



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 7, 2019 – 02:25 PM EST

PDB ID : 6C1C  
Title : FGFR1 kinase complex with inhibitor SN37116  
Authors : Yosaatmadja, Y.; Smaill, J.B.; Squire, C.J.  
Deposited on : 2018-01-04  
Resolution : 2.15 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](mailto: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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.7.3 (157068), CSD as539be (2018)  
Xtriage (Phenix) : 1.13  
EDS : rb-20031633  
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)  
Refmac : 5.8.0158  
CCP4 : 7.0 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20031633

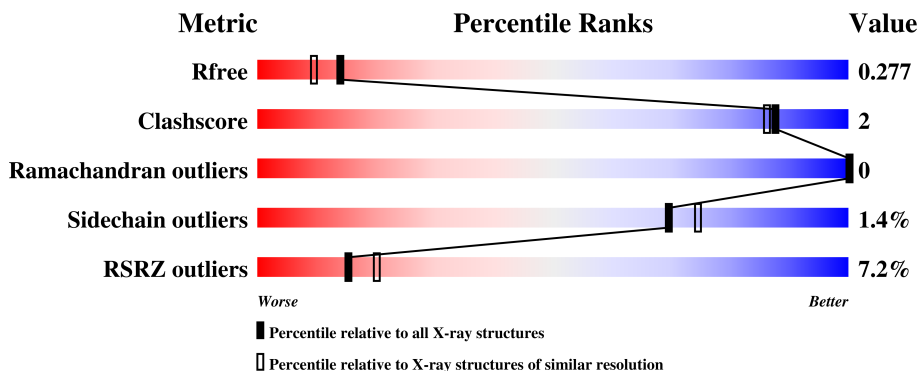
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.15 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))
$R_{free}$	111664	1287 (2.16-2.16)
Clashscore	122126	1390 (2.16-2.16)
Ramachandran outliers	120053	1368 (2.16-2.16)
Sidechain outliers	120020	1367 (2.16-2.16)
RSRZ outliers	108989	1262 (2.16-2.16)

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  $\geq 3$ , 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	311	 6% 82% 7% 11%
1	B	311	 7% 81% 5% 14%

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4326 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.

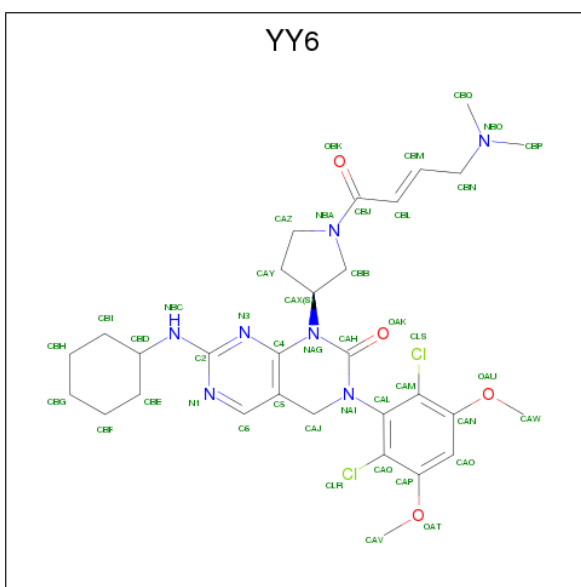
- Molecule 1 is a protein called Fibroblast growth factor receptor 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	276	2128	1348	363	398	19	0	2	0
1	B	267	2053	1311	347	377	18	0	2	0

There are 12 discrepancies between the modelled and reference sequences:

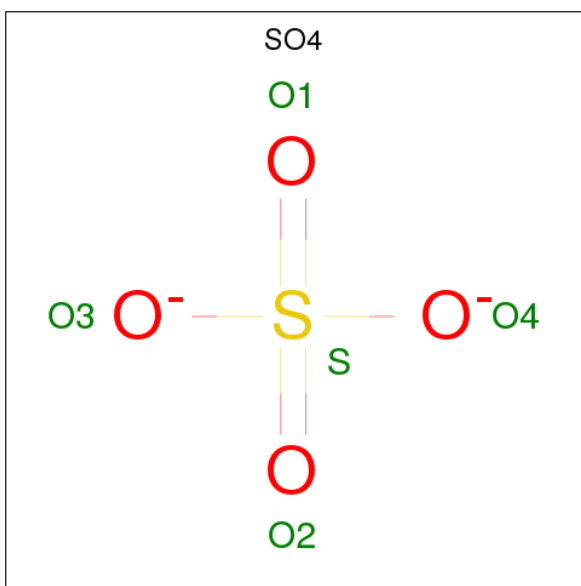
Chain	Residue	Modelled	Actual	Comment	Reference
A	455	GLY	-	expression tag	UNP P11362
A	456	ALA	-	expression tag	UNP P11362
A	457	MET	-	expression tag	UNP P11362
A	458	SER	-	expression tag	UNP P11362
A	488	ALA	CYS	engineered mutation	UNP P11362
A	584	SER	CYS	engineered mutation	UNP P11362
B	455	GLY	-	expression tag	UNP P11362
B	456	ALA	-	expression tag	UNP P11362
B	457	MET	-	expression tag	UNP P11362
B	458	SER	-	expression tag	UNP P11362
B	488	ALA	CYS	engineered mutation	UNP P11362
B	584	SER	CYS	engineered mutation	UNP P11362

- Molecule 2 is 7-(cyclohexylamino)-3-(2,6-dichloro-3,5-dimethoxyphenyl)-1-[(3S)-1-[(2E)-4-(dimethylamino)but-2-enoyl]pyrrolidin-3-yl]-3,4-dihydropyrimido[4,5-d]pyrimidin-2(1H)-one (three-letter code: YY6) (formula: C<sub>30</sub>H<sub>39</sub>Cl<sub>2</sub>N<sub>7</sub>O<sub>4</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
2	A	1	Total	C	Cl	N	O	0	0
			43	30	2	7	4		
2	B	1	Total	C	Cl	N	O	0	0
			43	30	2	7	4		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	
3	B	1	Total	O	S	0	0
			5	4	1		

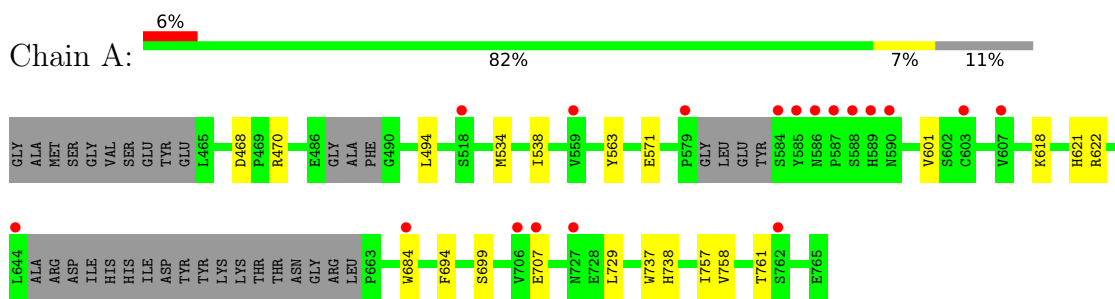
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	32	Total 32	O 32	0	0
4	B	22	Total 22	O 22	0	0

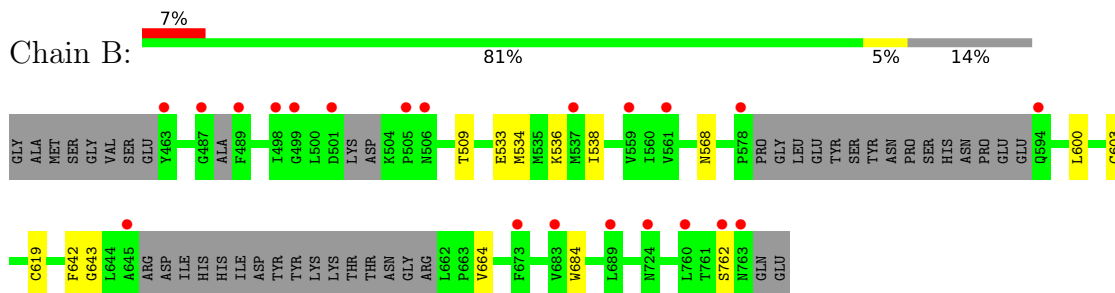
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Fibroblast growth factor receptor 1



- Molecule 1: Fibroblast growth factor receptor 1



## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	213.29Å 52.03Å 66.05Å 90.00° 107.08° 90.00°	Depositor
Resolution (Å)	19.51 – 2.15 19.51 – 2.15	Depositor EDS
% Data completeness (in resolution range)	99.8 (19.51-2.15) 100.0 (19.51-2.15)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.20 (at 2.15Å)	Xtrriage
Refinement program	REFMAC 5.8.0049	Depositor
R, $R_{free}$	0.226 , 0.270 0.234 , 0.277	Depositor DCC
$R_{free}$ test set	1889 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	36.7	Xtrriage
Anisotropy	0.091	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 33.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.016 for -h-2*1,-k,l	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	4326	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	43.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.68% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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](#)

Bond lengths and bond angles in the following residue types are not validated in this section: YY6, SO4

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	0.46	0/2170	0.61	0/2944
1	B	0.46	0/2096	0.63	0/2841
All	All	0.46	0/4266	0.62	0/5785

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	2128	0	2067	11	0
1	B	2053	0	2003	7	0
2	A	43	0	0	1	0
2	B	43	0	0	0	0
3	B	5	0	0	0	0
4	A	32	0	0	0	0
4	B	22	0	0	0	0
All	All	4326	0	4070	18	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 2.



All (18) 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:534:MET:SD	1:B:538:ILE:HD12	2.30	0.72
1:A:757:ILE:O	1:A:761:THR:HG23	1.93	0.69
1:A:468:ASP:OD1	1:A:470:ARG:HD3	1.98	0.63
1:A:601:VAL:HG12	1:A:758:VAL:HG23	1.88	0.56
1:A:601:VAL:HG12	1:A:758:VAL:CG2	2.38	0.54
1:A:494:LEU:HD13	1:A:563:TYR:CE1	2.42	0.54
1:A:571:GLU:OE2	2:A:801:YY6:NBO	2.43	0.51
1:A:534[A]:MET:HE2	1:A:538:ILE:HD11	1.92	0.51
1:B:533:GLU:OE2	1:B:536:LYS:NZ	2.45	0.49
1:B:534:MET:CE	1:B:643:GLY:HA3	2.44	0.47
1:A:694:PHE:CZ	1:A:729:LEU:HD13	2.51	0.45
1:B:619:CYS:SG	1:B:642:PHE:O	2.75	0.45
1:A:621:HIS:O	1:A:622:ARG:HB2	2.18	0.44
1:B:568:ASN:OD1	1:B:568:ASN:C	2.58	0.42
1:B:600:LEU:O	1:B:603[B]:CYS:HB2	2.20	0.41
1:A:707:GLU:H	1:A:707:GLU:CD	2.24	0.41
1:A:684:TRP:CE3	1:A:737:TRP:HA	2.55	0.41
1:B:684:TRP:C	1:B:684:TRP:CD1	2.95	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	270/311 (87%)	260 (96%)	10 (4%)	0	100	100
1	B	259/311 (83%)	255 (98%)	4 (2%)	0	100	100
All	All	529/622 (85%)	515 (97%)	14 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	225/271 (83%)	222 (99%)	3 (1%)	71	77
1	B	214/271 (79%)	211 (99%)	3 (1%)	69	74
All	All	439/542 (81%)	433 (99%)	6 (1%)	69	74

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	618	LYS
1	A	699	SER
1	A	738	HIS
1	B	509	THR
1	B	664	VAL
1	B	762	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

3 ligands are modelled in this entry.

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
2	YY6	A	801	-	46,47,47	2.20	8 (17%)	54,67,67	2.75	25 (46%)
2	YY6	B	801	-	46,47,47	2.20	6 (13%)	54,67,67	2.78	23 (42%)
3	SO4	B	802	-	4,4,4	0.18	0	6,6,6	0.39	0

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
2	YY6	A	801	-	-	0/26/59/59	0/5/5/5
2	YY6	B	801	-	-	0/26/59/59	0/5/5/5
3	SO4	B	802	-	-	0/0/0/0	0/0/0/0

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	801	YY6	CAJ-C5	-5.58	1.38	1.51
2	B	801	YY6	CAJ-C5	-5.21	1.39	1.51
2	A	801	YY6	CBE-CBD	-3.55	1.43	1.51
2	A	801	YY6	CAH-NAI	-3.32	1.33	1.37
2	B	801	YY6	CAH-NAI	-2.99	1.34	1.37
2	B	801	YY6	CBE-CBD	-2.92	1.44	1.51
2	A	801	YY6	CAY-CAZ	-2.36	1.48	1.52
2	A	801	YY6	CBB-NBA	2.01	1.51	1.46
2	B	801	YY6	CBL-CBJ	4.23	1.55	1.48
2	A	801	YY6	CBL-CBJ	4.63	1.55	1.48
2	A	801	YY6	C2-NBC	6.60	1.44	1.34
2	B	801	YY6	C2-NBC	7.64	1.46	1.34
2	A	801	YY6	CBL-CBM	8.15	1.53	1.31
2	B	801	YY6	CBL-CBM	8.31	1.53	1.31

All (48) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	801	YY6	CAY-CAX-NAG	-9.66	105.94	114.18
2	A	801	YY6	CAY-CAX-NAG	-9.40	106.15	114.18
2	B	801	YY6	N1-C2-N3	-6.79	120.20	126.66
2	A	801	YY6	N1-C2-N3	-6.28	120.69	126.66
2	B	801	YY6	C5-C4-N3	-5.47	116.54	123.52
2	B	801	YY6	C2-NBC-CBD	-5.41	117.55	123.65
2	A	801	YY6	C5-C4-N3	-5.28	116.79	123.52
2	A	801	YY6	C4-NAG-CAH	-5.10	117.12	122.17
2	A	801	YY6	C2-NBC-CBD	-4.66	118.40	123.65
2	B	801	YY6	C4-NAG-CAH	-4.14	118.08	122.17
2	A	801	YY6	CBN-CBM-CBL	-3.93	118.31	124.74
2	B	801	YY6	CBI-CBD-CBE	-3.91	104.74	110.86
2	B	801	YY6	CAX-NAG-CAH	-3.77	111.68	117.45
2	B	801	YY6	CBN-CBM-CBL	-3.48	119.05	124.74
2	B	801	YY6	OAK-CAH-NAI	-3.27	117.74	122.06
2	A	801	YY6	CAX-NAG-CAH	-3.21	112.54	117.45
2	A	801	YY6	OAK-CAH-NAI	-3.20	117.83	122.06
2	B	801	YY6	CBG-CBF-CBE	-3.19	104.94	111.42
2	A	801	YY6	CBF-CBE-CBD	-3.06	106.68	111.09
2	B	801	YY6	CBF-CBE-CBD	-2.97	106.81	111.09
2	A	801	YY6	CBL-CBJ-NBA	-2.77	115.05	118.17
2	A	801	YY6	CBI-CBD-CBE	-2.58	106.83	110.86
2	A	801	YY6	CBE-CBD-NBC	-2.54	106.21	110.53
2	A	801	YY6	C5-C6-N1	-2.50	119.60	123.83
2	B	801	YY6	CBL-CBJ-NBA	-2.44	115.42	118.17
2	A	801	YY6	CBG-CBF-CBE	-2.20	106.96	111.42
2	A	801	YY6	CBI-CBD-NBC	-2.16	106.85	110.53
2	B	801	YY6	C5-C6-N1	-2.09	120.30	123.83
2	A	801	YY6	CAJ-NAI-CAL	-2.02	112.47	116.22
2	B	801	YY6	CAJ-C5-C4	2.00	122.97	119.96
2	A	801	YY6	C6-N1-C2	2.06	119.22	115.83
2	B	801	YY6	C6-N1-C2	2.11	119.30	115.83
2	A	801	YY6	CAY-CAX-CBB	2.14	105.72	102.14
2	A	801	YY6	CBH-CBI-CBD	2.17	114.23	111.09
2	B	801	YY6	CAY-CAX-CBB	2.37	106.11	102.14
2	B	801	YY6	C5-CAJ-NAI	2.63	113.55	109.62
2	A	801	YY6	C2-N3-C4	2.64	123.34	113.95
2	B	801	YY6	C2-N3-C4	2.65	123.36	113.95
2	B	801	YY6	CAL-NAI-CAH	3.05	122.63	117.65
2	A	801	YY6	NBC-C2-N3	3.27	121.76	117.06
2	B	801	YY6	C6-C5-C4	3.36	120.26	115.66
2	A	801	YY6	C6-C5-C4	3.41	120.34	115.66
2	B	801	YY6	NBC-C2-N3	3.75	122.46	117.06

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	801	YY6	N3-C4-NAG	3.84	122.43	117.58
2	A	801	YY6	CAL-NAI-CAH	3.89	124.00	117.65
2	B	801	YY6	N3-C4-NAG	4.15	122.83	117.58
2	B	801	YY6	NAG-CAH-NAI	4.19	122.24	115.65
2	A	801	YY6	NAG-CAH-NAI	4.35	122.49	115.65

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	801	YY6	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	276/311 (88%)	0.33	18 (6%) 19 24	25, 41, 73, 93	0
1	B	267/311 (85%)	0.30	21 (7%) 12 17	27, 41, 66, 90	0
All	All	543/622 (87%)	0.32	39 (7%) 15 20	25, 41, 71, 93	0

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	585	TYR	4.5
1	A	587	PRO	4.4
1	B	578	PRO	4.3
1	A	584	SER	4.2
1	A	589	HIS	3.9
1	A	518	SER	3.9
1	A	644	LEU	3.7
1	B	498	ILE	3.6
1	B	506	ASN	3.3
1	B	762	SER	3.2
1	B	673	PHE	3.2
1	A	590	ASN	3.1
1	B	763	ASN	2.9
1	A	586	ASN	2.9
1	B	645	ALA	2.9
1	A	762	SER	2.9
1	B	463	TYR	2.9
1	A	706	VAL	2.8
1	A	588	SER	2.7
1	A	707	GLU	2.7
1	A	579	PRO	2.6
1	A	607	VAL	2.5
1	B	505	PRO	2.5
1	A	603[A]	CYS	2.4

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	B	489	PHE	2.4
1	B	594	GLN	2.4
1	B	683	VAL	2.3
1	B	724	ASN	2.3
1	B	501	ASP	2.2
1	B	487	GLY	2.2
1	A	684	TRP	2.2
1	A	727	ASN	2.2
1	B	689	LEU	2.1
1	B	760	LEU	2.1
1	B	561	VAL	2.1
1	B	499	GLY	2.1
1	A	559	VAL	2.1
1	B	537	MET	2.0
1	B	559	VAL	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 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. The B-factors column lists the minimum, median, 95<sup>th</sup> 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	B-factors(Å <sup>2</sup> )	Q<0.9
3	SO4	B	802	5/5	0.81	0.29	94,96,99,100	0
2	YY6	A	801	43/43	0.94	0.12	31,36,46,51	0
2	YY6	B	801	43/43	0.94	0.13	34,38,51,54	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.