



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 10:15 AM UTC

PDB ID : 9F8O / pdb_00009f8o
Title : Crystal Structure of PhzA/B from Burkholderia cepacia R18194 in complex with [6-Hydroxy-2-(4-hydroxyphenyl)benzo[b]thiophen-3-yl]{2-[(2-morpholino ethyl)amino]phenyl}methanone
Authors : Thiemann, M.; Zimmermann, M.; Kunick, C.; Blankenfeldt, W.
Deposited on : 2024-05-06
Resolution : 1.57 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

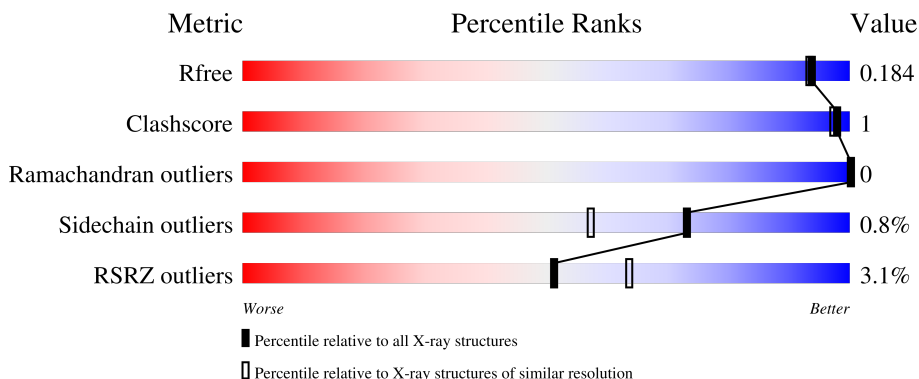
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.57 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	1094 (1.58-1.58)
Clashscore	190562	1105 (1.58-1.58)
Ramachandran outliers	187476	1082 (1.58-1.58)
Sidechain outliers	187428	1081 (1.58-1.58)
RSRZ outliers	180081	1094 (1.58-1.58)

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	185	4% 81% 17%
1	B	185	2% 81% 17%
1	C	185	2% 82% 17%
1	D	185	3% 81% 17%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11041 atoms, of which 5103 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 Phenazine biosynthesis protein A/B.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	154	Total	C	H	N	O	S	0	11	0
			2564	835	1247	246	230	6			
1	B	154	Total	C	H	N	O	S	0	15	0
			2614	848	1273	250	237	6			
1	C	154	Total	C	H	N	O	S	0	7	0
			2522	821	1224	242	230	5			
1	D	153	Total	C	H	N	O	S	0	2	0
			2465	804	1197	237	222	5			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP Q396C9
A	-18	GLY	-	expression tag	UNP Q396C9
A	-17	SER	-	expression tag	UNP Q396C9
A	-16	SER	-	expression tag	UNP Q396C9
A	-15	HIS	-	expression tag	UNP Q396C9
A	-14	HIS	-	expression tag	UNP Q396C9
A	-13	HIS	-	expression tag	UNP Q396C9
A	-12	HIS	-	expression tag	UNP Q396C9
A	-11	HIS	-	expression tag	UNP Q396C9
A	-10	HIS	-	expression tag	UNP Q396C9
A	-9	SER	-	expression tag	UNP Q396C9
A	-8	SER	-	expression tag	UNP Q396C9
A	-7	GLY	-	expression tag	UNP Q396C9
A	-6	LEU	-	expression tag	UNP Q396C9
A	-5	VAL	-	expression tag	UNP Q396C9
A	-4	PRO	-	expression tag	UNP Q396C9
A	-3	ARG	-	expression tag	UNP Q396C9
A	-2	GLY	-	expression tag	UNP Q396C9
A	-1	SER	-	expression tag	UNP Q396C9
A	0	HIS	-	expression tag	UNP Q396C9
B	-19	MET	-	initiating methionine	UNP Q396C9

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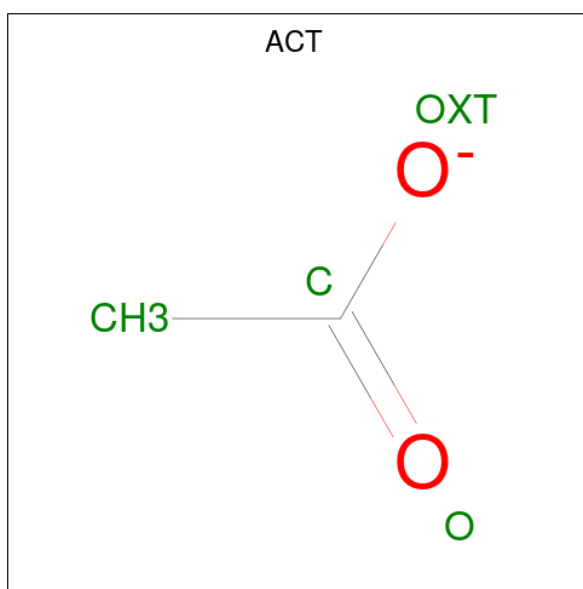
Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP Q396C9
B	-17	SER	-	expression tag	UNP Q396C9
B	-16	SER	-	expression tag	UNP Q396C9
B	-15	HIS	-	expression tag	UNP Q396C9
B	-14	HIS	-	expression tag	UNP Q396C9
B	-13	HIS	-	expression tag	UNP Q396C9
B	-12	HIS	-	expression tag	UNP Q396C9
B	-11	HIS	-	expression tag	UNP Q396C9
B	-10	HIS	-	expression tag	UNP Q396C9
B	-9	SER	-	expression tag	UNP Q396C9
B	-8	SER	-	expression tag	UNP Q396C9
B	-7	GLY	-	expression tag	UNP Q396C9
B	-6	LEU	-	expression tag	UNP Q396C9
B	-5	VAL	-	expression tag	UNP Q396C9
B	-4	PRO	-	expression tag	UNP Q396C9
B	-3	ARG	-	expression tag	UNP Q396C9
B	-2	GLY	-	expression tag	UNP Q396C9
B	-1	SER	-	expression tag	UNP Q396C9
B	0	HIS	-	expression tag	UNP Q396C9
C	-19	MET	-	initiating methionine	UNP Q396C9
C	-18	GLY	-	expression tag	UNP Q396C9
C	-17	SER	-	expression tag	UNP Q396C9
C	-16	SER	-	expression tag	UNP Q396C9
C	-15	HIS	-	expression tag	UNP Q396C9
C	-14	HIS	-	expression tag	UNP Q396C9
C	-13	HIS	-	expression tag	UNP Q396C9
C	-12	HIS	-	expression tag	UNP Q396C9
C	-11	HIS	-	expression tag	UNP Q396C9
C	-10	HIS	-	expression tag	UNP Q396C9
C	-9	SER	-	expression tag	UNP Q396C9
C	-8	SER	-	expression tag	UNP Q396C9
C	-7	GLY	-	expression tag	UNP Q396C9
C	-6	LEU	-	expression tag	UNP Q396C9
C	-5	VAL	-	expression tag	UNP Q396C9
C	-4	PRO	-	expression tag	UNP Q396C9
C	-3	ARG	-	expression tag	UNP Q396C9
C	-2	GLY	-	expression tag	UNP Q396C9
C	-1	SER	-	expression tag	UNP Q396C9
C	0	HIS	-	expression tag	UNP Q396C9
D	-19	MET	-	initiating methionine	UNP Q396C9
D	-18	GLY	-	expression tag	UNP Q396C9
D	-17	SER	-	expression tag	UNP Q396C9

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP Q396C9
D	-15	HIS	-	expression tag	UNP Q396C9
D	-14	HIS	-	expression tag	UNP Q396C9
D	-13	HIS	-	expression tag	UNP Q396C9
D	-12	HIS	-	expression tag	UNP Q396C9
D	-11	HIS	-	expression tag	UNP Q396C9
D	-10	HIS	-	expression tag	UNP Q396C9
D	-9	SER	-	expression tag	UNP Q396C9
D	-8	SER	-	expression tag	UNP Q396C9
D	-7	GLY	-	expression tag	UNP Q396C9
D	-6	LEU	-	expression tag	UNP Q396C9
D	-5	VAL	-	expression tag	UNP Q396C9
D	-4	PRO	-	expression tag	UNP Q396C9
D	-3	ARG	-	expression tag	UNP Q396C9
D	-2	GLY	-	expression tag	UNP Q396C9
D	-1	SER	-	expression tag	UNP Q396C9
D	0	HIS	-	expression tag	UNP Q396C9

- Molecule 2 is ACETATE ION (CCD ID: ACT) (formula: C₂H₃O₂).



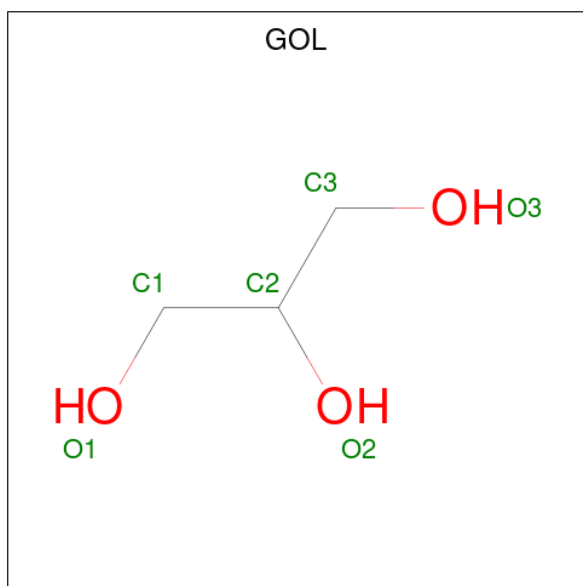
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	H	O	0	0
			7	2	3	2		
2	B	1	Total	C	H	O	0	0
			7	2	3	2		
2	C	1	Total	C	H	O	0	0
			7	2	3	2		

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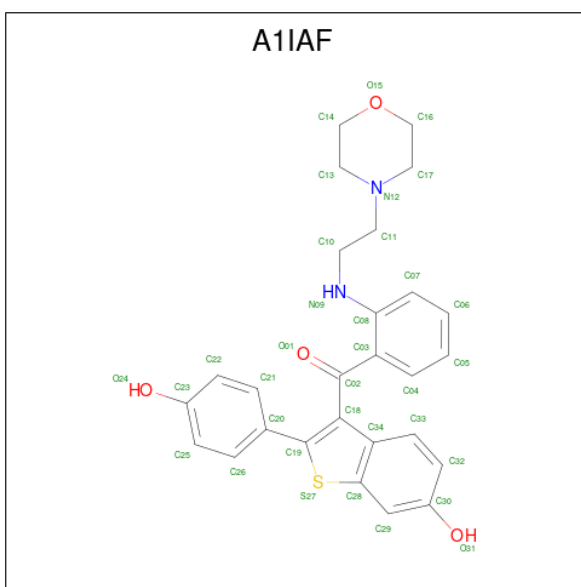
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	D	1	Total	C	H	O	0	0
			7	2	3	2		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	B	1	Total	C	H	O	0	0
			14	3	8	3		
3	C	1	Total	C	H	O	0	0
			14	3	8	3		
3	C	1	Total	C	H	O	0	0
			13	3	7	3		
3	D	1	Total	C	H	O	0	0
			13	3	7	3		

- Molecule 4 is [2-(4-hydroxyphenyl)-6-oxidanyl-1-benzothiophen-3-yl]-[2-(2-morpholin-4-ylethylamino)phenyl]methanone (CCD ID: A1IAF) (formula: $C_{27}H_{26}N_2O_4S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
4	A	1	Total 60	C 27	H 26	N 2	O 4	S 1	0	0
4	B	1	Total 60	C 27	H 26	N 2	O 4	S 1	0	0
4	C	1	Total 60	C 27	H 26	N 2	O 4	S 1	0	0
4	D	1	Total 60	C 27	H 26	N 2	O 4	S 1	0	0

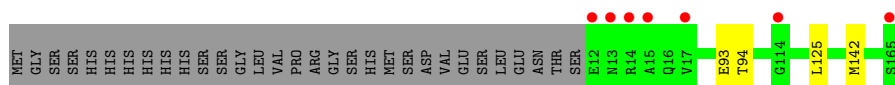
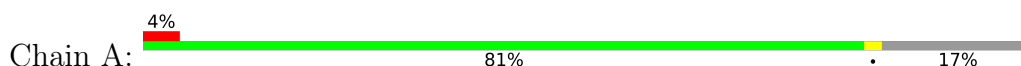
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	129	Total	O	0	0
			129	129		
5	B	129	Total	O	0	0
			129	129		
5	C	141	Total	O	0	0
			141	141		
5	D	127	Total	O	0	0
			127	127		

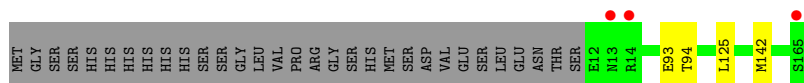
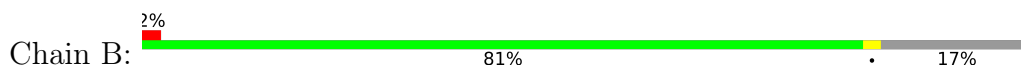
3 Residue-property plots [i](#)

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.

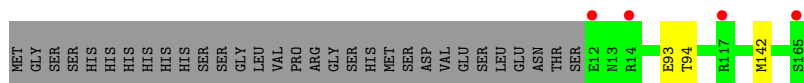
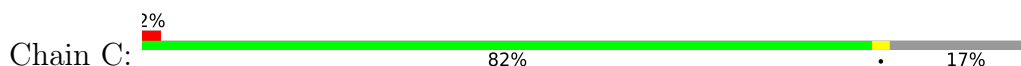
- Molecule 1: Phenazine biosynthesis protein A/B



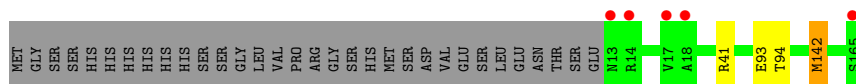
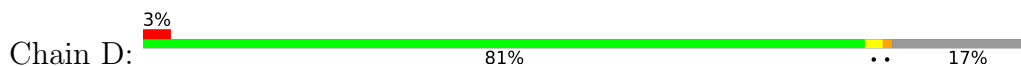
- Molecule 1: Phenazine biosynthesis protein A/B



- Molecule 1: Phenazine biosynthesis protein A/B



- Molecule 1: Phenazine biosynthesis protein A/B



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	68.83Å 69.63Å 83.14Å 90.00° 90.12° 90.00°	Depositor
Resolution (Å)	53.07 – 1.57 53.07 – 1.57	Depositor EDS
% Data completeness (in resolution range)	98.7 (53.07-1.57) 99.0 (53.07-1.57)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.48 (at 1.57Å)	Xtriage
Refinement program	PHENIX v1.20.1-4487	Depositor
R, R_{free}	0.164 , 0.183 0.166 , 0.184	Depositor DCC
R_{free} test set	5525 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	18.8	Xtriage
Anisotropy	0.780	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.44 , 46.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.000 for -k,-h,-l 0.000 for k,h,-l 0.079 for h,-k,-l	Xtriage
F_o, F_c correlation	0.98	EDS
Total number of atoms	11041	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 88.10 % 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 5.4992e-08. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: ACT, GOL, A1IAF

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	0.38	0/1401	0.45	0/1897
1	B	0.34	0/1449	0.44	0/1961
1	C	0.39	0/1368	0.44	0/1850
1	D	0.37	0/1310	0.45	0/1772
All	All	0.37	0/5528	0.45	0/7480

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1317	1247	1201	3	0
1	B	1341	1273	1214	3	0
1	C	1298	1224	1193	2	0
1	D	1268	1197	1189	4	0
2	A	4	3	3	0	0
2	B	4	3	3	0	0
2	C	4	3	3	0	0
2	D	4	3	3	0	0
3	A	12	16	16	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	6	8	8	0	0
3	C	12	15	16	0	0
3	D	6	7	8	0	0
4	A	34	26	0	0	0
4	B	34	26	0	0	0
4	C	34	26	0	0	0
4	D	34	26	0	0	0
5	A	129	0	0	0	0
5	B	129	0	0	0	0
5	C	141	0	0	0	0
5	D	127	0	0	1	0
All	All	5938	5103	4857	7	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 1.

All (7) 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:D:41:ARG:NH1	5:D:301:HOH:O	2.16	0.78
1:A:125:LEU:HD12	1:B:125:LEU:HD12	1.97	0.47
1:C:94:THR:HA	1:D:93:GLU:O	2.19	0.42
1:A:93:GLU:O	1:B:94:THR:HA	2.20	0.42
1:D:142:MET:SD	1:D:142:MET:C	3.03	0.42
1:A:94:THR:HA	1:B:93:GLU:O	2.21	0.41
1:C:93:GLU:O	1:D:94:THR:HA	2.21	0.41

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	163/185 (88%)	162 (99%)	1 (1%)	0	100	100
1	B	167/185 (90%)	166 (99%)	1 (1%)	0	100	100
1	C	159/185 (86%)	158 (99%)	1 (1%)	0	100	100
1	D	153/185 (83%)	152 (99%)	1 (1%)	0	100	100
All	All	642/740 (87%)	638 (99%)	4 (1%)	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	137/161 (85%)	136 (99%)	1 (1%)	76	61
1	B	143/161 (89%)	142 (99%)	1 (1%)	76	61
1	C	134/161 (83%)	133 (99%)	1 (1%)	76	61
1	D	128/161 (80%)	127 (99%)	1 (1%)	73	57
All	All	542/644 (84%)	538 (99%)	4 (1%)	73	61

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	142	MET
1	B	142	MET
1	C	142	MET
1	D	142	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	138	GLN
1	B	23	ASN
1	B	98	ASN
1	C	138	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 ⓘ

14 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
2	ACT	D	203	-	3,3,3	1.15	0	3,3,3	1.23	0
3	GOL	A	202	-	5,5,5	1.09	0	5,5,5	0.96	0
3	GOL	A	204	-	5,5,5	0.91	0	5,5,5	1.05	0
3	GOL	B	701	-	5,5,5	1.09	0	5,5,5	0.96	0
4	A1IAF	A	203	-	38,38,38	1.67	7 (18%)	52,53,53	2.14	12 (23%)
4	A1IAF	B	702	-	38,38,38	1.81	10 (26%)	52,53,53	1.94	9 (17%)
4	A1IAF	D	202	-	38,38,38	1.97	9 (23%)	52,53,53	2.03	11 (21%)
4	A1IAF	C	202	-	38,38,38	1.88	10 (26%)	52,53,53	2.04	11 (21%)
2	ACT	A	201	-	3,3,3	0.97	0	3,3,3	1.32	0
2	ACT	C	201	-	3,3,3	1.07	0	3,3,3	1.40	0
3	GOL	D	201	-	5,5,5	1.06	0	5,5,5	0.87	0
2	ACT	B	703	-	3,3,3	0.81	0	3,3,3	1.28	0
3	GOL	C	204	-	5,5,5	0.88	0	5,5,5	1.05	0
3	GOL	C	203	-	5,5,5	0.99	0	5,5,5	1.00	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	GOL	A	202	-	-	2/4/4/4	-
3	GOL	A	204	-	-	2/4/4/4	-
3	GOL	B	701	-	-	2/4/4/4	-
4	A1IAF	A	203	-	-	0/18/26/26	0/5/5/5
4	A1IAF	B	702	-	-	0/18/26/26	0/5/5/5
4	A1IAF	D	202	-	-	0/18/26/26	0/5/5/5
4	A1IAF	C	202	-	-	0/18/26/26	0/5/5/5
3	GOL	D	201	-	-	2/4/4/4	-
3	GOL	C	204	-	-	1/4/4/4	-
3	GOL	C	203	-	-	2/4/4/4	-

All (36) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	202	A1IAF	C11-N12	-8.00	1.29	1.47
4	C	202	A1IAF	C11-N12	-7.04	1.31	1.47
4	B	702	A1IAF	C11-N12	-6.68	1.32	1.47
4	A	203	A1IAF	C11-N12	-5.68	1.34	1.47
4	D	202	A1IAF	C20-C19	-3.67	1.40	1.48
4	C	202	A1IAF	C13-N12	-3.28	1.38	1.46
4	A	203	A1IAF	C08-N09	3.24	1.46	1.37
4	B	702	A1IAF	C20-C19	-3.18	1.41	1.48
4	A	203	A1IAF	C13-N12	-3.01	1.38	1.46
4	C	202	A1IAF	C08-N09	2.98	1.45	1.37
4	C	202	A1IAF	C20-C19	-2.95	1.42	1.48
4	D	202	A1IAF	C13-N12	-2.92	1.39	1.46
4	D	202	A1IAF	C08-N09	2.92	1.45	1.37
4	A	203	A1IAF	C20-C19	-2.92	1.42	1.48
4	B	702	A1IAF	C17-N12	-2.91	1.39	1.46
4	D	202	A1IAF	C34-C28	-2.88	1.37	1.41
4	A	203	A1IAF	C34-C28	-2.83	1.37	1.41
4	C	202	A1IAF	C34-C28	-2.75	1.37	1.41
4	D	202	A1IAF	C18-C19	2.63	1.41	1.37
4	B	702	A1IAF	C18-C19	2.62	1.41	1.37
4	B	702	A1IAF	C08-N09	2.61	1.44	1.37
4	B	702	A1IAF	C03-C02	2.46	1.54	1.49
4	C	202	A1IAF	C17-N12	-2.46	1.40	1.46
4	D	202	A1IAF	C17-N12	-2.40	1.40	1.46
4	A	203	A1IAF	O24-C23	2.32	1.42	1.37
4	B	702	A1IAF	C26-C20	-2.31	1.35	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	202	A1IAF	C33-C34	2.29	1.43	1.39
4	B	702	A1IAF	O24-C23	2.29	1.42	1.37
4	A	203	A1IAF	C17-N12	-2.25	1.40	1.46
4	D	202	A1IAF	C03-C02	2.24	1.53	1.49
4	D	202	A1IAF	O24-C23	2.19	1.41	1.37
4	C	202	A1IAF	C03-C02	2.14	1.53	1.49
4	C	202	A1IAF	O24-C23	2.05	1.41	1.37
4	C	202	A1IAF	C22-C21	2.04	1.42	1.38
4	B	702	A1IAF	C34-C28	-2.02	1.38	1.41
4	B	702	A1IAF	C33-C34	2.00	1.43	1.39

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	203	A1IAF	C28-S27-C19	7.83	96.59	90.58
4	D	202	A1IAF	C28-S27-C19	7.52	96.35	90.58
4	B	702	A1IAF	C28-S27-C19	7.47	96.31	90.58
4	C	202	A1IAF	C28-S27-C19	7.32	96.20	90.58
4	A	203	A1IAF	C18-C19-S27	-6.70	106.11	112.04
4	D	202	A1IAF	C18-C19-S27	-5.95	106.78	112.04
4	B	702	A1IAF	C18-C19-S27	-5.63	107.06	112.04
4	C	202	A1IAF	C18-C19-S27	-5.46	107.21	112.04
4	C	202	A1IAF	C34-C28-S27	-4.92	106.45	112.24
4	A	203	A1IAF	C34-C28-S27	-4.70	106.71	112.24
4	C	202	A1IAF	C28-C34-C18	4.68	116.56	111.47
4	D	202	A1IAF	C34-C28-S27	-4.44	107.01	112.24
4	D	202	A1IAF	C28-C34-C18	4.37	116.22	111.47
4	B	702	A1IAF	C34-C28-S27	-4.33	107.15	112.24
4	B	702	A1IAF	C28-C34-C18	4.32	116.17	111.47
4	A	203	A1IAF	C28-C34-C18	4.18	116.01	111.47
4	A	203	A1IAF	C33-C34-C18	-3.96	124.00	133.25
4	D	202	A1IAF	C33-C34-C18	-3.77	124.44	133.25
4	C	202	A1IAF	C33-C34-C18	-3.67	124.67	133.25
4	B	702	A1IAF	C33-C34-C18	-3.38	125.34	133.25
4	C	202	A1IAF	C26-C20-C19	-3.23	115.70	120.84
4	D	202	A1IAF	C26-C20-C19	-3.17	115.80	120.84
4	B	702	A1IAF	C21-C20-C19	-3.15	115.83	120.84
4	D	202	A1IAF	C20-C19-S27	3.05	122.17	117.69
4	A	203	A1IAF	C20-C19-S27	2.98	122.07	117.69
4	A	203	A1IAF	C34-C18-C19	2.86	114.57	112.51
4	D	202	A1IAF	C16-C17-N12	2.69	114.20	110.12
4	A	203	A1IAF	C21-C20-C19	-2.66	116.61	120.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	203	A1IAF	C16-C17-N12	2.64	114.14	110.12
4	A	203	A1IAF	C14-C13-N12	2.63	114.11	110.12
4	B	702	A1IAF	C20-C19-S27	2.61	121.52	117.69
4	C	202	A1IAF	C26-C20-C21	2.60	121.88	118.57
4	C	202	A1IAF	C20-C19-S27	2.57	121.46	117.69
4	C	202	A1IAF	C14-C13-N12	2.49	113.90	110.12
4	C	202	A1IAF	C29-C28-S27	2.38	132.00	126.07
4	C	202	A1IAF	C16-C17-N12	2.31	113.63	110.12
4	A	203	A1IAF	C29-C28-S27	2.24	131.65	126.07
4	A	203	A1IAF	C07-C08-N09	-2.23	118.07	121.75
4	B	702	A1IAF	C29-C28-S27	2.06	131.22	126.07
4	D	202	A1IAF	C10-N09-C08	-2.06	118.35	123.35
4	D	202	A1IAF	C26-C20-C21	2.05	121.17	118.57
4	D	202	A1IAF	C29-C28-S27	2.02	131.12	126.07
4	B	702	A1IAF	C26-C20-C21	2.01	121.13	118.57

There are no chirality outliers.

All (11) torsion outliers are listed below:

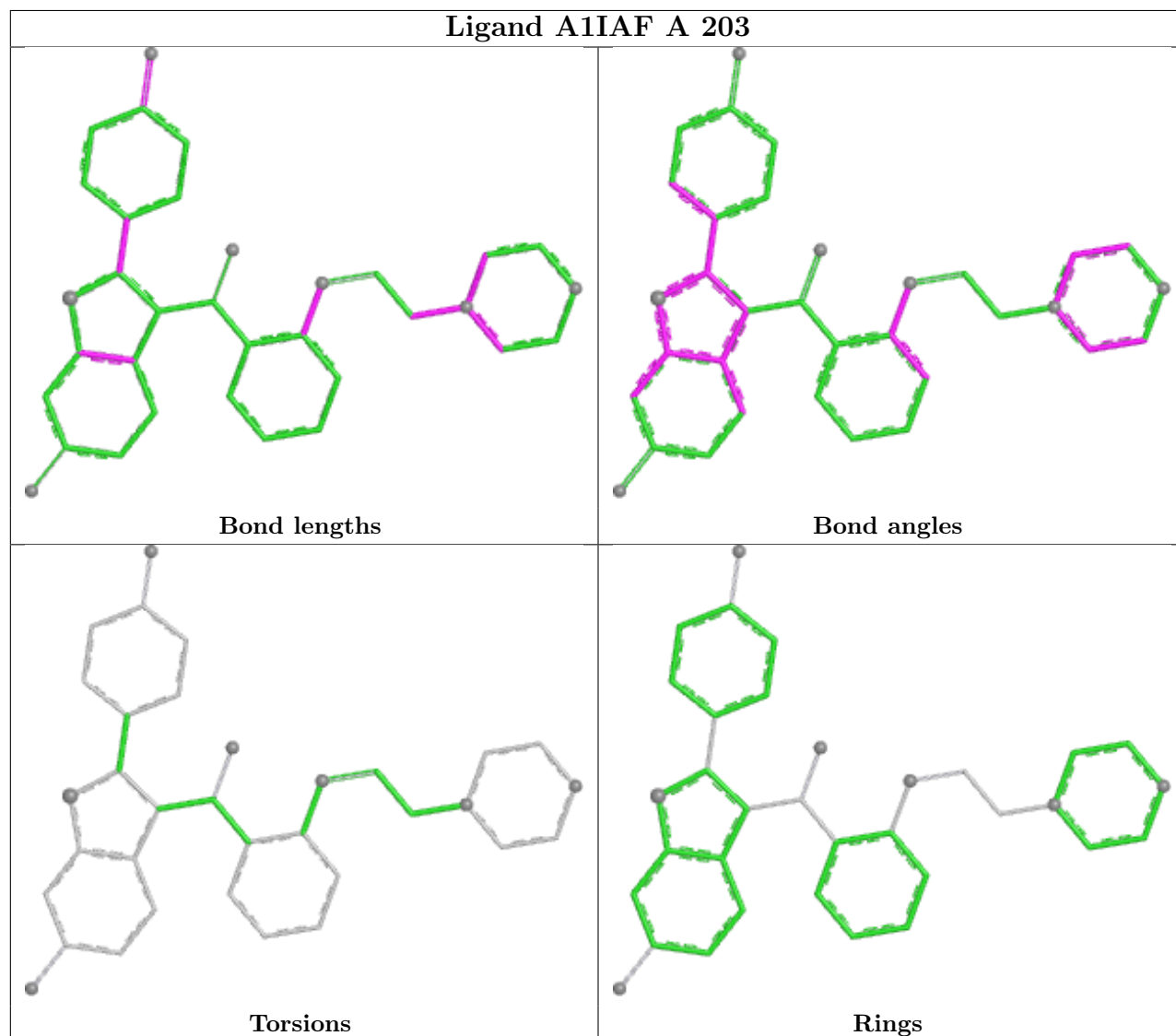
Mol	Chain	Res	Type	Atoms
3	A	202	GOL	O2-C2-C3-O3
3	A	204	GOL	O1-C1-C2-C3
3	B	701	GOL	O2-C2-C3-O3
3	A	202	GOL	C1-C2-C3-O3
3	B	701	GOL	C1-C2-C3-O3
3	C	203	GOL	C1-C2-C3-O3
3	D	201	GOL	C1-C2-C3-O3
3	A	204	GOL	O1-C1-C2-O2
3	C	203	GOL	O2-C2-C3-O3
3	D	201	GOL	O2-C2-C3-O3
3	C	204	GOL	O1-C1-C2-O2

There are no ring outliers.

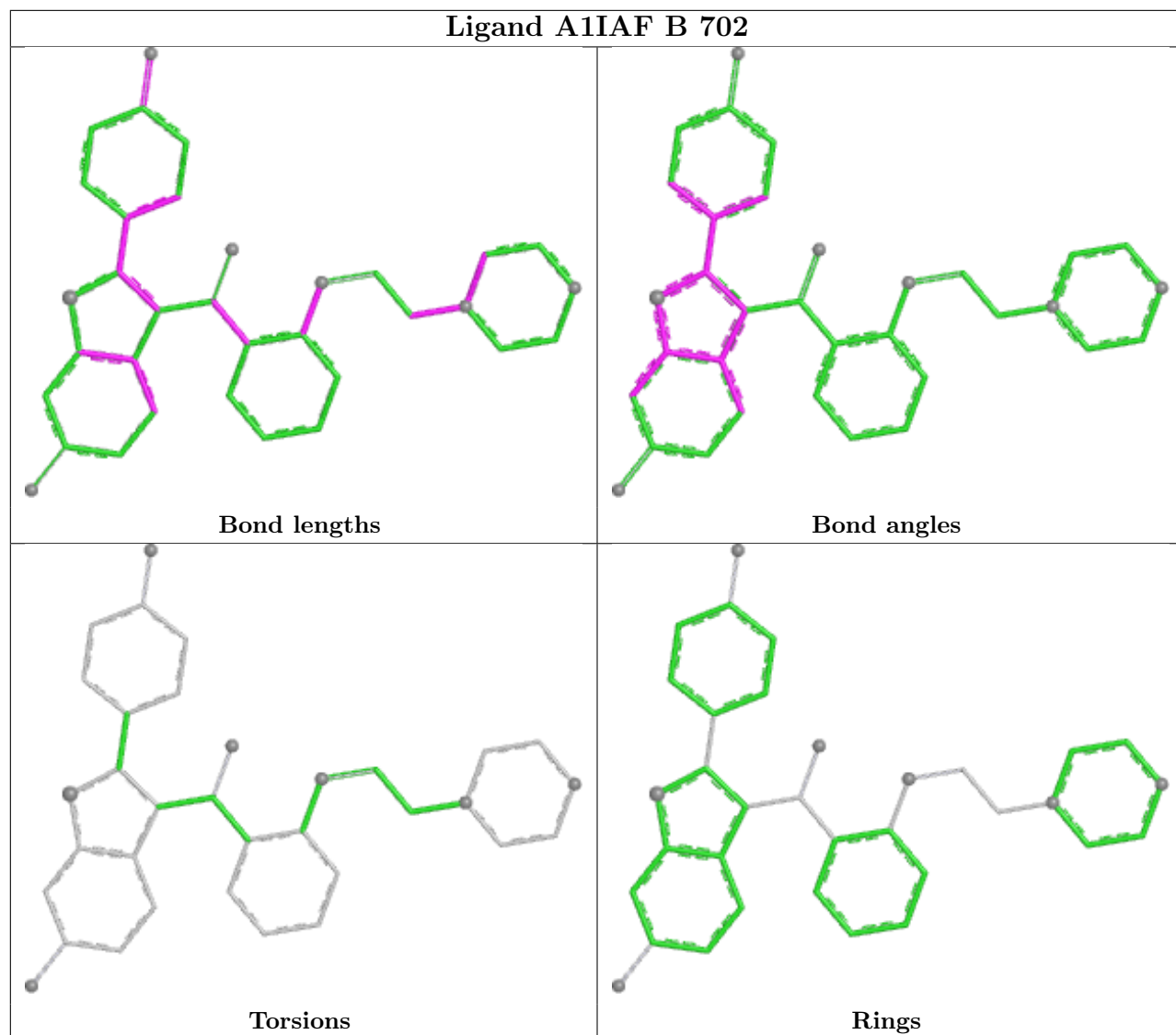
No monomer is involved in short contacts.

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

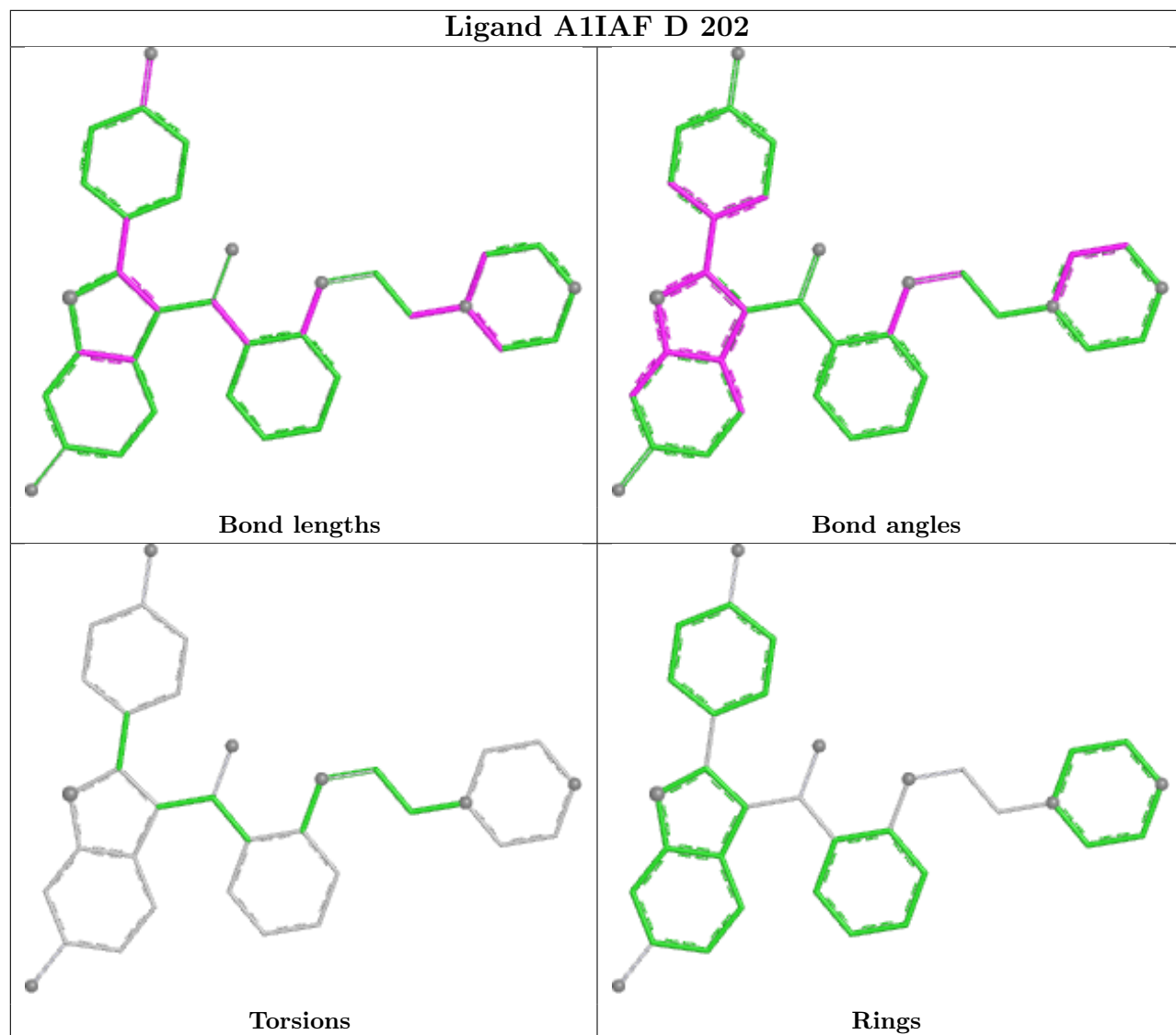
in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

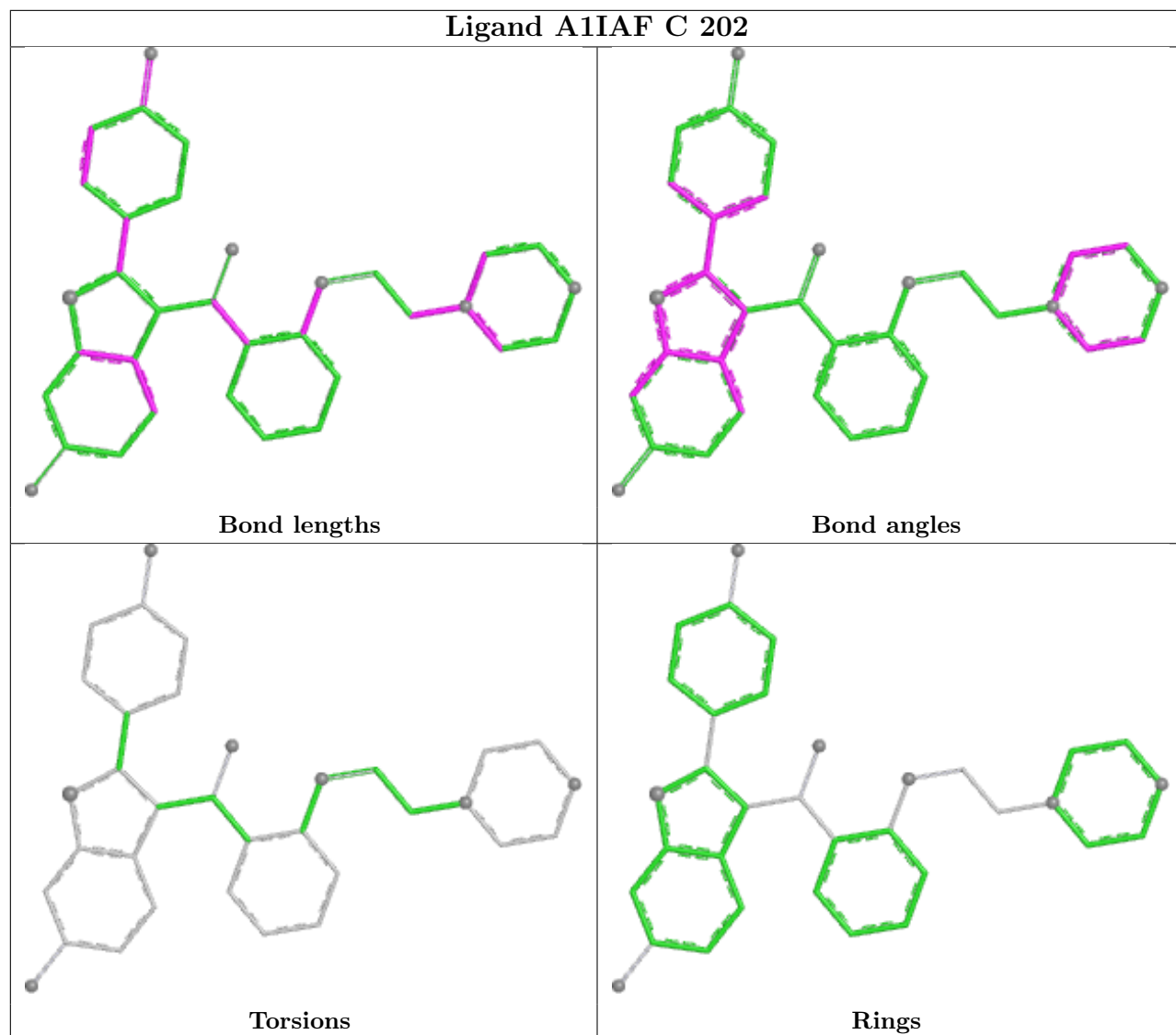


Ligand A1IAF B 702



Ligand A1IAF D 202





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	154/185 (83%)	-0.04	7 (4%)	38 50	14, 26, 50, 78	6 (3%)
1	B	154/185 (83%)	-0.09	3 (1%)	66 75	12, 27, 51, 69	8 (5%)
1	C	154/185 (83%)	-0.09	4 (2%)	57 68	14, 26, 47, 68	3 (1%)
1	D	153/185 (82%)	0.03	5 (3%)	49 62	12, 28, 52, 66	1 (0%)
All	All	615/740 (83%)	-0.05	19 (3%)	51 64	12, 27, 51, 78	18 (2%)

All (19) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	13	ASN	5.5
1	C	165	SER	4.5
1	A	165	SER	3.6
1	A	12	GLU	3.3
1	A	14	ARG	3.2
1	B	13	ASN	3.1
1	D	14	ARG	2.9
1	A	13	ASN	2.9
1	C	14	ARG	2.9
1	A	17	VAL	2.7
1	C	117	ARG	2.7
1	C	12	GLU	2.5
1	B	165	SER	2.4
1	D	17	VAL	2.3
1	B	14	ARG	2.3
1	D	18	ALA	2.2
1	A	15	ALA	2.1
1	A	114	GLY	2.1
1	D	165	SER	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

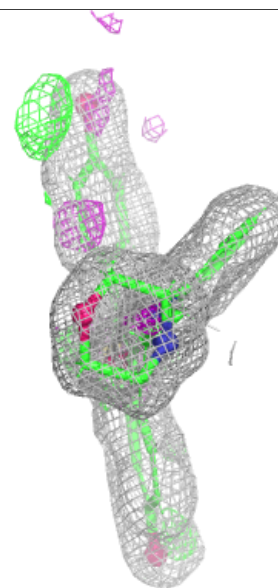
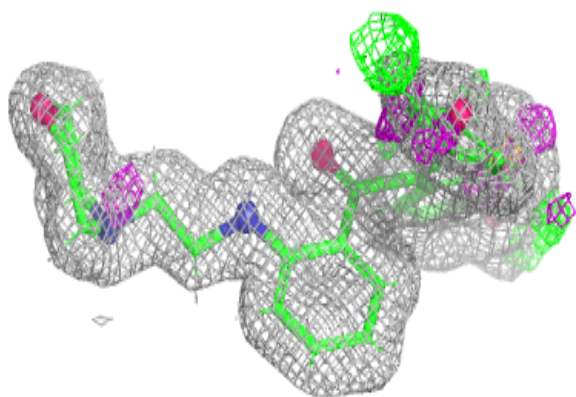
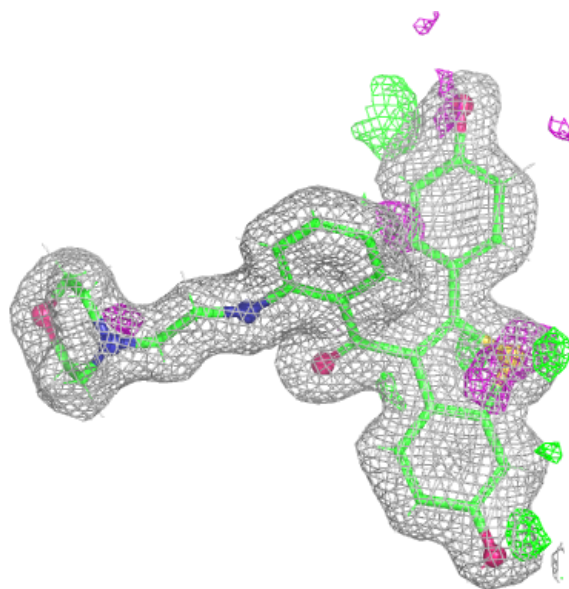
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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
3	GOL	A	204	6/6	0.80	0.14	41,51,66,75	0
3	GOL	C	204	6/6	0.82	0.14	40,49,59,65	0
3	GOL	D	201	6/6	0.84	0.18	25,39,54,54	0
2	ACT	D	203	4/4	0.87	0.13	32,36,39,39	0
3	GOL	C	203	6/6	0.87	0.15	24,39,51,51	0
3	GOL	B	701	6/6	0.88	0.14	24,36,45,53	0
3	GOL	A	202	6/6	0.91	0.12	22,32,47,47	0
2	ACT	B	703	4/4	0.93	0.17	25,27,31,31	0
4	A1IAF	C	202	34/34	0.95	0.07	17,23,31,37	0
2	ACT	C	201	4/4	0.96	0.14	20,26,35,35	0
4	A1IAF	A	203	34/34	0.97	0.06	15,20,27,35	0
4	A1IAF	B	702	34/34	0.97	0.06	16,21,28,36	0
2	ACT	A	201	4/4	0.97	0.13	20,23,26,26	0
4	A1IAF	D	202	34/34	0.97	0.07	16,22,30,36	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.

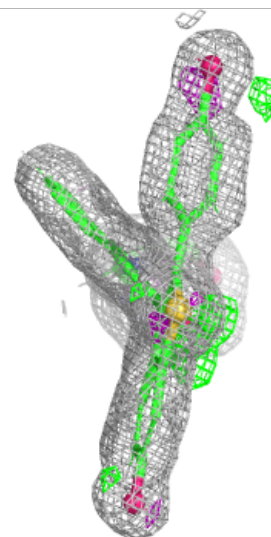
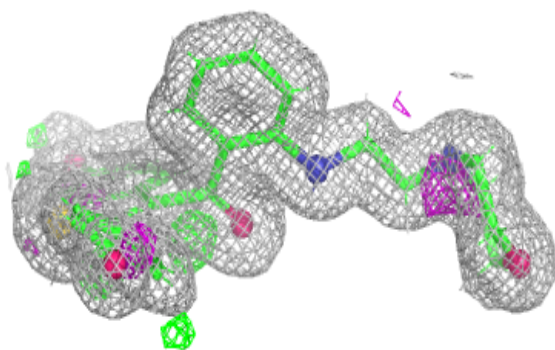
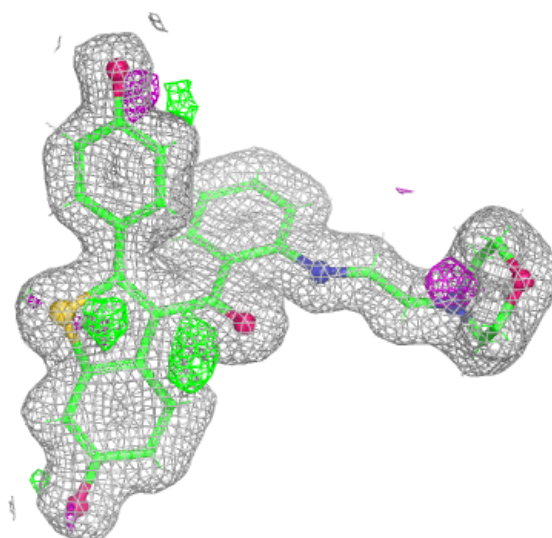
Electron density around A1IAF C 202:

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



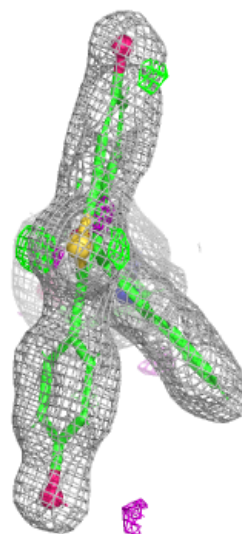
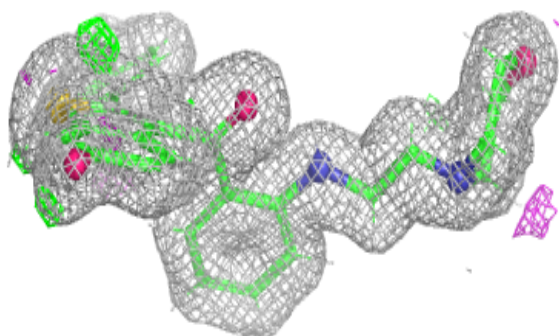
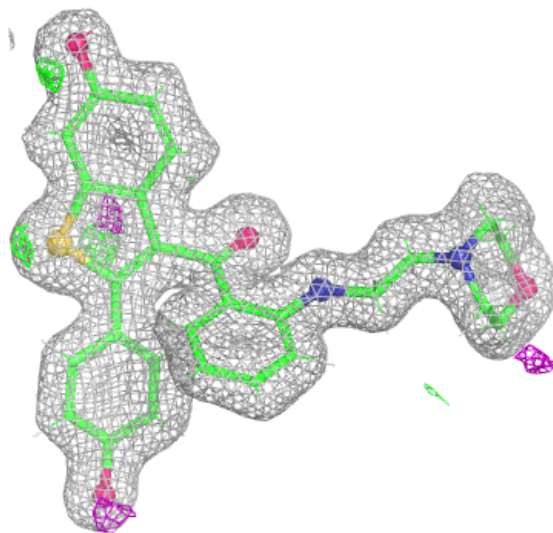
Electron density around A1IAF A 203:

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



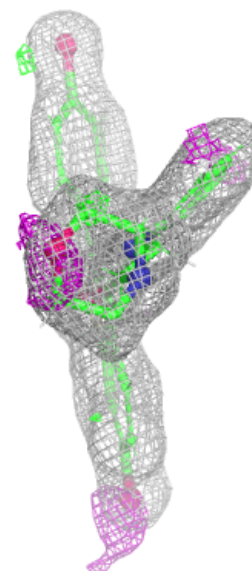
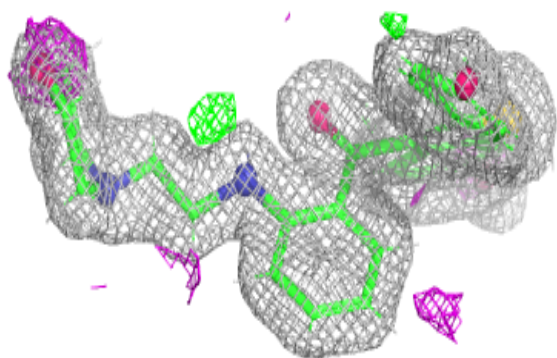
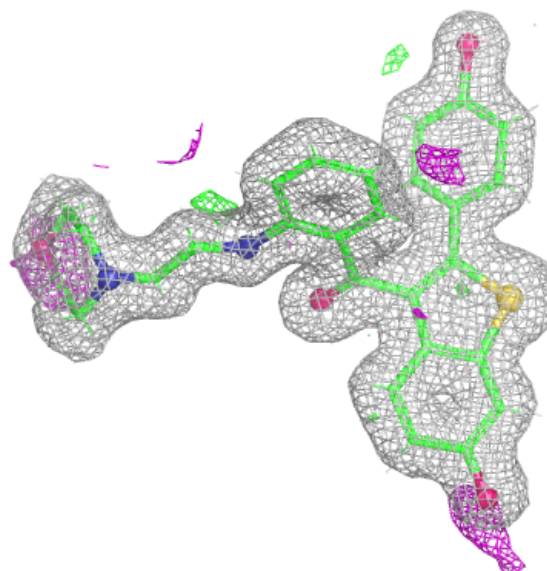
Electron density around A1IAF B 702:

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



Electron density around A1IAF D 202:

$2mF_o-DF_c$ (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.