



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 29, 2020 – 03:14 am BST

PDB ID : 3M4W  
Title : Structural basis for the negative regulation of bacterial stress response by RseB  
Authors : Kim, D.Y.; Kwon, E.; Choi, J.K.; Hwang, H.-Y.; Kim, K.K.  
Deposited on : 2010-03-12  
Resolution : 2.30 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](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
Xtriage (Phenix)	:	1.13
EDS	:	2.11
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)	:	2.11

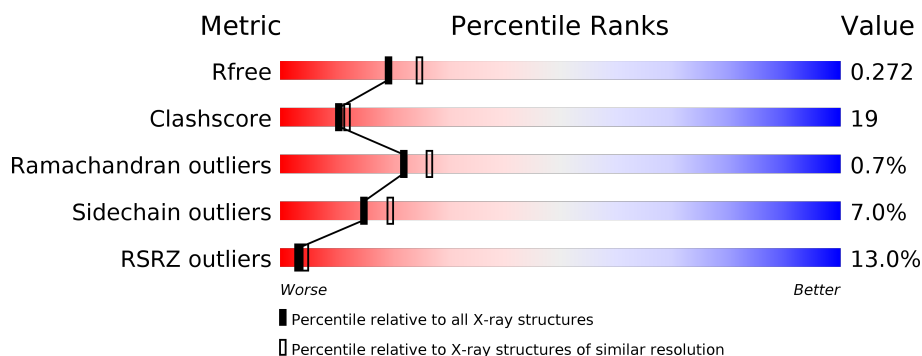
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (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  $\geq 3$ , 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	295	<div> <div>9%</div> <div>63%</div> <div>31%</div> <div>• •</div> </div>
1	B	295	<div> <div>8%</div> <div>72%</div> <div>22%</div> <div>• •</div> </div>
1	C	295	<div> <div>11%</div> <div>60%</div> <div>29%</div> <div>• 6%</div> </div>
1	D	295	<div> <div>13%</div> <div>55%</div> <div>31%</div> <div>• 9%</div> </div>
2	E	96	<div> <div>6%</div> <div>26%</div> <div>10%</div> <div>7%</div> <div>56%</div> </div>
2	F	96	<div> <div>9%</div> <div>23%</div> <div>18%</div> <div>•</div> <div>56%</div> </div>

*Continued on next page...*

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	G	96	<div><div><div></div><div></div><div></div><div></div></div><div>14%19%16%63%</div></div>
2	H	96	<div><div><div></div><div></div><div></div><div></div></div><div>17%15%15%68%</div></div>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 10535 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 Sigma-E factor regulatory protein rseB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	284	Total	C	N	O	S	0	0	0
			2263	1424	401	430	8			
1	B	284	Total	C	N	O	S	0	0	0
			2263	1424	401	430	8			
1	C	276	Total	C	N	O	S	0	0	0
			2206	1387	392	420	7			
1	D	269	Total	C	N	O	S	0	0	0
			2147	1349	378	413	7			

- Molecule 2 is a protein called Sigma-E factor negative regulatory protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	42	Total	C	N	O	S	0	0	0
			341	210	66	62	3			
2	F	42	Total	C	N	O	S	0	0	0
			341	210	66	62	3			
2	G	36	Total	C	N	O	S	0	0	0
			300	185	60	52	3			
2	H	31	Total	C	N	O	S	0	0	0
			247	157	44	43	3			

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	2	Total	Zn	0	0
			2	2		
3	A	2	Total	Zn	0	0
			2	2		
3	F	1	Total	Zn	0	0
			1	1		
3	E	1	Total	Zn	0	0
			1	1		

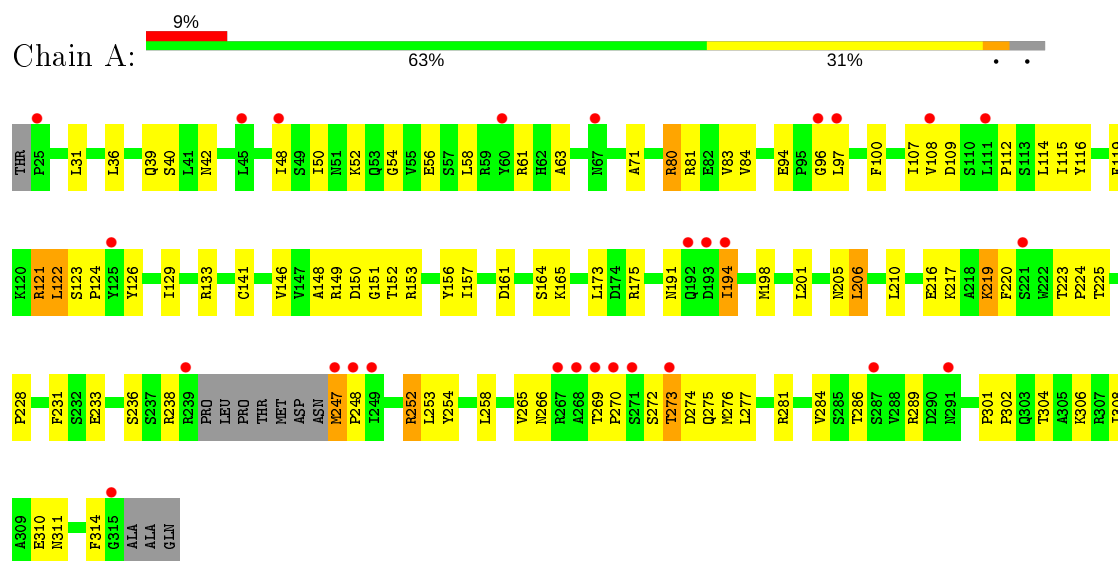
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	112	Total 112	O 112	0	0
4	B	103	Total 103	O 103	0	0
4	C	77	Total 77	O 77	0	0
4	D	91	Total 91	O 91	0	0
4	E	11	Total 11	O 11	0	0
4	F	12	Total 12	O 12	0	0
4	G	9	Total 9	O 9	0	0
4	H	6	Total 6	O 6	0	0

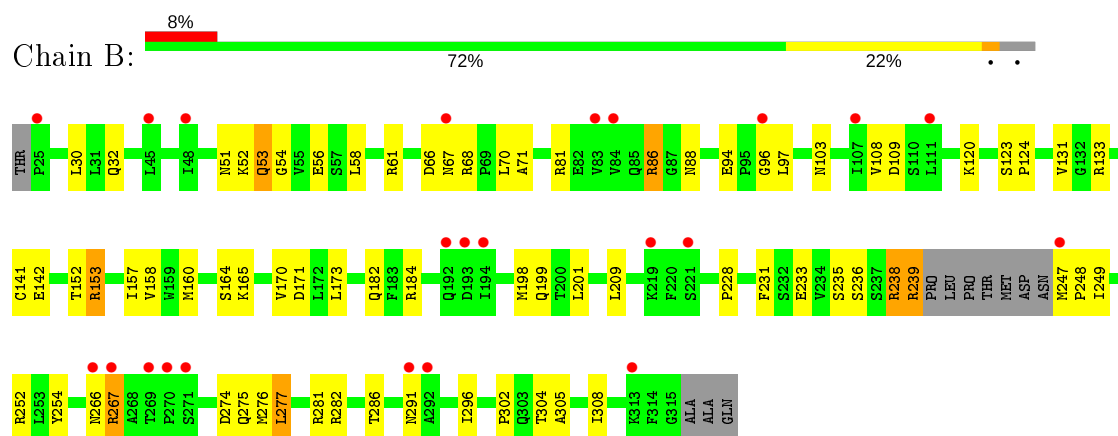
### 3 Residue-property plots [i](#)

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: Sigma-E factor regulatory protein rseB

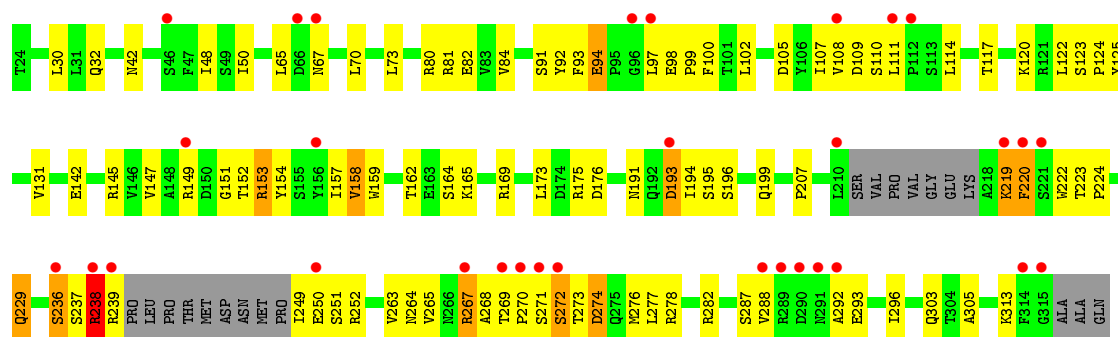


#### • Molecule 1: Sigma-E factor regulatory protein rseB

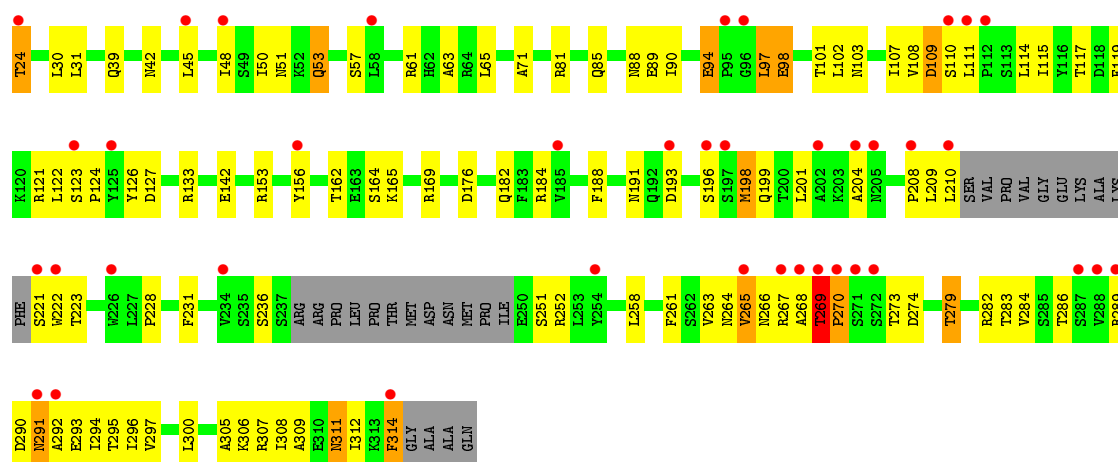


#### • Molecule 1: Sigma-E factor regulatory protein rseB

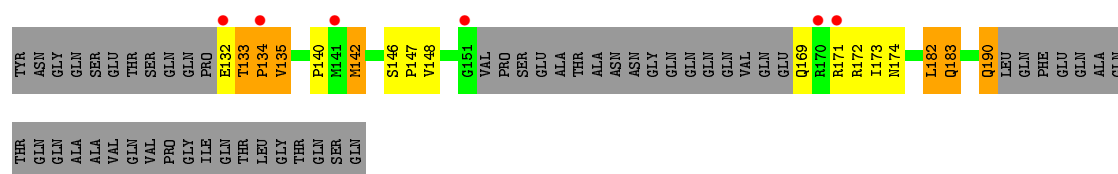
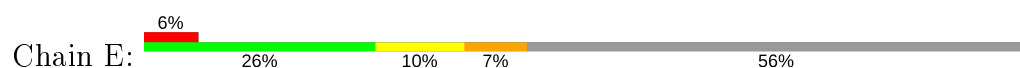




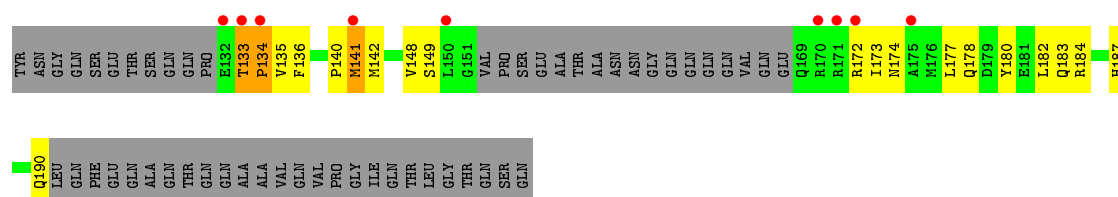
• Molecule 1: Sigma-E factor regulatory protein rseB



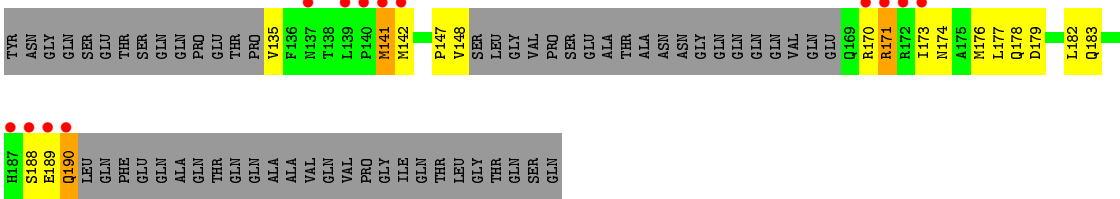
• Molecule 2: Sigma-E factor negative regulatory protein



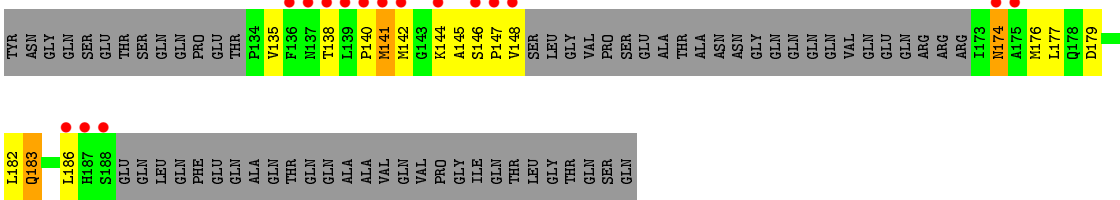
• Molecule 2: Sigma-E factor negative regulatory protein



• Molecule 2: Sigma-E factor negative regulatory protein



• Molecule 2: Sigma-E factor negative regulatory protein





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	87.10Å 119.51Å 150.87Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.98 – 2.30 29.39 – 2.29	Depositor EDS
% Data completeness (in resolution range)	93.8 (19.98-2.30) 92.6 (29.39-2.29)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.06	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.55 (at 2.29Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.239 , 0.272 0.240 , 0.272	Depositor DCC
$R_{free}$ test set	3352 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	42.8	Xtriage
Anisotropy	0.279	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 64.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.53$ , $\langle L^2 \rangle = 0.36$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	10535	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	51.0	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 54.53 % 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 3.6066e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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: ZN

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	0.39	0/2307	0.67	0/3125
1	B	0.38	0/2307	0.71	0/3125
1	C	0.39	0/2247	0.70	2/3043 (0.1%)
1	D	0.40	0/2187	0.71	0/2965
2	E	0.32	0/345	0.71	1/461 (0.2%)
2	F	0.34	0/345	0.64	0/461
2	G	0.36	0/303	0.56	0/403
2	H	0.35	0/251	0.59	0/336
All	All	0.39	0/10292	0.69	3/13919 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	133	THR	N-CA-C	-6.90	92.38	111.00
1	C	238	ARG	N-CA-CB	-5.60	100.52	110.60
1	C	158	VAL	CB-CA-C	-5.18	101.56	111.40

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	2263	0	2262	95	0
1	B	2263	0	2262	52	0
1	C	2206	0	2199	92	0
1	D	2147	0	2132	93	0
2	E	341	0	344	25	0
2	F	341	0	344	19	0
2	G	300	0	305	20	0
2	H	247	0	252	24	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
4	A	112	0	0	4	0
4	B	103	0	0	3	0
4	C	77	0	0	7	0
4	D	91	0	0	5	0
4	E	11	0	0	0	0
4	F	12	0	0	0	0
4	G	9	0	0	0	0
4	H	6	0	0	0	0
All	All	10535	0	10100	376	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 19.

The worst 5 of 376 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:219:LYS:HD3	1:A:219:LYS:H	1.11	1.07
1:D:209:LEU:HD23	1:D:210:LEU:H	1.27	0.97
1:D:81:ARG:HD3	2:H:146:SER:HA	1.49	0.94
1:D:209:LEU:HD23	1:D:210:LEU:N	1.82	0.94
1:C:267:ARG:HH11	1:C:267:ARG:HG3	1.34	0.93

There are no symmetry-related clashes.

## 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	280/295 (95%)	260 (93%)	19 (7%)	1 (0%)	34	42
1	B	280/295 (95%)	271 (97%)	9 (3%)	0	100	100
1	C	270/295 (92%)	257 (95%)	11 (4%)	2 (1%)	22	26
1	D	263/295 (89%)	242 (92%)	19 (7%)	2 (1%)	19	23
2	E	38/96 (40%)	36 (95%)	1 (3%)	1 (3%)	5	4
2	F	38/96 (40%)	31 (82%)	5 (13%)	2 (5%)	2	1
2	G	32/96 (33%)	29 (91%)	2 (6%)	1 (3%)	4	2
2	H	27/96 (28%)	23 (85%)	4 (15%)	0	100	100
All	All	1228/1564 (78%)	1149 (94%)	70 (6%)	9 (1%)	22	26

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	270	PRO
2	G	188	SER
1	C	270	PRO
2	F	149	SER
1	D	269	THR

### 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	254/263 (97%)	241 (95%)	13 (5%)	24	33

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	254/263 (97%)	242 (95%)	12 (5%)	26	37
1	C	247/263 (94%)	233 (94%)	14 (6%)	20	28
1	D	242/263 (92%)	220 (91%)	22 (9%)	9	11
2	E	38/83 (46%)	33 (87%)	5 (13%)	4	4
2	F	38/83 (46%)	31 (82%)	7 (18%)	1	1
2	G	33/83 (40%)	30 (91%)	3 (9%)	9	11
2	H	28/83 (34%)	25 (89%)	3 (11%)	6	7
All	All	1134/1384 (82%)	1055 (93%)	79 (7%)	15	19

5 of 79 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	267	ARG
1	D	94	GLU
2	G	141	MET
1	C	273	THR
1	D	39	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 29 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	192	GLN
1	C	303	GLN
2	F	190	GLN
1	C	199	GLN
1	D	103	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 [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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	284/295 (96%)	0.51	27 (9%) 8 11	22, 44, 71, 102	0
1	B	284/295 (96%)	0.45	23 (8%) 12 16	23, 43, 72, 98	0
1	C	276/295 (93%)	0.56	31 (11%) 5 7	22, 44, 91, 111	0
1	D	269/295 (91%)	0.82	39 (14%) 2 3	24, 51, 91, 115	0
2	E	42/96 (43%)	1.11	6 (14%) 2 3	36, 60, 89, 97	0
2	F	42/96 (43%)	0.97	9 (21%) 0 1	39, 60, 83, 97	0
2	G	36/96 (37%)	1.65	13 (36%) 0 0	48, 75, 109, 113	0
2	H	31/96 (32%)	2.00	16 (51%) 0 0	51, 75, 96, 108	0
All	All	1264/1564 (80%)	0.68	164 (12%) 3 4	22, 48, 88, 115	0

The worst 5 of 164 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	271	SER	8.4
1	B	270	PRO	7.3
1	A	270	PRO	6.3
1	D	292	ALA	6.1
1	C	315	GLY	6.1

### 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. 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	ZN	B	6	1/1	0.84	0.17	123,123,123,123	0
3	ZN	F	3	1/1	0.94	0.09	71,71,71,71	0
3	ZN	A	5	1/1	0.97	0.15	108,108,108,108	0
3	ZN	E	4	1/1	0.97	0.10	76,76,76,76	0
3	ZN	B	2	1/1	0.98	0.09	55,55,55,55	0
3	ZN	A	1	1/1	0.99	0.08	60,60,60,60	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.