	PHE
1	A	55	GLU
1	A	87	THR
1	A	102	ARG
1	A	112	LEU
1	A	148	LEU

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Mol	Chain	Res	Type
1	A	198	LEU
1	A	243	ILE
1	A	263	LEU
1	A	268	GLU
1	A	272	LEU
1	A	277	TYR
1	A	288	LYS
1	A	314	ARG
1	B	12	LEU
1	B	20	PHE
1	B	29	LYS
1	B	54	PHE
1	B	65	ASN
1	B	67	ASP
1	B	103	GLU
1	B	112	LEU
1	B	148	LEU
1	B	161	ASP
1	B	193	GLU
1	B	198	LEU
1	B	212	ILE
1	B	256	GLU
1	B	263	LEU
1	B	272	LEU
1	C	12	LEU
1	C	20	PHE
1	C	54	PHE
1	C	103	GLU
1	C	112	LEU
1	C	148	LEU
1	C	161	ASP
1	C	188	MET
1	C	198	LEU
1	C	263	LEU
1	C	268	GLU
1	C	272	LEU
1	D	17	LYS
1	D	67	ASP
1	D	102	ARG
1	D	107	VAL
1	D	112	LEU
1	D	148	LEU

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Mol	Chain	Res	Type
1	D	161	ASP
1	D	198	LEU
1	D	263	LEU
1	D	272	LEU
1	D	275	LYS
1	D	288	LYS
1	D	326	LYS
1	E	12	LEU
1	E	20	PHE
1	E	55	GLU
1	E	67	ASP
1	E	103	GLU
1	E	107	VAL
1	E	112	LEU
1	E	148	LEU
1	E	151	ASP
1	E	156	ARG
1	E	198	LEU
1	E	258	ARG
1	E	263	LEU
1	F	63	ARG
1	F	87	THR
1	F	96	GLU
1	F	102	ARG
1	F	103	GLU
1	F	112	LEU
1	F	148	LEU
1	F	161	ASP
1	F	198	LEU
1	F	277	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	336	ASN
1	B	65	ASN
1	B	93	GLN
1	B	105	ASN
1	B	324	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

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, 95^{th} 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	329/357 (92%)	0.06	12 (3%)	42	49	18, 32, 56, 80	4 (1%)
1	B	329/357 (92%)	-0.02	8 (2%)	59	64	19, 30, 48, 81	4 (1%)
1	C	329/357 (92%)	-0.04	9 (2%)	54	60	19, 29, 48, 98	4 (1%)
1	D	329/357 (92%)	0.19	20 (6%)	21	26	23, 37, 59, 100	4 (1%)
1	E	329/357 (92%)	0.07	15 (4%)	32	38	21, 34, 55, 86	4 (1%)
1	F	329/357 (92%)	0.17	15 (4%)	32	38	25, 39, 60, 102	4 (1%)
All	All	1974/2142 (92%)	0.07	79 (4%)	38	44	18, 34, 56, 102	24 (1%)

All (79) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	103	GLU	6.0
1	E	9	ILE	5.5
1	F	102	ARG	5.4
1	D	103	GLU	4.8
1	D	87	THR	4.7
1	A	103	GLU	4.7
1	F	9	ILE	4.6
1	F	103	GLU	4.6
1	F	248	LEU	4.5
1	C	103	GLU	4.4
1	D	102	ARG	4.4
1	F	104	GLY	4.3
1	A	9	ILE	4.3
1	C	102	ARG	3.8
1	C	9	ILE	3.7
1	E	245	ILE	3.7
1	B	104	GLY	3.6
1	E	103	GLU	3.6
1	D	104	GLY	3.5

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Mol	Chain	Res	Type	RSRZ
1	A	102	ARG	3.4
1	A	312	ILE	3.4
1	E	102	ARG	3.4
1	D	17	LYS	3.2
1	D	248	LEU	3.2
1	C	248	LEU	3.2
1	C	312	ILE	3.2
1	F	216	ALA	3.1
1	D	294	VAL	3.1
1	F	294	VAL	3.1
1	A	296	PHE	3.1
1	D	9	ILE	3.1
1	A	248	LEU	3.1
1	F	176	GLU	3.0
1	B	312	ILE	3.0
1	E	295	THR	2.9
1	E	176	GLU	2.9
1	A	17	LYS	2.8
1	F	245	ILE	2.8
1	A	245	ILE	2.8
1	E	268	GLU	2.8
1	E	101	ASP	2.7
1	C	176	GLU	2.7
1	C	104	GLY	2.6
1	E	34	VAL	2.6
1	F	296	PHE	2.6
1	E	78	LYS	2.5
1	D	216	ALA	2.5
1	B	9	ILE	2.5
1	A	137	VAL	2.5
1	B	290	VAL	2.4
1	E	105	ASN	2.4
1	D	245	ILE	2.4
1	E	312	ILE	2.4
1	D	86	HIS	2.4
1	A	295	THR	2.4
1	C	46	LEU	2.4
1	D	335	VAL	2.3
1	E	104	GLY	2.3
1	D	295	THR	2.3
1	F	100	LYS	2.3
1	F	105	ASN	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	105	ASN	2.2
1	B	267	GLU	2.2
1	D	101	ASP	2.2
1	F	336	ASN	2.2
1	E	319	LEU	2.1
1	D	176	GLU	2.1
1	F	22	ILE	2.1
1	B	296	PHE	2.1
1	E	248	LEU	2.1
1	A	78	LYS	2.1
1	D	296	PHE	2.1
1	D	337	PHE	2.1
1	B	248	LEU	2.1
1	D	204	ASP	2.0
1	D	332	PHE	2.0
1	A	176	GLU	2.0
1	F	295	THR	2.0
1	C	290	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 monosaccharides 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.