



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 15, 2024 – 04:58 PM EDT

PDB ID : 4LWO
Title : Crystal structure of PRMT6
Authors : Zhu, Y.; Wang, C.; Shi, Y.; Teng, M.
Deposited on : 2013-07-28
Resolution : 2.20 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

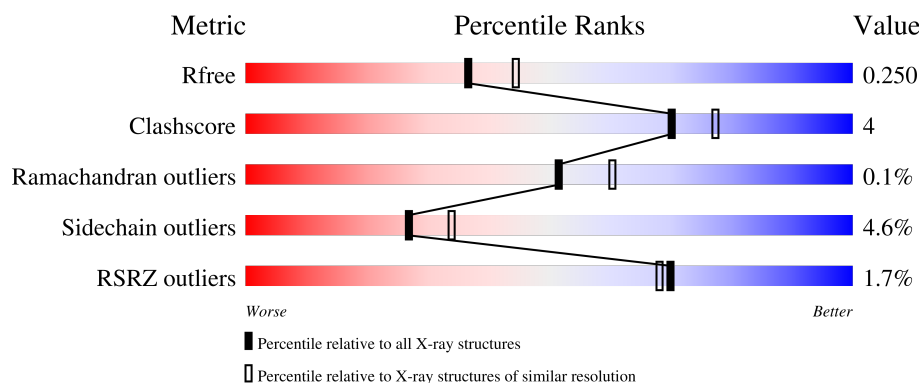
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	368	
1	B	368	
1	E	368	
1	G	368	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 10531 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 Arginine N-methyltransferase, putative.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	341	Total	C	N	O	S	0	2	0
			2625	1685	443	485	12			
1	A	341	Total	C	N	O	S	0	0	0
			2613	1674	440	488	11			
1	E	341	Total	C	N	O	S	0	0	0
			2573	1652	433	477	11			
1	G	342	Total	C	N	O	S	0	1	0
			2560	1643	430	476	11			

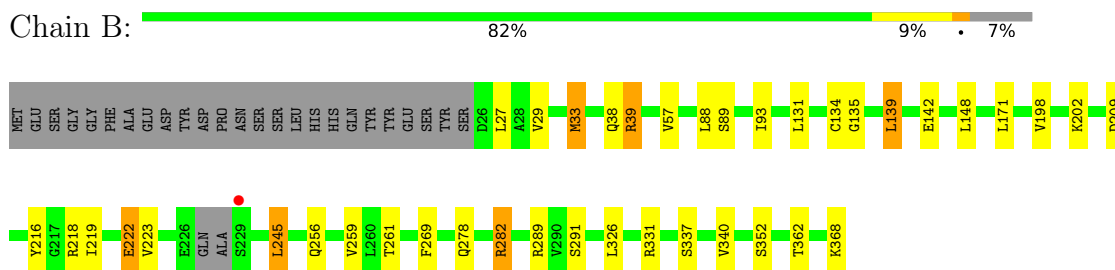
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	52	Total	O	0	0
			52	52		
2	A	59	Total	O	0	0
			59	59		
2	E	25	Total	O	0	0
			25	25		
2	G	24	Total	O	0	0
			24	24		

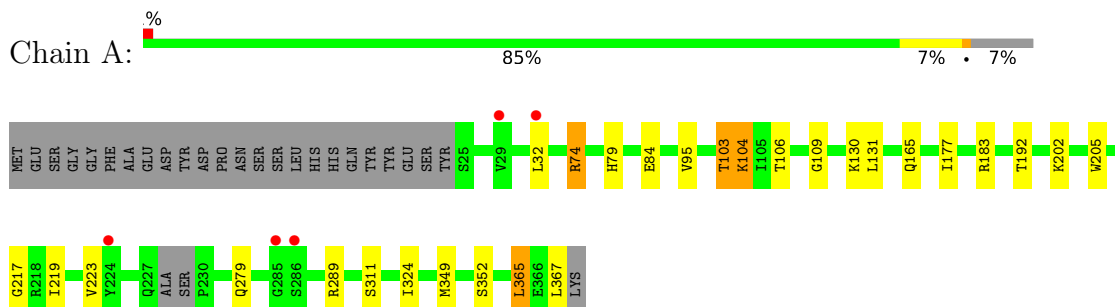
3 Residue-property plots [i](#)

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.

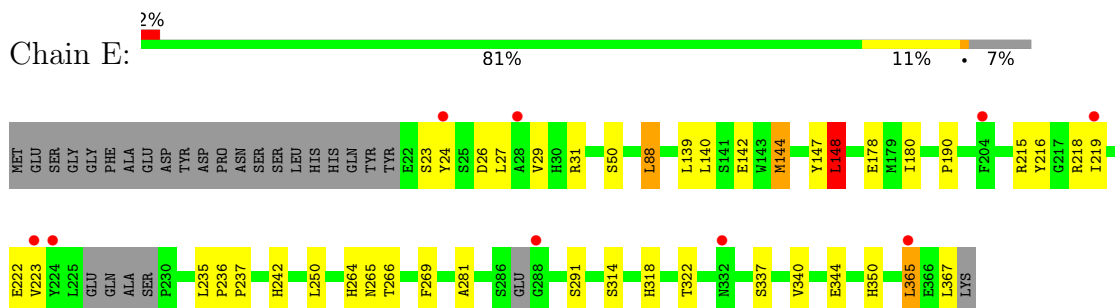
- Molecule 1: Arginine N-methyltransferase, putative



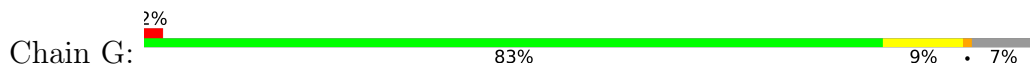
- Molecule 1: Arginine N-methyltransferase, putative

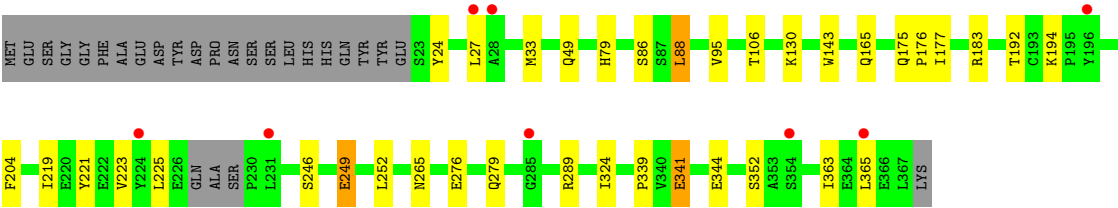


- Molecule 1: Arginine N-methyltransferase, putative



- Molecule 1: Arginine N-methyltransferase, putative





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	73.90Å 143.26Å 75.60Å 90.00° 96.67° 90.00°	Depositor
Resolution (Å)	44.03 – 2.20 44.03 – 2.20	Depositor EDS
% Data completeness (in resolution range)	97.9 (44.03-2.20) 97.9 (44.03-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.20 (at 2.20Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.202 , 0.249 0.203 , 0.250	Depositor DCC
R_{free} test set	3869 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	34.3	Xtriage
Anisotropy	0.212	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 46.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.033 for l,-k,h	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10531	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.31% of the height of the origin peak. No significant pseudotranslation is detected.*

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	0.51	0/2671	0.60	0/3631
1	B	0.47	0/2683	0.62	2/3646 (0.1%)
1	E	0.44	0/2630	0.57	2/3579 (0.1%)
1	G	0.38	0/2618	0.56	0/3566
All	All	0.46	0/10602	0.59	4/14422 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	148	LEU	CB-CA-C	-5.72	99.33	110.20
1	E	148	LEU	CB-CA-C	-5.66	99.45	110.20
1	B	139	LEU	CA-CB-CG	5.62	128.24	115.30
1	E	365	LEU	CA-CB-CG	5.02	126.84	115.30

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	2613	0	2517	12	0
1	B	2625	0	2550	25	0
1	E	2573	0	2457	23	0
1	G	2560	0	2417	20	0
2	A	59	0	0	1	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	52	0	0	0	0
2	E	25	0	0	0	0
2	G	24	0	0	1	0
All	All	10531	0	9941	74	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 4.

All (74) 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:33:MET:HG2	1:B:39:ARG:HH22	1.34	0.92
1:B:33:MET:HG2	1:B:39:ARG:NH2	1.97	0.79
1:A:79:HIS:NE2	1:A:106:THR:HG23	1.98	0.78
1:B:27:LEU:HG	1:B:88:LEU:HD21	1.74	0.70
1:E:147:TYR:HD1	1:E:322:THR:HG21	1.58	0.69
1:B:326:LEU:O	1:B:331:ARG:NH1	2.26	0.68
1:B:278:GLN:OE1	1:B:282:ARG:NH1	2.26	0.68
1:A:165:GLN:HE21	1:A:177:ILE:H	1.47	0.62
1:G:183:ARG:NH1	1:G:249[B]:GLU:OE2	2.33	0.61
1:A:103:THR:HG22	1:A:104:LYS:HG2	1.83	0.59
1:E:281:ALA:HB1	1:E:340:VAL:HG13	1.85	0.58
1:G:79:HIS:NE2	1:G:106:THR:HG23	2.19	0.58
1:B:289:ARG:NH1	1:B:337:SER:OG	2.36	0.58
1:E:219:ILE:O	1:E:223:VAL:HG22	2.03	0.58
1:G:192:THR:HG22	1:G:194:LYS:H	1.69	0.58
1:G:106:THR:HG21	1:G:130:LYS:NZ	2.19	0.57
1:B:39:ARG:HH21	1:B:39:ARG:CB	2.19	0.55
1:B:39:ARG:HH21	1:B:39:ARG:HB3	1.71	0.55
1:B:219:ILE:O	1:B:223:VAL:HG22	2.06	0.55
1:B:39:ARG:NH2	1:B:142:GLU:OE2	2.41	0.54
1:G:221:TYR:CZ	1:G:225:LEU:HD11	2.42	0.54
1:G:192:THR:HG23	2:G:419:HOH:O	2.07	0.53
1:A:106:THR:HG21	1:A:130:LYS:NZ	2.23	0.53
1:E:190:PRO:HD2	1:E:242:HIS:HB3	1.91	0.53
1:G:165:GLN:HE21	1:G:177:ILE:H	1.58	0.51
1:E:140:LEU:HD23	1:E:180:ILE:HB	1.92	0.51
1:E:269:PHE:O	1:E:344:GLU:HA	2.10	0.51
1:E:291:SER:HA	1:E:337:SER:HA	1.93	0.51
1:A:165:GLN:NE2	2:A:416:HOH:O	2.42	0.51
1:E:50:SER:OG	1:E:178:GLU:OE1	2.23	0.50

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:215:ARG:O	1:E:219:ILE:HG12	2.11	0.50
1:E:26:ASP:O	1:E:29:VAL:HG13	2.12	0.50
1:E:24:TYR:CB	1:G:223:VAL:HG11	2.43	0.49
1:E:218:ARG:O	1:E:222:GLU:HG2	2.12	0.49
1:A:324:ILE:HG21	1:A:365:LEU:HD12	1.95	0.49
1:B:198:VAL:HA	1:B:202:LYS:HB3	1.96	0.48
1:G:143:TRP:CZ2	1:G:252:LEU:HD21	2.49	0.47
1:E:26:ASP:O	1:E:29:VAL:CG1	2.62	0.47
1:E:31:ARG:HG3	1:G:204:PHE:CZ	2.51	0.46
1:B:256:GLN:O	1:B:259:VAL:HG22	2.16	0.45
1:B:282:ARG:HD3	1:B:282:ARG:HA	1.65	0.45
1:B:245:LEU:HD22	1:B:269:PHE:CD1	2.50	0.45
1:B:278:GLN:HB3	1:B:282:ARG:HH11	1.82	0.45
1:B:57:VAL:HB	1:B:135:GLY:O	2.17	0.45
1:A:106:THR:HG21	1:A:130:LYS:HZ2	1.82	0.45
1:B:216:TYR:CZ	1:A:95:VAL:HG21	2.52	0.45
1:E:142:GLU:HG3	1:E:144:MET:HE2	1.97	0.45
1:A:219:ILE:O	1:A:223:VAL:HG12	2.16	0.45
1:E:147:TYR:CD1	1:E:322:THR:HG21	2.45	0.44
1:B:218:ARG:O	1:B:222:GLU:HB2	2.18	0.44
1:G:219:ILE:O	1:G:223:VAL:HG12	2.18	0.44
1:B:39:ARG:HH21	1:B:39:ARG:CG	2.31	0.43
1:G:27:LEU:HD23	1:G:27:LEU:HA	1.82	0.43
1:G:324:ILE:HD11	1:G:363:ILE:HD12	2.00	0.43
1:E:27:LEU:HD23	1:E:27:LEU:HA	1.79	0.43
1:G:276:GLU:O	1:G:279:GLN:HB2	2.18	0.42
1:E:265:ASN:OD1	1:E:266:THR:N	2.51	0.42
1:G:86:SER:OG	1:G:88:LEU:HB2	2.19	0.42
1:G:175:GLN:HA	1:G:176:PRO:HD3	1.91	0.42
1:E:264:HIS:HB3	1:E:350:HIS:CE1	2.55	0.42
1:E:223:VAL:HG21	1:G:24:TYR:CB	2.49	0.42
1:B:89:SER:O	1:B:93:ILE:HG13	2.19	0.42
1:B:131:LEU:HD13	1:B:171:LEU:HD11	2.01	0.41
1:A:205:TRP:CD1	1:A:217:GLY:HA2	2.56	0.41
1:B:209:ASP:O	1:A:74:ARG:NH2	2.40	0.41
1:B:291:SER:HA	1:B:337:SER:HA	2.03	0.41
1:E:88:LEU:HD23	1:E:88:LEU:HA	1.84	0.41
1:G:88:LEU:HD23	1:G:88:LEU:HA	1.94	0.41
1:E:216:TYR:CE2	1:G:95:VAL:HG21	2.56	0.41
1:B:57:VAL:HG23	1:B:134[B]:CYS:SG	2.61	0.41
1:G:339:PRO:HB2	1:G:341:GLU:OE2	2.21	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:219:ILE:HD13	1:B:219:ILE:HA	1.91	0.40
1:A:84:GLU:O	1:A:109:GLY:HA2	2.22	0.40
1:E:236:PRO:HA	1:E:237:PRO:HD2	1.93	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	337/368 (92%)	328 (97%)	9 (3%)	0	100	100
1	B	339/368 (92%)	331 (98%)	8 (2%)	0	100	100
1	E	335/368 (91%)	323 (96%)	10 (3%)	2 (1%)	25	26
1	G	339/368 (92%)	329 (97%)	10 (3%)	0	100	100
All	All	1350/1472 (92%)	1311 (97%)	37 (3%)	2 (0%)	51	60

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	23	SER
1	E	148	LEU

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	272/317 (86%)	257 (94%)	15 (6%)	21	26
1	B	275/317 (87%)	262 (95%)	13 (5%)	26	33
1	E	263/317 (83%)	253 (96%)	10 (4%)	33	42
1	G	258/317 (81%)	246 (95%)	12 (5%)	26	33
All	All	1068/1268 (84%)	1018 (95%)	50 (5%)	27	33

All (50) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	29	VAL
1	B	33	MET
1	B	38	GLN
1	B	39	ARG
1	B	139	LEU
1	B	222	GLU
1	B	245	LEU
1	B	261	THR
1	B	282	ARG
1	B	340	VAL
1	B	352	SER
1	B	362	THR
1	B	368	LYS
1	A	32	LEU
1	A	74	ARG
1	A	103	THR
1	A	104	LYS
1	A	131	LEU
1	A	183	ARG
1	A	192	THR
1	A	202	LYS
1	A	279	GLN
1	A	289	ARG
1	A	311	SER
1	A	349	MET
1	A	352	SER
1	A	365	LEU
1	A	367	LEU
1	E	88	LEU
1	E	139	LEU
1	E	144	MET
1	E	148	LEU
1	E	235	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	E	250	LEU
1	E	314	SER
1	E	318	HIS
1	E	365	LEU
1	E	367	LEU
1	G	33	MET
1	G	49	GLN
1	G	88	LEU
1	G	246	SER
1	G	249[A]	GLU
1	G	249[B]	GLU
1	G	265	ASN
1	G	289	ARG
1	G	341	GLU
1	G	344	GLU
1	G	352	SER
1	G	365	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	165	GLN
1	G	30	HIS
1	G	165	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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	341/368 (92%)	-0.06	5 (1%) 73 72	19, 31, 50, 70	0
1	B	341/368 (92%)	-0.08	1 (0%) 94 93	19, 30, 46, 61	0
1	E	341/368 (92%)	0.15	9 (2%) 56 53	24, 42, 68, 81	0
1	G	342/368 (92%)	0.05	8 (2%) 60 58	26, 42, 59, 69	0
All	All	1365/1472 (92%)	0.01	23 (1%) 70 68	19, 36, 60, 81	0

All (23) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	223	VAL	4.2
1	G	285	GLY	3.7
1	E	332	ASN	3.5
1	E	28	ALA	3.3
1	E	24	TYR	3.1
1	E	224	TYR	3.1
1	A	32	LEU	3.1
1	G	28	ALA	2.9
1	A	285	GLY	2.8
1	B	229	SER	2.7
1	A	224	TYR	2.6
1	A	29	VAL	2.6
1	G	231	LEU	2.6
1	E	288	GLY	2.3
1	G	224	TYR	2.3
1	E	204	PHE	2.3
1	E	219	ILE	2.3
1	G	27	LEU	2.2
1	G	365	LEU	2.1
1	A	286	SER	2.1
1	G	196	TYR	2.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	365	LEU	2.0
1	G	354	SER	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.