



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 02:11 PM UTC

PDB ID : 2W8F / pdb\_00002w8f  
Title : Aplysia californica AChBP bound to in silico compound 31  
Authors : Ulens, C.; Akdemir, A.; Jongejan, A.; van Elk, R.; Edink, E.; Bertrand, S.;  
Perrakis, A.; Leurs, R.; Smit, A.B.; Sixma, T.K.; Bertrand, D.; de Esch, I.J.  
Deposited on : 2009-01-16  
Resolution : 2.70 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:

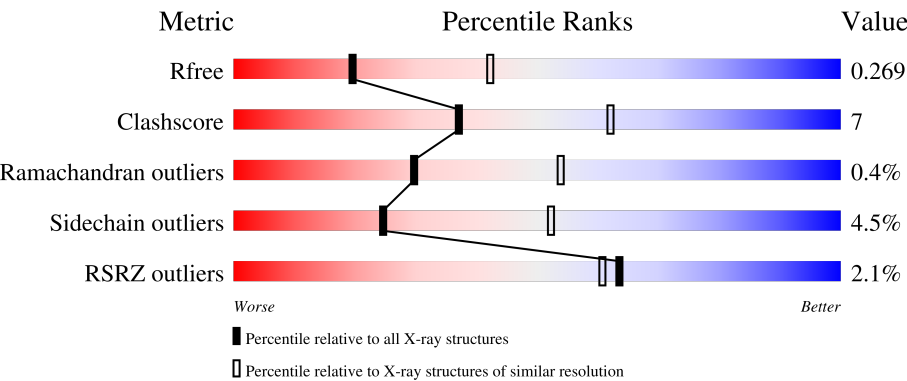
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

# 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 2.70 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 <sub>free</sub>	180053	3538 (2.70-2.70)
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)
RSRZ outliers	180081	3538 (2.70-2.70)

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	217	<div><div>2%</div><div></div><div>76%</div><div>16%</div><div>6%</div></div>
1	B	217	<div><div></div><div>77%</div><div>15%</div><div>6%</div></div>
1	C	217	<div><div>2%</div><div></div><div>76%</div><div>17%</div><div>6%</div></div>
1	D	217	<div><div></div><div>77%</div><div>16%</div><div>6%</div></div>
1	E	217	<div><div>%</div><div></div><div>77%</div><div>16%</div><div>6%</div></div>

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Mol	Chain	Length	Quality of chain
1	F	217	 76% 16% • 6%
1	G	217	 76% 16% • 6%
1	H	217	 76% 14% • • 6%
1	I	217	 76% 16% • • 6%
1	J	217	 76% 13% • • 6%

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:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	BS1	A	1206	X	-	-	-
2	BS1	F	1206	X	-	-	-

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 16482 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 SOLUBLE ACETYLCHOLINE RECEPTOR.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	B	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	C	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	D	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	E	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	F	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	G	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	H	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	I	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			
1	J	205	Total	C	N	O	S	0	0	0
			1636	1036	266	325	9			

There are 20 discrepancies between the modelled and reference sequences:

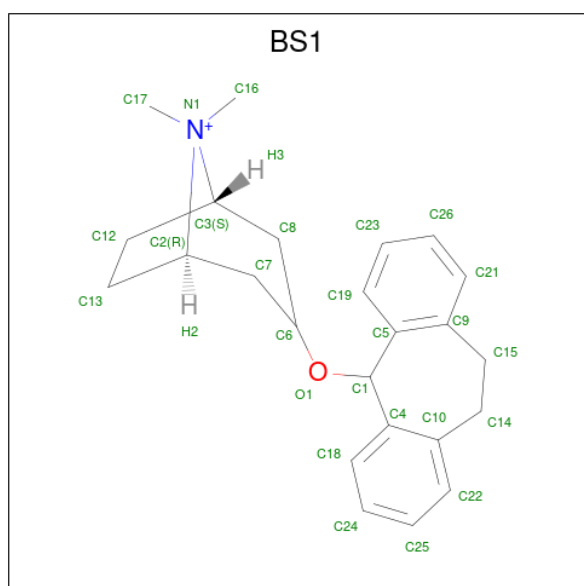
Chain	Residue	Modelled	Actual	Comment	Reference
A	41	VAL	ALA	conflict	UNP Q8WSF8
A	136	VAL	ALA	conflict	UNP Q8WSF8
B	41	VAL	ALA	conflict	UNP Q8WSF8
B	136	VAL	ALA	conflict	UNP Q8WSF8
C	41	VAL	ALA	conflict	UNP Q8WSF8
C	136	VAL	ALA	conflict	UNP Q8WSF8
D	41	VAL	ALA	conflict	UNP Q8WSF8
D	136	VAL	ALA	conflict	UNP Q8WSF8
E	41	VAL	ALA	conflict	UNP Q8WSF8

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Chain	Residue	Modelled	Actual	Comment	Reference
E	136	VAL	ALA	conflict	UNP Q8WSF8
F	41	VAL	ALA	conflict	UNP Q8WSF8
F	136	VAL	ALA	conflict	UNP Q8WSF8
G	41	VAL	ALA	conflict	UNP Q8WSF8
G	136	VAL	ALA	conflict	UNP Q8WSF8
H	41	VAL	ALA	conflict	UNP Q8WSF8
H	136	VAL	ALA	conflict	UNP Q8WSF8
I	41	VAL	ALA	conflict	UNP Q8WSF8
I	136	VAL	ALA	conflict	UNP Q8WSF8
J	41	VAL	ALA	conflict	UNP Q8WSF8
J	136	VAL	ALA	conflict	UNP Q8WSF8

- Molecule 2 is (3-EXO)-3-(10,11-DIHYDRO-5H-DIBENZO[A,D][7]ANNULEN-5-YLOXY)-8,8-DIMETHYL-8-AZONIABICYCLO[3.2.1]OCTANE (CCD ID: BS1) (formula: C<sub>24</sub>H<sub>30</sub>NO).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			26	24	1	1		
2	F	1	Total	C	N	O	0	0
			26	24	1	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	11	Total	O	0	0
			11	11		

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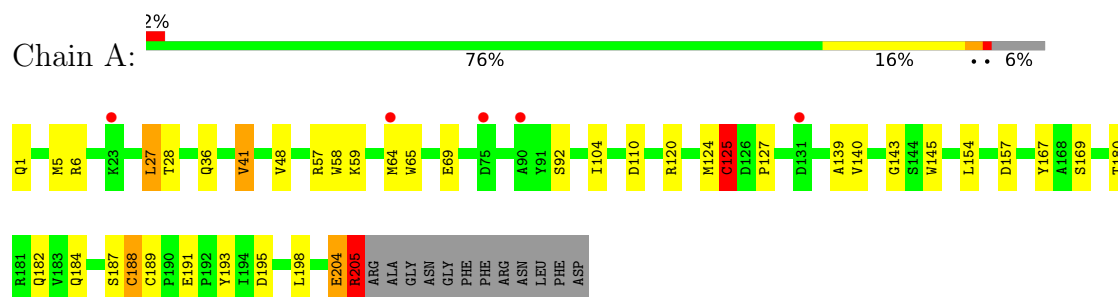
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	10	Total 10	O 10	0	0
3	C	6	Total 6	O 6	0	0
3	D	7	Total 7	O 7	0	0
3	E	6	Total 6	O 6	0	0
3	F	8	Total 8	O 8	0	0
3	G	7	Total 7	O 7	0	0
3	H	4	Total 4	O 4	0	0
3	I	7	Total 7	O 7	0	0
3	J	4	Total 4	O 4	0	0

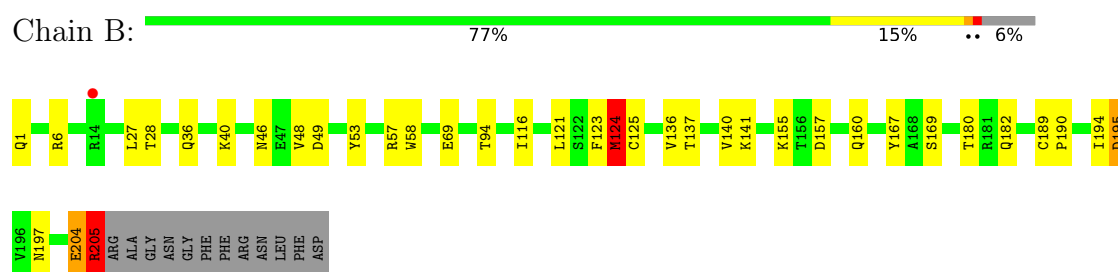
### 3 Residue-property plots [i](#)

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.

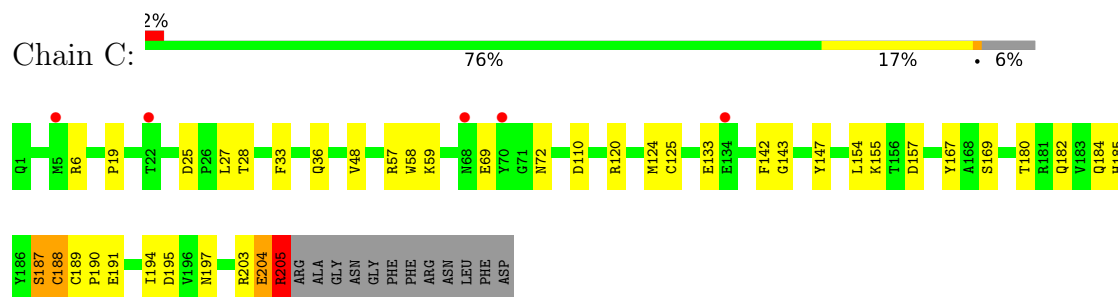
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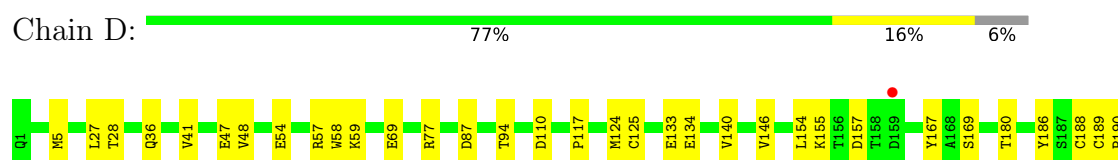
#### • Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR

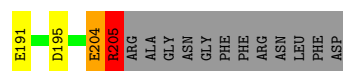


#### • Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR

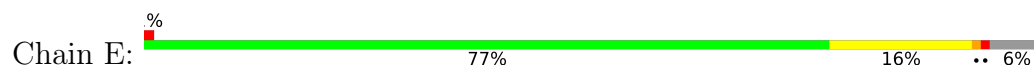


#### • Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR

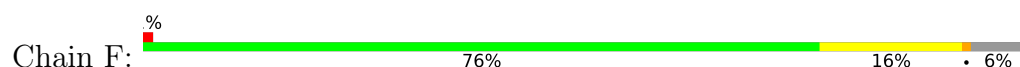




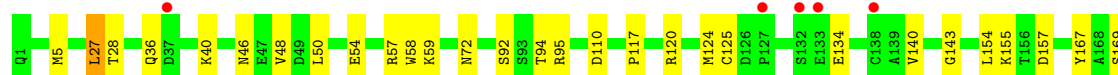
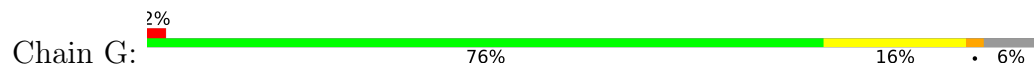
• Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR



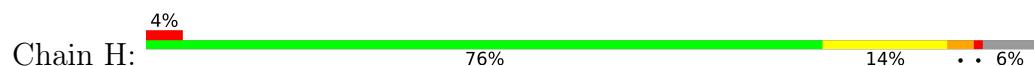
• Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR



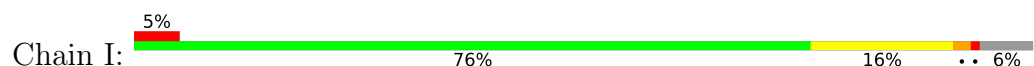
• Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR



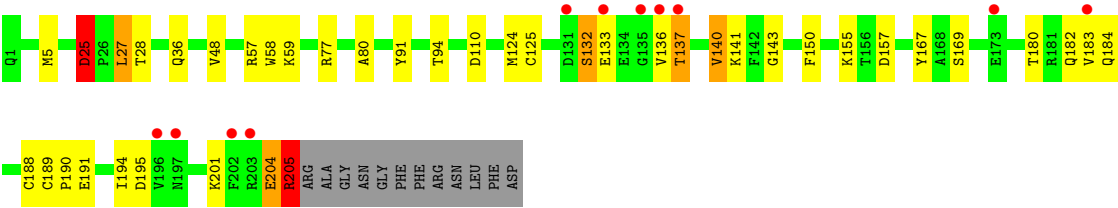
• Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR



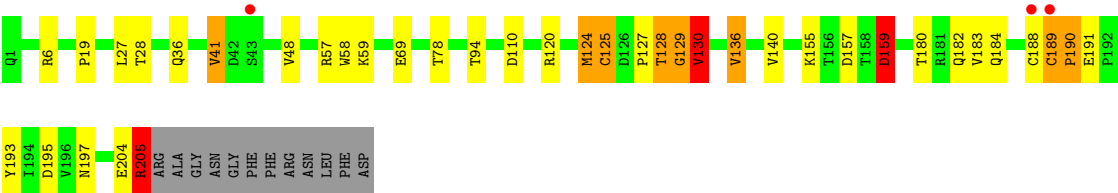
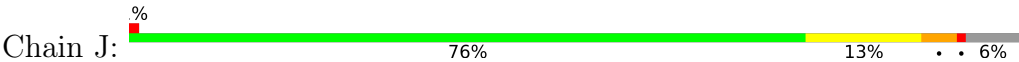
• Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR







● Molecule 1: SOLUBLE ACETYLCHOLINE RECEPTOR



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	76.80Å 76.80Å 725.52Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	42.76 – 2.70 42.76 – 2.70	Depositor EDS
% Data completeness (in resolution range)	97.6 (42.76-2.70) 64.8 (42.76-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.08	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.48 (at 2.69Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, $R_{free}$	0.237 , 0.267 0.234 , 0.269	Depositor DCC
$R_{free}$ test set	2375 reflections (5.17%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	61.3	Xtriage
Anisotropy	0.008	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 0.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.157 for -h,-k,l	Xtriage
$F_o, F_c$ correlation	0.89	EDS
Total number of atoms	16482	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	9.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.06% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: BS1

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	0.93	0/1676	1.04	5/2287 (0.2%)
1	B	0.91	0/1676	1.02	7/2287 (0.3%)
1	C	0.82	0/1676	0.95	7/2287 (0.3%)
1	D	0.79	0/1676	0.94	7/2287 (0.3%)
1	E	0.82	0/1676	0.92	2/2287 (0.1%)
1	F	0.96	0/1676	1.02	4/2287 (0.2%)
1	G	0.86	0/1676	0.97	6/2287 (0.3%)
1	H	1.93	25/1676 (1.5%)	1.12	9/2287 (0.4%)
1	I	1.03	4/1676 (0.2%)	1.00	4/2287 (0.2%)
1	J	0.84	3/1676 (0.2%)	1.08	10/2287 (0.4%)
All	All	1.04	32/16760 (0.2%)	1.01	61/22870 (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
1	B	0	1
1	C	0	1
1	E	0	1
1	H	0	2
1	I	0	1
1	J	0	3
All	All	0	9

All (32) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	H	134	GLU	CD-OE1	34.39	1.90	1.25
1	H	134	GLU	CG-CD	24.56	2.13	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	H	133	GLU	CD-OE1	20.26	1.63	1.25
1	H	132	SER	C-N	17.50	1.57	1.34
1	H	133	GLU	CG-CD	16.42	1.93	1.52
1	H	134	GLU	CD-OE2	16.25	1.56	1.25
1	H	133	GLU	CD-OE2	16.23	1.56	1.25
1	I	133	GLU	C-O	15.31	1.42	1.24
1	H	132	SER	C-O	14.56	1.41	1.23
1	H	42	ASP	CG-OD1	13.70	1.51	1.25
1	H	133	GLU	CA-C	13.41	1.71	1.52
1	H	135	GLY	N-CA	12.26	1.63	1.45
1	H	44	SER	CB-OG	8.83	1.59	1.42
1	H	132	SER	CB-OG	-8.70	1.24	1.42
1	I	132	SER	CB-OG	8.51	1.59	1.42
1	H	133	GLU	C-O	8.11	1.34	1.24
1	H	42	ASP	CG-OD2	8.00	1.40	1.25
1	H	136	VAL	C-O	7.90	1.33	1.24
1	J	159	ASP	CG-OD1	7.54	1.39	1.25
1	H	40	LYS	CG-CD	7.19	1.74	1.52
1	H	135	GLY	C-N	7.14	1.43	1.33
1	J	128	THR	CB-OG1	6.62	1.54	1.43
1	J	129	GLY	N-CA	-6.61	1.34	1.45
1	H	134	GLU	CB-CG	6.42	1.71	1.52
1	H	134	GLU	CA-C	6.14	1.61	1.52
1	I	133	GLU	C-N	5.93	1.42	1.33
1	H	41	VAL	CA-CB	5.62	1.61	1.54
1	H	43	SER	C-O	5.51	1.31	1.24
1	H	174	ILE	CA-CB	-5.24	1.47	1.54
1	I	80	ALA	CA-CB	-5.19	1.44	1.53
1	H	135	GLY	CA-C	5.15	1.59	1.51
1	H	47	GLU	CD-OE2	5.04	1.34	1.25

All (61) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	J	130	VAL	N-CA-C	-18.89	89.98	113.22
1	B	124	MET	N-CA-C	13.28	130.23	110.30
1	A	64	MET	CB-CG-SD	-10.85	80.16	112.70
1	A	125	CYS	N-CA-CB	-8.87	95.29	110.99
1	J	128	THR	CA-C-N	8.52	137.04	121.70
1	J	128	THR	C-N-CA	8.52	137.04	121.70
1	F	191	GLU	CA-C-N	-8.43	112.05	120.31
1	F	191	GLU	C-N-CA	-8.43	112.05	120.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	132	SER	O-C-N	7.85	131.85	123.06
1	B	205	ARG	NE-CZ-NH2	-7.65	112.32	119.20
1	G	205	ARG	CD-NE-CZ	7.57	135.00	124.40
1	G	205	ARG	NE-CZ-NH2	-7.45	112.50	119.20
1	D	205	ARG	NE-CZ-NH2	-7.43	112.51	119.20
1	C	188	CYS	N-CA-C	7.41	120.30	111.33
1	H	134	GLU	O-C-N	7.33	131.27	122.26
1	B	205	ARG	CD-NE-CZ	7.23	134.53	124.40
1	I	205	ARG	NE-CZ-NH2	-7.22	112.70	119.20
1	F	205	ARG	NE-CZ-NH2	7.17	125.66	119.20
1	A	205	ARG	NE-CZ-NH2	7.10	125.59	119.20
1	J	159	ASP	N-CA-CB	6.90	121.30	110.46
1	J	128	THR	O-C-N	-6.86	114.44	122.95
1	D	205	ARG	CD-NE-CZ	6.86	134.01	124.40
1	I	205	ARG	CD-NE-CZ	6.80	133.92	124.40
1	A	64	MET	CG-SD-CE	6.79	115.83	100.90
1	J	205	ARG	NE-CZ-NH2	6.69	125.22	119.20
1	E	205	ARG	NE-CZ-NH1	-6.54	114.95	121.50
1	F	205	ARG	NE-CZ-NH1	-6.50	115.00	121.50
1	A	205	ARG	NE-CZ-NH1	-6.49	115.01	121.50
1	H	205	ARG	NE-CZ-NH2	6.49	125.04	119.20
1	E	205	ARG	NE-CZ-NH2	6.46	125.01	119.20
1	C	187	SER	CA-C-N	6.36	129.09	120.38
1	C	187	SER	C-N-CA	6.36	129.09	120.38
1	J	205	ARG	NE-CZ-NH1	-6.33	115.17	121.50
1	J	159	ASP	CB-CA-C	-6.33	97.56	109.72
1	C	205	ARG	NE-CZ-NH1	-6.26	115.24	121.50
1	C	205	ARG	NE-CZ-NH2	6.21	124.79	119.20
1	G	185	HIS	N-CA-C	6.21	124.03	110.80
1	H	205	ARG	NE-CZ-NH1	-6.21	115.29	121.50
1	J	189	CYS	CA-C-N	6.10	127.47	119.84
1	J	189	CYS	C-N-CA	6.10	127.47	119.84
1	B	205	ARG	NE-CZ-NH1	6.05	127.55	121.50
1	G	205	ARG	NE-CZ-NH1	5.94	127.44	121.50
1	I	25	ASP	N-CA-C	5.87	122.78	109.81
1	H	134	GLU	CB-CG-CD	-5.78	102.77	112.60
1	C	189	CYS	N-CA-C	5.71	118.84	110.10
1	D	205	ARG	NE-CZ-NH1	5.57	127.07	121.50
1	B	195	ASP	CA-C-N	-5.51	115.95	123.12
1	B	195	ASP	C-N-CA	-5.51	115.95	123.12
1	H	195	ASP	N-CA-C	5.48	116.97	107.93
1	I	205	ARG	NE-CZ-NH1	5.31	126.81	121.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	133	GLU	OE1-CD-OE2	-5.30	110.17	122.90
1	B	40	LYS	N-CA-C	5.19	117.14	108.99
1	C	187	SER	N-CA-C	5.17	121.80	110.80
1	H	134	GLU	CG-CD-OE1	-5.10	106.66	118.40
1	G	95	ARG	CA-C-N	-5.09	114.52	119.76
1	G	95	ARG	C-N-CA	-5.09	114.52	119.76
1	D	41	VAL	N-CA-C	-5.08	100.90	108.46
1	H	134	GLU	N-CA-CB	5.05	118.99	110.92
1	D	191	GLU	CA-C-N	5.03	124.93	119.85
1	D	191	GLU	C-N-CA	5.03	124.93	119.85
1	D	47	GLU	N-CA-C	-5.01	101.99	109.95

There are no chirality outliers.

All (9) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	123	PHE	Peptide
1	C	188	CYS	Peptide
1	E	188	CYS	Peptide
1	H	133	GLU	Sidechain
1	H	134	GLU	Sidechain
1	I	25	ASP	Peptide
1	J	124	MET	Peptide
1	J	129	GLY	Peptide
1	J	188	CYS	Peptide

## 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	1636	0	1572	27	3
1	B	1636	0	1572	29	0
1	C	1636	0	1572	26	0
1	D	1636	0	1572	22	1
1	E	1636	0	1572	24	1
1	F	1636	0	1572	24	4
1	G	1636	0	1572	25	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	H	1636	0	1572	32	0
1	I	1636	0	1572	26	0
1	J	1636	0	1572	25	0
2	A	26	0	30	5	0
2	F	26	0	30	1	0
3	A	11	0	0	1	1
3	B	10	0	0	0	0
3	C	6	0	0	1	0
3	D	7	0	0	0	0
3	E	6	0	0	0	0
3	F	8	0	0	0	0
3	G	7	0	0	1	0
3	H	4	0	0	0	0
3	I	7	0	0	0	0
3	J	4	0	0	0	0
All	All	16482	0	15780	227	5

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 7.

All (227) 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:H:133:GLU:CD	1:H:133:GLU:CG	1.93	1.41
1:H:133:GLU:CD	1:H:133:GLU:OE1	1.63	1.40
1:H:134:GLU:CD	1:H:134:GLU:CG	2.13	1.22
1:H:134:GLU:CD	1:H:134:GLU:OE1	1.90	1.14
1:J:127:PRO:O	1:J:130:VAL:HG12	1.65	0.95
1:F:124:MET:HE1	1:G:36:GLN:HG2	1.51	0.92
1:I:124:MET:HE1	1:J:36:GLN:HG2	1.49	0.91
1:E:48:VAL:HG21	1:E:125:CYS:SG	2.15	0.86
1:E:133:GLU:O	1:E:135:GLY:N	2.07	0.86
1:C:182:GLN:HB2	1:C:195:ASP:OD1	1.79	0.82
1:G:124:MET:HE1	1:H:36:GLN:HG2	1.62	0.80
1:J:159:ASP:OD1	1:J:159:ASP:N	2.12	0.80
1:B:48:VAL:HG21	1:B:125:CYS:SG	2.22	0.80
1:A:36:GLN:HG2	1:E:124:MET:HE1	1.64	0.78
1:D:27:LEU:HD21	1:D:58:TRP:HB2	1.65	0.78
1:I:91:TYR:OH	1:I:143:GLY:HA3	1.85	0.77
1:C:133:GLU:HG2	1:C:203:ARG:NH1	2.00	0.76
1:G:27:LEU:HD21	1:G:58:TRP:HB2	1.68	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:184:GLN:HG2	1:G:186:TYR:CE1	2.21	0.76
1:E:133:GLU:C	1:E:135:GLY:H	1.95	0.74
1:B:27:LEU:HD21	1:B:58:TRP:HB2	1.68	0.74
1:F:36:GLN:HG2	1:J:124:MET:HE1	1.70	0.73
1:C:27:LEU:HD21	1:C:58:TRP:HB2	1.69	0.73
1:F:27:LEU:HD21	1:F:58:TRP:HB2	1.70	0.73
1:C:124:MET:HE1	1:D:36:GLN:HG2	1.69	0.72
1:B:136:VAL:HG22	1:B:137:THR:H	1.53	0.71
1:D:124:MET:HE1	1:E:36:GLN:HG2	1.72	0.71
1:J:182:GLN:OE1	1:J:197:ASN:HB2	1.89	0.71
1:C:190:PRO:HD2	1:C:191:GLU:OE1	1.90	0.71
1:J:27:LEU:HD21	1:J:58:TRP:HB2	1.73	0.71
1:H:41:VAL:HG23	1:H:41:VAL:O	1.91	0.70
1:E:27:LEU:HD21	1:E:58:TRP:HB2	1.72	0.70
1:J:189:CYS:HB3	1:J:191:GLU:OE2	1.93	0.69
1:H:141:LYS:HD3	1:H:195:ASP:OD2	1.93	0.69
1:I:183:VAL:HG22	1:I:194:ILE:HD12	1.75	0.69
1:A:27:LEU:HD21	1:A:58:TRP:HB2	1.75	0.68
1:B:124:MET:HE1	1:C:36:GLN:HG2	1.75	0.68
1:B:182:GLN:HB2	1:B:195:ASP:OD1	1.94	0.67
1:H:27:LEU:HD21	1:H:58:TRP:HB2	1.76	0.67
1:F:59:LYS:HE3	1:F:110:ASP:O	1.95	0.66
1:I:27:LEU:HD21	1:I:58:TRP:HB2	1.77	0.66
1:G:188:CYS:SG	1:G:189:CYS:N	2.69	0.65
1:H:124:MET:HE1	1:I:36:GLN:HG2	1.78	0.65
1:I:188:CYS:SG	1:I:189:CYS:N	2.70	0.64
1:F:182:GLN:HB2	1:F:195:ASP:OD1	1.97	0.64
1:I:91:TYR:CZ	1:I:143:GLY:HA3	2.31	0.64
1:A:59:LYS:HE3	1:A:110:ASP:O	1.98	0.64
1:A:182:GLN:HB2	1:A:195:ASP:OD1	1.96	0.64
1:B:182:GLN:OE1	1:B:197:ASN:HB2	1.97	0.64
1:J:204:GLU:O	1:J:205:ARG:HB2	1.98	0.63
1:A:124:MET:HE1	1:B:36:GLN:HG2	1.79	0.63
1:F:57:ARG:NH2	1:F:157:ASP:OD2	2.31	0.63
1:F:204:GLU:O	1:F:205:ARG:HB2	1.97	0.63
1:G:46:ASN:ND2	1:H:169:SER:O	2.33	0.62
1:E:204:GLU:O	1:E:205:ARG:HB2	1.98	0.62
1:A:204:GLU:O	1:A:205:ARG:HB2	1.99	0.62
1:D:57:ARG:NH2	1:D:157:ASP:OD2	2.33	0.62
1:I:57:ARG:NH2	1:I:157:ASP:OD2	2.33	0.61
1:C:204:GLU:O	1:C:205:ARG:HB2	2.01	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:48:VAL:HG21	1:G:125:CYS:SG	2.41	0.61
1:C:57:ARG:NH2	1:C:157:ASP:OD2	2.34	0.60
1:D:186:TYR:HB2	1:D:188:CYS:SG	2.42	0.60
1:B:204:GLU:O	1:B:205:ARG:HB2	2.01	0.60
1:C:133:GLU:HG2	1:C:203:ARG:HH11	1.67	0.59
1:I:124:MET:HE1	1:J:36:GLN:CG	2.27	0.59
1:B:136:VAL:HG22	1:B:137:THR:N	2.17	0.59
1:G:204:GLU:O	1:G:205:ARG:HB2	2.02	0.58
1:B:160:GLN:NE2	1:F:190:PRO:HG3	2.18	0.58
1:F:1:GLN:N	1:F:1:GLN:OE1	2.36	0.58
1:D:204:GLU:O	1:D:205:ARG:HB2	2.04	0.58
1:H:133:GLU:CD	1:H:133:GLU:CB	2.73	0.58
1:I:182:GLN:HB2	1:I:195:ASP:OD1	2.05	0.57
1:H:204:GLU:O	1:H:205:ARG:HB2	2.04	0.56
1:A:57:ARG:NH2	1:A:157:ASP:OD2	2.38	0.56
1:E:57:ARG:NH2	1:E:157:ASP:OD2	2.38	0.56
1:G:72:ASN:ND2	3:G:2002:HOH:O	2.33	0.56
1:J:48:VAL:HG21	1:J:125:CYS:SG	2.44	0.56
1:G:57:ARG:NH2	1:G:157:ASP:OD2	2.39	0.56
1:J:57:ARG:NH2	1:J:157:ASP:OD2	2.39	0.56
1:C:147:TYR:CE1	1:D:77:ARG:HD3	2.42	0.55
1:H:41:VAL:O	1:H:41:VAL:CG2	2.54	0.55
1:A:143:GLY:HA2	1:A:154:LEU:HD11	1.89	0.55
1:G:54:GLU:O	1:G:117:PRO:HD2	2.07	0.55
1:B:57:ARG:NH2	1:B:157:ASP:OD2	2.40	0.54
1:E:133:GLU:C	1:E:135:GLY:N	2.62	0.54
1:C:48:VAL:HG21	1:C:125:CYS:SG	2.48	0.54
1:F:167:TYR:CZ	1:F:169:SER:HB2	2.44	0.53
1:I:204:GLU:O	1:I:205:ARG:HB2	2.08	0.53
1:H:188:CYS:C	1:H:189:CYS:SG	2.92	0.52
1:I:141:LYS:HD3	1:I:195:ASP:OD2	2.09	0.52
1:D:134:GLU:H	1:D:134:GLU:CD	2.18	0.52
1:B:48:VAL:CG2	1:B:125:CYS:SG	2.97	0.51
1:F:1:GLN:N	1:F:1:GLN:CD	2.68	0.51
1:H:57:ARG:NH2	1:H:157:ASP:OD2	2.44	0.51
2:A:1206:BS1:H142	1:B:116:ILE:HD11	1.92	0.51
1:E:48:VAL:CG2	1:E:125:CYS:SG	2.95	0.51
2:F:1206:BS1:C19	2:F:1206:BS1:H71C	2.41	0.51
1:J:130:VAL:HB	1:J:136:VAL:CG2	2.41	0.51
1:C:28:THR:HG21	1:C:155:LYS:HE2	1.93	0.50
1:E:28:THR:HG21	1:E:155:LYS:HE2	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:143:GLY:HA2	1:C:154:LEU:HD11	1.92	0.50
1:I:167:TYR:CZ	1:I:169:SER:HB2	2.47	0.50
2:A:1206:BS1:H171	2:A:1206:BS1:C6	2.42	0.50
1:G:28:THR:HG21	1:G:155:LYS:HE2	1.94	0.50
1:H:127:PRO:HA	1:H:136:VAL:HG11	1.94	0.50
1:A:145:TRP:CZ3	2:A:1206:BS1:H162	2.47	0.49
1:B:141:LYS:HD3	1:B:195:ASP:OD2	2.12	0.49
1:C:59:LYS:HE3	1:C:110:ASP:O	2.12	0.49
1:F:94:THR:O	1:G:120:ARG:HD2	2.12	0.49
1:G:94:THR:O	1:H:120:ARG:HD2	2.12	0.49
1:A:1:GLN:OE1	1:A:1:GLN:N	2.44	0.49
1:D:94:THR:O	1:E:120:ARG:HD2	2.12	0.49
1:F:143:GLY:HA2	1:F:154:LEU:HD11	1.95	0.48
1:I:137:THR:HG23	1:I:201:LYS:CB	2.44	0.48
1:J:28:THR:HG21	1:J:155:LYS:HE2	1.94	0.48
1:A:125:CYS:HA	1:B:167:TYR:OH	2.13	0.48
1:B:1:GLN:OE1	1:B:1:GLN:N	2.45	0.48
1:A:92:SER:HB2	1:A:124:MET:HE3	1.95	0.48
1:E:91:TYR:OH	1:E:143:GLY:HA3	2.12	0.48
1:A:1:GLN:N	1:A:1:GLN:CD	2.72	0.48
1:E:167:TYR:CZ	1:E:169:SER:HB2	2.49	0.48
1:H:130:VAL:HB	1:H:136:VAL:HG12	1.96	0.48
1:H:19:PRO:HG3	1:I:5:MET:HG3	1.95	0.47
1:A:191:GLU:HG2	1:A:193:TYR:CE2	2.49	0.47
1:J:182:GLN:HB2	1:J:195:ASP:OD1	2.15	0.47
1:C:182:GLN:OE1	1:C:197:ASN:HB2	2.15	0.47
1:F:41:VAL:HG22	1:F:48:VAL:HG22	1.97	0.47
1:F:120:ARG:HD2	1:J:94:THR:O	2.15	0.47
1:H:205:ARG:HH21	1:H:205:ARG:HB3	1.80	0.46
1:A:188:CYS:C	1:A:189:CYS:SG	2.98	0.46
2:A:1206:BS1:C14	1:B:116:ILE:CD1	2.92	0.46
1:B:189:CYS:HA	1:B:190:PRO:HD3	1.83	0.46
1:H:54:GLU:OE2	1:H:56:GLN:NE2	2.48	0.46
1:J:130:VAL:HA	1:J:136:VAL:HG22	1.96	0.46
1:F:54:GLU:O	1:F:117:PRO:HD2	2.15	0.46
1:C:205:ARG:HH21	1:C:205:ARG:HB3	1.81	0.46
1:E:204:GLU:O	1:E:205:ARG:CB	2.65	0.45
1:A:167:TYR:CZ	1:A:169:SER:HB2	2.51	0.45
1:E:1:GLN:H3	1:E:1:GLN:CD	2.24	0.45
1:D:189:CYS:HA	1:D:190:PRO:HD3	1.80	0.45
1:C:72:ASN:ND2	3:C:2003:HOH:O	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:28:THR:HG21	1:D:155:LYS:HE2	1.99	0.45
1:H:133:GLU:OE2	1:H:133:GLU:C	2.59	0.45
1:B:1:GLN:N	1:B:1:GLN:CD	2.75	0.45
1:B:136:VAL:CG2	1:B:137:THR:H	2.27	0.45
1:H:124:MET:HE1	1:I:36:GLN:CG	2.47	0.44
1:C:19:PRO:HG3	1:D:5:MET:HG3	1.97	0.44
1:A:205:ARG:HH21	1:A:205:ARG:HB3	1.83	0.44
1:E:141:LYS:HD3	1:E:195:ASP:OD2	2.16	0.44
1:C:133:GLU:HG2	1:C:203:ARG:HH12	1.81	0.44
1:H:147:TYR:CE1	1:I:77:ARG:HD3	2.51	0.44
1:F:5:MET:HG3	1:J:19:PRO:HG3	2.00	0.44
1:G:143:GLY:HA2	1:G:154:LEU:HD11	1.98	0.44
1:A:5:MET:HG3	1:E:19:PRO:HG3	1.99	0.44
1:A:104:ILE:HG21	1:E:146:VAL:HG21	2.00	0.44
1:H:130:VAL:HB	1:H:136:VAL:CG1	2.48	0.44
1:B:182:GLN:O	1:B:194:ILE:HA	2.18	0.44
1:D:188:CYS:SG	1:D:189:CYS:N	2.91	0.44
1:E:159:ASP:OD1	1:E:159:ASP:N	2.51	0.44
1:A:187:SER:O	1:A:188:CYS:CB	2.66	0.44
1:H:133:GLU:OE2	1:H:133:GLU:O	2.36	0.43
1:A:139:ALA:HA	1:A:198:LEU:O	2.17	0.43
1:F:1:GLN:O	1:F:2:ALA:C	2.62	0.43
1:I:137:THR:HG23	1:I:201:LYS:HG3	2.00	0.43
1:J:204:GLU:O	1:J:205:ARG:CB	2.64	0.43
1:D:59:LYS:HE3	1:D:110:ASP:O	2.18	0.43
1:G:50:LEU:O	1:G:120:ARG:HA	2.18	0.43
1:H:134:GLU:CG	1:H:134:GLU:O	2.66	0.43
1:A:120:ARG:HD2	1:E:94:THR:O	2.19	0.43
1:D:188:CYS:C	1:D:189:CYS:SG	3.01	0.43
1:F:204:GLU:O	1:F:205:ARG:CB	2.65	0.43
1:E:205:ARG:HB3	1:E:205:ARG:HH21	1.84	0.43
1:H:54:GLU:O	1:H:117:PRO:HD2	2.18	0.43
1:I:136:VAL:HG22	1:I:137:THR:N	2.34	0.43
1:B:28:THR:HG21	1:B:155:LYS:HE2	2.01	0.43
1:C:167:TYR:CZ	1:C:169:SER:HB2	2.54	0.43
1:I:28:THR:HG21	1:I:155:LYS:HE2	2.01	0.43
1:B:46:ASN:ND2	1:C:169:SER:O	2.51	0.42
1:G:184:GLN:HG2	1:G:186:TYR:CZ	2.54	0.42
1:I:48:VAL:HG21	1:I:125:CYS:SG	2.58	0.42
1:A:6:ARG:NH2	1:A:69:GLU:O	2.53	0.42
1:B:94:THR:O	1:C:120:ARG:HD2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:54:GLU:O	1:D:117:PRO:HD2	2.19	0.42
1:D:167:TYR:CZ	1:D:169:SER:HB2	2.54	0.42
1:G:59:LYS:HE3	1:G:110:ASP:O	2.19	0.42
1:G:204:GLU:O	1:G:205:ARG:CB	2.67	0.42
1:D:48:VAL:HG21	1:D:125:CYS:SG	2.59	0.42
1:B:6:ARG:NH2	1:B:69:GLU:O	2.53	0.42
1:F:148:SER:CB	1:F:191:GLU:HG3	2.50	0.42
1:G:48:VAL:CG2	1:G:125:CYS:SG	3.05	0.42
1:F:189:CYS:HA	1:F:190:PRO:HD3	1.80	0.42
1:H:205:ARG:HB3	1:H:205:ARG:NH2	2.35	0.42
1:D:87:ASP:HB2	1:E:102:PRO:HG2	2.02	0.41
1:J:41:VAL:HG22	1:J:48:VAL:HG22	2.02	0.41
1:C:154:LEU:HB2	1:C:194:ILE:HG22	2.02	0.41
1:D:154:LEU:HD12	1:D:195:ASP:HA	2.02	0.41
1:F:48:VAL:HG21	1:F:125:CYS:SG	2.60	0.41
1:I:150:PHE:CE2	1:I:191:GLU:HA	2.54	0.41
1:A:59:LYS:HE2	3:A:2002:HOH:O	2.20	0.41
1:F:188:CYS:C	1:F:189:CYS:SG	3.02	0.41
1:J:130:VAL:HB	1:J:136:VAL:HG22	2.02	0.41
1:G:92:SER:HB2	1:G:124:MET:HE3	2.02	0.41
1:I:28:THR:CG2	1:I:155:LYS:HE2	2.51	0.41
1:C:33:PHE:CZ	1:C:142:PHE:CD2	3.09	0.41
1:F:19:PRO:HG3	1:G:5:MET:HG3	2.03	0.41
1:G:27:LEU:CD2	1:G:58:TRP:HB2	2.45	0.41
1:J:191:GLU:HG2	1:J:193:TYR:CE2	2.55	0.41
2:A:1206:BS1:H151	1:B:116:ILE:HD13	2.02	0.41
1:B:167:TYR:CZ	1:B:169:SER:HB2	2.56	0.41
1:D:87:ASP:OD2	1:D:146:VAL:HG22	2.20	0.41
1:I:59:LYS:HE3	1:I:110:ASP:O	2.20	0.41
1:A:145:TRP:HH2	1:B:53:TYR:CE1	2.38	0.41
1:G:167:TYR:CZ	1:G:169:SER:HB2	2.55	0.41
1:J:130:VAL:O	1:J:130:VAL:CG2	2.66	0.41
1:H:130:VAL:O	1:H:130:VAL:HG22	2.21	0.41
1:I:189:CYS:HA	1:I:190:PRO:HD3	1.80	0.41
1:B:49:ASP:HA	1:B:121:LEU:O	2.21	0.40
1:C:124:MET:HE1	1:D:36:GLN:CG	2.46	0.40
1:A:41:VAL:HG22	1:A:48:VAL:HG22	2.02	0.40
1:A:41:VAL:HG13	1:A:127:PRO:HG3	2.04	0.40
1:C:6:ARG:NH2	1:C:69:GLU:O	2.54	0.40
1:E:6:ARG:NH2	1:E:69:GLU:O	2.55	0.40
1:H:28:THR:HG21	1:H:155:LYS:HE2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:6:ARG:NH2	1:J:69:GLU:O	2.55	0.40
1:G:124:MET:HE1	1:H:36:GLN:CG	2.42	0.40
1:I:94:THR:O	1:J:120:ARG:HD2	2.22	0.40
1:J:59:LYS:HE3	1:J:110:ASP:O	2.21	0.40

All (5) 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	Interatomic distance (Å)	Clash overlap (Å)
1:A:28:THR:OG1	1:F:69:GLU:OE2[1_655]	2.02	0.18
1:A:65:TRP:O	1:F:59:LYS:NZ[1_655]	2.07	0.13
1:F:64:MET:CE	3:A:2002:HOH:O[1_455]	2.11	0.09
1:D:69:GLU:OE2	1:E:133:GLU:CG[1_545]	2.11	0.09
1:A:59:LYS:NZ	1:F:65:TRP:O[1_655]	2.15	0.05

## 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	203/217 (94%)	199 (98%)	3 (2%)	1 (0%)	24	48
1	B	203/217 (94%)	199 (98%)	4 (2%)	0	100	100
1	C	203/217 (94%)	197 (97%)	5 (2%)	1 (0%)	24	48
1	D	203/217 (94%)	197 (97%)	6 (3%)	0	100	100
1	E	203/217 (94%)	196 (97%)	5 (2%)	2 (1%)	12	32
1	F	203/217 (94%)	198 (98%)	5 (2%)	0	100	100
1	G	203/217 (94%)	196 (97%)	6 (3%)	1 (0%)	24	48
1	H	203/217 (94%)	194 (96%)	8 (4%)	1 (0%)	24	48
1	I	203/217 (94%)	194 (96%)	8 (4%)	1 (0%)	24	48
1	J	203/217 (94%)	196 (97%)	5 (2%)	2 (1%)	12	32

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	2030/2170 (94%)	1966 (97%)	55 (3%)	9 (0%)	30 54

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	187	SER
1	E	134	GLU
1	G	186	TYR
1	A	188	CYS
1	I	140	VAL
1	J	125	CYS
1	J	190	PRO
1	E	133	GLU
1	H	135	GLY

### 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	188/197 (95%)	180 (96%)	8 (4%)	26 54
1	B	188/197 (95%)	183 (97%)	5 (3%)	39 69
1	C	188/197 (95%)	182 (97%)	6 (3%)	34 64
1	D	188/197 (95%)	183 (97%)	5 (3%)	39 69
1	E	188/197 (95%)	177 (94%)	11 (6%)	18 42
1	F	188/197 (95%)	181 (96%)	7 (4%)	30 59
1	G	188/197 (95%)	178 (95%)	10 (5%)	20 46
1	H	188/197 (95%)	177 (94%)	11 (6%)	18 42
1	I	188/197 (95%)	179 (95%)	9 (5%)	23 50
1	J	188/197 (95%)	176 (94%)	12 (6%)	16 38
All	All	1880/1970 (95%)	1796 (96%)	84 (4%)	24 52

All (84) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	27	LEU
1	A	41	VAL
1	A	125	CYS
1	A	140	VAL
1	A	180	THR
1	A	184	GLN
1	A	204	GLU
1	A	205	ARG
1	B	124	MET
1	B	140	VAL
1	B	180	THR
1	B	204	GLU
1	B	205	ARG
1	C	25	ASP
1	C	180	THR
1	C	184	GLN
1	C	185	HIS
1	C	204	GLU
1	C	205	ARG
1	D	133	GLU
1	D	140	VAL
1	D	180	THR
1	D	204	GLU
1	D	205	ARG
1	E	25	ASP
1	E	31	LEU
1	E	41	VAL
1	E	114	MET
1	E	133	GLU
1	E	134	GLU
1	E	180	THR
1	E	184	GLN
1	E	187	SER
1	E	204	GLU
1	E	205	ARG
1	F	41	VAL
1	F	124	MET
1	F	134	GLU
1	F	140	VAL
1	F	180	THR
1	F	187	SER
1	F	205	ARG
1	G	27	LEU

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Mol	Chain	Res	Type
1	G	40	LYS
1	G	134	GLU
1	G	140	VAL
1	G	180	THR
1	G	183	VAL
1	G	185	HIS
1	G	191	GLU
1	G	204	GLU
1	G	205	ARG
1	H	40	LYS
1	H	44	SER
1	H	133	GLU
1	H	134	GLU
1	H	140	VAL
1	H	180	THR
1	H	184	GLN
1	H	191	GLU
1	H	194	ILE
1	H	204	GLU
1	H	205	ARG
1	I	25	ASP
1	I	27	LEU
1	I	132	SER
1	I	137	THR
1	I	140	VAL
1	I	180	THR
1	I	184	GLN
1	I	204	GLU
1	I	205	ARG
1	J	41	VAL
1	J	78	THR
1	J	128	THR
1	J	130	VAL
1	J	136	VAL
1	J	140	VAL
1	J	159	ASP
1	J	180	THR
1	J	183	VAL
1	J	184	GLN
1	J	190	PRO
1	J	205	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14)



such sidechains are listed below:

Mol	Chain	Res	Type
1	A	119	GLN
1	B	13	ASN
1	C	36	GLN
1	C	72	ASN
1	C	119	GLN
1	D	72	ASN
1	D	119	GLN
1	E	72	ASN
1	F	119	GLN
1	G	119	GLN
1	H	72	ASN
1	I	72	ASN
1	I	119	GLN
1	J	185	HIS

### 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 oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	BS1	F	1206	-	30,30,30	1.85	4 (13%)	40,45,45	1.87	7 (17%)
2	BS1	A	1206	-	30,30,30	1.89	4 (13%)	40,45,45	1.59	7 (17%)

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	BS1	F	1206	-	1/1/5/5	0/2/42/42	0/6/5/5
2	BS1	A	1206	-	1/1/5/5	2/2/42/42	0/6/5/5

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1206	BS1	C2-N1	-6.80	1.46	1.53
2	F	1206	BS1	C2-N1	-6.40	1.47	1.53
2	F	1206	BS1	C3-N1	-5.73	1.47	1.53
2	A	1206	BS1	C3-N1	-5.43	1.48	1.53
2	F	1206	BS1	C4-C1	-2.67	1.49	1.52
2	A	1206	BS1	C7-C6	2.57	1.58	1.52
2	F	1206	BS1	C16-N1	-2.22	1.47	1.51
2	A	1206	BS1	C16-N1	-2.17	1.47	1.51

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	1206	BS1	C7-C2-C13	-5.71	107.90	113.14
2	F	1206	BS1	C8-C3-C12	-4.74	108.80	113.14
2	A	1206	BS1	C8-C3-C12	-4.56	108.95	113.14
2	F	1206	BS1	C2-C7-C6	3.85	117.06	113.77
2	F	1206	BS1	C9-C5-C1	3.12	126.79	120.17
2	A	1206	BS1	C16-N1-C3	-3.07	107.33	112.88
2	F	1206	BS1	C16-N1-C2	-2.88	107.66	112.88
2	A	1206	BS1	C9-C5-C1	2.84	126.20	120.17
2	A	1206	BS1	C2-C7-C6	2.68	116.06	113.77
2	A	1206	BS1	C22-C10-C4	2.67	121.83	118.77
2	F	1206	BS1	C22-C10-C4	2.51	121.65	118.77
2	A	1206	BS1	C16-N1-C2	-2.35	108.63	112.88
2	F	1206	BS1	C19-C5-C1	-2.14	114.95	120.28
2	A	1206	BS1	C7-C6-C8	2.06	115.83	112.03

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	A	1206	BS1	C1
2	F	1206	BS1	C1

All (2) torsion outliers are listed below:

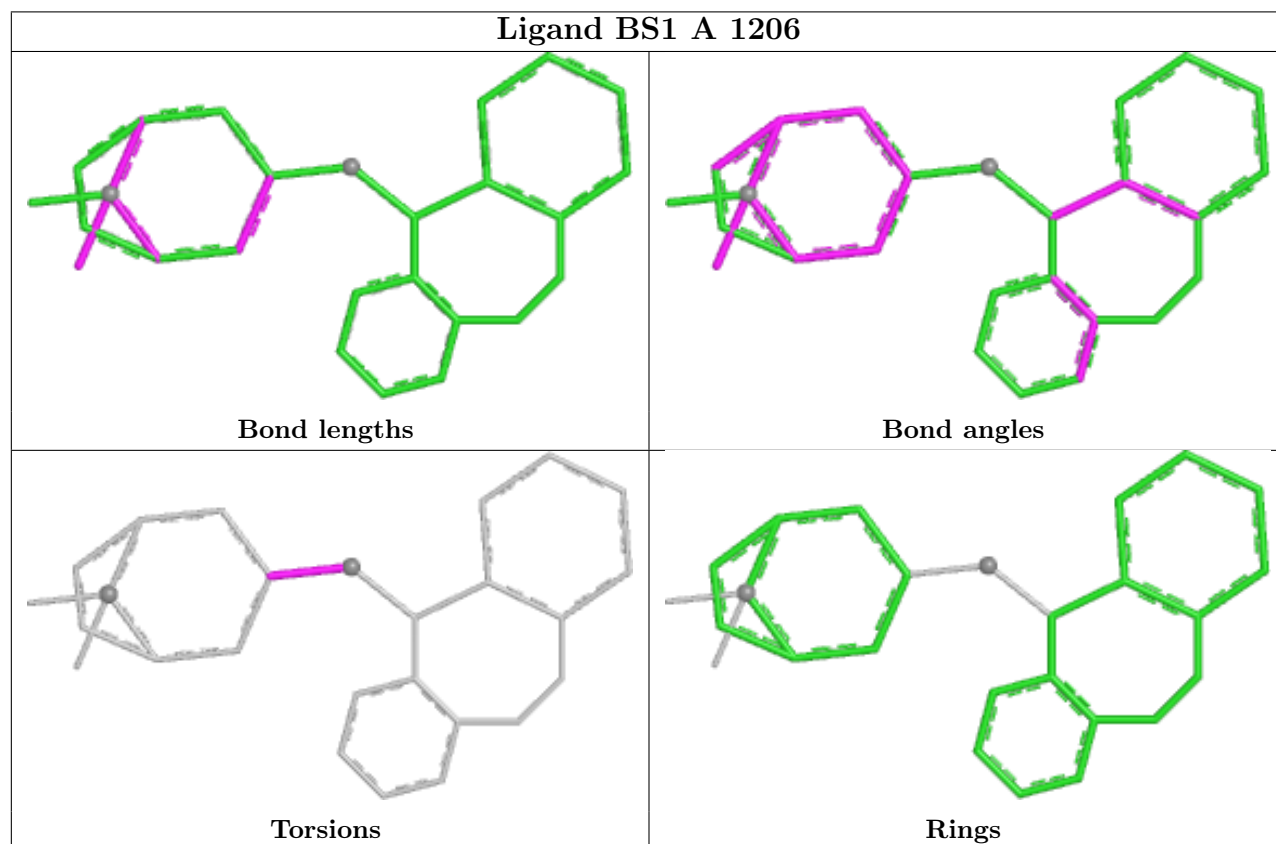
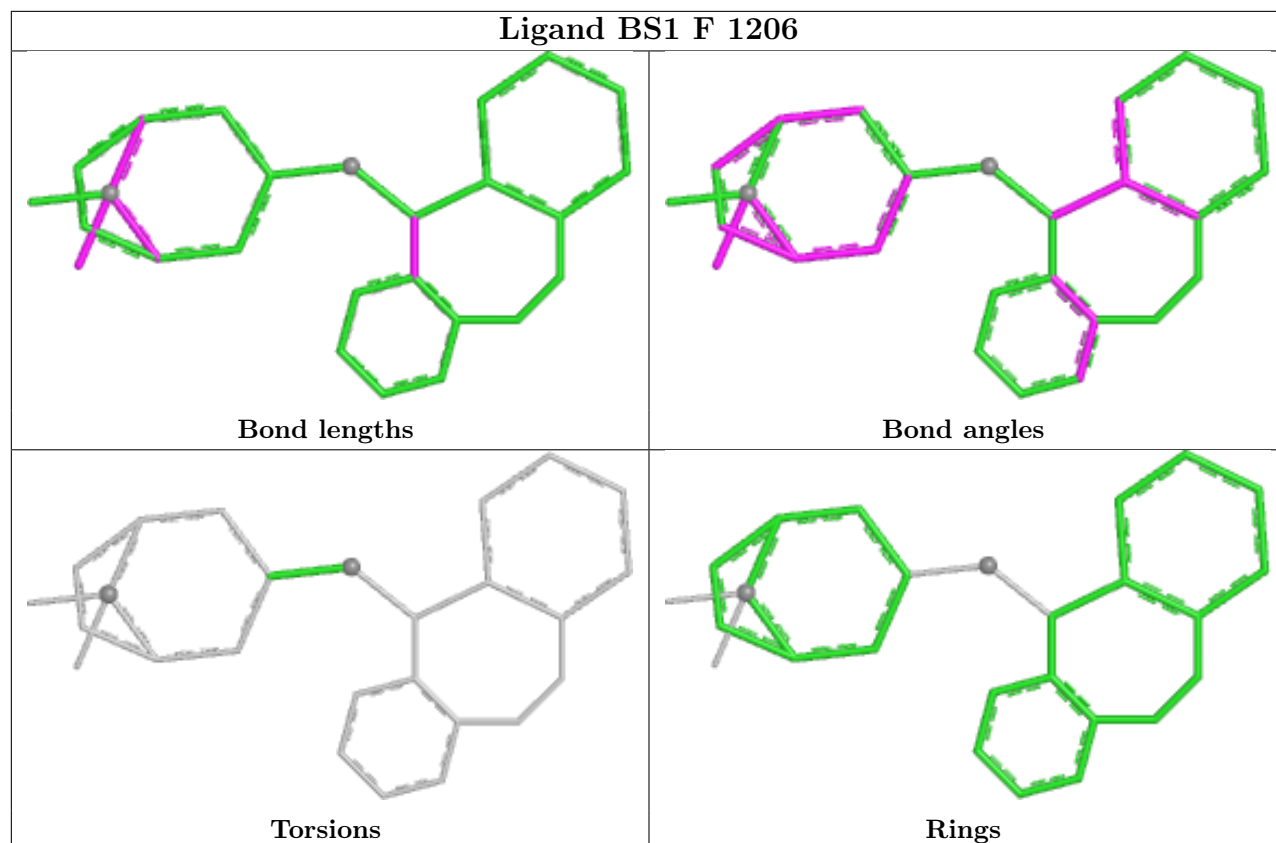
Mol	Chain	Res	Type	Atoms
2	A	1206	BS1	C8-C6-O1-C1
2	A	1206	BS1	C7-C6-O1-C1

There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	F	1206	BS1	1	0
2	A	1206	BS1	5	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	205/217 (94%)	0.17	5 (2%) 59 56	2, 9, 14, 25	0
1	B	205/217 (94%)	0.05	1 (0%) 87 86	3, 9, 14, 25	0
1	C	205/217 (94%)	0.16	5 (2%) 59 56	4, 9, 16, 26	0
1	D	205/217 (94%)	0.01	1 (0%) 87 86	5, 9, 17, 26	0
1	E	205/217 (94%)	0.03	2 (0%) 79 78	3, 9, 17, 25	0
1	F	205/217 (94%)	0.22	3 (1%) 72 70	2, 9, 13, 25	0
1	G	205/217 (94%)	0.22	5 (2%) 59 56	5, 9, 14, 25	0
1	H	205/217 (94%)	0.52	8 (3%) 43 39	5, 9, 19, 25	0
1	I	205/217 (94%)	0.48	11 (5%) 31 27	3, 9, 14, 25	0
1	J	205/217 (94%)	0.20	3 (1%) 72 70	2, 9, 15, 25	0
All	All	2050/2170 (94%)	0.21	44 (2%) 63 61	2, 9, 16, 26	0

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	135	GLY	4.2
1	I	202	PHE	4.1
1	J	188	CYS	3.9
1	H	199	VAL	3.8
1	I	203	ARG	3.6
1	A	90	ALA	3.5
1	C	134	GLU	3.5
1	J	189	CYS	3.4
1	C	68	ASN	3.4
1	I	136	VAL	3.1
1	H	127	PRO	3.0
1	F	32	GLY	2.9
1	I	133	GLU	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	131	ASP	2.8
1	I	137	THR	2.8
1	A	23	LYS	2.8
1	A	64	MET	2.7
1	G	37	ASP	2.7
1	G	138	CYS	2.7
1	G	133	GLU	2.6
1	H	48	VAL	2.6
1	I	173	GLU	2.5
1	C	5	MET	2.5
1	I	196	VAL	2.5
1	D	159	ASP	2.4
1	G	127	PRO	2.4
1	I	183	VAL	2.4
1	J	43	SER	2.4
1	G	132	SER	2.4
1	C	22	THR	2.3
1	H	136	VAL	2.3
1	H	157	ASP	2.3
1	C	70	TYR	2.3
1	A	75	ASP	2.2
1	F	3	ASN	2.2
1	E	93	SER	2.2
1	B	14	ARG	2.1
1	F	64	MET	2.1
1	H	32	GLY	2.1
1	H	198	LEU	2.1
1	H	51	VAL	2.1
1	I	131	ASP	2.0
1	E	149	GLY	2.0
1	I	197	ASN	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](#)

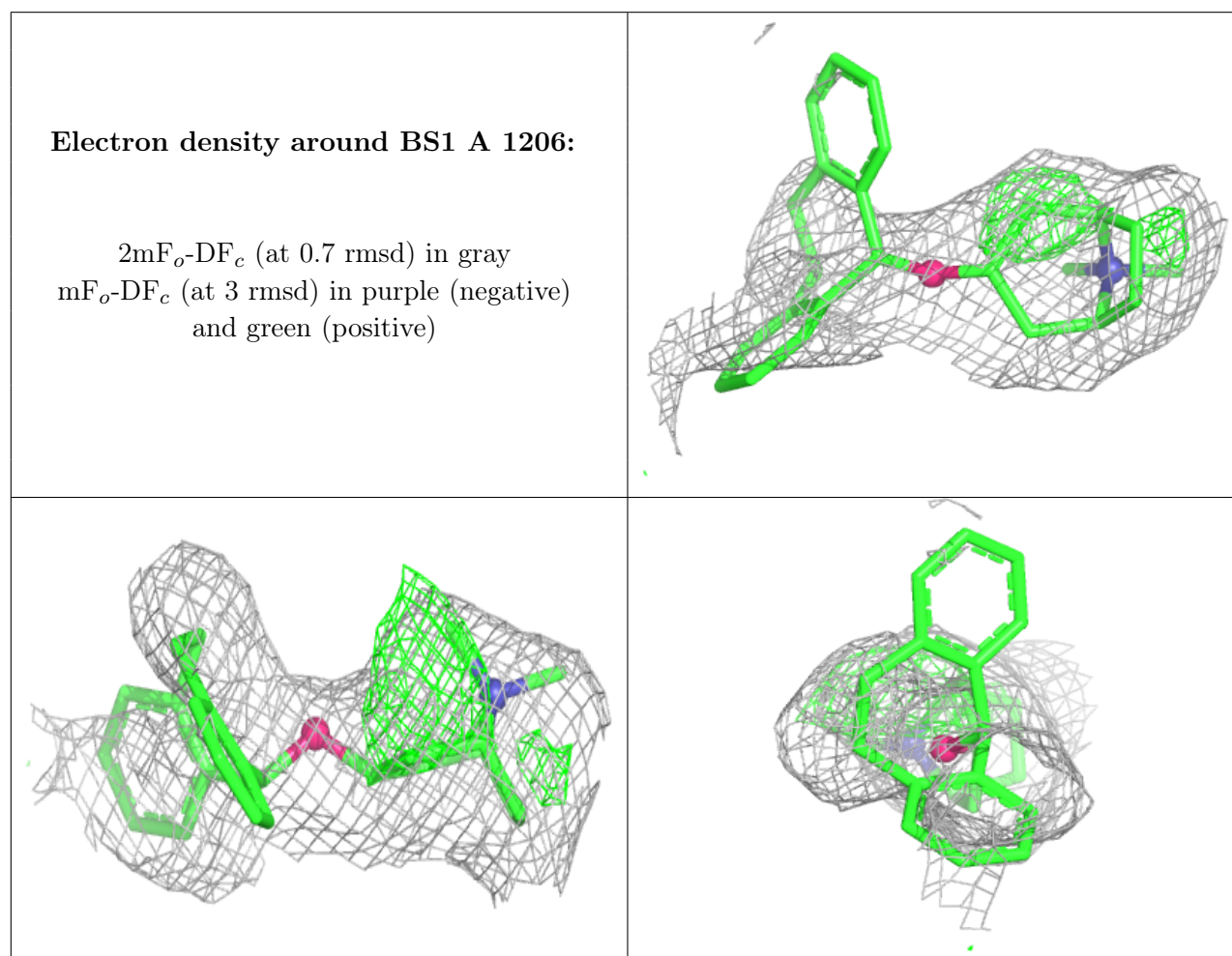
There are no oligosaccharides in this entry.

## 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( $\text{\AA}^2$ )	Q<0.9
2	BS1	A	1206	26/26	0.84	0.17	41,50,51,51	0
2	BS1	F	1206	26/26	0.87	0.16	48,60,61,62	0

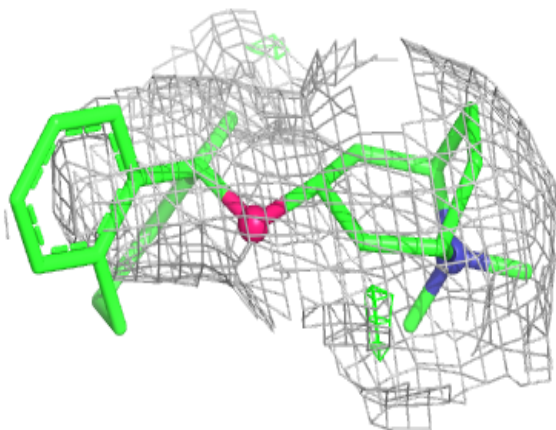
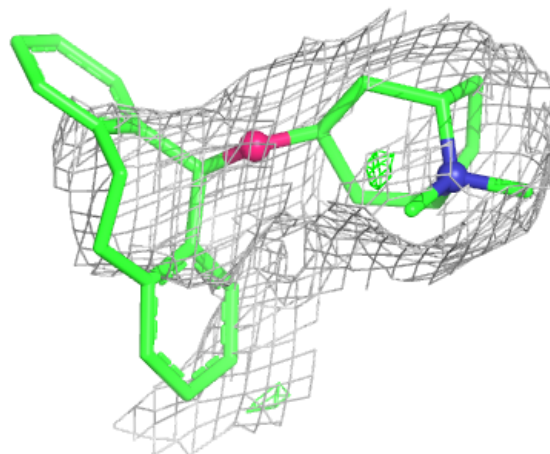
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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





**Electron density around BS1 F 1206:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



## 6.5 Other polymers [i](#)

There are no such residues in this entry.