



wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 31, 2016 – 08:18 PM GMT

PDB ID : 1JPN
Title : GMPPNP Complex of SRP GTPase NG Domain
Authors : Padmanabhan, S.; Freymann, D.M.
Deposited on : 2001-08-02
Resolution : 1.90 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

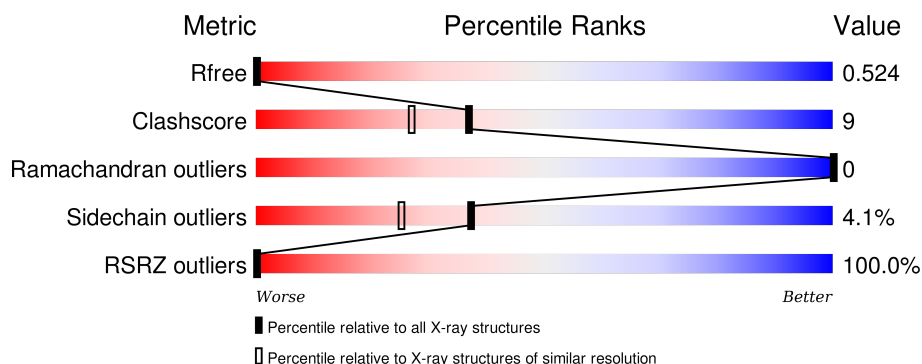
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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}	91344	4755 (1.90-1.90)
Clashscore	102246	5398 (1.90-1.90)
Ramachandran outliers	100387	5338 (1.90-1.90)
Sidechain outliers	100360	5339 (1.90-1.90)
RSRZ outliers	91569	4766 (1.90-1.90)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	296	<div> <div>100%</div> <div> <div></div> <div>81%</div> <div>18%</div> <div>.</div> </div> </div>
1	B	296	<div> <div>100%</div> <div> <div></div> <div>77%</div> <div>21%</div> <div>.</div> </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	CA	A	901	-	-	-	X
3	GNP	A	911	-	-	-	X
3	GNP	B	910	-	-	-	X
4	ACY	A	952	-	-	X	X
4	ACY	A	953	-	-	-	X
4	ACY	B	950	-	-	-	X
4	ACY	B	951	-	-	-	X

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 5117 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.

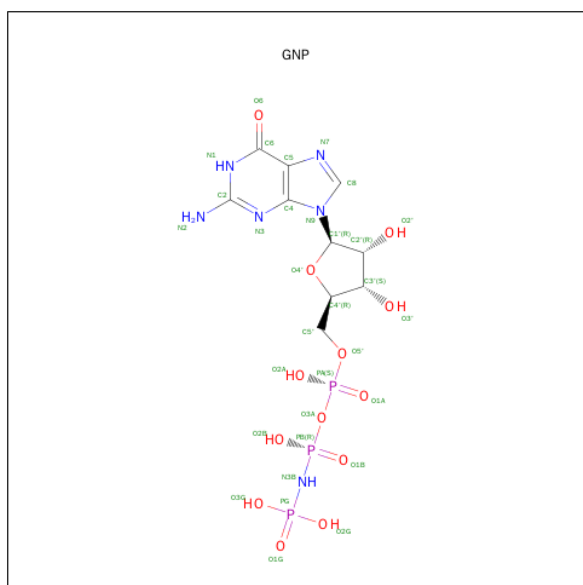
- Molecule 1 is a protein called SIGNAL RECOGNITION PARTICLE PROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	295	Total	C	N	O	S	0	6	0
			2318	1454	423	434	7			
1	A	296	Total	C	N	O	S	0	1	0
			2286	1435	416	428	7			

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

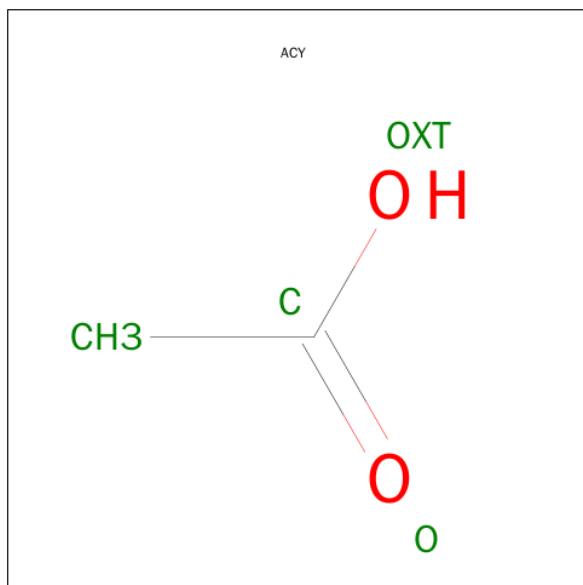
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total	Ca	0	0
			1	1		
2	A	1	Total	Ca	0	0
			1	1		

- Molecule 3 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula: $C_{10}H_{17}N_6O_{13}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
3	A	1	Total	C	N	O	P	0	0
			32	10	6	13	3		

- Molecule 4 is ACETIC ACID (three-letter code: ACY) (formula: C₂H₄O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		

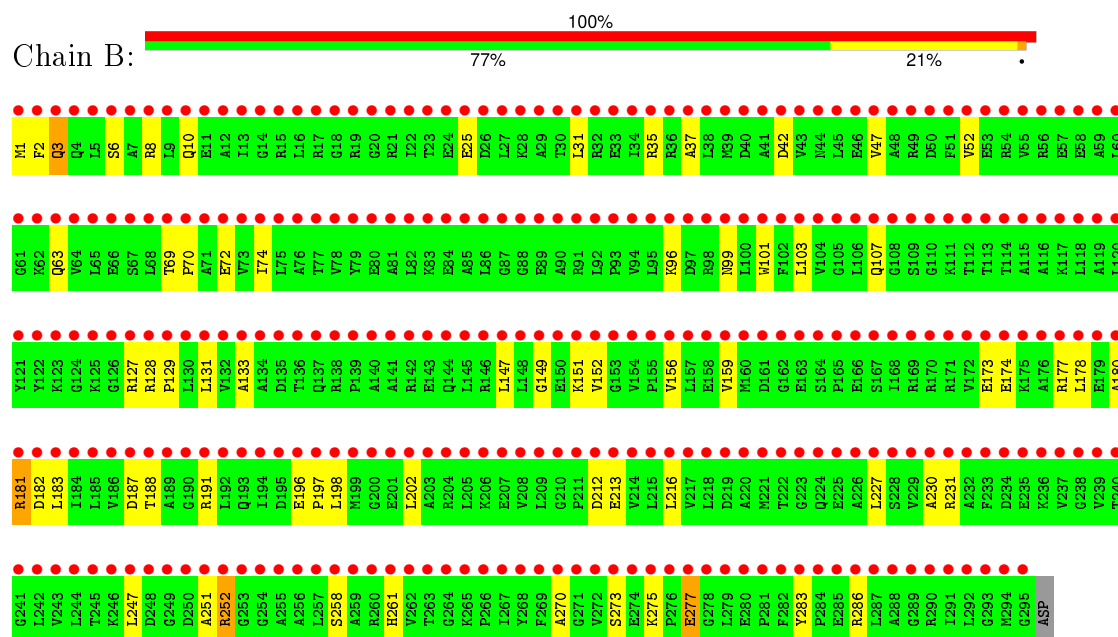
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	251	Total	O	0	0
			251	251		
5	B	180	Total	O	0	0
			180	180		

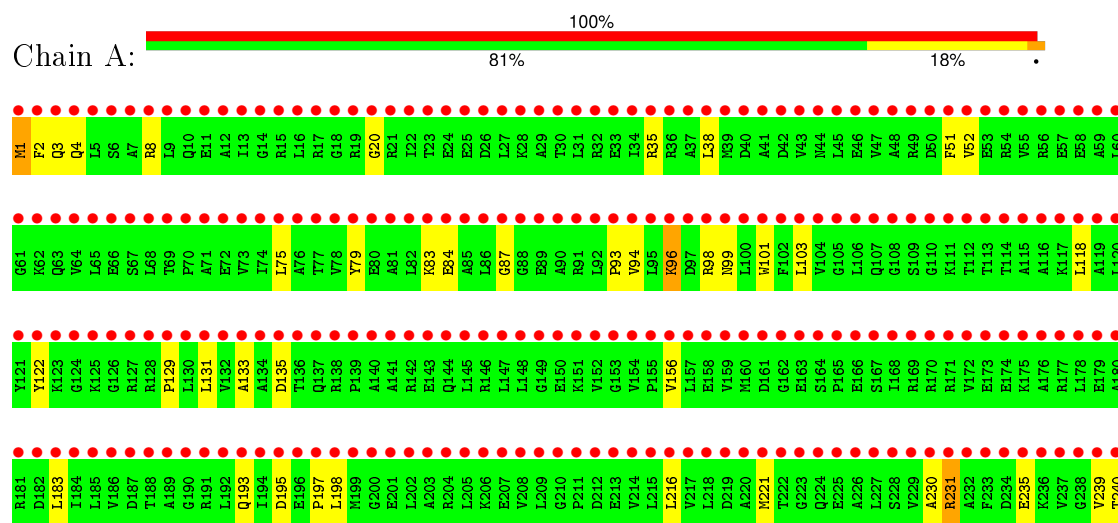
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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 ($\text{RSRZ} > 2$). 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: SIGNAL RECOGNITION PARTICLE PROTEIN



• Molecule 1: SIGNAL RECOGNITION PARTICLE PROTEIN



G241	L242	V243	L244	T245	K246	L247	D248	G249	D250	A251	R252	G253	G254	A255	A256	L257	S258	A259	R260	H261	V262	T263	G264	K265	P266	I267	Y268	F269	A270	G271	V272	S273	E274	K275	P276	E277	G278	L279	E280	F281	F282	Y283	P284	E285	K286	L287	A288	G289	R290	I291	L292	G293	M294	G295	D296
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4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	108.81Å 54.53Å 99.08Å 90.00° 97.42° 90.00°	Depositor
Resolution (Å)	15.00 – 1.90 17.84 – 0.78	Depositor EDS
% Data completeness (in resolution range)	(Not available) (15.00-1.90) 7.5 (17.84-0.78)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.56 (at 0.78Å)	Xtriage
Refinement program	X-PLOR 3.851	Depositor
R, R_{free}	0.190 , 0.241 0.517 , 0.524	Depositor DCC
R_{free} test set	469 reflections (4.53%)	DCC
Wilson B-factor (Å ²)	2.2	Xtriage
Anisotropy	2.035	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.01 , -1.5	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtriage
Outliers	0 of 48986 reflections	Xtriage
F_o, F_c correlation	0.43	EDS
Total number of atoms	5117	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 100.00 % 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 0.0000e+00.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ACY, CA, GNP

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	0.23	0/2311	0.46	0/3112
1	B	0.23	0/2343	0.45	0/3155
All	All	0.23	0/4654	0.45	0/6267

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 [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	2286	0	2385	37	0
1	B	2318	0	2416	53	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	32	0	13	0	0
3	B	32	0	13	1	0
4	A	8	0	6	3	0
4	B	8	0	6	1	0
5	A	251	0	0	4	3
5	B	180	0	0	2	3
All	All	5117	0	4839	90	4

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 9.

The worst 5 of 90 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:96:LYS:H	1:B:99:ASN:HD21	1.06	0.93
1:A:96:LYS:H	1:A:99:ASN:HD21	1.13	0.92
1:B:35:ARG:HB2	1:B:52[A]:VAL:HG21	1.68	0.76
1:B:69:THR:HB	1:B:72:GLU:HG3	1.69	0.73
1:A:1:MET:HA	1:A:3:GLN:HE22	1.51	0.73

All (4) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:1121:HOH:O	5:B:1407:HOH:O[2_656]	1.93	0.27
5:B:1299:HOH:O	5:A:1385:HOH:O[3_445]	2.02	0.18
5:A:1180:HOH:O	5:A:1321:HOH:O[2_655]	2.04	0.16
5:B:1158:HOH:O	5:A:1050:HOH:O[4_546]	2.11	0.09

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	295/296 (100%)	289 (98%)	6 (2%)	0	100	100
1	B	299/296 (101%)	295 (99%)	4 (1%)	0	100	100
All	All	594/592 (100%)	584 (98%)	10 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	235/234 (100%)	225 (96%)	10 (4%)	35	23
1	B	239/234 (102%)	230 (96%)	9 (4%)	40	28
All	All	474/468 (101%)	455 (96%)	19 (4%)	37	26

5 of 19 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	277	GLU
1	A	4	GLN
1	A	231	ARG
1	B	252	ARG
1	A	250	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	261	HIS
1	A	261	HIS
1	A	99	ASN
1	B	144	GLN
1	A	44	ASN

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 carbohydrates in this entry.

5.6 Ligand geometry

Of 8 ligands modelled in this entry, 2 are monoatomic - leaving 6 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GNP	A	911	-	28,34,34	2.03	11 (39%)	33,54,54	2.30	7 (21%)
4	ACY	A	952	-	1,3,3	3.85	1 (100%)	0,3,3	0.00	-
4	ACY	A	953	-	1,3,3	4.61	1 (100%)	0,3,3	0.00	-
3	GNP	B	910	-	28,34,34	2.00	12 (42%)	33,54,54	2.32	7 (21%)
4	ACY	B	950	-	1,3,3	4.59	1 (100%)	0,3,3	0.00	-
4	ACY	B	951	-	1,3,3	4.79	1 (100%)	0,3,3	0.00	-

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GNP	A	911	-	-	0/12/38/38	0/3/3/3
4	ACY	A	952	-	-	0/0/0/0	0/0/0/0
4	ACY	A	953	-	-	0/0/0/0	0/0/0/0
3	GNP	B	910	-	-	0/12/38/38	0/3/3/3
4	ACY	B	950	-	-	0/0/0/0	0/0/0/0
4	ACY	B	951	-	-	0/0/0/0	0/0/0/0

The worst 5 of 27 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	910	GNP	C8-N7	-2.57	1.29	1.34
3	A	911	GNP	C8-N7	-2.56	1.29	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	910	GNP	PG-O2G	-2.37	1.50	1.56
3	A	911	GNP	PG-O3G	-2.36	1.50	1.56
3	B	910	GNP	PB-O2B	-2.25	1.50	1.56

The worst 5 of 14 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	911	GNP	C5-C6-N1	-8.06	112.57	123.59
3	B	910	GNP	C5-C6-N1	-8.02	112.62	123.59
3	B	910	GNP	N3-C2-N1	-3.52	122.08	127.44
3	A	911	GNP	N3-C2-N1	-3.49	122.12	127.44
3	B	910	GNP	O1G-PG-N3B	-2.24	108.46	111.90

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	952	ACY	3	0
3	B	910	GNP	1	0
4	B	950	ACY	1	0

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	296/296 (100%)	7.18	296 (100%) 0 0	8, 17, 37, 63	0
1	B	295/296 (99%)	7.43	295 (100%) 0 0	10, 20, 43, 65	0
All	All	591/592 (99%)	7.31	591 (100%) 0 0	8, 18, 42, 65	0

The worst 5 of 591 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	276	PRO	16.9
1	B	273	SER	16.9
1	A	251	ALA	16.6
1	B	194	ILE	16.5
1	B	295	GLY	16.1

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 carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
4	ACY	B	950	4/4	-0.06	0.70	12.11	41,42,43,44	0
4	ACY	A	953	4/4	-0.06	0.95	6.14	62,64,64,65	0
4	ACY	A	952	4/4	-0.04	0.91	6.01	90,90,91,92	0
4	ACY	B	951	4/4	-0.00	0.83	3.95	44,45,46,47	0
2	CA	A	901	1/1	0.71	0.57	1.51	37,37,37,37	0
3	GNP	B	910	32/32	0.16	0.72	1.04	23,51,71,71	0
3	GNP	A	911	32/32	0.28	0.63	0.90	20,31,48,50	0
2	CA	B	900	1/1	0.99	0.32	-4.56	16,16,16,16	0

6.5 Other polymers [i](#)

There are no such residues in this entry.