



# Full wwPDB EM Validation Report ⓘ

Apr 11, 2024 – 04:27 PM EDT

PDB ID : 1FQY  
Title : STRUCTURE OF AQUAPORIN-1 AT 3.8 Å RESOLUTION BY ELECTRON CRYSTALLOGRAPHY  
Authors : Murata, K.; Mitsuoka, K.; Hirai, T.; Walz, T.; Agre, P.; Heymann, J.B.; Engel, A.; Fujiyoshi, Y.  
Deposited on : 2000-09-07  
Resolution : 3.80 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB/EMDB 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/EMValidationReportHelp>

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  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.1

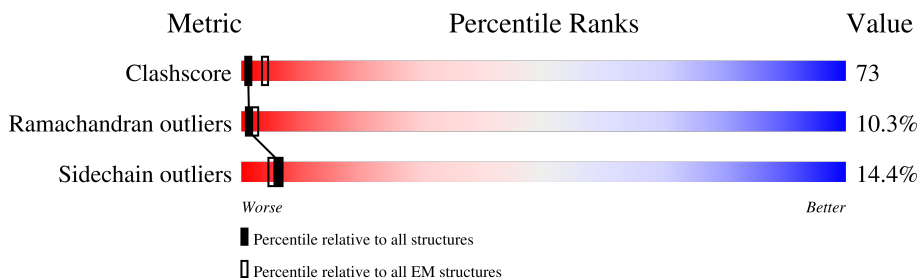
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON CRYSTALLOGRAPHY*

The reported resolution of this entry is 3.80 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)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	269	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1661 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 AQUAPORIN-1.

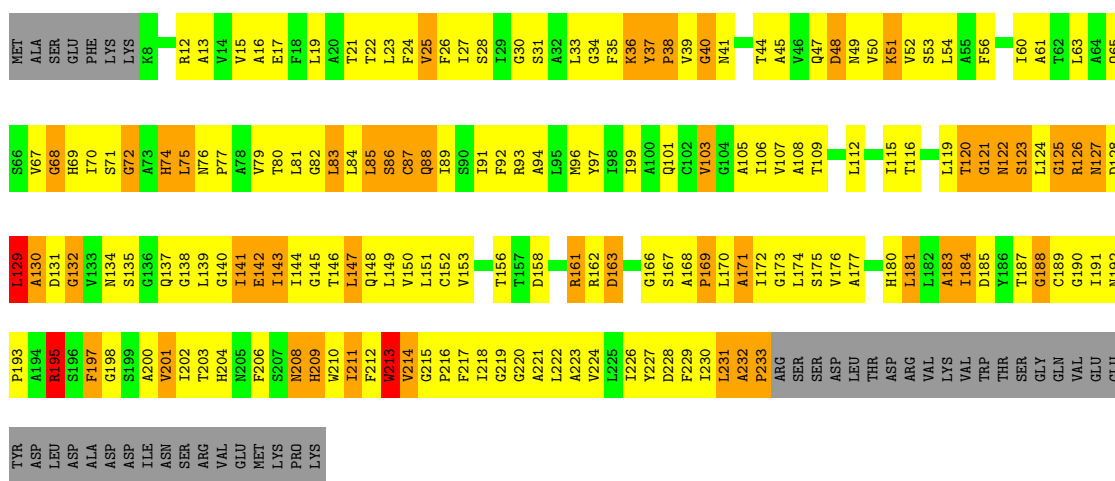
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	226	1661	1077	283	296	5	0	0

### 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.

- Molecule 1: AQUAPORIN-1

Chain A: 19% 46% 17% 16%



## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 4 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	96.00Å 96.00Å 100.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	6.00 – 3.80	Depositor
% Data completeness (in resolution range)	50.8 (6.00-3.80)	Depositor
$R_{merge}$	0.49	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR 3.851	Depositor
R, $R_{free}$	0.399 , 0.417	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	1661	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	23.0	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	0.76	1/1693 (0.1%)	1.25	19/2308 (0.8%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	213	TRP	CB-CG	5.91	1.60	1.50

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	37	TYR	N-CA-C	10.29	138.77	111.00
1	A	195	ARG	NE-CZ-NH2	7.41	124.01	120.30
1	A	121	GLY	N-CA-C	-6.83	96.03	113.10
1	A	49	ASN	N-CA-C	6.77	129.28	111.00
1	A	232	ALA	N-CA-C	6.67	129.02	111.00
1	A	45	ALA	N-CA-C	-6.65	93.05	111.00
1	A	163	ASP	N-CA-C	6.62	128.89	111.00
1	A	195	ARG	NE-CZ-NH1	-6.55	117.02	120.30
1	A	231	LEU	CA-CB-CG	-6.40	100.59	115.30
1	A	132	GLY	N-CA-C	5.59	127.07	113.10
1	A	120	THR	N-CA-C	5.48	125.80	111.00
1	A	211	ILE	N-CA-C	-5.48	96.20	111.00
1	A	122	ASN	C-N-CA	5.42	135.25	121.70
1	A	129	LEU	CB-CG-CD2	5.37	120.14	111.00
1	A	88	GLN	N-CA-C	5.35	125.46	111.00
1	A	162	ARG	N-CA-C	5.33	125.38	111.00
1	A	40	GLY	N-CA-C	5.25	126.23	113.10
1	A	37	TYR	C-N-CD	5.22	139.35	128.40
1	A	125	GLY	N-CA-C	-5.07	100.42	113.10

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts [i](#)

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	1661	0	1712	247	0
All	All	1661	0	1712	247	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 73.

All (247) 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:212:PHE:O	1:A:216:PRO:HD2	1.52	1.10
1:A:77:PRO:HD2	1:A:193:PRO:HD2	1.36	1.08
1:A:17:GLU:OE1	1:A:97:TYR:CD2	2.14	1.00
1:A:115:ILE:HG13	1:A:116:THR:H	1.25	0.98
1:A:149:LEU:O	1:A:153:VAL:HG23	1.67	0.94
1:A:167:SER:O	1:A:170:LEU:HG	1.67	0.94
1:A:120:THR:HA	1:A:123:SER:HB3	1.51	0.91
1:A:76:ASN:HB3	1:A:192:ASN:ND2	1.86	0.90
1:A:129:LEU:HD11	1:A:195:ARG:HE	1.38	0.89
1:A:134:ASN:HD21	1:A:137:GLN:HB2	1.38	0.88
1:A:209:HIS:HA	1:A:212:PHE:CD2	2.08	0.88
1:A:190:GLY:CA	1:A:195:ARG:NH2	2.36	0.88
1:A:51:LYS:HD3	1:A:52:VAL:H	1.39	0.84
1:A:83:LEU:HD11	1:A:92:PHE:CZ	2.11	0.84
1:A:190:GLY:HA3	1:A:195:ARG:NH2	1.92	0.84
1:A:70:ILE:HD11	1:A:161:ARG:HD3	1.59	0.84
1:A:99:ILE:O	1:A:103:VAL:HG22	1.78	0.84
1:A:120:THR:CA	1:A:123:SER:HB3	2.07	0.84
1:A:149:LEU:HD22	1:A:191:ILE:HD11	1.59	0.83
1:A:17:GLU:OE1	1:A:97:TYR:CE2	2.32	0.83
1:A:70:ILE:HD11	1:A:161:ARG:CD	2.08	0.82
1:A:48:ASP:O	1:A:51:LYS:HD2	1.78	0.82
1:A:129:LEU:HD11	1:A:189:CYS:O	1.80	0.81
1:A:190:GLY:HA3	1:A:195:ARG:HH21	1.44	0.80
1:A:61:ALA:HB2	1:A:173:GLY:HA3	1.64	0.79
1:A:77:PRO:HD2	1:A:193:PRO:CD	2.12	0.78

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:51:LYS:HZ3	1:A:52:VAL:HG22	1.49	0.78
1:A:83:LEU:HD21	1:A:92:PHE:CE1	2.19	0.77
1:A:52:VAL:HG12	1:A:56:PHE:HE1	1.49	0.77
1:A:190:GLY:CA	1:A:195:ARG:HH21	1.95	0.77
1:A:176:VAL:HG12	1:A:180:HIS:HE1	1.50	0.76
1:A:17:GLU:OE1	1:A:97:TYR:HD2	1.65	0.76
1:A:51:LYS:NZ	1:A:52:VAL:HG22	2.03	0.74
1:A:190:GLY:HA2	1:A:195:ARG:NH2	2.01	0.74
1:A:231:LEU:HD12	1:A:232:ALA:H	1.52	0.74
1:A:192:ASN:O	1:A:195:ARG:HD2	1.88	0.74
1:A:21:THR:O	1:A:25:VAL:HG23	1.88	0.73
1:A:168:ALA:HB3	1:A:169:PRO:HD3	1.70	0.72
1:A:83:LEU:HG	1:A:84:LEU:N	2.03	0.72
1:A:209:HIS:O	1:A:212:PHE:HB2	1.90	0.71
1:A:63:LEU:O	1:A:67:VAL:HG22	1.90	0.71
1:A:134:ASN:ND2	1:A:137:GLN:HB2	2.05	0.71
1:A:115:ILE:HG13	1:A:116:THR:N	2.05	0.71
1:A:51:LYS:HD3	1:A:52:VAL:N	2.06	0.70
1:A:70:ILE:HD11	1:A:161:ARG:CZ	2.20	0.70
1:A:97:TYR:O	1:A:101:GLN:HG3	1.91	0.70
1:A:36:LYS:HA	1:A:44:THR:HG21	1.73	0.70
1:A:70:ILE:HD11	1:A:161:ARG:NE	2.06	0.70
1:A:83:LEU:HD21	1:A:92:PHE:HE1	1.56	0.69
1:A:213:TRP:CZ3	1:A:217:PHE:HB2	2.28	0.69
1:A:116:THR:HG22	1:A:119:LEU:HG	1.74	0.69
1:A:53:SER:OG	1:A:181:LEU:HD23	1.93	0.69
1:A:129:LEU:HD11	1:A:195:ARG:NE	2.07	0.68
1:A:215:GLY:O	1:A:218:ILE:HG12	1.95	0.67
1:A:163:ASP:OD2	1:A:166:GLY:HA2	1.94	0.67
1:A:151:LEU:CD1	1:A:227:TYR:HD1	2.08	0.67
1:A:147:LEU:O	1:A:151:LEU:HB2	1.95	0.67
1:A:184:ILE:HD12	1:A:189:CYS:H	1.58	0.67
1:A:36:LYS:HA	1:A:44:THR:CG2	2.26	0.66
1:A:176:VAL:HG12	1:A:180:HIS:CE1	2.30	0.66
1:A:81:LEU:O	1:A:85:LEU:HG	1.95	0.66
1:A:80:THR:O	1:A:83:LEU:HD23	1.96	0.65
1:A:76:ASN:O	1:A:79:VAL:HG22	1.97	0.65
1:A:128:ASP:C	1:A:129:LEU:HD23	2.17	0.65
1:A:85:LEU:N	1:A:85:LEU:HD23	2.09	0.65
1:A:141:ILE:HG13	1:A:142:GLU:N	2.11	0.65
1:A:172:ILE:O	1:A:176:VAL:HG23	1.98	0.64

*Continued on next page...*



*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:52:VAL:O	1:A:56:PHE:HD1	1.81	0.63
1:A:166:GLY:O	1:A:170:LEU:HD23	1.98	0.63
1:A:217:PHE:O	1:A:221:ALA:N	2.32	0.63
1:A:149:LEU:HD22	1:A:191:ILE:CD1	2.28	0.63
1:A:74:HIS:O	1:A:75:LEU:HD23	2.00	0.62
1:A:226:ILE:O	1:A:230:ILE:HG12	1.99	0.62
1:A:209:HIS:HA	1:A:212:PHE:CG	2.34	0.62
1:A:210:TRP:C	1:A:212:PHE:N	2.46	0.61
1:A:105:ALA:O	1:A:108:ALA:HB3	2.01	0.61
1:A:89:ILE:HA	1:A:92:PHE:HB2	1.83	0.61
1:A:190:GLY:HA2	1:A:195:ARG:CZ	2.31	0.61
1:A:231:LEU:HD12	1:A:232:ALA:N	2.16	0.60
1:A:180:HIS:HA	1:A:183:ALA:HB3	1.82	0.60
1:A:214:VAL:O	1:A:218:ILE:HG12	2.02	0.60
1:A:83:LEU:HD11	1:A:92:PHE:HZ	1.63	0.59
1:A:208:ASN:O	1:A:210:TRP:N	2.35	0.59
1:A:134:ASN:OD1	1:A:135:SER:N	2.35	0.59
1:A:151:LEU:HD11	1:A:227:TYR:HD1	1.67	0.59
1:A:213:TRP:HE3	1:A:213:TRP:O	1.86	0.59
1:A:91:ILE:HG12	1:A:91:ILE:O	2.03	0.59
1:A:121:GLY:C	1:A:123:SER:H	2.05	0.59
1:A:156:THR:HG21	1:A:168:ALA:HB1	1.83	0.59
1:A:210:TRP:CZ3	1:A:213:TRP:HD1	2.21	0.59
1:A:96:MET:O	1:A:99:ILE:HG22	2.03	0.58
1:A:192:ASN:O	1:A:195:ARG:NH1	2.36	0.58
1:A:167:SER:HA	1:A:170:LEU:HD21	1.86	0.58
1:A:170:LEU:O	1:A:174:LEU:HG	2.03	0.58
1:A:176:VAL:HG13	1:A:191:ILE:HD13	1.85	0.58
1:A:210:TRP:HZ3	1:A:213:TRP:HD1	1.50	0.58
1:A:129:LEU:HD13	1:A:188:GLY:O	2.03	0.57
1:A:80:THR:HG21	1:A:94:ALA:HB1	1.85	0.57
1:A:189:CYS:O	1:A:189:CYS:SG	2.62	0.57
1:A:33:LEU:HD21	1:A:125:GLY:HA2	1.87	0.56
1:A:167:SER:HA	1:A:170:LEU:CD2	2.35	0.56
1:A:86:SER:OG	1:A:87:CYS:N	2.39	0.56
1:A:12:ARG:HA	1:A:15:VAL:CG2	2.36	0.56
1:A:163:ASP:HB2	1:A:166:GLY:H	1.71	0.56
1:A:206:PHE:HB3	1:A:208:ASN:HB2	1.88	0.56
1:A:206:PHE:C	1:A:208:ASN:H	2.09	0.55
1:A:168:ALA:O	1:A:171:ALA:HB3	2.07	0.55
1:A:151:LEU:HD12	1:A:227:TYR:CD1	2.42	0.54

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:142:GLU:HG3	1:A:190:GLY:O	2.08	0.54
1:A:145:GLY:O	1:A:148:GLN:HG2	2.07	0.54
1:A:197:PHE:O	1:A:201:VAL:HG23	2.07	0.54
1:A:226:ILE:HA	1:A:229:PHE:CE2	2.42	0.54
1:A:129:LEU:CD1	1:A:189:CYS:O	2.54	0.54
1:A:129:LEU:CD1	1:A:195:ARG:HH21	2.20	0.54
1:A:31:SER:O	1:A:35:PHE:HD1	1.91	0.53
1:A:147:LEU:HD13	1:A:219:GLY:O	2.07	0.53
1:A:149:LEU:HD13	1:A:176:VAL:HG22	1.90	0.53
1:A:109:THR:HG21	1:A:198:GLY:O	2.09	0.53
1:A:228:ASP:OD1	1:A:233:PRO:HD2	2.08	0.53
1:A:209:HIS:CD2	1:A:210:TRP:CD1	2.97	0.52
1:A:36:LYS:O	1:A:36:LYS:HG2	2.09	0.52
1:A:206:PHE:HB3	1:A:208:ASN:CB	2.40	0.52
1:A:70:ILE:CD1	1:A:161:ARG:HD3	2.36	0.52
1:A:26:PHE:CZ	1:A:115:ILE:HD11	2.45	0.52
1:A:130:ALA:HB2	1:A:212:PHE:CZ	2.44	0.52
1:A:129:LEU:HD22	1:A:188:GLY:C	2.31	0.51
1:A:70:ILE:CD1	1:A:161:ARG:NH1	2.74	0.51
1:A:149:LEU:HG	1:A:150:VAL:N	2.24	0.51
1:A:206:PHE:C	1:A:208:ASN:N	2.64	0.51
1:A:33:LEU:HD12	1:A:112:LEU:HD21	1.93	0.50
1:A:28:SER:HB2	1:A:56:PHE:CD2	2.46	0.50
1:A:51:LYS:O	1:A:54:LEU:HB2	2.11	0.50
1:A:220:GLY:HA2	1:A:223:ALA:HB3	1.94	0.50
1:A:220:GLY:O	1:A:223:ALA:HB3	2.12	0.50
1:A:174:LEU:O	1:A:177:ALA:HB3	2.12	0.49
1:A:200:ALA:HB1	1:A:204:HIS:CD2	2.48	0.49
1:A:44:THR:HG23	1:A:47:GLN:H	1.78	0.49
1:A:209:HIS:HA	1:A:212:PHE:CE2	2.44	0.49
1:A:106:ILE:HD12	1:A:201:VAL:HG21	1.94	0.49
1:A:52:VAL:O	1:A:56:PHE:CD1	2.64	0.49
1:A:12:ARG:HA	1:A:15:VAL:HG22	1.94	0.49
1:A:26:PHE:HZ	1:A:115:ILE:HD11	1.76	0.49
1:A:139:LEU:HD22	1:A:211:ILE:CG2	2.43	0.49
1:A:183:ALA:HB1	1:A:189:CYS:HA	1.94	0.49
1:A:151:LEU:CD1	1:A:227:TYR:CD1	2.93	0.48
1:A:200:ALA:HB1	1:A:204:HIS:HB3	1.95	0.48
1:A:13:ALA:O	1:A:16:ALA:HB3	2.14	0.48
1:A:23:LEU:O	1:A:27:ILE:HG13	2.12	0.48
1:A:80:THR:CG2	1:A:94:ALA:HB1	2.44	0.48

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:70:ILE:HD11	1:A:161:ARG:NH1	2.29	0.48
1:A:70:ILE:CD1	1:A:161:ARG:CZ	2.89	0.48
1:A:210:TRP:C	1:A:212:PHE:H	2.14	0.48
1:A:48:ASP:O	1:A:51:LYS:CD	2.56	0.48
1:A:51:LYS:HD3	1:A:52:VAL:HG23	1.96	0.48
1:A:69:HIS:CG	1:A:70:ILE:H	2.32	0.48
1:A:120:THR:HA	1:A:123:SER:CB	2.35	0.48
1:A:37:TYR:O	1:A:38:PRO:C	2.50	0.47
1:A:134:ASN:HD21	1:A:138:GLY:N	2.12	0.47
1:A:180:HIS:O	1:A:184:ILE:HB	2.14	0.47
1:A:120:THR:CB	1:A:123:SER:HB3	2.44	0.47
1:A:80:THR:O	1:A:83:LEU:HB3	2.14	0.47
1:A:212:PHE:O	1:A:216:PRO:CD	2.43	0.47
1:A:124:LEU:HD23	1:A:126:ARG:HG3	1.97	0.47
1:A:48:ASP:OD1	1:A:51:LYS:HD2	2.15	0.47
1:A:172:ILE:O	1:A:175:SER:HB3	2.14	0.47
1:A:210:TRP:CZ3	1:A:213:TRP:CD1	3.02	0.47
1:A:129:LEU:O	1:A:131:ASP:N	2.48	0.47
1:A:140:GLY:O	1:A:143:ILE:HG12	2.15	0.47
1:A:129:LEU:CD1	1:A:195:ARG:NH2	2.79	0.46
1:A:17:GLU:CD	1:A:97:TYR:CE2	2.89	0.46
1:A:69:HIS:CG	1:A:70:ILE:N	2.83	0.46
1:A:26:PHE:HE1	1:A:112:LEU:CD1	2.29	0.46
1:A:141:ILE:CG1	1:A:142:GLU:N	2.78	0.46
1:A:200:ALA:O	1:A:204:HIS:HD2	1.98	0.46
1:A:25:VAL:HA	1:A:28:SER:OG	2.16	0.46
1:A:151:LEU:HD12	1:A:227:TYR:HD1	1.76	0.46
1:A:222:LEU:O	1:A:226:ILE:HG23	2.16	0.46
1:A:210:TRP:HZ3	1:A:213:TRP:CD1	2.30	0.46
1:A:37:TYR:HB2	1:A:119:LEU:HD22	1.98	0.45
1:A:26:PHE:HZ	1:A:115:ILE:CD1	2.30	0.45
1:A:77:PRO:HD2	1:A:193:PRO:CG	2.47	0.45
1:A:129:LEU:HD12	1:A:195:ARG:NH2	2.31	0.45
1:A:147:LEU:CD1	1:A:223:ALA:HB2	2.46	0.45
1:A:127:ASN:C	1:A:129:LEU:N	2.70	0.45
1:A:12:ARG:O	1:A:16:ALA:N	2.37	0.45
1:A:50:VAL:HG23	1:A:51:LYS:N	2.32	0.44
1:A:60:ILE:HG23	1:A:75:LEU:CD1	2.48	0.44
1:A:82:GLY:HA2	1:A:224:VAL:HG21	1.99	0.44
1:A:121:GLY:C	1:A:123:SER:N	2.71	0.44
1:A:180:HIS:O	1:A:181:LEU:C	2.56	0.44

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:209:HIS:C	1:A:212:PHE:HB2	2.38	0.44
1:A:106:ILE:HG23	1:A:201:VAL:HG21	2.00	0.44
1:A:67:VAL:O	1:A:68:GLY:C	2.56	0.44
1:A:156:THR:HG21	1:A:168:ALA:CB	2.46	0.44
1:A:69:HIS:CD2	1:A:70:ILE:H	2.36	0.44
1:A:184:ILE:CD1	1:A:189:CYS:HB3	2.48	0.44
1:A:218:ILE:HA	1:A:221:ALA:CB	2.49	0.43
1:A:200:ALA:O	1:A:202:ILE:N	2.51	0.43
1:A:187:THR:O	1:A:188:GLY:O	2.36	0.43
1:A:30:GLY:O	1:A:34:GLY:N	2.49	0.43
1:A:65:GLN:HE21	1:A:65:GLN:HB3	1.61	0.43
1:A:81:LEU:HD23	1:A:81:LEU:HA	1.93	0.43
1:A:91:ILE:O	1:A:91:ILE:CG1	2.66	0.43
1:A:146:THR:HG23	1:A:150:VAL:HG23	2.00	0.43
1:A:220:GLY:HA2	1:A:223:ALA:CB	2.48	0.43
1:A:12:ARG:O	1:A:15:VAL:HG23	2.19	0.43
1:A:124:LEU:HG	1:A:126:ARG:HA	2.01	0.43
1:A:151:LEU:HD12	1:A:151:LEU:HA	1.90	0.43
1:A:83:LEU:HD11	1:A:92:PHE:CE1	2.50	0.42
1:A:24:PHE:HB2	1:A:63:LEU:HD13	2.01	0.42
1:A:71:SER:OG	1:A:72:GLY:N	2.52	0.42
1:A:84:LEU:O	1:A:86:SER:N	2.52	0.42
1:A:176:VAL:O	1:A:180:HIS:ND1	2.52	0.42
1:A:146:THR:O	1:A:146:THR:CG2	2.67	0.42
1:A:184:ILE:CG2	1:A:185:ASP:N	2.83	0.42
1:A:115:ILE:CG1	1:A:116:THR:H	2.09	0.42
1:A:60:ILE:HG23	1:A:75:LEU:HD11	2.02	0.42
1:A:17:GLU:CD	1:A:97:TYR:HE2	2.23	0.42
1:A:19:LEU:O	1:A:22:THR:HB	2.19	0.42
1:A:149:LEU:HD22	1:A:191:ILE:CG1	2.50	0.42
1:A:218:ILE:HA	1:A:221:ALA:HB3	2.01	0.42
1:A:229:PHE:CD1	1:A:229:PHE:C	2.93	0.42
1:A:76:ASN:HA	1:A:77:PRO:HD3	1.76	0.42
1:A:213:TRP:O	1:A:215:GLY:N	2.53	0.41
1:A:144:ILE:O	1:A:147:LEU:HB3	2.20	0.41
1:A:147:LEU:HD13	1:A:223:ALA:HB2	2.01	0.41
1:A:129:LEU:CD1	1:A:195:ARG:NE	2.79	0.41
1:A:200:ALA:HB1	1:A:204:HIS:CG	2.55	0.41
1:A:28:SER:HB2	1:A:56:PHE:CE2	2.55	0.41
1:A:87:CYS:O	1:A:88:GLN:HG3	2.20	0.41
1:A:230:ILE:HD13	1:A:230:ILE:HA	1.86	0.41

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:27:ILE:O	1:A:30:GLY:N	2.53	0.41
1:A:109:THR:O	1:A:112:LEU:HB3	2.19	0.41
1:A:126:ARG:O	1:A:128:ASP:N	2.54	0.41
1:A:24:PHE:CD2	1:A:25:VAL:HG22	2.55	0.41
1:A:37:TYR:CB	1:A:119:LEU:HD22	2.51	0.41
1:A:37:TYR:CD2	1:A:38:PRO:HD3	2.56	0.41
1:A:149:LEU:O	1:A:152:CYS:SG	2.63	0.41
1:A:127:ASN:O	1:A:129:LEU:N	2.53	0.41
1:A:231:LEU:HD12	1:A:231:LEU:HA	1.62	0.41
1:A:200:ALA:CB	1:A:204:HIS:HB3	2.51	0.40
1:A:139:LEU:HD22	1:A:211:ILE:HG21	2.01	0.40
1:A:163:ASP:CG	1:A:166:GLY:HA2	2.41	0.40
1:A:208:ASN:O	1:A:211:ILE:N	2.54	0.40
1:A:208:ASN:ND2	1:A:212:PHE:CE1	2.89	0.40
1:A:35:PHE:CZ	1:A:51:LYS:HE3	2.56	0.40
1:A:65:GLN:O	1:A:65:GLN:HG2	2.21	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	224/269 (83%)	142 (63%)	59 (26%)	23 (10%)	<b>0</b> <b>9</b>

All (23) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	40	GLY
1	A	126	ARG
1	A	158	ASP
1	A	188	GLY
1	A	39	VAL

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type
1	A	48	ASP
1	A	68	GLY
1	A	74	HIS
1	A	130	ALA
1	A	132	GLY
1	A	161	ARG
1	A	201	VAL
1	A	209	HIS
1	A	86	SER
1	A	184	ILE
1	A	85	LEU
1	A	123	SER
1	A	171	ALA
1	A	183	ALA
1	A	213	TRP
1	A	214	VAL
1	A	141	ILE
1	A	72	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 PDB entries followed by that with respect to all EM entries.

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	174/214 (81%)	149 (86%)	25 (14%)	<b>3</b> <b>20</b>

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	25	VAL
1	A	36	LYS
1	A	38	PRO
1	A	41	ASN
1	A	51	LYS
1	A	75	LEU
1	A	83	LEU
1	A	87	CYS

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	A	93	ARG
1	A	103	VAL
1	A	107	VAL
1	A	122	ASN
1	A	127	ASN
1	A	129	LEU
1	A	142	GLU
1	A	143	ILE
1	A	147	LEU
1	A	169	PRO
1	A	181	LEU
1	A	195	ARG
1	A	197	PHE
1	A	203	THR
1	A	208	ASN
1	A	213	TRP
1	A	233	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	41	ASN
1	A	65	GLN
1	A	69	HIS
1	A	137	GLN
1	A	192	ASN
1	A	204	HIS
1	A	208	ASN
1	A	209	HIS

### 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 [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.