



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 14, 2026 – 01:23 PM UTC

PDB ID : 6H4T / pdb_00006h4t
Title : Crystal structure of human KDM4A in complex with compound 19a
Authors : Le Bihan, Y.V.; van Montfort, R.L.M.
Deposited on : 2018-07-23
Resolution : 2.38 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

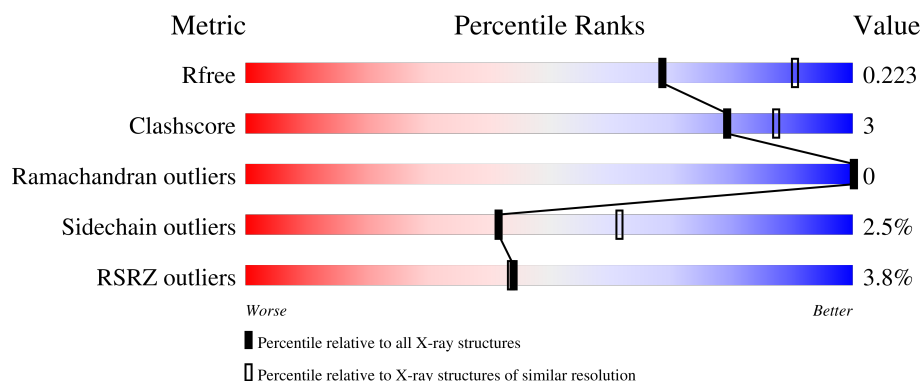
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.38 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	7164 (2.40-2.36)
Clashscore	190562	7722 (2.40-2.36)
Ramachandran outliers	187476	7626 (2.40-2.36)
Sidechain outliers	187428	7627 (2.40-2.36)
RSRZ outliers	180081	7170 (2.40-2.36)

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	360	3% 86% 8% 6%
1	B	360	2% 85% 9% 6%
1	C	360	4% 87% 6% 6%
1	D	360	4% 87% 7% 5%

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 11699 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 Lysine-specific demethylase 4A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	340	Total	C	N	O	S	0	0	0
			2674	1749	429	482	14			
1	B	340	Total	C	N	O	S	0	0	0
			2712	1765	444	489	14			
1	C	338	Total	C	N	O	S	0	3	0
			2672	1741	434	482	15			
1	D	342	Total	C	N	O	S	0	1	0
			2712	1767	439	492	14			

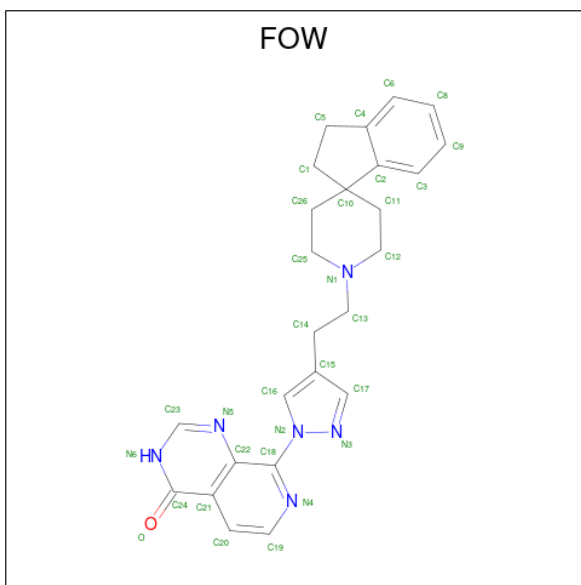
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	expression tag	UNP O75164
B	0	SER	-	expression tag	UNP O75164
C	0	SER	-	expression tag	UNP O75164
D	0	SER	-	expression tag	UNP O75164

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Zn	0	0
			2	2		
2	B	2	Total	Zn	0	0
			2	2		
2	C	2	Total	Zn	0	0
			2	2		
2	D	2	Total	Zn	0	0
			2	2		

- Molecule 3 is 8-[4-(2-spiro[1,2-dihydroindene-3,4'-piperidine]-1'-ylethyl)pyrazol-1-yl]-3 {H}-pyrido[3,4-d]pyrimidin-4-one (CCD ID: FOW) (formula: C₂₅H₂₆N₆O).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			32	25	6	1		
3	B	1	Total	C	N	O	0	0
			32	25	6	1		
3	C	1	Total	C	N	O	0	0
			32	25	6	1		
3	D	1	Total	C	N	O	0	0
			32	25	6	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	1	Total	Cl	0	0
			1	1		
4	C	1	Total	Cl	0	0
			1	1		
4	D	1	Total	Cl	0	0
			1	1		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



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

- Molecule 6 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C_2H_6OS).



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

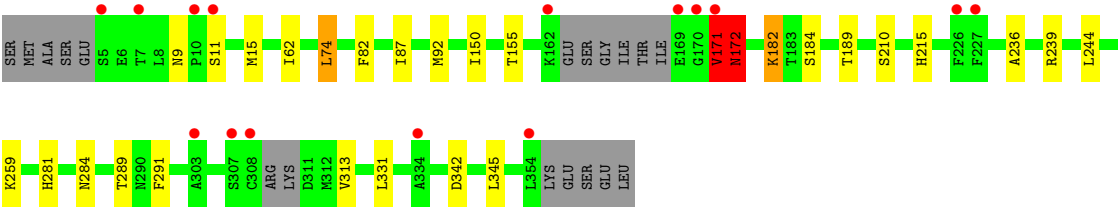
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	D	1	Total 4	C 2	O 1	S 1	0	0
6	D	1	Total 4	C 2	O 1	S 1	0	0
6	D	1	Total 4	C 2	O 1	S 1	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	178	Total 178	O 178	0	0
7	B	242	Total 244	O 244	0	2
7	C	129	Total 133	O 133	0	4
7	D	200	Total 204	O 204	0	4



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	57.86Å 101.81Å 142.68Å 90.00° 99.20° 90.00°	Depositor
Resolution (Å)	43.64 – 2.38 43.64 – 2.38	Depositor EDS
% Data completeness (in resolution range)	100.0 (43.64-2.38) 100.0 (43.64-2.38)	Depositor EDS
R_{merge}	0.26	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.53 (at 2.37Å)	Xtriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.173 , 0.216 0.184 , 0.223	Depositor DCC
R_{free} test set	3335 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å ²)	39.1	Xtriage
Anisotropy	0.125	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 83.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.030 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	11699	wwPDB-VP
Average B, all atoms (Å ²)	50.0	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 22.90 % 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 5.1926e-03. 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: DMS, ZN, FOW, GOL, CL

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	0.85	0/2760	1.28	7/3760 (0.2%)
1	B	0.89	1/2798 (0.0%)	1.26	9/3805 (0.2%)
1	C	0.82	0/2757	1.26	4/3757 (0.1%)
1	D	0.88	0/2797	1.26	8/3807 (0.2%)
All	All	0.86	1/11112 (0.0%)	1.26	28/15129 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	211	VAL	CA-C	5.28	1.56	1.52

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	171	VAL	N-CA-C	9.34	121.87	112.90
1	B	308	CYS	N-CA-C	9.23	124.97	111.96
1	A	308	CYS	N-CA-C	9.21	125.31	112.04
1	B	309	ARG	N-CA-C	7.79	121.53	110.23
1	A	62	ILE	N-CA-C	7.72	119.55	112.29
1	D	62	ILE	N-CA-C	7.07	119.83	112.83
1	A	313	VAL	N-CA-C	6.64	117.60	109.30
1	A	309	ARG	N-CA-C	6.31	119.62	110.28
1	C	184	SER	N-CA-C	6.30	118.75	109.24
1	A	184	SER	N-CA-C	6.25	118.67	109.24
1	C	189	THR	N-CA-C	-6.07	101.22	110.14
1	D	184	SER	N-CA-C	6.04	118.89	109.52
1	C	284	ASN	CA-CB-CG	5.84	118.44	112.60
1	B	189	THR	N-CA-C	-5.77	101.65	110.14
1	D	189	THR	N-CA-C	-5.60	101.90	110.14
1	B	313	VAL	N-CA-C	5.58	116.25	108.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	215	HIS	CA-C-N	5.57	126.27	120.03
1	D	215	HIS	C-N-CA	5.57	126.27	120.03
1	D	172	ASN	N-CA-C	-5.54	105.88	113.30
1	A	189	THR	N-CA-C	-5.53	102.01	110.14
1	B	99	LYS	CA-C-N	5.46	127.52	120.70
1	B	99	LYS	C-N-CA	5.46	127.52	120.70
1	B	305	LEU	N-CA-C	5.46	118.50	110.59
1	D	284	ASN	CA-CB-CG	5.43	118.03	112.60
1	A	307	SER	N-CA-C	5.40	117.25	111.36
1	C	308	CYS	N-CA-C	5.38	126.08	111.00
1	B	153	LEU	N-CA-C	5.38	118.06	111.82
1	B	184	SER	N-CA-C	5.27	117.68	109.52

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	2674	0	2455	11	0
1	B	2712	0	2518	13	0
1	C	2672	0	2417	10	0
1	D	2712	0	2495	20	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
3	A	32	0	0	1	0
3	B	32	0	0	1	0
3	C	32	0	0	1	0
3	D	32	0	0	1	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	B	6	0	8	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	8	0	12	0	0
6	C	4	0	6	1	0
6	D	12	0	18	2	0
7	A	178	0	0	1	0
7	B	244	0	0	1	0
7	C	133	0	0	1	0
7	D	204	0	0	4	0
All	All	11699	0	9929	57	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 (57) 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:126:THR:HB	5:B:404:GOL:H2	1.34	1.07
1:A:150:ILE:HG23	1:A:289:THR:HG22	1.80	0.64
1:D:9:ASN:CG	1:D:15:MET:HE3	2.22	0.62
1:B:158:ASP:HA	1:B:172:ASN:HD21	1.64	0.62
1:A:158:ASP:HA	1:A:172:ASN:HD21	1.65	0.62
1:A:74:LEU:HB3	1:C:74:LEU:HD22	1.86	0.58
1:D:281:HIS:HE1	6:D:405:DMS:H23	1.68	0.58
1:D:150:ILE:HG23	1:D:289:THR:HG22	1.86	0.57
1:B:151:GLY:HA2	1:B:174:PRO:HG3	1.87	0.57
1:C:153:LEU:HD11	1:C:197:ILE:HG21	1.88	0.56
1:D:281:HIS:CE1	6:D:405:DMS:H23	2.41	0.56
1:D:172:ASN:OD1	1:D:172:ASN:N	2.39	0.54
1:D:171:VAL:HG11	1:D:313:VAL:HG11	1.89	0.53
1:A:236:ALA:HB1	1:A:239:ARG:HG3	1.90	0.53
1:D:9:ASN:HB2	1:D:15:MET:CE	2.39	0.53
1:A:332:TRP:HA	1:A:337:ASP:HB2	1.91	0.52
3:C:403:FOW:C16	3:C:403:FOW:N5	2.73	0.52
1:B:100:ILE:HG22	1:B:180:MET:HE1	1.92	0.51
1:D:259:LYS:HB2	7:D:638:HOH:O	2.11	0.50
1:A:191:ASP:HB3	1:A:313:VAL:HB	1.95	0.49
3:B:403:FOW:N5	3:B:403:FOW:C16	2.76	0.48
1:D:182:LYS:HE3	7:D:601:HOH:O	2.14	0.48
3:D:403:FOW:C16	3:D:403:FOW:N5	2.77	0.48
1:A:141:TYR:CE2	1:A:149:ASN:HA	2.50	0.47
1:D:9:ASN:HB2	1:D:15:MET:HE3	1.96	0.47
1:D:236:ALA:HB1	1:D:239:ARG:HG3	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:155:THR:HG21	1:A:291:PHE:HB2	1.96	0.46
1:D:155:THR:HG21	1:D:291:PHE:HB2	1.96	0.46
3:A:403:FOW:N5	3:A:403:FOW:C16	2.79	0.45
1:A:259:LYS:HB2	7:A:565:HOH:O	2.16	0.45
1:B:236:ALA:HB1	1:B:239:ARG:HG3	1.99	0.44
1:C:342:ASP:HB3	1:C:345:LEU:HD12	1.99	0.44
1:C:150:ILE:HG22	1:C:174:PRO:HB3	2.00	0.44
1:D:210:SER:HB2	7:D:525:HOH:O	2.18	0.44
1:D:92:MET:HE2	7:D:507:HOH:O	2.17	0.43
1:B:342:ASP:HB3	1:B:345:LEU:HD12	1.99	0.43
1:D:171:VAL:HG13	1:D:313:VAL:HG21	2.00	0.43
1:D:74:LEU:HD13	1:D:87:ILE:HD12	1.99	0.43
1:C:82:PHE:HB2	1:C:244[A]:LEU:HB2	2.00	0.43
1:B:186:ALA:HA	1:B:244:LEU:HD23	2.00	0.43
1:B:312:MET:CB	7:B:698:HOH:O	2.67	0.43
1:C:333:LYS:HA	6:C:405:DMS:H22	1.99	0.43
1:C:182:LYS:HE3	7:C:559:HOH:O	2.18	0.42
1:C:236:ALA:HB1	1:C:239:ARG:HG3	2.02	0.42
1:D:9:ASN:CB	1:D:15:MET:HE3	2.49	0.42
1:A:342:ASP:HB3	1:A:345:LEU:HD12	2.01	0.42
1:C:74:LEU:HD13	1:C:87:ILE:HD12	2.01	0.41
1:B:79:SER:O	1:B:249:MET:HE3	2.20	0.41
1:B:201:HIS:HE2	1:B:287:GLU:HB2	1.85	0.41
1:A:30:TYR:O	1:A:34:ILE:HG23	2.20	0.41
1:B:150:ILE:HG23	1:B:289:THR:HG22	2.03	0.41
1:D:342:ASP:HB3	1:D:345:LEU:HD12	2.03	0.40
1:B:63:ASP:CG	1:B:98:ARG:HH22	2.29	0.40
1:D:9:ASN:HB2	1:D:15:MET:HE1	2.02	0.40
1:B:82:PHE:HB2	1:B:244:LEU:HB2	2.02	0.40
1:D:82:PHE:HB2	1:D:244:LEU:HB2	2.03	0.40
1:C:308:CYS:SG	1:C:309:ARG:N	2.94	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	336/360 (93%)	330 (98%)	6 (2%)	0	100	100
1	B	336/360 (93%)	329 (98%)	7 (2%)	0	100	100
1	C	335/360 (93%)	326 (97%)	9 (3%)	0	100	100
1	D	337/360 (94%)	332 (98%)	5 (2%)	0	100	100
All	All	1344/1440 (93%)	1317 (98%)	27 (2%)	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	259/316 (82%)	253 (98%)	6 (2%)	44	64
1	B	267/316 (84%)	263 (98%)	4 (2%)	57	75
1	C	254/316 (80%)	243 (96%)	11 (4%)	26	41
1	D	266/316 (84%)	259 (97%)	7 (3%)	40	60
All	All	1046/1264 (83%)	1018 (97%)	28 (3%)	42	59

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	60	ASP
1	A	152	ARG
1	A	182	LYS
1	A	184	SER
1	A	289	THR
1	A	327	GLU
1	B	74	LEU
1	B	182	LYS
1	B	184	SER
1	B	307	SER

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Mol	Chain	Res	Type
1	C	11[A]	SER
1	C	11[B]	SER
1	C	74	LEU
1	C	156	ILE
1	C	159	LEU
1	C	163	GLU
1	C	182	LYS
1	C	184	SER
1	C	289	THR
1	C	307	SER
1	C	327	GLU
1	D	11[A]	SER
1	D	11[B]	SER
1	D	74	LEU
1	D	171	VAL
1	D	172	ASN
1	D	182	LYS
1	D	331	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	37	GLN
1	A	84	GLN
1	A	86	ASN
1	A	128	ASN
1	A	172	ASN
1	B	84	GLN
1	B	172	ASN
1	B	215	HIS
1	C	128	ASN
1	C	144	HIS
1	D	144	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 23 ligands modelled in this entry, 12 are monoatomic - leaving 11 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$
3	FOW	B	403	2	36,37,37	0.74	1 (2%)	46,54,54	0.75	1 (2%)
6	DMS	B	406	-	3,3,3	0.23	0	3,3,3	0.13	0
5	GOL	B	404	-	5,5,5	0.15	0	5,5,5	0.62	0
3	FOW	C	403	2	36,37,37	0.53	1 (2%)	46,54,54	0.72	1 (2%)
6	DMS	D	407	-	3,3,3	0.33	0	3,3,3	0.44	0
6	DMS	B	407	-	3,3,3	0.23	0	3,3,3	0.40	0
3	FOW	A	403	2	36,37,37	0.54	1 (2%)	46,54,54	0.70	1 (2%)
6	DMS	C	405	-	3,3,3	0.30	0	3,3,3	0.31	0
3	FOW	D	403	2	36,37,37	0.63	1 (2%)	46,54,54	0.70	1 (2%)
6	DMS	D	406	-	3,3,3	0.30	0	3,3,3	0.23	0
6	DMS	D	405	-	3,3,3	0.23	0	3,3,3	0.71	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	FOW	B	403	2	-	4/9/33/33	0/6/6/6
5	GOL	B	404	-	-	0/4/4/4	-
3	FOW	C	403	2	-	4/9/33/33	0/6/6/6

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	FOW	A	403	2	-	4/9/33/33	0/6/6/6
3	FOW	D	403	2	-	5/9/33/33	0/6/6/6

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	403	FOW	C24-N6	-3.35	1.32	1.38
3	D	403	FOW	C24-N6	-2.92	1.32	1.38
3	C	403	FOW	C24-N6	-2.38	1.33	1.38
3	A	403	FOW	C24-N6	-2.07	1.34	1.38

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	403	FOW	C22-C18-N4	3.31	125.41	118.55
3	B	403	FOW	C22-C18-N4	3.00	124.77	118.55
3	D	403	FOW	C22-C18-N4	2.73	124.22	118.55
3	A	403	FOW	C22-C18-N4	2.61	123.96	118.55

There are no chirality outliers.

All (17) torsion outliers are listed below:

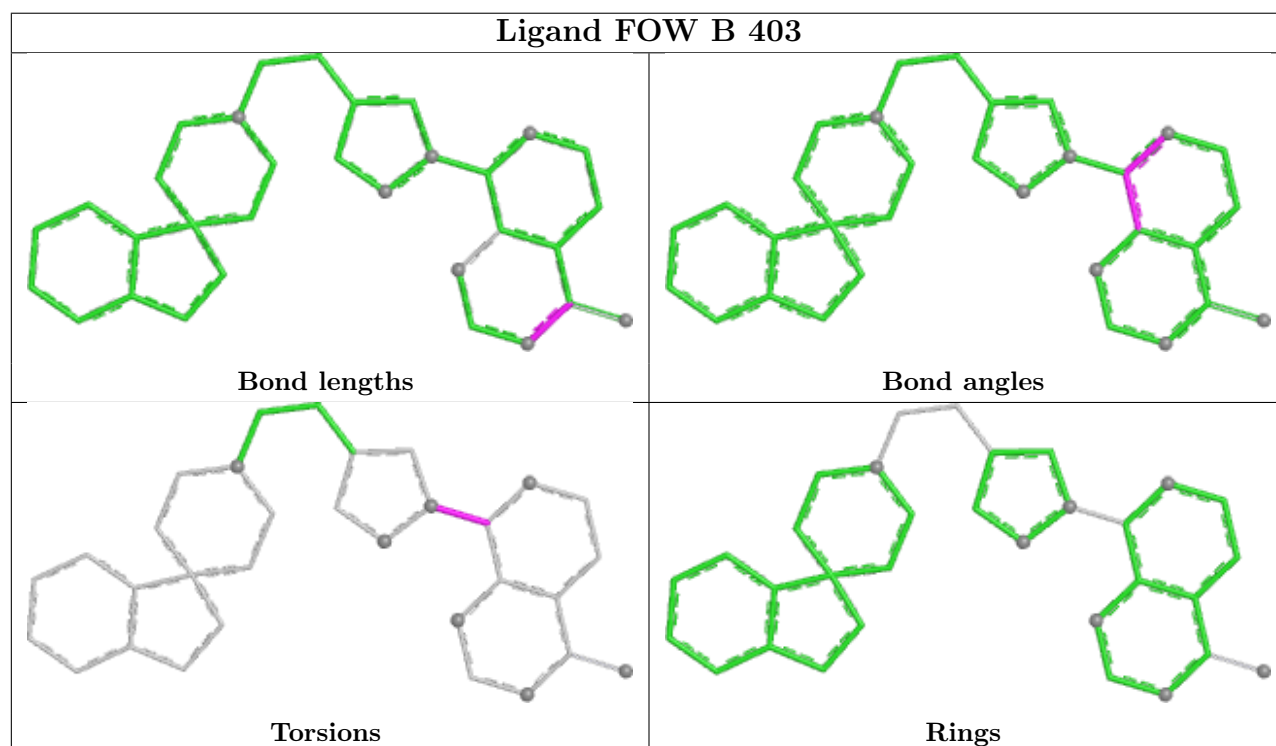
Mol	Chain	Res	Type	Atoms
3	A	403	FOW	C22-C18-N2-N3
3	A	403	FOW	N4-C18-N2-N3
3	B	403	FOW	C22-C18-N2-N3
3	B	403	FOW	N4-C18-N2-N3
3	C	403	FOW	C22-C18-N2-N3
3	C	403	FOW	N4-C18-N2-N3
3	D	403	FOW	C22-C18-N2-N3
3	D	403	FOW	N4-C18-N2-N3
3	A	403	FOW	N4-C18-N2-C16
3	B	403	FOW	N4-C18-N2-C16
3	C	403	FOW	N4-C18-N2-C16
3	D	403	FOW	N4-C18-N2-C16
3	A	403	FOW	C22-C18-N2-C16
3	B	403	FOW	C22-C18-N2-C16
3	C	403	FOW	C22-C18-N2-C16
3	D	403	FOW	C22-C18-N2-C16
3	D	403	FOW	C14-C13-N1-C25

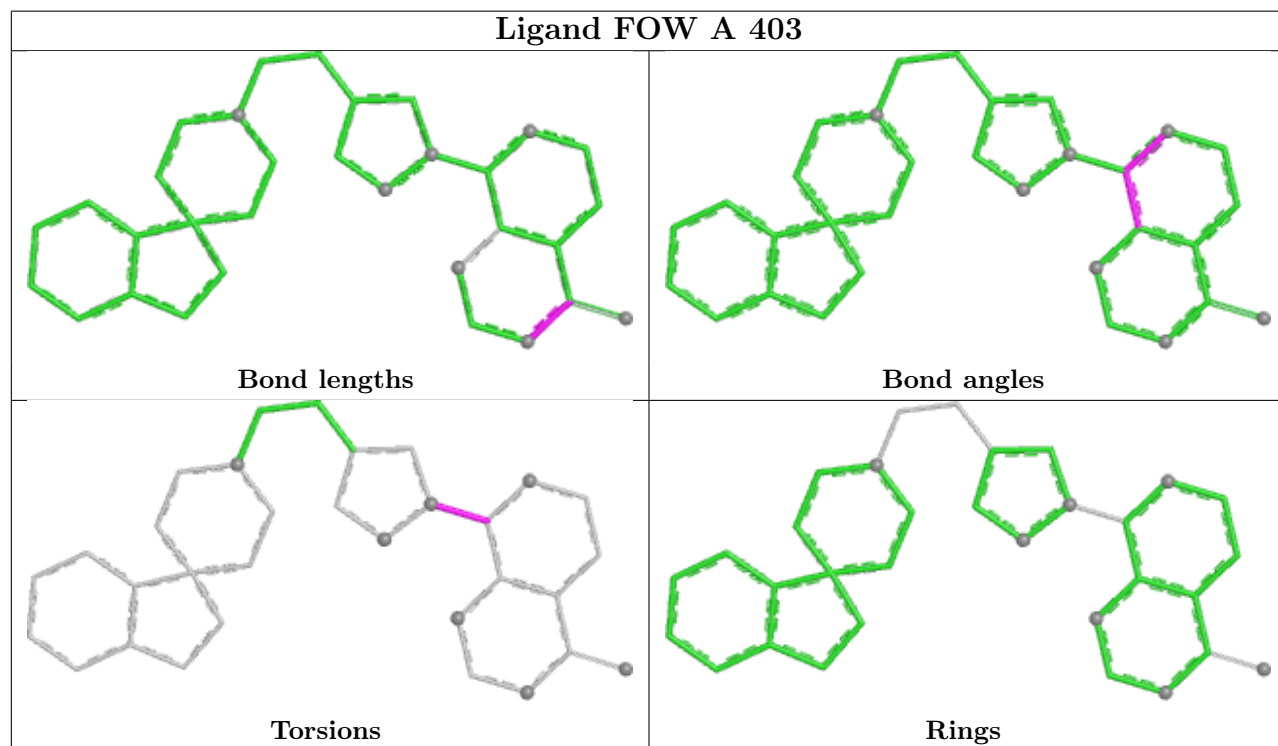
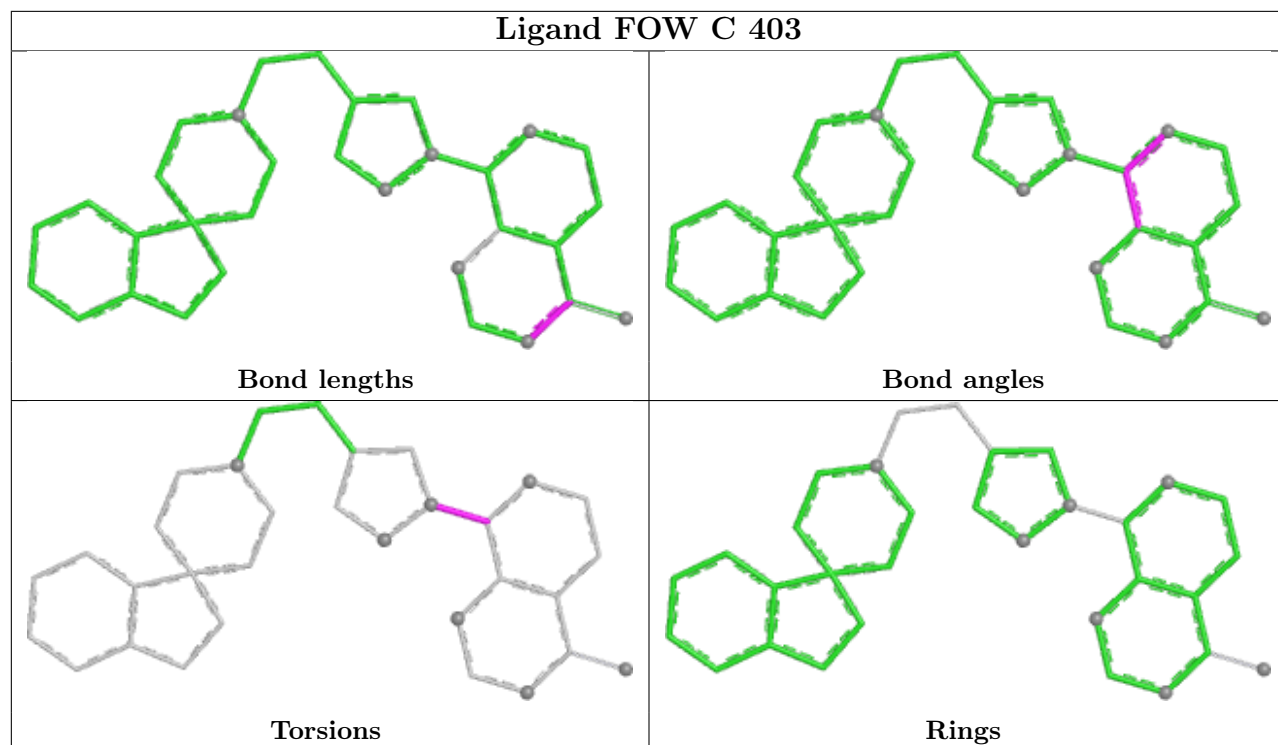
There are no ring outliers.

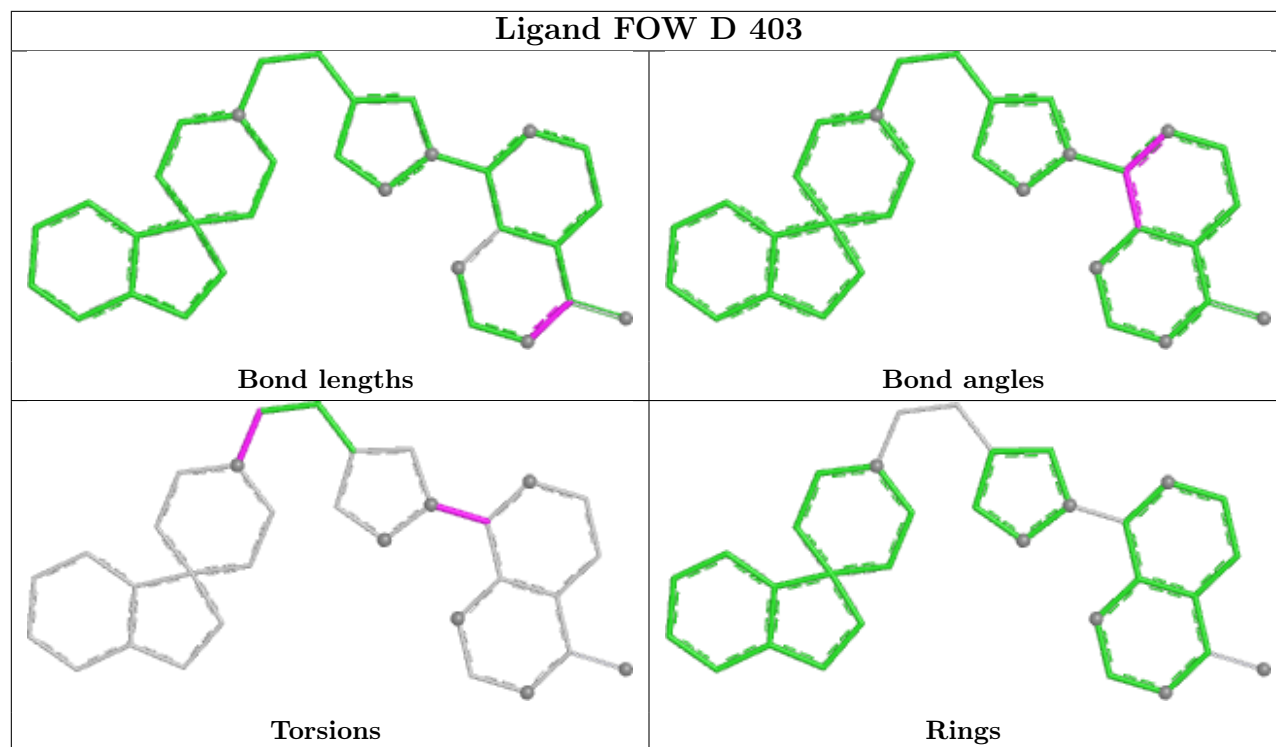
7 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	403	FOW	1	0
5	B	404	GOL	1	0
3	C	403	FOW	1	0
3	A	403	FOW	1	0
6	C	405	DMS	1	0
3	D	403	FOW	1	0
6	D	405	DMS	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	340/360 (94%)	-0.02	11 (3%) 50 50	27, 47, 92, 107	0
1	B	340/360 (94%)	-0.31	9 (2%) 57 56	22, 38, 67, 105	1 (0%)
1	C	338/360 (93%)	0.24	16 (4%) 36 36	19, 55, 102, 127	3 (0%)
1	D	342/360 (95%)	0.01	15 (4%) 39 38	22, 48, 89, 112	2 (0%)
All	All	1360/1440 (94%)	-0.02	51 (3%) 44 44	19, 46, 92, 127	6 (0%)

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	11[A]	SER	4.4
1	C	164	SER	4.1
1	C	104	ASP	3.9
1	B	7	THR	3.9
1	A	161	GLU	3.6
1	D	171	VAL	3.6
1	C	354	LEU	3.5
1	D	5	SER	3.3
1	D	308	CYS	3.3
1	D	162	LYS	3.2
1	B	170	GLY	3.1
1	D	170	GLY	3.0
1	A	312	MET	3.0
1	D	10	PRO	2.9
1	A	311	ASP	2.9
1	D	226	PHE	2.9
1	B	160	VAL	2.9
1	C	169	GLU	2.9
1	B	171	VAL	2.8
1	C	313	VAL	2.8
1	C	170	GLY	2.8

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Mol	Chain	Res	Type	RSRZ
1	D	354	LEU	2.8
1	C	171	VAL	2.8
1	D	7	THR	2.7
1	C	309	ARG	2.6
1	A	7	THR	2.6
1	D	11[A]	SER	2.6
1	C	162	LYS	2.6
1	D	227	PHE	2.5
1	C	10	PRO	2.4
1	D	169	GLU	2.4
1	B	311	ASP	2.3
1	B	354	LEU	2.3
1	A	232	GLN	2.3
1	C	227	PHE	2.3
1	D	303	ALA	2.3
1	A	303	ALA	2.2
1	B	8	LEU	2.2
1	A	8	LEU	2.2
1	A	235	GLU	2.1
1	B	312	MET	2.1
1	A	329	TYR	2.1
1	B	338	ASN	2.1
1	C	319	VAL	2.1
1	A	309	ARG	2.1
1	D	334	ALA	2.1
1	A	338	ASN	2.1
1	C	105	LYS	2.0
1	D	307	SER	2.0
1	C	12	ALA	2.0
1	C	329	TYR	2.0

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

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

6.3 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands

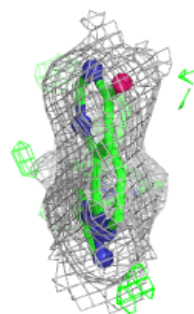
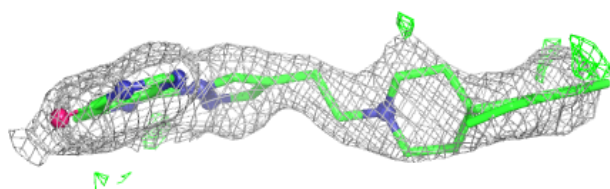
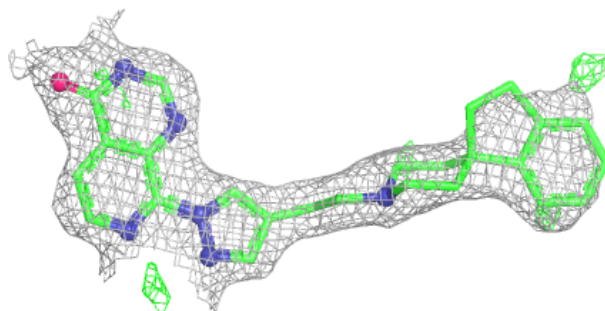
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	DMS	C	405	4/4	0.69	0.16	127,127,128,128	0
6	DMS	D	407	4/4	0.76	0.19	80,81,81,82	4
6	DMS	B	406	4/4	0.78	0.20	61,62,63,63	4
6	DMS	B	407	4/4	0.78	0.25	64,64,64,65	4
6	DMS	D	406	4/4	0.85	0.19	60,61,62,63	4
6	DMS	D	405	4/4	0.86	0.20	62,62,62,65	4
4	CL	A	404	1/1	0.90	0.11	73,73,73,73	0
4	CL	B	405	1/1	0.90	0.15	72,72,72,72	0
4	CL	D	404	1/1	0.90	0.15	90,90,90,90	0
4	CL	C	404	1/1	0.91	0.12	71,71,71,71	0
3	FOW	C	403	32/32	0.93	0.10	32,44,67,68	32
3	FOW	A	403	32/32	0.94	0.10	33,38,46,46	32
3	FOW	D	403	32/32	0.94	0.09	29,41,60,61	32
5	GOL	B	404	6/6	0.95	0.09	11,16,17,21	6
3	FOW	B	403	32/32	0.96	0.08	17,28,41,42	32
2	ZN	C	402	1/1	0.96	0.06	68,68,68,68	1
2	ZN	A	401	1/1	0.98	0.07	50,50,50,50	0
2	ZN	D	402	1/1	0.99	0.04	46,46,46,46	1
2	ZN	C	401	1/1	0.99	0.05	48,48,48,48	0
2	ZN	B	401	1/1	0.99	0.04	37,37,37,37	0
2	ZN	D	401	1/1	0.99	0.03	44,44,44,44	0
2	ZN	B	402	1/1	1.00	0.03	38,38,38,38	1
2	ZN	A	402	1/1	1.00	0.05	43,43,43,43	1

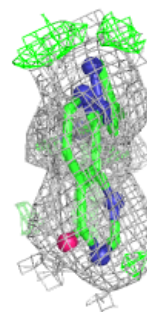
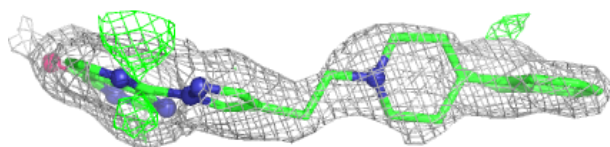
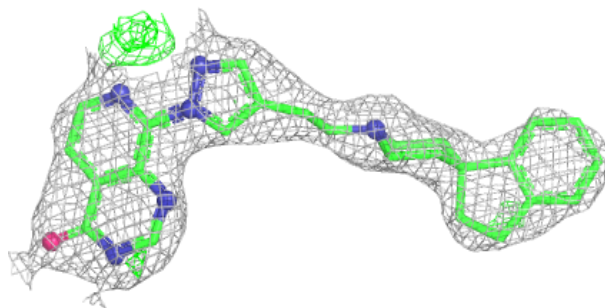
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around FOW C 403:

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

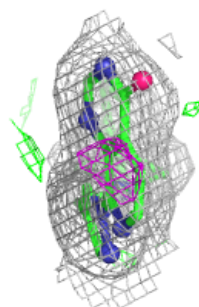
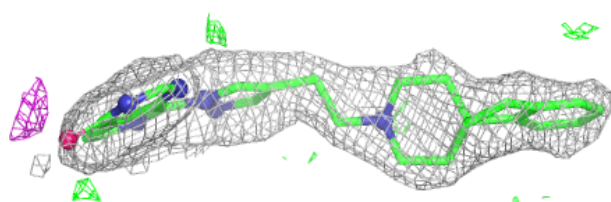
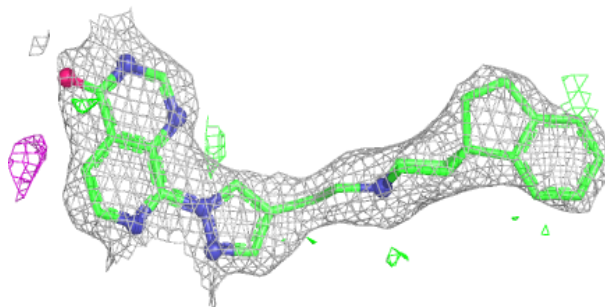
**Electron density around FOW A 403:**

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

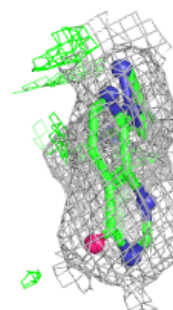
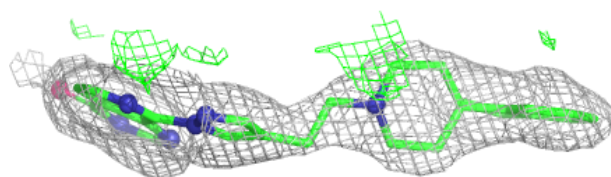
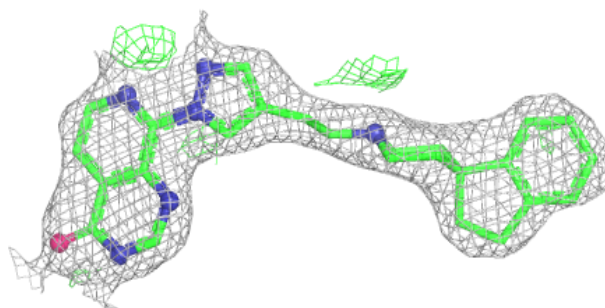


Electron density around FOW D 403:

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

**Electron density around FOW B 403:**

$2mF_o-DF_c$ (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.