



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 22, 2020 – 06:28 PM BST

PDB ID : 3W87
Title : Structure of Trypanosoma cruzi dihydroorotate dehydrogenase in complex with SH-1-103
Authors : Inaoka, D.K.; Hashimoto, S.; Rocha, J.R.; Iida, M.; Tabuchi, T.; Lee, N.; Matsuoka, S.; Kuranaga, T.; Shiba, T.; Balogun, E.O.; Sakamoto, K.; Suzuki, S.; Montanari, C.A.; Nara, T.; Aoki, T.; Inoue, M.; Honma, T.; Tanaka, A.; Harada, S.; Kita, K.
Deposited on : 2013-03-12
Resolution : 1.43 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 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

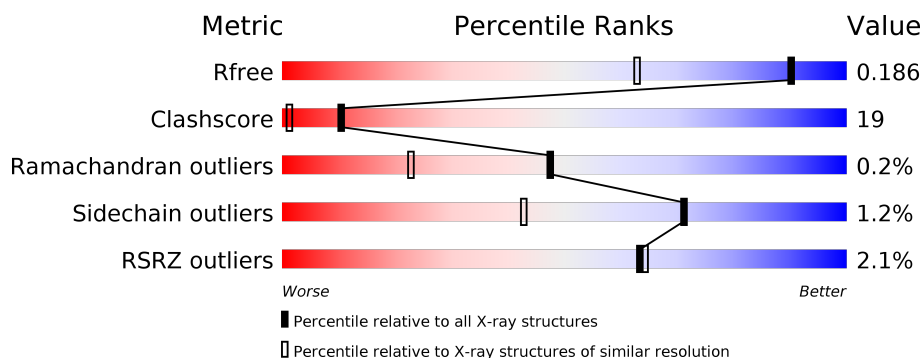
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.43 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	2021 (1.46-1.42)
Clashscore	141614	2086 (1.46-1.42)
Ramachandran outliers	138981	2047 (1.46-1.42)
Sidechain outliers	138945	2047 (1.46-1.42)
RSRZ outliers	127900	1993 (1.46-1.42)

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 ≥ 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	314	<div> <div>3%</div> <div>75%</div> <div>21%</div> <div>•</div> </div>
1	B	314	<div> <div>%</div> <div>83%</div> <div>15%</div> <div>•</div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	EDO	A	423	-	-	X	-
6	EDO	A	424	-	-	X	-
6	EDO	A	427	-	-	-	X
6	EDO	A	428	-	-	X	-
6	EDO	A	431	-	X	X	-
6	EDO	B	417	-	-	X	-
6	EDO	B	419	-	-	X	-
6	EDO	B	420	-	-	X	-
6	EDO	B	422	-	-	X	-
6	EDO	B	425	-	X	X	-
7	PEG	A	432	-	-	X	-
7	PEG	A	433	-	X	X	-
7	PEG	B	427	-	-	X	-

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 6373 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.

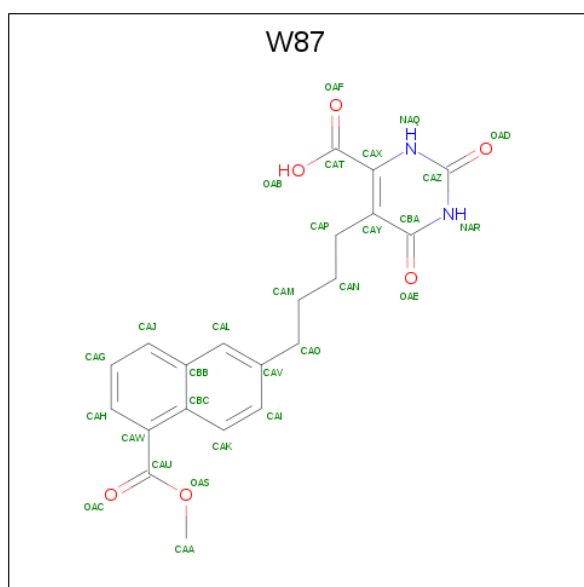
- Molecule 1 is a protein called Dihydroorotate dehydrogenase (fumarate).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	314	Total	C	N	O	S	0	18	0
			2540	1618	425	478	19			
1	B	314	Total	C	N	O	S	0	15	0
			2522	1603	423	477	19			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	SER	-	EXPRESSION TAG	UNP Q4D3W2
B	-1	SER	-	EXPRESSION TAG	UNP Q4D3W2

- Molecule 2 is 5-{4-[5-(methoxycarbonyl)naphthalen-2-yl]butyl}-2,6-dioxo-1,2,3,6-tetrahydro pyrimidine-4-carboxylic acid (three-letter code: W87) (formula: C₂₁H₂₀N₂O₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			29	21	2	6		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	B	1	Total	C	N	O	0	1
			58	42	4	12		

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



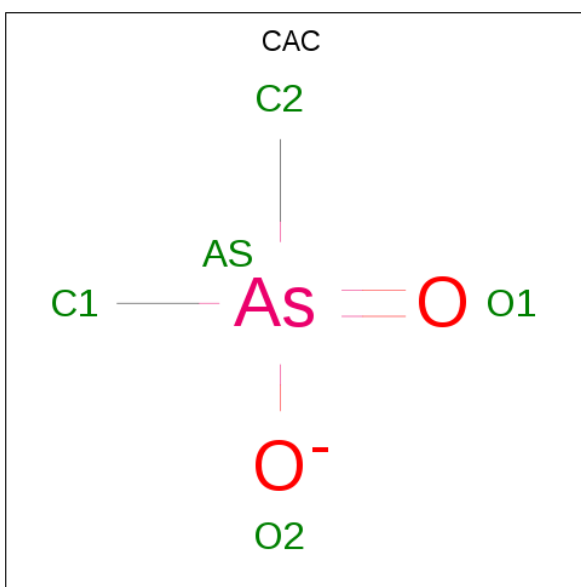
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	1
			12	6	6		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	1
			12	6	6		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total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

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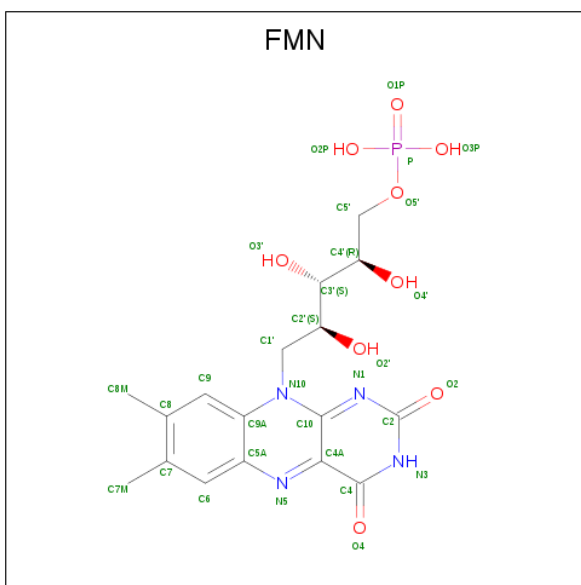
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	1
			12	6	6		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 4 is CACODYLATE ION (three-letter code: CAC) (formula: C₂H₆AsO₂).



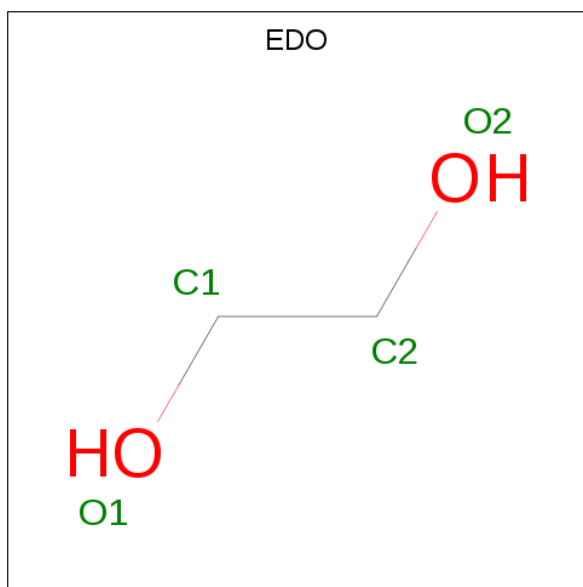
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	As	C	O	0	0
			5	1	2	2		
4	A	1	Total	As	C	O	0	0
			5	1	2	2		
4	B	1	Total	As	C	O	0	0
			5	1	2	2		
4	B	1	Total	As	C	O	0	0
			5	1	2	2		

- Molecule 5 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: $C_{17}H_{21}N_4O_9P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
5	B	1	Total	C	N	O	P	0	0
			31	17	4	9	1		

- Molecule 6 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



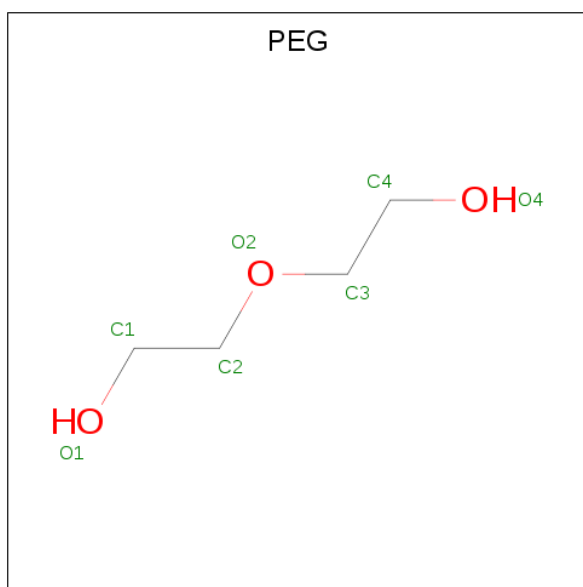
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		

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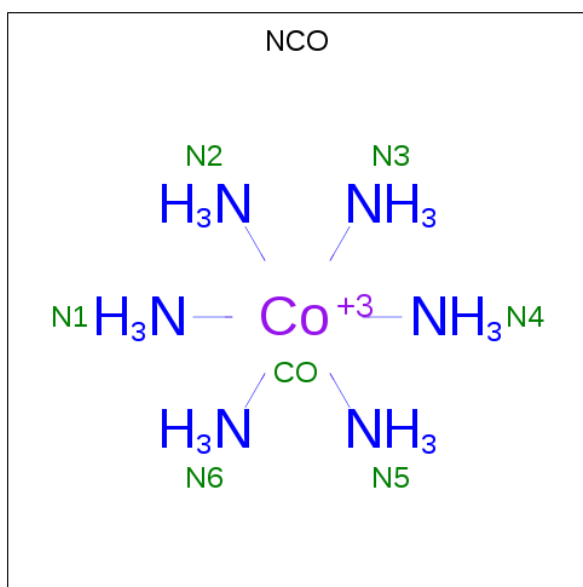
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total 4	C 2	O 2	0	0
6	A	1	Total 4	C 2	O 2	0	0
6	A	1	Total 4	C 2	O 2	0	0
6	A	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0
6	B	1	Total 4	C 2	O 2	0	0

- Molecule 7 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C₄H₁₀O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			7	4	3		
7	A	1	Total	C	O	0	0
			7	4	3		
7	B	1	Total	C	O	0	0
			7	4	3		

- Molecule 8 is COBALT HEXAMMINE(III) (three-letter code: NCO) (formula: $\text{CoH}_{18}\text{N}_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	Co	N	0	0
			7	1	6		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	Co	N	0	1
			14	2	12		

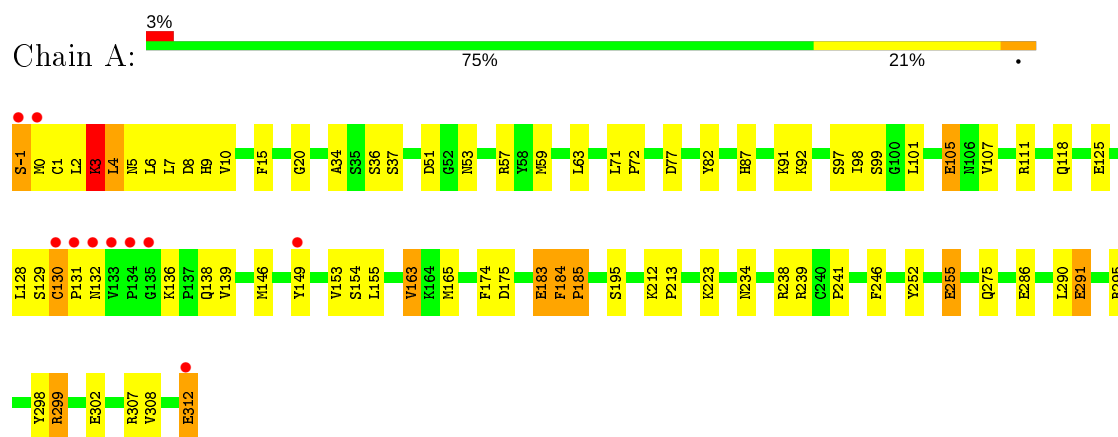
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	377	Total	O	0	9
			386	386		
9	B	444	Total	O	0	6
			450	450		

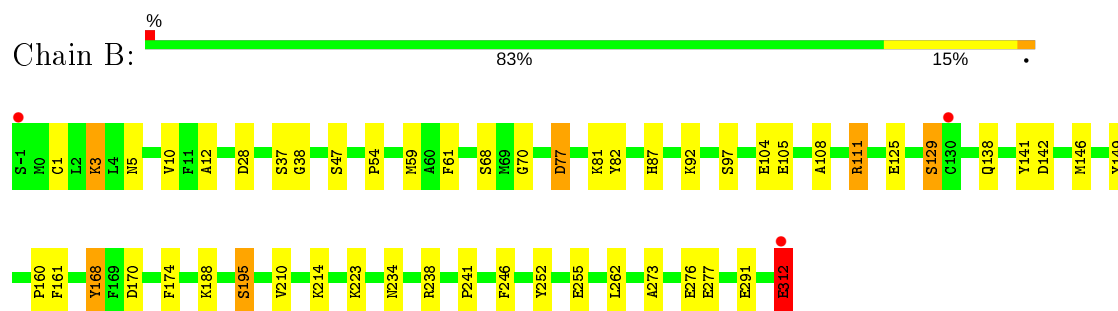
3 Residue-property plots

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: Dihydroorotate dehydrogenase (fumarate)



- Molecule 1: Dihydroorotate dehydrogenase (fumarate)



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	67.93Å 71.48Å 129.65Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	36.98 – 1.43 39.21 – 1.43	Depositor EDS
% Data completeness (in resolution range)	97.3 (36.98-1.43) 97.4 (39.21-1.43)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.39 (at 1.43Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.153 , 0.187 0.152 , 0.186	Depositor DCC
R_{free} test set	5704 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	8.9	Xtriage
Anisotropy	0.008	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 50.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.005 for k,h,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	6373	wwPDB-VP
Average B, all atoms (Å ²)	13.0	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 26.97 % 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 2.3903e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹ Intensities estimated from amplitudes.

² 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: GOL, W87, EDO, FMN, NCO, CAC, PEG

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	1.41	15/2591 (0.6%)	1.30	19/3506 (0.5%)
1	B	1.39	12/2574 (0.5%)	1.30	19/3482 (0.5%)
All	All	1.40	27/5165 (0.5%)	1.30	38/6988 (0.5%)

The worst 5 of 27 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	3	LYS	CE-NZ	14.96	1.86	1.49
1	B	1	CYS	CB-SG	-12.48	1.61	1.82
1	B	3	LYS	CD-CE	8.12	1.71	1.51
1	B	195	SER	CB-OG	-7.68	1.32	1.42
1	B	291	GLU	CG-CD	7.31	1.62	1.51

The worst 5 of 38 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	3	LYS	CD-CE-NZ	13.46	142.67	111.70
1	B	146	MET	CG-SD-CE	-9.20	85.48	100.20
1	B	77	ASP	CB-CG-OD2	-8.52	110.63	118.30
1	A	105	GLU	OE1-CD-OE2	-8.41	113.20	123.30
1	B	1	CYS	N-CA-CB	-8.03	96.15	110.60

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	2540	0	2524	118	0
1	B	2522	0	2501	57	0
2	A	29	0	19	1	0
2	B	58	0	38	3	0
3	A	90	0	119	12	0
3	B	78	0	102	9	0
4	A	10	0	0	2	0
4	B	10	0	0	0	0
5	A	31	0	19	1	0
5	B	31	0	19	0	0
6	A	56	0	84	33	0
6	B	40	0	59	34	0
7	A	14	0	19	21	0
7	B	7	0	10	8	0
8	A	21	0	0	4	0
9	A	386	0	0	24	0
9	B	450	0	0	23	0
All	All	6373	0	5513	207	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 19.

The worst 5 of 207 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:B:3:LYS:NZ	1:B:3:LYS:CE	1.86	1.38
1:A:2:LEU:HD12	1:A:286:GLU:HG3	1.18	1.09
1:A:128:LEU:CD1	1:A:163[B]:VAL:HG21	1.85	1.06
1:A:1:CYS:HB2	7:A:433:PEG:H22	1.26	1.06
6:B:420:EDO:H21	9:B:874:HOH:O	1.54	1.05

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	329/314 (105%)	318 (97%)	10 (3%)	1 (0%)	41	19
1	B	328/314 (104%)	316 (96%)	12 (4%)	0	100	100
All	All	657/628 (105%)	634 (96%)	22 (3%)	1 (0%)	47	23

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	0	MET

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	277/259 (107%)	270 (98%)	7 (2%)	47	13
1	B	275/259 (106%)	274 (100%)	1 (0%)	91	80
All	All	552/518 (107%)	544 (99%)	8 (1%)	71	37

5 of 8 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	130[A]	CYS
1	B	312	GLU
1	A	312[A]	GLU
1	A	118	GLN
1	A	130[B]	CYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 10 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	275	GLN

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Mol	Chain	Res	Type
1	B	87	HIS
1	B	138	GLN
1	A	234	ASN
1	B	118	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 ⓘ

67 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	$\# Z > 2$
4	CAC	A	415	-	0,4,4	0.00	-	0,6,6	0.00	-
6	EDO	A	424	-	3,3,3	0.61	0	2,2,2	0.36	0
7	PEG	A	433	-	6,6,6	1.02	1 (16%)	5,5,5	2.24	1 (20%)
3	GOL	A	409	-	5,5,5	0.80	0	5,5,5	1.42	1 (20%)
6	EDO	A	419	-	3,3,3	0.53	0	2,2,2	0.42	0
6	EDO	A	430	-	3,3,3	0.90	0	2,2,2	0.68	0
4	CAC	B	414	-	0,4,4	0.00	-	0,6,6	0.00	-
6	EDO	A	431	-	3,3,3	1.66	1 (33%)	2,2,2	1.67	1 (50%)
6	EDO	B	425	-	3,3,3	1.28	1 (33%)	2,2,2	2.04	1 (50%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	B	411	-	5,5,5	0.51	0	5,5,5	1.10	0
3	GOL	A	407	-	5,5,5	0.38	0	5,5,5	0.42	0
2	W87	A	401	-	27,31,31	1.86	4 (14%)	30,43,43	2.45	13 (43%)
7	PEG	A	432	-	6,6,6	1.05	1 (16%)	5,5,5	1.10	0
3	GOL	A	403	-	5,5,5	0.62	0	5,5,5	1.09	0
6	EDO	B	426	-	3,3,3	0.82	0	2,2,2	0.69	0
8	NCO	A	435[A]	-	6,6,6	2.39	3 (50%)	-		
6	EDO	B	419	-	3,3,3	0.65	0	2,2,2	0.54	0
8	NCO	A	434	-	6,6,6	5.15	6 (100%)	-		
6	EDO	A	420	-	3,3,3	0.64	0	2,2,2	0.81	0
3	GOL	A	405	-	5,5,5	0.94	0	5,5,5	1.25	1 (20%)
3	GOL	B	408	-	5,5,5	0.50	0	5,5,5	0.67	0
7	PEG	B	427	-	6,6,6	1.24	1 (16%)	5,5,5	1.78	1 (20%)
2	W87	B	401[A]	-	27,31,31	1.86	6 (22%)	30,43,43	2.20	8 (26%)
3	GOL	A	408	-	5,5,5	0.46	0	5,5,5	0.70	0
6	EDO	B	424	-	3,3,3	0.60	0	2,2,2	0.29	0
6	EDO	B	420	-	3,3,3	0.97	0	2,2,2	0.97	0
6	EDO	A	425	-	3,3,3	0.68	0	2,2,2	0.38	0
2	W87	B	401[B]	-	27,31,31	1.70	5 (18%)	30,43,43	2.01	5 (16%)
8	NCO	A	435[B]	-	6,6,6	2.46	4 (66%)	-		
6	EDO	A	421	-	3,3,3	0.38	0	2,2,2	2.04	1 (50%)
3	GOL	B	405[B]	-	5,5,5	0.35	0	5,5,5	1.16	0
3	GOL	B	404	-	5,5,5	1.26	1 (20%)	5,5,5	0.99	0
3	GOL	B	403	-	5,5,5	0.57	0	5,5,5	0.87	0
3	GOL	B	405[A]	-	5,5,5	0.71	0	5,5,5	0.82	0
3	GOL	A	402[B]	-	5,5,5	1.28	0	5,5,5	1.02	0
6	EDO	B	422	-	3,3,3	0.68	0	2,2,2	0.30	0
6	EDO	A	426	-	3,3,3	0.53	0	2,2,2	0.20	0
3	GOL	A	402[A]	-	5,5,5	1.02	0	5,5,5	0.41	0
3	GOL	A	411	-	5,5,5	0.56	0	5,5,5	1.30	1 (20%)
6	EDO	A	427	-	3,3,3	0.83	0	2,2,2	0.14	0
6	EDO	B	417	-	3,3,3	1.28	0	2,2,2	1.37	0
3	GOL	A	413	-	5,5,5	0.73	0	5,5,5	0.77	0
6	EDO	A	423	-	3,3,3	0.52	0	2,2,2	0.47	0
3	GOL	B	413	-	5,5,5	0.40	0	5,5,5	1.13	0
6	EDO	B	423	-	3,3,3	0.48	0	2,2,2	0.64	0
3	GOL	B	406	-	5,5,5	0.98	0	5,5,5	1.40	1 (20%)
4	CAC	B	415	-	0,4,4	0.00	-	0,6,6	0.00	-
6	EDO	B	418	-	3,3,3	0.31	0	2,2,2	1.05	0
3	GOL	B	402	-	5,5,5	0.65	0	5,5,5	0.64	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	B	409	-	5,5,5	0.89	0	5,5,5	0.88	0
3	GOL	A	414	-	5,5,5	0.39	0	5,5,5	0.36	0
4	CAC	A	416	-	0,4,4	0.00	-	0,6,6	0.00	-
3	GOL	A	410	-	5,5,5	0.38	0	5,5,5	0.62	0
6	EDO	A	422	-	3,3,3	0.37	0	2,2,2	1.10	0
3	GOL	A	406[B]	-	5,5,5	0.22	0	5,5,5	0.67	0
3	GOL	A	406[A]	-	5,5,5	0.50	0	5,5,5	0.44	0
5	FMN	A	417	-	31,33,33	1.66	4 (12%)	40,50,50	2.30	4 (10%)
3	GOL	A	412	-	5,5,5	0.56	0	5,5,5	0.70	0
3	GOL	B	412	-	5,5,5	0.37	0	5,5,5	0.79	0
6	EDO	A	428	-	3,3,3	0.51	0	2,2,2	0.61	0
5	FMN	B	416	-	31,33,33	1.39	2 (6%)	40,50,50	1.88	7 (17%)
6	EDO	A	429	-	3,3,3	0.41	0	2,2,2	0.80	0
3	GOL	A	404	-	5,5,5	0.83	0	5,5,5	2.20	3 (60%)
6	EDO	A	418	-	3,3,3	0.88	0	2,2,2	0.35	0
6	EDO	B	421	-	3,3,3	0.84	0	2,2,2	0.55	0
3	GOL	B	407	-	5,5,5	0.45	0	5,5,5	0.83	0
3	GOL	B	410	-	5,5,5	0.25	0	5,5,5	0.79	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
6	EDO	A	424	-	-	0/1/1/1	-
7	PEG	A	433	-	-	4/4/4/4	-
3	GOL	A	409	-	-	0/4/4/4	-
6	EDO	A	419	-	-	0/1/1/1	-
6	EDO	A	430	-	-	1/1/1/1	-
6	EDO	A	431	-	-	1/1/1/1	-
6	EDO	B	425	-	-	1/1/1/1	-
3	GOL	B	411	-	-	2/4/4/4	-
3	GOL	A	407	-	-	1/4/4/4	-
2	W87	A	401	-	-	4/13/17/17	0/3/3/3
7	PEG	A	432	-	-	2/4/4/4	-
3	GOL	A	403	-	-	0/4/4/4	-
6	EDO	B	426	-	-	0/1/1/1	-
6	EDO	B	419	-	-	0/1/1/1	-
3	GOL	B	413	-	-	3/4/4/4	-
6	EDO	A	420	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	A	405	-	-	0/4/4/4	-
3	GOL	B	408	-	-	2/4/4/4	-
7	PEG	B	427	-	-	3/4/4/4	-
2	W87	B	401[A]	-	-	6/13/17/17	0/3/3/3
3	GOL	A	408	-	-	3/4/4/4	-
6	EDO	B	424	-	-	1/1/1/1	-
6	EDO	B	420	-	-	1/1/1/1	-
6	EDO	A	425	-	-	0/1/1/1	-
2	W87	B	401[B]	-	-	10/13/17/17	0/3/3/3
6	EDO	A	421	-	-	1/1/1/1	-
3	GOL	B	405[B]	-	-	3/4/4/4	-
3	GOL	B	404	-	-	0/4/4/4	-
3	GOL	B	403	-	-	4/4/4/4	-
3	GOL	B	405[A]	-	-	1/4/4/4	-
3	GOL	A	402[B]	-	-	0/4/4/4	-
6	EDO	B	422	-	-	1/1/1/1	-
6	EDO	A	426	-	-	1/1/1/1	-
3	GOL	A	402[A]	-	-	0/4/4/4	-
3	GOL	A	411	-	-	4/4/4/4	-
6	EDO	A	427	-	-	1/1/1/1	-
6	EDO	B	417	-	-	0/1/1/1	-
3	GOL	A	413	-	-	4/4/4/4	-
6	EDO	A	423	-	-	1/1/1/1	-
6	EDO	B	423	-	-	1/1/1/1	-
6	EDO	A	422	-	-	1/1/1/1	-
3	GOL	B	406	-	-	0/4/4/4	-
6	EDO	B	418	-	-	0/1/1/1	-
3	GOL	B	402	-	-	0/4/4/4	-
3	GOL	B	409	-	-	4/4/4/4	-
3	GOL	A	414	-	-	3/4/4/4	-
3	GOL	A	410	-	-	4/4/4/4	-
3	GOL	A	406[B]	-	-	1/4/4/4	-
3	GOL	A	406[A]	-	-	4/4/4/4	-
5	FMN	A	417	-	-	1/18/18/18	0/3/3/3
3	GOL	A	412	-	-	0/4/4/4	-
3	GOL	B	412	-	-	0/4/4/4	-
6	EDO	A	428	-	-	0/1/1/1	-
5	FMN	B	416	-	-	2/18/18/18	0/3/3/3
6	EDO	A	429	-	-	1/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	A	404	-	-	2/4/4/4	-
6	EDO	A	418	-	-	1/1/1/1	-
6	EDO	B	421	-	-	1/1/1/1	-
3	GOL	B	407	-	-	3/4/4/4	-
3	GOL	B	410	-	-	0/4/4/4	-

The worst 5 of 40 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	434	NCO	CO-N5	7.71	2.24	1.96
5	A	417	FMN	C4A-C10	6.87	1.45	1.38
8	A	434	NCO	CO-N3	6.11	2.18	1.96
2	B	401[B]	W87	OAS-CAU	6.08	1.46	1.33
2	B	401[A]	W87	OAS-CAU	6.03	1.46	1.33

The worst 5 of 49 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	417	FMN	C4-C4A-C10	-8.51	114.32	119.95
5	A	417	FMN	C4-N3-C2	8.10	121.98	115.14
2	B	401[A]	W87	CBA-NAR-CAZ	8.09	121.97	115.14
2	B	401[B]	W87	CBA-NAR-CAZ	8.01	121.91	115.14
2	A	401	W87	CBA-NAR-CAZ	7.42	121.41	115.14

There are no chirality outliers.

5 of 95 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	411	GOL	O1-C1-C2-O2
3	B	411	GOL	O1-C1-C2-C3
3	B	413	GOL	O1-C1-C2-O2
3	B	413	GOL	O1-C1-C2-C3
3	B	408	GOL	O1-C1-C2-C3

There are no ring outliers.

44 monomers are involved in 125 short contacts:

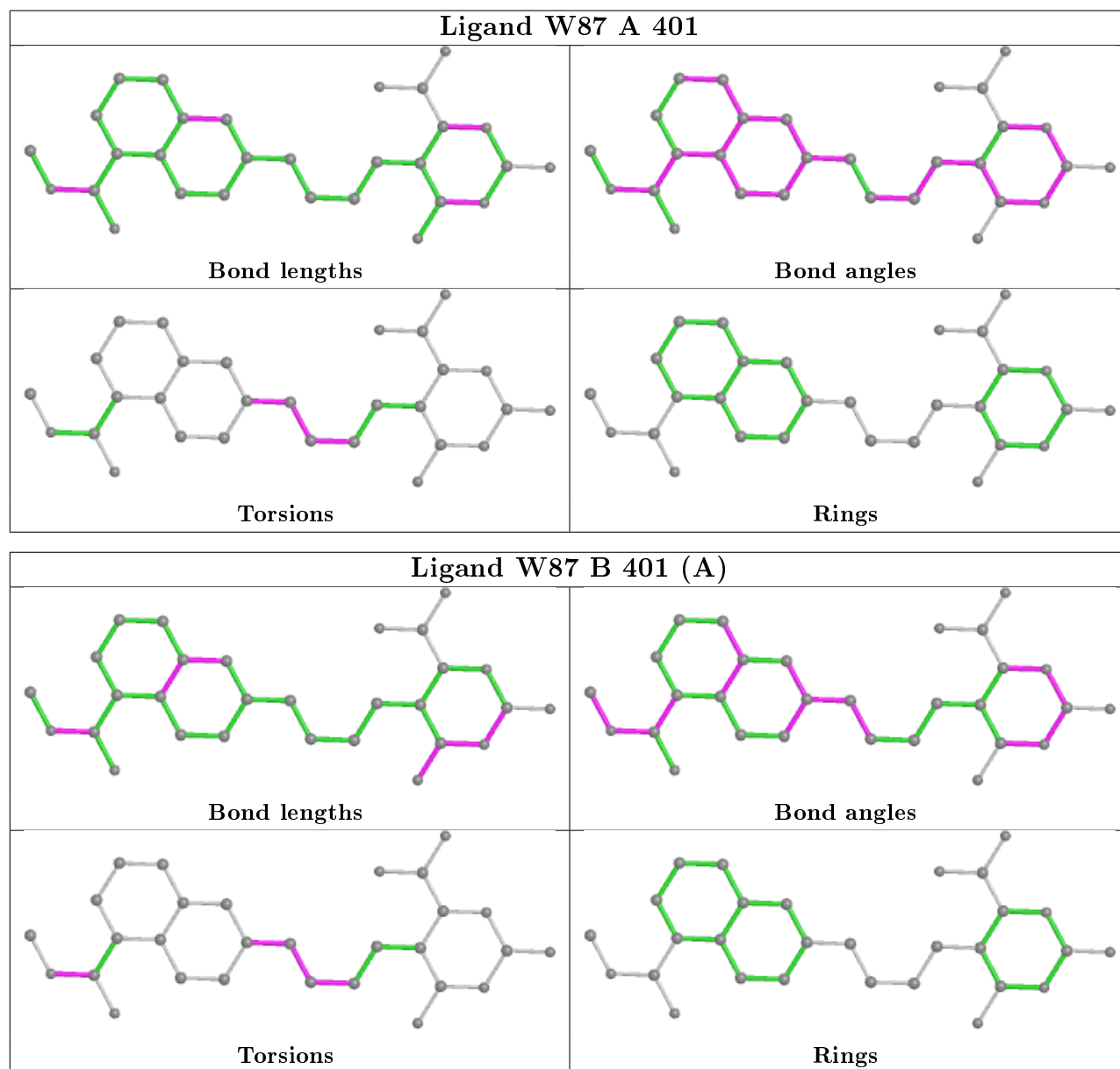
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	415	CAC	1	0
6	A	424	EDO	4	0

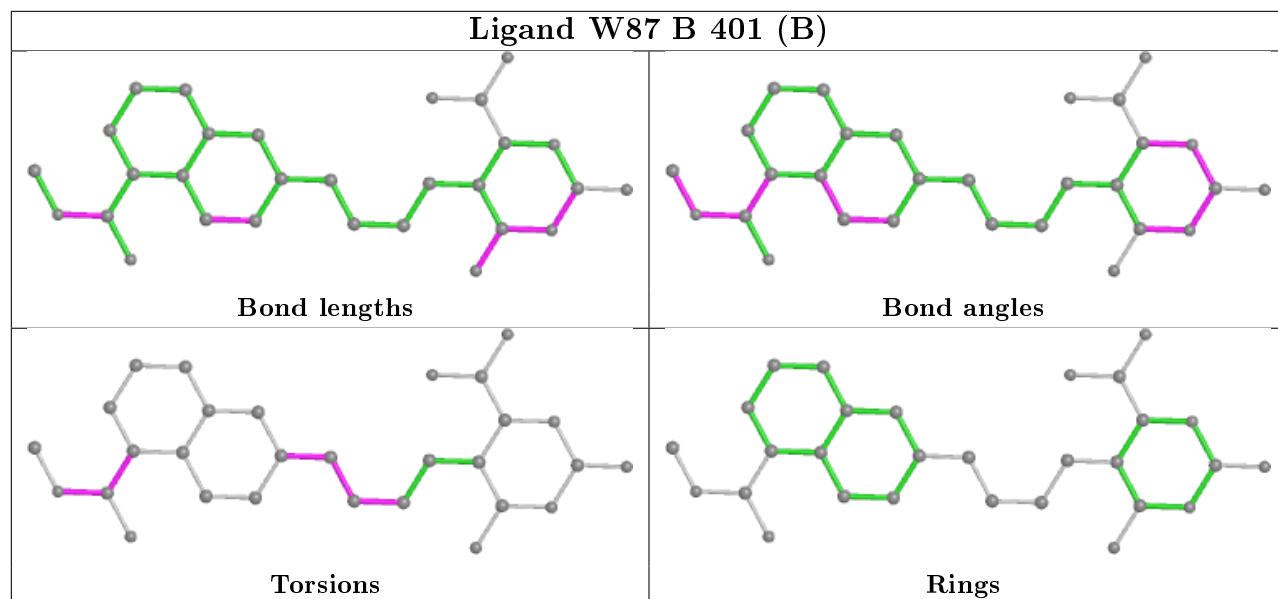
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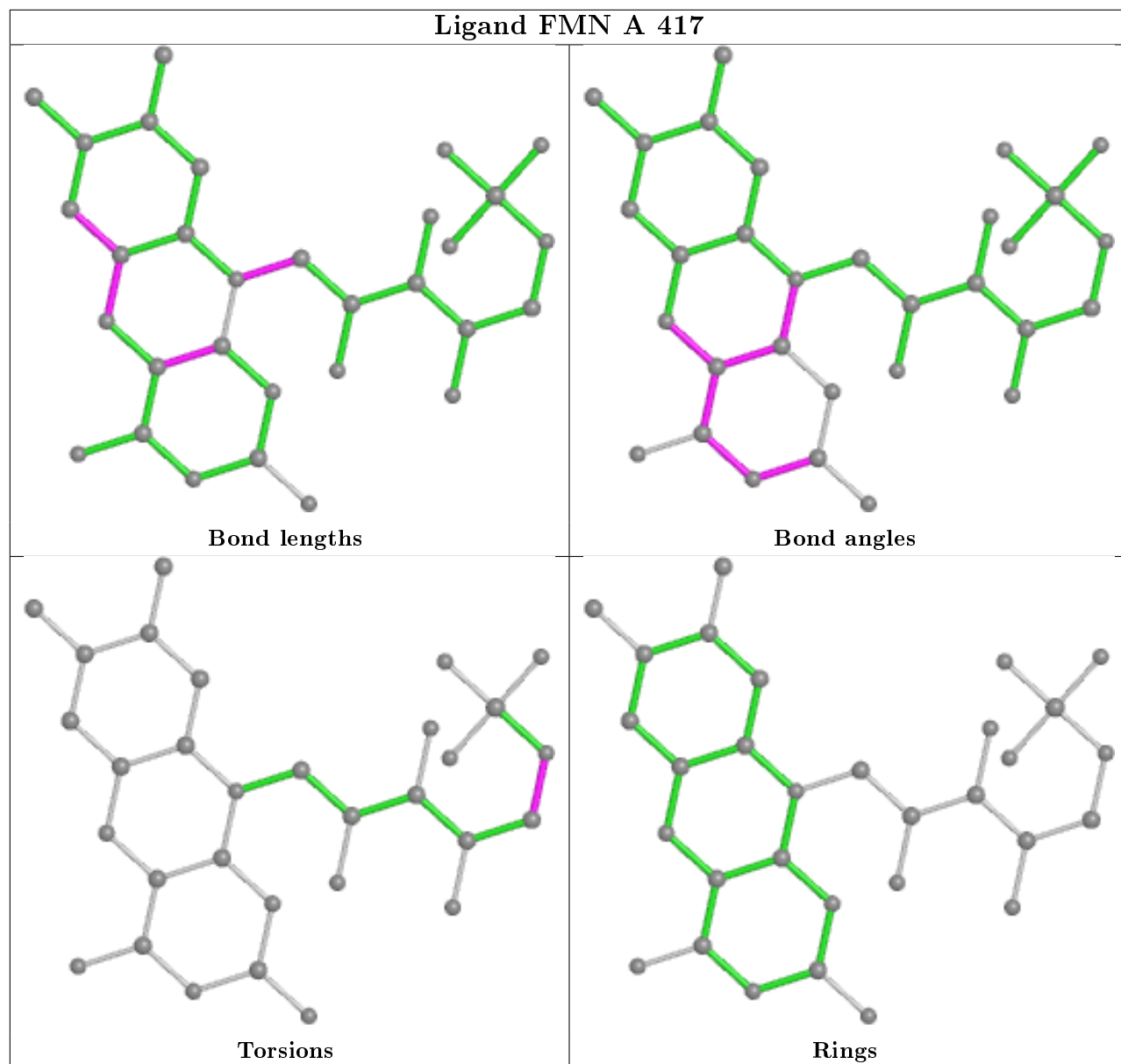
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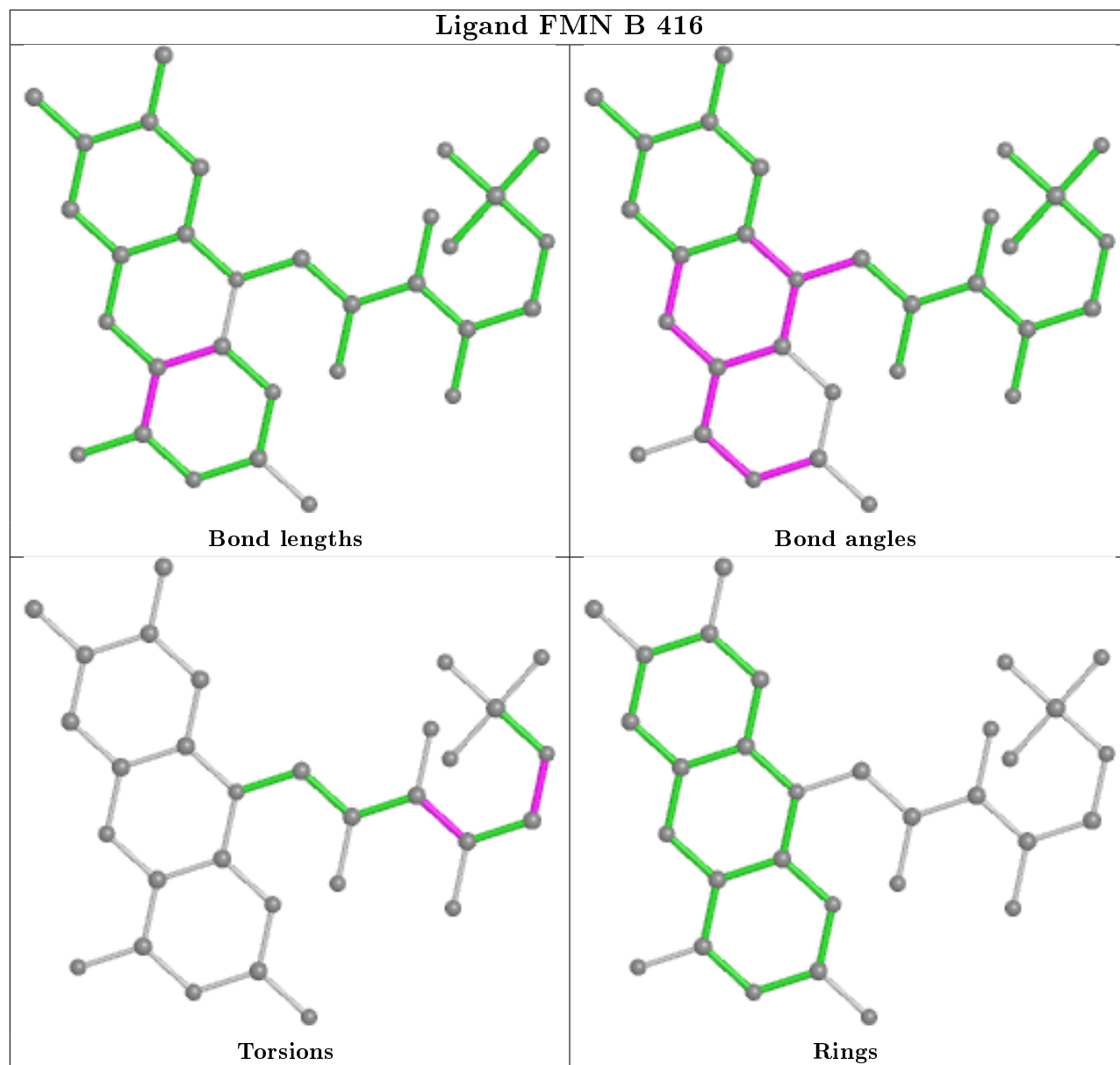
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	433	PEG	16	0
3	A	409	GOL	2	0
6	A	430	EDO	1	0
6	A	431	EDO	8	0
6	B	425	EDO	6	0
3	B	411	GOL	1	0
2	A	401	W87	1	0
7	A	432	PEG	5	0
3	A	403	GOL	1	0
6	B	426	EDO	1	0
6	B	419	EDO	4	0
8	A	434	NCO	4	0
6	A	420	EDO	3	0
3	B	408	GOL	1	0
7	B	427	PEG	8	0
2	B	401[A]	W87	1	0
6	B	420	EDO	4	0
6	A	425	EDO	1	0
2	B	401[B]	W87	2	0
6	A	421	EDO	1	0
3	B	403	GOL	1	0
6	B	422	EDO	4	0
6	A	426	EDO	2	0
3	A	402[A]	GOL	1	0
3	A	411	GOL	3	0
6	A	427	EDO	2	0
6	B	417	EDO	9	0
3	A	413	GOL	1	0
6	A	423	EDO	5	0
3	B	413	GOL	2	0
6	B	423	EDO	3	0
6	B	418	EDO	1	0
3	B	409	GOL	2	0
3	A	414	GOL	2	0
4	A	416	CAC	1	0
3	A	410	GOL	1	0
3	A	406[B]	GOL	1	0
5	A	417	FMN	1	0
6	A	428	EDO	4	0
6	A	418	EDO	3	0
6	B	421	EDO	2	0
3	B	410	GOL	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 [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, 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	314/314 (100%)	-0.21	10 (3%) 47 48	4, 9, 24, 41	0
1	B	314/314 (100%)	-0.39	3 (0%) 82 82	4, 8, 19, 36	0
All	All	628/628 (100%)	-0.30	13 (2%) 63 64	4, 8, 21, 41	0

The worst 5 of 13 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	131	PRO	5.6
1	A	133	VAL	5.4
1	A	-1	SER	5.3
1	A	135	GLY	4.8
1	A	134	PRO	4.7

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 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, 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(\AA^2)	Q<0.9
3	GOL	A	410	6/6	0.40	0.26	50,56,58,62	0
4	CAC	B	415	5/5	0.55	0.36	169,169,169,169	0
3	GOL	B	412	6/6	0.62	0.21	49,50,50,51	0
6	EDO	A	427	4/4	0.63	0.43	39,48,48,52	0
6	EDO	A	419	4/4	0.65	0.13	53,53,54,55	0
6	EDO	A	426	4/4	0.67	0.24	53,54,54,55	0
6	EDO	B	424	4/4	0.68	0.16	47,47,50,51	0
6	EDO	B	422	4/4	0.71	0.25	41,42,43,44	0
3	GOL	A	407	6/6	0.75	0.24	38,51,54,55	0
3	GOL	A	408	6/6	0.76	0.21	29,35,40,48	0
6	EDO	A	425	4/4	0.76	0.24	33,35,37,39	0
3	GOL	B	403	6/6	0.77	0.20	20,34,36,37	0
6	EDO	A	429	4/4	0.78	0.17	51,52,52,53	0
3	GOL	B	405[A]	6/6	0.80	0.18	14,18,18,27	6
3	GOL	B	405[B]	6/6	0.80	0.18	22,28,31,36	6
6	EDO	B	421	4/4	0.80	0.21	33,34,40,41	0
6	EDO	A	431	4/4	0.81	0.14	17,23,29,31	0
3	GOL	B	409	6/6	0.82	0.19	29,35,36,43	0
3	GOL	A	414	6/6	0.82	0.28	33,48,49,52	0
3	GOL	A	412	6/6	0.83	0.29	31,42,44,45	0
3	GOL	B	411	6/6	0.83	0.34	26,32,35,40	0
6	EDO	A	430	4/4	0.83	0.19	30,36,38,40	0
7	PEG	A	433	7/7	0.83	0.23	18,21,32,38	0
6	EDO	B	420	4/4	0.86	0.22	27,31,32,33	0
6	EDO	B	418	4/4	0.86	0.16	35,37,39,41	0
7	PEG	B	427	7/7	0.86	0.22	20,25,26,26	0
3	GOL	A	406[A]	6/6	0.87	0.16	35,37,38,41	6
3	GOL	A	413	6/6	0.87	0.17	29,38,42,43	0
3	GOL	A	405	6/6	0.87	0.19	19,24,29,31	0
3	GOL	B	413	6/6	0.87	0.36	27,46,48,51	0
3	GOL	A	406[B]	6/6	0.87	0.16	16,26,27,28	6
3	GOL	B	406	6/6	0.88	0.15	16,20,21,23	0
3	GOL	A	403	6/6	0.88	0.11	22,22,25,30	0
6	EDO	A	428	4/4	0.88	0.36	34,35,36,37	0
3	GOL	B	408	6/6	0.88	0.20	27,41,42,43	0
6	EDO	B	417	4/4	0.88	0.24	17,23,23,32	0
3	GOL	B	407	6/6	0.88	0.18	28,37,39,48	0
6	EDO	A	418	4/4	0.89	0.23	15,24,30,31	0
6	EDO	A	424	4/4	0.89	0.20	30,30,37,40	0
3	GOL	A	409	6/6	0.89	0.16	23,25,30,38	0
3	GOL	A	404	6/6	0.90	0.16	19,23,33,33	0
3	GOL	A	411	6/6	0.90	0.48	25,41,44,52	0
3	GOL	B	410	6/6	0.90	0.42	20,39,42,43	0

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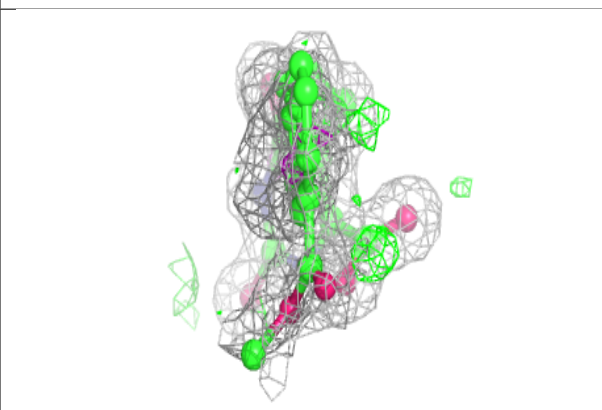
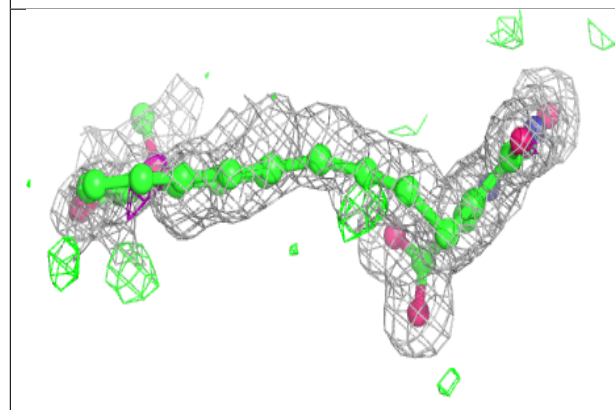
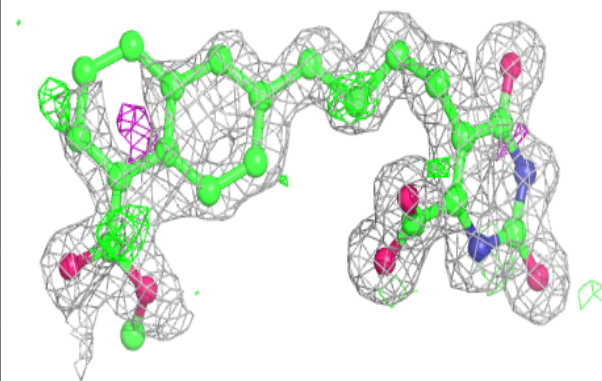
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
6	EDO	A	423	4/4	0.91	0.23	20,27,28,35	0
6	EDO	B	423	4/4	0.91	0.29	22,29,34,35	0
6	EDO	A	422	4/4	0.91	0.13	31,32,36,37	0
3	GOL	B	404	6/6	0.91	0.15	22,23,24,25	0
6	EDO	A	421	4/4	0.92	0.27	22,28,33,34	0
6	EDO	B	426	4/4	0.92	0.20	25,31,33,35	0
4	CAC	A	415	5/5	0.92	0.28	11,18,21,21	0
6	EDO	A	420	4/4	0.93	0.25	27,28,30,35	0
4	CAC	A	416	5/5	0.93	0.41	33,35,43,44	0
6	EDO	B	419	4/4	0.94	0.19	19,20,22,23	0
8	NCO	A	435[B]	7/7	0.94	0.35	14,25,29,30	7
2	W87	B	401[B]	29/29	0.94	0.15	5,9,24,29	29
2	W87	A	401	29/29	0.94	0.12	5,16,32,34	0
8	NCO	A	435[A]	7/7	0.94	0.35	16,26,28,29	7
2	W87	B	401[A]	29/29	0.94	0.15	5,11,27,29	29
6	EDO	B	425	4/4	0.95	0.21	18,21,21,24	0
7	PEG	A	432	7/7	0.95	0.14	11,23,26,30	0
8	NCO	A	434	7/7	0.96	0.31	7,14,18,19	0
3	GOL	A	402[A]	6/6	0.96	0.10	8,9,10,10	6
3	GOL	A	402[B]	6/6	0.96	0.10	8,11,11,11	6
4	CAC	B	414	5/5	0.96	0.20	10,16,19,19	0
3	GOL	B	402	6/6	0.96	0.07	15,15,18,18	0
5	FMN	A	417	31/31	0.99	0.07	3,4,6,6	0
5	FMN	B	416	31/31	0.99	0.08	3,4,6,6	0

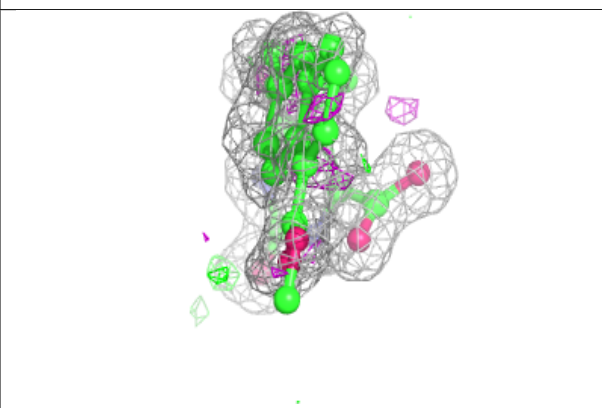
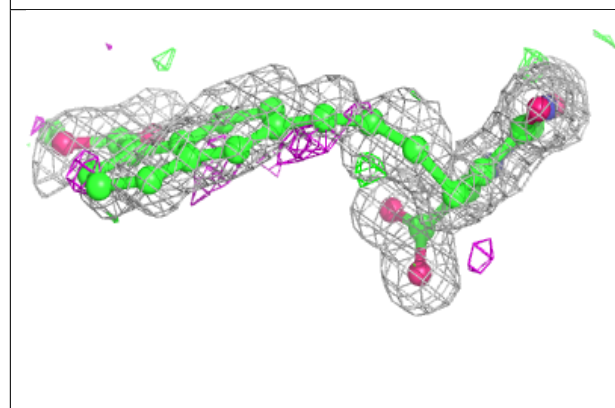
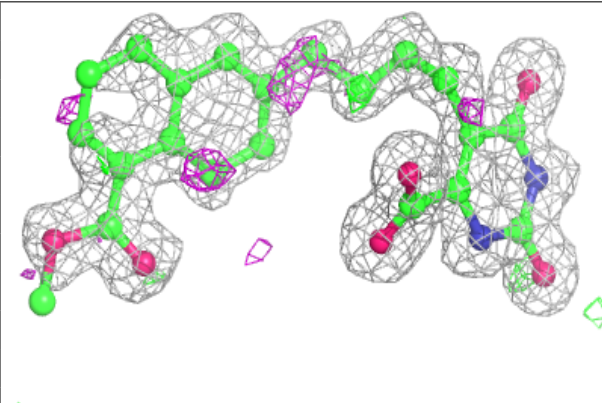
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around W87 B 401 (B):

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

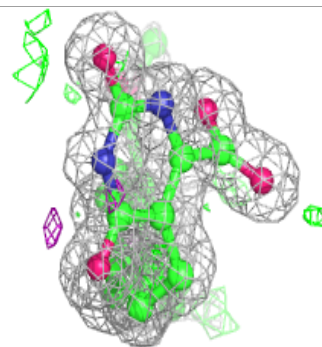
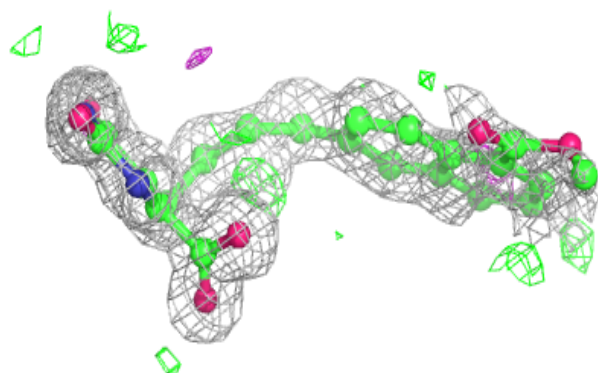
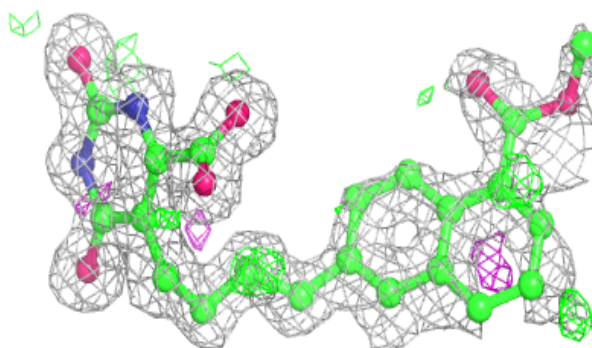
**Electron density around W87 A 401:**

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



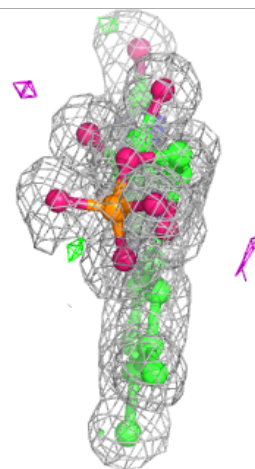
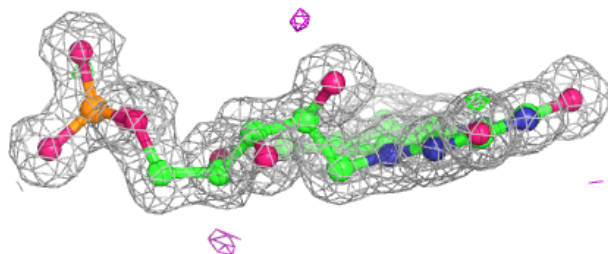
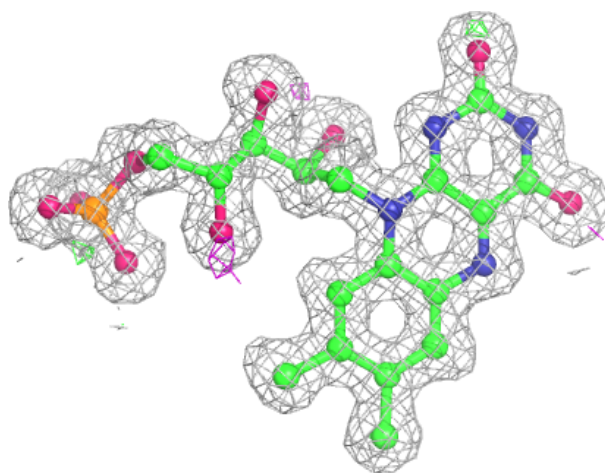
Electron density around W87 B 401 (A):

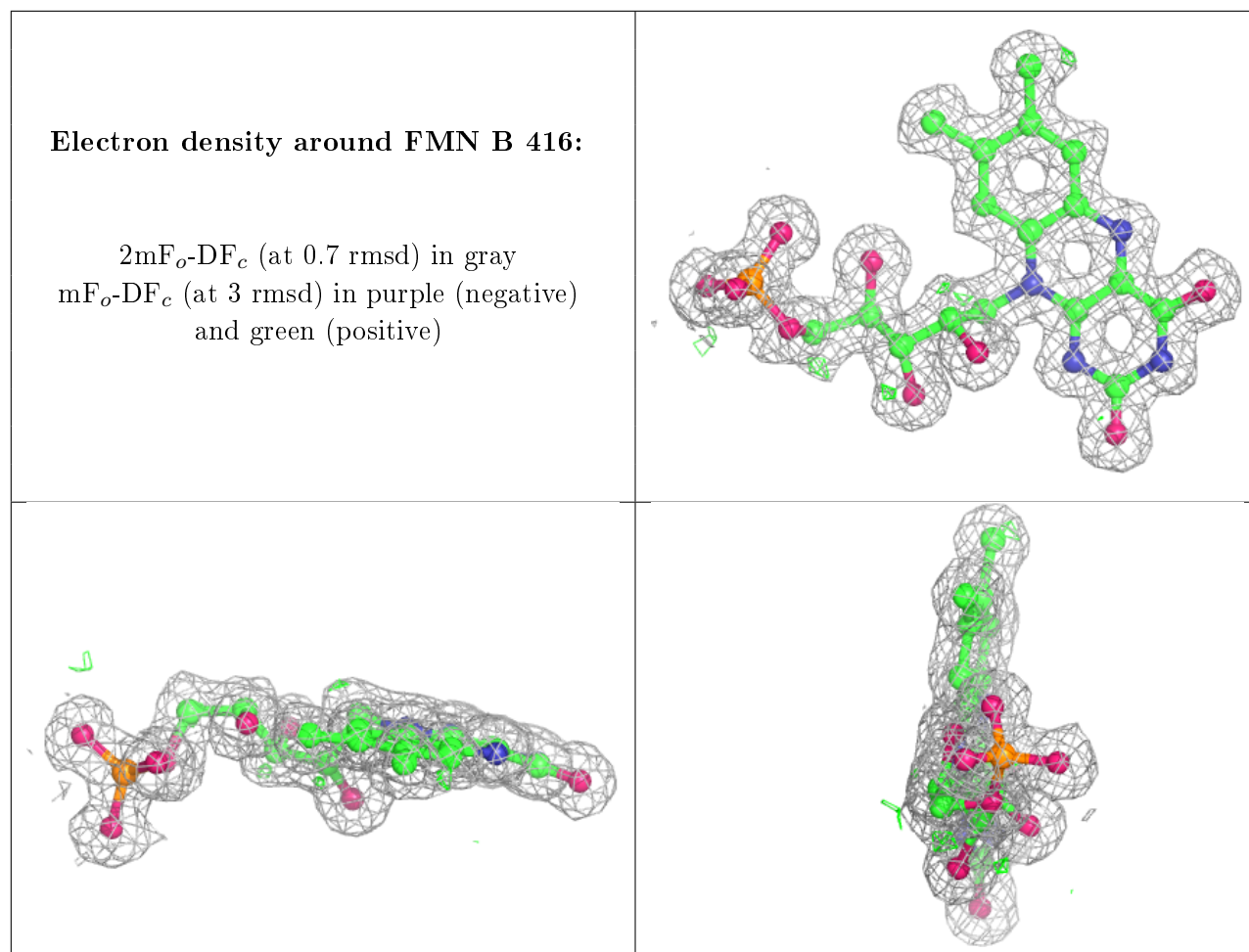
$2mF_o - DF_c$ (at 0.7 rmsd) in gray
 $mF_o - DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around FMN A 417:

$2mF_o-DF_c$ (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.