



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 18, 2024 – 11:48 pm BST

PDB ID : 8S7Z
Title : Urethanase umg-spl without inhibitor or substrate displays flexible active site loops
Authors : Palm, G.J.; Graf, L.G.; Berndt, L.; Lammers, M.
Deposited on : 2024-03-05
Resolution : 2.67 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 : 2.37.1
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) : 2.37.1

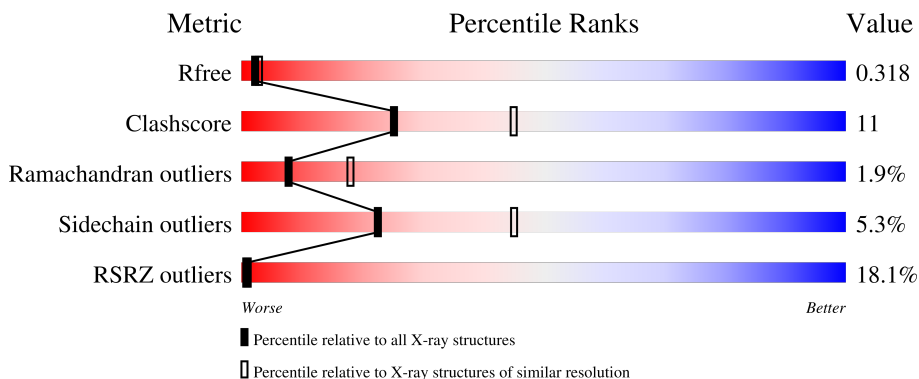
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION


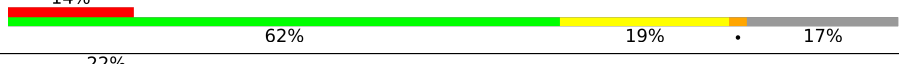

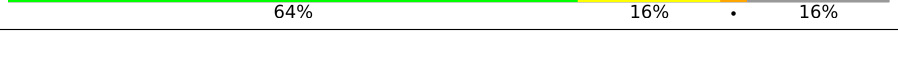
The reported resolution of this entry is 2.67 Å.

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	3863 (2.70-2.66)
Clashscore	141614	4210 (2.70-2.66)
Ramachandran outliers	138981	4141 (2.70-2.66)
Sidechain outliers	138945	4141 (2.70-2.66)
RSRZ outliers	127900	3780 (2.70-2.66)

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 $\leq 5\%$. 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	446	
1	B	446	
1	C	446	
1	D	446	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 21828 atoms, of which 10956 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 Urethanase umg-sp1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	372	Total 5469	C 1703	H 2747	N 502	O 509	S 8	73	4	0
1	B	371	Total 5421	C 1694	H 2720	N 494	O 504	S 9	71	0	0
1	C	372	Total 5425	C 1692	H 2722	N 496	O 506	S 9	71	0	0
1	D	373	Total 5510	C 1717	H 2767	N 506	O 511	S 9	73	4	0

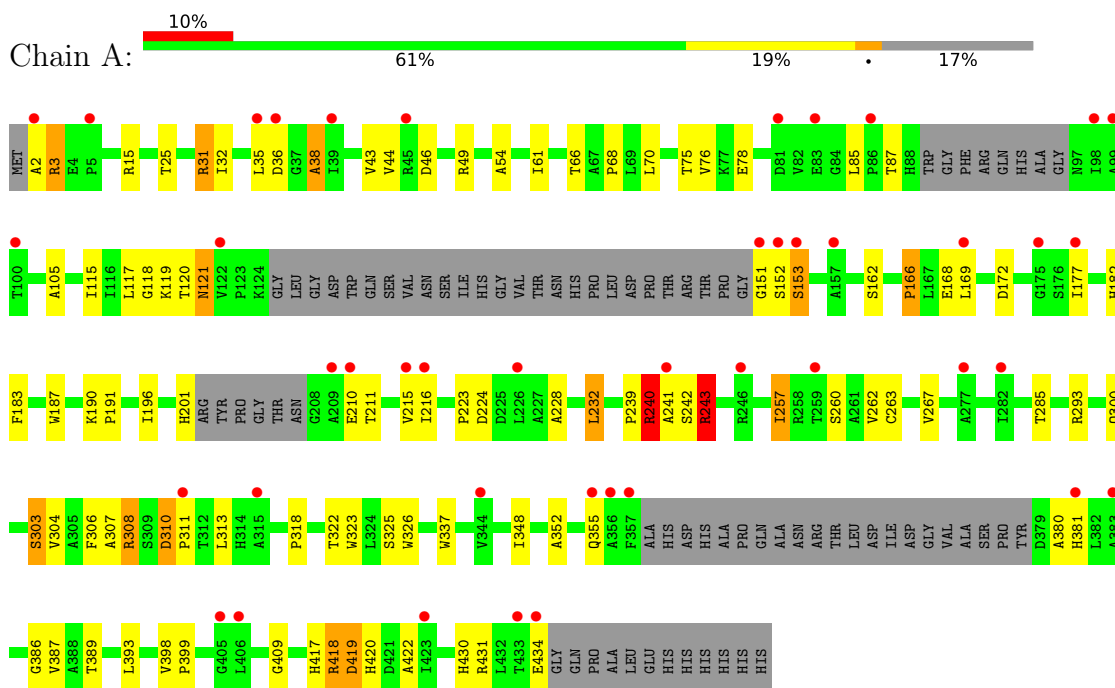
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total 1 O 1	0	0
2	C	2	Total 2 O 2	0	0

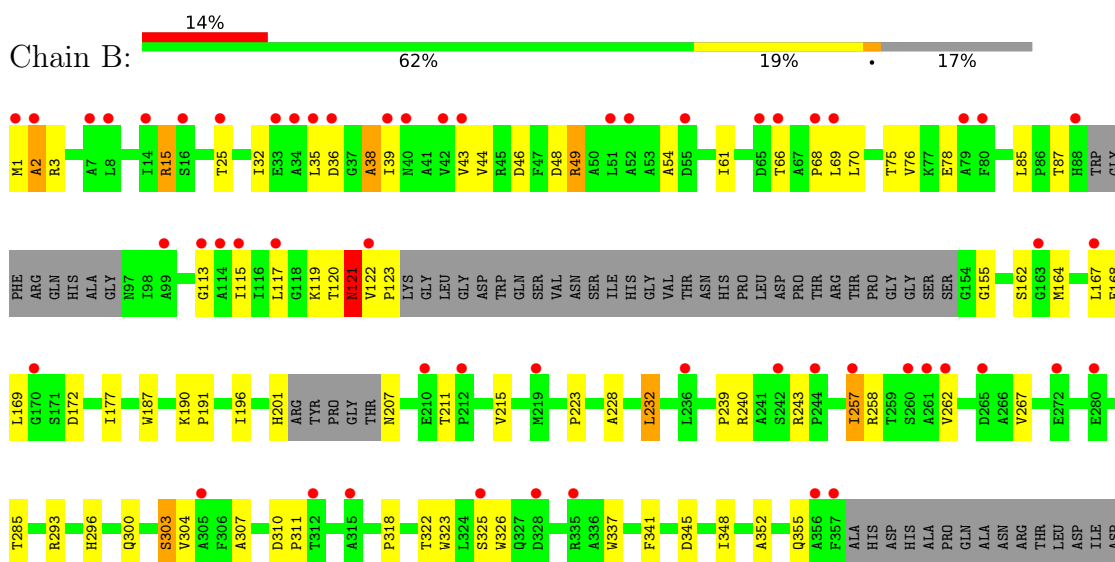
3 Residue-property plots [i](#)

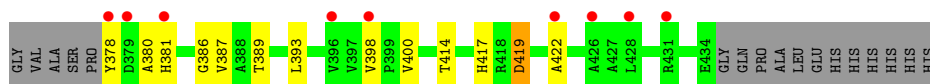
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Urethanase umg-sp1

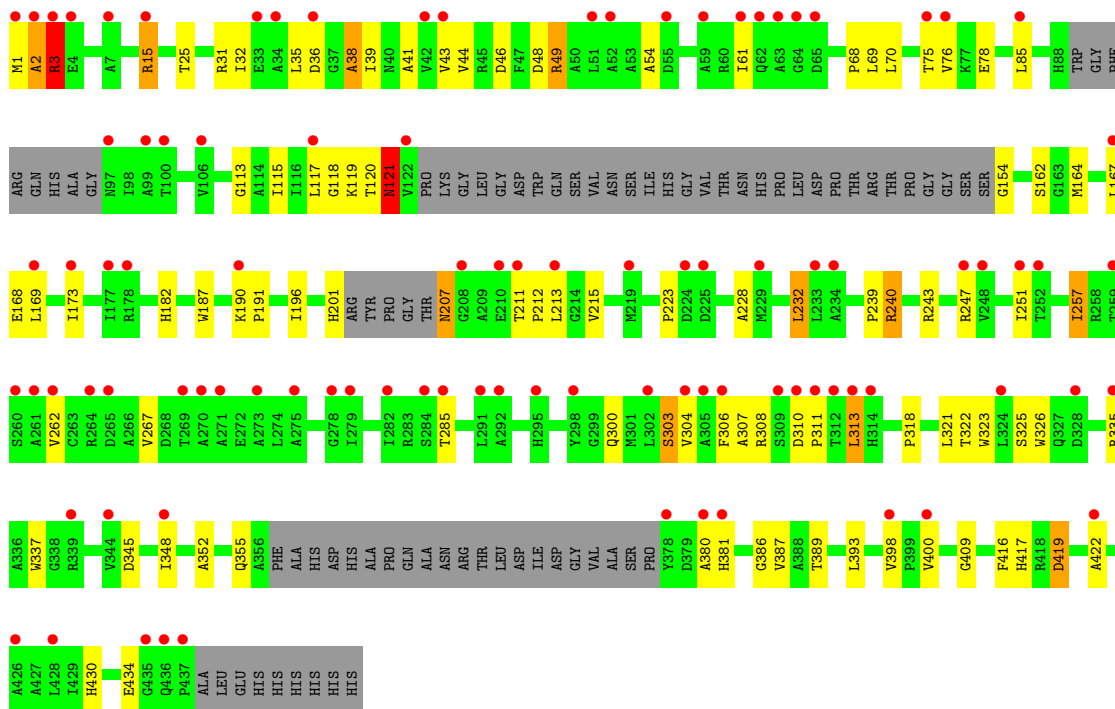


- Molecule 1: Urethanase umg-sp1

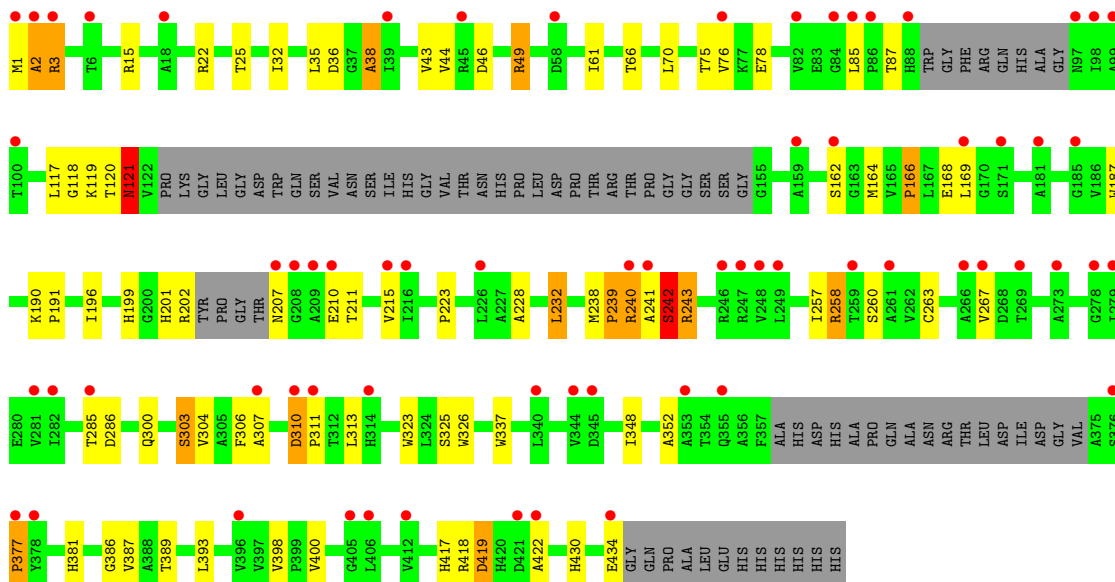




• Molecule 1: Urethanase umg-sp1



• Molecule 1: Urethanase umg-sp1



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	68.17Å 76.79Å 95.07Å 89.99° 112.65° 113.64°	Depositor
Resolution (Å)	44.54 – 2.67 44.50 – 2.67	Depositor EDS
% Data completeness (in resolution range)	97.1 (44.54-2.67) 88.8 (44.50-2.67)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.35	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.04 (at 2.69Å)	Xtrriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.260 , 0.323 0.263 , 0.318	Depositor DCC
R_{free} test set	2194 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	50.0	Xtrriage
Anisotropy	0.132	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 35.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.000 for h,-h-k,-h-l	Xtrriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	21828	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 28.69 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.7634e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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	0.54	0/2784	1.06	9/3804 (0.2%)
1	B	0.51	0/2755	0.99	6/3767 (0.2%)
1	C	0.47	0/2756	0.97	9/3768 (0.2%)
1	D	0.50	0/2806	0.98	6/3835 (0.2%)
All	All	0.51	0/11101	1.00	30/15174 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	4
1	B	0	4
1	C	0	5
1	D	0	6
All	All	0	19

There are no bond length outliers.

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	121	ASN	CB-CA-C	-12.47	85.47	110.40
1	C	201	HIS	CA-C-O	-9.39	100.38	120.10
1	A	201	HIS	CA-C-O	-9.33	100.51	120.10
1	B	201	HIS	CA-C-O	-7.81	103.69	120.10
1	C	48	ASP	CB-CA-C	7.61	125.62	110.40
1	A	418	ARG	NE-CZ-NH2	-7.52	116.54	120.30
1	D	418	ARG	NE-CZ-NH2	-7.47	116.56	120.30
1	A	418	ARG	CG-CD-NE	-7.44	96.17	111.80
1	A	166	PRO	N-CA-CB	-6.65	95.29	102.60
1	D	166	PRO	N-CA-CB	-6.46	95.50	102.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	232	LEU	CB-CG-CD1	6.44	121.95	111.00
1	B	48	ASP	CB-CA-C	6.37	123.14	110.40
1	B	232	LEU	CB-CG-CD2	-6.35	100.21	111.00
1	C	232	LEU	CB-CG-CD1	6.18	121.50	111.00
1	A	31	ARG	NE-CZ-NH1	6.14	123.37	120.30
1	D	232	LEU	CB-CG-CD1	5.98	121.17	111.00
1	B	232	LEU	CB-CG-CD1	5.94	121.10	111.00
1	D	121	ASN	CB-CA-C	-5.75	98.90	110.40
1	D	418	ARG	NE-CZ-NH1	5.65	123.13	120.30
1	C	15	ARG	NE-CZ-NH2	-5.59	117.51	120.30
1	C	121	ASN	CB-CA-C	-5.55	99.30	110.40
1	C	240	ARG	NE-CZ-NH1	-5.49	117.55	120.30
1	B	207	ASN	CB-CA-C	5.44	121.29	110.40
1	A	121	ASN	CB-CA-C	-5.39	99.62	110.40
1	C	335	ARG	NE-CZ-NH2	5.25	122.92	120.30
1	C	31	ARG	NE-CZ-NH1	5.16	122.88	120.30
1	A	240[A]	ARG	NE-CZ-NH1	5.14	122.87	120.30
1	A	240[B]	ARG	NE-CZ-NH1	5.14	122.87	120.30
1	C	78	GLU	N-CA-CB	-5.14	101.35	110.60
1	D	238	MET	CG-SD-CE	5.11	108.37	100.20

There are no chirality outliers.

All (19) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	240[A]	ARG	Sidechain
1	A	293	ARG	Sidechain
1	A	308	ARG	Sidechain
1	A	431	ARG	Sidechain
1	B	15	ARG	Sidechain
1	B	240	ARG	Sidechain
1	B	258	ARG	Sidechain
1	B	49	ARG	Sidechain
1	C	15	ARG	Sidechain
1	C	240	ARG	Sidechain
1	C	247	ARG	Sidechain
1	C	3	ARG	Sidechain
1	C	49	ARG	Sidechain
1	D	22	ARG	Sidechain
1	D	239	PRO	Peptide
1	D	240[A]	ARG	Sidechain
1	D	243[A]	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	D	258	ARG	Sidechain
1	D	49	ARG	Sidechain

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	2722	2747	2721	67	0
1	B	2701	2720	2704	56	0
1	C	2703	2722	2706	61	0
1	D	2743	2767	2742	51	0
2	B	1	0	0	0	0
2	C	2	0	0	0	0
All	All	10872	10956	10873	232	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 11.

All (232) 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:239:PRO:HB2	1:A:241[B]:ALA:HB2	1.43	0.99
1:B:75:THR:HG21	1:B:120:THR:HG23	1.62	0.81
1:D:75:THR:HG21	1:D:120:THR:HG23	1.61	0.81
1:A:75:THR:HG21	1:A:120:THR:HG23	1.60	0.81
1:B:75:THR:CG2	1:B:120:THR:HG23	2.11	0.80
1:C:75:THR:HG21	1:C:120:THR:HG23	1.64	0.79
1:A:75:THR:CG2	1:A:120:THR:HG23	2.12	0.77
1:D:75:THR:CG2	1:D:120:THR:HG23	2.14	0.77
1:C:75:THR:CG2	1:C:120:THR:HG23	2.15	0.77
1:C:121:ASN:ND2	1:C:154:GLY:O	2.23	0.72
1:C:41:ALA:HA	1:C:121:ASN:ND2	2.10	0.66
1:B:168:GLU:HG3	1:B:169:LEU:H	1.60	0.66
1:C:168:GLU:HG3	1:C:169:LEU:H	1.61	0.66
1:D:241[B]:ALA:O	1:D:242[B]:SER:O	2.15	0.65
1:D:168:GLU:HG3	1:D:169:LEU:H	1.63	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:228:ALA:O	1:A:232:LEU:HD13	1.99	0.62
1:B:43:VAL:HG23	1:B:44:VAL:HG23	1.81	0.62
1:A:168:GLU:HG3	1:A:169:LEU:H	1.63	0.62
1:A:242[B]:SER:O	1:A:243[B]:ARG:HB3	1.99	0.61
1:C:191:PRO:HG2	1:C:196:ILE:HD12	1.82	0.60
1:A:43:VAL:HG23	1:A:44:VAL:HG23	1.84	0.60
1:C:43:VAL:HG23	1:C:44:VAL:HG23	1.83	0.59
1:D:43:VAL:HG23	1:D:44:VAL:HG23	1.83	0.59
1:C:228:ALA:O	1:C:232:LEU:HD13	2.02	0.59
1:B:191:PRO:HG2	1:B:196:ILE:HD12	1.85	0.59
1:D:228:ALA:O	1:D:232:LEU:HD13	2.03	0.58
1:B:75:THR:HG21	1:B:120:THR:CG2	2.34	0.57
1:D:15:ARG:HH11	1:D:66:THR:HA	1.69	0.57
1:B:228:ALA:O	1:B:232:LEU:HD13	2.04	0.57
1:C:207:ASN:N	1:C:207:ASN:HD22	2.03	0.57
1:B:15:ARG:NH1	1:B:66:THR:HA	2.20	0.57
1:B:300:GLN:HB3	1:B:326:TRP:CH2	2.39	0.57
1:A:430:HIS:CE1	1:A:434:GLU:OE2	2.60	0.55
1:D:35:LEU:O	1:D:38:ALA:HB3	2.07	0.55
1:C:35:LEU:O	1:C:38:ALA:HB3	2.07	0.55
1:A:152:SER:O	1:A:153:SER:CB	2.54	0.55
1:B:35:LEU:O	1:B:38:ALA:HB3	2.07	0.54
1:A:257:ILE:HG23	1:A:380:ALA:HB1	1.90	0.54
1:C:2:ALA:O	1:C:3:ARG:O	2.26	0.54
1:C:239:PRO:HG2	1:C:417:HIS:O	2.08	0.54
1:D:2:ALA:O	1:D:3:ARG:O	2.26	0.54
1:A:35:LEU:O	1:A:38:ALA:HB3	2.08	0.54
1:C:173:ILE:HG21	1:C:306:PHE:HE2	1.72	0.53
1:A:15:ARG:HH11	1:A:66:THR:HA	1.74	0.53
1:A:25:THR:HG23	1:A:117:LEU:HD21	1.91	0.53
1:A:75:THR:HG21	1:A:120:THR:CG2	2.35	0.53
1:C:41:ALA:HA	1:C:121:ASN:HD21	1.72	0.53
1:A:162:SER:HA	1:B:35:LEU:HD21	1.91	0.53
1:A:304:VAL:O	1:A:308:ARG:HG3	2.09	0.53
1:D:257:ILE:HG13	1:D:258:ARG:O	2.09	0.53
1:C:300:GLN:HB3	1:C:326:TRP:CH2	2.44	0.52
1:B:303:SER:O	1:B:304:VAL:C	2.48	0.52
1:B:25:THR:HG23	1:B:117:LEU:HD21	1.89	0.52
1:A:303:SER:O	1:A:304:VAL:C	2.48	0.52
1:D:303:SER:O	1:D:304:VAL:C	2.48	0.52
1:C:25:THR:HG23	1:C:117:LEU:HD21	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:239:PRO:HG2	1:B:417:HIS:O	2.09	0.52
1:C:257:ILE:HG23	1:C:380:ALA:HB1	1.90	0.52
1:C:303:SER:O	1:C:304:VAL:C	2.48	0.52
1:B:121:ASN:HB2	1:B:155:GLY:HA2	1.92	0.52
1:C:68:PRO:HG2	1:C:232:LEU:HD11	1.91	0.51
1:A:152:SER:O	1:A:153:SER:HB2	2.10	0.51
1:A:240[A]:ARG:HD2	1:A:241[A]:ALA:H	1.75	0.51
1:D:75:THR:HG21	1:D:120:THR:CG2	2.36	0.51
1:A:2:ALA:O	1:A:3:ARG:O	2.27	0.51
1:A:241[B]:ALA:HB1	1:A:418:ARG:HH11	1.75	0.51
1:D:430:HIS:CE1	1:D:434:GLU:OE2	2.64	0.51
1:A:190:LYS:CG	1:A:215:VAL:HG21	2.40	0.50
1:A:46:ASP:HB2	1:A:85:LEU:HD21	1.93	0.50
1:C:304:VAL:HG21	1:C:323:TRP:CZ3	2.46	0.50
1:D:257:ILE:HD12	1:D:258:ARG:H	1.77	0.50
1:A:239:PRO:HG2	1:A:417:HIS:O	2.11	0.49
1:B:267:VAL:HG13	1:B:348:ILE:HG13	1.94	0.49
1:D:25:THR:HG23	1:D:117:LEU:HD21	1.95	0.49
1:C:267:VAL:HG13	1:C:348:ILE:HG13	1.95	0.49
1:A:75:THR:HG22	1:A:120:THR:HG23	1.95	0.49
1:B:46:ASP:HB2	1:B:85:LEU:HD21	1.95	0.49
1:D:190:LYS:HG2	1:D:215:VAL:HG21	1.94	0.49
1:C:337:TRP:CD2	1:C:393:LEU:HD11	2.48	0.48
1:A:318:PRO:HB2	1:A:322:THR:HB	1.95	0.48
1:C:44:VAL:O	1:C:118:GLY:HA3	2.13	0.48
1:C:416:PHE:HE1	1:C:417:HIS:NE2	2.12	0.48
1:A:190:LYS:HG2	1:A:215:VAL:HG21	1.95	0.48
1:B:187:TRP:CZ2	1:B:223:PRO:HD3	2.49	0.48
1:C:162:SER:OG	1:C:164:MET:HG3	2.13	0.48
1:B:69:LEU:HD13	1:B:167:LEU:HD21	1.95	0.48
1:C:46:ASP:HB2	1:C:85:LEU:HD21	1.96	0.48
1:B:68:PRO:HG2	1:B:232:LEU:HD11	1.96	0.48
1:B:75:THR:HG22	1:B:120:THR:HG23	1.93	0.47
1:B:257:ILE:HG12	1:B:380:ALA:O	2.14	0.47
1:A:2:ALA:C	1:A:3:ARG:O	2.51	0.47
1:D:300:GLN:HB3	1:D:326:TRP:CH2	2.49	0.47
1:A:187:TRP:CZ2	1:A:223:PRO:HD3	2.50	0.47
1:B:337:TRP:CD2	1:B:393:LEU:HD11	2.50	0.47
1:D:190:LYS:CG	1:D:215:VAL:HG21	2.44	0.47
1:C:190:LYS:HG2	1:C:215:VAL:HG21	1.97	0.47
1:D:191:PRO:HG2	1:D:196:ILE:HD12	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:257:ILE:HG23	1:B:380:ALA:HB1	1.95	0.47
1:C:337:TRP:CG	1:C:393:LEU:HD11	2.49	0.47
1:B:2:ALA:O	1:B:3:ARG:O	2.31	0.47
1:B:32:ILE:O	1:B:36:ASP:HB2	2.15	0.47
1:C:32:ILE:O	1:C:36:ASP:HB2	2.15	0.47
1:B:168:GLU:CG	1:B:169:LEU:H	2.28	0.47
1:B:337:TRP:CG	1:B:393:LEU:HD11	2.50	0.47
1:C:76:VAL:O	1:C:119:LYS:HA	2.15	0.46
1:A:68:PRO:HG2	1:A:232:LEU:HD11	1.98	0.46
1:B:76:VAL:O	1:B:119:LYS:HA	2.16	0.46
1:A:304:VAL:HG21	1:A:323:TRP:CZ3	2.50	0.46
1:C:75:THR:HG21	1:C:120:THR:CG2	2.39	0.46
1:D:168:GLU:HG3	1:D:169:LEU:N	2.29	0.46
1:A:337:TRP:CD2	1:A:393:LEU:HD11	2.50	0.46
1:C:2:ALA:O	1:C:3:ARG:C	2.54	0.46
1:D:201:HIS:CE1	1:D:202:ARG:HB2	2.51	0.46
1:C:430:HIS:CE1	1:C:434:GLU:OE2	2.69	0.46
1:D:61:ILE:CD1	1:D:70:LEU:HD23	2.46	0.46
1:D:337:TRP:CG	1:D:393:LEU:HD11	2.51	0.46
1:C:416:PHE:CE1	1:C:417:HIS:CD2	3.04	0.46
1:A:46:ASP:OD1	1:A:49:ARG:HD3	2.16	0.45
1:B:296:HIS:NE2	1:B:300:GLN:NE2	2.64	0.45
1:C:190:LYS:CG	1:C:215:VAL:HG21	2.46	0.45
1:A:31:ARG:HG2	1:B:1:MET:HG3	1.98	0.45
1:A:191:PRO:HG2	1:A:196:ILE:HD12	1.98	0.45
1:D:187:TRP:CZ3	1:D:398:VAL:HG23	2.51	0.45
1:D:257:ILE:HG13	1:D:258:ARG:N	2.30	0.45
1:D:386:GLY:O	1:D:387:VAL:C	2.54	0.45
1:A:151:GLY:O	1:A:183:PHE:CD2	2.69	0.45
1:C:257:ILE:HG12	1:C:380:ALA:O	2.15	0.45
1:A:337:TRP:CG	1:A:393:LEU:HD11	2.52	0.45
1:C:386:GLY:O	1:C:387:VAL:C	2.55	0.45
1:D:46:ASP:OD1	1:D:49:ARG:HD3	2.16	0.45
1:A:61:ILE:CD1	1:A:70:LEU:HD23	2.46	0.45
1:D:304:VAL:HG21	1:D:323:TRP:CZ3	2.51	0.45
1:B:54:ALA:HA	1:B:115:ILE:HD11	1.99	0.45
1:A:419:ASP:O	1:A:422:ALA:HB3	2.17	0.45
1:D:46:ASP:HB2	1:D:85:LEU:HD21	1.97	0.45
1:D:207:ASN:N	1:D:207:ASN:HD22	2.13	0.45
1:A:2:ALA:O	1:A:3:ARG:C	2.55	0.45
1:B:2:ALA:O	1:B:3:ARG:C	2.55	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:187:TRP:CZ2	1:C:223:PRO:HD3	2.52	0.45
1:B:243:ARG:HH12	1:B:345:ASP:CG	2.19	0.45
1:C:187:TRP:CZ3	1:C:398:VAL:HG23	2.52	0.45
1:C:419:ASP:O	1:C:422:ALA:HB3	2.17	0.45
1:D:337:TRP:CD2	1:D:393:LEU:HD11	2.51	0.45
1:A:240[A]:ARG:HD3	1:A:420:HIS:ND1	2.32	0.45
1:B:46:ASP:OD1	1:B:49:ARG:HD3	2.18	0.44
1:C:54:ALA:HA	1:C:115:ILE:HD11	1.99	0.44
1:A:187:TRP:CZ3	1:A:398:VAL:HG23	2.52	0.44
1:A:310:ASP:HB3	1:A:313:LEU:HD12	2.00	0.44
1:B:187:TRP:CH2	1:B:223:PRO:HD3	2.53	0.44
1:B:187:TRP:CZ3	1:B:398:VAL:HG23	2.53	0.44
1:A:76:VAL:HG23	1:A:119:LYS:HG2	2.00	0.44
1:A:241[B]:ALA:CB	1:A:418:ARG:HH11	2.31	0.44
1:B:304:VAL:HG21	1:B:323:TRP:CZ3	2.53	0.44
1:A:168:GLU:HG3	1:A:169:LEU:N	2.31	0.44
1:B:122:VAL:HG12	1:B:123:PRO:HD2	1.99	0.44
1:D:2:ALA:O	1:D:3:ARG:C	2.55	0.44
1:A:267:VAL:HG13	1:A:348:ILE:HG13	2.00	0.44
1:A:300:GLN:HB3	1:A:326:TRP:CH2	2.52	0.44
1:C:416:PHE:CE1	1:C:417:HIS:NE2	2.86	0.44
1:D:44:VAL:O	1:D:118:GLY:HA3	2.17	0.44
1:D:76:VAL:HG23	1:D:119:LYS:HG2	1.99	0.44
1:C:69:LEU:HD13	1:C:167:LEU:HD21	2.00	0.44
1:C:243:ARG:HH12	1:C:345:ASP:CG	2.20	0.44
1:D:267:VAL:HG13	1:D:348:ILE:HG13	1.99	0.44
1:A:172:ASP:HB2	1:A:177:ILE:HB	1.98	0.44
1:B:61:ILE:CD1	1:B:70:LEU:HD23	2.47	0.43
1:C:75:THR:HG22	1:C:120:THR:HG23	1.95	0.43
1:B:190:LYS:CG	1:B:215:VAL:HG21	2.47	0.43
1:D:76:VAL:O	1:D:119:LYS:HA	2.18	0.43
1:A:44:VAL:O	1:A:118:GLY:HA3	2.18	0.43
1:C:168:GLU:CG	1:C:169:LEU:H	2.30	0.43
1:B:162:SER:OG	1:B:164:MET:HG3	2.19	0.43
1:A:76:VAL:O	1:A:119:LYS:HA	2.19	0.43
1:B:318:PRO:HB2	1:B:322:THR:HB	2.01	0.43
1:C:313:LEU:HD23	1:C:313:LEU:HA	1.87	0.43
1:D:187:TRP:CZ2	1:D:223:PRO:HD3	2.53	0.43
1:D:419:ASP:O	1:D:422:ALA:HB3	2.19	0.43
1:D:187:TRP:CH2	1:D:398:VAL:HG23	2.54	0.43
1:A:352:ALA:HB1	1:A:381:HIS:CE1	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:70:LEU:HA	1:C:113:GLY:HA3	2.01	0.42
1:A:262:VAL:HG11	1:A:355:GLN:CD	2.40	0.42
1:B:419:ASP:O	1:B:422:ALA:HB3	2.19	0.42
1:A:32:ILE:O	1:A:36:ASP:HB2	2.18	0.42
1:D:239:PRO:HG2	1:D:417:HIS:O	2.20	0.42
1:B:168:GLU:CG	1:B:169:LEU:N	2.81	0.42
1:C:61:ILE:CD1	1:C:70:LEU:HD23	2.49	0.42
1:A:257:ILE:HG12	1:A:380:ALA:O	2.19	0.42
1:B:386:GLY:O	1:B:387:VAL:C	2.56	0.42
1:C:318:PRO:HB2	1:C:322:THR:HB	2.01	0.42
1:D:260:SER:OG	1:D:263:CYS:SG	2.71	0.42
1:B:168:GLU:HG3	1:B:169:LEU:N	2.29	0.42
1:C:168:GLU:CG	1:C:169:LEU:N	2.82	0.42
1:A:54:ALA:HA	1:A:115:ILE:HD11	2.01	0.42
1:A:187:TRP:CH2	1:A:223:PRO:HD3	2.55	0.42
1:C:46:ASP:OD1	1:C:49:ARG:HD3	2.18	0.42
1:D:162:SER:OG	1:D:164:MET:HG3	2.19	0.42
1:D:352:ALA:HB1	1:D:381:HIS:CE1	2.55	0.42
1:B:352:ALA:HB1	1:B:381:HIS:CE1	2.55	0.42
1:B:341:PHE:CE1	1:B:414:THR:HA	2.55	0.42
1:A:78:GLU:O	1:A:87:THR:HG23	2.20	0.41
1:A:386:GLY:O	1:A:387:VAL:C	2.55	0.41
1:B:190:LYS:HG2	1:B:215:VAL:HG21	2.02	0.41
1:A:260:SER:OG	1:A:263:CYS:SG	2.74	0.41
1:D:310:ASP:HB3	1:D:313:LEU:HD12	2.01	0.41
1:A:398:VAL:HA	1:A:399:PRO:HD3	1.93	0.41
1:D:32:ILE:O	1:D:36:ASP:HB2	2.20	0.41
1:D:199:HIS:CE1	1:D:207:ASN:HB3	2.55	0.41
1:A:182:HIS:CE1	1:A:409:GLY:H	2.38	0.41
1:A:187:TRP:CH2	1:A:398:VAL:HG23	2.55	0.41
1:B:70:LEU:HA	1:B:113:GLY:HA3	2.03	0.41
1:C:168:GLU:HG3	1:C:169:LEU:N	2.31	0.41
1:B:172:ASP:HB2	1:B:177:ILE:HB	2.01	0.41
1:C:352:ALA:HB1	1:C:381:HIS:CE1	2.56	0.41
1:D:240[B]:ARG:C	1:D:242[B]:SER:N	2.74	0.41
1:B:262:VAL:HG11	1:B:355:GLN:CD	2.41	0.41
1:C:262:VAL:HG11	1:C:355:GLN:CD	2.41	0.41
1:D:257:ILE:CG1	1:D:258:ARG:N	2.84	0.41
1:C:322:THR:O	1:C:325:SER:HB3	2.21	0.41
1:A:75:THR:HG22	1:A:76:VAL:N	2.36	0.41
1:B:187:TRP:CH2	1:B:398:VAL:HG23	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:15:ARG:NH2	1:D:15:ARG:HB2	2.36	0.41
1:A:105:ALA:HB2	1:A:216:ILE:HD11	2.02	0.40
1:C:187:TRP:CH2	1:C:398:VAL:HG23	2.56	0.40
1:C:187:TRP:CH2	1:C:223:PRO:HD3	2.55	0.40
1:D:78:GLU:HA	1:D:119:LYS:HE2	2.03	0.40
1:C:182:HIS:CE1	1:C:409:GLY:H	2.39	0.40
1:C:300:GLN:HB3	1:C:326:TRP:CZ3	2.57	0.40
1:A:31:ARG:HG2	1:B:1:MET:CG	2.52	0.40
1:C:212:PRO:O	1:C:213:LEU:HB2	2.21	0.40
1:D:78:GLU:O	1:D:87:THR:HG23	2.22	0.40
1:A:75:THR:CG2	1:A:76:VAL:N	2.85	0.40
1:B:78:GLU:O	1:B:87:THR:HG23	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	366/446 (82%)	340 (93%)	18 (5%)	8 (2%)	6	15
1	B	361/446 (81%)	335 (93%)	21 (6%)	5 (1%)	11	25
1	C	362/446 (81%)	338 (93%)	18 (5%)	6 (2%)	9	20
1	D	367/446 (82%)	337 (92%)	19 (5%)	11 (3%)	4	9
All	All	1456/1784 (82%)	1350 (93%)	76 (5%)	30 (2%)	8	16

All (30) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3	ARG
1	A	121	ASN
1	A	153	SER

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Mol	Chain	Res	Type
1	B	121	ASN
1	B	307	ALA
1	C	2	ALA
1	C	121	ASN
1	C	307	ALA
1	D	242[A]	SER
1	D	242[B]	SER
1	A	307	ALA
1	C	3	ARG
1	D	121	ASN
1	D	307	ALA
1	D	377	PRO
1	A	38	ALA
1	B	2	ALA
1	B	38	ALA
1	B	311	PRO
1	C	38	ALA
1	C	311	PRO
1	D	3	ARG
1	D	38	ALA
1	D	311	PRO
1	A	311	PRO
1	D	2	ALA
1	D	243[A]	ARG
1	D	243[B]	ARG
1	A	243[A]	ARG
1	A	243[B]	ARG

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	269/325 (83%)	253 (94%)	16 (6%)	19	40
1	B	266/325 (82%)	254 (96%)	12 (4%)	27	52
1	C	266/325 (82%)	251 (94%)	15 (6%)	21	42

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	271/325 (83%)	254 (94%)	17 (6%)	18	37
All	All	1072/1300 (82%)	1012 (94%)	60 (6%)	22	42

All (60) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	166	PRO
1	A	210	GLU
1	A	211	THR
1	A	224	ASP
1	A	240[A]	ARG
1	A	240[B]	ARG
1	A	243[A]	ARG
1	A	243[B]	ARG
1	A	257	ILE
1	A	285	THR
1	A	303	SER
1	A	306	PHE
1	A	310	ASP
1	A	325	SER
1	A	389	THR
1	A	419	ASP
1	B	39	ILE
1	B	211	THR
1	B	257	ILE
1	B	285	THR
1	B	293	ARG
1	B	303	SER
1	B	310	ASP
1	B	325	SER
1	B	378	TYR
1	B	389	THR
1	B	400	VAL
1	B	419	ASP
1	C	1	MET
1	C	39	ILE
1	C	207	ASN
1	C	211	THR
1	C	251	ILE
1	C	257	ILE
1	C	285	THR
1	C	303	SER

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Mol	Chain	Res	Type
1	C	308	ARG
1	C	310	ASP
1	C	313	LEU
1	C	321	LEU
1	C	389	THR
1	C	400	VAL
1	C	419	ASP
1	D	1	MET
1	D	121	ASN
1	D	166	PRO
1	D	210	GLU
1	D	211	THR
1	D	242[A]	SER
1	D	242[B]	SER
1	D	285	THR
1	D	286	ASP
1	D	303	SER
1	D	306	PHE
1	D	310	ASP
1	D	325	SER
1	D	377	PRO
1	D	389	THR
1	D	400	VAL
1	D	419	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	381	HIS
1	A	417	HIS
1	A	430	HIS
1	B	207	ASN
1	B	300	GLN
1	B	381	HIS
1	B	417	HIS
1	C	381	HIS
1	C	417	HIS
1	C	430	HIS
1	D	199	HIS
1	D	381	HIS
1	D	417	HIS
1	D	430	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.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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, 95th 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	372/446 (83%)	0.97	43 (11%) 4 3	27, 47, 78, 117	0
1	B	371/446 (83%)	1.10	64 (17%) 1 1	28, 51, 87, 131	0
1	C	372/446 (83%)	1.41	96 (25%) 0 0	37, 62, 96, 139	0
1	D	373/446 (83%)	1.26	67 (17%) 1 1	35, 55, 92, 169	0
All	All	1488/1784 (83%)	1.18	270 (18%) 1 1	27, 53, 92, 169	0

All (270) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	377	PRO	18.7
1	B	2	ALA	18.3
1	C	2	ALA	14.2
1	D	207	ASN	10.6
1	B	51	LEU	9.7
1	D	1	MET	9.5
1	A	151	GLY	8.8
1	C	51	LEU	8.4
1	D	285	THR	8.3
1	A	355	GLN	6.9
1	D	259	THR	6.5
1	C	324	LEU	6.4
1	C	344	VAL	6.3
1	C	247	ARG	6.2
1	B	379	ASP	6.1
1	C	42	VAL	5.9
1	A	405	GLY	5.6
1	B	262	VAL	5.6
1	D	215	VAL	5.6
1	C	248	VAL	5.5
1	D	2	ALA	5.5

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Mol	Chain	Res	Type	RSRZ
1	D	39	ILE	5.5
1	B	1	MET	5.5
1	C	285	THR	5.4
1	D	340	LEU	5.4
1	D	376	SER	5.4
1	C	252	THR	5.2
1	C	265	ASP	5.1
1	B	65	ASP	5.0
1	A	381	HIS	5.0
1	C	36	ASP	4.9
1	B	36	ASP	4.9
1	D	355	GLN	4.8
1	D	58	ASP	4.7
1	A	2	ALA	4.7
1	C	328	ASP	4.7
1	C	167	LEU	4.6
1	C	64	GLY	4.6
1	A	39	ILE	4.5
1	B	357	PHE	4.5
1	B	426	ALA	4.5
1	C	262	VAL	4.5
1	C	225	ASP	4.4
1	D	273	ALA	4.4
1	C	59	ALA	4.3
1	C	261	ALA	4.3
1	C	251	ILE	4.2
1	C	437	PRO	4.2
1	C	1	MET	4.1
1	A	36	ASP	4.1
1	B	378	TYR	4.1
1	C	269	THR	4.1
1	D	226	LEU	4.0
1	D	185	GLY	4.0
1	A	434	GLU	4.0
1	A	152	SER	4.0
1	B	242	SER	3.9
1	B	42	VAL	3.9
1	C	122	VAL	3.9
1	D	344	VAL	3.8
1	B	68	PRO	3.8
1	D	421	ASP	3.8
1	C	335	ARG	3.8

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Mol	Chain	Res	Type	RSRZ
1	D	311	PRO	3.7
1	D	246	ARG	3.7
1	B	114	ALA	3.7
1	D	98	ILE	3.7
1	D	86	PRO	3.7
1	B	69	LEU	3.6
1	B	210	GLU	3.5
1	C	55	ASP	3.5
1	B	431	ARG	3.5
1	C	271	ALA	3.5
1	C	190	LYS	3.5
1	A	383	ALA	3.5
1	D	241[A]	ALA	3.5
1	D	278	GLY	3.5
1	B	356	ALA	3.4
1	C	278	GLY	3.4
1	A	153	SER	3.4
1	B	34	ALA	3.4
1	C	34	ALA	3.3
1	C	291	LEU	3.3
1	C	428	LEU	3.3
1	D	307	ALA	3.3
1	B	113	GLY	3.3
1	C	65	ASP	3.3
1	B	272	GLU	3.3
1	C	61	ILE	3.3
1	C	284	SER	3.3
1	C	435	GLY	3.3
1	C	260	SER	3.3
1	C	3	ARG	3.3
1	B	40	ASN	3.2
1	A	215	VAL	3.2
1	B	325	SER	3.2
1	C	298	TYR	3.2
1	B	381	HIS	3.2
1	C	177	ILE	3.2
1	D	247	ARG	3.2
1	C	173	ILE	3.2
1	A	433	THR	3.1
1	C	295	HIS	3.1
1	A	241[A]	ALA	3.1
1	B	428	LEU	3.1

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Mol	Chain	Res	Type	RSRZ
1	C	400	VAL	3.1
1	C	292	ALA	3.1
1	B	66	THR	3.1
1	D	248	VAL	3.1
1	C	378	TYR	3.0
1	B	55	ASP	3.0
1	D	209	ALA	3.0
1	D	99	ALA	3.0
1	C	259	THR	3.0
1	A	216	ILE	2.9
1	A	99	ALA	2.9
1	D	18	ALA	2.9
1	A	83	GLU	2.9
1	D	100	THR	2.9
1	C	422	ALA	2.9
1	B	39	ILE	2.9
1	D	279	ILE	2.9
1	B	16	SER	2.9
1	C	85	LEU	2.9
1	D	434	GLU	2.9
1	C	313	LEU	2.9
1	B	261	ALA	2.9
1	D	378	TYR	2.9
1	A	98	ILE	2.8
1	B	115	ILE	2.8
1	C	75	THR	2.8
1	C	380	ALA	2.8
1	C	52	ALA	2.8
1	A	35	LEU	2.8
1	A	282	ILE	2.8
1	D	405	GLY	2.8
1	C	43	VAL	2.7
1	D	422	ALA	2.7
1	A	406	LEU	2.7
1	C	279	ILE	2.7
1	C	305	ALA	2.7
1	C	208	GLY	2.7
1	A	210	GLU	2.7
1	C	436	GLN	2.7
1	B	43	VAL	2.7
1	C	76	VAL	2.7
1	B	312	THR	2.7

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Mol	Chain	Res	Type	RSRZ
1	D	310	ASP	2.7
1	C	33	GLU	2.7
1	B	88	HIS	2.7
1	B	167	LEU	2.7
1	B	335	ARG	2.7
1	D	269	THR	2.7
1	C	100	THR	2.6
1	A	226	LEU	2.6
1	C	169	LEU	2.6
1	C	339	ARG	2.6
1	B	170	GLY	2.6
1	D	181	ALA	2.6
1	A	177	ILE	2.6
1	A	311	PRO	2.6
1	B	99	ALA	2.6
1	D	159	ALA	2.6
1	C	311	PRO	2.6
1	C	270	ALA	2.6
1	A	246	ARG	2.6
1	C	15	ARG	2.6
1	C	381	HIS	2.5
1	D	261	ALA	2.5
1	A	277	ALA	2.5
1	D	210	GLU	2.5
1	B	265	ASP	2.5
1	A	86	PRO	2.5
1	A	100	THR	2.5
1	D	169	LEU	2.5
1	D	171	SER	2.5
1	C	273	ALA	2.5
1	B	52	ALA	2.5
1	D	6	THR	2.5
1	B	260	SER	2.5
1	C	63	ALA	2.5
1	C	99	ALA	2.5
1	B	8	LEU	2.5
1	B	117	LEU	2.5
1	C	309	SER	2.5
1	C	229	MET	2.5
1	D	249	LEU	2.4
1	D	3	ARG	2.4
1	D	162	SER	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	310	ASP	2.4
1	D	85	LEU	2.4
1	B	257	ILE	2.4
1	C	62	GLN	2.4
1	B	305	ALA	2.4
1	C	275	ALA	2.4
1	D	88	HIS	2.4
1	A	209	ALA	2.3
1	A	356	ALA	2.3
1	C	312	THR	2.3
1	D	281	VAL	2.3
1	C	302	LEU	2.3
1	D	353	ALA	2.3
1	D	282	ILE	2.3
1	D	208	GLY	2.3
1	B	122	VAL	2.3
1	C	282	ILE	2.3
1	C	178	ARG	2.3
1	B	35	LEU	2.3
1	A	259	THR	2.3
1	C	398	VAL	2.3
1	D	82	VAL	2.3
1	C	426	ALA	2.3
1	B	33	GLU	2.3
1	B	163	GLY	2.3
1	C	117	LEU	2.3
1	C	7	ALA	2.3
1	D	267	VAL	2.3
1	D	396	VAL	2.3
1	A	157	ALA	2.2
1	B	25	THR	2.2
1	D	45	ARG	2.2
1	A	81	ASP	2.2
1	C	106	VAL	2.2
1	D	97	ASN	2.2
1	C	219	MET	2.2
1	A	423	ILE	2.2
1	B	422	ALA	2.2
1	A	357	PHE	2.2
1	B	219	MET	2.2
1	D	266	ALA	2.2
1	A	175	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	412	VAL	2.2
1	B	236	LEU	2.2
1	B	244	PRO	2.2
1	B	7	ALA	2.2
1	B	398	VAL	2.1
1	C	304	VAL	2.1
1	C	233	LEU	2.1
1	D	84	GLY	2.1
1	A	315	ALA	2.1
1	B	396	VAL	2.1
1	B	212	PRO	2.1
1	B	280	GLU	2.1
1	C	210	GLU	2.1
1	B	14	ILE	2.1
1	D	76	VAL	2.1
1	C	224	ASP	2.1
1	C	234	ALA	2.1
1	B	328	ASP	2.1
1	C	4	GLU	2.1
1	A	344	VAL	2.1
1	D	406	LEU	2.1
1	C	97	ASN	2.1
1	A	45	ARG	2.1
1	D	216	ILE	2.1
1	B	79	ALA	2.1
1	C	306	PHE	2.1
1	D	314	HIS	2.0
1	B	80	PHE	2.0
1	C	213	LEU	2.0
1	A	122	VAL	2.0
1	C	348	ILE	2.0
1	B	315	ALA	2.0
1	A	169	LEU	2.0
1	C	264	ARG	2.0
1	C	314	HIS	2.0
1	A	5	PRO	2.0
1	D	240[A]	ARG	2.0
1	D	345	ASP	2.0
1	C	211	THR	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.