



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:50 PM UTC

PDB ID : 6T37 / pdb_00006t37
Title : Pseudomonas aeruginosa RmlA in complex with allosteric inhibitor
Authors : Alpey, M.S.; Xiao, G.; Westwood, J.N.
Deposited on : 2019-10-10
Resolution : 2.08 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

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>.

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

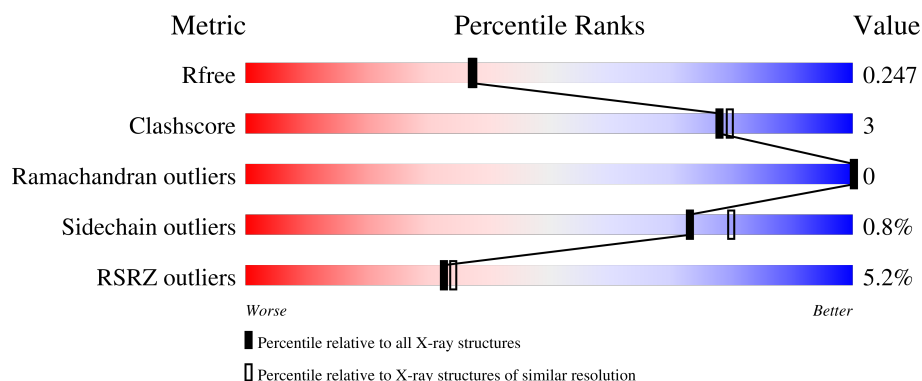
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.08 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}	180053	8172 (2.10-2.06)
Clashscore	190562	8714 (2.10-2.06)
Ramachandran outliers	187476	8641 (2.10-2.06)
Sidechain outliers	187428	8642 (2.10-2.06)
RSRZ outliers	180081	8177 (2.10-2.06)

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 ≥ 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	303	10% 86% 9% 5%
1	B	303	10% 89% 6% 5%
1	C	303	4% 85% 7% 8%
1	D	303	5% 87% 7% 6%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 9422 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 Glucose-1-phosphate thymidyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	289	Total	C	N	O	S	0	0	0
			2237	1432	371	430	4			
1	B	289	Total	C	N	O	S	0	0	0
			2173	1392	356	421	4			
1	C	280	Total	C	N	O	S	0	1	0
			2167	1387	362	414	4			
1	D	286	Total	C	N	O	S	0	2	0
			2202	1413	362	423	4			

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-9	HIS	-	expression tag	UNP G3XCK4
A	-8	HIS	-	expression tag	UNP G3XCK4
A	-7	HIS	-	expression tag	UNP G3XCK4
A	-6	HIS	-	expression tag	UNP G3XCK4
A	-5	HIS	-	expression tag	UNP G3XCK4
A	-4	HIS	-	expression tag	UNP G3XCK4
A	-3	GLY	-	expression tag	UNP G3XCK4
A	-2	SER	-	expression tag	UNP G3XCK4
A	-1	MET	-	expression tag	UNP G3XCK4
A	0	ALA	-	expression tag	UNP G3XCK4
B	-9	HIS	-	expression tag	UNP G3XCK4
B	-8	HIS	-	expression tag	UNP G3XCK4
B	-7	HIS	-	expression tag	UNP G3XCK4
B	-6	HIS	-	expression tag	UNP G3XCK4
B	-5	HIS	-	expression tag	UNP G3XCK4
B	-4	HIS	-	expression tag	UNP G3XCK4
B	-3	GLY	-	expression tag	UNP G3XCK4
B	-2	SER	-	expression tag	UNP G3XCK4
B	-1	MET	-	expression tag	UNP G3XCK4
B	0	ALA	-	expression tag	UNP G3XCK4
C	-9	HIS	-	expression tag	UNP G3XCK4

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-8	HIS	-	expression tag	UNP G3XCK4
C	-7	HIS	-	expression tag	UNP G3XCK4
C	-6	HIS	-	expression tag	UNP G3XCK4
C	-5	HIS	-	expression tag	UNP G3XCK4
C	-4	HIS	-	expression tag	UNP G3XCK4
C	-3	GLY	-	expression tag	UNP G3XCK4
C	-2	SER	-	expression tag	UNP G3XCK4
C	-1	MET	-	expression tag	UNP G3XCK4
C	0	ALA	-	expression tag	UNP G3XCK4
D	-9	HIS	-	expression tag	UNP G3XCK4
D	-8	HIS	-	expression tag	UNP G3XCK4
D	-7	HIS	-	expression tag	UNP G3XCK4
D	-6	HIS	-	expression tag	UNP G3XCK4
D	-5	HIS	-	expression tag	UNP G3XCK4
D	-4	HIS	-	expression tag	UNP G3XCK4
D	-3	GLY	-	expression tag	UNP G3XCK4
D	-2	SER	-	expression tag	UNP G3XCK4
D	-1	MET	-	expression tag	UNP G3XCK4
D	0	ALA	-	expression tag	UNP G3XCK4

- # M9Z

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			37	24	8	4	1		

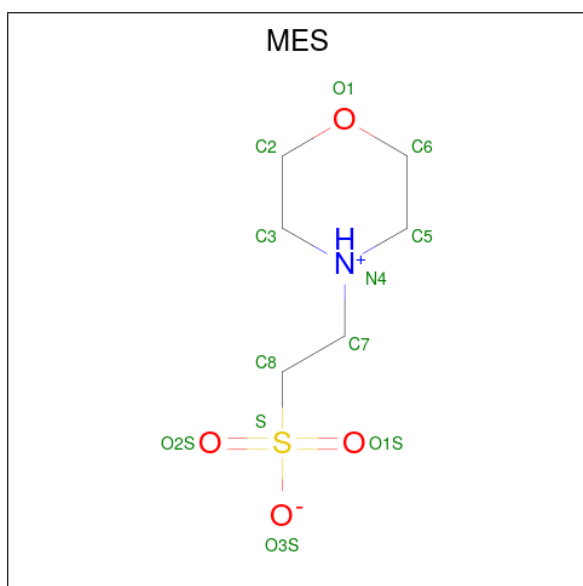


WORLD WIDE
PDB
PROTEIN DATA BANK

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	N	O	S	0	0
			37	24	8	4	1		
2	C	1	Total	C	N	O	S	0	0
			37	24	8	4	1		
2	D	1	Total	C	N	O	S	0	0
			37	24	8	4	1		

- Molecule 3 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (CCD ID: MES) (formula: $C_6H_{13}NO_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
3	C	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Cl	0	0
			1	1		
4	B	2	Total	Cl	0	0
			2	2		
4	C	2	Total	Cl	0	0
			2	2		
4	D	3	Total	Cl	0	0
			3	3		

- Molecule 5 is water.

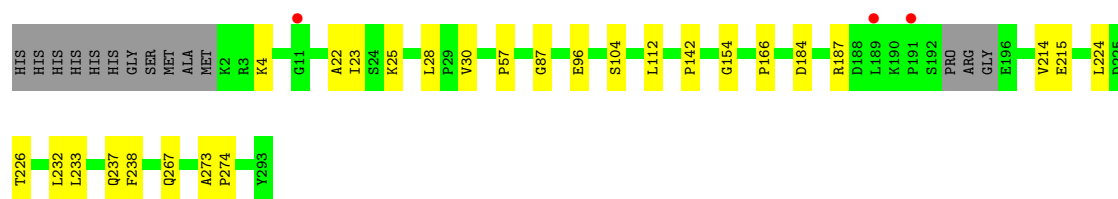
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	139	Total 139	O 139	0	0
5	B	90	Total 90	O 90	0	0
5	C	132	Total 132	O 132	0	0
5	D	102	Total 102	O 102	0	0

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.

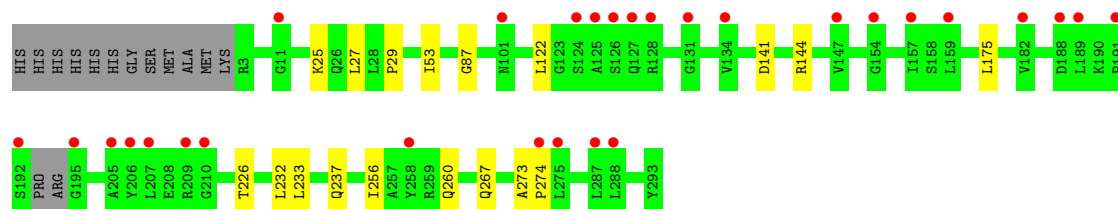
- Molecule 1: Glucose-1-phosphate thymidyltransferase

Chain A: 



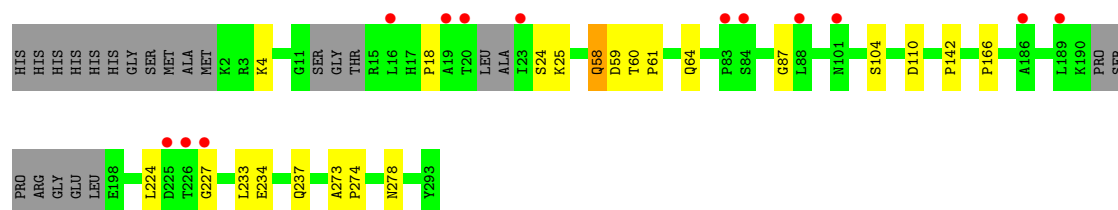
- Molecule 1: Glucose-1-phosphate thymidyltransferase

Chain B: 



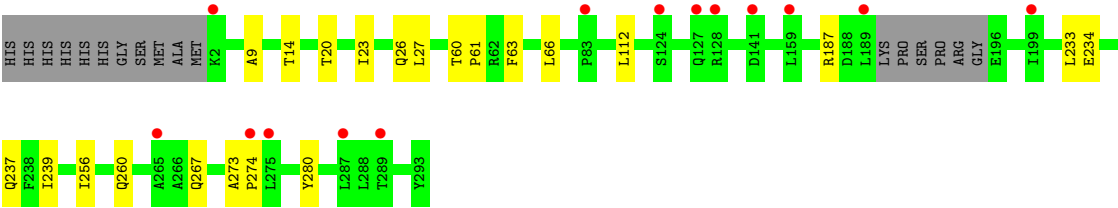
- Molecule 1: Glucose-1-phosphate thymidyltransferase

Chain C: 



- Molecule 1: Glucose-1-phosphate thymidyltransferase

Chain D: 



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	63.91Å 152.57Å 134.72Å 90.00° 93.39° 90.00°	Depositor
Resolution (Å)	25.71 – 2.08 25.71 – 2.08	Depositor EDS
% Data completeness (in resolution range)	99.1 (25.71-2.08) 99.1 (25.71-2.08)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.60 (at 2.08Å)	Xtriage
Refinement program	REFMAC 5.8.0257	Depositor
R, R_{free}	0.217 , 0.242 0.223 , 0.247	Depositor DCC
R_{free} test set	3850 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	26.5	Xtriage
Anisotropy	0.314	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 42.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	9422	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.05% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: CL, M9Z, MES

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	0.99	0/2285	1.32	1/3106 (0.0%)
1	B	1.01	0/2221	1.35	1/3030 (0.0%)
1	C	0.99	0/2215	1.33	3/3007 (0.1%)
1	D	0.99	0/2255	1.35	2/3069 (0.1%)
All	All	1.00	0/8976	1.34	7/12212 (0.1%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	87	GLY	CA-C-O	-6.13	118.23	122.22
1	D	9	ALA	CA-C-N	6.04	126.08	120.34
1	D	9	ALA	C-N-CA	6.04	126.08	120.34
1	C	87	GLY	CA-C-O	-5.54	118.41	122.23
1	B	87	GLY	CA-C-O	-5.51	118.64	122.22
1	C	224	LEU	CA-C-N	5.50	129.72	122.30
1	C	224	LEU	C-N-CA	5.50	129.72	122.30

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	2237	0	2187	17	0
1	B	2173	0	2058	10	0
1	C	2167	0	2098	17	0
1	D	2202	0	2136	16	0
2	A	37	0	0	0	0
2	B	37	0	0	0	0
2	C	37	0	0	0	0
2	D	37	0	0	0	0
3	A	12	0	13	2	0
3	C	12	0	13	0	0
4	A	1	0	0	0	0
4	B	2	0	0	0	0
4	C	2	0	0	0	0
4	D	3	0	0	0	0
5	A	139	0	0	1	0
5	B	90	0	0	0	0
5	C	132	0	0	0	0
5	D	102	0	0	0	0
All	All	9422	0	8505	49	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 3.

All (49) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:278:ASN:ND2	1:D:14:THR:O	2.26	0.68
1:C:18:PRO:HD3	1:D:280:TYR:CD2	2.39	0.56
1:A:233:LEU:HD21	1:B:237:GLN:HA	1.87	0.56
1:C:25:LYS:NZ	1:C:227:GLY:HA2	2.21	0.56
1:D:26:GLN:HB2	1:D:63:PHE:HZ	1.72	0.54
1:A:28:LEU:HD22	1:B:29:PRO:CD	2.38	0.54
1:A:214:VAL:O	3:A:302:MES:H71	2.07	0.54
1:A:30:VAL:HG11	1:A:112:LEU:HD21	1.90	0.53
1:C:24:SER:HB2	1:C:59:ASP:CG	2.33	0.52
1:C:234:GLU:HA	1:C:237[A]:GLN:HE21	1.74	0.52
1:D:234:GLU:HA	1:D:237[A]:GLN:HE21	1.74	0.52
1:C:25:LYS:HZ1	1:C:227:GLY:HA2	1.74	0.51
1:D:26:GLN:HB2	1:D:63:PHE:CZ	2.46	0.50
1:C:233:LEU:HD11	1:D:237[A]:GLN:HG3	1.95	0.49
1:A:22:ALA:HB3	5:A:409:HOH:O	2.13	0.48
1:C:237[A]:GLN:HG3	1:D:233:LEU:HD11	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:25:LYS:NZ	1:C:110:ASP:OD2	2.47	0.48
1:D:112[B]:LEU:HD21	1:D:239:ILE:HD11	1.96	0.48
1:A:237:GLN:HA	1:B:233:LEU:HD21	1.96	0.47
1:A:22:ALA:CB	1:B:27:LEU:HD22	2.47	0.45
1:A:154:GLY:O	3:A:302:MES:N4	2.49	0.45
1:A:142:PRO:HG2	1:A:166:PRO:HG2	1.98	0.45
1:A:184:ASP:OD1	1:A:187:ARG:NH1	2.49	0.45
1:C:273:ALA:HB3	1:C:274:PRO:HD3	2.00	0.44
1:A:96:GLU:OE2	1:A:187:ARG:NH2	2.50	0.44
1:D:273:ALA:HB3	1:D:274:PRO:HD3	2.00	0.44
1:D:60:THR:HB	1:D:61:PRO:HD3	2.00	0.44
1:B:122:LEU:CD2	1:B:175:LEU:HD21	2.49	0.43
1:C:60:THR:N	1:C:61:PRO:HD2	2.33	0.43
1:C:233:LEU:HD21	1:D:237[B]:GLN:HA	2.01	0.43
1:A:57:PRO:O	1:C:64:GLN:NE2	2.51	0.43
1:C:58:GLN:CD	1:C:58:GLN:H	2.27	0.42
1:D:27:LEU:HD22	1:D:66:LEU:HD22	2.01	0.42
1:D:20:THR:HA	1:D:23:ILE:O	2.20	0.42
1:B:267:GLN:HA	1:B:267:GLN:OE1	2.18	0.42
1:A:224:LEU:HD11	1:A:238:PHE:CD2	2.54	0.42
1:A:273:ALA:HB3	1:A:274:PRO:HD3	2.02	0.42
1:A:267:GLN:HA	1:A:267:GLN:OE1	2.19	0.42
1:B:25:LYS:HE3	1:B:226:THR:O	2.20	0.42
1:B:141:ASP:OD2	1:B:144:ARG:HD3	2.19	0.41
1:C:4:LYS:O	1:C:104:SER:HA	2.20	0.41
1:A:25:LYS:HE3	1:A:226:THR:O	2.20	0.41
1:A:4:LYS:O	1:A:104:SER:HA	2.21	0.41
1:B:256:ILE:O	1:B:260:GLN:HG2	2.21	0.41
1:D:267:GLN:HA	1:D:267:GLN:OE1	2.20	0.41
1:B:273:ALA:HB3	1:B:274:PRO:HD3	2.02	0.40
1:C:233:LEU:HD21	1:D:237[A]:GLN:HA	2.03	0.40
1:D:256:ILE:O	1:D:260:GLN:HG2	2.22	0.40
1:C:142:PRO:HG2	1:C:166:PRO:HG2	2.03	0.40

There are no symmetry-related clashes.

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	285/303 (94%)	277 (97%)	8 (3%)	0	100	100
1	B	285/303 (94%)	278 (98%)	7 (2%)	0	100	100
1	C	273/303 (90%)	265 (97%)	8 (3%)	0	100	100
1	D	284/303 (94%)	277 (98%)	7 (2%)	0	100	100
All	All	1127/1212 (93%)	1097 (97%)	30 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	231/248 (93%)	228 (99%)	3 (1%)	61	68
1	B	215/248 (87%)	213 (99%)	2 (1%)	70	77
1	C	220/248 (89%)	219 (100%)	1 (0%)	81	87
1	D	224/248 (90%)	223 (100%)	1 (0%)	84	89
All	All	890/992 (90%)	883 (99%)	7 (1%)	73	80

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	ILE
1	A	215	GLU

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Mol	Chain	Res	Type
1	A	232	LEU
1	B	53	ILE
1	B	232	LEU
1	C	58	GLN
1	D	187	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	82	GLN
1	A	90	GLN
1	A	181	GLN
1	A	211	GLN
1	A	237	GLN
1	B	82	GLN
1	B	90	GLN
1	B	237	GLN
1	C	82	GLN
1	C	90	GLN
1	C	181	GLN
1	C	211	GLN
1	D	82	GLN
1	D	90	GLN
1	D	181	GLN
1	D	211	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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 14 ligands modelled in this entry, 8 are monoatomic - leaving 6 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	M9Z	B	301	-	39,40,40	2.71	9 (23%)	48,56,56	2.35	14 (29%)
3	MES	C	302	-	12,12,12	0.79	0	15,16,16	0.39	0
3	MES	A	302	-	12,12,12	0.83	0	15,16,16	0.39	0
2	M9Z	A	301	-	39,40,40	2.97	7 (17%)	48,56,56	2.09	14 (29%)
2	M9Z	D	301	-	39,40,40	2.40	8 (20%)	48,56,56	2.32	16 (33%)
2	M9Z	C	301	-	39,40,40	2.91	11 (28%)	48,56,56	2.13	11 (22%)

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	M9Z	B	301	-	-	12/24/29/29	0/4/4/4
3	MES	C	302	-	-	0/6/14/14	0/1/1/1
3	MES	A	302	-	-	3/6/14/14	0/1/1/1
2	M9Z	A	301	-	-	6/24/29/29	0/4/4/4
2	M9Z	D	301	-	-	5/24/29/29	0/4/4/4
2	M9Z	C	301	-	-	7/24/29/29	0/4/4/4

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	301	M9Z	OAT-SAL	10.44	1.54	1.43
2	B	301	M9Z	OAT-SAL	9.20	1.53	1.43
2	A	301	M9Z	OAT-SAL	9.17	1.53	1.43
2	B	301	M9Z	OAU-SAL	8.78	1.52	1.43
2	D	301	M9Z	OAT-SAL	8.67	1.52	1.43
2	C	301	M9Z	OAU-SAL	8.61	1.52	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	301	M9Z	OAU-SAL	8.57	1.52	1.43
2	D	301	M9Z	OAU-SAL	7.85	1.51	1.43
2	A	301	M9Z	SAL-NAK	7.79	1.82	1.65
2	C	301	M9Z	SAL-NAK	7.71	1.82	1.65
2	A	301	M9Z	NBF-NBE	-7.35	1.20	1.32
2	A	301	M9Z	CAI-CAV	-5.82	1.40	1.51
2	C	301	M9Z	CAI-CAV	-5.61	1.41	1.51
2	D	301	M9Z	CAI-CAV	-5.34	1.41	1.51
2	B	301	M9Z	NBF-NBE	-5.17	1.23	1.32
2	B	301	M9Z	CAI-CAV	-5.02	1.42	1.51
2	B	301	M9Z	SAL-NAK	4.29	1.75	1.65
2	B	301	M9Z	NBD-NBE	-4.18	1.28	1.34
2	D	301	M9Z	NBF-NBE	-3.45	1.26	1.32
2	A	301	M9Z	CAF-NAA	-3.17	1.34	1.39
2	C	301	M9Z	CAF-NAA	-2.88	1.35	1.39
2	C	301	M9Z	NBF-NBE	-2.85	1.27	1.32
2	B	301	M9Z	CBH-CBG	-2.65	1.32	1.36
2	D	301	M9Z	CAF-NAA	-2.47	1.35	1.39
2	C	301	M9Z	NBD-NBE	-2.37	1.31	1.34
2	D	301	M9Z	SAL-NAK	2.37	1.70	1.65
2	B	301	M9Z	CAF-NAA	-2.33	1.35	1.39
2	C	301	M9Z	CBI-CBG	2.29	1.54	1.50
2	D	301	M9Z	CAI-NAA	2.23	1.51	1.47
2	B	301	M9Z	CAI-NAA	2.17	1.51	1.47
2	C	301	M9Z	CAN-SAL	-2.13	1.73	1.76
2	C	301	M9Z	CAI-NAA	2.09	1.50	1.47
2	D	301	M9Z	CBH-CBG	-2.08	1.33	1.36
2	C	301	M9Z	CAM-NAK	-2.04	1.45	1.48
2	A	301	M9Z	CBI-CBG	2.01	1.54	1.50

All (55) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	301	M9Z	OAU-SAL-OAT	-7.94	107.20	119.59
2	D	301	M9Z	OAU-SAL-OAT	-7.74	107.50	119.59
2	C	301	M9Z	OAU-SAL-OAT	-6.78	109.01	119.59
2	B	301	M9Z	CAC-NAK-SAL	5.41	128.13	120.72
2	C	301	M9Z	CAD-NAE-CAF	-5.31	120.37	127.34
2	B	301	M9Z	OAU-SAL-NAK	5.15	113.74	106.59
2	B	301	M9Z	CAD-NAE-CAF	-5.13	120.62	127.34
2	D	301	M9Z	CAD-NAE-CAF	-5.02	120.76	127.34
2	D	301	M9Z	OAT-SAL-NAK	4.90	113.40	106.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	301	M9Z	OAU-SAL-OAT	-4.78	112.13	119.59
2	A	301	M9Z	CAD-NAE-CAF	-4.77	121.09	127.34
2	C	301	M9Z	OAT-SAL-NAK	4.56	112.92	106.59
2	C	301	M9Z	CAC-CAD-NAE	4.52	118.89	110.94
2	B	301	M9Z	CAC-CAD-NAE	4.47	118.81	110.94
2	D	301	M9Z	CAC-CAD-NAE	4.36	118.61	110.94
2	A	301	M9Z	CAC-CAD-NAE	4.30	118.51	110.94
2	D	301	M9Z	CAV-CAI-NAA	4.20	120.12	113.09
2	C	301	M9Z	OAU-SAL-CAN	4.10	113.20	108.10
2	A	301	M9Z	CAV-CAI-NAA	4.08	119.92	113.09
2	B	301	M9Z	CAM-NAK-CAC	-3.82	113.81	121.14
2	A	301	M9Z	CAC-NAK-SAL	3.76	125.87	120.72
2	D	301	M9Z	NBD-NBE-NBF	3.72	110.36	107.02
2	A	301	M9Z	OAU-SAL-NAK	3.67	111.69	106.59
2	B	301	M9Z	NBD-NBE-NBF	3.63	110.29	107.02
2	A	301	M9Z	NBD-NBE-NBF	3.59	110.25	107.02
2	A	301	M9Z	OAT-SAL-NAK	3.56	111.54	106.59
2	C	301	M9Z	CAV-CAI-NAA	3.54	119.02	113.09
2	A	301	M9Z	CAM-NAK-CAC	-3.52	114.39	121.14
2	B	301	M9Z	CAV-CAI-NAA	3.51	118.97	113.09
2	C	301	M9Z	CAC-NAK-SAL	3.35	125.30	120.72
2	D	301	M9Z	OAU-SAL-NAK	3.29	111.17	106.59
2	C	301	M9Z	NAE-CAF-NAA	3.15	121.12	115.45
2	D	301	M9Z	CAM-NAK-CAC	-3.14	115.12	121.14
2	D	301	M9Z	CAC-NAK-SAL	3.14	125.02	120.72
2	A	301	M9Z	NAE-CAF-NAA	3.14	121.09	115.45
2	D	301	M9Z	NAE-CAF-NAA	2.86	120.60	115.45
2	B	301	M9Z	NAE-CAF-NAA	2.76	120.42	115.45
2	C	301	M9Z	NBD-NBE-NBF	2.69	109.44	107.02
2	A	301	M9Z	CBH-NBD-NBE	-2.66	108.16	110.75
2	D	301	M9Z	CBH-NBD-NBE	-2.58	108.25	110.75
2	D	301	M9Z	OAU-SAL-CAN	2.56	111.29	108.10
2	A	301	M9Z	CAI-CAV-CAW	-2.56	116.04	120.75
2	A	301	M9Z	CAI-CAV-CBA	2.38	125.13	120.75
2	B	301	M9Z	OAH-CAD-CAC	-2.35	121.86	127.62
2	D	301	M9Z	CBI-CBG-CBH	-2.32	125.89	129.89
2	C	301	M9Z	CAM-NAK-CAC	-2.28	116.77	121.14
2	B	301	M9Z	CBI-CBG-CBH	-2.26	125.99	129.89
2	D	301	M9Z	CAI-CAV-CBA	-2.25	116.61	120.75
2	D	301	M9Z	OAH-CAD-CAC	-2.23	122.14	127.62
2	B	301	M9Z	CAI-CAV-CBA	-2.23	116.64	120.75
2	B	301	M9Z	CBI-CBG-NBF	2.21	125.67	121.75

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	301	M9Z	CAI-CAV-CAW	2.19	124.79	120.75
2	A	301	M9Z	CBH-CBG-NBF	2.11	110.68	108.12
2	B	301	M9Z	CAI-CAV-CAW	2.03	124.48	120.75
2	D	301	M9Z	CAI-CAV-CAW	2.01	124.45	120.75

There are no chirality outliers.

All (33) torsion outliers are listed below:

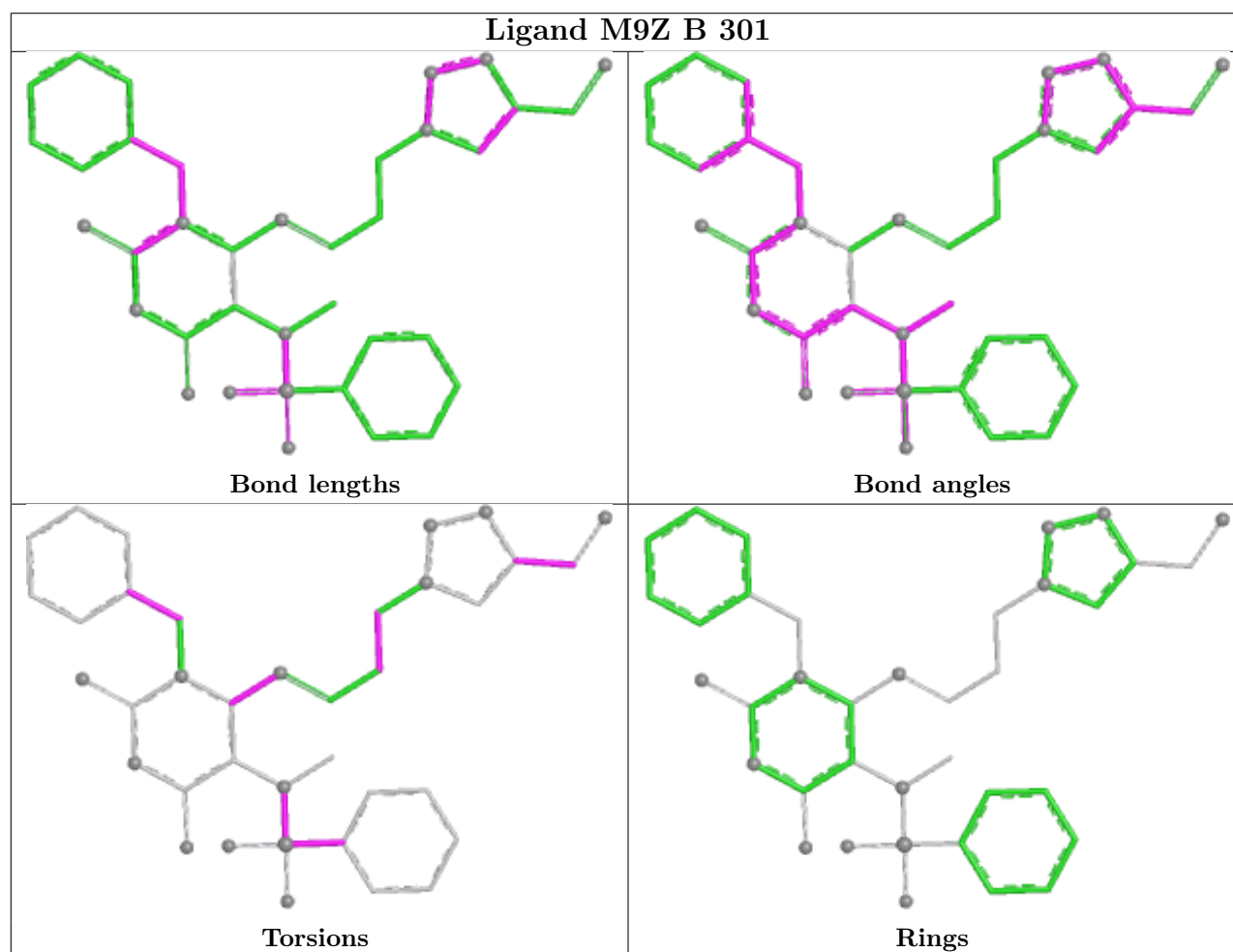
Mol	Chain	Res	Type	Atoms
2	A	301	M9Z	NBF-CBG-CBI-NBJ
2	B	301	M9Z	CAC-NAK-SAL-OAU
2	B	301	M9Z	NBF-CBG-CBI-NBJ
2	C	301	M9Z	NBF-CBG-CBI-NBJ
2	D	301	M9Z	NBF-CBG-CBI-NBJ
3	A	302	MES	C7-C8-S-O1S
2	C	301	M9Z	CAC-NAK-SAL-OAU
2	D	301	M9Z	CAC-NAK-SAL-OAU
2	A	301	M9Z	NAA-CAB-NAJ-CBB
2	B	301	M9Z	NAA-CAB-NAJ-CBB
2	C	301	M9Z	NAA-CAB-NAJ-CBB
2	D	301	M9Z	NAA-CAB-NAJ-CBB
2	B	301	M9Z	CAO-CAN-SAL-OAU
2	B	301	M9Z	CAS-CAN-SAL-OAU
3	A	302	MES	C7-C8-S-O2S
2	A	301	M9Z	CAC-CAB-NAJ-CBB
2	B	301	M9Z	CAC-CAB-NAJ-CBB
2	C	301	M9Z	CAC-CAB-NAJ-CBB
2	D	301	M9Z	CAC-CAB-NAJ-CBB
2	D	301	M9Z	CAM-NAK-SAL-OAU
3	A	302	MES	C7-C8-S-O3S
2	B	301	M9Z	CAM-NAK-SAL-OAU
2	A	301	M9Z	CAC-NAK-SAL-OAU
2	C	301	M9Z	NAJ-CBB-CBC-CBK
2	B	301	M9Z	CBB-CBC-CBK-NBD
2	A	301	M9Z	CAM-NAK-SAL-OAU
2	C	301	M9Z	CAM-NAK-SAL-OAU
2	B	301	M9Z	NAA-CAI-CAV-CAW
2	B	301	M9Z	CAS-CAN-SAL-NAK
2	B	301	M9Z	NAA-CAI-CAV-CBA
2	B	301	M9Z	CAO-CAN-SAL-NAK
2	A	301	M9Z	NAJ-CBB-CBC-CBK
2	C	301	M9Z	CBB-CBC-CBK-NBD

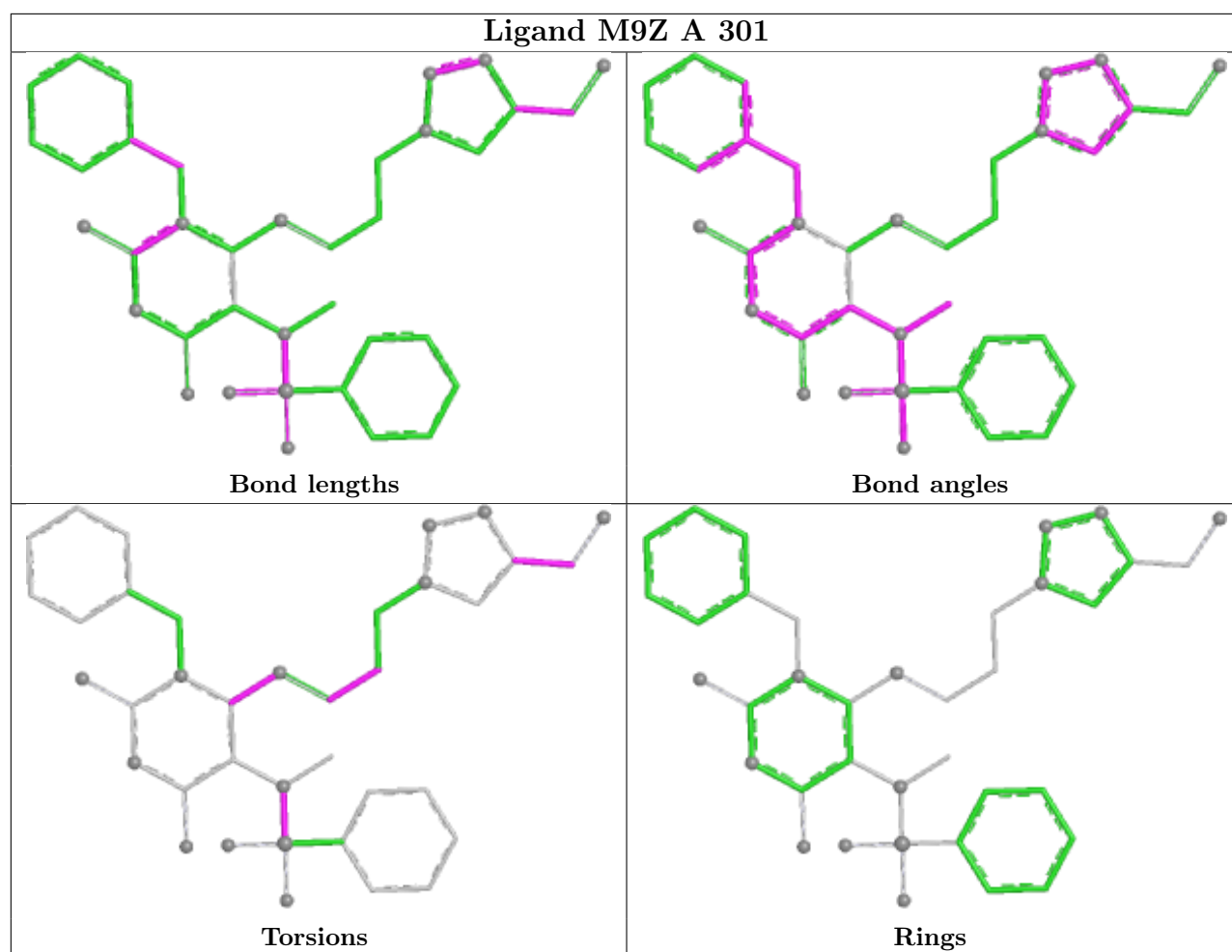
There are no ring outliers.

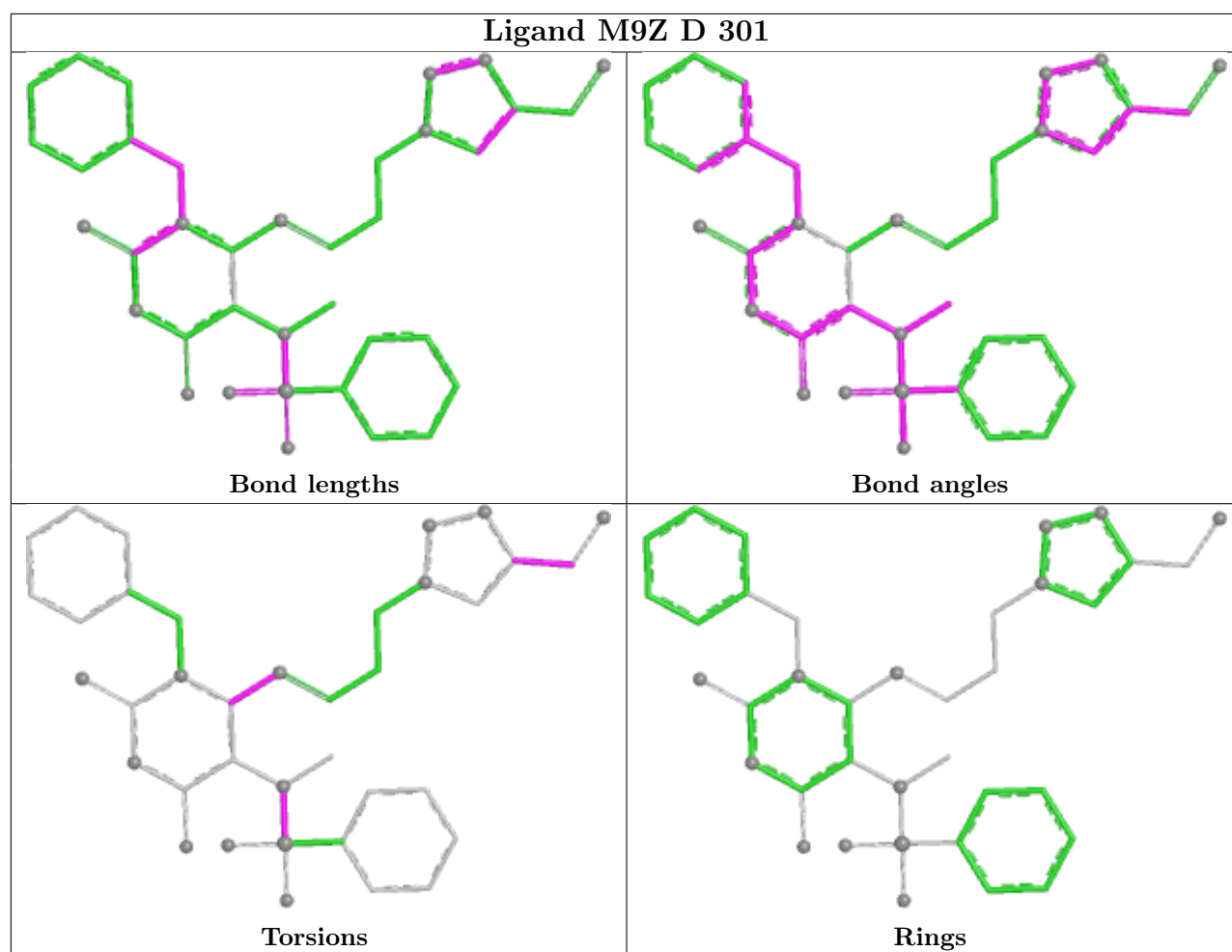
1 monomer is involved in 2 short contacts:

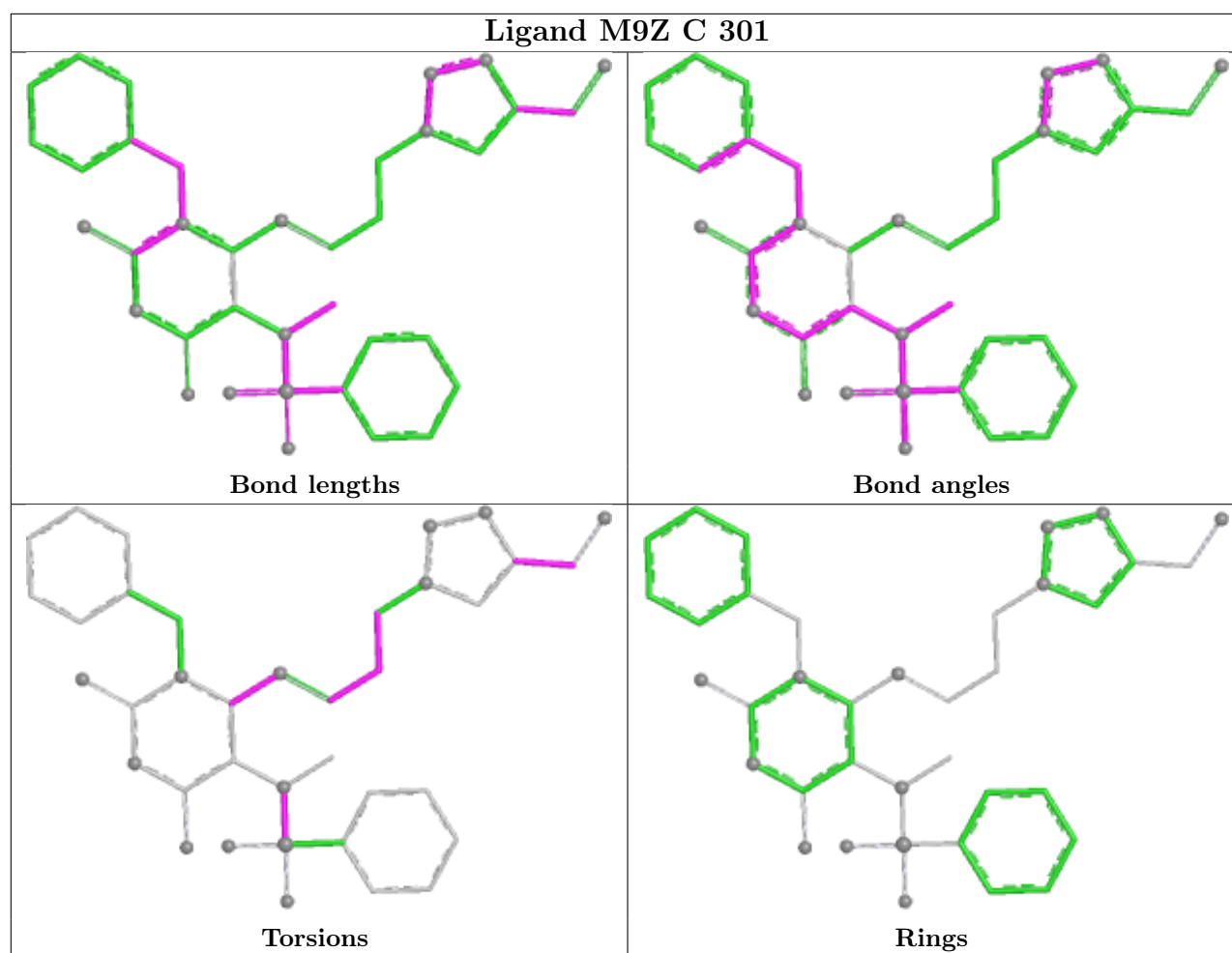
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	302	MES	2	0

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 [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, 95th 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 ²)	Q<0.9
1	A	289/303 (95%)	0.08	3 (1%) 79 82	15, 27, 44, 61	0
1	B	289/303 (95%)	0.87	29 (10%) 12 13	24, 40, 56, 76	0
1	C	280/303 (92%)	0.32	13 (4%) 37 39	11, 30, 53, 73	1 (0%)
1	D	286/303 (94%)	0.61	14 (4%) 35 36	13, 37, 58, 72	2 (0%)
All	All	1144/1212 (94%)	0.47	59 (5%) 33 34	11, 34, 54, 76	3 (0%)

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	128	ARG	4.6
1	C	189	LEU	3.4
1	C	227	GLY	3.3
1	B	209	ARG	3.1
1	C	20	THR	3.1
1	D	189	LEU	3.1
1	B	192	SER	3.1
1	C	23	ILE	2.9
1	B	131	GLY	2.8
1	D	275	LEU	2.8
1	B	124	SER	2.7
1	A	11	GLY	2.7
1	D	128	ARG	2.6
1	B	101	ASN	2.6
1	B	207	LEU	2.6
1	B	159	LEU	2.6
1	B	147	VAL	2.5
1	C	19	ALA	2.5
1	B	195	GLY	2.5
1	D	124	SER	2.5
1	B	134	VAL	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	127	GLN	2.5
1	D	159	LEU	2.5
1	B	11	GLY	2.5
1	B	275	LEU	2.4
1	B	288	LEU	2.4
1	D	287	LEU	2.4
1	D	289	THR	2.4
1	A	189	LEU	2.4
1	D	199	ILE	2.4
1	B	205	ALA	2.3
1	B	157	ILE	2.3
1	C	84	SER	2.3
1	B	125	ALA	2.3
1	D	265	ALA	2.3
1	B	182	VAL	2.3
1	B	274	PRO	2.3
1	B	206	TYR	2.3
1	B	127	GLN	2.2
1	C	186	ALA	2.2
1	C	83	PRO	2.2
1	B	258	TYR	2.1
1	B	191	PRO	2.1
1	B	210	GLY	2.1
1	C	101	ASN	2.1
1	B	189	LEU	2.1
1	C	88	LEU	2.1
1	D	83	PRO	2.1
1	D	2	LYS	2.1
1	C	16	LEU	2.0
1	C	226	THR	2.0
1	B	154	GLY	2.0
1	B	126	SER	2.0
1	B	287	LEU	2.0
1	B	188	ASP	2.0
1	C	225	ASP	2.0
1	D	141	ASP	2.0
1	A	191	PRO	2.0
1	D	274	PRO	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 [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

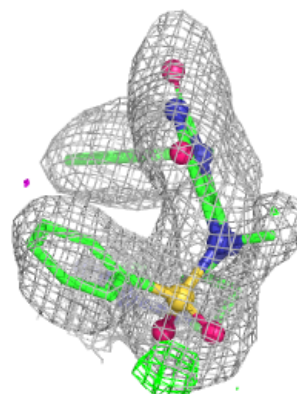
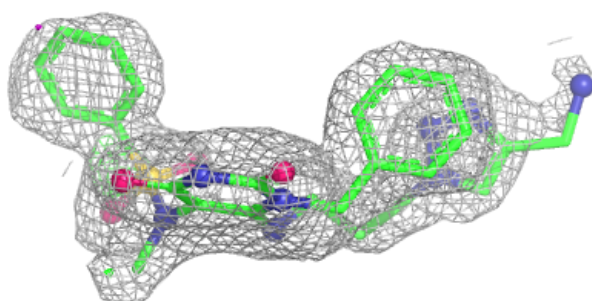
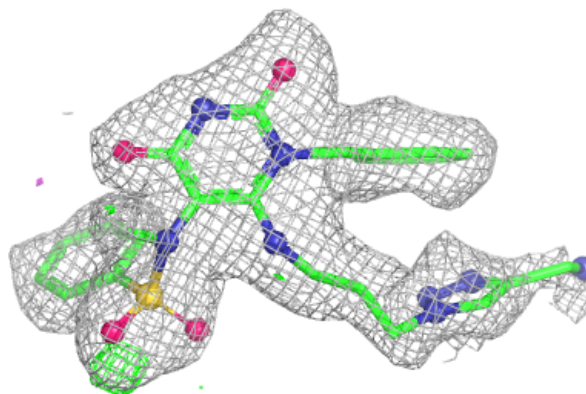
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	M9Z	B	301	37/37	0.89	0.13	33,43,71,71	0
3	MES	A	302	12/12	0.89	0.13	37,38,42,45	12
3	MES	C	302	12/12	0.89	0.12	38,40,44,46	12
2	M9Z	C	301	37/37	0.94	0.09	21,24,43,44	0
2	M9Z	D	301	37/37	0.94	0.09	28,35,57,59	0
2	M9Z	A	301	37/37	0.95	0.08	18,23,35,38	0
4	CL	D	304	1/1	0.95	0.07	46,46,46,46	0
4	CL	B	302	1/1	0.96	0.06	33,33,33,33	0
4	CL	B	303	1/1	0.97	0.13	51,51,51,51	0
4	CL	C	303	1/1	0.99	0.03	20,20,20,20	0
4	CL	C	304	1/1	0.99	0.03	32,32,32,32	0
4	CL	D	302	1/1	0.99	0.03	27,27,27,27	0
4	CL	D	303	1/1	0.99	0.03	22,22,22,22	0
4	CL	A	303	1/1	0.99	0.02	18,18,18,18	0

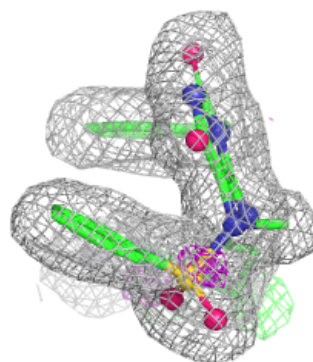
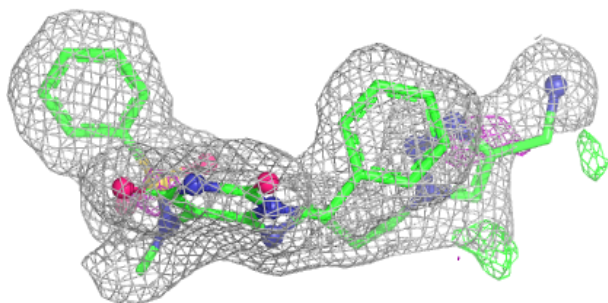
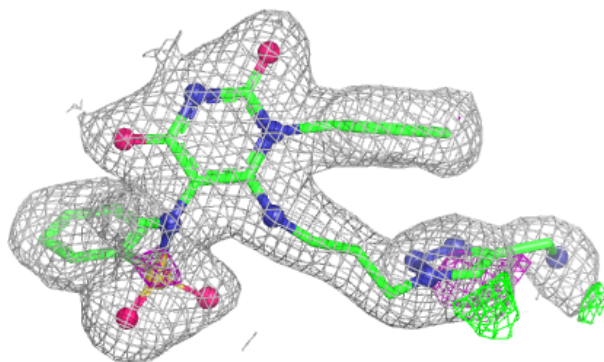
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around M9Z B 301:

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

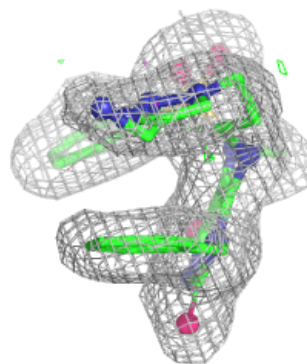
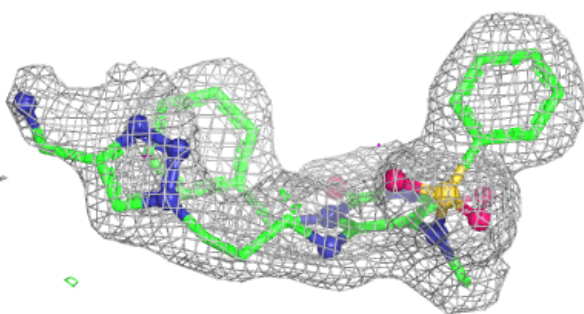
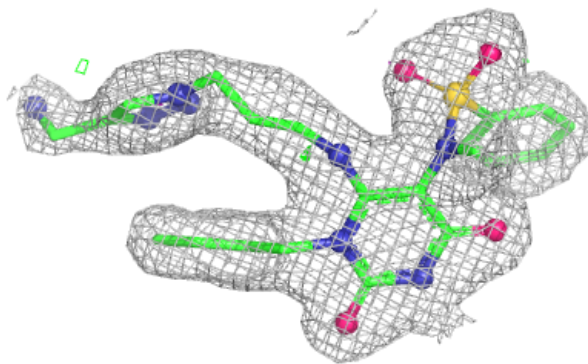
**Electron density around M9Z C 301:**

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

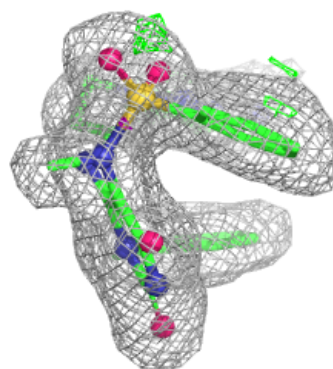
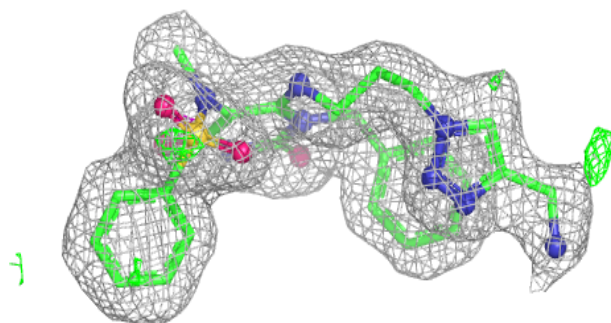
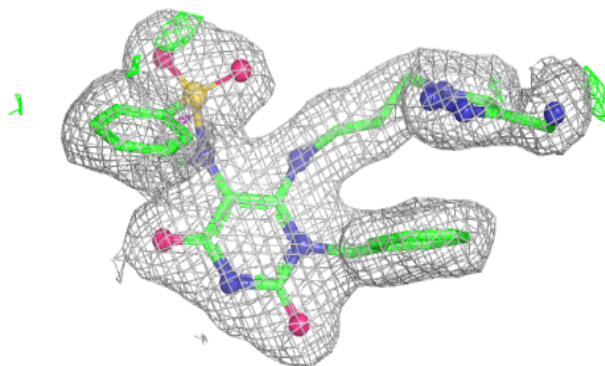


Electron density around M9Z D 301:

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

**Electron density around M9Z A 301:**

$2mF_o-DF_c$ (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.