Full wwPDB X-ray Structure Validation Report (i)

Jan 31, 2016 – 10:07 PM GMT

PDB ID	:	1S7J
Title	:	Crystal structure of phenazine biosynthesis protein PhzF family (Enterococcus faecalis)
Authors	:	Patskovsky, Y.; Almo, S.C.; Burley, S.K.; New York SGX Research Center for Structural Genomics (NYSGXRC)
Deposited on	:	2004-01-29
Resolution	:	2.30 Å(reported)

The following versions of software and data (see references (i)) 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 (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	Percentile Ranks	Value
Rfree		0.273
Clashscore		14
Ramachandran outliers		0.8%
Sidechain outliers		8.0%
RSRZ outliers		9.0%

Worse *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
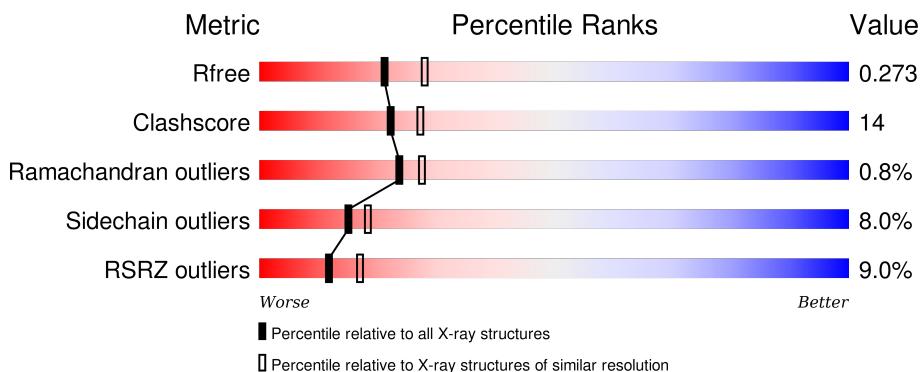
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	91344	3852 (2.30-2.30)
Clashscore	102246	4452 (2.30-2.30)
Ramachandran outliers	100387	4410 (2.30-2.30)
Sidechain outliers	100360	4409 (2.30-2.30)
RSRZ outliers	91569	3857 (2.30-2.30)

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 <=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	262	14% / 66% / 29% / ··
1	B	262	4% / 69% / 26% / ···
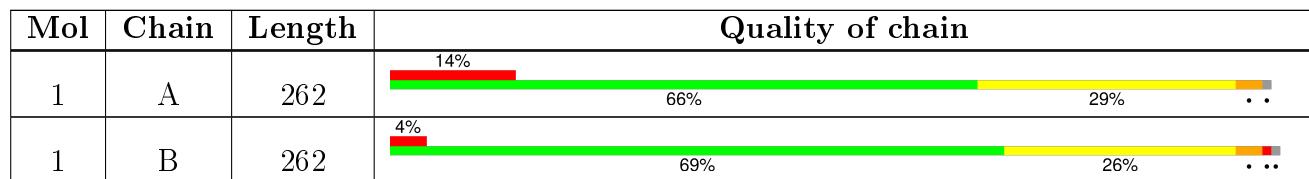
2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 4476 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 phenazine biosynthesis protein PhzF family.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	260	Total 2064	C 1348	N 324	O 387	S 5	0	0	0
1	B	260	Total 2064	C 1348	N 324	O 387	S 5	0	0	0

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	150	Total 150	O 150	0	0
2	B	198	Total 198	O 198	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 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 (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: phenazine biosynthesis protein PhzF family
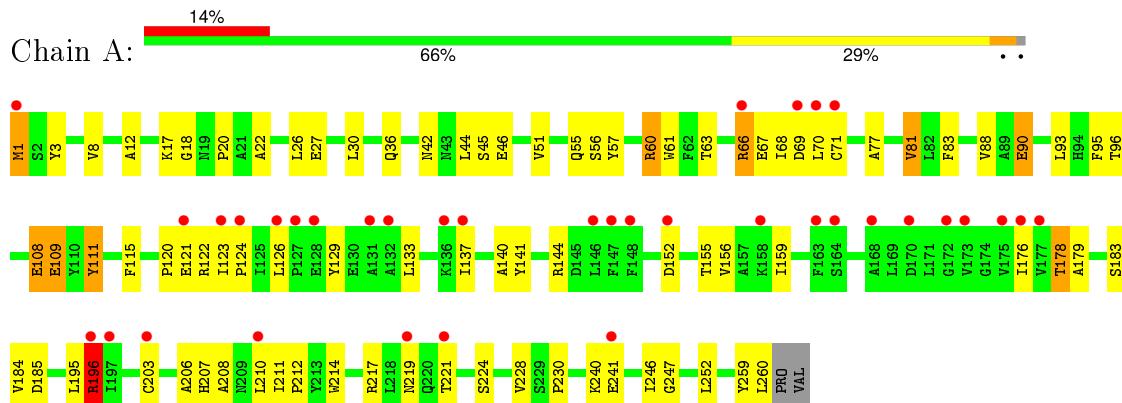
- Molecule 1: phenazine biosynthesis protein PhzF family
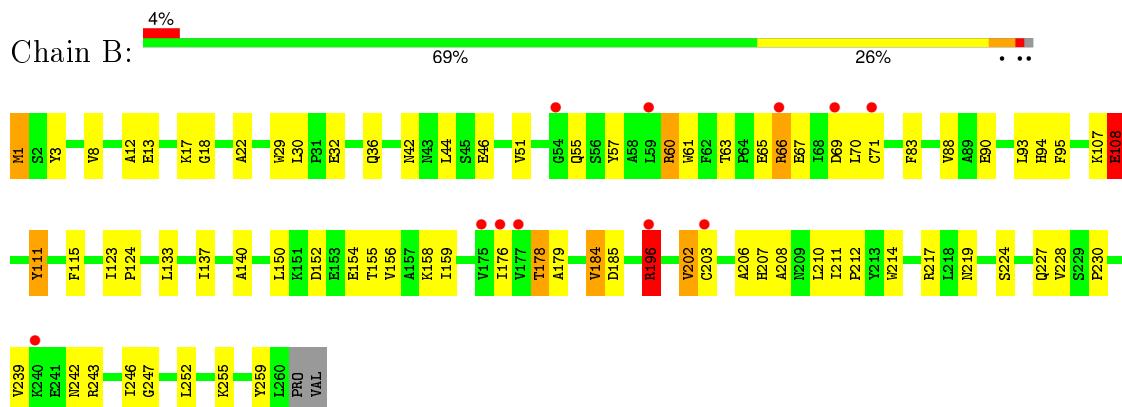
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	60.80Å　　85.74Å　　105.40Å 90.00°　　90.00°　　90.00°	Depositor
Resolution (Å)	19.92　–　2.30 19.92　–　2.30	Depositor EDS
% Data completeness (in resolution range)	98.9 (19.92-2.30) 99.3 (19.92-2.30)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
$<I/\sigma(I)>$ [1]	5.13 (at 2.30Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.229　,　0.273 0.230　,　0.273	Depositor DCC
R_{free} test set	740 reflections (2.97%)	DCC
Wilson B-factor (Å^2)	33.6	Xtriage
Anisotropy	0.657	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 59.0	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning[2]	$<|L|> = 0.46$, $<L^2> = 0.28$	Xtriage
Outliers	0 of 24914 reflections	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	4476	wwPDB-VP
Average B, all atoms (Å^2)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.38% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $<|L|>$, $<L^2>$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

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	0.58	0/2119	0.72	2/2886 (0.1%)
1	B	0.59	0/2119	0.75	2/2886 (0.1%)
All	All	0.58	0/4238	0.73	4/5772 (0.1%)

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	2
1	B	0	2
All	All	0	4

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	196	ARG	NE-CZ-NH1	-12.87	113.86	120.30
1	A	196	ARG	NE-CZ-NH1	-10.84	114.88	120.30
1	B	196	ARG	NE-CZ-NH2	10.81	125.71	120.30
1	A	196	ARG	NE-CZ-NH2	9.21	124.91	120.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	111	TYR	Sidechain
1	A	196	ARG	Sidechain
1	B	111	TYR	Sidechain
1	B	196	ARG	Sidechain

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	2064	0	2034	60	0
1	B	2064	0	2034	55	0
2	A	150	0	0	15	0
2	B	198	0	0	10	0
All	All	4476	0	4068	113	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 14.

All (113) 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:178:THR:HG21	1:A:214:TRP:HE1	1.28	0.95
1:B:178:THR:HG21	1:B:214:TRP:HE1	1.34	0.92
1:A:109:GLU:HG3	2:A:439:HOH:O	1.71	0.90
1:A:20:PRO:HG2	2:A:391:HOH:O	1.71	0.89
1:B:61:TRP:CZ2	1:B:70:LEU:HD12	2.20	0.77
1:A:178:THR:HG21	1:A:214:TRP:NE1	2.01	0.75
1:A:207:HIS:HA	1:A:210:LEU:HB2	1.74	0.69
1:B:61:TRP:CH2	1:B:70:LEU:HD12	2.28	0.69
1:A:61:TRP:O	1:A:67:GLU:HG3	1.94	0.68
1:B:207:HIS:HA	1:B:210:LEU:HB2	1.76	0.68
1:A:144:ARG:HB3	2:A:581:HOH:O	1.92	0.67
1:B:178:THR:HG21	1:B:214:TRP:NE1	2.07	0.67
1:A:55:GLN:HE22	1:B:90:GLU:HB2	1.60	0.66
1:B:65:GLU:HG3	2:B:513:HOH:O	1.94	0.66
1:B:211:ILE:HG22	1:B:239:VAL:HG22	1.76	0.65
1:B:230:PRO:HD2	2:B:267:HOH:O	1.95	0.65
1:A:27:GLU:HB3	2:A:454:HOH:O	1.96	0.65
1:B:155:THR:O	1:B:159:ILE:HG23	1.97	0.64
1:A:27:GLU:HG2	2:A:536:HOH:O	1.97	0.64
1:A:45:SER:HB2	2:A:391:HOH:O	1.96	0.64
1:A:176:ILE:HG21	1:A:210:LEU:HD21	1.80	0.63
1:B:61:TRP:O	1:B:67:GLU:HG3	1.98	0.62
1:A:90:GLU:HB2	1:B:55:GLN:HE22	1.64	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:155:THR:O	1:A:159:ILE:HG23	2.01	0.60
1:B:176:ILE:HG21	1:B:210:LEU:HD21	1.84	0.60
1:A:1:MET:O	1:A:259:TYR:HA	2.03	0.59
1:A:36:GLN:OE1	1:A:66:ARG:HA	2.02	0.58
1:B:36:GLN:OE1	1:B:66:ARG:HA	2.04	0.58
1:B:83:PHE:HA	1:B:88:VAL:HG22	1.85	0.58
1:B:1:MET:O	1:B:259:TYR:HA	2.04	0.58
1:A:83:PHE:HA	1:A:88:VAL:HG22	1.86	0.57
1:A:46:GLU:HG3	1:A:63:THR:HG22	1.88	0.56
1:B:108:GLU:HG2	2:B:540:HOH:O	2.06	0.56
1:A:208:ALA:O	1:A:212:PRO:HG2	2.06	0.56
1:A:195:LEU:O	1:A:196:ARG:HB3	2.06	0.55
1:B:133:LEU:HD22	1:B:137:ILE:HD11	1.90	0.54
1:B:46:GLU:HG3	1:B:63:THR:HG22	1.89	0.54
1:B:12:ALA:HB2	1:B:18:GLY:HA3	1.91	0.53
1:A:12:ALA:HB2	1:A:18:GLY:HA3	1.90	0.53
1:A:42:ASN:HB3	2:A:364:HOH:O	2.09	0.53
1:B:13:GLU:HG3	2:B:473:HOH:O	2.09	0.52
1:A:123:ILE:HG22	1:A:140:ALA:HB1	1.92	0.52
1:A:240:LYS:HE3	2:A:586:HOH:O	2.09	0.52
1:A:123:ILE:HG13	1:A:124:PRO:HD2	1.91	0.52
1:B:208:ALA:O	1:B:212:PRO:HG2	2.10	0.51
2:A:606:HOH:O	1:B:94:HIS:HE1	1.91	0.51
1:B:61:TRP:HE3	2:B:593:HOH:O	1.92	0.51
1:A:26:LEU:HB2	1:A:51:VAL:HG22	1.94	0.50
1:A:133:LEU:HD22	1:A:137:ILE:HD11	1.92	0.50
1:B:202:VAL:HA	1:B:227:GLN:CD	2.31	0.50
1:A:68:ILE:HD12	1:A:69:ASP:H	1.77	0.50
1:B:211:ILE:CG2	1:B:239:VAL:HG22	2.41	0.50
1:A:77:ALA:O	1:A:81:VAL:HG13	2.11	0.50
1:A:56:SER:HB3	1:A:96:THR:HG23	1.94	0.49
1:A:115:PHE:HE2	1:A:246:ILE:HD11	1.77	0.49
1:A:183:SER:HB2	2:A:589:HOH:O	2.13	0.48
1:A:206:ALA:O	1:A:210:LEU:HD23	2.14	0.48
1:B:178:THR:CG2	1:B:214:TRP:HE1	2.16	0.48
1:B:196:ARG:HA	1:B:196:ARG:HD2	1.49	0.48
1:A:66:ARG:N	1:A:66:ARG:HE	2.12	0.47
1:B:42:ASN:HA	2:B:468:HOH:O	2.14	0.47
1:B:69:ASP:O	1:B:70:LEU:HB2	2.14	0.47
1:A:69:ASP:O	1:A:70:LEU:HB2	2.15	0.47
1:A:178:THR:CG2	1:A:214:TRP:HE1	2.13	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:70:LEU:HD11	2:B:590:HOH:O	2.15	0.47
1:B:57:TYR:O	1:B:95:PHE:HA	2.14	0.47
1:A:17:LYS:NZ	1:A:17:LYS:HB3	2.29	0.47
1:B:29:TRP:NE1	1:B:51:VAL:HG11	2.28	0.47
1:B:66:ARG:HE	1:B:66:ARG:N	2.13	0.46
1:B:123:ILE:HG22	1:B:140:ALA:HB1	1.96	0.46
1:B:29:TRP:CZ2	1:B:51:VAL:HG12	2.51	0.46
1:A:57:TYR:O	1:A:95:PHE:HA	2.16	0.45
1:A:230:PRO:HD2	2:A:366:HOH:O	2.15	0.45
1:B:185:ASP:HB2	1:B:224:SER:O	2.16	0.45
1:A:123:ILE:HG13	1:A:124:PRO:CD	2.47	0.45
1:B:123:ILE:HG13	1:B:124:PRO:HD2	1.99	0.45
1:B:29:TRP:CE2	1:B:51:VAL:HG12	2.51	0.44
1:B:211:ILE:HG22	1:B:239:VAL:CG2	2.45	0.44
1:B:111:TYR:O	1:B:247:GLY:HA2	2.16	0.44
1:B:242:ASN:O	1:B:243:ARG:HB2	2.17	0.44
1:A:185:ASP:HB2	1:A:224:SER:O	2.17	0.44
1:B:17:LYS:HB3	1:B:17:LYS:NZ	2.33	0.44
1:B:178:THR:HG22	1:B:179:ALA:H	1.83	0.43
1:A:122:ARG:HB2	2:A:385:HOH:O	2.19	0.43
1:A:22:ALA:HB2	1:A:44:LEU:HD12	2.00	0.43
1:A:108:GLU:HB3	2:A:510:HOH:O	2.18	0.43
1:A:178:THR:HG22	1:A:179:ALA:H	1.83	0.43
1:A:120:PRO:HB2	1:A:141:TYR:HB3	2.01	0.43
1:B:3:TYR:CE2	1:B:30:LEU:HD21	2.53	0.43
1:A:126:LEU:O	1:A:129:TYR:HB2	2.19	0.43
1:B:255:LYS:HE2	2:B:314:HOH:O	2.19	0.42
1:A:221:THR:CG2	2:A:447:HOH:O	2.68	0.42
1:A:211:ILE:HB	1:A:212:PRO:HD3	2.01	0.42
1:B:184:VAL:HG22	1:B:224:SER:HB2	2.02	0.42
1:B:29:TRP:CE2	1:B:51:VAL:CG1	3.03	0.42
1:A:60:ARG:HG3	1:A:67:GLU:OE2	2.21	0.41
1:B:206:ALA:O	1:B:210:LEU:HD23	2.20	0.41
1:A:176:ILE:HG21	1:A:210:LEU:CD2	2.49	0.41
1:A:221:THR:HG21	2:A:447:HOH:O	2.19	0.41
1:B:115:PHE:HE2	1:B:246:ILE:HD11	1.84	0.41
1:B:22:ALA:HB2	1:B:44:LEU:HD12	2.03	0.41
1:A:108:GLU:HB3	1:A:109:GLU:H	1.70	0.41
1:A:111:TYR:O	1:A:247:GLY:HA2	2.20	0.41
1:B:60:ARG:HG3	1:B:67:GLU:OE2	2.21	0.41
1:A:176:ILE:CG2	1:A:210:LEU:HD21	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:259:TYR:O	1:A:260:LEU:HD23	2.20	0.41
1:A:123:ILE:HG22	1:A:140:ALA:CB	2.50	0.41
1:B:107:LYS:CE	2:B:596:HOH:O	2.69	0.41
1:B:152:ASP:O	1:B:156:VAL:HG23	2.21	0.41
1:B:154:GLU:HB2	2:B:327:HOH:O	2.21	0.41
1:A:178:THR:O	1:A:179:ALA:HB2	2.20	0.40
1:A:3:TYR:CE2	1:A:30:LEU:HD21	2.56	0.40
1:A:152:ASP:O	1:A:156:VAL:HG23	2.22	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	258/262 (98%)	244 (95%)	13 (5%)	1 (0%)	39	48
1	B	258/262 (98%)	242 (94%)	13 (5%)	3 (1%)	16	16
All	All	516/524 (98%)	486 (94%)	26 (5%)	4 (1%)	24	27

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	108	GLU
1	B	202	VAL
1	A	228	VAL
1	B	228	VAL

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	218/220 (99%)	200 (92%)	18 (8%)	14	17
1	B	218/220 (99%)	201 (92%)	17 (8%)	16	19
All	All	436/440 (99%)	401 (92%)	35 (8%)	15	18

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	8	VAL
1	A	60	ARG
1	A	66	ARG
1	A	71	CYS
1	A	81	VAL
1	A	90	GLU
1	A	93	LEU
1	A	108	GLU
1	A	109	GLU
1	A	121	GLU
1	A	178	THR
1	A	184	VAL
1	A	203	CYS
1	A	217	ARG
1	A	219	ASN
1	A	241	GLU
1	A	252	LEU
1	B	1	MET
1	B	8	VAL
1	B	32	GLU
1	B	60	ARG
1	B	66	ARG
1	B	71	CYS
1	B	93	LEU
1	B	108	GLU
1	B	150	LEU
1	B	158	LYS
1	B	178	THR
1	B	184	VAL
1	B	196	ARG
1	B	203	CYS
1	B	217	ARG

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Mol	Chain	Res	Type
1	B	219	ASN
1	B	252	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	37	ASN
1	A	55	GLN
1	A	219	ASN
1	A	220	GLN
1	A	227	GLN
1	B	37	ASN
1	B	55	GLN
1	B	94	HIS
1	B	219	ASN
1	B	220	GLN
1	B	227	GLN

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)

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	260/262 (99%)	0.69	36 (13%)	4	6	16, 38, 70, 79	0
1	B	260/262 (99%)	0.23	11 (4%)	40	49	15, 28, 51, 64	0
All	All	520/524 (99%)	0.46	47 (9%)	12	17	15, 30, 66, 79	0

All (47) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	219	ASN	5.5
1	A	124	PRO	5.1
1	A	175	VAL	4.4
1	A	197	ILE	4.4
1	A	203	CYS	3.9
1	A	131	ALA	3.8
1	A	177	VAL	3.8
1	A	168	ALA	3.5
1	A	148	PHE	3.5
1	A	221	THR	3.5
1	A	147	PHE	3.5
1	A	176	ILE	3.4
1	A	164	SER	3.3
1	B	69	ASP	3.1
1	B	66	ARG	3.0
1	A	196	ARG	2.9
1	A	121	GLU	2.9
1	A	127	PRO	2.9
1	A	71	CYS	2.9
1	A	123	ILE	2.8
1	A	132	ALA	2.8
1	A	173	VAL	2.7
1	A	70	LEU	2.6
1	B	240	LYS	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	196	ARG	2.6
1	B	71	CYS	2.6
1	B	203	CYS	2.5
1	A	126	LEU	2.5
1	A	137	ILE	2.4
1	A	69	ASP	2.4
1	B	59	LEU	2.4
1	B	54	GLY	2.3
1	B	176	ILE	2.3
1	A	152	ASP	2.2
1	A	241	GLU	2.2
1	A	128	GLU	2.2
1	B	177	VAL	2.2
1	B	175	VAL	2.2
1	A	146	LEU	2.2
1	A	66	ARG	2.1
1	A	136	LYS	2.1
1	A	163	PHE	2.1
1	A	158	LYS	2.1
1	A	170	ASP	2.1
1	A	210	LEU	2.1
1	A	1	MET	2.1
1	A	172	GLY	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)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.