



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 22, 2020 – 04:37 AM BST

PDB ID : 2JB6  
Title : Fab fragment in complex with small molecule hapten, crystal form-2  
Authors : Hillig, R.C.; Baesler, S.; Malawski, G.; Badock, V.; Bahr, I.; Schirner, M.; Licha, K.  
Deposited on : 2006-12-03  
Resolution : 2.85 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.

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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 : 2.13.1  
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) : 2.13.1

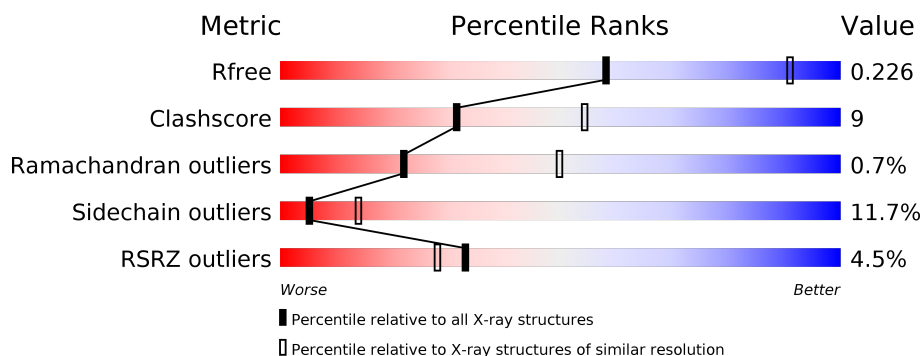
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.85 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	3168 (2.90-2.82)
Clashscore	141614	3438 (2.90-2.82)
Ramachandran outliers	138981	3348 (2.90-2.82)
Sidechain outliers	138945	3351 (2.90-2.82)
RSRZ outliers	127900	3103 (2.90-2.82)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	216	<div> <div>2%</div> <div> <div></div> <div>76%</div> <div>20%</div> <div>• •</div> </div> </div>
1	L	216	<div> <div>%</div> <div> <div></div> <div>73%</div> <div>20%</div> <div>• •</div> </div> </div>
2	B	244	<div> <div>7%</div> <div> <div></div> <div>71%</div> <div>15%</div> <div>• 12%</div> </div> </div>
2	H	244	<div> <div>7%</div> <div> <div></div> <div>59%</div> <div>24%</div> <div>• 13%</div> </div> </div>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 6441 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.

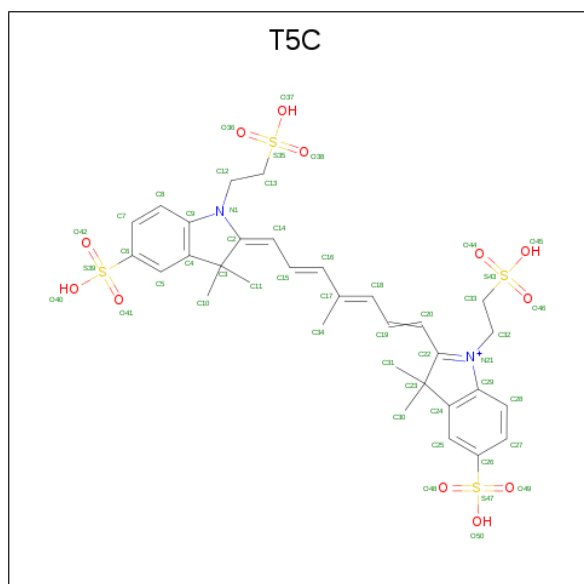
- Molecule 1 is a protein called FAB FRAGMENT MOR03268 LIGHT CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	212	Total	C	N	O	S	0	0	1
			1563	971	265	322	5			
1	L	211	Total	C	N	O	S	0	0	1
			1558	968	264	321	5			

- Molecule 2 is a protein called FAB FRAGMENT MOR03268 HEAVY CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	214	Total	C	N	O	S	0	0	1
			1604	1013	266	318	7			
2	H	213	Total	C	N	O	S	0	0	1
			1598	1010	265	316	7			

- Molecule 3 is 2-[(1E,3Z,5E,7E)-7-[3,3-DIMETHYL-5-SULFO-1-(2-SULFOETHYL)-1,3-DIHYDRO-2H-INDOL-2-YLIDENE]-4-METHYLHEPTA-1,3,5-TRIEN-1-YL]-3,3-DIMETHYL-5-SULFO-1-(2-SULFOETHYL)-3H-INDOLIUM (three-letter code: T5C) (formula: C<sub>32</sub>H<sub>39</sub>N<sub>2</sub>O<sub>12</sub>S<sub>4</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total	C	N	O	S	0	0
			50	32	2	12	4		
3	H	1	Total	C	N	O	S	0	0
			50	32	2	12	4		

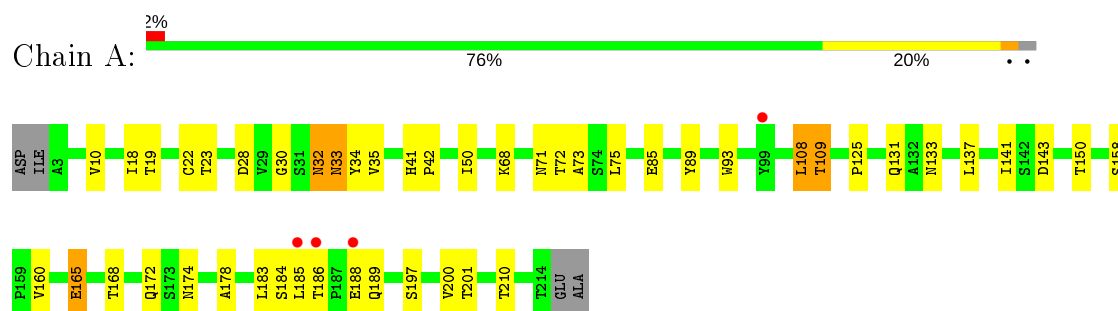
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	5	Total	O	0	0
			5	5		
4	B	7	Total	O	0	0
			7	7		
4	H	2	Total	O	0	0
			2	2		
4	L	4	Total	O	0	0
			4	4		

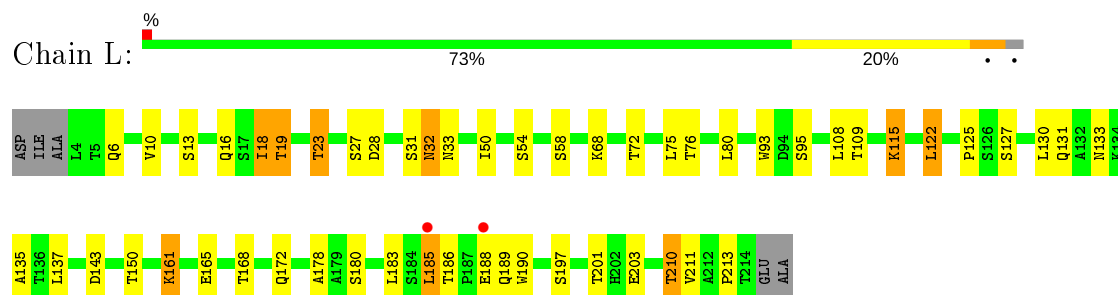
### 3 Residue-property plots [i](#)

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.

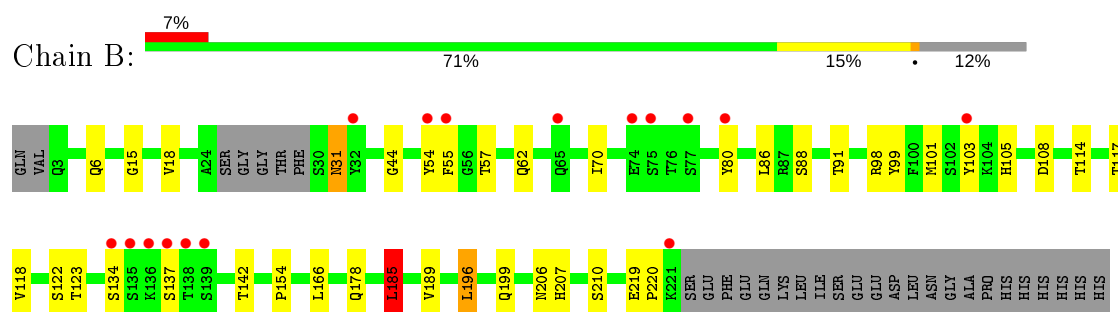
#### • Molecule 1: FAB FRAGMENT MOR03268 LIGHT CHAIN



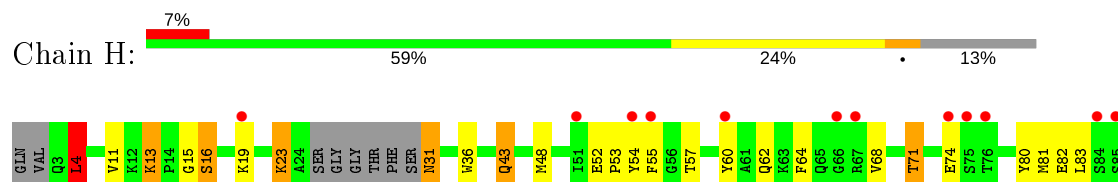
#### • Molecule 1: FAB FRAGMENT MOR03268 LIGHT CHAIN

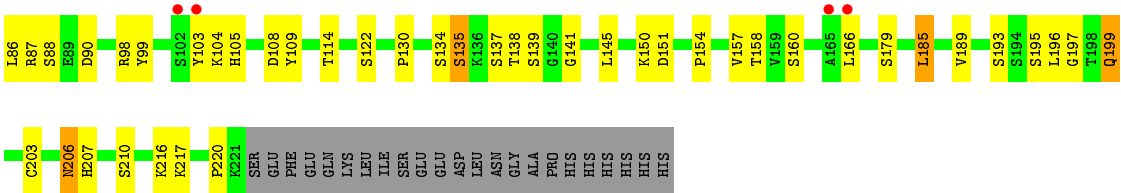


#### • Molecule 2: FAB FRAGMENT MOR03268 HEAVY CHAIN



#### • Molecule 2: FAB FRAGMENT MOR03268 HEAVY CHAIN





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	77.03Å 77.03Å 379.13Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.40 – 2.85 48.85 – 2.85	Depositor EDS
% Data completeness (in resolution range)	99.2 (47.40-2.85) 99.1 (48.85-2.85)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.12 (at 2.86Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, $R_{free}$	0.229 , 0.282 0.232 , 0.226	Depositor DCC
$R_{free}$ test set	1361 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	62.3	Xtriage
Anisotropy	0.220	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 67.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	6441	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.68% 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: T5C

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	0.46	0/1601	0.57	0/2184
1	L	0.45	0/1596	0.58	0/2177
2	B	0.48	0/1643	0.62	1/2238 (0.0%)
2	H	0.50	0/1637	0.62	1/2230 (0.0%)
All	All	0.47	0/6477	0.60	2/8829 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	185	LEU	CA-CB-CG	5.25	127.36	115.30
2	H	185	LEU	CA-CB-CG	5.08	126.99	115.30

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	1563	0	1501	25	0
1	L	1558	0	1496	28	0
2	B	1604	0	1561	21	0
2	H	1598	0	1556	42	0
3	B	50	0	39	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	H	50	0	39	2	0
4	A	5	0	0	0	0
4	B	7	0	0	0	0
4	H	2	0	0	0	0
4	L	4	0	0	0	0
All	All	6441	0	6192	114	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 9.

All (114) 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)
2:H:195:SER:HB2	2:H:199:GLN:HG3	1.53	0.87
2:H:13:LYS:HD3	2:H:13:LYS:H	1.39	0.85
1:A:10:VAL:HG23	1:A:108:LEU:HD23	1.64	0.79
2:H:154:PRO:O	2:H:207:HIS:HE1	1.64	0.79
1:L:125:PRO:HD3	1:L:137:LEU:HD23	1.65	0.78
1:A:197:SER:HB3	1:A:210:THR:HB	1.66	0.77
1:A:18:ILE:HD11	1:A:108:LEU:HD21	1.66	0.77
1:A:18:ILE:CD1	1:A:108:LEU:HD21	2.15	0.77
1:A:137:LEU:HD12	1:A:183:LEU:HD23	1.68	0.76
2:H:31:ASN:HD22	2:H:98:ARG:HH22	1.35	0.73
2:H:13:LYS:CD	2:H:13:LYS:H	2.04	0.71
2:H:103:TYR:HD1	1:L:58:SER:HG	1.38	0.71
1:L:172:GLN:HE21	1:L:178:ALA:HB2	1.59	0.68
1:L:23:THR:HB	1:L:72:THR:HG22	1.75	0.67
2:B:154:PRO:O	2:B:207:HIS:HE1	1.79	0.64
1:L:197:SER:HB3	1:L:210:THR:HB	1.81	0.63
2:H:13:LYS:CD	2:H:13:LYS:N	2.62	0.62
2:H:166:LEU:HD21	2:H:189:VAL:HG11	1.82	0.62
1:L:19:THR:HA	1:L:75:LEU:O	2.02	0.59
2:H:207:HIS:HD2	2:H:210:SER:OG	1.86	0.59
2:H:31:ASN:HA	2:H:98:ARG:NH2	2.18	0.59
1:L:125:PRO:HD3	1:L:137:LEU:CD2	2.33	0.59
2:B:31:ASN:HA	2:B:98:ARG:HH21	1.67	0.58
2:B:99:TYR:CD2	2:B:108:ASP:HB3	2.38	0.58
2:B:134:SER:HB2	2:B:137:SER:HB2	1.85	0.58
1:A:32:ASN:ND2	1:A:34:TYR:H	2.03	0.57
2:B:207:HIS:HD2	2:B:210:SER:OG	1.88	0.57
2:H:206:ASN:HD22	2:H:207:HIS:N	2.02	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:18:VAL:HG12	2:B:86:LEU:HD11	1.87	0.56
2:H:103:TYR:C	2:H:105:HIS:H	2.09	0.56
2:H:4:LEU:HD12	2:H:109:TYR:HB3	1.88	0.56
2:H:99:TYR:CD2	2:H:108:ASP:HB3	2.40	0.56
2:B:196:LEU:O	2:B:219:GLU:HG2	2.05	0.55
1:A:19:THR:HA	1:A:75:LEU:O	2.07	0.55
1:A:32:ASN:HD22	1:A:34:TYR:H	1.55	0.54
2:H:52:GLU:HB3	2:H:53:PRO:CD	2.37	0.54
2:B:166:LEU:HD21	2:B:189:VAL:HG11	1.90	0.53
2:H:4:LEU:HA	2:H:23:LYS:O	2.08	0.52
2:H:134:SER:O	2:H:135:SER:HB2	2.08	0.52
2:B:15:GLY:N	2:B:86:LEU:O	2.42	0.52
1:L:143:ASP:H	1:L:172:GLN:HE22	1.57	0.52
1:A:32:ASN:C	1:A:32:ASN:HD22	2.12	0.52
2:H:64:PHE:HB3	2:H:68:VAL:CG1	2.39	0.52
1:A:125:PRO:HD3	1:A:137:LEU:HD23	1.92	0.51
2:H:43:GLN:HA	2:H:43:GLN:HE21	1.75	0.51
1:A:172:GLN:HE21	1:A:178:ALA:HB2	1.75	0.51
1:L:190:TRP:CH2	1:L:213:PRO:HA	2.45	0.51
1:A:18:ILE:HD12	1:A:108:LEU:HD21	1.92	0.50
1:A:85:GLU:HG3	1:A:109:THR:HA	1.94	0.50
1:A:41:HIS:HB3	1:A:42:PRO:HD2	1.93	0.50
2:B:103:TYR:C	2:B:105:HIS:H	2.15	0.50
1:L:115:LYS:HE3	1:L:203:GLU:OE2	2.12	0.49
2:H:15:GLY:O	2:H:16:SER:O	2.31	0.49
1:L:135:ALA:HB3	1:L:185:LEU:HD12	1.95	0.49
2:H:154:PRO:O	2:H:207:HIS:CE1	2.54	0.48
1:L:32:ASN:HD22	1:L:32:ASN:C	2.17	0.48
2:H:206:ASN:HD22	2:H:207:HIS:H	1.61	0.48
1:L:32:ASN:O	1:L:68:LYS:NZ	2.47	0.48
1:A:30:GLY:HA3	1:A:71:ASN:HD22	1.79	0.48
2:H:19:LYS:HG3	2:H:82:GLU:HG3	1.96	0.48
2:H:36:TRP:CE2	2:H:81:MET:HB2	2.49	0.48
2:H:103:TYR:HD1	1:L:58:SER:OG	1.95	0.47
1:L:186:THR:OG1	1:L:189:GLN:HB2	2.15	0.47
1:L:18:ILE:HD11	1:L:108:LEU:HD11	1.96	0.47
2:H:134:SER:O	2:H:135:SER:CB	2.62	0.47
2:H:81:MET:HE2	2:H:83:LEU:HB2	1.96	0.46
2:H:60:TYR:CD1	2:H:68:VAL:HG13	2.50	0.46
2:B:123:THR:HG22	2:B:210:SER:HB3	1.98	0.46
2:H:141:GLY:HA2	2:H:193:SER:HB2	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:71:THR:HG23	2:H:80:TYR:HB2	1.99	0.45
2:H:86:LEU:HA	2:H:90:ASP:OD2	2.17	0.45
1:A:186:THR:OG1	1:A:189:GLN:HB2	2.16	0.45
1:L:19:THR:HB	1:L:76:THR:OG1	2.17	0.45
1:A:131:GLN:C	1:A:133:ASN:H	2.20	0.44
1:A:33:ASN:HB3	1:A:68:LYS:HZ2	1.83	0.44
2:H:52:GLU:HB3	2:H:53:PRO:HD2	1.97	0.44
1:L:161:LYS:H	1:L:161:LYS:HD3	1.82	0.44
2:H:150:LYS:HE3	2:H:151:ASP:OD2	2.17	0.44
2:H:197:GLY:O	2:H:220:PRO:HB3	2.18	0.44
1:L:137:LEU:HD12	1:L:183:LEU:HD23	2.00	0.44
3:H:1222:T5C:H341	3:H:1222:T5C:H191	1.79	0.44
2:H:64:PHE:HB3	2:H:68:VAL:HG11	2.00	0.44
1:L:127:SER:HA	1:L:130:LEU:HD12	1.99	0.44
1:A:141:ILE:HG12	1:A:200:VAL:HG21	2.00	0.44
1:A:10:VAL:HG12	1:L:10:VAL:HG12	2.00	0.43
2:B:103:TYR:HB2	2:B:105:HIS:HB2	2.00	0.43
2:B:103:TYR:C	2:B:105:HIS:N	2.72	0.43
1:A:172:GLN:HB2	1:A:174:ASN:OD1	2.17	0.43
2:B:154:PRO:O	2:B:207:HIS:CE1	2.66	0.43
2:H:130:PRO:HD3	2:H:216:LYS:HE2	2.01	0.42
2:B:70:ILE:HA	2:B:80:TYR:O	2.19	0.42
2:H:36:TRP:O	2:H:48:MET:HB2	2.19	0.42
1:L:127:SER:O	1:L:131:GLN:HB2	2.20	0.42
1:A:93:TRP:CZ2	3:B:1222:T5C:H7	2.54	0.42
2:H:217:LYS:HE2	2:H:220:PRO:HD2	2.02	0.42
1:L:13:SER:O	1:L:16:GLN:HG2	2.19	0.42
1:A:22:CYS:HB3	1:A:73:ALA:HB3	2.01	0.42
2:H:11:VAL:HB	2:H:154:PRO:HG3	2.02	0.42
1:A:89:TYR:OH	2:B:44:GLY:HA2	2.20	0.42
3:H:1222:T5C:H7	1:L:93:TRP:CZ2	2.54	0.42
1:L:131:GLN:C	1:L:133:ASN:H	2.23	0.42
3:B:1222:T5C:H191	3:B:1222:T5C:H341	1.79	0.42
2:B:185:LEU:C	2:B:185:LEU:HD23	2.41	0.41
1:L:122:LEU:HD13	1:L:211:VAL:HG13	2.03	0.41
2:B:91:THR:HG23	2:B:117:THR:HA	2.02	0.41
1:L:143:ASP:H	1:L:172:GLN:NE2	2.18	0.41
2:B:219:GLU:HG3	2:B:220:PRO:HA	2.03	0.41
2:B:88:SER:HA	2:B:118:VAL:HB	2.03	0.41
3:B:1222:T5C:H111	3:B:1222:T5C:H15	2.03	0.41
1:A:165:GLU:HG2	2:B:178:GLN:HA	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:185:LEU:HD13	1:L:190:TRP:HB2	2.03	0.40
2:H:199:GLN:HB3	2:H:199:GLN:HE21	1.67	0.40
2:H:60:TYR:CE1	2:H:68:VAL:HG13	2.56	0.40
2:H:74:GLU:HA	2:H:74:GLU:OE2	2.21	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	210/216 (97%)	197 (94%)	13 (6%)	0	100	100
1	L	209/216 (97%)	196 (94%)	13 (6%)	0	100	100
2	B	210/244 (86%)	197 (94%)	13 (6%)	0	100	100
2	H	209/244 (86%)	185 (88%)	18 (9%)	6 (3%)	4	15
All	All	838/920 (91%)	775 (92%)	57 (7%)	6 (1%)	22	50

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	H	16	SER
2	H	135	SER
2	H	137	SER
2	H	4	LEU
2	H	104	LYS
2	H	88	SER

### 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	176/180 (98%)	157 (89%)	19 (11%)	6	17
1	L	176/180 (98%)	151 (86%)	25 (14%)	3	9
2	B	180/207 (87%)	166 (92%)	14 (8%)	12	32
2	H	179/207 (86%)	154 (86%)	25 (14%)	3	9
All	All	711/774 (92%)	628 (88%)	83 (12%)	5	14

All (83) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	THR
1	A	28	ASP
1	A	32	ASN
1	A	33	ASN
1	A	35	VAL
1	A	50	ILE
1	A	72	THR
1	A	108	LEU
1	A	109	THR
1	A	143	ASP
1	A	150	THR
1	A	158	SER
1	A	160	VAL
1	A	165	GLU
1	A	168	THR
1	A	184	SER
1	A	185	LEU
1	A	188	GLU
1	A	201	THR
2	B	6	GLN
2	B	31	ASN
2	B	54	TYR
2	B	55	PHE
2	B	57	THR
2	B	62	GLN
2	B	101	MET
2	B	114	THR
2	B	122	SER

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Mol	Chain	Res	Type
2	B	142	THR
2	B	185	LEU
2	B	196	LEU
2	B	199	GLN
2	B	206	ASN
2	H	4	LEU
2	H	13	LYS
2	H	23	LYS
2	H	31	ASN
2	H	43	GLN
2	H	54	TYR
2	H	55	PHE
2	H	57	THR
2	H	62	GLN
2	H	71	THR
2	H	87	ARG
2	H	114	THR
2	H	122	SER
2	H	138	THR
2	H	139	SER
2	H	145	LEU
2	H	157	VAL
2	H	158	THR
2	H	160	SER
2	H	179	SER
2	H	185	LEU
2	H	196	LEU
2	H	199	GLN
2	H	203	CYS
2	H	206	ASN
1	L	6	GLN
1	L	18	ILE
1	L	19	THR
1	L	23	THR
1	L	27	SER
1	L	28	ASP
1	L	31	SER
1	L	32	ASN
1	L	33	ASN
1	L	50	ILE
1	L	54	SER
1	L	80	LEU

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Mol	Chain	Res	Type
1	L	95	SER
1	L	109	THR
1	L	115	LYS
1	L	122	LEU
1	L	150	THR
1	L	161	LYS
1	L	165	GLU
1	L	168	THR
1	L	180	SER
1	L	185	LEU
1	L	188	GLU
1	L	201	THR
1	L	210	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	32	ASN
1	A	71	ASN
1	A	96	ASN
1	A	131	GLN
1	A	172	GLN
2	B	43	GLN
2	B	62	GLN
2	B	65	GLN
2	B	207	HIS
2	H	31	ASN
2	H	43	GLN
2	H	65	GLN
2	H	199	GLN
2	H	206	ASN
2	H	207	HIS
1	L	32	ASN
1	L	81	GLN
1	L	133	ASN
1	L	172	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

## 5.6 Ligand geometry ⓘ

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
3	T5C	B	1222	-	53,53,53	1.44	6 (11%)	81,85,85	1.82	19 (23%)
3	T5C	H	1222	-	53,53,53	1.52	6 (11%)	81,85,85	1.82	20 (24%)

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	T5C	B	1222	-	-	1/36/76/76	0/4/4/4
3	T5C	H	1222	-	-	2/36/76/76	0/4/4/4

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	1222	T5C	C13-S35	4.17	1.83	1.77
3	H	1222	T5C	C33-S43	4.11	1.83	1.77
3	B	1222	T5C	C33-S43	3.80	1.82	1.77
3	B	1222	T5C	C13-S35	3.68	1.82	1.77
3	H	1222	T5C	C29-N21	-3.53	1.34	1.40
3	B	1222	T5C	C29-N21	-3.42	1.34	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1222	T5C	C16-C17	-2.98	1.39	1.45
3	H	1222	T5C	C16-C17	-2.89	1.39	1.45
3	H	1222	T5C	C9-N1	-2.73	1.34	1.39
3	H	1222	T5C	C18-C17	2.72	1.39	1.35
3	B	1222	T5C	C9-N1	-2.63	1.34	1.39
3	B	1222	T5C	C18-C17	2.56	1.39	1.35

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1222	T5C	C14-C2-N1	5.56	128.83	122.44
3	H	1222	T5C	C14-C2-N1	5.53	128.79	122.44
3	B	1222	T5C	C13-C12-N1	-5.14	104.54	112.17
3	H	1222	T5C	C13-C12-N1	-4.91	104.88	112.17
3	B	1222	T5C	C19-C18-C17	-4.56	120.81	127.31
3	H	1222	T5C	C19-C18-C17	-4.53	120.84	127.31
3	B	1222	T5C	C3-C2-C14	-4.35	124.54	129.01
3	H	1222	T5C	C3-C2-C14	-4.23	124.66	129.01
3	B	1222	T5C	C20-C22-N21	3.94	128.04	121.61
3	H	1222	T5C	C20-C22-N21	3.91	127.98	121.61
3	B	1222	T5C	C9-N1-C2	3.55	114.65	111.25
3	H	1222	T5C	C9-N1-C2	3.46	114.57	111.25
3	B	1222	T5C	C12-N1-C2	-3.11	122.44	125.97
3	H	1222	T5C	C12-N1-C2	-3.09	122.47	125.97
3	H	1222	T5C	C28-C29-C24	-3.08	119.44	123.20
3	B	1222	T5C	C28-C29-C24	-3.07	119.45	123.20
3	B	1222	T5C	C29-N21-C22	2.77	114.63	111.18
3	B	1222	T5C	O38-S35-C13	2.76	110.24	106.92
3	H	1222	T5C	C29-N21-C22	2.74	114.59	111.18
3	H	1222	T5C	O38-S35-C13	2.72	110.19	106.92
3	B	1222	T5C	C8-C9-C4	-2.65	119.11	121.76
3	H	1222	T5C	C3-C4-C9	-2.64	107.14	109.61
3	B	1222	T5C	C3-C4-C9	-2.63	107.15	109.61
3	H	1222	T5C	C8-C9-C4	-2.62	119.15	121.76
3	H	1222	T5C	O37-S35-C13	2.57	109.93	105.77
3	H	1222	T5C	O46-S43-C33	2.49	109.91	106.92
3	H	1222	T5C	O45-S43-C33	2.48	109.78	105.77
3	B	1222	T5C	O45-S43-C33	2.43	109.70	105.77
3	B	1222	T5C	O46-S43-C33	2.43	109.84	106.92
3	B	1222	T5C	O37-S35-C13	2.40	109.66	105.77
3	B	1222	T5C	C32-N21-C22	-2.34	122.43	126.13
3	H	1222	T5C	C32-N21-C22	-2.30	122.50	126.13

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	H	1222	T5C	C23-C24-C29	-2.28	106.90	109.49
3	H	1222	T5C	C34-C17-C16	2.21	121.56	118.08
3	B	1222	T5C	C23-C24-C29	-2.18	107.01	109.49
3	B	1222	T5C	C25-C24-C23	2.14	132.72	130.42
3	B	1222	T5C	C34-C17-C16	2.10	121.38	118.08
3	H	1222	T5C	C25-C24-C23	2.07	132.65	130.42
3	H	1222	T5C	C3-C2-N1	-2.06	106.55	108.53

There are no chirality outliers.

All (3) torsion outliers are listed below:

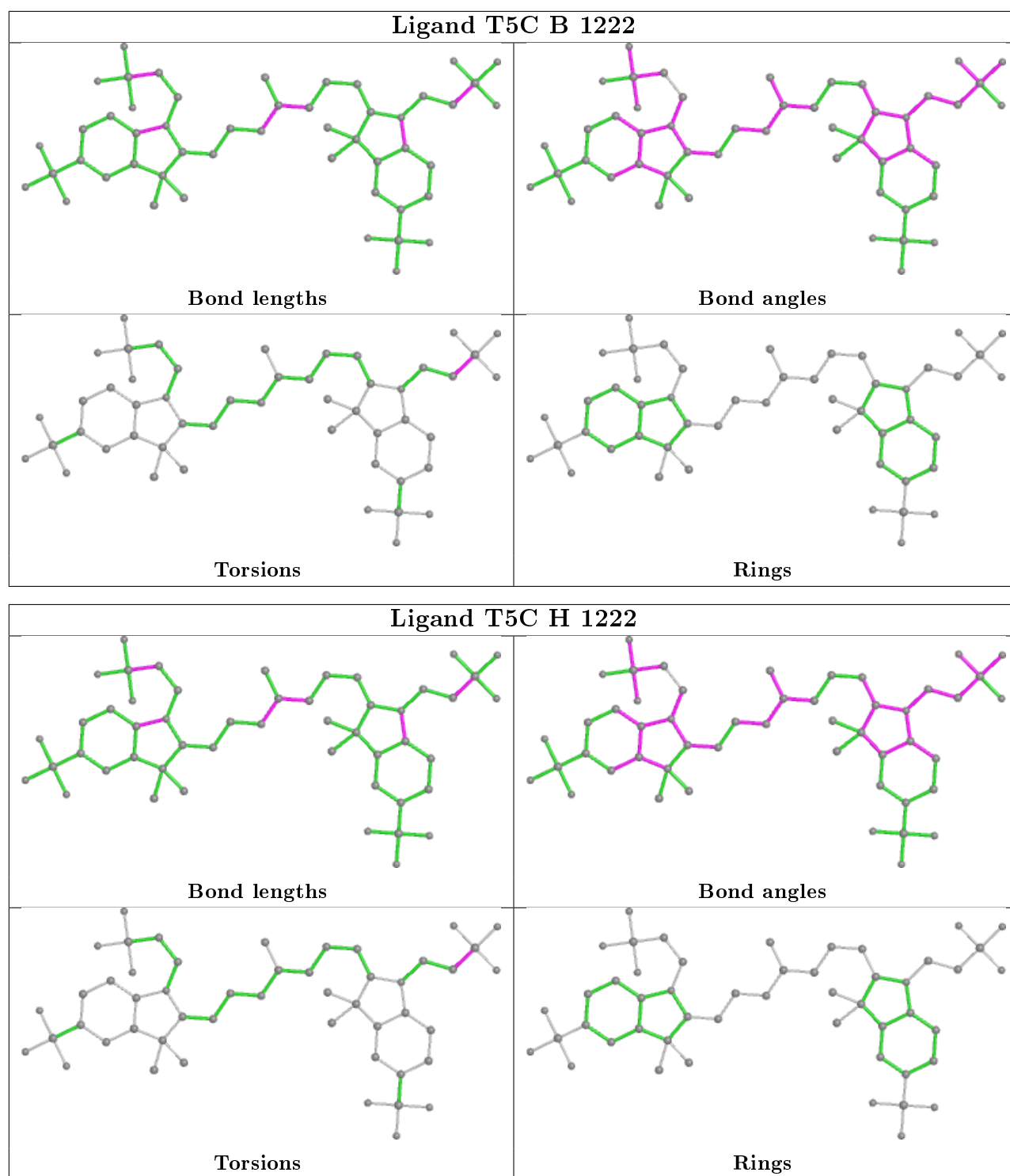
Mol	Chain	Res	Type	Atoms
3	H	1222	T5C	C12-C13-S35-O36
3	H	1222	T5C	C12-C13-S35-O37
3	B	1222	T5C	C12-C13-S35-O36

There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	1222	T5C	3	0
3	H	1222	T5C	2	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

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	212/216 (98%)	0.13	4 (1%) 66 64	47, 55, 63, 67	0
1	L	211/216 (97%)	0.20	2 (0%) 84 84	43, 54, 64, 67	0
2	B	214/244 (87%)	0.29	16 (7%) 14 10	44, 57, 66, 85	0
2	H	213/244 (87%)	0.47	16 (7%) 14 10	44, 57, 64, 79	0
All	All	850/920 (92%)	0.28	38 (4%) 33 28	43, 56, 64, 85	0

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	55	PHE	5.4
2	B	55	PHE	5.1
2	H	84	SER	5.0
2	H	66	GLY	4.8
2	H	75	SER	4.4
2	B	75	SER	4.1
2	B	138	THR	4.1
1	A	188	GLU	3.5
2	H	76	THR	3.5
2	B	135	SER	3.3
1	A	99	TYR	3.1
1	A	186	THR	3.1
2	H	102	SER	3.0
2	B	134	SER	3.0
2	H	19	LYS	2.9
2	B	103	TYR	2.9
2	B	65	GLN	2.8
1	L	188	GLU	2.7
2	H	103	TYR	2.7
2	B	137	SER	2.7
2	H	54	TYR	2.7

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Mol	Chain	Res	Type	RSRZ
2	B	139	SER	2.6
1	A	185	LEU	2.6
2	H	51	ILE	2.6
2	B	32	TYR	2.3
2	B	80	TYR	2.2
2	H	74	GLU	2.2
2	H	67	ARG	2.2
2	H	60	TYR	2.2
2	B	54	TYR	2.1
1	L	185	LEU	2.1
2	B	77	SER	2.1
2	H	85	SER	2.1
2	B	221	LYS	2.1
2	B	74	GLU	2.0
2	H	166	LEU	2.0
2	B	136	LYS	2.0
2	H	165	ALA	2.0

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

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

## 6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

## 6.4 Ligands ⓘ

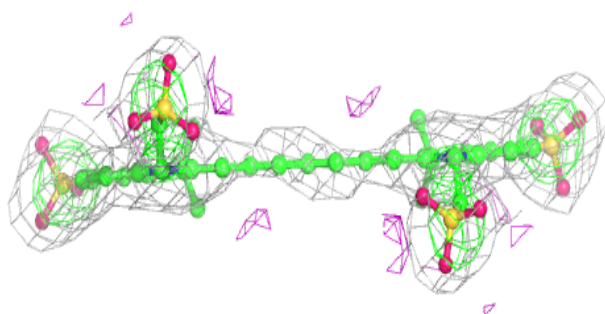
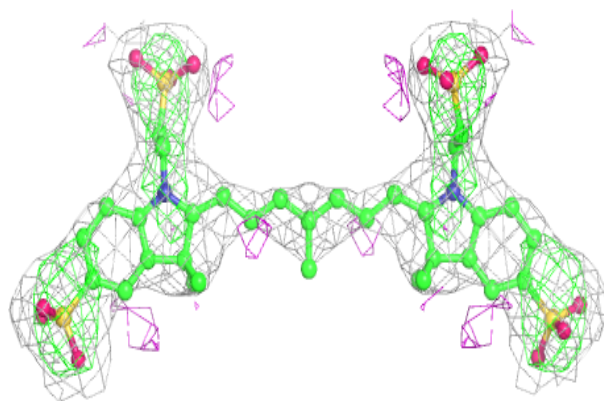
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 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
3	T5C	B	1222	50/50	0.93	0.37	47,50,51,51	50
3	T5C	H	1222	50/50	0.94	0.39	47,50,51,51	50

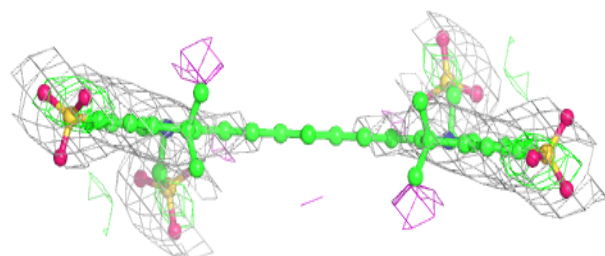
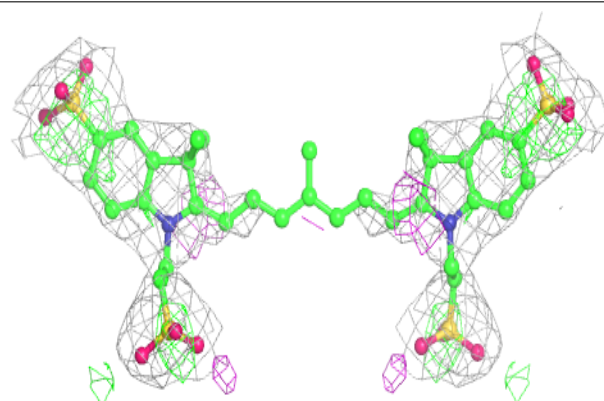
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around T5C B 1222:**

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

**Electron density around T5C H 1222:**

$2mF_o-DF_c$  (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.