



# Full wwPDB X-ray Structure Validation Report ⓘ

Apr 21, 2024 – 10:12 am BST

PDB ID : 4B9K  
Title : pVHL-ELOB-ELOC complex\_(2S,4R)-1-(3-amino-2-methylbenzoyl)-4-hydroxy-N-(4-(4-methylthiazol-5-yl)benzyl)pyrrolidine-2-carboxamide bound  
Authors : Buckley, D.L.; Gustafson, J.L.; VanMolle, I.; Roth, A.G.; SeopTae, H.; Gareiss, P.C.; Jorgensen, W.L.; Ciulli, A.; Crews, C.M.  
Deposited on : 2012-09-05  
Resolution : 2.00 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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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 : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36.2  
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) : 2.36.2

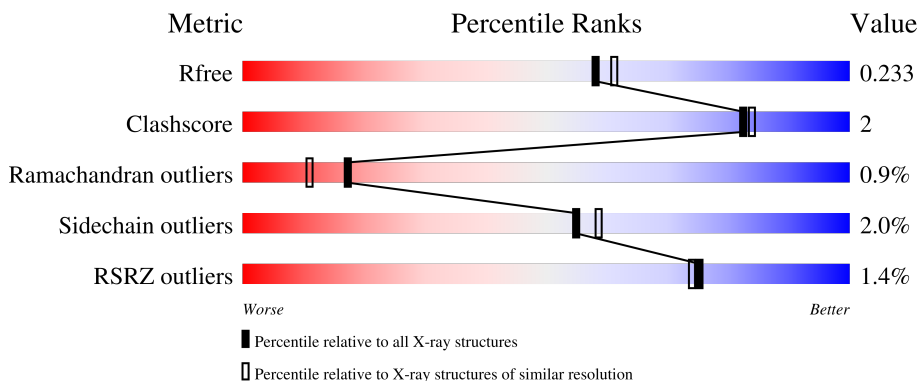
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

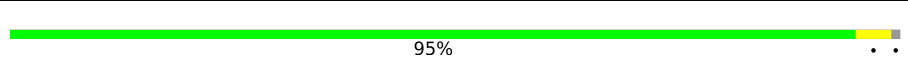
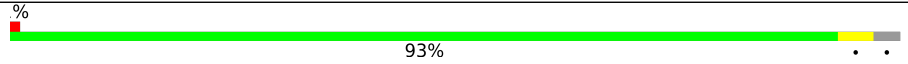
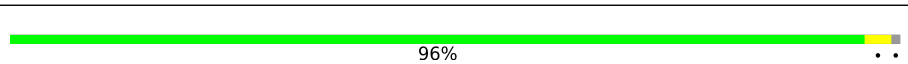
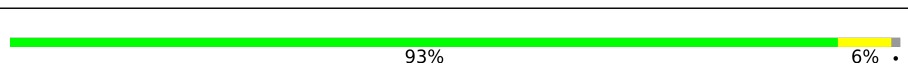
The reported resolution of this entry is 2.00 Å.

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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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	104	 95%
1	D	104	 93%
1	G	104	 96%
1	J	104	 93% 6%

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Mol	Chain	Length	Quality of chain
2	B	97	<p>2% 78% 8% 9%</p>
2	H	97	<p>2% 81% 9% 8%</p>
2	K	97	<p>4% 77% 14% 6%</p>
3	C	171	<p>% 75% 19%</p>
3	F	171	<p>% 78% 6% 16%</p>
3	I	171	<p>2% 78% 8% 14%</p>
3	L	171	<p>% 75% 10% 15%</p>
4	E	97	<p>3% 76% 11% 10%</p>

## 2 Entry composition i

There are 7 unique types of molecules in this entry. The entry contains 11711 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 TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	As	C	N	O				S
1	A	103	Total 811	As 3	C 516	N 137	O 150	S 5	0	1	0
1	D	101	Total 803	As 3	C 509	N 137	O 150	S 4	0	2	0
1	G	103	Total 827	As 2	C 523	N 140	O 157	S 5	0	1	0
1	J	103	Total 810	As 2	C 515	N 136	O 152	S 5	0	0	0

- Molecule 2 is a protein called TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	88	Total 698	C 452	N 113	O 127	S 6	0	1	0
2	H	89	Total 693	C 449	N 110	O 128	S 6	0	1	0
2	K	91	Total 714	C 461	N 112	O 134	S 7	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	16	MET	-	expression tag	UNP Q15369
H	16	MET	-	expression tag	UNP Q15369
K	16	MET	-	expression tag	UNP Q15369

- Molecule 3 is a protein called VON HIPPEL-LINDAU DISEASE TUMOR SUPPRESSOR.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	As	C	N	O				S
3	C	138	Total 1119	As 1	C 717	N 198	O 201	S 2	0	2	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	As	C	N	O				S
3	F	143	1157	1	738	206	210	2	0	2	0
3	I	147	1172	1	751	206	212	2	0	1	0
3	L	146	1164	1	742	212	207	2	0	0	0

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	43	SER	-	expression tag	UNP P40337
C	44	MET	-	expression tag	UNP P40337
C	45	SER	-	expression tag	UNP P40337
C	46	GLU	-	expression tag	UNP P40337
C	47	ASN	-	expression tag	UNP P40337
C	48	LEU	-	expression tag	UNP P40337
C	49	TYR	-	expression tag	UNP P40337
C	50	PHE	-	expression tag	UNP P40337
C	51	GLN	-	expression tag	UNP P40337
C	52	GLY	-	expression tag	UNP P40337
C	53	SER	-	expression tag	UNP P40337
F	43	SER	-	expression tag	UNP P40337
F	44	MET	-	expression tag	UNP P40337
F	45	SER	-	expression tag	UNP P40337
F	46	GLU	-	expression tag	UNP P40337
F	47	ASN	-	expression tag	UNP P40337
F	48	LEU	-	expression tag	UNP P40337
F	49	TYR	-	expression tag	UNP P40337
F	50	PHE	-	expression tag	UNP P40337
F	51	GLN	-	expression tag	UNP P40337
F	52	GLY	-	expression tag	UNP P40337
F	53	SER	-	expression tag	UNP P40337
I	43	SER	-	expression tag	UNP P40337
I	44	MET	-	expression tag	UNP P40337
I	45	SER	-	expression tag	UNP P40337
I	46	GLU	-	expression tag	UNP P40337
I	47	ASN	-	expression tag	UNP P40337
I	48	LEU	-	expression tag	UNP P40337
I	49	TYR	-	expression tag	UNP P40337
I	50	PHE	-	expression tag	UNP P40337
I	51	GLN	-	expression tag	UNP P40337
I	52	GLY	-	expression tag	UNP P40337

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Chain	Residue	Modelled	Actual	Comment	Reference
I	53	SER	-	expression tag	UNP P40337
L	43	SER	-	expression tag	UNP P40337
L	44	MET	-	expression tag	UNP P40337
L	45	SER	-	expression tag	UNP P40337
L	46	GLU	-	expression tag	UNP P40337
L	47	ASN	-	expression tag	UNP P40337
L	48	LEU	-	expression tag	UNP P40337
L	49	TYR	-	expression tag	UNP P40337
L	50	PHE	-	expression tag	UNP P40337
L	51	GLN	-	expression tag	UNP P40337
L	52	GLY	-	expression tag	UNP P40337
L	53	SER	-	expression tag	UNP P40337

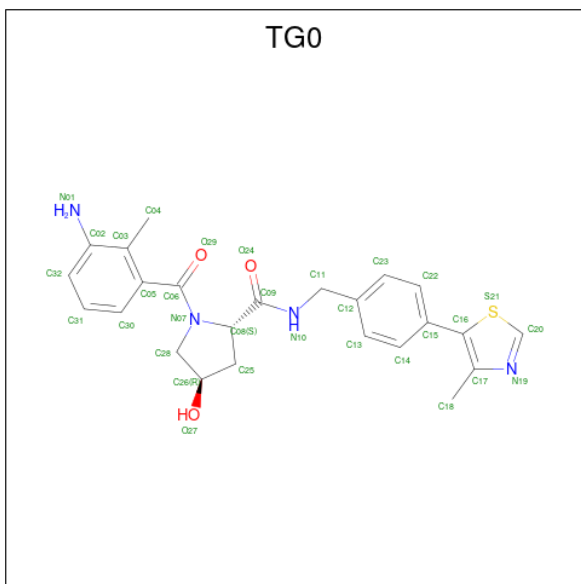
- Molecule 4 is a protein called TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	As	C	N	O				S
4	E	87	690	1	446	109	128	6	0	0	0

There is a discrepancy between the modelled and reference sequences:

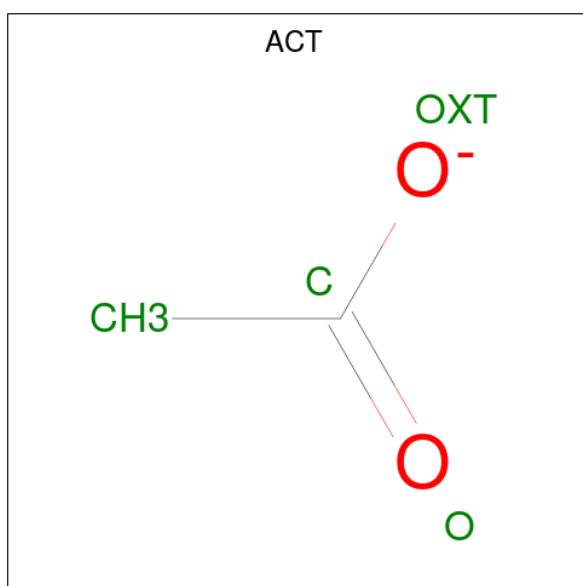
Chain	Residue	Modelled	Actual	Comment	Reference
E	16	MET	-	expression tag	UNP Q15369

- Molecule 5 is (2S,4R)-1-(3-amino-2-methylbenzoyl)-4-hydroxy-N-(4-(4-methylthiazol-5-yl)benzyl)pyrrolidine-2-carboxamide (three-letter code: TG0) (formula: C<sub>24</sub>H<sub>26</sub>N<sub>4</sub>O<sub>3</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	C	1	Total	C	N	O	S	0	0
			32	24	4	3	1		
5	F	1	Total	C	N	O	S	0	0
			32	24	4	3	1		
5	I	1	Total	C	N	O	S	0	0
			32	24	4	3	1		
5	L	1	Total	C	N	O	S	0	0
			32	24	4	3	1		

- Molecule 6 is ACETATE ION (three-letter code: ACT) (formula: C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	F	1	Total	C	O	0	0
			4	2	2		
6	F	1	Total	C	O	0	0
			4	2	2		
6	H	1	Total	C	O	0	0
			4	2	2		
6	H	1	Total	C	O	0	0
			4	2	2		
6	I	1	Total	C	O	0	0
			4	2	2		
6	K	1	Total	C	O	0	0
			4	2	2		
6	L	1	Total	C	O	0	0
			4	2	2		
6	L	1	Total	C	O	0	0
			4	2	2		

- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	96	Total O 96 96	0	0
7	B	41	Total O 41 41	0	0
7	C	85	Total O 85 85	0	0
7	D	58	Total O 58 58	0	0
7	E	33	Total O 33 33	0	0
7	F	82	Total O 82 82	0	0
7	G	82	Total O 82 82	0	0
7	H	60	Total O 60 60	0	0
7	I	93	Total O 93 93	0	0
7	J	105	Total O 105 105	0	0
7	K	58	Total O 58 58	0	0
7	L	100	Total O 100 100	0	0

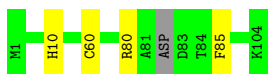


### 3 Residue-property plots [i](#)

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.

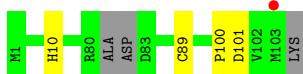
- Molecule 1: TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 2

Chain A:  95%



- Molecule 1: TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 2

Chain D:  93%



- Molecule 1: TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 2

Chain G:  96%




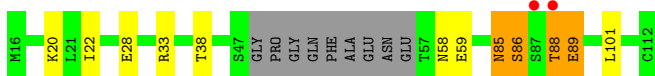
- Molecule 1: TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 2

Chain J:  93%




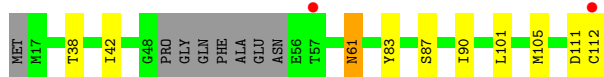
- Molecule 2: TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 1

Chain B:  78%

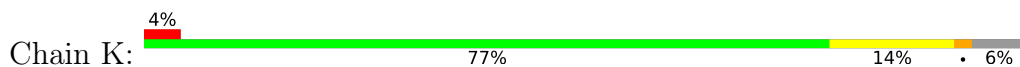


- Molecule 2: TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 1

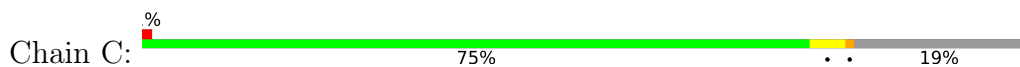
Chain H:  81%



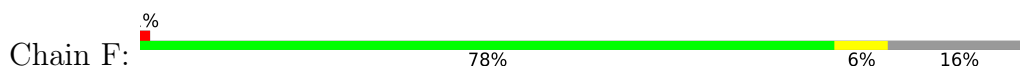
- Molecule 2: TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 1



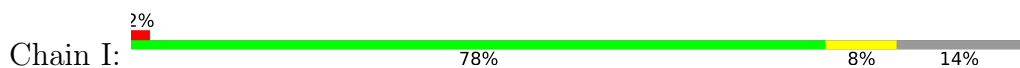
- Molecule 3: VON HIPPEL-LINDAU DISEASE TUMOR SUPPRESSOR



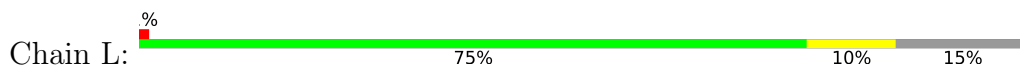
- Molecule 3: VON HIPPEL-LINDAU DISEASE TUMOR SUPPRESSOR



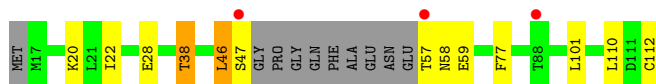
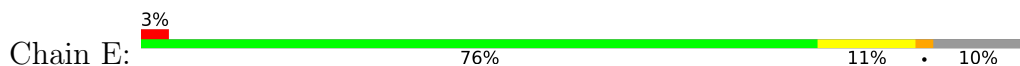
- Molecule 3: VON HIPPEL-LINDAU DISEASE TUMOR SUPPRESSOR



- Molecule 3: VON HIPPEL-LINDAU DISEASE TUMOR SUPPRESSOR



- Molecule 4: TRANSCRIPTION ELONGATION FACTOR B POLYPEPTIDE 1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	92.86Å 92.86Å 364.39Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.06 – 2.00 46.06 – 2.00	Depositor EDS
% Data completeness (in resolution range)	100.0 (46.06-2.00) 100.0 (46.06-2.00)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.83 (at 2.00Å)	Xtrriage
Refinement program	BUSTER 2.10.0	Depositor
R, $R_{free}$	0.189 , 0.220 0.199 , 0.233	Depositor DCC
$R_{free}$ test set	5443 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	33.1	Xtrriage
Anisotropy	0.452	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 52.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.44$ , $\langle L^2 \rangle = 0.26$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	11711	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	43.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 29.64 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.4981e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ACT, TG0, CAS

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	0.48	0/797	0.67	0/1073
1	D	0.44	0/788	0.69	1/1063 (0.1%)
1	G	0.47	0/823	0.69	0/1110
1	J	0.50	0/806	0.67	0/1087
2	B	0.49	0/712	0.69	0/961
2	H	0.53	0/707	0.63	0/956
2	K	0.54	0/729	0.71	0/984
3	C	0.46	0/1138	0.68	1/1555 (0.1%)
3	F	0.46	0/1177	0.67	0/1609
3	I	0.47	0/1192	0.65	0/1629
3	L	0.48	0/1184	0.70	0/1618
4	E	0.48	0/694	0.64	0/938
All	All	0.48	0/10747	0.67	2/14583 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	103	PRO	N-CA-C	5.39	126.12	112.10
1	D	100	PRO	N-CA-CB	5.06	109.37	103.30

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	811	0	792	1	0
1	D	803	0	766	0	0
1	G	827	0	819	1	0
1	J	810	0	802	5	0
2	B	698	0	683	6	0
2	H	693	0	685	4	0
2	K	714	0	706	10	0
3	C	1119	0	1081	8	0
3	F	1157	0	1115	5	0
3	I	1172	0	1131	6	0
3	L	1164	0	1136	8	0
4	E	690	0	677	10	0
5	C	32	0	26	0	0
5	F	32	0	26	0	0
5	I	32	0	26	0	0
5	L	32	0	26	0	0
6	F	8	0	6	1	0
6	H	8	0	6	0	0
6	I	4	0	3	0	0
6	K	4	0	3	0	0
6	L	8	0	6	1	0
7	A	96	0	0	0	0
7	B	41	0	0	0	0
7	C	85	0	0	0	0
7	D	58	0	0	0	0
7	E	33	0	0	0	0
7	F	82	0	0	0	0
7	G	82	0	0	0	0
7	H	60	0	0	1	0
7	I	93	0	0	2	0
7	J	105	0	0	1	0
7	K	58	0	0	0	0
7	L	100	0	0	0	0
All	All	11711	0	10521	53	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 2.

All (53) 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)
4:E:77:PHE:HE1	4:E:112:CAS:AS	2.35	0.69
4:E:57:THR:HA	4:E:59:GLU:H	1.61	0.65
4:E:77:PHE:CE1	4:E:112:CAS:AS	3.11	0.64
3:L:91:PHE:H	6:L:1210:ACT:H2	1.65	0.60
3:C:120[B]:ARG:NH1	3:C:197:ASP:OD2	2.28	0.58
3:F:166:VAL:O	3:F:170:VAL:HG12	2.06	0.56
4:E:110:LEU:HD13	4:E:112:CAS:CE1	2.36	0.56
2:B:20:LYS:HB3	2:B:59:GLU:HG2	1.89	0.54
3:I:166:VAL:O	3:I:170:VAL:HG12	2.07	0.54
2:K:101:LEU:HD11	3:L:178:LEU:HD22	1.89	0.53
4:E:20:LYS:HB3	4:E:59:GLU:HG2	1.91	0.53
1:J:63:THR:OG1	1:J:66:THR:HG22	2.09	0.52
1:G:80:ARG:HA	1:G:85:PHE:HA	1.92	0.52
1:J:102:VAL:HG13	3:L:174:ASN:HB3	1.92	0.51
2:K:87:SER:HA	2:K:88:THR:O	2.11	0.51
3:C:200:ARG:HA	3:C:201:LEU:HB2	1.93	0.50
3:F:161:ARG:HH12	6:F:1205:ACT:H3	1.77	0.50
2:H:101:LEU:HD11	3:I:178:LEU:HD22	1.95	0.49
2:B:85:ASN:HA	2:B:86:SER:HB2	1.95	0.48
4:E:46:LEU:O	4:E:47:SER:HB3	2.13	0.48
3:F:63:LEU:HD21	3:F:201:LEU:HB3	1.95	0.48
3:C:104:GLY:HA3	2:K:63:ARG:HD3	1.96	0.48
1:J:99:LEU:HG	2:K:98:GLU:HG3	1.95	0.48
3:L:62:VAL:HB	3:L:64:ARG:HH11	1.79	0.48
3:I:176:ARG:HG2	7:I:2077:HOH:O	2.14	0.47
1:A:80:ARG:HA	1:A:85:PHE:HA	1.95	0.47
2:B:101:LEU:HD11	3:C:178:LEU:HD22	1.96	0.47
2:K:112:CYS:HB2	3:L:158:LEU:HB3	1.96	0.46
3:L:120:ARG:HD3	3:L:127:GLY:HA2	1.97	0.46
4:E:38:THR:HG23	4:E:112:CAS:CE2	2.46	0.45
3:I:180:ILE:HD12	3:I:184:LEU:HB3	1.98	0.45
3:F:120[A]:ARG:NH1	3:F:197:ASP:OD2	2.50	0.45
2:H:61:ASN:ND2	7:H:2007:HOH:O	2.37	0.45
3:I:120:ARG:HD3	3:I:127:GLY:HA2	1.98	0.44
1:J:68:ARG:NE	7:J:2076:HOH:O	2.49	0.44
3:L:73:GLN:HG2	3:L:108:ARG:NH2	2.33	0.44
4:E:22:ILE:HG12	4:E:28:GLU:HG2	2.00	0.44
2:H:105:MET:HG2	7:I:2082:HOH:O	2.17	0.44
2:B:22:ILE:HG12	2:B:28:GLU:HG2	2.00	0.44
2:K:83:TYR:HB3	2:K:90:ILE:HG12	1.99	0.43
4:E:101:LEU:HD11	3:F:178:LEU:HD22	2.01	0.43
2:K:68:HIS:HD2	2:K:99:ILE:HD12	1.83	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:47:SER:O	4:E:47:SER:OG	2.34	0.42
2:B:88:THR:HG22	2:B:89:GLU:H	1.85	0.41
3:L:115:HIS:O	3:L:138:PRO:CD	2.68	0.41
2:B:33[B]:ARG:HH22	2:B:58:ASN:CG	2.24	0.41
3:C:75:ILE:HD12	2:K:41:THR:HG23	2.01	0.41
3:C:200:ARG:HA	3:C:201:LEU:CB	2.50	0.41
3:C:108:ARG:HD3	2:K:111:ASP:HB2	2.01	0.41
3:I:73:GLN:HE22	3:I:110:HIS:CD2	2.39	0.41
3:C:120[B]:ARG:HA	3:C:120[B]:ARG:HD3	1.97	0.41
2:H:83:TYR:HB3	2:H:90:ILE:HG12	2.02	0.41
1:J:15:PHE:HB2	2:K:31:VAL:HG12	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	97/104 (93%)	94 (97%)	3 (3%)	0	100 100
1	D	96/104 (92%)	92 (96%)	3 (3%)	1 (1%)	15 9
1	G	100/104 (96%)	97 (97%)	3 (3%)	0	100 100
1	J	99/104 (95%)	96 (97%)	3 (3%)	0	100 100
2	B	85/97 (88%)	80 (94%)	2 (2%)	3 (4%)	3 1
2	H	86/97 (89%)	84 (98%)	2 (2%)	0	100 100
2	K	87/97 (90%)	83 (95%)	2 (2%)	2 (2%)	6 2
3	C	135/171 (79%)	130 (96%)	4 (3%)	1 (1%)	22 16
3	F	142/171 (83%)	138 (97%)	4 (3%)	0	100 100
3	I	145/171 (85%)	140 (97%)	4 (3%)	1 (1%)	22 16
3	L	143/171 (84%)	134 (94%)	6 (4%)	3 (2%)	7 2

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	E	83/97 (86%)	82 (99%)	1 (1%)	0	100	100
All	All	1298/1488 (87%)	1250 (96%)	37 (3%)	11 (1%)	17	13

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	L	142	VAL
3	L	180	ILE
2	B	89	GLU
3	I	206	ILE
2	K	88	THR
2	B	85	ASN
2	B	86	SER
1	D	101	ASP
3	L	144	GLY
3	C	103	PRO
2	K	48	GLY

### 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	83/90 (92%)	82 (99%)	1 (1%)	71	76
1	D	80/90 (89%)	79 (99%)	1 (1%)	69	74
1	G	89/90 (99%)	88 (99%)	1 (1%)	73	78
1	J	86/90 (96%)	86 (100%)	0	100	100
2	B	74/86 (86%)	72 (97%)	2 (3%)	44	46
2	H	76/86 (88%)	70 (92%)	6 (8%)	12	8
2	K	79/86 (92%)	76 (96%)	3 (4%)	33	31
3	C	121/156 (78%)	120 (99%)	1 (1%)	81	86
3	F	125/156 (80%)	123 (98%)	2 (2%)	62	67
3	I	125/156 (80%)	123 (98%)	2 (2%)	62	67

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	L	126/156 (81%)	124 (98%)	2 (2%)	62	67
4	E	75/85 (88%)	72 (96%)	3 (4%)	31	29
All	All	1139/1327 (86%)	1115 (98%)	24 (2%)	55	57

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	HIS
2	B	38	THR
2	B	88	THR
3	C	201	LEU
1	D	10	HIS
4	E	38	THR
4	E	46	LEU
4	E	58	ASN
3	F	107[A]	ARG
3	F	107[B]	ARG
1	G	3	VAL
2	H	38	THR
2	H	42	ILE
2	H	61	ASN
2	H	87	SER
2	H	111	ASP
2	H	112	CYS
3	I	140	LEU
3	I	148	PHE
2	K	38	THR
2	K	42	ILE
2	K	112	CYS
3	L	63	LEU
3	L	107	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	G	10	HIS
3	I	110	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](#)

15 non-standard protein/DNA/RNA residues 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	CAS	F	77	3	5,8,9	1.19	1 (20%)	1,9,11	0.48	0
1	CAS	A	89[A]	1	5,8,9	1.16	0	1,9,11	0.55	0
1	CAS	D	89[B]	1	5,8,9	1.01	0	1,9,11	1.98	0
1	CAS	A	60	1	5,8,9	0.79	0	1,9,11	2.64	1 (100%)
4	CAS	E	112	4	6,9,9	1.10	0	5,11,11	0.87	0
3	CAS	C	77	3	5,8,9	1.02	0	1,9,11	0.81	0
1	CAS	G	89	1	5,8,9	1.06	0	1,9,11	1.26	0
1	CAS	J	60	1	5,8,9	0.74	0	1,9,11	1.86	0
3	CAS	L	77	3	5,8,9	0.74	0	1,9,11	0.26	0
1	CAS	A	89[B]	1	5,8,9	1.26	0	1,9,11	1.98	0
3	CAS	I	77	3	5,8,9	0.70	0	1,9,11	0.19	0
1	CAS	J	89	1	5,8,9	1.08	0	1,9,11	0.34	0
1	CAS	D	60	1	5,8,9	0.61	0	1,9,11	1.66	0
1	CAS	G	60	1	5,8,9	0.96	0	1,9,11	1.77	0
1	CAS	D	89[A]	1	5,8,9	1.22	1 (20%)	1,9,11	0.50	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	CAS	F	77	3	-	0/0/7/9	-
1	CAS	A	89[A]	1	-	0/0/7/9	-
1	CAS	D	89[B]	1	-	0/0/7/9	-
1	CAS	A	60	1	-	0/0/7/9	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	CAS	E	112	4	-	0/6/9/9	-
3	CAS	C	77	3	-	0/0/7/9	-
1	CAS	G	89	1	-	0/0/7/9	-
1	CAS	J	60	1	-	0/0/7/9	-
3	CAS	L	77	3	-	0/0/7/9	-
1	CAS	A	89[B]	1	-	0/0/7/9	-
3	CAS	I	77	3	-	0/0/7/9	-
1	CAS	J	89	1	-	0/0/7/9	-
1	CAS	D	60	1	-	0/0/7/9	-
1	CAS	G	60	1	-	0/0/7/9	-
1	CAS	D	89[A]	1	-	0/0/7/9	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	77	CAS	AS-CE2	2.46	2.02	1.96
1	D	89[A]	CAS	AS-CE1	2.13	2.01	1.96

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	60	CAS	CA-CB-SG	-2.64	103.34	114.43

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	112	CAS	4	0

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

12 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$
5	TG0	I	1210	-	30,35,35	1.88	5 (16%)	37,50,50	1.42	5 (13%)
5	TG0	F	1206	-	30,35,35	1.77	6 (20%)	37,50,50	1.48	5 (13%)
6	ACT	L	1208	-	3,3,3	1.07	0	3,3,3	1.10	0
6	ACT	H	1113	-	3,3,3	1.01	0	3,3,3	1.03	0
6	ACT	I	1209	-	3,3,3	1.07	0	3,3,3	0.86	0
6	ACT	K	1113	-	3,3,3	1.23	0	3,3,3	0.80	0
6	ACT	L	1210	-	3,3,3	0.72	0	3,3,3	1.07	0
6	ACT	F	1207	-	3,3,3	1.16	0	3,3,3	0.87	0
5	TG0	L	1209	-	30,35,35	1.67	4 (13%)	37,50,50	1.57	7 (18%)
6	ACT	F	1205	-	3,3,3	1.04	0	3,3,3	0.90	0
5	TG0	C	1203	-	30,35,35	1.71	6 (20%)	37,50,50	1.41	6 (16%)
6	ACT	H	1114	-	3,3,3	0.99	0	3,3,3	1.02	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
5	TG0	I	1210	-	-	0/21/33/33	0/4/4/4
5	TG0	F	1206	-	-	0/21/33/33	0/4/4/4
5	TG0	L	1209	-	-	0/21/33/33	0/4/4/4
5	TG0	C	1203	-	-	0/21/33/33	0/4/4/4

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	I	1210	TG0	C09-N10	5.67	1.46	1.33
5	L	1209	TG0	C09-N10	5.31	1.45	1.33
5	C	1203	TG0	C09-N10	4.95	1.44	1.33
5	I	1210	TG0	C15-C16	4.85	1.52	1.48
5	F	1206	TG0	C09-N10	4.81	1.44	1.33
5	C	1203	TG0	C06-N07	4.73	1.45	1.34
5	I	1210	TG0	C06-N07	4.53	1.45	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	F	1206	TG0	C15-C16	4.40	1.52	1.48
5	F	1206	TG0	C06-N07	4.39	1.44	1.34
5	L	1209	TG0	C15-C16	3.87	1.52	1.48
5	L	1209	TG0	C06-N07	3.83	1.43	1.34
5	C	1203	TG0	C15-C16	3.39	1.51	1.48
5	C	1203	TG0	C25-C26	-2.49	1.47	1.52
5	L	1209	TG0	C25-C08	-2.36	1.49	1.53
5	I	1210	TG0	C25-C26	-2.33	1.48	1.52
5	F	1206	TG0	C02-N01	2.27	1.45	1.37
5	I	1210	TG0	C02-N01	2.19	1.45	1.37
5	C	1203	TG0	C25-C08	-2.16	1.49	1.53
5	F	1206	TG0	C13-C12	2.11	1.43	1.38
5	C	1203	TG0	C02-N01	2.10	1.44	1.37
5	F	1206	TG0	C25-C26	-2.02	1.48	1.52

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	I	1210	TG0	C25-C08-N07	4.53	109.08	103.10
5	I	1210	TG0	C25-C26-C28	3.97	108.19	103.31
5	L	1209	TG0	C25-C26-C28	3.81	107.99	103.31
5	C	1203	TG0	C11-N10-C09	-3.77	116.92	122.34
5	L	1209	TG0	C30-C05-C03	3.76	123.43	120.72
5	F	1206	TG0	C25-C26-C28	3.52	107.63	103.31
5	C	1203	TG0	C25-C08-N07	3.31	107.47	103.10
5	L	1209	TG0	C12-C11-N10	-3.07	106.46	113.05
5	F	1206	TG0	C25-C08-N07	3.07	107.15	103.10
5	F	1206	TG0	C11-N10-C09	-2.98	118.05	122.34
5	L	1209	TG0	C25-C08-N07	2.97	107.03	103.10
5	L	1209	TG0	C03-C02-N01	2.81	123.74	120.26
5	F	1206	TG0	C03-C02-N01	2.74	123.65	120.26
5	F	1206	TG0	C12-C11-N10	-2.60	107.48	113.05
5	I	1210	TG0	C28-N07-C08	-2.51	108.07	111.70
5	I	1210	TG0	C12-C11-N10	-2.51	107.68	113.05
5	I	1210	TG0	C03-C02-N01	2.33	123.14	120.26
5	C	1203	TG0	C25-C26-C28	2.26	106.08	103.31
5	C	1203	TG0	C12-C11-N10	-2.21	108.32	113.05
5	C	1203	TG0	C28-N07-C08	-2.09	108.68	111.70
5	L	1209	TG0	C32-C02-N01	-2.07	116.12	120.13
5	C	1203	TG0	C03-C02-N01	2.04	122.79	120.26
5	L	1209	TG0	O24-C09-N10	-2.03	118.63	122.99

There are no chirality outliers.

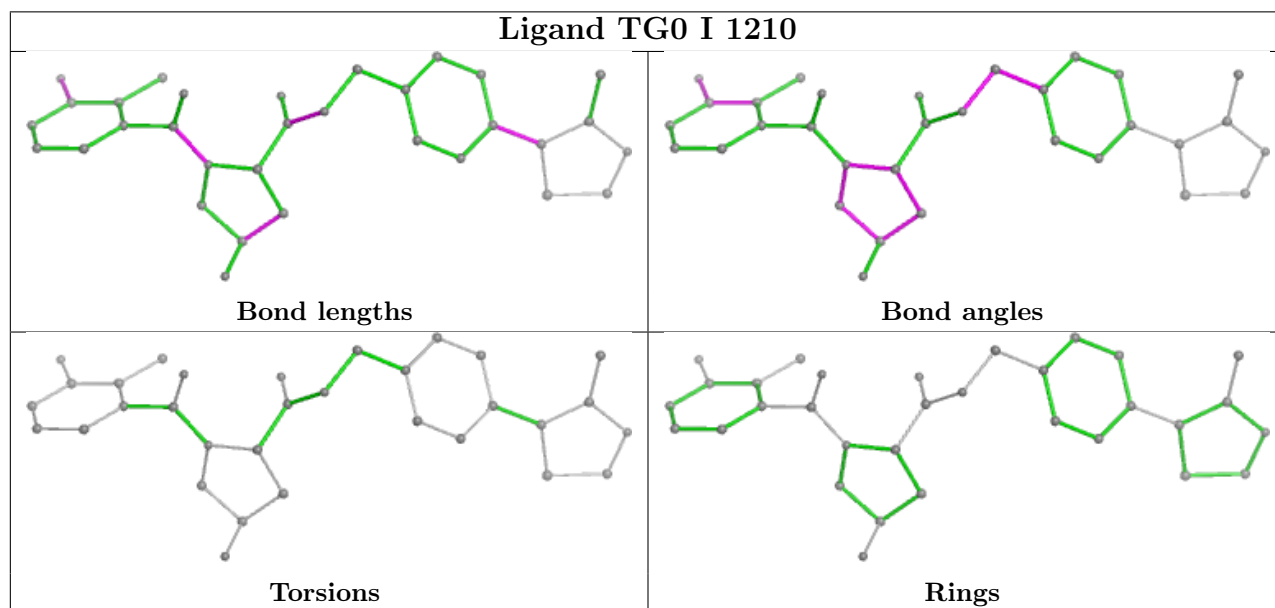
There are no torsion outliers.

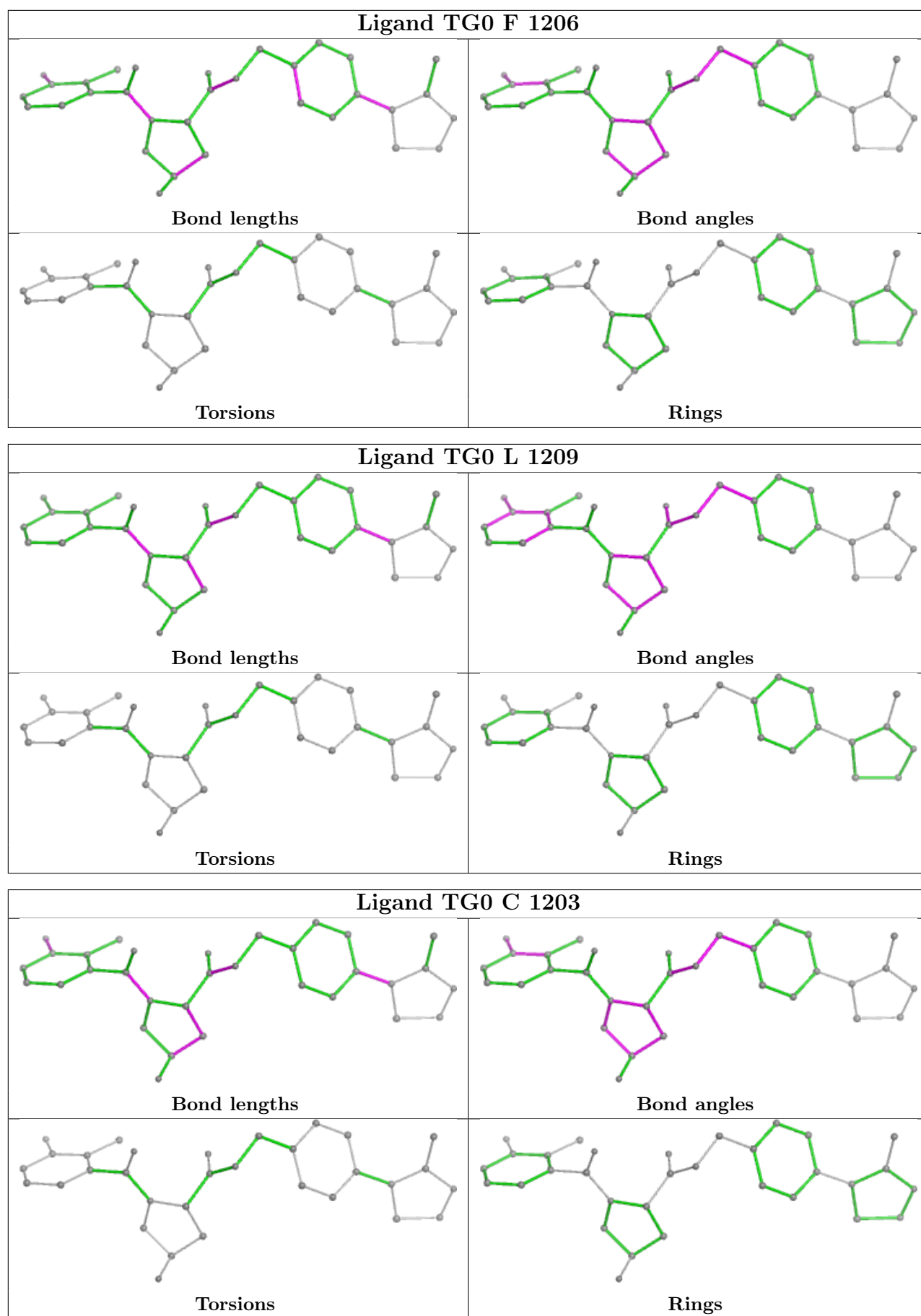
There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	L	1210	ACT	1	0
6	F	1205	ACT	1	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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	101/104 (97%)	-0.30	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	27, 38, 65, 85	0
1	D	99/104 (95%)	0.02	1 (1%) <span style="border: 1px solid blue; padding: 2px;">82</span> <span style="border: 1px solid blue; padding: 2px;">81</span>	30, 50, 86, 112	0
1	G	101/104 (97%)	-0.24	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	28, 42, 62, 73	0
1	J	101/104 (97%)	-0.33	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	24, 33, 56, 70	0
2	B	88/97 (90%)	-0.10	2 (2%) <span style="border: 1px solid blue; padding: 2px;">60</span> <span style="border: 1px solid blue; padding: 2px;">59</span>	26, 40, 72, 86	0
2	H	89/97 (91%)	-0.11	2 (2%) <span style="border: 1px solid blue; padding: 2px;">62</span> <span style="border: 1px solid blue; padding: 2px;">60</span>	26, 37, 62, 82	0
2	K	91/97 (93%)	0.10	4 (4%) <span style="border: 1px solid red; padding: 2px;">34</span> <span style="border: 1px solid red; padding: 2px;">33</span>	24, 36, 68, 83	0
3	C	137/171 (80%)	-0.16	1 (0%) <span style="border: 1px solid blue; padding: 2px;">87</span> <span style="border: 1px solid blue; padding: 2px;">87</span>	27, 38, 61, 107	0
3	F	142/171 (83%)	-0.10	1 (0%) <span style="border: 1px solid blue; padding: 2px;">87</span> <span style="border: 1px solid blue; padding: 2px;">87</span>	26, 39, 65, 117	0
3	I	146/171 (85%)	-0.05	3 (2%) <span style="border: 1px solid blue; padding: 2px;">63</span> <span style="border: 1px solid blue; padding: 2px;">62</span>	28, 41, 61, 129	0
3	L	145/171 (84%)	-0.02	2 (1%) <span style="border: 1px solid blue; padding: 2px;">75</span> <span style="border: 1px solid blue; padding: 2px;">74</span>	23, 37, 74, 121	0
4	E	86/97 (88%)	0.03	3 (3%) <span style="border: 1px solid red; padding: 2px;">44</span> <span style="border: 1px solid red; padding: 2px;">43</span>	27, 45, 71, 85	0
All	All	1326/1488 (89%)	-0.10	19 (1%) <span style="border: 1px solid blue; padding: 2px;">75</span> <span style="border: 1px solid blue; padding: 2px;">74</span>	23, 40, 71, 129	0

All (19) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	K	48	GLY	5.9
2	K	49	PRO	4.8
3	F	201	LEU	4.3
1	D	103	MET	3.5
3	L	143	ASP	3.3
2	B	87	SER	3.3
3	I	206	ILE	3.2
2	H	57	THR	3.0
4	E	57	THR	3.0
2	B	88	THR	2.9
4	E	88	THR	2.8

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Mol	Chain	Res	Type	RSRZ
2	K	87	SER	2.6
2	H	112	CYS	2.6
2	K	111	ASP	2.6
4	E	47	SER	2.4
3	I	208	HIS	2.3
3	C	62	VAL	2.2
3	L	207	ALA	2.2
3	I	207	ALA	2.1

## 6.2 Non-standard residues in protein, DNA, RNA chains [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
1	CAS	G	89	9/10	0.66	0.20	32,39,59,60	3
4	CAS	E	112	10/10	0.90	0.20	45,55,58,63	3
3	CAS	C	77	9/10	0.92	0.15	33,38,51,54	3
1	CAS	D	89[A]	9/10	0.92	0.14	60,62,76,76	9
1	CAS	D	89[B]	9/10	0.92	0.14	60,62,74,78	9
1	CAS	A	89[A]	9/10	0.92	0.15	43,46,62,63	9
1	CAS	A	89[B]	9/10	0.92	0.15	44,46,60,62	9
1	CAS	J	60	9/10	0.92	0.13	34,38,48,49	3
1	CAS	A	60	9/10	0.94	0.12	31,34,42,42	3
3	CAS	L	77	9/10	0.94	0.13	26,29,43,45	3
1	CAS	G	60	9/10	0.95	0.12	38,40,47,49	3
1	CAS	D	60	9/10	0.96	0.10	36,38,49,50	3
1	CAS	J	89	9/10	0.96	0.13	32,34,44,45	3
3	CAS	F	77	9/10	0.96	0.10	29,32,45,47	3
3	CAS	I	77	9/10	0.97	0.11	31,35,49,49	3

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

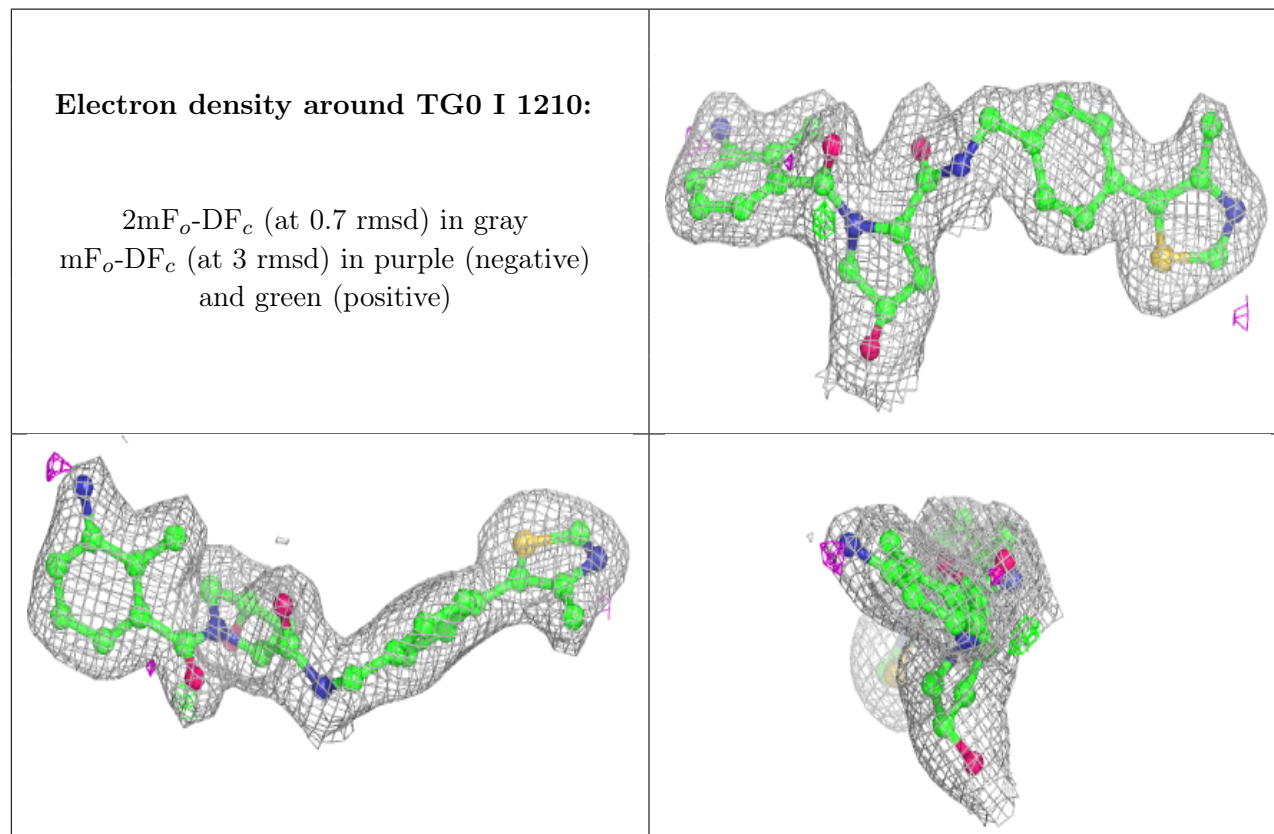
## 6.4 Ligands [i](#)

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.

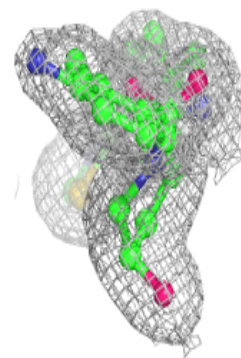
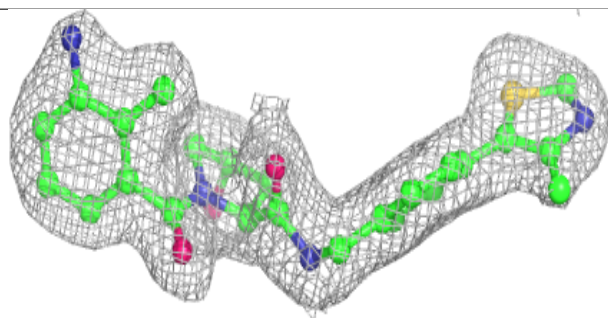
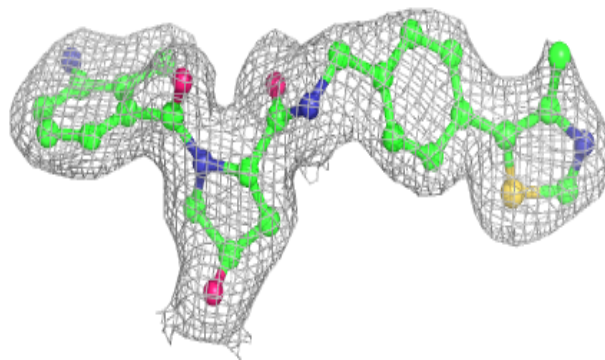
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
6	ACT	L	1208	4/4	0.42	0.35	59,60,61,62	0
6	ACT	F	1205	4/4	0.67	0.20	66,69,69,71	0
6	ACT	L	1210	4/4	0.73	0.28	43,50,55,59	0
6	ACT	H	1114	4/4	0.78	0.31	64,64,64,65	0
6	ACT	H	1113	4/4	0.85	0.13	61,61,63,64	0
6	ACT	I	1209	4/4	0.86	0.14	53,65,66,67	0
6	ACT	F	1207	4/4	0.90	0.16	75,76,76,76	0
6	ACT	K	1113	4/4	0.91	0.13	52,54,55,61	0
5	TG0	I	1210	32/32	0.95	0.12	31,35,40,42	0
5	TG0	C	1203	32/32	0.96	0.11	23,32,42,43	0
5	TG0	F	1206	32/32	0.97	0.10	24,31,35,36	0
5	TG0	L	1209	32/32	0.97	0.11	23,28,31,31	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.

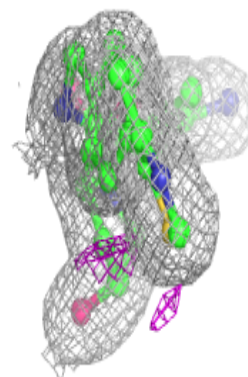
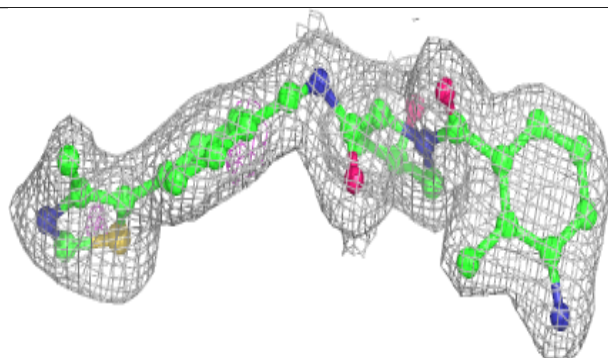
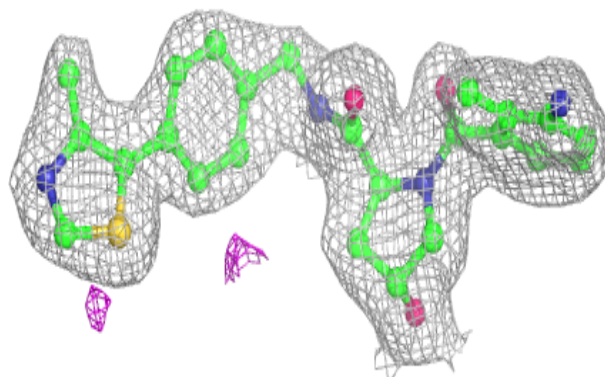


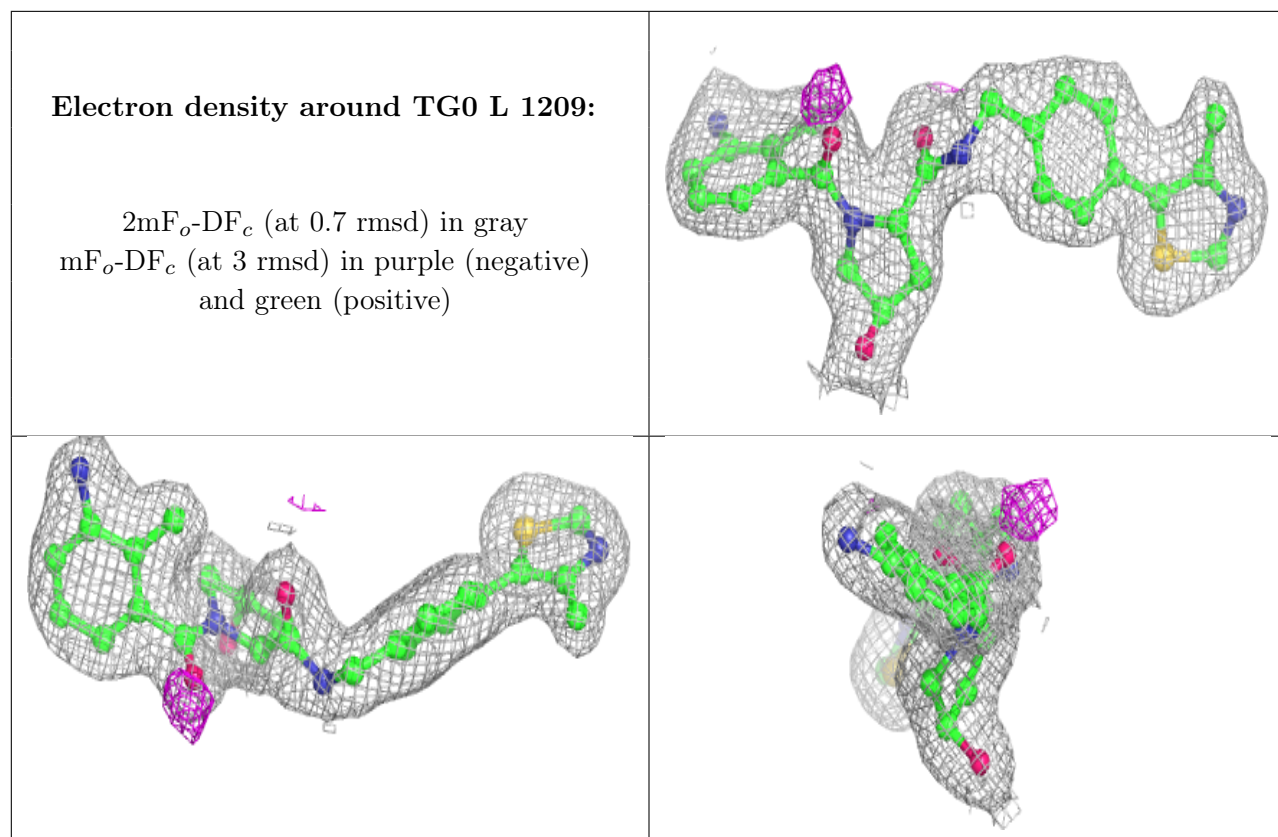
**Electron density around TG0 C 1203:**

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

**Electron density around TG0 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.