Full wwPDB X-ray Structure Validation Report ⓘ

Nov 16, 2023 – 08:24 AM JST

PDB ID	:	6LCJ
Title	:	TtGalA, alpha-galactosidase from Thermus thermopilus in apo form
Authors	:	Chen, S.C.; Hsu, C.H.
Deposited on	:	2019-11-19
Resolution	:	2.50 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:

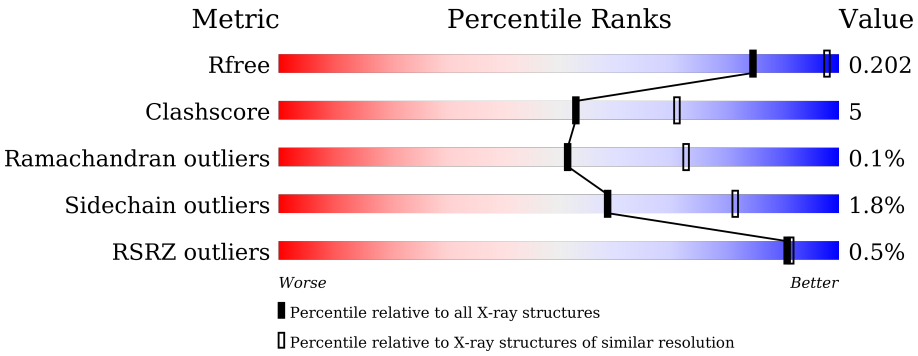
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation 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 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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	479	86% 13% •
1	B	479	85% 14% •
1	C	479	% 87% 13%
1	D	479	% 81% 14% • •
1	E	479	90% 9%
1	F	479	% 84% 12% •

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 23458 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 Alpha-galactosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	479	Total	C	N	O	S	0	0	0
			3829	2475	685	662	7			
1	B	478	Total	C	N	O	S	0	0	0
			3825	2473	684	661	7			
1	C	479	Total	C	N	O	S	0	0	0
			3829	2475	685	662	7			
1	D	460	Total	C	N	O	S	0	0	0
			3672	2372	660	633	7			
1	E	479	Total	C	N	O	S	0	0	0
			3829	2475	685	662	7			
1	F	458	Total	C	N	O	S	0	0	0
			3650	2360	652	631	7			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP Q53W51
A	-1	SER	-	expression tag	UNP Q53W51
A	0	HIS	-	expression tag	UNP Q53W51
B	-2	GLY	-	expression tag	UNP Q53W51
B	-1	SER	-	expression tag	UNP Q53W51
B	0	HIS	-	expression tag	UNP Q53W51
C	-2	GLY	-	expression tag	UNP Q53W51
C	-1	SER	-	expression tag	UNP Q53W51
C	0	HIS	-	expression tag	UNP Q53W51
D	-2	GLY	-	expression tag	UNP Q53W51
D	-1	SER	-	expression tag	UNP Q53W51
D	0	HIS	-	expression tag	UNP Q53W51
E	-2	GLY	-	expression tag	UNP Q53W51
E	-1	SER	-	expression tag	UNP Q53W51
E	0	HIS	-	expression tag	UNP Q53W51
F	-2	GLY	-	expression tag	UNP Q53W51
F	-1	SER	-	expression tag	UNP Q53W51

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Chain	Residue	Modelled	Actual	Comment	Reference
F	0	HIS	-	expression tag	UNP Q53W51

- Molecule 2 is water.

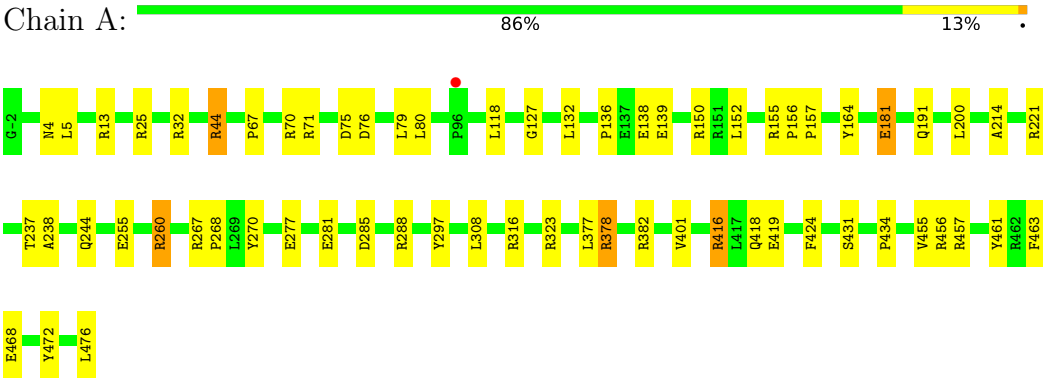
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	142	Total O 142 142	0	0
2	B	138	Total O 138 138	0	0
2	C	140	Total O 140 140	0	0
2	D	140	Total O 140 140	0	0
2	E	119	Total O 119 119	0	0
2	F	145	Total O 145 145	0	0

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.

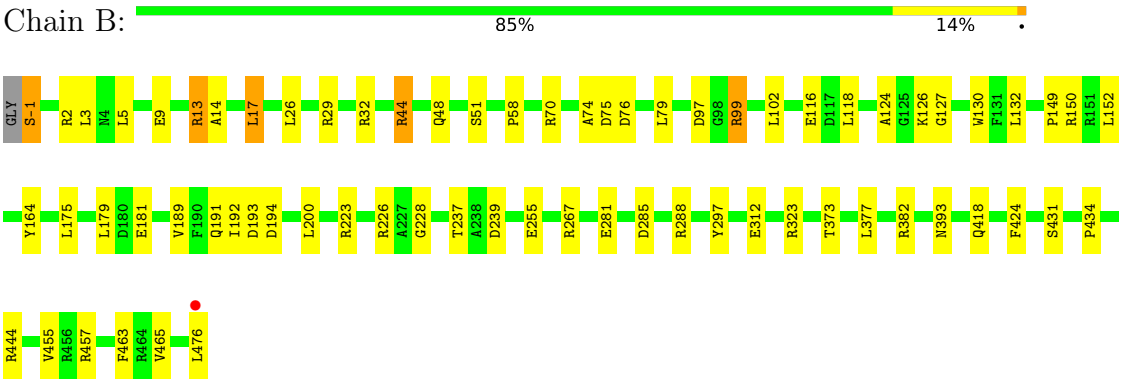
• Molecule 1: Alpha-galactosidase

Chain A:



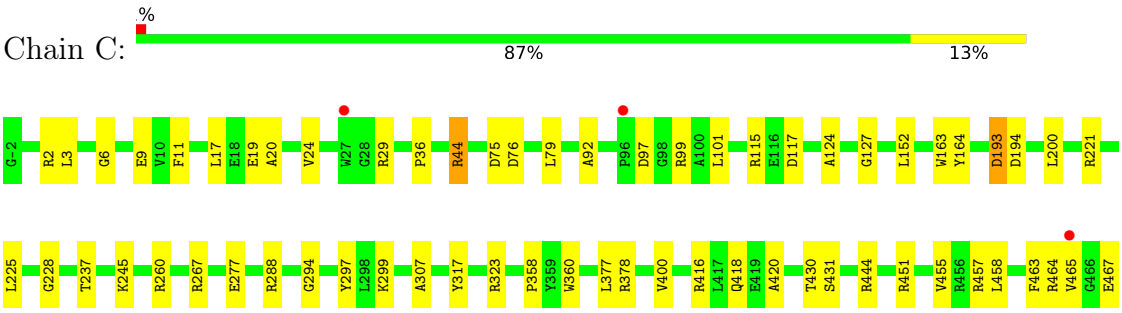
• Molecule 1: Alpha-galactosidase

Chain B:



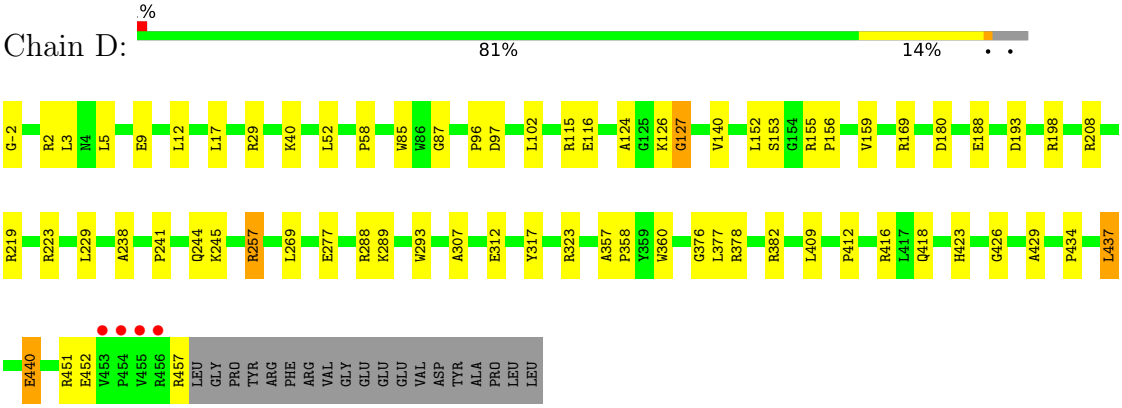
• Molecule 1: Alpha-galactosidase

Chain C:



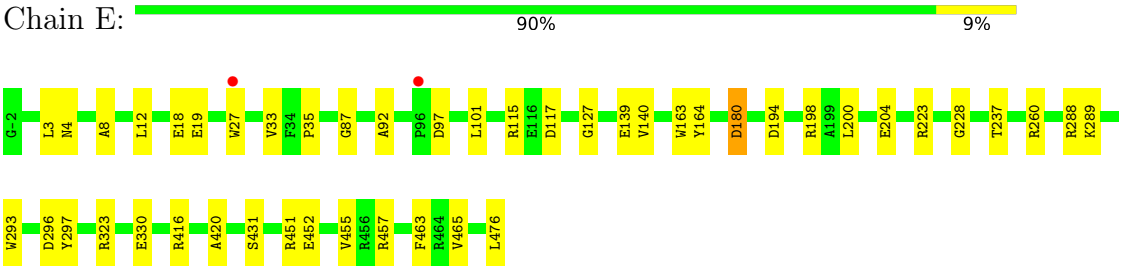
• Molecule 1: Alpha-galactosidase

Chain D:



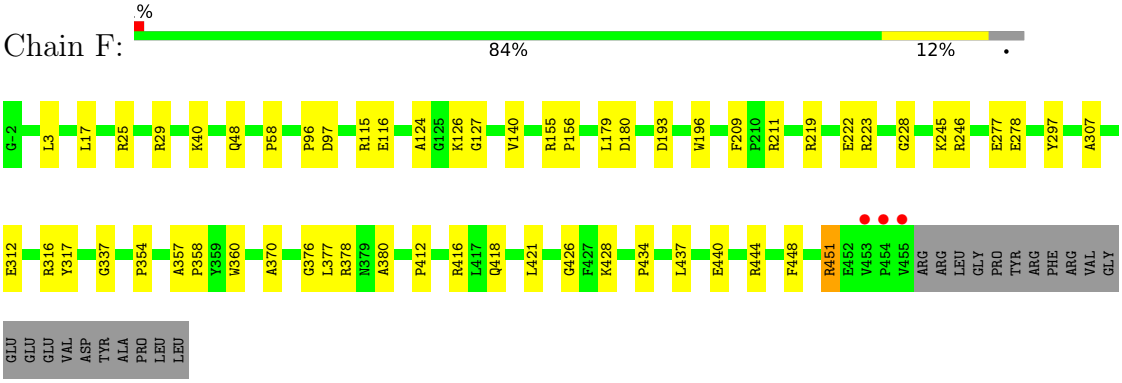
• Molecule 1: Alpha-galactosidase

Chain E:



• Molecule 1: Alpha-galactosidase

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	118.44Å 163.50Å 118.65Å 90.00° 119.92° 90.00°	Depositor
Resolution (Å)	34.28 – 2.50 35.10 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.7 (34.28-2.50) 95.1 (35.10-2.50)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.24 (at 2.51Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.165 , 0.202 0.165 , 0.202	Depositor DCC
R_{free} test set	2011 reflections (1.50%)	wwPDB-VP
Wilson B-factor (Å^2)	31.2	Xtriage
Anisotropy	0.430	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 24.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.011 for -h-l,k,h 0.011 for l,k,-h-l 0.478 for h,-k,-h-l 0.015 for -h-l,-k,l 0.015 for l,-k,h	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	23458	wwPDB-VP
Average B, all atoms (Å^2)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.80% of the height of the origin peak. No significant pseudotranslation is detected.*

[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	0.47	1/3951 (0.0%)	0.59	0/5377
1	B	0.46	0/3947	0.60	1/5372 (0.0%)
1	C	0.44	0/3951	0.59	0/5377
1	D	0.43	0/3789	0.60	0/5156
1	E	0.44	0/3951	0.58	0/5377
1	F	0.43	0/3767	0.58	0/5128
All	All	0.44	1/23356 (0.0%)	0.59	1/31787 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	181	GLU	CD-OE1	5.12	1.31	1.25

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	194	ASP	CB-CG-OD1	5.59	123.33	118.30

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	3829	0	3733	46	1
1	B	3825	0	3730	42	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3829	0	3733	45	0
1	D	3672	0	3582	47	0
1	E	3829	0	3733	32	0
1	F	3650	0	3556	33	1
2	A	142	0	0	6	0
2	B	138	0	0	3	0
2	C	140	0	0	7	0
2	D	140	0	0	11	0
2	E	119	0	0	9	0
2	F	145	0	0	5	0
All	All	23458	0	22067	239	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 5.

All (239) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:221:ARG:NH1	2:A:501:HOH:O	1.85	1.08
1:C:277:GLU:OE2	2:C:501:HOH:O	1.84	0.94
1:B:255:GLU:O	1:D:115:ARG:NH2	2.06	0.88
1:C:451:ARG:NH1	2:C:504:HOH:O	2.08	0.86
1:D:155:ARG:NH2	1:D:188:GLU:OE2	2.09	0.85
1:E:288:ARG:HH21	1:E:323:ARG:HH22	1.22	0.85
1:C:294:GLY:O	2:C:502:HOH:O	1.95	0.83
1:B:58:PRO:HG2	1:B:116:GLU:HG2	1.61	0.82
1:A:424:PHE:HA	1:A:455:VAL:HG11	1.62	0.82
1:C:288:ARG:HH21	1:C:323:ARG:HH22	1.28	0.81
1:C:458:LEU:HD11	1:C:464:ARG:HG3	1.62	0.80
1:C:260:ARG:O	2:C:503:HOH:O	2.01	0.79
1:D:-2:GLY:N	2:D:502:HOH:O	2.04	0.79
1:B:70:ARG:NH1	2:B:502:HOH:O	2.16	0.79
1:B:424:PHE:HA	1:B:455:VAL:HG21	1.64	0.78
1:C:44:ARG:NH2	1:C:75:ASP:OD2	2.17	0.77
1:E:451:ARG:NH1	2:E:505:HOH:O	2.18	0.77
1:F:58:PRO:HG2	1:F:116:GLU:HG3	1.65	0.77
1:B:44:ARG:NH2	1:B:75:ASP:OD2	2.20	0.75
1:A:136:PRO:HB2	1:A:139:GLU:HG3	1.69	0.74
1:E:416:ARG:NE	2:E:501:HOH:O	2.06	0.74
1:A:455:VAL:HB	1:A:465:VAL:HG23	1.68	0.74
1:D:208:ARG:NH2	2:D:501:HOH:O	1.92	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:3:LEU:HD22	1:D:17:LEU:HD11	1.71	0.73
1:A:155:ARG:HD3	1:A:156:PRO:HD2	1.70	0.73
1:A:260:ARG:HH12	1:A:268:PRO:HB3	1.53	0.72
1:D:269:LEU:O	2:D:503:HOH:O	2.10	0.70
1:A:4:ASN:ND2	2:A:506:HOH:O	2.23	0.69
1:A:44:ARG:NH2	1:A:75:ASP:OD2	2.24	0.69
1:D:288:ARG:HH12	1:D:323:ARG:HH22	1.41	0.69
1:C:115:ARG:NH1	1:C:117:ASP:OD1	2.25	0.69
1:E:97:ASP:OD2	2:E:502:HOH:O	2.11	0.69
1:E:330:GLU:OE2	2:E:503:HOH:O	2.12	0.68
1:D:58:PRO:HG2	1:D:116:GLU:HG3	1.75	0.68
1:F:155:ARG:HH22	1:F:451:ARG:HD2	1.60	0.67
1:D:97:ASP:OD1	2:D:504:HOH:O	2.13	0.67
1:F:156:PRO:HG2	1:F:426:GLY:O	1.96	0.66
1:B:255:GLU:OE2	2:B:501:HOH:O	2.14	0.66
1:F:126:LYS:O	2:F:501:HOH:O	2.15	0.65
1:A:308:LEU:O	1:A:316:ARG:NH2	2.29	0.65
1:E:180:ASP:OD1	1:E:223:ARG:NH2	2.21	0.64
1:C:200:LEU:HD12	1:C:237:THR:HG23	1.80	0.64
1:C:455:VAL:HG22	1:C:465:VAL:HG13	1.81	0.63
1:D:124:ALA:HB1	1:D:312:GLU:HG3	1.79	0.63
1:B:444:ARG:NH1	2:B:505:HOH:O	2.32	0.63
1:B:455:VAL:HG12	1:B:465:VAL:HB	1.81	0.63
1:C:416:ARG:NE	2:C:505:HOH:O	2.16	0.63
1:F:155:ARG:HH22	1:F:451:ARG:CD	2.10	0.62
1:A:76:ASP:OD2	2:A:502:HOH:O	2.16	0.62
1:A:214:ALA:HB1	1:C:467:GLU:HG2	1.82	0.62
1:B:281:GLU:HG2	1:B:323:ARG:NH2	2.14	0.61
1:E:200:LEU:HD12	1:E:237:THR:HG23	1.82	0.61
1:C:76:ASP:HB3	1:C:79:LEU:HG	1.83	0.61
1:F:434:PRO:HA	1:F:437:LEU:HD12	1.81	0.61
1:D:156:PRO:HG2	1:D:426:GLY:O	2.00	0.61
1:F:124:ALA:HB1	1:F:312:GLU:HG3	1.83	0.60
1:A:238:ALA:O	1:A:244:GLN:NE2	2.34	0.60
1:F:370:ALA:O	2:F:502:HOH:O	2.16	0.59
1:A:281:GLU:HG2	1:A:323:ARG:NH2	2.17	0.59
1:A:150:ARG:CZ	1:B:150:ARG:HG2	2.32	0.59
1:A:260:ARG:NH2	1:A:270:TYR:OH	2.36	0.58
1:E:288:ARG:NH2	1:E:323:ARG:HH22	1.97	0.58
1:A:155:ARG:CD	1:A:156:PRO:HD2	2.34	0.58
1:B:281:GLU:HG2	1:B:323:ARG:HH21	1.67	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:377:LEU:HD11	1:F:418:GLN:HB2	1.86	0.58
1:A:457:ARG:HG3	1:A:463:PHE:CE2	2.39	0.57
1:B:26:LEU:HB2	1:B:130:TRP:HB2	1.86	0.57
1:A:281:GLU:HG3	2:A:505:HOH:O	2.05	0.56
1:E:115:ARG:NH1	1:E:117:ASP:OD1	2.38	0.56
1:C:97:ASP:OD2	1:C:99:ARG:HD3	2.06	0.56
1:A:5:LEU:HD21	1:A:132:LEU:HG	1.88	0.56
1:E:139:GLU:OE2	2:E:504:HOH:O	2.18	0.56
1:B:3:LEU:HD11	1:B:5:LEU:HD13	1.88	0.55
1:B:285:ASP:OD1	1:B:288:ARG:NH1	2.40	0.55
1:C:288:ARG:HH11	1:C:288:ARG:HG2	1.71	0.55
1:B:200:LEU:HD12	1:B:237:THR:HG23	1.88	0.55
1:C:457:ARG:HG3	1:C:463:PHE:CE2	2.42	0.55
1:D:358:PRO:HD3	2:D:529:HOH:O	2.08	0.54
1:A:200:LEU:HD12	1:A:237:THR:HG23	1.88	0.54
1:A:281:GLU:HG2	1:A:323:ARG:HH21	1.72	0.54
1:B:32:ARG:HB3	1:B:118:LEU:HD11	1.89	0.54
1:D:3:LEU:HD11	1:D:5:LEU:HB2	1.90	0.54
1:D:169:ARG:HD3	2:D:570:HOH:O	2.07	0.54
1:A:456:ARG:NH1	1:A:464:ARG:HH12	2.06	0.54
1:A:476:LEU:O	2:A:503:HOH:O	2.18	0.54
1:E:288:ARG:HG2	1:E:288:ARG:HH11	1.72	0.54
1:D:440:GLU:CD	1:D:440:GLU:H	2.08	0.53
1:E:416:ARG:CD	2:E:501:HOH:O	2.55	0.53
1:C:19:GLU:HG3	1:C:20:ALA:H	1.74	0.53
1:B:76:ASP:HB3	1:B:79:LEU:HG	1.91	0.53
1:C:44:ARG:O	1:C:44:ARG:HG3	2.08	0.53
1:F:48:GLN:OE1	1:F:337:GLY:HA2	2.10	0.52
1:D:241:PRO:O	1:D:245:LYS:HG2	2.09	0.52
1:D:87:GLY:HA3	2:D:542:HOH:O	2.09	0.52
1:D:238:ALA:O	1:D:244:GLN:NE2	2.42	0.52
1:A:76:ASP:HB3	1:A:79:LEU:HG	1.92	0.52
1:C:163:TRP:CZ3	1:C:194:ASP:HB3	2.45	0.51
1:D:115:ARG:NE	2:D:507:HOH:O	2.31	0.51
1:F:440:GLU:H	1:F:440:GLU:CD	2.14	0.51
1:C:2:ARG:HG3	1:C:11:PHE:CE1	2.45	0.51
1:A:456:ARG:HH11	1:A:464:ARG:HH12	1.59	0.51
1:C:455:VAL:HG13	1:C:465:VAL:HG22	1.92	0.51
1:C:420:ALA:HB1	1:C:465:VAL:HG21	1.92	0.51
1:F:360:TRP:CZ2	1:F:378:ARG:HG3	2.46	0.51
1:B:3:LEU:CD2	1:B:17:LEU:HD11	2.42	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:444:ARG:NH1	2:F:511:HOH:O	2.44	0.50
1:E:163:TRP:CZ3	1:E:194:ASP:HB3	2.46	0.50
1:B:175:LEU:HD13	1:B:192:ILE:HG12	1.94	0.50
1:E:455:VAL:HG22	1:E:465:VAL:HG13	1.94	0.50
1:A:138:GLU:CD	1:A:138:GLU:H	2.14	0.50
1:C:288:ARG:NH2	1:C:323:ARG:HH22	2.03	0.50
1:D:377:LEU:HD11	1:D:418:GLN:HB2	1.94	0.49
1:C:228:GLY:HA2	1:C:297:TYR:O	2.11	0.49
1:D:434:PRO:HA	1:D:437:LEU:HD22	1.94	0.49
1:F:3:LEU:HD13	1:F:17:LEU:HD11	1.95	0.49
1:A:424:PHE:HD1	1:A:455:VAL:HG22	1.77	0.49
1:A:285:ASP:OD1	1:A:288:ARG:NH1	2.46	0.49
1:F:358:PRO:HD3	2:F:515:HOH:O	2.13	0.49
1:B:149:PRO:O	1:B:393:ASN:ND2	2.30	0.49
1:B:228:GLY:HA2	1:B:297:TYR:O	2.13	0.49
1:F:29:ARG:HA	1:F:127:GLY:HA2	1.95	0.48
1:D:289:LYS:HE3	1:D:293:TRP:CH2	2.48	0.48
1:D:40:LYS:HE2	1:D:96:PRO:HG3	1.95	0.48
1:E:87:GLY:HA3	2:E:532:HOH:O	2.14	0.48
1:F:246:ARG:NH2	1:F:278:GLU:OE1	2.42	0.48
1:B:97:ASP:OD2	1:B:99:ARG:NH1	2.47	0.48
1:C:97:ASP:OD1	1:C:97:ASP:N	2.30	0.48
1:E:455:VAL:HG13	1:E:465:VAL:HG22	1.95	0.48
1:B:2:ARG:HD3	1:B:9:GLU:OE2	2.14	0.48
1:C:288:ARG:HH21	1:C:323:ARG:NH2	2.03	0.48
1:E:198:ARG:HG3	1:E:204:GLU:O	2.14	0.48
1:E:296:ASP:OD1	2:E:506:HOH:O	2.20	0.48
1:F:245:LYS:HE3	1:F:245:LYS:HB2	1.65	0.47
1:B:5:LEU:HD21	1:B:132:LEU:HG	1.95	0.47
1:C:29:ARG:NH2	1:C:124:ALA:O	2.47	0.47
1:F:277:GLU:H	1:F:277:GLU:CD	2.17	0.47
1:C:193:ASP:OD2	1:C:299:LYS:HE2	2.15	0.47
1:B:44:ARG:HG3	1:B:44:ARG:O	2.13	0.47
1:D:155:ARG:HD3	1:D:451:ARG:NH2	2.29	0.47
1:D:423:HIS:ND1	1:D:452:GLU:OE1	2.47	0.47
1:A:468:GLU:CD	1:F:219:ARG:HH21	2.18	0.47
1:E:457:ARG:HG3	1:E:463:PHE:CE2	2.50	0.47
1:B:181:GLU:HB3	1:B:434:PRO:HG2	1.95	0.47
1:C:400:VAL:HB	1:C:430:THR:HA	1.96	0.46
1:E:452:GLU:N	1:E:452:GLU:OE2	2.47	0.46
1:A:228:GLY:HA2	1:A:297:TYR:O	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:277:GLU:OE2	2:A:505:HOH:O	2.20	0.46
1:B:377:LEU:HD11	1:B:418:GLN:HB2	1.97	0.46
1:D:357:ALA:HB3	1:D:376:GLY:HA2	1.97	0.46
1:D:360:TRP:CZ2	1:D:378:ARG:HG3	2.50	0.46
1:F:228:GLY:HA2	1:F:297:TYR:O	2.16	0.46
1:A:71:ARG:HG2	1:A:80:LEU:HD13	1.97	0.46
1:C:307:ALA:HB2	1:C:317:TYR:HB2	1.97	0.46
1:D:307:ALA:HB2	1:D:317:TYR:HB2	1.98	0.46
1:F:354:PRO:HD2	1:F:380:ALA:HA	1.97	0.46
1:A:44:ARG:O	1:A:44:ARG:HG3	2.14	0.46
1:A:67:PRO:HD2	1:A:70:ARG:HD2	1.98	0.46
1:D:378:ARG:NH2	1:D:382:ARG:HH22	2.14	0.46
1:A:377:LEU:HD11	1:A:418:GLN:HB2	1.98	0.45
1:A:223:ARG:NH1	1:C:444:ARG:HD2	2.32	0.45
1:D:29:ARG:HA	1:D:127:GLY:HA2	1.98	0.45
1:B:179:LEU:HG	1:B:223:ARG:HD2	1.97	0.45
1:C:6:GLY:O	1:C:99:ARG:NH2	2.49	0.45
1:B:164:TYR:HB2	1:B:431:SER:HB2	1.99	0.45
1:C:245:LYS:HD2	1:C:245:LYS:O	2.17	0.45
1:F:307:ALA:HB2	1:F:317:TYR:HB2	1.99	0.45
1:B:124:ALA:HB1	1:B:312:GLU:HG3	1.98	0.45
1:F:428:LYS:HG2	1:F:448:PHE:CZ	2.51	0.45
1:C:416:ARG:CD	2:C:505:HOH:O	2.61	0.45
1:C:152:LEU:HA	1:C:152:LEU:HD23	1.74	0.45
1:E:228:GLY:HA2	1:E:297:TYR:O	2.17	0.45
1:D:198:ARG:NH1	2:D:511:HOH:O	2.38	0.44
1:D:102:LEU:HD13	1:D:140:VAL:HG12	1.98	0.44
1:A:181:GLU:HB2	1:A:434:PRO:HG2	1.99	0.44
1:D:180:ASP:OD1	1:D:223:ARG:NE	2.47	0.44
1:B:74:ALA:HB1	1:B:373:THR:HG21	1.99	0.44
1:A:32:ARG:HB3	1:A:118:LEU:HD11	2.00	0.44
1:E:33:VAL:HG12	1:E:101:LEU:HD21	2.00	0.44
1:B:126:LYS:HE3	1:B:127:GLY:H	1.83	0.43
1:D:277:GLU:CD	1:D:277:GLU:H	2.21	0.43
1:E:420:ALA:HB1	1:E:465:VAL:HG21	1.99	0.43
1:F:211:ARG:NH1	2:F:506:HOH:O	2.30	0.43
1:F:196:TRP:HA	1:F:209:PHE:CE1	2.54	0.43
1:D:3:LEU:CD2	1:D:12:LEU:HD21	2.48	0.43
1:D:153:SER:HA	2:D:505:HOH:O	2.19	0.43
1:D:358:PRO:O	1:D:409:LEU:HB2	2.19	0.43
1:F:40:LYS:HE3	1:F:96:PRO:HA	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:97:ASP:OD1	1:F:97:ASP:N	2.47	0.43
1:C:3:LEU:HD21	1:C:24:VAL:HG11	2.01	0.43
1:C:164:TYR:HB2	1:C:431:SER:HB2	1.99	0.43
1:E:35:PRO:HD2	1:E:117:ASP:O	2.18	0.43
1:A:461:TYR:HB3	1:A:472:TYR:HB2	2.01	0.43
1:B:189:VAL:HG22	1:B:226:ARG:HB2	2.00	0.43
1:D:159:VAL:O	1:D:429:ALA:HA	2.19	0.43
1:D:288:ARG:HH12	1:D:323:ARG:NH2	2.11	0.43
1:C:3:LEU:HD13	1:C:17:LEU:HD11	2.01	0.42
1:C:9:GLU:O	1:C:36:PRO:HB3	2.19	0.42
1:D:412:PRO:O	1:D:416:ARG:HG2	2.19	0.42
1:E:288:ARG:HH21	1:E:323:ARG:NH2	2.03	0.42
1:E:289:LYS:HD2	1:E:293:TRP:CZ2	2.55	0.42
1:A:401:VAL:HG11	1:A:419:GLU:HG3	2.00	0.42
1:A:416:ARG:NH2	1:F:222:GLU:OE1	2.46	0.42
1:D:257:ARG:HE	1:D:257:ARG:HB2	1.59	0.42
1:E:4:ASN:HA	1:E:8:ALA:O	2.20	0.42
1:B:382:ARG:HG3	1:B:476:LEU:CD2	2.50	0.42
1:E:476:LEU:O	2:E:507:HOH:O	2.21	0.42
1:F:412:PRO:O	1:F:416:ARG:HG2	2.20	0.42
1:B:-1:SER:O	1:B:13:ARG:HA	2.20	0.41
1:E:164:TYR:HB2	1:E:431:SER:HB2	2.02	0.41
1:B:152:LEU:HD12	1:B:152:LEU:HA	1.76	0.41
1:D:219:ARG:HD2	2:D:522:HOH:O	2.19	0.41
1:A:156:PRO:HA	1:A:157:PRO:HD3	1.89	0.41
1:C:360:TRP:CE2	1:C:378:ARG:HB2	2.56	0.41
1:D:52:LEU:HD11	1:D:382:ARG:HD3	2.03	0.41
1:D:229:LEU:HD12	1:D:229:LEU:HA	1.90	0.41
1:E:97:ASP:OD1	1:E:97:ASP:N	2.42	0.41
1:C:19:GLU:HG3	1:C:20:ALA:N	2.35	0.41
1:F:357:ALA:HB3	1:F:376:GLY:HA2	2.02	0.41
1:E:18:GLU:HG2	1:E:19:GLU:O	2.20	0.41
1:A:164:TYR:HB2	1:A:431:SER:HB2	2.02	0.41
1:A:378:ARG:HH11	1:A:382:ARG:NH2	2.18	0.41
1:A:424:PHE:HD1	1:A:455:VAL:CG2	2.33	0.41
1:C:92:ALA:HA	1:C:101:LEU:O	2.21	0.41
1:F:179:LEU:HG	1:F:223:ARG:HD2	2.03	0.41
1:B:102:LEU:O	1:B:132:LEU:HD12	2.21	0.41
1:B:457:ARG:HG3	1:B:463:PHE:CE2	2.56	0.41
1:C:377:LEU:HD11	1:C:418:GLN:HB2	2.02	0.41
1:E:92:ALA:HA	1:E:101:LEU:O	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:152:LEU:HD23	1:A:152:LEU:HA	1.71	0.41
1:B:-1:SER:HA	1:B:14:ALA:O	2.21	0.41
1:B:48:GLN:HG3	1:B:51:SER:OG	2.21	0.41
1:C:358:PRO:HG3	2:C:542:HOH:O	2.21	0.40
1:B:126:LYS:HD2	1:B:126:LYS:HA	1.99	0.40
1:F:421:LEU:HD23	1:F:421:LEU:HA	1.88	0.40
1:D:2:ARG:HD3	1:D:9:GLU:OE2	2.20	0.40
1:D:58:PRO:HA	1:D:85:TRP:CD1	2.57	0.40
1:D:152:LEU:HD23	1:D:152:LEU:HA	1.82	0.40
1:B:239:ASP:OD1	1:B:239:ASP:N	2.54	0.40
1:C:221:ARG:HA	1:C:225:LEU:O	2.21	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)
1:A:255:GLU:O	1:F:115:ARG:NH2[1_554]	2.08	0.12

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	477/479 (100%)	463 (97%)	13 (3%)	1 (0%)	47 68
1	B	476/479 (99%)	460 (97%)	16 (3%)	0	100 100
1	C	477/479 (100%)	458 (96%)	18 (4%)	1 (0%)	47 68
1	D	458/479 (96%)	442 (96%)	15 (3%)	1 (0%)	47 68
1	E	477/479 (100%)	457 (96%)	19 (4%)	1 (0%)	47 68
1	F	456/479 (95%)	438 (96%)	18 (4%)	0	100 100
All	All	2821/2874 (98%)	2718 (96%)	99 (4%)	4 (0%)	51 73

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	127	GLY
1	A	127	GLY
1	E	127	GLY
1	C	127	GLY

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	371/371 (100%)	362 (98%)	9 (2%)	49	74
1	B	371/371 (100%)	362 (98%)	9 (2%)	49	74
1	C	371/371 (100%)	368 (99%)	3 (1%)	81	93
1	D	355/371 (96%)	349 (98%)	6 (2%)	60	82
1	E	371/371 (100%)	365 (98%)	6 (2%)	62	84
1	F	353/371 (95%)	347 (98%)	6 (2%)	60	82
All	All	2192/2226 (98%)	2153 (98%)	39 (2%)	59	81

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	ARG
1	A	25	ARG
1	A	44	ARG
1	A	191	GLN
1	A	260	ARG
1	A	267	ARG
1	A	378	ARG
1	A	416	ARG
1	A	467	GLU
1	B	-1	SER
1	B	13	ARG
1	B	17	LEU
1	B	29	ARG

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Mol	Chain	Res	Type
1	B	44	ARG
1	B	99	ARG
1	B	191	GLN
1	B	193	ASP
1	B	267	ARG
1	C	44	ARG
1	C	193	ASP
1	C	267	ARG
1	D	126	LYS
1	D	193	ASP
1	D	257	ARG
1	D	437	LEU
1	D	440	GLU
1	D	457	ARG
1	E	3	LEU
1	E	12	LEU
1	E	27	TRP
1	E	140	VAL
1	E	180	ASP
1	E	260	ARG
1	F	25	ARG
1	F	140	VAL
1	F	180	ASP
1	F	193	ASP
1	F	316	ARG
1	F	451	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 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	479/479 (100%)	-0.43	1 (0%)	95	95	20, 31, 56, 78	0
1	B	478/479 (99%)	-0.43	1 (0%)	95	95	20, 31, 56, 78	0
1	C	479/479 (100%)	-0.39	3 (0%)	89	90	22, 34, 58, 75	0
1	D	460/479 (96%)	-0.41	4 (0%)	84	86	22, 32, 53, 92	0
1	E	479/479 (100%)	-0.37	2 (0%)	92	93	23, 34, 58, 73	0
1	F	458/479 (95%)	-0.42	3 (0%)	87	89	22, 32, 52, 81	0
All	All	2833/2874 (98%)	-0.41	14 (0%)	91	91	20, 32, 56, 92	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	453	VAL	5.4
1	D	455	VAL	4.8
1	F	453	VAL	4.3
1	F	454	PRO	3.1
1	F	455	VAL	2.8
1	D	454	PRO	2.8
1	D	456	ARG	2.8
1	B	476	LEU	2.5
1	A	96	PRO	2.4
1	C	96	PRO	2.4
1	C	27	TRP	2.2
1	C	465	VAL	2.2
1	E	96	PRO	2.1
1	E	27	TRP	2.1

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 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.