



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 11, 2024 – 06:26 PM EDT

PDB ID : 1QVB
Title : CRYSTAL STRUCTURE OF THE BETA-GLYCOSIDASE FROM THE HYPER-
THERMOPHILE THERMOPHILIC AGGREGANS
Authors : Chi, Y.-I.; Martinez-Cruz, L.A.; Swanson, R.V.; Robertson, D.E.; Kim, S.-H.
Deposited on : 1999-07-07
Resolution : 2.40 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
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)	:	2.36.2

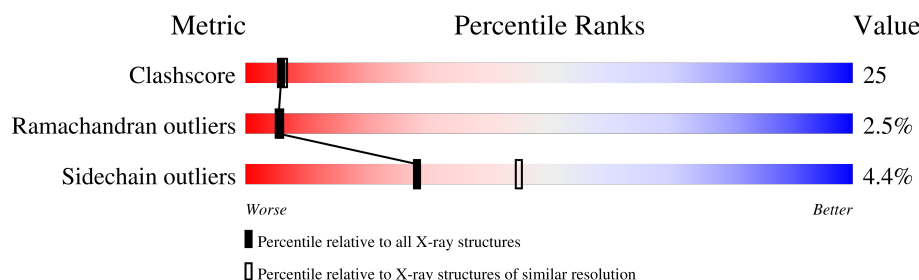
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	481	 63% 32% •
1	B	481	 64% 31% •

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 8295 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-GLYCOSIDASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	481	Total	C	N	O	S	0	0	0
			3928	2549	659	707	13			
1	B	481	Total	C	N	O	S	0	0	0
			3928	2549	659	707	13			

- Molecule 2 is water.

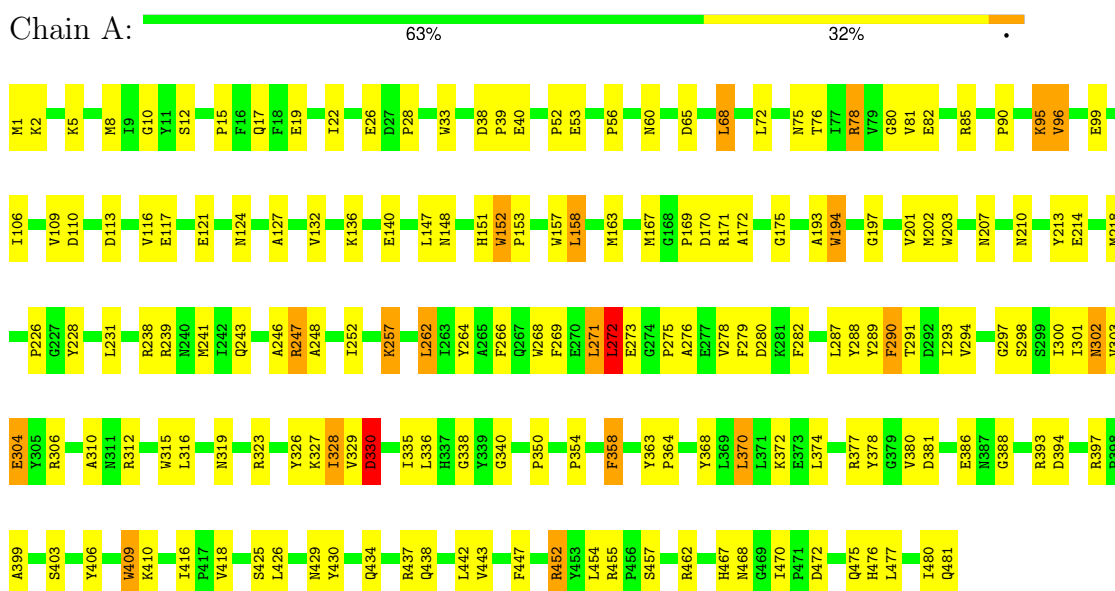
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	234	Total	O	0	0
			234	234		
2	B	205	Total	O	0	0
			205	205		

3 Residue-property plots

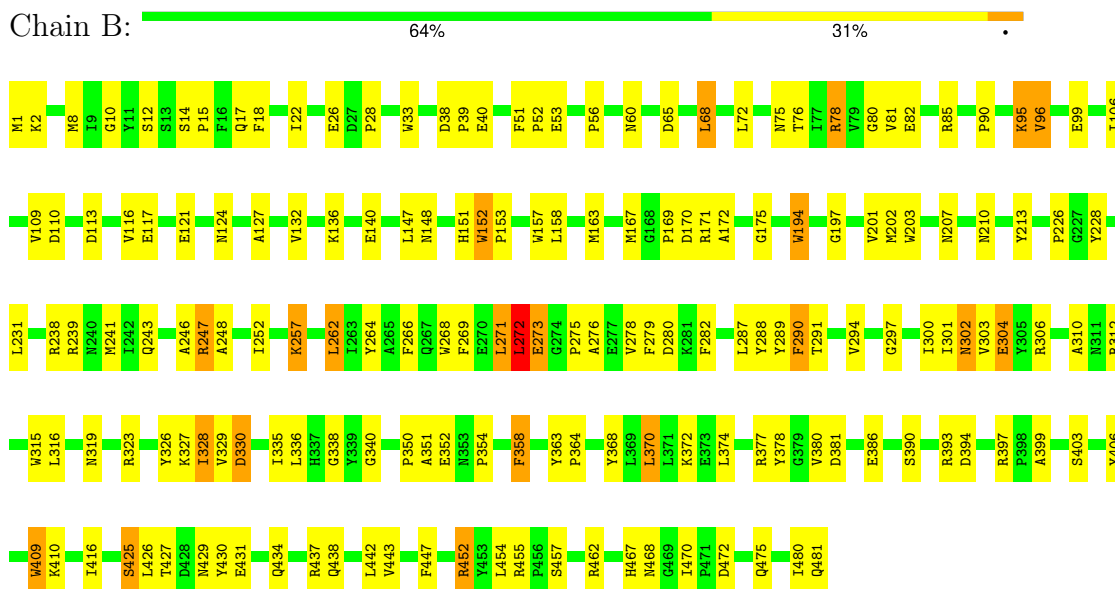
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded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



• Molecule 1: BETA-GLYCOSIDASE



4 Data and refinement statistics

Xtriage (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, α , β , γ	117.51Å 102.22Å 95.78Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.40	Depositor
% Data completeness (in resolution range)	93.7 (20.00-2.40)	Depositor
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, R_{free}	0.210 , 0.249	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	8295	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

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	0.36	0/4053	0.66	0/5514
1	B	0.35	0/4053	0.67	0/5514
All	All	0.35	0/8106	0.67	0/11028

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	3928	0	3808	200	0
1	B	3928	0	3808	203	0
2	A	234	0	0	5	0
2	B	205	0	0	3	0
All	All	8295	0	7616	390	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 25.

All (390) 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:B:8:MET:HB3	1:B:76:THR:HG21	1.34	1.08

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:8:MET:HB3	1:A:76:THR:HG21	1.30	1.08
1:B:480:ILE:HG22	1:B:481:GLN:H	1.16	1.07
1:A:480:ILE:HG22	1:A:481:GLN:H	1.16	1.06
1:A:278:VAL:HG11	1:A:329:VAL:HG13	1.40	1.01
1:B:278:VAL:HG11	1:B:329:VAL:HG13	1.41	1.00
1:A:327:LYS:HD2	1:A:336:LEU:HD21	1.58	0.84
1:B:327:LYS:HD2	1:B:336:LEU:HD21	1.61	0.83
1:B:480:ILE:HG22	1:B:481:GLN:N	1.94	0.82
1:A:480:ILE:HG22	1:A:481:GLN:N	1.95	0.81
1:A:171:ARG:HH11	1:B:171:ARG:HH11	1.27	0.81
1:B:327:LYS:HD2	1:B:336:LEU:CD2	2.12	0.80
1:A:327:LYS:HD2	1:A:336:LEU:CD2	2.12	0.79
1:A:96:VAL:HG13	1:A:110:ASP:O	1.83	0.78
1:A:201:VAL:HG23	1:A:202:MET:HG3	1.66	0.77
1:B:81:VAL:HG23	1:B:147:LEU:HD11	1.66	0.77
1:A:278:VAL:CG1	1:A:329:VAL:HG13	2.15	0.76
1:B:96:VAL:HG13	1:B:110:ASP:O	1.85	0.76
1:A:266:PHE:HD2	1:A:287:LEU:HD21	1.51	0.75
1:B:278:VAL:CG1	1:B:329:VAL:HG13	2.16	0.75
1:A:213:TYR:HD2	1:A:241:MET:CE	2.00	0.74
1:B:434:GLN:NE2	1:B:437:ARG:HE	1.85	0.74
1:B:480:ILE:CG2	1:B:481:GLN:H	1.99	0.74
1:B:201:VAL:HG23	1:B:202:MET:HG3	1.70	0.73
1:B:213:TYR:HD2	1:B:241:MET:CE	2.01	0.73
1:A:452:ARG:HD2	1:A:452:ARG:N	2.04	0.72
1:B:266:PHE:HD2	1:B:287:LEU:HD21	1.53	0.72
1:B:158:LEU:HD22	1:B:175:GLY:HA2	1.69	0.72
1:B:272:LEU:HD22	1:B:272:LEU:H	1.55	0.72
1:A:272:LEU:H	1:A:272:LEU:HD22	1.55	0.71
1:B:272:LEU:HD21	1:B:328:ILE:N	2.05	0.71
1:A:81:VAL:HG23	1:A:147:LEU:HD11	1.71	0.71
1:B:452:ARG:N	1:B:452:ARG:HD2	2.05	0.70
1:A:480:ILE:CG2	1:A:481:GLN:H	2.00	0.70
1:A:272:LEU:HD21	1:A:328:ILE:N	2.06	0.70
1:A:158:LEU:HD22	1:A:175:GLY:HA2	1.73	0.69
1:A:22:ILE:HB	1:A:60:ASN:ND2	2.09	0.68
1:A:213:TYR:HD2	1:A:241:MET:HE3	1.58	0.68
1:A:434:GLN:NE2	1:A:437:ARG:HE	1.92	0.68
1:A:65:ASP:OD1	1:A:452:ARG:NH1	2.29	0.66
1:B:163:MET:HG2	1:B:172:ALA:HB2	1.76	0.66
1:A:40:GLU:HG2	1:B:231:LEU:HG	1.77	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1:MET:HE3	1:A:470:ILE:HD12	1.77	0.65
1:A:171:ARG:NH1	1:B:171:ARG:HH11	1.94	0.65
1:A:136:LYS:O	1:A:140:GLU:HG3	1.96	0.65
1:B:472:ASP:HA	1:B:475:GLN:HG2	1.78	0.65
1:A:300:ILE:O	1:A:300:ILE:HD12	1.97	0.65
1:B:272:LEU:HD21	1:B:328:ILE:H	1.62	0.65
1:A:472:ASP:HA	1:A:475:GLN:HG2	1.80	0.64
1:A:272:LEU:HD21	1:A:328:ILE:H	1.63	0.64
1:A:15:PRO:CB	1:A:82:GLU:HG2	2.28	0.63
1:B:243:GLN:HE21	1:B:306:ARG:HH22	1.46	0.63
1:A:171:ARG:HH11	1:B:171:ARG:NH1	1.95	0.63
1:A:243:GLN:HE21	1:A:306:ARG:HH22	1.46	0.63
1:B:275:PRO:HB2	1:B:329:VAL:HG23	1.80	0.63
1:A:163:MET:HG2	1:A:172:ALA:HB2	1.80	0.62
1:A:275:PRO:HB2	1:A:329:VAL:HG23	1.81	0.62
1:B:22:ILE:HB	1:B:60:ASN:ND2	2.14	0.62
1:B:354:PRO:HG3	1:B:481:GLN:HB2	1.80	0.62
1:A:302:ASN:OD1	1:A:304:GLU:HB2	1.98	0.62
1:A:354:PRO:HG3	1:A:481:GLN:HB2	1.80	0.62
1:B:1:MET:CE	1:B:475:GLN:HE22	2.12	0.62
1:B:75:ASN:OD1	1:B:76:THR:HG22	2.00	0.62
1:A:287:LEU:HD23	1:A:287:LEU:O	1.99	0.62
1:B:8:MET:CB	1:B:76:THR:HG21	2.21	0.61
1:B:15:PRO:CB	1:B:82:GLU:HG2	2.31	0.61
1:B:300:ILE:HD12	1:B:300:ILE:O	2.00	0.61
1:B:275:PRO:HB2	1:B:329:VAL:CG2	2.31	0.61
1:A:275:PRO:HB2	1:A:329:VAL:CG2	2.31	0.60
1:B:213:TYR:HD2	1:B:241:MET:HE3	1.65	0.60
1:A:368:TYR:CZ	1:A:372:LYS:HD2	2.36	0.60
1:A:8:MET:CB	1:A:76:THR:HG21	2.20	0.60
1:A:319:ASN:CG	1:A:386:GLU:HB2	2.22	0.60
1:B:65:ASP:OD1	1:B:452:ARG:NH1	2.34	0.60
1:B:302:ASN:OD1	1:B:304:GLU:HB2	2.00	0.60
1:A:323:ARG:HD3	1:A:363:TYR:CE2	2.37	0.60
1:B:289:TYR:O	1:B:290:PHE:HB2	2.02	0.60
1:A:210:ASN:HA	1:A:213:TYR:CZ	2.37	0.59
1:A:151:HIS:O	1:A:153:PRO:HD3	2.03	0.59
1:B:416:ILE:N	1:B:416:ILE:HD12	2.17	0.59
1:B:213:TYR:HD2	1:B:241:MET:HE1	1.67	0.59
1:A:289:TYR:O	1:A:290:PHE:HB2	2.02	0.59
1:B:136:LYS:O	1:B:140:GLU:HG3	2.03	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:238:ARG:HD3	1:B:289:TYR:HE2	1.68	0.59
1:A:388:GLY:HA3	2:A:1365:HOH:O	2.03	0.58
1:A:106:ILE:H	1:A:243:GLN:HE22	1.51	0.58
1:B:319:ASN:CG	1:B:386:GLU:HB2	2.24	0.58
1:A:1:MET:CE	1:A:475:GLN:HE22	2.17	0.57
1:A:28:PRO:HA	1:A:33:TRP:CG	2.40	0.57
1:A:78:ARG:NH2	1:A:207:ASN:OD1	2.36	0.57
1:A:416:ILE:HD12	1:A:416:ILE:N	2.19	0.57
1:B:90:PRO:HG3	1:B:157:TRP:CB	2.34	0.57
1:A:2:LYS:O	1:A:409:TRP:HZ3	1.88	0.57
1:B:1:MET:HE3	1:B:470:ILE:HD12	1.85	0.57
1:B:90:PRO:HG3	1:B:157:TRP:HB2	1.86	0.57
1:A:171:ARG:NH1	1:B:171:ARG:HD2	2.20	0.56
1:A:238:ARG:HD2	2:A:1339:HOH:O	2.04	0.56
1:A:171:ARG:HD2	1:B:171:ARG:NH1	2.20	0.56
1:A:279:PHE:O	1:A:282:PHE:HB3	2.05	0.56
1:B:106:ILE:H	1:B:243:GLN:HE22	1.52	0.56
1:B:124:ASN:HD22	1:B:127:ALA:HB2	1.70	0.56
1:A:397:ARG:HD3	1:A:442:LEU:HD23	1.88	0.56
1:A:276:ALA:HB3	1:A:278:VAL:HG12	1.88	0.56
1:B:2:LYS:O	1:B:409:TRP:HZ3	1.89	0.55
1:A:210:ASN:HA	1:A:213:TYR:CE2	2.41	0.55
1:A:12:SER:OG	1:A:78:ARG:HD3	2.07	0.55
1:A:15:PRO:HB2	1:A:82:GLU:HG2	1.88	0.55
1:B:15:PRO:HB2	1:B:82:GLU:HG2	1.87	0.55
1:B:78:ARG:NH2	1:B:207:ASN:OD1	2.39	0.55
1:B:109:VAL:CG2	1:B:247:ARG:HG2	2.36	0.55
1:A:358:PHE:CE2	1:A:438:GLN:HG2	2.40	0.55
1:B:158:LEU:CD2	1:B:175:GLY:HA2	2.37	0.55
1:B:279:PHE:O	1:B:282:PHE:HB3	2.07	0.55
1:B:323:ARG:HD3	1:B:363:TYR:CE2	2.42	0.55
1:B:368:TYR:CZ	1:B:372:LYS:HD2	2.41	0.54
1:B:257:LYS:HB3	1:B:257:LYS:HZ2	1.72	0.54
1:B:269:PHE:CD1	1:B:287:LEU:HD12	2.42	0.54
1:B:287:LEU:O	1:B:287:LEU:HD23	2.07	0.54
1:A:75:ASN:OD1	1:A:76:THR:HG22	2.07	0.54
1:A:475:GLN:HE21	1:A:475:GLN:HA	1.72	0.54
1:B:28:PRO:HA	1:B:33:TRP:CG	2.43	0.54
1:A:90:PRO:HG3	1:A:157:TRP:HB2	1.89	0.54
1:A:472:ASP:O	1:A:475:GLN:HG2	2.07	0.54
1:B:117:GLU:O	1:B:121:GLU:HG3	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:90:PRO:HG3	1:A:157:TRP:CB	2.38	0.54
1:A:272:LEU:HB2	1:A:275:PRO:HD3	1.89	0.53
1:B:1:MET:HE2	1:B:475:GLN:HE22	1.73	0.53
1:B:151:HIS:O	1:B:153:PRO:HD3	2.08	0.53
1:A:269:PHE:CD1	1:A:287:LEU:HD12	2.43	0.53
1:B:276:ALA:HB3	1:B:278:VAL:HG12	1.90	0.53
1:A:289:TYR:CZ	1:A:293:ILE:HD11	2.43	0.53
1:B:272:LEU:HD21	1:B:327:LYS:HA	1.90	0.53
1:B:358:PHE:CE2	1:B:438:GLN:HG2	2.44	0.53
1:B:210:ASN:HA	1:B:213:TYR:CZ	2.43	0.53
1:A:272:LEU:HD21	1:A:327:LYS:HA	1.91	0.53
1:B:158:LEU:HD23	1:B:158:LEU:O	2.09	0.52
1:A:231:LEU:HG	1:B:40:GLU:HG2	1.92	0.52
1:B:287:LEU:HD22	1:B:288:TYR:CE2	2.45	0.52
1:B:272:LEU:HB2	1:B:275:PRO:HD3	1.90	0.52
1:B:287:LEU:HD22	1:B:288:TYR:CD2	2.44	0.52
1:B:289:TYR:O	1:B:290:PHE:CB	2.58	0.52
1:B:467:HIS:O	1:B:467:HIS:ND1	2.42	0.52
1:A:213:TYR:HD2	1:A:241:MET:HE1	1.71	0.52
1:B:264:TYR:HB3	1:B:266:PHE:CE1	2.45	0.52
1:A:1:MET:CE	1:A:470:ILE:HD12	2.40	0.52
1:B:109:VAL:HG23	1:B:247:ARG:HG2	1.92	0.52
1:B:248:ALA:O	1:B:252:ILE:HG13	2.10	0.51
1:A:171:ARG:CZ	1:B:171:ARG:HD2	2.40	0.51
1:B:2:LYS:HE2	1:B:467:HIS:CE1	2.46	0.51
1:B:472:ASP:HA	1:B:475:GLN:CG	2.41	0.51
1:A:248:ALA:O	1:A:252:ILE:HG13	2.11	0.51
1:A:257:LYS:HZ2	1:A:257:LYS:HB3	1.76	0.51
1:B:151:HIS:O	1:B:152:TRP:HB2	2.11	0.51
1:B:297:GLY:HA3	1:B:310:ALA:HB2	1.92	0.51
1:A:289:TYR:O	1:A:290:PHE:CB	2.58	0.51
1:B:82:GLU:HB2	1:B:85:ARG:HG3	1.92	0.51
1:A:213:TYR:CD2	1:A:241:MET:HE3	2.43	0.51
1:A:52:PRO:HD2	1:A:53:GLU:OE2	2.11	0.50
1:B:2:LYS:HG2	1:B:467:HIS:CE1	2.47	0.50
1:B:262:LEU:C	1:B:262:LEU:HD23	2.31	0.50
1:A:472:ASP:HA	1:A:475:GLN:CG	2.42	0.50
1:B:210:ASN:HA	1:B:213:TYR:CE2	2.46	0.50
1:B:238:ARG:HD3	1:B:289:TYR:CE2	2.46	0.50
1:A:2:LYS:HG2	1:A:467:HIS:CE1	2.47	0.50
1:A:117:GLU:O	1:A:121:GLU:HG3	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:315:TRP:HA	1:B:380:VAL:CG1	2.42	0.50
1:A:56:PRO:O	1:A:452:ARG:NH2	2.44	0.50
1:A:394:ASP:HB2	1:A:455:ARG:HD3	1.94	0.50
1:B:434:GLN:NE2	1:B:437:ARG:NE	2.59	0.50
1:A:56:PRO:HD3	1:A:447:PHE:HE2	1.76	0.50
1:A:151:HIS:O	1:A:152:TRP:HB2	2.12	0.50
1:A:171:ARG:HD2	1:B:171:ARG:CZ	2.42	0.50
1:A:262:LEU:C	1:A:262:LEU:HD23	2.31	0.50
1:B:475:GLN:HE21	1:B:475:GLN:HA	1.77	0.50
1:A:109:VAL:CG2	1:A:247:ARG:HG2	2.42	0.49
1:A:315:TRP:HA	1:A:380:VAL:CG1	2.41	0.49
1:A:326:TYR:CE2	1:A:335:ILE:HG23	2.46	0.49
1:B:80:GLY:HA2	1:B:148:ASN:O	2.12	0.49
1:B:397:ARG:HD3	1:B:442:LEU:HD23	1.94	0.49
1:A:2:LYS:HE2	1:A:467:HIS:CE1	2.48	0.49
1:A:82:GLU:HB2	1:A:85:ARG:HG3	1.92	0.49
1:A:257:LYS:HA	1:A:257:LYS:HZ3	1.77	0.49
1:A:158:LEU:HD23	1:A:158:LEU:O	2.12	0.49
1:B:56:PRO:HD3	1:B:447:PHE:HE2	1.77	0.49
1:A:15:PRO:HB3	1:A:82:GLU:HG2	1.93	0.49
1:A:323:ARG:HD3	1:A:363:TYR:CD2	2.47	0.49
1:A:327:LYS:HD2	1:A:336:LEU:HD23	1.93	0.49
1:A:197:GLY:HA2	1:A:203:TRP:CZ2	2.48	0.49
1:B:12:SER:OG	1:B:78:ARG:HD3	2.13	0.49
1:B:327:LYS:HD2	1:B:336:LEU:HD23	1.91	0.49
1:A:106:ILE:H	1:A:243:GLN:NE2	2.10	0.49
1:A:264:TYR:HB3	1:A:266:PHE:CE1	2.48	0.49
1:B:197:GLY:HA2	1:B:203:TRP:CZ2	2.48	0.49
1:B:124:ASN:HD22	1:B:127:ALA:CB	2.26	0.49
1:B:303:VAL:HG23	1:B:304:GLU:N	2.28	0.49
1:A:80:GLY:HA2	1:A:148:ASN:O	2.13	0.49
1:A:480:ILE:HA	2:A:1048:HOH:O	2.13	0.48
1:B:106:ILE:H	1:B:243:GLN:NE2	2.11	0.48
1:A:1:MET:HE2	1:A:475:GLN:HE22	1.77	0.48
1:A:238:ARG:HD3	1:A:289:TYR:HE2	1.77	0.48
1:B:52:PRO:HD2	1:B:53:GLU:OE2	2.13	0.48
1:B:393:ARG:HG2	1:B:393:ARG:HH11	1.78	0.48
1:B:452:ARG:NH2	2:B:1391:HOH:O	2.44	0.48
1:A:152:TRP:HB2	1:A:153:PRO:HD3	1.93	0.48
1:A:266:PHE:CD2	1:A:287:LEU:HD21	2.40	0.48
1:B:169:PRO:HD3	1:B:228:TYR:CZ	2.48	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:287:LEU:HD23	1:A:287:LEU:C	2.34	0.48
1:A:338:GLY:O	1:A:350:PRO:HD3	2.13	0.48
1:B:213:TYR:CD2	1:B:241:MET:HE1	2.48	0.48
1:A:247:ARG:HE	1:A:247:ARG:HA	1.78	0.48
1:A:370:LEU:HD22	1:A:374:LEU:CD1	2.44	0.48
1:B:124:ASN:ND2	1:B:127:ALA:HB2	2.29	0.48
1:A:113:ASP:O	1:A:117:GLU:HG3	2.14	0.48
1:A:467:HIS:O	1:A:467:HIS:ND1	2.46	0.48
1:A:358:PHE:CD2	1:A:438:GLN:HG2	2.49	0.48
1:B:113:ASP:O	1:B:117:GLU:HG3	2.14	0.48
1:A:124:ASN:HD22	1:A:127:ALA:HB2	1.78	0.47
1:B:434:GLN:HE21	1:B:437:ARG:HE	1.60	0.47
1:A:136:LYS:HG2	1:A:140:GLU:CD	2.34	0.47
1:A:197:GLY:HA2	1:A:203:TRP:HZ2	1.78	0.47
1:B:197:GLY:HA2	1:B:203:TRP:HZ2	1.78	0.47
1:B:399:ALA:HB3	1:B:481:GLN:HG2	1.95	0.47
1:B:287:LEU:HD23	1:B:287:LEU:C	2.35	0.47
1:B:472:ASP:O	1:B:475:GLN:HG2	2.15	0.47
1:A:399:ALA:HB3	1:A:481:GLN:HG2	1.96	0.47
1:B:272:LEU:CD2	1:B:327:LYS:HA	2.45	0.47
1:B:338:GLY:O	1:B:350:PRO:HD3	2.15	0.47
1:A:95:LYS:O	1:A:96:VAL:HB	2.15	0.47
1:A:287:LEU:HD22	1:A:288:TYR:CD2	2.50	0.47
1:A:297:GLY:HA3	1:A:310:ALA:HB2	1.96	0.47
1:A:393:ARG:HG2	1:A:393:ARG:HH11	1.80	0.47
1:B:14:SER:HB3	1:B:151:HIS:CE1	2.49	0.47
1:B:326:TYR:CE2	1:B:335:ILE:HG23	2.48	0.47
1:B:95:LYS:O	1:B:96:VAL:HB	2.15	0.47
1:B:152:TRP:HB2	1:B:153:PRO:HD3	1.96	0.47
1:A:247:ARG:HA	1:A:247:ARG:NE	2.30	0.47
1:A:303:VAL:HG23	1:A:304:GLU:N	2.29	0.47
1:B:434:GLN:HE21	1:B:437:ARG:NE	2.13	0.47
1:A:287:LEU:HD22	1:A:288:TYR:CE2	2.50	0.47
1:B:380:VAL:HG12	1:B:381:ASP:N	2.29	0.47
1:A:171:ARG:NH2	1:B:170:ASP:OD1	2.48	0.46
1:A:271:LEU:HD13	1:A:275:PRO:HG3	1.97	0.46
1:B:275:PRO:O	1:B:276:ALA:HB2	2.14	0.46
1:B:323:ARG:HD3	1:B:363:TYR:CD2	2.50	0.46
1:A:72:LEU:O	1:A:462:ARG:HA	2.14	0.46
1:A:272:LEU:CD2	1:A:327:LYS:HA	2.45	0.46
1:B:290:PHE:O	1:B:294:VAL:HG22	2.14	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:271:LEU:HD22	1:A:275:PRO:HG3	1.98	0.46
1:B:136:LYS:HG2	1:B:140:GLU:CD	2.36	0.46
1:B:377:ARG:HD3	1:B:378:TYR:CZ	2.50	0.46
1:A:109:VAL:HG23	1:A:247:ARG:HG2	1.98	0.46
1:B:1:MET:HE1	1:B:475:GLN:HE22	1.81	0.46
1:B:15:PRO:HB3	1:B:82:GLU:HG2	1.98	0.46
1:B:271:LEU:HD22	1:B:275:PRO:HG3	1.97	0.46
1:B:462:ARG:HD2	2:B:1125:HOH:O	2.15	0.46
1:B:213:TYR:CD2	1:B:241:MET:HE3	2.49	0.46
1:B:268:TRP:O	1:B:323:ARG:HB2	2.16	0.46
1:A:275:PRO:O	1:A:276:ALA:HB2	2.15	0.45
1:A:291:THR:HA	1:A:294:VAL:HG22	1.97	0.45
1:B:431:GLU:HG3	1:B:431:GLU:O	2.17	0.45
1:B:81:VAL:CG2	1:B:147:LEU:HD11	2.41	0.45
1:A:171:ARG:NH1	1:B:171:ARG:CD	2.79	0.45
1:A:443:VAL:HG11	1:A:452:ARG:HB3	1.97	0.45
1:A:170:ASP:OD1	1:B:171:ARG:NH2	2.49	0.45
1:B:394:ASP:HB2	1:B:455:ARG:HD3	1.99	0.45
1:A:169:PRO:HD3	1:A:228:TYR:CZ	2.51	0.45
1:B:17:GLN:HB3	1:B:429:ASN:HD22	1.81	0.45
1:B:364:PRO:CB	1:B:403:SER:HB3	2.47	0.45
1:A:214:GLU:O	1:A:218:MET:HB2	2.17	0.45
1:A:238:ARG:HD3	1:A:289:TYR:CE2	2.51	0.45
1:B:257:LYS:HA	1:B:257:LYS:HZ3	1.82	0.45
1:A:68:LEU:HD21	1:A:454:LEU:HD21	1.99	0.45
1:B:291:THR:HA	1:B:294:VAL:HG22	1.98	0.45
1:A:171:ARG:CD	1:B:171:ARG:NH1	2.80	0.45
1:A:246:ALA:HA	1:A:312:ARG:HD3	1.99	0.45
1:B:12:SER:CB	1:B:78:ARG:HD3	2.47	0.45
1:B:18:PHE:O	1:B:56:PRO:HG2	2.16	0.45
1:A:269:PHE:HB3	1:A:279:PHE:CZ	2.51	0.45
1:B:26:GLU:CD	1:B:26:GLU:H	2.20	0.45
1:B:51:PHE:HB3	1:B:53:GLU:OE2	2.16	0.45
1:B:167:MET:O	1:B:171:ARG:HD3	2.16	0.44
1:A:213:TYR:CD2	1:A:241:MET:CE	2.91	0.44
1:A:290:PHE:O	1:A:294:VAL:HG22	2.16	0.44
1:B:271:LEU:HD13	1:B:275:PRO:HG3	1.99	0.44
1:B:416:ILE:N	1:B:416:ILE:CD1	2.81	0.44
1:B:399:ALA:HB3	1:B:481:GLN:CG	2.48	0.44
1:A:213:TYR:CD2	1:A:241:MET:HE1	2.52	0.44
1:A:472:ASP:CA	1:A:475:GLN:HG2	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:266:PHE:HB2	1:B:370:LEU:HD11	2.00	0.44
1:A:82:GLU:OE2	1:A:82:GLU:HA	2.17	0.44
1:A:82:GLU:CB	1:A:85:ARG:HG3	2.48	0.44
1:A:287:LEU:C	1:A:287:LEU:CD2	2.86	0.44
1:B:323:ARG:O	1:B:340:GLY:HA3	2.18	0.44
1:B:358:PHE:CD2	1:B:438:GLN:HG2	2.53	0.44
1:B:364:PRO:HB3	1:B:403:SER:HB3	1.99	0.43
1:B:443:VAL:HG11	1:B:452:ARG:HB3	1.99	0.43
1:B:472:ASP:CA	1:B:475:GLN:HG2	2.46	0.43
1:B:247:ARG:HA	1:B:247:ARG:NE	2.32	0.43
1:A:10:GLY:HA3	1:A:76:THR:O	2.19	0.43
1:A:434:GLN:HE21	1:A:437:ARG:HE	1.66	0.43
1:B:425:SER:HB3	1:B:427:THR:O	2.18	0.43
1:A:399:ALA:HB3	1:A:481:GLN:CG	2.49	0.43
1:B:116:VAL:HG11	1:B:194:TRP:CG	2.54	0.43
1:B:56:PRO:O	1:B:452:ARG:NH2	2.52	0.43
1:B:72:LEU:HD12	1:B:426:LEU:HD11	1.99	0.43
1:B:239:ARG:HG3	1:B:239:ARG:HH11	1.83	0.43
1:B:239:ARG:HH12	1:B:306:ARG:NH1	2.16	0.43
1:B:390:SER:OG	1:B:438:GLN:HG3	2.19	0.43
1:A:1:MET:HE3	1:A:406:TYR:HD1	1.84	0.43
1:A:15:PRO:O	1:A:19:GLU:HG3	2.19	0.43
1:A:257:LYS:HA	1:A:257:LYS:NZ	2.33	0.43
1:B:15:PRO:HD2	2:B:1110:HOH:O	2.19	0.43
1:B:246:ALA:HA	1:B:312:ARG:HD3	2.01	0.43
1:A:124:ASN:ND2	1:A:127:ALA:HB2	2.33	0.43
1:A:17:GLN:HB3	1:A:429:ASN:HD22	1.84	0.42
1:B:303:VAL:O	1:B:304:GLU:C	2.56	0.42
1:B:272:LEU:H	1:B:272:LEU:CD2	2.29	0.42
1:B:287:LEU:C	1:B:287:LEU:CD2	2.87	0.42
1:A:1:MET:HE2	1:A:470:ILE:HB	2.00	0.42
1:A:26:GLU:H	1:A:26:GLU:CD	2.23	0.42
1:A:167:MET:O	1:A:171:ARG:HD3	2.18	0.42
1:A:268:TRP:O	1:A:323:ARG:HB2	2.19	0.42
1:B:266:PHE:CD2	1:B:287:LEU:HD21	2.42	0.42
1:B:315:TRP:HA	1:B:380:VAL:HG12	2.00	0.42
1:A:380:VAL:HG12	1:A:381:ASP:N	2.34	0.42
1:B:1:MET:CE	1:B:470:ILE:HD12	2.49	0.42
1:B:257:LYS:HA	1:B:257:LYS:NZ	2.35	0.42
1:A:409:TRP:CD1	1:A:410:LYS:N	2.87	0.42
1:A:475:GLN:HA	1:A:475:GLN:NE2	2.34	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:12:SER:CB	1:A:78:ARG:HD3	2.49	0.42
1:A:15:PRO:HD2	2:A:1042:HOH:O	2.20	0.42
1:A:303:VAL:O	1:A:304:GLU:C	2.57	0.42
1:A:416:ILE:N	1:A:416:ILE:CD1	2.83	0.42
1:B:152:TRP:CD1	1:B:152:TRP:N	2.85	0.42
1:B:239:ARG:HH12	1:B:306:ARG:HH12	1.68	0.42
1:A:475:GLN:HE21	1:A:475:GLN:CA	2.29	0.42
1:B:213:TYR:CZ	1:B:238:ARG:HG3	2.55	0.42
1:A:266:PHE:HB2	1:A:370:LEU:HD11	2.02	0.42
1:B:52:PRO:HG3	1:B:430:TYR:CE2	2.55	0.42
1:B:68:LEU:HD21	1:B:454:LEU:HD21	2.02	0.42
1:B:247:ARG:HA	1:B:247:ARG:HE	1.85	0.42
1:A:116:VAL:HG11	1:A:194:TRP:CG	2.55	0.42
1:B:273:GLU:O	1:B:275:PRO:HD2	2.19	0.42
1:B:370:LEU:HD22	1:B:374:LEU:CD1	2.50	0.42
1:A:2:LYS:O	1:A:409:TRP:CZ3	2.72	0.41
1:B:380:VAL:CG1	1:B:381:ASP:N	2.82	0.41
1:B:475:GLN:HA	1:B:475:GLN:NE2	2.35	0.41
1:A:239:ARG:HH12	1:A:306:ARG:HH12	1.69	0.41
1:B:1:MET:HE2	1:B:470:ILE:HB	2.02	0.41
1:A:38:ASP:HA	1:A:39:PRO:HD3	1.84	0.41
1:A:158:LEU:CD2	1:A:175:GLY:HA2	2.47	0.41
1:A:315:TRP:HA	1:A:380:VAL:HG12	2.01	0.41
1:A:377:ARG:HD3	1:A:378:TYR:CZ	2.55	0.41
1:B:28:PRO:HA	1:B:33:TRP:CD1	2.55	0.41
1:B:393:ARG:HG2	1:B:393:ARG:NH1	2.35	0.41
1:A:298:SER:HB3	1:A:304:GLU:O	2.20	0.41
1:A:416:ILE:HG22	1:A:418:VAL:HG23	2.03	0.41
1:B:397:ARG:HD2	1:B:457:SER:OG	2.20	0.41
1:B:409:TRP:CD1	1:B:410:LYS:N	2.87	0.41
1:A:239:ARG:HH12	1:A:306:ARG:NH1	2.17	0.41
1:A:272:LEU:H	1:A:272:LEU:CD2	2.29	0.41
1:A:28:PRO:HA	1:A:33:TRP:CD1	2.55	0.41
1:A:72:LEU:HD12	1:A:426:LEU:HD11	2.02	0.41
1:A:364:PRO:CB	1:A:403:SER:HB3	2.50	0.41
1:B:82:GLU:OE2	1:B:82:GLU:HA	2.20	0.41
1:A:5:LYS:HE3	1:A:5:LYS:HB2	1.93	0.41
1:B:72:LEU:O	1:B:462:ARG:HA	2.19	0.41
1:B:10:GLY:HA3	1:B:76:THR:O	2.21	0.41
1:A:167:MET:HE3	1:A:171:ARG:CZ	2.50	0.41
1:A:399:ALA:CB	1:A:481:GLN:HG2	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:462:ARG:HD2	2:A:1380:HOH:O	2.21	0.41
1:B:1:MET:HE3	1:B:406:TYR:HD1	1.86	0.41
1:B:132:VAL:O	1:B:136:LYS:HB2	2.21	0.41
1:B:351:ALA:O	1:B:352:GLU:HB2	2.19	0.41
1:B:2:LYS:HG2	1:B:467:HIS:HE1	1.85	0.41
1:B:167:MET:HE3	1:B:171:ARG:CZ	2.51	0.41
1:B:403:SER:O	1:B:406:TYR:HB3	2.21	0.41
1:A:239:ARG:HH11	1:A:239:ARG:HG3	1.85	0.40
1:A:476:HIS:CE1	1:A:477:LEU:HG	2.56	0.40
1:B:269:PHE:HB3	1:B:279:PHE:CZ	2.56	0.40
1:A:81:VAL:CG2	1:A:147:LEU:HD11	2.47	0.40
1:A:152:TRP:N	1:A:152:TRP:CD1	2.86	0.40
1:A:193:ALA:HA	1:A:203:TRP:CH2	2.57	0.40
1:A:323:ARG:O	1:A:340:GLY:HA3	2.21	0.40
1:B:38:ASP:HA	1:B:39:PRO:HD3	1.83	0.40
1:A:132:VAL:O	1:A:136:LYS:HB2	2.20	0.40
1:A:329:VAL:O	1:A:330:ASP:C	2.60	0.40
1:B:213:TYR:HB3	1:B:241:MET:HE1	2.04	0.40
1:A:52:PRO:HG3	1:A:430:TYR:CE2	2.56	0.40
1:A:397:ARG:HD2	1:A:457:SER:OG	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 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	479/481 (100%)	439 (92%)	28 (6%)	12 (2%)	5	6
1	B	479/481 (100%)	439 (92%)	28 (6%)	12 (2%)	5	6
All	All	958/962 (100%)	878 (92%)	56 (6%)	24 (2%)	5	6

All (24) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	152	TRP
1	A	273	GLU
1	A	290	PHE
1	B	152	TRP
1	B	273	GLU
1	B	290	PHE
1	A	95	LYS
1	A	272	LEU
1	A	302	ASN
1	A	328	ILE
1	B	95	LYS
1	B	272	LEU
1	B	328	ILE
1	A	425	SER
1	B	302	ASN
1	B	425	SER
1	A	96	VAL
1	A	301	ILE
1	B	96	VAL
1	B	301	ILE
1	B	304	GLU
1	B	330	ASP
1	A	304	GLU
1	A	330	ASP

5.3.2 Protein sidechains ⓘ

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	417/417 (100%)	398 (95%)	19 (5%)	27	43
1	B	417/417 (100%)	399 (96%)	18 (4%)	29	46
All	All	834/834 (100%)	797 (96%)	37 (4%)	28	45

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	68	LEU
1	A	78	ARG
1	A	99	GLU
1	A	158	LEU
1	A	194	TRP
1	A	226	PRO
1	A	247	ARG
1	A	257	LYS
1	A	262	LEU
1	A	271	LEU
1	A	272	LEU
1	A	280	ASP
1	A	316	LEU
1	A	330	ASP
1	A	358	PHE
1	A	370	LEU
1	A	409	TRP
1	A	452	ARG
1	A	468	ASN
1	B	68	LEU
1	B	78	ARG
1	B	99	GLU
1	B	194	TRP
1	B	226	PRO
1	B	247	ARG
1	B	257	LYS
1	B	262	LEU
1	B	271	LEU
1	B	272	LEU
1	B	280	ASP
1	B	316	LEU
1	B	330	ASP
1	B	358	PHE
1	B	370	LEU
1	B	409	TRP
1	B	452	ARG
1	B	468	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	17	GLN
1	A	60	ASN

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Mol	Chain	Res	Type
1	A	93	ASN
1	A	124	ASN
1	A	129	ASN
1	A	130	HIS
1	A	243	GLN
1	A	387	ASN
1	A	429	ASN
1	A	434	GLN
1	A	468	ASN
1	A	475	GLN
1	B	17	GLN
1	B	29	ASN
1	B	54	ASN
1	B	60	ASN
1	B	124	ASN
1	B	129	ASN
1	B	130	HIS
1	B	243	GLN
1	B	387	ASN
1	B	429	ASN
1	B	434	GLN
1	B	468	ASN
1	B	475	GLN

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 [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.