



# wwPDB X-ray Structure Validation Summary Report

Feb 27, 2014 – 04:18 PM GMT

PDB ID : 2C5C  
Title : SHIGA-LIKE TOXIN 1 B SUBUNIT COMPLEXED WITH A BIVALENT INHIBITOR  
Authors : Dodd, R.B.; Read, R.J.  
Deposited on : 2005-10-26  
Resolution : 2.94 Å(reported)

This is a wwPDB 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 <http://wwpdb.org/ValidationPDFNotes.html>

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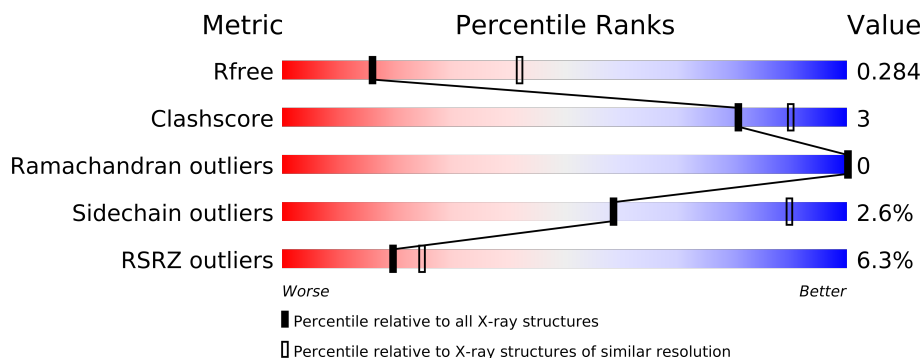
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	1.15 2013
Xtriage (Phenix)	:	dev-1323
EDS	:	stable22639
Percentile statistics	:	21963
Refmac	:	5.8.0049
CCP4	:	6.3.0 (Settle)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP)	:	stable22683

# 1 Overall quality at a glance

The reported resolution of this entry is 2.94 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))
$R_{free}$	66092	1424 (2.98-2.90)
Clashscore	79885	1761 (2.98-2.90)
Ramachandran outliers	78287	1708 (2.98-2.90)
Sidechain outliers	78261	1710 (2.98-2.90)
RSRZ outliers	66119	1425 (2.98-2.90)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	69	
1	B	69	
1	C	69	
1	D	69	
1	E	69	
1	F	69	
1	G	69	
1	H	69	
1	I	69	
1	J	69	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
3	S10	C	1073	-	X
5	GLA	C	1070	-	X

## 2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 6136 atoms, of which 0 are hydrogen and 0 are deuterium.

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 SHIGA-LIKE TOXIN 1 B SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	B	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	C	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	D	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	E	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	F	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	G	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	H	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	I	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			
1	J	69	Total	C	N	O	S	0	0	0
			540	339	90	108	3			

- Molecule 2 is a polymer of unknown type called SUGAR (3-MER).

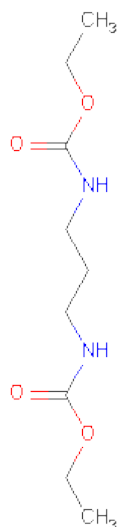
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	3	Total	C	O	0	0
			34	18	16		
2	A	3	Total	C	O	0	0
			34	18	16		
2	B	3	Total	C	O	0	0
			34	18	16		
2	B	3	Total	C	O	0	0
			34	18	16		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	C	3	Total	C	O	0	0
			34	18	16		
2	E	3	Total	C	O	0	0
			34	18	16		
2	H	3	Total	C	O	0	0
			34	18	16		
2	J	3	Total	C	O	0	0
			34	18	16		
2	J	3	Total	C	O	0	0
			34	18	16		

- Molecule 3 is DIETHYL PROPANE-1,3-DIYLBISCARBAMATE (three-letter code: S10) (formula: C<sub>9</sub>H<sub>18</sub>N<sub>2</sub>O<sub>4</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			15	9	2	4		
3	C	1	Total	C	N	O	0	0
			15	9	2	4		
3	D	1	Total	C	N	O	0	0
			15	9	2	4		
3	E	1	Total	C	O		0	0
			5	3	2			
3	F	1	Total	C	N	O	0	0
			9	6	1	2		
3	I	1	Total	C	N	O	0	0
			15	9	2	4		

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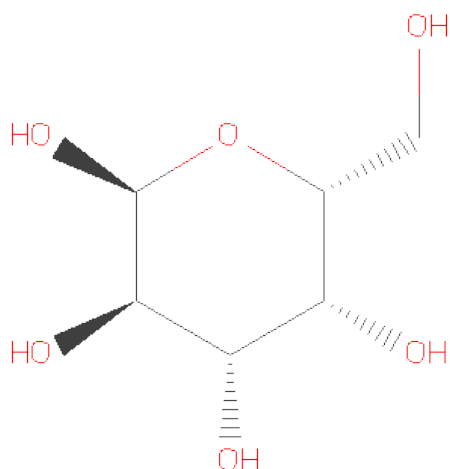
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	J	1	Total	C	N	O	0	0
			15	9	2	4		
3	J	1	Total	C	O		0	0
			5	3	2			

- Molecule 4 is a polymer of unknown type called SUGAR (3-MER).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	3	Total	C	O	0	0
			34	18	16		

- Molecule 5 is SUGAR (ALPHA D-GALACTOSE) (three-letter code: GLA) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	C	1	Total	C	O	0	0
			11	6	5		

- Molecule 6 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	C	2	Total	C	O	0	0
			22	12	10		
6	D	2	Total	C	O	0	0
			22	12	10		
6	E	2	Total	C	O	0	0
			22	12	10		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	G	2	Total	C	O	0	0
			22	12	10		
6	H	2	Total	C	O	0	0
			22	12	10		
6	I	2	Total	C	O	0	0
			22	12	10		

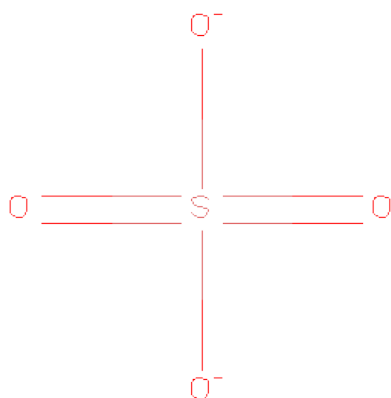
- Molecule 7 is a polymer of unknown type called SUGAR (3-MER).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	D	3	Total	C	O	0	0
			34	18	16		
7	D	3	Total	C	O	0	0
			34	18	16		

- Molecule 8 is a polymer of unknown type called SUGAR (3-MER).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	I	3	Total	C	O	0	0
			34	18	16		
8	I	3	Total	C	O	0	0
			34	18	16		

- Molecule 9 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	I	1	Total	O	S	0	0
			5	4	1		

- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	5	Total	O	0	0
			5	5		
10	B	1	Total	O	0	0
			1	1		
10	D	2	Total	O	0	0
			2	2		
10	E	2	Total	O	0	0
			2	2		
10	G	1	Total	O	0	0
			1	1		
10	I	2	Total	O	0	0
			2	2		
10	J	5	Total	O	0	0
			5	5		

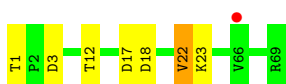


### 3 Residue-property plots

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 ( $RSRZ > 2$ ). 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: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain A: 



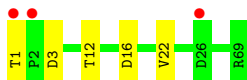
- Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain B: 



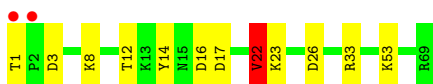
- Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain C: 



- Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain D: 



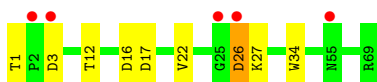
- Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain E: 

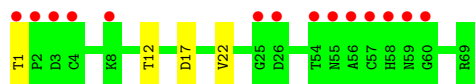


- Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

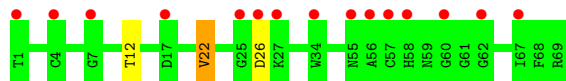
Chain F: 



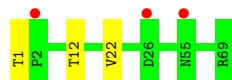
## ● Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain G: 

## ● Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain H: 

## ● Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain I: 

## ● Molecule 1: SHIGA-LIKE TOXIN 1 B SUBUNIT

Chain J: 

## 4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	114.31 Å   114.31 Å   406.94 Å 90.00°   90.00°   120.00°	Depositor
Resolution (Å)	22.76 – 2.94 22.76 – 2.94	Depositor EDS
% Data completeness (in resolution range)	90.4 (22.76-2.94) 90.4 (22.76-2.94)	Depositor EDS
$R_{merge}$	0.18	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.05 (at 2.94 Å)	Xtriage
Refinement program	REFMAC 5.1.29	Depositor
R, $R_{free}$	0.198   ,   0.267 0.207   ,   0.284	Depositor DCC
$R_{free}$ test set	1029 reflections (5.39%)	DCC
Wilson B-factor (Å <sup>2</sup> )	65.5	Xtriage
Anisotropy	0.048	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 14.5	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.35$	Xtriage
Outliers	0 of 20116 reflections	Xtriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	6136	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.86% of the height of the origin peak. No significant pseudotranslation is detected.*

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

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: S10, GLA, GLC, GAL, BGC, 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	1.10	0/549	1.05	3/742 (0.4%)
1	B	1.26	2/549 (0.4%)	1.09	2/742 (0.3%)
1	C	1.03	0/549	1.03	2/742 (0.3%)
1	D	1.17	2/549 (0.4%)	1.09	3/742 (0.4%)
1	E	1.22	2/549 (0.4%)	1.11	2/742 (0.3%)
1	F	1.00	0/549	1.09	4/742 (0.5%)
1	G	0.90	0/549	0.98	1/742 (0.1%)
1	H	0.82	0/549	0.87	1/742 (0.1%)
1	I	0.98	0/549	0.98	0/742
1	J	1.14	0/549	1.05	1/742 (0.1%)
All	All	1.07	6/5490 (0.1%)	1.04	19/7420 (0.3%)

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
2	A	2	0
2	B	2	0
2	C	1	0
2	E	1	0
2	H	1	0
2	J	2	0
4	B	1	0
8	I	2	0
All	All	12	0

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	22	VAL	CB-CG2	-6.50	1.39	1.52
1	B	42	SER	CB-OG	-6.07	1.34	1.42
1	E	22	VAL	CB-CG2	-5.65	1.41	1.52
1	D	14	TYR	CD2-CE2	5.50	1.47	1.39
1	E	64	SER	C-O	-5.21	1.13	1.23

The worst 5 of 19 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	16	ASP	CB-CG-OD2	8.12	125.61	118.30
1	F	26	ASP	CB-CG-OD2	7.91	125.42	118.30
1	E	17	ASP	CB-CG-OD2	7.13	124.72	118.30
1	A	17	ASP	CB-CG-OD2	6.84	124.46	118.30
1	E	16	ASP	CB-CG-OD2	6.56	124.20	118.30

5 of 12 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	A	1072	GLC	C1
2	A	1075	GLC	C1
2	B	72	GLC	C1
2	B	1074	GLC	C1
4	B	1075	GLC	C1

There are no planarity outliers.

## 5.2 Close contacts ⓘ

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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	540	0	527	1	0
1	B	540	0	527	1	0
1	C	540	0	527	1	0
1	D	540	0	527	3	0
1	E	540	0	527	2	0
1	F	540	0	527	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	540	0	527	1	0
1	H	540	0	527	1	0
1	I	540	0	527	1	0
1	J	540	0	527	3	0
2	A	68	0	58	1	0
2	B	68	0	59	1	0
2	C	34	0	29	1	0
2	E	34	0	29	0	0
2	H	34	0	30	0	0
2	J	68	0	58	2	0
3	A	15	0	14	0	0
3	C	15	0	16	0	0
3	D	15	0	16	2	0
3	E	5	0	4	0	0
3	F	9	0	9	1	0
3	I	15	0	14	0	0
3	J	20	0	19	2	0
4	B	34	0	28	1	0
5	C	11	0	10	1	0
6	C	22	0	17	1	0
6	D	22	0	19	1	0
6	E	22	0	18	0	0
6	G	22	0	19	0	0
6	H	22	0	19	2	0
6	I	22	0	19	1	0
7	D	68	0	58	2	36
8	I	68	0	58	8	34
9	I	5	0	0	0	0
10	A	5	0	0	0	0
10	B	1	0	0	0	0
10	D	2	0	0	0	0
10	E	2	0	0	0	0
10	G	1	0	0	0	0
10	I	2	0	0	0	0
10	J	5	0	0	0	0
All	All	6136	0	5890	39	70

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 3.

The worst 5 of 39 close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
6:H:1070:GLA:C1	6:H:1071:GLA:H61	2.01	0.90
4:B:1077:GAL:H4	1:F:34:TRP:CD2	2.35	0.62
5:C:1070:GLA:O6	5:C:1070:GLA:O4	2.20	0.60
1:E:11:TYR:OH	1:E:28:GLU:OE2	2.14	0.56
3:J:1076:S10:H133	3:J:1076:S10:O15	2.09	0.52

The worst 5 of 70 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	Distance(Å)	Clash(Å)
7:D:1072:GLA:C1	7:D:1076:GLA:C1[6_555]	0.00	2.20
7:D:1072:GLA:C2	7:D:1076:GLA:C2[6_555]	0.00	2.20
7:D:1072:GLA:C3	7:D:1076:GLA:C3[6_555]	0.00	2.20
7:D:1072:GLA:C4	7:D:1076:GLA:C4[6_555]	0.00	2.20
7:D:1072:GLA:C5	7:D:1076:GLA:C5[6_555]	0.00	2.20

## 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	67/69 (97%)	63 (94%)	4 (6%)	0	100	100
1	B	67/69 (97%)	65 (97%)	2 (3%)	0	100	100
1	C	67/69 (97%)	65 (97%)	2 (3%)	0	100	100
1	D	67/69 (97%)	64 (96%)	3 (4%)	0	100	100
1	E	67/69 (97%)	65 (97%)	2 (3%)	0	100	100
1	F	67/69 (97%)	64 (96%)	3 (4%)	0	100	100
1	G	67/69 (97%)	66 (98%)	1 (2%)	0	100	100
1	H	67/69 (97%)	65 (97%)	2 (3%)	0	100	100
1	I	67/69 (97%)	65 (97%)	2 (3%)	0	100	100
1	J	67/69 (97%)	65 (97%)	2 (3%)	0	100	100
All	All	670/690 (97%)	647 (97%)	23 (3%)	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	61/61 (100%)	58 (95%)	3 (5%)	35	73
1	B	61/61 (100%)	60 (98%)	1 (2%)	75	94
1	C	61/61 (100%)	60 (98%)	1 (2%)	75	94
1	D	61/61 (100%)	57 (93%)	4 (7%)	24	57
1	E	61/61 (100%)	60 (98%)	1 (2%)	75	94
1	F	61/61 (100%)	60 (98%)	1 (2%)	75	94
1	G	61/61 (100%)	60 (98%)	1 (2%)	75	94
1	H	61/61 (100%)	60 (98%)	1 (2%)	75	94
1	I	61/61 (100%)	60 (98%)	1 (2%)	75	94
1	J	61/61 (100%)	59 (97%)	2 (3%)	50	86
All	All	610/610 (100%)	594 (97%)	16 (3%)	59	90

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	22	VAL
1	D	23	LYS
1	H	22	VAL
1	D	8	LYS
1	I	1	THR

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

### 5.3.3 RNA ⓘ

There are no RNA chains 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 ⓘ

54 carbohydrates 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	GLA	A	1070	2	10,11,12	0.77	0	11,15,17	2.69	4 (36%)
2	GAL	A	1071	3,2	10,11,12	1.03	1 (10%)	11,15,17	1.84	4 (36%)
2	GLC	A	1072	2	12,12,12	1.17	2 (16%)	17,17,17	2.21	9 (52%)
2	GLA	A	1073	2	10,11,12	1.19	1 (10%)	11,15,17	1.70	1 (9%)
2	GAL	A	1074	3,2	10,11,12	0.71	0	11,15,17	3.31	3 (27%)
2	GLC	A	1075	2	12,12,12	0.58	0	17,17,17	2.38	8 (47%)
2	GLA	B	1072	2	10,11,12	1.47	1 (10%)	11,15,17	2.47	5 (45%)
2	GAL	B	1073	2	10,11,12	1.49	1 (10%)	11,15,17	2.96	6 (54%)
2	GLC	B	1074	2	12,12,12	1.16	1 (8%)	17,17,17	1.70	6 (35%)
4	GLC	B	1075	4	12,12,12	0.87	0	17,17,17	2.94	8 (47%)
4	GLA	B	1076	4	10,11,12	1.23	0	11,15,17	4.15	8 (72%)
4	GAL	B	1077	3,4	10,11,12	0.75	0	11,15,17	2.46	2 (18%)
2	GLA	B	70	2	10,11,12	1.27	1 (10%)	11,15,17	1.97	3 (27%)
2	GAL	B	71	2	10,11,12	1.16	1 (10%)	11,15,17	1.46	2 (18%)
2	GLC	B	72	2	12,12,12	1.02	1 (8%)	17,17,17	2.47	8 (47%)
6	GLA	C	1071	6	10,11,12	1.26	2 (20%)	11,15,17	2.01	5 (45%)
6	GLA	C	1072	3,6	10,11,12	1.00	0	11,15,17	4.75	6 (54%)
2	GLA	C	1074	2	10,11,12	1.06	1 (10%)	11,15,17	1.58	3 (27%)
2	GAL	C	1075	3,2	10,11,12	1.07	1 (10%)	11,15,17	3.33	7 (63%)
2	GLC	C	1076	2	12,12,12	0.95	0	17,17,17	2.76	5 (29%)
6	GLA	D	1070	6	10,11,12	0.83	0	11,15,17	3.19	7 (63%)
6	GLA	D	1071	6	10,11,12	2.08	5 (50%)	11,15,17	4.65	5 (45%)
7	GLA	D	1072	7	10,11,12	1.08	0	11,15,17	1.51	2 (18%)
7	GAL	D	1073	3,7	10,11,12	1.00	0	11,15,17	2.00	3 (27%)
7	BGC	D	1074	7	12,12,12	0.62	0	17,17,17	2.10	4 (23%)
7	GLA	D	1076	7	10,11,12	1.09	0	11,15,17	1.50	2 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	GAL	D	1077	3,7	10,11,12	1.01	0	11,15,17	2.00	3 (27%)
7	BGC	D	1078	7	12,12,12	0.61	0	17,17,17	2.10	4 (23%)
6	GLA	E	1070	6	10,11,12	0.86	0	11,15,17	1.59	2 (18%)
6	GLA	E	1071	3,6	10,11,12	1.32	2 (20%)	11,15,17	3.54	5 (45%)
2	GLA	E	1072	2	10,11,12	1.59	2 (20%)	11,15,17	2.85	6 (54%)
2	GAL	E	1073	3,2	10,11,12	1.06	1 (10%)	11,15,17	2.86	5 (45%)
2	GLC	E	1074	2	12,12,12	0.75	0	17,17,17	2.24	5 (29%)
6	GLA	G	1070	6	10,11,12	0.88	0	11,15,17	3.54	4 (36%)
6	GLA	G	1071	6	10,11,12	0.75	0	11,15,17	3.23	6 (54%)
6	GLA	H	1070	6	10,11,12	0.77	0	11,15,17	3.76	4 (36%)
6	GLA	H	1071	6	10,11,12	1.52	2 (20%)	11,15,17	3.05	5 (45%)
2	GLA	H	1072	2	10,11,12	0.93	1 (10%)	11,15,17	2.93	5 (45%)
2	GAL	H	1073	2	10,11,12	1.06	1 (10%)	11,15,17	2.85	6 (54%)
2	GLC	H	1074	2	12,12,12	0.73	0	17,17,17	2.69	6 (35%)
6	GLA	I	1070	6	10,11,12	1.62	3 (30%)	11,15,17	2.51	4 (36%)
6	GLA	I	1071	6	10,11,12	1.42	1 (10%)	11,15,17	2.69	7 (63%)
8	GLA	I	1072	8	10,11,12	1.18	1 (10%)	11,15,17	2.39	2 (18%)
8	GLA	I	1073	8,3	10,11,12	0.78	0	11,15,17	1.28	1 (9%)
8	BGC	I	1074	8	12,12,12	0.84	0	17,17,17	2.29	5 (29%)
8	GLA	I	1077	8	10,11,12	1.18	1 (10%)	11,15,17	2.39	2 (18%)
8	GLA	I	1078	8,3	10,11,12	0.78	0	11,15,17	1.28	1 (9%)
8	BGC	I	1079	8	12,12,12	0.84	0	17,17,17	2.29	5 (29%)
2	GLA	J	1070	2	10,11,12	0.83	0	11,15,17	2.42	3 (27%)
2	GAL	J	1071	3,2	10,11,12	1.33	1 (10%)	11,15,17	4.59	9 (81%)
2	GLC	J	1072	2	12,12,12	0.73	0	17,17,17	2.98	8 (47%)
2	GLA	J	1073	2	10,11,12	0.68	0	11,15,17	1.96	4 (36%)
2	GAL	J	1074	3,2	10,11,12	1.11	0	11,15,17	3.23	7 (63%)
2	GLC	J	1075	2	12,12,12	0.90	0	17,17,17	2.03	6 (35%)

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	GLA	A	1070	2	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GAL	A	1071	3,2	-	0/2/19/22	0/1/1/1
2	GLC	A	1072	2	1/1/5/5	0/2/22/22	0/1/1/1
2	GLA	A	1073	2	-	0/2/19/22	0/1/1/1
2	GAL	A	1074	3,2	-	0/2/19/22	0/1/1/1
2	GLC	A	1075	2	1/1/5/5	0/2/22/22	0/1/1/1
2	GLA	B	1072	2	-	0/2/19/22	0/1/1/1
2	GAL	B	1073	2	-	0/2/19/22	0/1/1/1
2	GLC	B	1074	2	1/1/5/5	0/2/22/22	0/1/1/1
4	GLC	B	1075	4	1/1/5/5	0/2/22/22	0/1/1/1
4	GLA	B	1076	4	-	0/2/19/22	0/1/1/1
4	GAL	B	1077	3,4	-	0/2/19/22	0/1/1/1
2	GLA	B	70	2	-	0/2/19/22	0/1/1/1
2	GAL	B	71	2	-	0/2/19/22	0/1/1/1
2	GLC	B	72	2	1/1/5/5	0/2/22/22	0/1/1/1
6	GLA	C	1071	6	-	0/2/19/22	0/1/1/1
6	GLA	C	1072	3,6	-	0/2/19/22	0/1/1/1
2	GLA	C	1074	2	-	0/2/19/22	0/1/1/1
2	GAL	C	1075	3,2	-	0/2/19/22	0/1/1/1
2	GLC	C	1076	2	1/1/5/5	0/2/22/22	0/1/1/1
6	GLA	D	1070	6	-	0/2/19/22	0/1/1/1
6	GLA	D	1071	6	-	0/2/19/22	0/1/1/1
7	GLA	D	1072	7	-	0/2/19/22	0/1/1/1
7	GAL	D	1073	3,7	-	0/2/19/22	0/1/1/1
7	BGC	D	1074	7	-	0/2/22/22	0/1/1/1
7	GLA	D	1076	7	-	0/2/19/22	0/1/1/1
7	GAL	D	1077	3,7	-	0/2/19/22	0/1/1/1
7	BGC	D	1078	7	-	0/2/22/22	0/1/1/1
6	GLA	E	1070	6	-	0/2/19/22	0/1/1/1
6	GLA	E	1071	3,6	-	0/2/19/22	0/1/1/1
2	GLA	E	1072	2	-	0/2/19/22	0/1/1/1
2	GAL	E	1073	3,2	-	0/2/19/22	0/1/1/1
2	GLC	E	1074	2	1/1/5/5	0/2/22/22	0/1/1/1
6	GLA	G	1070	6	-	0/2/19/22	0/1/1/1
6	GLA	G	1071	6	-	0/2/19/22	0/1/1/1
6	GLA	H	1070	6	-	0/2/19/22	0/1/1/1
6	GLA	H	1071	6	-	0/2/19/22	0/1/1/1
2	GLA	H	1072	2	-	0/2/19/22	0/1/1/1
2	GAL	H	1073	2	-	0/2/19/22	0/1/1/1
2	GLC	H	1074	2	1/1/5/5	0/2/22/22	0/1/1/1
6	GLA	I	1070	6	-	0/2/19/22	0/1/1/1
6	GLA	I	1071	6	-	0/2/19/22	0/1/1/1
8	GLA	I	1072	8	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	GLA	I	1073	8,3	1/1/4/5	0/2/19/22	0/1/1/1
8	BGC	I	1074	8	-	0/2/22/22	0/1/1/1
8	GLA	I	1077	8	-	0/2/19/22	0/1/1/1
8	GLA	I	1078	8,3	1/1/4/5	0/2/19/22	0/1/1/1
8	BGC	I	1079	8	-	0/2/22/22	0/1/1/1
2	GLA	J	1070	2	-	0/2/19/22	0/1/1/1
2	GAL	J	1071	3,2	-	0/2/19/22	0/1/1/1
2	GLC	J	1072	2	1/1/5/5	0/2/22/22	0/1/1/1
2	GLA	J	1073	2	-	0/2/19/22	0/1/1/1
2	GAL	J	1074	3,2	-	0/2/19/22	0/1/1/1
2	GLC	J	1075	2	1/1/5/5	0/2/22/22	0/1/1/1

The worst 5 of 35 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	D	1071	GLA	C3-C2	3.72	1.61	1.52
2	B	1072	GLA	O5-C5	-3.55	1.38	1.45
2	B	1073	GAL	C4-C5	3.30	1.60	1.53
6	I	1071	GLA	C3-C2	3.10	1.59	1.52
6	I	1070	GLA	C4-C5	3.10	1.59	1.53

The worst 5 of 256 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	1072	GLA	O5-C5-C6	13.25	120.88	106.98
6	H	1070	GLA	O5-C5-C6	11.04	118.56	106.98
2	J	1071	GAL	O5-C5-C6	-10.28	96.20	106.98
2	A	1074	GAL	O5-C5-C4	-9.35	98.78	110.65
6	E	1071	GLA	O5-C5-C6	9.20	116.64	106.98

5 of 12 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
8	I	1073	GLA	C1
8	I	1078	GLA	C1
2	A	1075	GLC	C1
2	B	1074	GLC	C1
2	J	1075	GLC	C1

There are no torsion outliers.

There are no ring outliers.

## 5.6 Ligand geometry ⓘ

10 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
3	S10	A	1076	2,6	14,14,14	2.12	2 (14%)	15,15,15	2.23	6 (40%)
5	GLA	C	1070	-	10,11,12	1.43	1 (10%)	11,15,17	3.37	7 (63%)
3	S10	C	1073	2,6	14,14,14	2.66	3 (21%)	15,15,15	2.07	6 (40%)
3	S10	D	1075	7	14,14,14	1.95	4 (28%)	15,15,15	2.88	9 (60%)
3	S10	E	1075	2	3,4,14	0.97	0	1,3,15	0.34	0
3	S10	F	1073	4	8,8,14	4.23	3 (37%)	8,8,15	3.65	4 (50%)
3	S10	I	1075	8	14,14,14	1.94	2 (14%)	15,15,15	2.61	6 (40%)
9	SO4	I	1076	-	4,4,4	0.23	0	6,6,6	0.43	0
3	S10	J	1076	2	14,14,14	2.06	2 (14%)	15,15,15	4.15	8 (53%)
3	S10	J	1077	2	3,4,14	0.74	0	1,3,15	1.16	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
3	S10	A	1076	2,6	-	0/14/14/14	0/0/0/0
5	GLA	C	1070	-	-	0/2/19/22	0/1/1/1
3	S10	C	1073	2,6	-	0/14/14/14	0/0/0/0
3	S10	D	1075	7	-	0/14/14/14	0/0/0/0
3	S10	E	1075	2	-	0/1/2/14	0/0/0/0
3	S10	F	1073	4	-	0/7/7/14	0/0/0/0
3	S10	I	1075	8	-	0/14/14/14	0/0/0/0
9	SO4	I	1076	-	-	0/0/0/0	0/0/0/0
3	S10	J	1076	2	-	0/14/14/14	0/0/0/0
3	S10	J	1077	2	-	0/1/2/14	0/0/0/0

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	1073	S10	C6-C7	8.31	1.58	1.55
3	C	1073	S10	O11-C10	6.47	1.48	1.35
3	C	1073	S10	O3-C4	6.44	1.48	1.35
3	F	1073	S10	O11-C10	6.32	1.48	1.35
3	J	1076	S10	O11-C10	5.73	1.47	1.35

The worst 5 of 46 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	J	1076	S10	O3-C4-N5	9.80	128.17	110.65
3	J	1076	S10	C6-N5-C4	-8.23	107.00	121.99
3	J	1076	S10	O14-C4-N5	-6.33	114.42	124.94
3	F	1073	S10	O11-C10-N9	6.12	121.58	110.65
3	F	1073	S10	C12-O11-C10	5.34	126.46	116.09

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 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, 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	69/69 (100%)	0.05	1 (1%) 72 82	26, 31, 38, 41	0
1	B	69/69 (100%)	-0.07	0 100 100	26, 31, 38, 41	0
1	C	69/69 (100%)	0.15	3 (4%) 34 42	27, 31, 38, 41	0
1	D	69/69 (100%)	0.09	2 (2%) 49 59	27, 31, 38, 41	0
1	E	69/69 (100%)	-0.02	0 100 100	27, 31, 38, 41	0
1	F	69/69 (100%)	0.11	5 (7%) 15 20	27, 31, 38, 41	0
1	G	69/69 (100%)	0.82	14 (20%) 1 2	27, 31, 38, 41	0
1	H	69/69 (100%)	0.93	15 (21%) 1 2	27, 31, 38, 41	0
1	I	69/69 (100%)	0.29	3 (4%) 34 42	27, 31, 38, 41	0
1	J	69/69 (100%)	0.07	0 100 100	27, 31, 38, 41	0
All	All	690/690 (100%)	0.24	43 (6%) 19 25	26, 31, 39, 41	0

The worst 5 of 43 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	1	THR	4.5
1	G	26	ASP	4.5
1	C	2	PRO	4.2
1	G	55	ASN	4.1
1	H	55	ASN	3.8

### 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

## 6.3 Carbohydrates

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, 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	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	GLC	B	72	12/12	0.24	3.55	55,62,64,65	0
6	GLA	G	1070	11/12	0.37	2.53	87,90,91,92	0
2	GLC	A	1072	12/12	0.26	2.51	38,49,51,54	0
6	GLA	I	1070	11/12	0.30	1.78	61,72,77,79	0
2	GAL	B	71	11/12	0.20	1.57	48,59,63,63	0
2	GLA	B	1072	11/12	0.20	1.00	48,52,54,55	0
6	GLA	H	1071	11/12	0.32	0.96	98,103,105,106	0
2	GLA	A	1073	11/12	0.25	0.94	44,52,56,57	0
8	BGC	I	1079	12/12	0.31	0.77	76,78,80,81	12
8	BGC	I	1074	12/12	0.30	0.55	76,78,80,81	12
6	GLA	D	1071	11/12	0.25	0.51	62,64,69,69	0
6	GLA	G	1071	11/12	0.30	0.50	79,85,88,90	0
7	BGC	D	1078	12/12	0.19	0.37	46,48,50,51	12
2	GAL	A	1071	11/12	0.18	0.27	37,43,51,51	0
2	GLA	J	1073	11/12	0.22	0.13	34,44,51,52	0
2	GLC	C	1076	12/12	0.32	0.10	75,80,84,85	0
2	GLA	J	1070	11/12	0.20	0.04	39,46,50,51	0
6	GLA	D	1070	11/12	0.20	-0.02	54,59,63,63	0
7	BGC	D	1074	12/12	0.17	-0.07	46,48,50,51	12
2	GLA	B	70	11/12	0.16	-0.10	41,53,60,67	0
2	GAL	A	1074	11/12	0.19	-0.30	48,49,52,52	0
2	GLA	E	1072	11/12	0.19	-0.34	40,42,50,52	0
6	GLA	H	1070	11/12	0.22	-0.37	85,97,98,99	0
8	GLA	I	1077	11/12	0.19	-0.45	67,68,70,70	11
2	GAL	J	1074	11/12	0.17	-0.53	37,41,45,50	0
2	GLC	E	1074	12/12	0.16	-0.54	42,48,52,54	0
4	GAL	B	1077	11/12	0.16	-0.56	42,56,58,62	0
2	GLA	H	1072	11/12	0.19	-0.57	93,97,99,100	0
2	GAL	J	1071	11/12	0.16	-0.63	43,48,52,54	0
7	GAL	D	1073	11/12	0.16	-0.64	36,45,51,54	11
8	GLA	I	1078	11/12	0.19	-0.67	71,75,77,80	11
6	GLA	C	1072	11/12	0.17	-0.69	58,59,64,70	0
2	GLA	A	1070	11/12	0.17	-0.78	37,40,42,43	0
2	GLC	A	1075	12/12	0.18	-0.82	42,44,49,49	0
7	GAL	D	1077	11/12	0.15	-0.87	36,45,51,54	11

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Mol	Type	Chain	Res	Atoms	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
6	GLA	E	1071	11/12	0.20	-0.95	56,60,65,65	0
7	GLA	D	1076	11/12	0.17	-0.95	36,40,44,44	11
2	GLA	C	1074	11/12	0.16	-0.95	60,66,70,70	0
6	GLA	C	1071	11/12	0.16	-0.96	44,53,56,57	0
8	GLA	I	1072	11/12	0.17	-0.98	67,68,70,70	11
2	GLC	J	1075	12/12	0.16	-0.99	30,37,41,42	0
6	GLA	E	1070	11/12	0.17	-1.01	61,66,67,69	0
2	GAL	B	1073	11/12	0.14	-1.13	55,59,62,62	0
8	GLA	I	1073	11/12	0.16	-1.20	71,75,77,80	11
7	GLA	D	1072	11/12	0.16	-1.20	36,40,44,44	11
4	GLA	B	1076	11/12	0.12	-1.33	51,54,56,58	0
4	GLC	B	1075	12/12	0.19	-1.33	49,55,56,58	0
2	GAL	C	1075	11/12	0.14	-1.44	66,70,74,76	0
2	GAL	H	1073	11/12	0.21	-1.53	99,101,103,104	0
2	GAL	E	1073	11/12	0.13	-1.55	30,40,44,46	0
2	GLC	H	1074	12/12	0.34	-2.33	96,103,105,106	0
2	GLC	J	1072	12/12	0.13	-2.66	27,43,47,51	0
6	GLA	I	1071	11/12	0.23	-12.33	72,80,84,84	0
2	GLC	B	1074	12/12	0.18	-79.00	55,67,71,72	0

## 6.4 Ligands

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, 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	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	S10	C	1073	15/15	0.27	4.70	74,79,87,87	0
5	GLA	C	1070	11/12	0.28	2.87	57,67,73,74	0
9	SO4	I	1076	5/5	0.21	1.20	73,74,75,75	5
3	S10	D	1075	15/15	0.23	0.94	58,59,60,60	15
3	S10	J	1076	15/15	0.21	0.71	42,57,59,59	0
3	S10	F	1073	9/15	0.28	0.60	55,65,73,78	0
3	S10	E	1075	5/15	0.20	-0.20	40,44,51,53	0
3	S10	I	1075	15/15	0.35	-	76,77,79,79	15
3	S10	J	1077	5/15	0.32	-	59,60,62,63	0
3	S10	A	1076	15/15	0.36	-	45,68,78,78	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.