



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 01:21 AM UTC

PDB ID : 1B1Z / pdb\_00001b1z  
Title : STREPTOCOCCAL PYROGENIC EXOTOXIN A1  
Authors : Papageorgiou, A.C.; Acharya, K.R.  
Deposited on : 1998-11-24  
Resolution : 2.57 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](mailto: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>.

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

MolProbity : 4-5-2 with Phenix2.0  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

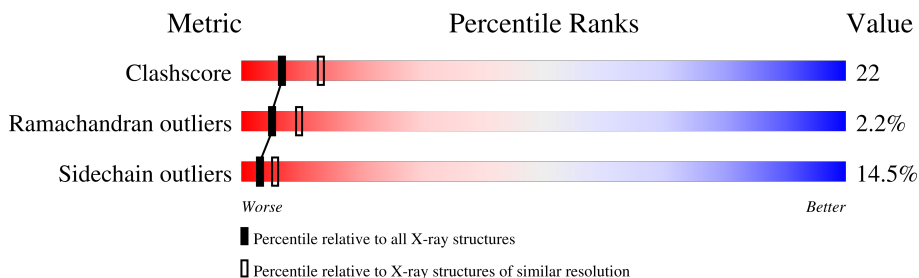
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.57 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))
Clashscore	190562	5124 (2.60-2.56)
Ramachandran outliers	187476	5046 (2.60-2.56)
Sidechain outliers	187428	5046 (2.60-2.56)

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  $\geq 3$ , 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  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	219	58% (green), 32% (yellow), 9% (orange/red), . (grey)
1	B	219	63% (green), 27% (yellow), 8% (orange/red), . (grey)
1	C	219	58% (green), 33% (yellow), 8% (orange/red), . (grey)
1	D	219	51% (green), 36% (yellow), 11% (orange/red), . (grey)

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 7114 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 PROTEIN (TOXIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	218	Total 1762	C 1128	N 284	O 344	S 6	0	0	0
1	B	218	Total 1755	C 1125	N 283	O 341	S 6	0	0	0
1	C	218	Total 1755	C 1125	N 283	O 341	S 6	0	0	0
1	D	218	Total 1755	C 1125	N 283	O 341	S 6	0	0	0

- Molecule 2 is water.

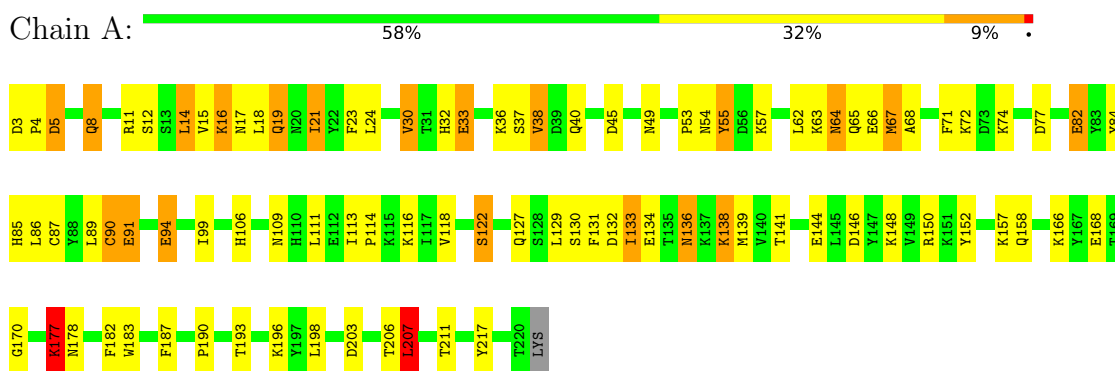
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	24	Total 24	O 24	0	0
2	B	23	Total 23	O 23	0	0
2	C	23	Total 23	O 23	0	0
2	D	17	Total 17	O 17	0	0

### 3 Residue-property plots [i](#)

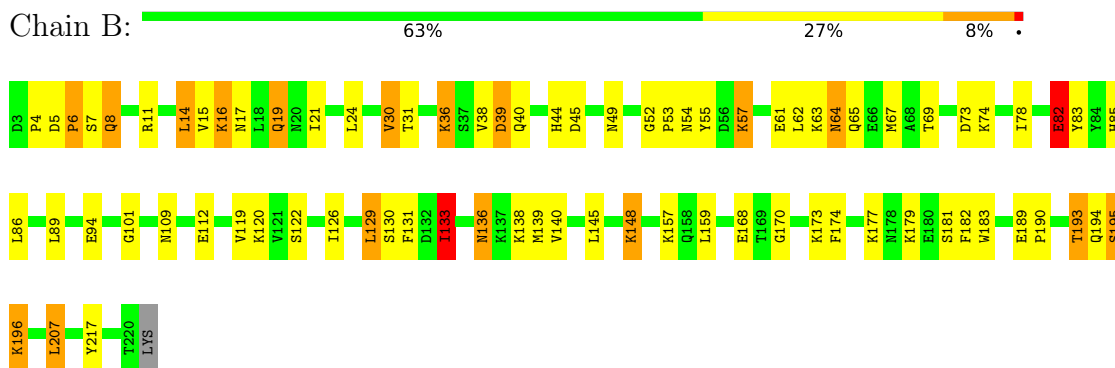
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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. 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.

Note EDS was not executed.

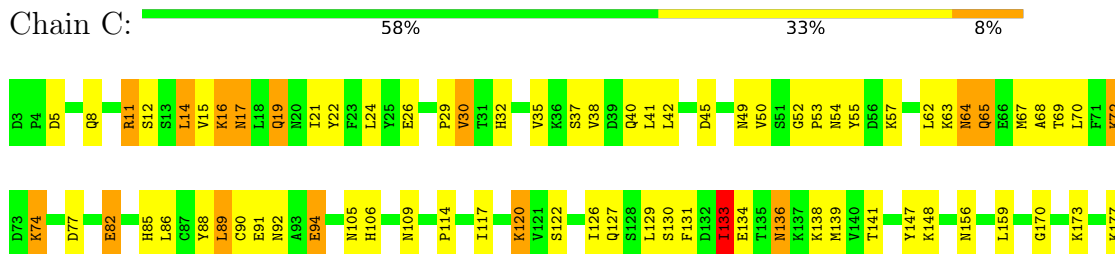
- Molecule 1: PROTEIN (TOXIN)



- Molecule 1: PROTEIN (TOXIN)



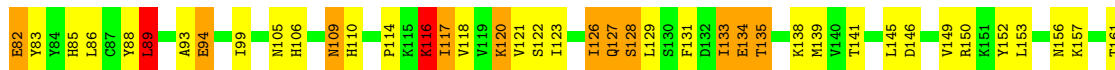
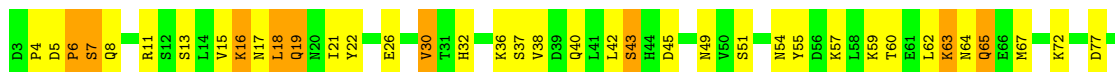
- Molecule 1: PROTEIN (TOXIN)





● Molecule 1: PROTEIN (TOXIN)

Chain D:  51% 36% 11%



## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	127.40Å 101.00Å 81.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.57	Depositor
% Data completeness (in resolution range)	97.4 (20.00-2.57)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.11	Depositor
Refinement program	X-PLOR 3.851	Depositor
R, $R_{free}$	0.194 , 0.274	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	7114	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	30.0	wwPDB-VP

## 5 Model quality i

### 5.1 Standard geometry i

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	0.48	1/1803 (0.1%)	0.87	5/2446 (0.2%)
1	B	0.45	0/1796	0.97	10/2437 (0.4%)
1	C	0.59	1/1796 (0.1%)	1.00	12/2437 (0.5%)
1	D	0.42	1/1796 (0.1%)	0.82	2/2437 (0.1%)
All	All	0.49	3/7191 (0.0%)	0.92	29/9757 (0.3%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	207	LEU	CA-CB	14.85	1.77	1.53
1	A	207	LEU	CA-CB	-7.99	1.37	1.54
1	D	207	LEU	CA-CB	5.13	1.62	1.54

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	207	LEU	CB-CA-C	-14.57	83.49	109.71
1	B	207	LEU	N-CA-CB	-7.29	99.62	110.85
1	C	133	ILE	N-CA-C	-6.94	99.10	108.96
1	C	5	ASP	N-CA-C	-6.40	102.01	110.07
1	A	94	GLU	N-CA-C	-6.39	102.29	110.53
1	A	132	ASP	N-CA-C	6.18	119.54	109.59
1	B	207	LEU	CA-CB-CG	6.17	137.90	116.30
1	B	39	ASP	N-CA-C	6.04	115.98	108.19
1	C	156	ASN	N-CA-C	6.03	120.83	112.45
1	C	207	LEU	CA-CB-CG	-5.93	95.53	116.30
1	C	15	VAL	N-CA-C	5.92	116.71	109.30
1	C	159	LEU	N-CA-C	-5.79	104.97	111.28
1	C	202	LYS	N-CA-C	5.79	117.59	111.28
1	C	52	GLY	CA-C-N	-5.74	113.87	119.90
1	C	52	GLY	C-N-CA	-5.74	113.87	119.90
1	C	21	ILE	N-CA-C	-5.72	105.51	111.58
1	D	43	SER	N-CA-C	5.68	118.24	111.71

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	82	GLU	N-CA-C	5.57	118.76	110.52
1	D	89	LEU	N-CA-C	-5.49	106.64	113.55
1	B	55	TYR	N-CA-C	5.25	117.72	108.75
1	A	5	ASP	N-CA-C	-5.20	103.52	110.07
1	B	52	GLY	N-CA-C	-5.17	101.80	112.34
1	A	55	TYR	N-CA-C	5.10	116.81	108.55
1	B	21	ILE	N-CA-C	-5.08	106.19	111.58
1	B	112	GLU	N-CA-C	-5.08	105.66	111.14
1	B	159	LEU	N-CA-C	-5.07	105.75	111.28
1	A	21	ILE	N-CA-C	-5.06	105.48	111.00
1	C	41	LEU	N-CA-C	-5.03	105.24	112.13
1	B	133	ILE	N-CA-C	-5.01	100.68	108.95

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	1762	0	1696	78	0
1	B	1755	0	1688	69	0
1	C	1755	0	1688	78	0
1	D	1755	0	1688	82	0
2	A	24	0	0	4	0
2	B	23	0	0	0	0
2	C	23	0	0	0	0
2	D	17	0	0	3	0
All	All	7114	0	6760	297	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 22.

All (297) 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:207:LEU:CB	1:C:207:LEU:CA	1.77	1.55
1:C:207:LEU:CB	1:C:207:LEU:C	2.21	1.12
1:A:90:CYS:HA	1:C:90:CYS:HA	1.30	1.06
1:D:17:ASN:HA	1:D:19:GLN:HE22	1.20	1.05
1:B:63:LYS:H	1:B:67:MET:HE2	1.19	1.04
1:C:207:LEU:CA	1:C:207:LEU:CG	2.45	0.94
1:A:109:ASN:HD21	1:A:139:MET:H	1.10	0.93
1:C:63:LYS:H	1:C:67:MET:HE2	1.33	0.92
1:C:109:ASN:HD21	1:C:139:MET:H	1.17	0.92
1:A:17:ASN:HA	1:A:19:GLN:NE2	1.87	0.90
1:D:62:LEU:HB3	1:D:67:MET:HE2	1.51	0.90
1:C:24:LEU:HD11	1:C:194:GLN:HG2	1.54	0.88
1:C:196:LYS:HD3	1:C:199:MET:HE3	1.57	0.86
1:D:193:THR:HG22	1:D:196:LYS:H	1.39	0.86
1:B:30:VAL:HG12	1:B:82:GLU:HG3	1.58	0.85
1:D:17:ASN:HA	1:D:19:GLN:NE2	1.90	0.85
1:C:65:GLN:O	1:C:69:THR:HG23	1.77	0.85
1:D:49:ASN:HD21	1:D:57:LYS:NZ	1.76	0.84
1:B:193:THR:HG22	1:B:196:LYS:H	1.42	0.84
1:C:193:THR:HG22	1:C:196:LYS:H	1.43	0.84
1:C:207:LEU:CA	1:C:207:LEU:HD23	2.08	0.84
1:C:207:LEU:HD23	1:C:207:LEU:HA	1.60	0.83
1:C:207:LEU:CA	1:C:207:LEU:CD2	2.58	0.81
1:A:114:PRO:HB2	1:A:134:GLU:HG2	1.63	0.79
1:D:63:LYS:H	1:D:67:MET:HE2	1.47	0.78
1:A:5:ASP:O	1:A:8:GLN:HG3	1.83	0.78
1:A:11:ARG:HB3	1:A:168:GLU:OE1	1.84	0.77
1:C:17:ASN:HA	1:C:19:GLN:NE2	2.01	0.76
1:B:129:LEU:HD12	1:B:130:SER:N	2.00	0.76
1:D:62:LEU:HD22	1:D:67:MET:HE3	1.71	0.72
1:A:90:CYS:CA	1:C:90:CYS:HA	2.16	0.72
1:B:63:LYS:N	1:B:67:MET:HE2	2.02	0.72
1:B:63:LYS:H	1:B:67:MET:CE	1.99	0.70
1:D:182:PHE:HZ	1:D:207:LEU:HD21	1.57	0.70
1:C:62:LEU:HB3	1:C:67:MET:HE2	1.74	0.70
1:B:109:ASN:HD21	1:B:139:MET:H	1.37	0.70
1:B:49:ASN:HD21	1:B:57:LYS:HE3	1.56	0.70
1:D:145:LEU:O	1:D:149:VAL:HG23	1.92	0.69
1:B:131:PHE:HE1	1:B:133:ILE:HD13	1.58	0.69
1:D:114:PRO:HB2	1:D:134:GLU:HG3	1.75	0.69
1:D:182:PHE:CZ	1:D:207:LEU:HD21	2.26	0.69
1:A:16:LYS:O	1:A:17:ASN:HB2	1.91	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:109:ASN:HD21	1:D:139:MET:H	1.40	0.69
1:A:109:ASN:HD21	1:A:139:MET:N	1.89	0.68
1:B:133:ILE:HG13	1:B:148:LYS:HB3	1.77	0.67
1:A:30:VAL:HG12	1:A:82:GLU:HG3	1.77	0.67
1:B:193:THR:HG22	1:B:196:LYS:N	2.10	0.66
1:D:161:THR:C	1:D:163:GLY:H	2.03	0.66
1:B:136:ASN:H	1:B:136:ASN:ND2	1.92	0.66
1:D:16:LYS:HZ3	1:D:16:LYS:HB2	1.60	0.66
1:C:74:LYS:HE3	1:C:105:ASN:OD1	1.94	0.66
1:D:196:LYS:O	1:D:199:MET:HG3	1.94	0.66
1:B:30:VAL:CG1	1:B:82:GLU:HG3	2.26	0.66
1:C:131:PHE:HE1	1:C:133:ILE:HD13	1.59	0.66
1:C:109:ASN:HD21	1:C:139:MET:N	1.92	0.65
1:D:196:LYS:HG3	1:D:199:MET:HE2	1.78	0.65
1:D:62:LEU:HB3	1:D:67:MET:CE	2.25	0.65
1:B:174:PHE:HB3	1:B:207:LEU:HD11	1.78	0.65
1:C:62:LEU:HD22	1:C:67:MET:HE3	1.79	0.65
1:D:63:LYS:H	1:D:67:MET:CE	2.09	0.64
1:A:170:GLY:HA2	1:A:217:TYR:O	1.98	0.64
1:A:193:THR:HG23	1:A:196:LYS:H	1.62	0.64
1:A:129:LEU:HD12	1:A:130:SER:N	2.13	0.64
1:B:5:ASP:H	1:B:8:GLN:NE2	1.96	0.63
1:D:18:LEU:HG	2:D:238:HOH:O	1.96	0.63
1:D:217:TYR:O	1:D:218:LEU:HG	1.99	0.63
1:D:4:PRO:HB3	1:D:183:TRP:CZ2	2.34	0.63
1:C:64:ASN:ND2	1:C:67:MET:H	1.97	0.62
1:D:40:GLN:HG3	1:D:45:ASP:O	1.99	0.62
1:A:53:PRO:O	1:A:54:ASN:HB2	2.00	0.62
1:D:77:ASP:OD1	1:D:106:HIS:HD2	1.82	0.62
1:C:67:MET:HE1	1:C:204:ASN:HB2	1.81	0.62
1:C:53:PRO:O	1:C:54:ASN:HB2	1.98	0.62
1:A:91:GLU:O	1:B:85:HIS:HE1	1.83	0.61
1:A:85:HIS:ND1	1:B:94:GLU:HG3	2.16	0.61
1:A:122:SER:HA	1:A:127:GLN:HA	1.82	0.61
1:C:32:HIS:HE1	1:C:55:TYR:OH	1.84	0.60
1:D:83:TYR:CE1	1:D:195:SER:HB3	2.36	0.60
1:C:17:ASN:HA	1:C:19:GLN:HE22	1.66	0.60
1:A:129:LEU:HD12	1:A:130:SER:H	1.67	0.60
1:C:131:PHE:CE1	1:C:133:ILE:HD13	2.36	0.59
1:D:16:LYS:O	1:D:17:ASN:HB2	2.01	0.59
1:D:193:THR:HG22	1:D:196:LYS:HB2	1.82	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:17:ASN:HA	1:B:19:GLN:NE2	2.17	0.59
1:A:5:ASP:H	1:A:8:GLN:CD	2.09	0.59
1:B:65:GLN:O	1:B:69:THR:HG23	2.02	0.59
1:B:5:ASP:O	1:B:8:GLN:N	2.24	0.59
1:B:24:LEU:HD11	1:B:194:GLN:HG2	1.84	0.59
1:D:121:VAL:HG12	1:D:122:SER:H	1.68	0.59
1:D:4:PRO:O	1:D:6:PRO:HD3	2.03	0.59
1:D:89:LEU:N	1:D:89:LEU:HD23	2.18	0.59
1:C:30:VAL:HG12	1:C:82:GLU:HG3	1.84	0.58
1:C:141:THR:HG22	1:C:206:THR:HG22	1.85	0.58
1:C:63:LYS:N	1:C:67:MET:HE2	2.12	0.58
1:D:59:LYS:HG2	2:D:231:HOH:O	2.03	0.58
1:A:77:ASP:OD1	1:A:106:HIS:HD2	1.87	0.58
1:A:193:THR:CG2	1:A:196:LYS:HG3	2.34	0.58
1:C:109:ASN:ND2	1:C:139:MET:H	1.95	0.57
1:D:49:ASN:ND2	1:D:57:LYS:NZ	2.50	0.57
1:D:109:ASN:ND2	1:D:139:MET:H	2.03	0.57
1:B:31:THR:HA	1:B:78:ILE:O	2.04	0.57
1:A:90:CYS:HA	1:C:90:CYS:CA	2.20	0.57
1:C:170:GLY:HA2	1:C:217:TYR:O	2.05	0.57
1:D:126:ILE:O	1:D:128:SER:N	2.38	0.57
1:B:109:ASN:HA	1:B:138:LYS:HD2	1.86	0.56
1:C:16:LYS:O	1:C:17:ASN:HB2	2.06	0.56
1:B:36:LYS:HG2	1:B:74:LYS:O	2.06	0.56
1:B:16:LYS:NZ	1:B:16:LYS:HB3	2.21	0.56
1:B:131:PHE:CE1	1:B:133:ILE:HD13	2.40	0.56
1:B:85:HIS:O	1:B:86:LEU:HB2	2.06	0.55
1:A:64:ASN:C	1:A:64:ASN:HD22	2.14	0.55
1:A:49:ASN:ND2	1:A:57:LYS:HZ2	2.04	0.55
1:C:11:ARG:NH1	1:C:11:ARG:HG3	2.19	0.55
1:A:64:ASN:ND2	1:A:67:MET:H	2.04	0.55
1:B:133:ILE:CG1	1:B:148:LYS:HB3	2.37	0.55
1:B:53:PRO:O	1:B:54:ASN:HB2	2.07	0.54
1:C:11:ARG:HH11	1:C:11:ARG:CG	2.20	0.54
2:A:245:HOH:O	1:B:195:SER:HB3	2.07	0.54
1:C:88:TYR:C	1:C:89:LEU:HD23	2.32	0.54
1:D:153:LEU:HD11	1:D:216:VAL:HG11	1.89	0.54
1:D:193:THR:HG22	1:D:196:LYS:N	2.17	0.54
1:B:136:ASN:H	1:B:136:ASN:HD22	1.56	0.54
1:A:85:HIS:O	1:A:86:LEU:HB2	2.08	0.53
1:C:40:GLN:HG3	1:C:45:ASP:O	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:120:LYS:HD2	1:C:214:ILE:O	2.09	0.53
1:B:62:LEU:HD23	1:B:101:GLY:HA2	1.90	0.53
1:D:4:PRO:HB3	1:D:183:TRP:CH2	2.44	0.53
1:D:109:ASN:HD21	1:D:139:MET:N	2.06	0.53
1:A:85:HIS:CE1	1:A:86:LEU:HG	2.44	0.53
1:D:67:MET:HE1	1:D:204:ASN:HB2	1.89	0.52
1:C:64:ASN:C	1:C:64:ASN:HD22	2.16	0.52
1:B:4:PRO:HB3	1:B:183:TRP:CH2	2.44	0.52
1:D:175:ILE:HB	1:D:213:GLN:HG3	1.92	0.52
1:A:15:VAL:HG11	1:A:18:LEU:HD13	1.91	0.52
1:A:177:LYS:HG3	1:A:211:THR:HB	1.91	0.52
1:B:15:VAL:HA	1:B:190:PRO:HA	1.91	0.52
1:B:11:ARG:HB2	1:B:14:LEU:HD22	1.92	0.52
1:D:63:LYS:N	1:D:67:MET:HE2	2.22	0.52
1:A:11:ARG:HB2	1:A:14:LEU:HD22	1.91	0.52
1:A:182:PHE:CZ	1:A:207:LEU:HD21	2.45	0.52
1:D:121:VAL:HG12	1:D:122:SER:N	2.25	0.52
1:C:207:LEU:HB3	1:C:212:SER:OG	2.10	0.52
1:A:17:ASN:HA	1:A:19:GLN:HE21	1.70	0.52
1:B:49:ASN:ND2	1:B:57:LYS:HE3	2.22	0.52
1:A:53:PRO:O	1:A:54:ASN:CB	2.58	0.51
1:B:40:GLN:HG3	1:B:45:ASP:O	2.11	0.51
1:C:136:ASN:H	1:C:136:ASN:HD22	1.58	0.51
1:A:203:ASP:OD1	2:A:230:HOH:O	2.19	0.51
1:B:136:ASN:ND2	1:B:136:ASN:N	2.59	0.51
1:C:11:ARG:HG3	1:C:11:ARG:HH11	1.76	0.51
1:A:62:LEU:HD22	1:A:67:MET:CE	2.41	0.51
1:B:4:PRO:HB3	1:B:183:TRP:CZ2	2.45	0.51
1:C:141:THR:HA	1:C:206:THR:HA	1.92	0.51
1:D:106:HIS:CD2	1:D:110:HIS:HE1	2.28	0.51
1:C:90:CYS:C	1:C:92:ASN:H	2.19	0.50
1:B:5:ASP:O	1:B:7:SER:N	2.45	0.50
1:D:15:VAL:HA	1:D:190:PRO:HA	1.94	0.50
1:D:88:TYR:C	1:D:89:LEU:HD23	2.36	0.50
1:A:111:LEU:HD23	1:A:138:LYS:HD2	1.94	0.49
1:D:146:ASP:O	1:D:150:ARG:HG3	2.12	0.49
1:B:5:ASP:O	1:B:8:GLN:HB2	2.13	0.49
1:A:131:PHE:CE1	1:A:133:ILE:HD13	2.47	0.49
1:D:141:THR:HA	1:D:206:THR:HA	1.94	0.49
1:B:44:HIS:HD2	1:B:61:GLU:HG2	1.77	0.49
1:D:5:ASP:O	1:D:7:SER:N	2.45	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:62:LEU:HD12	1:A:68:ALA:HA	1.95	0.48
1:A:32:HIS:HE1	1:A:55:TYR:OH	1.96	0.48
1:A:94:GLU:HG2	1:B:85:HIS:HB3	1.94	0.48
1:A:62:LEU:HD22	1:A:67:MET:HE1	1.96	0.48
1:C:193:THR:HG22	1:C:196:LYS:N	2.22	0.48
1:A:38:VAL:HG11	1:A:49:ASN:CG	2.38	0.48
1:A:38:VAL:HG11	1:A:49:ASN:OD1	2.13	0.48
1:D:114:PRO:CB	1:D:134:GLU:HG3	2.42	0.48
1:B:62:LEU:HB3	1:B:67:MET:CE	2.44	0.48
1:D:17:ASN:CA	1:D:19:GLN:NE2	2.71	0.48
1:A:40:GLN:HG3	1:A:45:ASP:O	2.14	0.47
1:D:217:TYR:C	1:D:218:LEU:HG	2.39	0.47
1:C:29:PRO:HD3	1:C:147:TYR:CZ	2.48	0.47
1:D:49:ASN:HD21	1:D:57:LYS:HZ3	1.57	0.47
1:D:161:THR:C	1:D:163:GLY:N	2.67	0.47
1:B:64:ASN:C	1:B:64:ASN:HD22	2.22	0.47
1:D:43:SER:HB3	1:D:65:GLN:HB2	1.96	0.47
1:A:111:LEU:CD2	1:A:138:LYS:HD2	2.45	0.47
1:A:15:VAL:HA	1:A:190:PRO:HA	1.96	0.47
1:D:152:TYR:CE1	1:D:156:ASN:ND2	2.83	0.47
1:A:67:MET:HE3	1:A:71:PHE:HE1	1.80	0.47
1:A:82:GLU:HA	1:A:99:ILE:HG22	1.97	0.46
1:A:152:TYR:C	1:A:152:TYR:CD2	2.92	0.46
1:A:146:ASP:O	1:A:150:ARG:HG3	2.15	0.46
1:A:33:GLU:HA	1:A:77:ASP:OD1	2.15	0.46
1:A:16:LYS:HG2	1:A:190:PRO:O	2.15	0.46
1:C:11:ARG:NH1	1:C:11:ARG:CG	2.78	0.46
1:D:30:VAL:HG11	1:D:99:ILE:HG21	1.97	0.46
1:D:77:ASP:OD1	1:D:106:HIS:CD2	2.65	0.46
1:A:24:LEU:HD13	1:A:198:LEU:HD21	1.97	0.46
1:A:193:THR:HG21	1:A:196:LYS:HG3	1.98	0.46
1:A:84:TYR:O	1:A:87:CYS:HB3	2.15	0.46
1:B:109:ASN:ND2	1:B:138:LYS:HB2	2.31	0.46
1:B:189:GLU:OE2	1:C:65:GLN:HB3	2.15	0.46
1:C:11:ARG:HB2	1:C:14:LEU:HD22	1.97	0.46
1:C:129:LEU:HG	1:C:130:SER:N	2.31	0.46
1:C:62:LEU:HB3	1:C:67:MET:CE	2.44	0.46
1:C:196:LYS:O	1:C:199:MET:HG3	2.16	0.46
1:D:13:SER:HG	1:D:168:GLU:CD	2.23	0.46
1:D:22:TYR:CE1	1:D:26:GLU:HG3	2.51	0.46
1:C:188:PRO:HB3	1:C:197:TYR:CD1	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:129:LEU:HD22	1:D:157:LYS:HE3	1.97	0.45
1:A:62:LEU:HB3	1:A:67:MET:HE2	1.97	0.45
1:A:49:ASN:ND2	1:A:57:LYS:NZ	2.64	0.45
1:C:22:TYR:O	1:C:26:GLU:HB3	2.16	0.45
1:D:135:THR:HG21	1:D:145:LEU:HD21	1.98	0.45
1:A:203:ASP:OD1	1:A:203:ASP:C	2.60	0.45
1:C:62:LEU:CD2	1:C:67:MET:HE3	2.43	0.45
1:C:85:HIS:O	1:C:86:LEU:HB2	2.17	0.45
1:C:208:ASP:OD2	1:C:211:THR:HG23	2.16	0.45
1:A:136:ASN:C	1:A:136:ASN:HD22	2.25	0.45
1:C:133:ILE:HG13	1:C:148:LYS:HB3	1.97	0.44
1:A:19:GLN:H	1:A:19:GLN:HG3	1.47	0.44
1:A:187:PHE:HD1	2:A:225:HOH:O	1.99	0.44
1:B:5:ASP:H	1:B:8:GLN:HE21	1.62	0.44
1:C:207:LEU:C	1:C:207:LEU:HB2	2.31	0.44
1:A:38:VAL:HG21	1:A:49:ASN:OD1	2.17	0.44
1:B:44:HIS:CD2	1:B:61:GLU:HG2	2.52	0.44
1:A:109:ASN:ND2	1:A:139:MET:H	1.93	0.44
1:B:129:LEU:HD12	1:B:130:SER:H	1.77	0.44
2:A:245:HOH:O	1:B:193:THR:HG23	2.18	0.44
1:D:82:GLU:HA	1:D:99:ILE:HG22	1.99	0.44
1:C:77:ASP:OD1	1:C:106:HIS:HD2	1.99	0.44
1:A:114:PRO:HB2	1:A:134:GLU:CG	2.41	0.44
1:A:109:ASN:ND2	1:A:138:LYS:HB2	2.33	0.44
1:B:39:ASP:CG	1:B:40:GLN:H	2.26	0.44
1:B:136:ASN:HD22	1:B:136:ASN:N	2.14	0.44
1:C:196:LYS:HD3	1:C:199:MET:CE	2.40	0.44
1:D:49:ASN:HD21	1:D:57:LYS:HZ2	1.63	0.44
1:D:32:HIS:HE1	1:D:55:TYR:OH	2.01	0.43
1:D:141:THR:HB	2:D:222:HOH:O	2.17	0.43
1:C:117:ILE:HD12	1:C:117:ILE:N	2.32	0.43
1:D:49:ASN:HD22	1:D:49:ASN:HA	1.62	0.43
1:D:177:LYS:HG3	1:D:178:ASN:N	2.33	0.43
1:B:119:VAL:O	1:B:130:SER:HA	2.18	0.43
1:C:114:PRO:HB2	1:C:134:GLU:HG2	1.99	0.43
1:D:131:PHE:HZ	1:D:149:VAL:HG13	1.83	0.43
1:A:4:PRO:HB3	1:A:183:TRP:CZ2	2.53	0.43
1:D:40:GLN:HG2	1:D:42:LEU:O	2.19	0.43
1:C:94:GLU:H	1:C:94:GLU:HG2	1.52	0.43
1:D:89:LEU:N	1:D:89:LEU:CD2	2.80	0.43
1:D:116:LYS:HB3	1:D:134:GLU:HB2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:36:LYS:HD3	1:B:73:ASP:C	2.42	0.43
1:D:117:ILE:HG21	1:D:214:ILE:HD12	2.00	0.43
1:B:53:PRO:O	1:B:54:ASN:CB	2.67	0.43
1:C:67:MET:HE1	1:C:204:ASN:CB	2.48	0.43
1:A:5:ASP:N	1:A:8:GLN:OE1	2.51	0.43
1:B:36:LYS:HD3	1:B:73:ASP:O	2.18	0.43
1:B:168:GLU:OE2	1:B:168:GLU:HA	2.18	0.43
1:B:83:TYR:CE1	1:B:195:SER:HB2	2.54	0.42
1:C:40:GLN:HG2	1:C:42:LEU:O	2.19	0.42
1:C:85:HIS:ND1	1:D:94:GLU:HB3	2.33	0.42
1:D:117:ILE:HB	1:D:133:ILE:HG22	2.02	0.42
1:D:176:PRO:HB3	1:D:207:LEU:HD22	2.00	0.42
1:A:21:ILE:O	1:A:24:LEU:HB2	2.19	0.42
1:A:177:LYS:HB3	1:A:178:ASN:H	1.60	0.42
1:B:170:GLY:HA2	1:B:217:TYR:O	2.19	0.42
1:A:65:GLN:HG2	1:A:66:GLU:OE2	2.19	0.42
1:C:67:MET:O	1:C:70:LEU:HB3	2.20	0.42
1:A:182:PHE:HZ	1:A:207:LEU:HD21	1.84	0.42
1:D:109:ASN:HD21	1:D:139:MET:HB2	1.84	0.42
1:A:144:GLU:OE2	1:A:148:LYS:NZ	2.53	0.42
1:B:140:VAL:HG13	1:B:145:LEU:HD11	2.02	0.42
1:B:182:PHE:HE2	1:B:207:LEU:HD21	1.85	0.42
1:C:215:GLU:OE1	1:C:217:TYR:OH	2.29	0.41
1:D:60:THR:O	1:D:60:THR:HG23	2.19	0.41
1:A:85:HIS:HB3	1:B:94:GLU:HG3	2.02	0.41
1:A:141:THR:HG22	1:A:206:THR:HG22	2.01	0.41
1:D:123:ILE:O	1:D:126:ILE:HD12	2.20	0.41
1:B:5:ASP:HA	1:B:6:PRO:HD2	1.83	0.41
1:B:45:ASP:OD1	1:B:45:ASP:C	2.63	0.41
1:C:53:PRO:O	1:C:54:ASN:CB	2.65	0.41
1:C:62:LEU:CD1	1:C:68:ALA:HA	2.51	0.41
1:C:207:LEU:CB	1:C:208:ASP:N	2.80	0.41
1:D:21:ILE:HG12	1:D:192:PHE:CZ	2.55	0.41
1:D:85:HIS:O	1:D:86:LEU:HB2	2.21	0.41
1:D:120:LYS:HB2	1:D:127:GLN:NE2	2.36	0.41
1:C:62:LEU:HD13	1:C:68:ALA:HA	2.03	0.41
1:A:133:ILE:HD12	1:A:133:ILE:HA	1.80	0.41
1:C:50:VAL:HG23	1:C:55:TYR:HE1	1.85	0.41
1:C:136:ASN:HD22	1:C:136:ASN:N	2.16	0.41
1:B:30:VAL:HG12	1:B:82:GLU:CG	2.41	0.40
1:D:16:LYS:HB2	1:D:16:LYS:NZ	2.34	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:19:GLN:O	1:A:23:PHE:CD1	2.74	0.40
1:C:69:THR:HA	1:C:72:LYS:HB2	2.02	0.40
1:A:62:LEU:CD1	1:A:68:ALA:HA	2.51	0.40
1:B:30:VAL:O	1:B:30:VAL:HG22	2.21	0.40
1:C:67:MET:CE	1:C:204:ASN:HB2	2.50	0.40
1:C:109:ASN:ND2	1:C:138:LYS:HB2	2.37	0.40
1:D:167:TYR:CD2	1:D:167:TYR:N	2.89	0.40
1:A:85:HIS:CG	1:B:94:GLU:HG3	2.55	0.40
1:B:62:LEU:HB3	1:B:67:MET:HE3	2.02	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	216/219 (99%)	202 (94%)	11 (5%)	3 (1%)	9	18
1	B	216/219 (99%)	202 (94%)	11 (5%)	3 (1%)	9	18
1	C	216/219 (99%)	204 (94%)	10 (5%)	2 (1%)	14	29
1	D	216/219 (99%)	179 (83%)	26 (12%)	11 (5%)	1	2
All	All	864/876 (99%)	787 (91%)	58 (7%)	19 (2%)	5	9

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	177	LYS
1	D	109	ASN
1	D	127	GLN
1	A	72	LYS
1	A	90	CYS
1	B	6	PRO

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Mol	Chain	Res	Type
1	B	177	LYS
1	D	6	PRO
1	D	7	SER
1	D	54	ASN
1	D	93	ALA
1	D	116	LYS
1	D	177	LYS
1	D	128	SER
1	B	179	LYS
1	C	17	ASN
1	C	91	GLU
1	D	63	LYS
1	D	162	ASN

### 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	198/206 (96%)	168 (85%)	30 (15%)	3	5
1	B	196/206 (95%)	172 (88%)	24 (12%)	5	9
1	C	196/206 (95%)	168 (86%)	28 (14%)	3	6
1	D	196/206 (95%)	164 (84%)	32 (16%)	2	4
All	All	786/824 (95%)	672 (86%)	114 (14%)	3	5

All (114) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	ASP
1	A	8	GLN
1	A	12	SER
1	A	14	LEU
1	A	16	LYS
1	A	19	GLN
1	A	30	VAL
1	A	33	GLU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	36	LYS
1	A	37	SER
1	A	38	VAL
1	A	63	LYS
1	A	64	ASN
1	A	67	MET
1	A	74	LYS
1	A	82	GLU
1	A	89	LEU
1	A	91	GLU
1	A	113	ILE
1	A	116	LYS
1	A	118	VAL
1	A	122	SER
1	A	133	ILE
1	A	136	ASN
1	A	138	LYS
1	A	157	LYS
1	A	158	GLN
1	A	166	LYS
1	A	177	LYS
1	A	207	LEU
1	B	8	GLN
1	B	14	LEU
1	B	16	LYS
1	B	19	GLN
1	B	30	VAL
1	B	36	LYS
1	B	38	VAL
1	B	57	LYS
1	B	64	ASN
1	B	82	GLU
1	B	89	LEU
1	B	120	LYS
1	B	122	SER
1	B	126	ILE
1	B	129	LEU
1	B	133	ILE
1	B	136	ASN
1	B	148	LYS
1	B	157	LYS
1	B	173	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	181	SER
1	B	193	THR
1	B	195	SER
1	B	196	LYS
1	C	8	GLN
1	C	11	ARG
1	C	12	SER
1	C	14	LEU
1	C	16	LYS
1	C	19	GLN
1	C	30	VAL
1	C	35	VAL
1	C	37	SER
1	C	38	VAL
1	C	49	ASN
1	C	57	LYS
1	C	64	ASN
1	C	65	GLN
1	C	72	LYS
1	C	74	LYS
1	C	82	GLU
1	C	89	LEU
1	C	94	GLU
1	C	120	LYS
1	C	122	SER
1	C	126	ILE
1	C	127	GLN
1	C	133	ILE
1	C	136	ASN
1	C	173	LYS
1	C	177	LYS
1	C	193	THR
1	D	8	GLN
1	D	11	ARG
1	D	16	LYS
1	D	18	LEU
1	D	19	GLN
1	D	30	VAL
1	D	36	LYS
1	D	37	SER
1	D	38	VAL
1	D	51	SER

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Mol	Chain	Res	Type
1	D	64	ASN
1	D	65	GLN
1	D	72	LYS
1	D	82	GLU
1	D	89	LEU
1	D	94	GLU
1	D	105	ASN
1	D	116	LYS
1	D	117	ILE
1	D	118	VAL
1	D	120	LYS
1	D	126	ILE
1	D	133	ILE
1	D	134	GLU
1	D	135	THR
1	D	138	LYS
1	D	166	LYS
1	D	193	THR
1	D	196	LYS
1	D	200	ILE
1	D	206	THR
1	D	215	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (39) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	32	HIS
1	A	44	HIS
1	A	49	ASN
1	A	64	ASN
1	A	65	GLN
1	A	75	ASN
1	A	106	HIS
1	A	109	ASN
1	A	136	ASN
1	A	158	GLN
1	B	8	GLN
1	B	32	HIS
1	B	44	HIS
1	B	49	ASN
1	B	64	ASN
1	B	109	ASN

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Mol	Chain	Res	Type
1	B	110	HIS
1	B	136	ASN
1	C	8	GLN
1	C	32	HIS
1	C	44	HIS
1	C	49	ASN
1	C	64	ASN
1	C	65	GLN
1	C	106	HIS
1	C	109	ASN
1	C	110	HIS
1	C	127	GLN
1	C	136	ASN
1	D	19	GLN
1	D	32	HIS
1	D	49	ASN
1	D	64	ASN
1	D	65	GLN
1	D	106	HIS
1	D	109	ASN
1	D	110	HIS
1	D	178	ASN
1	D	210	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

### 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.