



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 3, 2023 – 03:51 PM EDT

PDB ID : 3TDX  
Title : Crystal structure of HSC L82V  
Authors : Czyzewski, B.K.; Wang, D.-N.  
Deposited on : 2011-08-11  
Resolution : 2.50 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35  
buster-report : 1.1.7 (2018)  
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) : 2.35

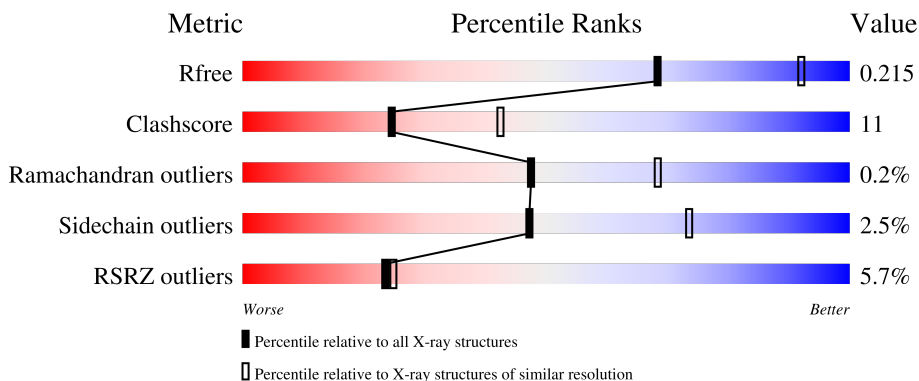
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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 of 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	268	 6% 86% 8% . .
1	B	268	 3% 83% 12% . .
1	C	268	 14% 78% 19% . .
1	D	268	 3% 82% 13% . .
1	E	268	 3% 82% 12% . .

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:

<b>Mol</b>	<b>Type</b>	<b>Chain</b>	<b>Res</b>	<b>Chirality</b>	<b>Geometry</b>	<b>Clashes</b>	<b>Electron density</b>
4	BOG	C	268	-	-	X	X

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 10110 atoms, of which 146 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 formate/nitrite transporter.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	257	1896	1243	299	340	14	0	0	0
1	B	257	1900	1246	300	340	14	0	0	0
1	C	266	1968	1289	311	354	14	0	0	0
1	D	257	1900	1246	300	340	14	0	0	0
1	E	256	1889	1240	296	339	14	0	0	0

There are 60 discrepancies between the modelled and reference sequences:

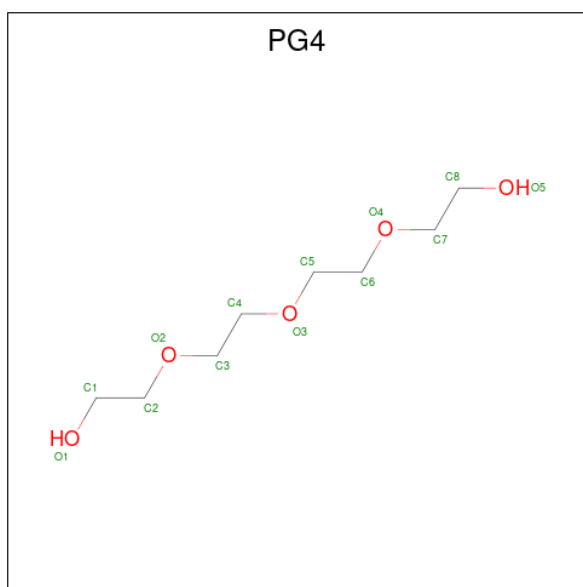
Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	MET	-	expression tag	UNP Q186B7
A	-1	GLY	-	expression tag	UNP Q186B7
A	0	ARG	-	expression tag	UNP Q186B7
A	1	ALA	-	expression tag	UNP Q186B7
A	82	VAL	LEU	engineered mutation	UNP Q186B7
A	259	ALA	-	expression tag	UNP Q186B7
A	260	ALA	-	expression tag	UNP Q186B7
A	261	ALA	-	expression tag	UNP Q186B7
A	262	GLU	-	expression tag	UNP Q186B7
A	263	ASN	-	expression tag	UNP Q186B7
A	264	LEU	-	expression tag	UNP Q186B7
A	265	TYR	-	expression tag	UNP Q186B7
B	-2	MET	-	expression tag	UNP Q186B7
B	-1	GLY	-	expression tag	UNP Q186B7
B	0	ARG	-	expression tag	UNP Q186B7
B	1	ALA	-	expression tag	UNP Q186B7
B	82	VAL	LEU	engineered mutation	UNP Q186B7
B	259	ALA	-	expression tag	UNP Q186B7
B	260	ALA	-	expression tag	UNP Q186B7

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Chain	Residue	Modelled	Actual	Comment	Reference
B	261	ALA	-	expression tag	UNP Q186B7
B	262	GLU	-	expression tag	UNP Q186B7
B	263	ASN	-	expression tag	UNP Q186B7
B	264	LEU	-	expression tag	UNP Q186B7
B	265	TYR	-	expression tag	UNP Q186B7
C	-2	MET	-	expression tag	UNP Q186B7
C	-1	GLY	-	expression tag	UNP Q186B7
C	0	ARG	-	expression tag	UNP Q186B7
C	1	ALA	-	expression tag	UNP Q186B7
C	82	VAL	LEU	engineered mutation	UNP Q186B7
C	259	ALA	-	expression tag	UNP Q186B7
C	260	ALA	-	expression tag	UNP Q186B7
C	261	ALA	-	expression tag	UNP Q186B7
C	262	GLU	-	expression tag	UNP Q186B7
C	263	ASN	-	expression tag	UNP Q186B7
C	264	LEU	-	expression tag	UNP Q186B7
C	265	TYR	-	expression tag	UNP Q186B7
D	-2	MET	-	expression tag	UNP Q186B7
D	-1	GLY	-	expression tag	UNP Q186B7
D	0	ARG	-	expression tag	UNP Q186B7
D	1	ALA	-	expression tag	UNP Q186B7
D	82	VAL	LEU	engineered mutation	UNP Q186B7
D	259	ALA	-	expression tag	UNP Q186B7
D	260	ALA	-	expression tag	UNP Q186B7
D	261	ALA	-	expression tag	UNP Q186B7
D	262	GLU	-	expression tag	UNP Q186B7
D	263	ASN	-	expression tag	UNP Q186B7
D	264	LEU	-	expression tag	UNP Q186B7
D	265	TYR	-	expression tag	UNP Q186B7
E	-2	MET	-	expression tag	UNP Q186B7
E	-1	GLY	-	expression tag	UNP Q186B7
E	0	ARG	-	expression tag	UNP Q186B7
E	1	ALA	-	expression tag	UNP Q186B7
E	82	VAL	LEU	engineered mutation	UNP Q186B7
E	259	ALA	-	expression tag	UNP Q186B7
E	260	ALA	-	expression tag	UNP Q186B7
E	261	ALA	-	expression tag	UNP Q186B7
E	262	GLU	-	expression tag	UNP Q186B7
E	263	ASN	-	expression tag	UNP Q186B7
E	264	LEU	-	expression tag	UNP Q186B7
E	265	TYR	-	expression tag	UNP Q186B7

- Molecule 2 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: C<sub>8</sub>H<sub>18</sub>O<sub>5</sub>).

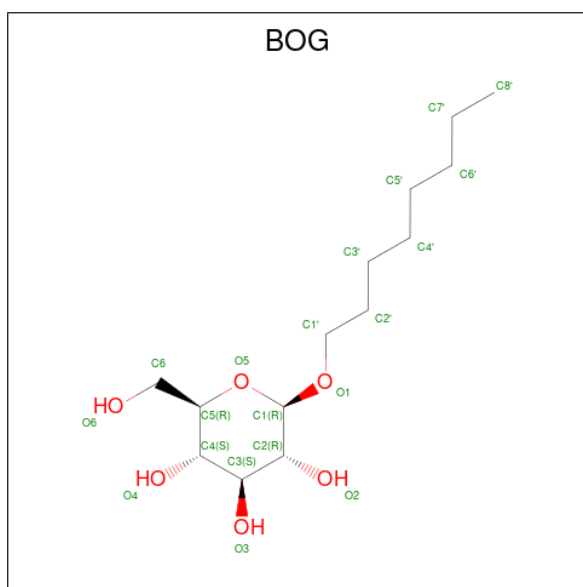


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
2	A	1	31	8	18	5	0	0
2	B	1	31	8	18	5	0	0
2	C	1	31	8	18	5	0	0
2	D	1	31	8	18	5	0	0
2	E	1	31	8	18	5	0	0

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Cl		
3	A	1	1	1	0	0
3	B	1	1	1	0	0
3	C	1	1	1	0	0
3	D	1	1	1	0	0
3	E	1	1	1	0	0

- Molecule 4 is octyl beta-D-glucopyranoside (three-letter code: BOG) (formula: C<sub>14</sub>H<sub>28</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	H			O
4	C	1	48	14	28	6	0	0
4	E	1	48	14	28	6	0	0

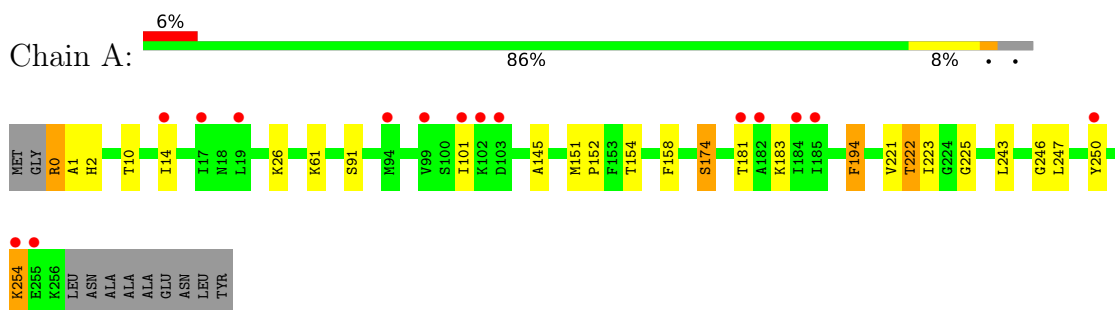
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	69	Total	O	0	0
			69	69		
5	B	68	Total	O	0	0
			68	68		
5	C	41	Total	O	0	0
			41	41		
5	D	62	Total	O	0	0
			62	62		
5	E	61	Total	O	0	0
			61	61		

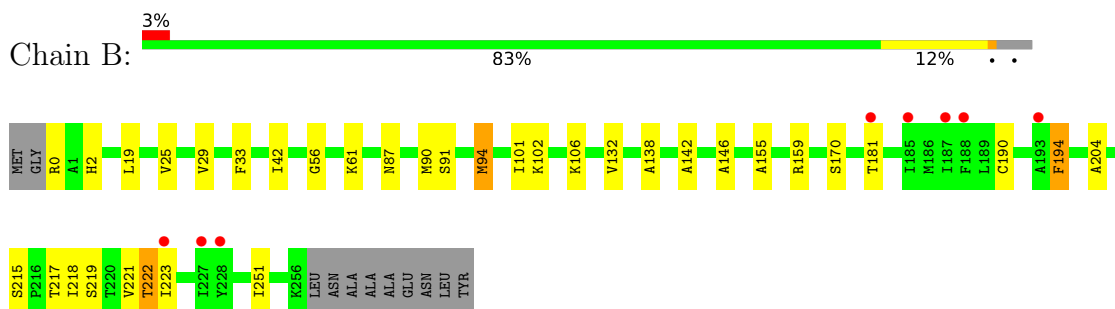
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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.

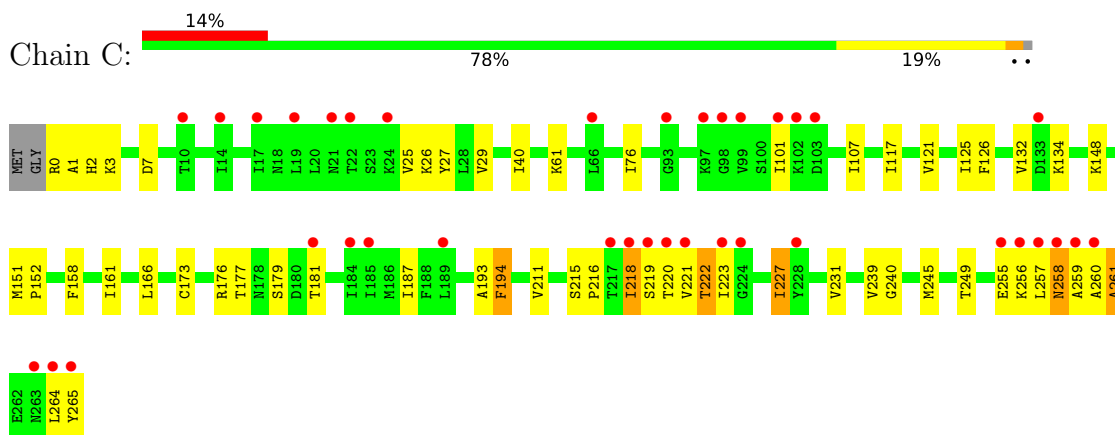
- Molecule 1: formate/nitrite transporter



- Molecule 1: formate/nitrite transporter

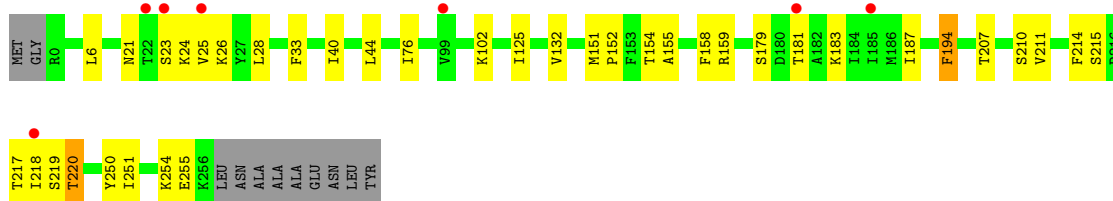
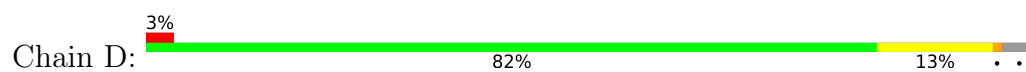


- Molecule 1: formate/nitrite transporter

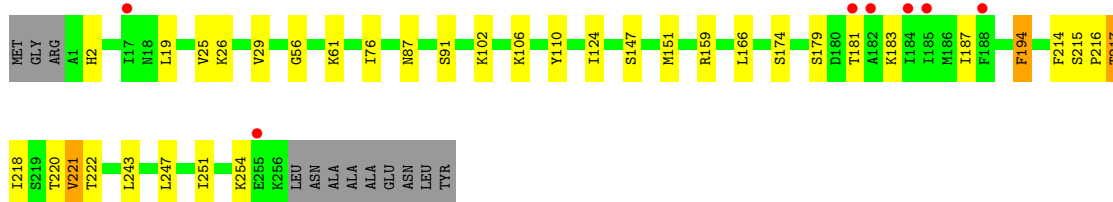
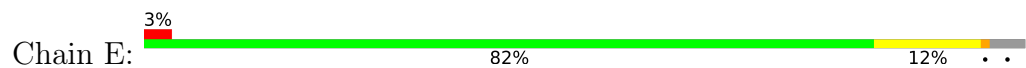


- Molecule 1: formate/nitrite transporter





- Molecule 1: formate/nitrite transporter



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	99.01Å 118.66Å 151.34Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.69 – 2.50 46.69 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.8 (46.69-2.50) 97.4 (46.69-2.50)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	6.63 (at 2.51Å)	Xtrriage
Refinement program	PHENIX 1.7.1_743	Depositor
R, $R_{free}$	0.162 , 0.208 0.181 , 0.215	Depositor DCC
$R_{free}$ test set	3144 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	46.6	Xtrriage
Anisotropy	0.076	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 64.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	10110	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	55.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.10% 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: CL, PG4, BOG

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	0/1928	0.48	0/2614
1	B	0.40	0/1932	0.48	0/2618
1	C	0.34	0/2001	0.46	0/2713
1	D	0.39	0/1932	0.47	0/2618
1	E	0.38	0/1921	0.48	0/2604
All	All	0.38	0/9714	0.47	0/13167

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	1896	0	1994	33	0
1	B	1900	0	2005	28	0
1	C	1968	0	2069	89	0
1	D	1900	0	2005	51	0
1	E	1889	0	1992	37	0
2	A	13	18	17	2	0
2	B	13	18	17	3	0
2	C	13	18	17	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	13	18	17	1	0
2	E	13	18	17	3	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
4	C	20	28	28	13	0
4	E	20	28	28	6	0
5	A	69	0	0	2	0
5	B	68	0	0	4	0
5	C	41	0	0	4	0
5	D	62	0	0	4	0
5	E	61	0	0	6	0
All	All	9964	146	10206	217	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 11.

All (217) 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:C:265:TYR:HE1	1:D:24:LYS:N	1.39	1.18
1:E:106:LYS:HE2	4:E:266:BOG:C6	1.73	1.17
4:C:268:BOG:O4	5:C:328:HOH:O	1.66	1.12
1:C:181:THR:HG21	4:C:268:BOG:H3'1	1.19	1.12
1:C:265:TYR:CE1	1:D:24:LYS:N	2.21	1.08
1:E:106:LYS:CE	4:E:266:BOG:H61	1.87	1.05
1:C:221:VAL:HG13	1:C:222:THR:H	1.22	1.04
1:C:0:ARG:HG2	1:C:0:ARG:HH11	1.22	1.04
1:C:265:TYR:CE2	1:D:25:VAL:HB	1.95	1.02
1:A:0:ARG:HD2	1:A:1:ALA:N	1.78	0.98
1:C:257:LEU:C	1:C:259:ALA:HB3	1.85	0.97
1:E:106:LYS:HE2	4:E:266:BOG:H61	1.00	0.97
4:C:268:BOG:H2'2	1:E:181:THR:HG21	1.43	0.97
1:C:101:ILE:HD12	1:C:101:ILE:H	1.29	0.95
4:C:268:BOG:H3'2	1:D:181:THR:HG21	1.50	0.93
1:C:265:TYR:HH	1:D:23:SER:HG	1.16	0.93
1:C:0:ARG:HG3	1:C:1:ALA:HA	1.48	0.92
1:C:265:TYR:HE1	1:D:24:LYS:H	0.91	0.91
1:C:221:VAL:HG13	1:C:222:THR:N	1.89	0.88

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:221:VAL:O	1:A:222:THR:HB	1.72	0.88
1:C:265:TYR:OH	1:D:25:VAL:N	2.06	0.87
1:C:0:ARG:CG	1:C:1:ALA:HA	2.04	0.87
1:C:265:TYR:HE2	1:D:25:VAL:HB	1.39	0.86
1:C:265:TYR:CZ	1:D:25:VAL:N	2.43	0.86
1:C:161:ILE:HG12	1:C:239:VAL:CG2	2.07	0.85
1:D:255:GLU:OE1	5:D:298:HOH:O	1.96	0.84
1:D:218:ILE:HG22	1:D:219:SER:N	1.92	0.84
1:C:161:ILE:HG12	1:C:239:VAL:HG23	1.61	0.83
2:D:266:PG4:O1	5:D:326:HOH:O	1.97	0.81
1:C:181:THR:CG2	4:C:268:BOG:H3'1	2.07	0.80
1:D:220:THR:O	1:D:220:THR:HG23	1.79	0.80
1:D:220:THR:O	1:D:220:THR:CG2	2.30	0.80
1:B:61:LYS:HD3	2:B:266:PG4:H21	1.63	0.80
1:C:0:ARG:HG2	1:C:0:ARG:NH1	1.97	0.80
1:A:101:ILE:H	1:A:101:ILE:HD12	1.46	0.80
1:C:132:VAL:HG12	1:C:132:VAL:O	1.82	0.79
1:C:221:VAL:CG1	1:C:222:THR:H	1.96	0.78
1:C:0:ARG:HG3	1:C:2:HIS:H	1.48	0.77
1:C:258:ASN:N	1:C:259:ALA:HB3	1.98	0.77
1:B:181:THR:HG21	4:C:268:BOG:H2'1	1.65	0.77
1:A:0:ARG:HD3	1:A:2:HIS:CD2	2.21	0.76
1:C:258:ASN:N	1:C:258:ASN:OD1	2.17	0.74
1:A:250:TYR:CE1	1:A:254:LYS:HG2	2.22	0.74
1:C:101:ILE:HD12	1:C:101:ILE:N	2.02	0.74
1:C:0:ARG:HG3	1:C:1:ALA:CA	2.18	0.74
1:C:101:ILE:H	1:C:101:ILE:CD1	1.99	0.74
1:C:227:ILE:O	1:C:231:VAL:HG23	1.88	0.73
1:D:215:SER:OG	1:D:217:THR:HG22	1.88	0.73
1:D:218:ILE:CG2	1:D:219:SER:N	2.52	0.72
1:C:265:TYR:CE1	1:D:23:SER:HA	2.25	0.72
1:D:219:SER:OG	1:D:220:THR:N	2.20	0.71
1:C:219:SER:O	1:C:220:THR:HG22	1.90	0.70
1:B:132:VAL:O	1:B:217:THR:HG21	1.90	0.70
1:C:264:LEU:C	1:C:265:TYR:CD2	2.66	0.69
1:C:61:LYS:HD3	2:C:266:PG4:O4	1.93	0.69
1:B:181:THR:HG21	4:C:268:BOG:C2'	2.23	0.68
1:A:221:VAL:O	1:A:222:THR:CB	2.40	0.68
4:C:268:BOG:H2	5:C:321:HOH:O	1.94	0.68
1:B:215:SER:OG	1:B:217:THR:HG22	1.94	0.67
1:C:265:TYR:CE2	1:D:25:VAL:CB	2.74	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:132:VAL:HG23	1:B:138:ALA:HA	1.76	0.66
1:A:0:ARG:CD	1:A:2:HIS:H	2.09	0.65
1:E:221:VAL:CG1	1:E:222:THR:N	2.58	0.65
1:B:61:LYS:CD	2:B:266:PG4:H21	2.26	0.65
1:D:132:VAL:O	1:D:217:THR:HG21	1.95	0.64
1:C:0:ARG:HG3	1:C:2:HIS:N	2.12	0.64
2:B:266:PG4:O1	5:B:332:HOH:O	2.15	0.63
1:B:155:ALA:O	1:B:159:ARG:HG3	1.98	0.63
1:A:1:ALA:HA	5:A:307:HOH:O	1.99	0.63
1:D:210:SER:O	1:D:214:PHE:HB2	2.00	0.62
1:B:132:VAL:O	1:B:132:VAL:HG22	2.00	0.62
1:C:2:HIS:HE1	5:D:327:HOH:O	1.82	0.62
1:A:0:ARG:HD2	1:A:1:ALA:H	1.63	0.61
1:C:265:TYR:OH	1:D:26:LYS:N	2.32	0.61
1:B:142:ALA:HB2	1:B:218:ILE:HG23	1.81	0.60
1:D:218:ILE:CG2	1:D:219:SER:H	2.13	0.60
1:C:132:VAL:O	1:C:132:VAL:CG1	2.49	0.60
1:A:0:ARG:HD2	1:A:2:HIS:H	1.67	0.59
1:C:264:LEU:O	1:C:265:TYR:HD2	1.86	0.59
1:C:148:LYS:NZ	2:C:266:PG4:H11	2.16	0.59
1:B:2:HIS:HE1	5:E:269:HOH:O	1.86	0.59
1:A:151:MET:HG3	1:A:152:PRO:HD2	1.84	0.59
1:C:3:LYS:HE2	1:C:7:ASP:OD2	2.03	0.59
1:C:258:ASN:CA	1:C:259:ALA:HB3	2.33	0.58
1:C:264:LEU:O	1:C:265:TYR:CD2	2.57	0.58
1:E:61:LYS:CE	2:E:267:PG4:H22	2.34	0.58
1:C:257:LEU:O	1:C:259:ALA:HB3	2.05	0.57
1:B:19:LEU:HD21	5:B:283:HOH:O	2.04	0.56
1:C:0:ARG:CG	1:C:0:ARG:NH1	2.64	0.56
1:C:173:CYS:O	1:C:177:THR:HG22	2.05	0.56
1:E:147:SER:O	1:E:151:MET:HG2	2.05	0.56
1:B:194:PHE:CD1	1:B:194:PHE:C	2.78	0.56
5:A:314:HOH:O	1:D:151:MET:HE2	2.05	0.56
1:A:0:ARG:HD2	1:A:0:ARG:C	2.25	0.55
1:C:27:TYR:OH	1:C:107:ILE:HG23	2.06	0.55
1:E:106:LYS:CE	4:E:266:BOG:C6	2.65	0.55
1:C:265:TYR:HE1	1:D:23:SER:C	2.07	0.55
1:C:151:MET:HG2	1:C:152:PRO:HD2	1.89	0.55
1:C:256:LYS:O	1:C:259:ALA:HB2	2.07	0.54
1:C:0:ARG:H3	1:C:1:ALA:HA	1.71	0.54
5:C:299:HOH:O	1:E:2:HIS:HE1	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:265:TYR:CE1	1:D:23:SER:CA	2.91	0.54
1:E:76:ILE:HG13	1:E:187:ILE:HD11	1.90	0.53
1:E:61:LYS:HD3	2:E:267:PG4:H22	1.90	0.53
1:C:256:LYS:HG3	1:C:264:LEU:HD12	1.90	0.53
1:C:265:TYR:CE1	1:D:23:SER:C	2.81	0.53
1:B:222:THR:OG1	1:B:223:ILE:N	2.42	0.53
1:B:146:ALA:HA	1:B:221:VAL:HG12	1.90	0.52
1:E:216:PRO:HG2	5:E:323:HOH:O	2.08	0.52
1:E:194:PHE:C	1:E:194:PHE:CD1	2.83	0.52
1:A:243:LEU:O	1:A:247:LEU:HB3	2.10	0.52
1:E:221:VAL:HG13	1:E:222:THR:N	2.24	0.52
1:A:222:THR:HG22	1:A:225:GLY:H	1.75	0.52
1:A:0:ARG:HD3	1:A:2:HIS:CG	2.45	0.51
1:C:179:SER:OG	4:C:268:BOG:O6	2.17	0.51
1:C:219:SER:O	1:C:220:THR:CG2	2.56	0.51
1:D:21:ASN:HA	5:D:277:HOH:O	2.11	0.51
1:E:221:VAL:HG12	1:E:222:THR:H	1.75	0.51
1:A:101:ILE:H	1:A:101:ILE:CD1	2.20	0.51
1:C:194:PHE:CD1	1:C:194:PHE:C	2.84	0.51
1:C:193:ALA:HA	1:D:44:LEU:HD13	1.92	0.51
1:E:61:LYS:CD	2:E:267:PG4:H22	2.41	0.51
1:B:146:ALA:HA	1:B:221:VAL:CG1	2.41	0.51
1:E:215:SER:OG	1:E:217:THR:HG23	2.10	0.51
1:E:87:ASN:O	1:E:91:SER:HB2	2.12	0.50
1:C:117:ILE:O	1:C:121:VAL:HG23	2.11	0.50
1:E:56:GLY:HA2	5:E:307:HOH:O	2.12	0.50
1:A:222:THR:HG23	1:A:223:ILE:N	2.27	0.49
1:C:265:TYR:CZ	1:D:25:VAL:HB	2.42	0.49
1:C:265:TYR:HH	1:D:26:LYS:H	1.57	0.49
1:C:0:ARG:NH2	1:C:3:LYS:HB3	2.27	0.49
1:D:218:ILE:HG22	1:D:219:SER:H	1.72	0.49
1:A:26:LYS:HE2	1:D:251:ILE:O	2.12	0.49
1:E:254:LYS:HE3	5:E:279:HOH:O	2.11	0.49
1:E:19:LEU:HD21	5:E:299:HOH:O	2.10	0.49
1:A:101:ILE:HD12	1:A:101:ILE:N	2.21	0.49
1:C:158:PHE:HD1	1:D:125:ILE:HG23	1.78	0.49
1:A:0:ARG:HH21	1:A:1:ALA:H	1.61	0.49
1:C:121:VAL:O	1:C:125:ILE:HG13	2.13	0.49
1:E:110:TYR:CZ	4:E:266:BOG:H3'1	2.48	0.48
1:D:155:ALA:O	1:D:159:ARG:HG3	2.13	0.48
1:E:124:ILE:HG13	1:E:214:PHE:CE2	2.49	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:102:LYS:O	1:B:106:LYS:HG2	2.13	0.48
1:D:194:PHE:CD1	1:D:194:PHE:C	2.86	0.48
1:A:91:SER:OG	1:A:246:GLY:HA3	2.14	0.48
1:B:132:VAL:HG23	1:B:138:ALA:CA	2.43	0.48
1:E:151:MET:HE1	1:E:159:ARG:NH2	2.28	0.47
1:C:265:TYR:CE2	1:D:25:VAL:CG2	2.96	0.47
1:A:181:THR:HG21	4:C:268:BOG:H2'1	1.96	0.47
1:B:142:ALA:CB	1:B:218:ILE:HG23	2.46	0.46
1:D:154:THR:HG23	1:D:158:PHE:HE2	1.80	0.46
1:E:221:VAL:HG12	1:E:222:THR:N	2.31	0.46
1:C:1:ALA:HB1	5:C:285:HOH:O	2.15	0.46
1:A:61:LYS:CE	2:A:266:PG4:H21	2.46	0.46
1:A:61:LYS:HE2	2:A:266:PG4:H21	1.98	0.46
1:D:154:THR:HG23	1:D:158:PHE:CE2	2.51	0.46
1:A:250:TYR:CZ	1:A:254:LYS:HG2	2.49	0.45
1:D:215:SER:OG	1:D:217:THR:CG2	2.61	0.45
1:D:217:THR:HG23	1:D:217:THR:O	2.15	0.45
1:C:179:SER:CB	4:C:268:BOG:O6	2.64	0.45
1:D:250:TYR:CE1	1:D:254:LYS:HD3	2.52	0.45
1:C:1:ALA:H	1:C:176:ARG:HH12	1.63	0.45
1:E:25:VAL:O	1:E:29:VAL:HG23	2.15	0.45
4:C:268:BOG:H3'2	1:D:181:THR:CG2	2.34	0.45
1:C:258:ASN:HA	1:C:259:ALA:C	2.38	0.45
1:D:179:SER:O	1:D:183:LYS:HG3	2.16	0.45
1:E:106:LYS:HG2	4:E:266:BOG:H4	1.98	0.45
1:E:217:THR:HG22	5:E:323:HOH:O	2.16	0.45
1:E:220:THR:HG23	1:E:220:THR:O	2.16	0.45
1:A:151:MET:HG3	1:A:152:PRO:CD	2.47	0.44
1:B:25:VAL:O	1:B:29:VAL:HG23	2.15	0.44
1:C:239:VAL:HG23	1:C:240:GLY:N	2.32	0.44
1:C:245:MET:O	1:C:249:THR:HG23	2.18	0.44
1:D:76:ILE:HG13	1:D:187:ILE:HD11	1.99	0.44
1:C:260:ALA:O	1:C:261:ALA:HB2	2.18	0.44
1:A:154:THR:HG23	1:A:158:PHE:CE2	2.53	0.44
1:B:251:ILE:O	1:E:26:LYS:HE2	2.18	0.44
1:C:215:SER:HA	1:C:216:PRO:HD3	1.78	0.44
1:C:151:MET:CG	1:C:152:PRO:HD2	2.48	0.44
1:D:215:SER:HG	1:D:217:THR:HG22	1.81	0.43
1:C:3:LYS:HD3	1:C:255:GLU:OE1	2.18	0.43
1:C:219:SER:HB3	1:C:221:VAL:HG12	2.00	0.43
1:B:42:ILE:HD11	1:B:204:ALA:HB1	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:170:SER:HB3	1:B:190:CYS:SG	2.59	0.43
1:C:264:LEU:O	1:C:265:TYR:HB3	2.19	0.43
1:B:87:ASN:O	1:B:91:SER:HB2	2.18	0.43
1:B:56:GLY:HA2	5:B:327:HOH:O	2.19	0.42
1:C:166:LEU:HD21	1:D:40:ILE:HG21	2.00	0.42
1:C:264:LEU:O	1:C:265:TYR:CB	2.67	0.42
1:C:265:TYR:OH	1:D:25:VAL:CA	2.67	0.42
1:B:101:ILE:HD12	5:B:313:HOH:O	2.18	0.42
1:D:207:THR:O	1:D:211:VAL:HG23	2.20	0.42
1:E:179:SER:O	1:E:183:LYS:HG3	2.20	0.42
4:C:268:BOG:C3'	1:D:181:THR:HG21	2.34	0.42
1:E:243:LEU:O	1:E:247:LEU:HB3	2.20	0.42
1:A:154:THR:HG23	1:A:158:PHE:HE2	1.85	0.42
1:A:194:PHE:CD1	1:A:194:PHE:C	2.92	0.42
1:B:90:MET:O	1:B:94:MET:HB2	2.20	0.42
1:C:126:PHE:CE2	1:C:132:VAL:CG2	3.02	0.42
1:C:161:ILE:HD11	1:C:239:VAL:HG21	2.02	0.42
1:C:258:ASN:HA	1:C:260:ALA:N	2.35	0.41
1:C:211:VAL:O	1:C:215:SER:HB2	2.21	0.41
1:E:218:ILE:HD12	1:E:218:ILE:N	2.36	0.41
1:C:26:LYS:HE2	1:E:251:ILE:O	2.20	0.41
1:E:151:MET:HE3	1:E:151:MET:HB3	1.92	0.41
1:B:215:SER:HG	1:B:217:THR:HG22	1.86	0.41
1:A:10:THR:O	1:A:14:ILE:HG13	2.21	0.41
1:A:145:ALA:HB1	1:A:221:VAL:HG11	2.02	0.41
1:C:25:VAL:O	1:C:29:VAL:HG23	2.21	0.41
1:C:161:ILE:CG1	1:C:239:VAL:CG2	2.89	0.41
1:C:76:ILE:HG13	1:C:187:ILE:HD11	2.02	0.41
1:D:6:LEU:HD13	1:D:250:TYR:HA	2.03	0.41
1:E:174:SER:HA	1:E:183:LYS:HG2	2.03	0.41
1:C:40:ILE:HG21	1:E:166:LEU:HD21	2.04	0.41
1:A:174:SER:O	1:A:183:LYS:HE2	2.21	0.40
1:D:151:MET:HG3	1:D:152:PRO:HD2	2.04	0.40
1:A:174:SER:HA	1:A:183:LYS:HG2	2.03	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	255/268 (95%)	246 (96%)	9 (4%)	0	100	100
1	B	255/268 (95%)	251 (98%)	4 (2%)	0	100	100
1	C	264/268 (98%)	251 (95%)	10 (4%)	3 (1%)	14	26
1	D	255/268 (95%)	242 (95%)	13 (5%)	0	100	100
1	E	254/268 (95%)	243 (96%)	11 (4%)	0	100	100
All	All	1283/1340 (96%)	1233 (96%)	47 (4%)	3 (0%)	47	68

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	218	ILE
1	C	261	ALA
1	C	222	THR

### 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	206/214 (96%)	201 (98%)	5 (2%)	49	74
1	B	207/214 (97%)	201 (97%)	6 (3%)	42	69
1	C	213/214 (100%)	207 (97%)	6 (3%)	43	70
1	D	207/214 (97%)	202 (98%)	5 (2%)	49	74
1	E	206/214 (96%)	202 (98%)	4 (2%)	57	80

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1039/1070 (97%)	1013 (98%)	26 (2%)	47 73

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	0	ARG
1	A	174	SER
1	A	194	PHE
1	A	222	THR
1	A	254	LYS
1	B	0	ARG
1	B	33	PHE
1	B	94	MET
1	B	194	PHE
1	B	219	SER
1	B	222	THR
1	C	134	LYS
1	C	194	PHE
1	C	218	ILE
1	C	223	ILE
1	C	227	ILE
1	C	258	ASN
1	D	28	LEU
1	D	33	PHE
1	D	102	LYS
1	D	194	PHE
1	D	220	THR
1	E	102	LYS
1	E	194	PHE
1	E	217	THR
1	E	221	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	87	ASN

### 5.3.3 RNA

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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 5 are monoatomic - leaving 7 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
2	PG4	E	267	-	12,12,12	1.05	0	11,11,11	1.10	2 (18%)
2	PG4	C	266	-	12,12,12	1.03	0	11,11,11	0.98	0
2	PG4	B	266	-	12,12,12	1.04	0	11,11,11	0.88	0
2	PG4	A	266	-	12,12,12	1.05	0	11,11,11	1.21	2 (18%)
2	PG4	D	266	-	12,12,12	1.01	0	11,11,11	0.99	2 (18%)
4	BOG	E	266	-	20,20,20	0.46	0	25,25,25	0.57	0
4	BOG	C	268	-	20,20,20	0.46	0	25,25,25	0.59	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	PG4	E	267	-	-	6/10/10/10	-
2	PG4	C	266	-	-	5/10/10/10	-
2	PG4	B	266	-	-	7/10/10/10	-
2	PG4	A	266	-	-	6/10/10/10	-
2	PG4	D	266	-	-	5/10/10/10	-
4	BOG	E	266	-	-	2/11/31/31	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	BOG	C	268	-	-	2/11/31/31	0/1/1/1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	266	PG4	C5-O3-C4	2.48	124.04	113.29
2	A	266	PG4	C7-O4-C6	2.25	123.03	113.29
2	E	267	PG4	C7-O4-C6	2.25	123.03	113.29
2	E	267	PG4	C3-O2-C2	2.25	123.03	113.29
2	D	266	PG4	C7-O4-C6	2.16	122.66	113.29
2	D	266	PG4	C5-O3-C4	2.16	122.64	113.29

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	268	BOG	O5-C5-C6-O6
4	C	268	BOG	C4-C5-C6-O6
2	E	267	PG4	O2-C3-C4-O3
2	A	266	PG4	O2-C3-C4-O3
2	A	266	PG4	O3-C5-C6-O4
2	B	266	PG4	O2-C3-C4-O3
2	B	266	PG4	O4-C7-C8-O5
2	D	266	PG4	O1-C1-C2-O2
2	D	266	PG4	O4-C7-C8-O5
4	E	266	BOG	O1-C1'-C2'-C3'
2	C	266	PG4	O3-C5-C6-O4
2	E	267	PG4	C3-C4-O3-C5
2	B	266	PG4	C8-C7-O4-C6
2	D	266	PG4	C5-C6-O4-C7
2	E	267	PG4	C8-C7-O4-C6
2	D	266	PG4	O3-C5-C6-O4
2	E	267	PG4	O1-C1-C2-O2
2	C	266	PG4	C5-C6-O4-C7
2	C	266	PG4	O1-C1-C2-O2
2	B	266	PG4	C5-C6-O4-C7
2	B	266	PG4	C3-C4-O3-C5
2	D	266	PG4	O2-C3-C4-O3
2	C	266	PG4	C6-C5-O3-C4
2	A	266	PG4	C4-C3-O2-C2

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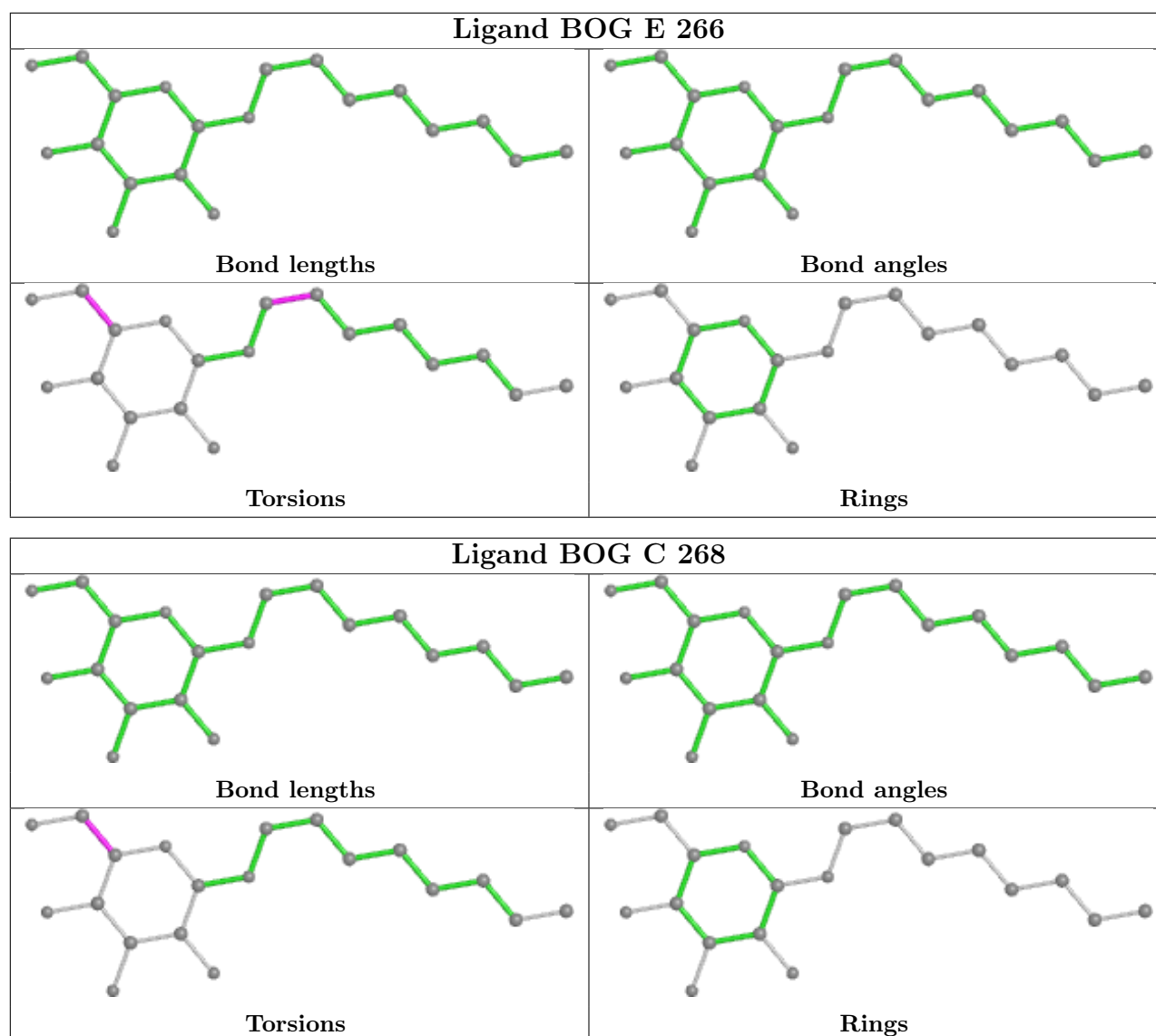
Mol	Chain	Res	Type	Atoms
4	E	266	BOG	O5-C5-C6-O6
2	E	267	PG4	O3-C5-C6-O4
2	A	266	PG4	C6-C5-O3-C4
2	A	266	PG4	C3-C4-O3-C5
2	B	266	PG4	C4-C3-O2-C2
2	E	267	PG4	C6-C5-O3-C4
2	C	266	PG4	O2-C3-C4-O3
2	A	266	PG4	C1-C2-O2-C3
2	B	266	PG4	O3-C5-C6-O4

There are no ring outliers.

7 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	267	PG4	3	0
2	C	266	PG4	2	0
2	B	266	PG4	3	0
2	A	266	PG4	2	0
2	D	266	PG4	1	0
4	E	266	BOG	6	0
4	C	268	BOG	13	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 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

### 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	257/268 (95%)	-0.09	15 (5%) 23 24	29, 47, 71, 125	0
1	B	257/268 (95%)	-0.19	8 (3%) 49 52	26, 45, 72, 113	0
1	C	266/268 (99%)	0.53	37 (13%) 2 2	38, 65, 120, 206	0
1	D	257/268 (95%)	-0.05	7 (2%) 54 58	31, 52, 85, 138	0
1	E	256/268 (95%)	-0.17	7 (2%) 54 58	33, 49, 77, 123	0
All	All	1293/1340 (96%)	0.01	74 (5%) 23 25	26, 50, 88, 206	0

All (74) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	265	TYR	6.6
1	C	219	SER	5.2
1	C	218	ILE	5.2
1	C	257	LEU	5.0
1	C	264	LEU	4.7
1	D	218	ILE	4.5
1	C	220	THR	4.4
1	A	17	ILE	4.3
1	C	263	ASN	4.2
1	B	223	ILE	4.2
1	E	185	ILE	4.1
1	C	102	LYS	4.0
1	B	227	ILE	3.9
1	C	14	ILE	3.8
1	A	255	GLU	3.8
1	A	102	LYS	3.7
1	C	223	ILE	3.6
1	D	23	SER	3.6
1	C	221	VAL	3.5
1	C	259	ALA	3.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	254	LYS	3.3
1	D	181	THR	3.2
1	C	256	LYS	3.2
1	A	181	THR	3.1
1	A	185	ILE	3.0
1	D	185	ILE	3.0
1	A	101	ILE	3.0
1	C	224	GLY	3.0
1	C	185	ILE	3.0
1	C	260	ALA	3.0
1	D	25	VAL	2.9
1	C	228	TYR	2.9
1	A	250	TYR	2.9
1	C	10	THR	2.9
1	E	181	THR	2.8
1	E	188	PHE	2.8
1	C	217	THR	2.7
1	E	255	GLU	2.7
1	C	97	LYS	2.7
1	B	228	TYR	2.7
1	C	19	LEU	2.6
1	E	184	ILE	2.6
1	C	21	ASN	2.6
1	C	181	THR	2.6
1	C	133	ASP	2.6
1	C	99	VAL	2.6
1	C	189	LEU	2.6
1	A	184	ILE	2.6
1	B	185	ILE	2.5
1	C	103	ASP	2.5
1	C	184	ILE	2.5
1	B	181	THR	2.5
1	E	182	ALA	2.5
1	A	103	ASP	2.5
1	C	17	ILE	2.3
1	A	182	ALA	2.3
1	A	19	LEU	2.3
1	A	99	VAL	2.3
1	A	14	ILE	2.3
1	E	17	ILE	2.2
1	B	193	ALA	2.2
1	C	98	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	99	VAL	2.2
1	C	258	ASN	2.2
1	B	188	PHE	2.1
1	A	94	MET	2.1
1	C	255	GLU	2.1
1	C	22	THR	2.1
1	C	93	GLY	2.1
1	B	187	ILE	2.1
1	C	66	LEU	2.1
1	D	22	THR	2.0
1	C	24	LYS	2.0
1	C	101	ILE	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 monosaccharides 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.

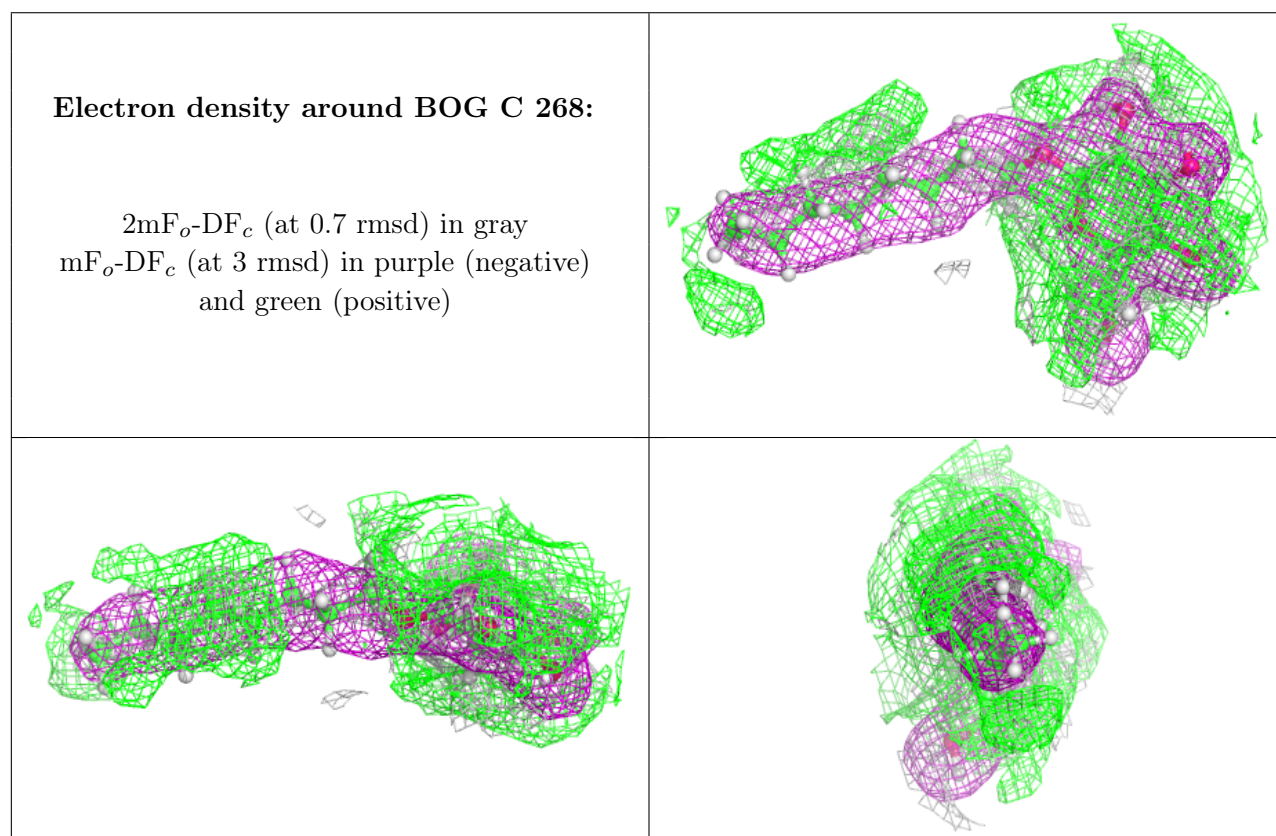
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	BOG	C	268	20/20	0.57	0.48	10,10,10,10	0
4	BOG	E	266	20/20	0.82	0.65	10,10,10,10	0
2	PG4	C	266	13/13	0.88	0.18	45,89,115,117	0
2	PG4	A	266	13/13	0.89	0.14	44,67,103,103	0
2	PG4	B	266	13/13	0.90	0.18	49,65,89,91	0
2	PG4	D	266	13/13	0.91	0.16	50,65,92,97	0
2	PG4	E	267	13/13	0.95	0.12	52,74,93,110	0
3	CL	C	267	1/1	0.97	0.17	70,70,70,70	0
3	CL	D	267	1/1	0.97	0.11	55,55,55,55	0
3	CL	E	268	1/1	0.99	0.10	57,57,57,57	0
3	CL	A	268	1/1	0.99	0.17	56,56,56,56	0

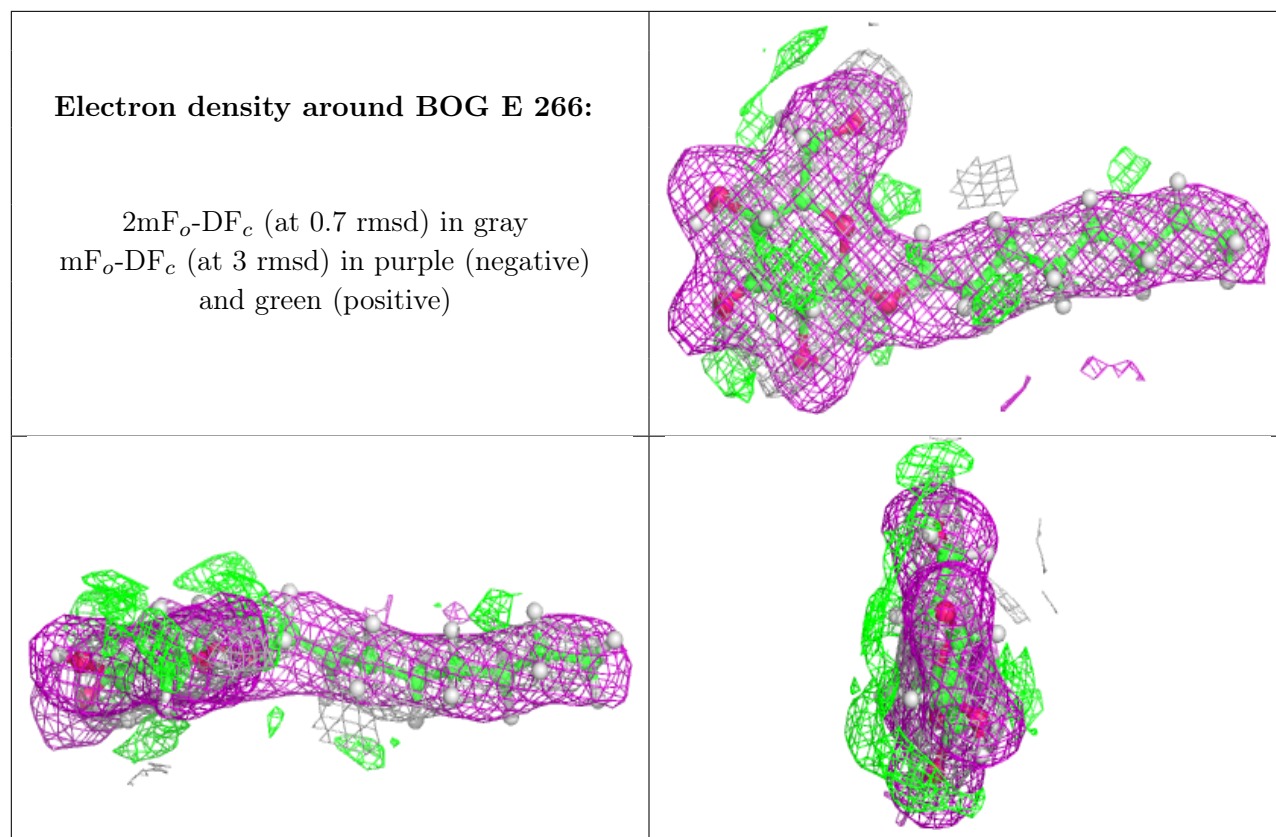
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	CL	B	267	1/1	0.99	0.11	56,56,56,56	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.





## 6.5 Other polymers [i](#)

There are no such residues in this entry.