



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 12:21 PM UTC

PDB ID : 4DKR / pdb_00004dkr
Title : Crystal structure of clade A/E 93TH057 HIV-1 gp120 core in complex with AWS-I-169
Authors : Kwon, Y.D.; LaLonde, J.M.; Jones, D.M.; Sun, A.W.; Courter, J.R.; Soeta, T.; Kobayashi, T.; Princiotta, A.M.; Wu, X.; Mascola, J.; Schon, A.; Freire, E.; Sodroski, J.; Madani, N.; Smith III, A.B.; Kwong, P.D.
Deposited on : 2012-02-03
Resolution : 1.80 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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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](#) ①) 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

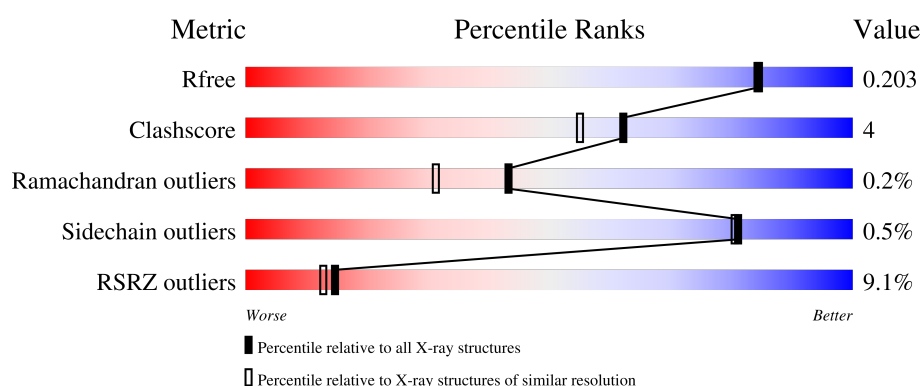
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.80 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	7662 (1.80-1.80)
Clashscore	190562	8479 (1.80-1.80)
Ramachandran outliers	187476	8391 (1.80-1.80)
Sidechain outliers	187428	8390 (1.80-1.80)
RSRZ outliers	180081	7663 (1.80-1.80)

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	353	
1	C	353	

2 Entry composition [i](#)

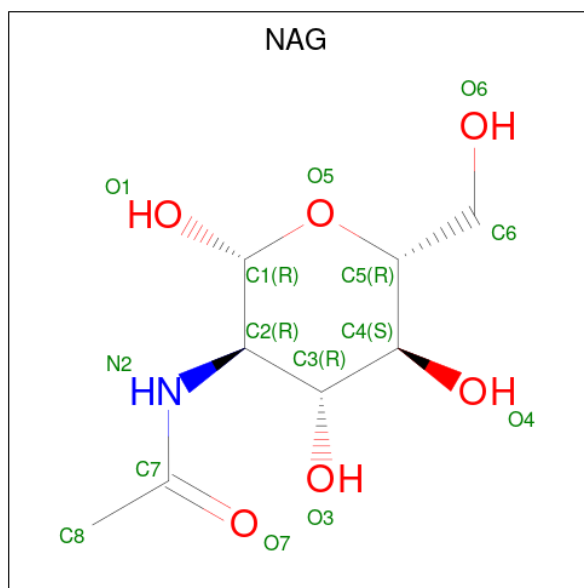
There are 5 unique types of molecules in this entry. The entry contains 6143 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 HIV-1 gp120 core.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	339	Total	C	N	O	S	0	0	0
			2654	1666	460	507	21			
1	C	339	Total	C	N	O	S	0	0	0
			2654	1666	460	507	21			

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		

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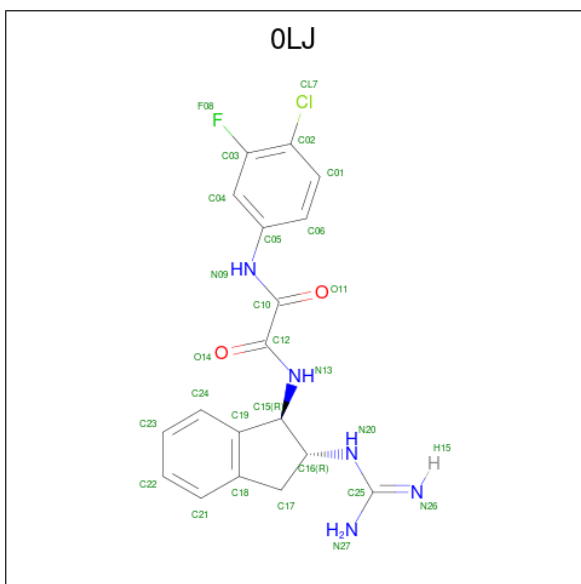
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 3 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (CCD ID: EPE) (formula: C₈H₁₈N₂O₄S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			15	8	2	4	1		
3	C	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

- Molecule 4 is N-[(1R,2R)-2-carbamimidamido-2,3-dihydro-1H-inden-1-yl]-N'-(4-chloro-3-fluorophenyl)ethanediamide (CCD ID: 0LJ) (formula: C₁₈H₁₇ClFN₅O₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
4	A	1	Total	C	Cl	F	N	O	0	0
			27	18	1	1	5	2		

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
4	C	1	Total	C	Cl	F	N	O	0	0
			27	18	1	1	5	2		

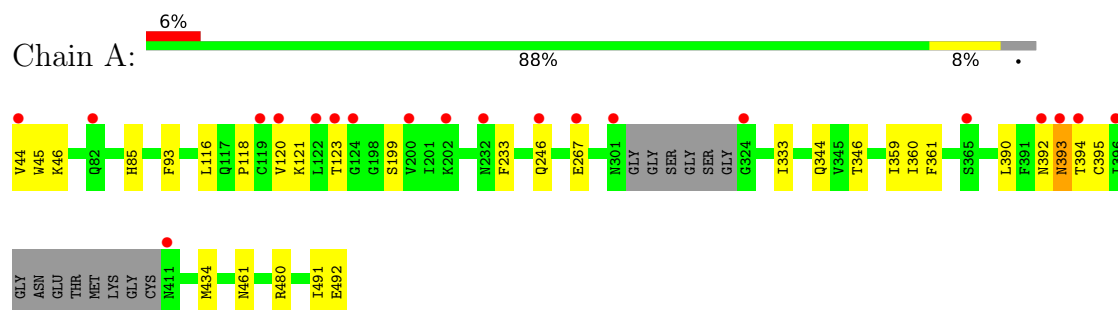
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	298	Total	O	0	0
			298	298		
5	C	145	Total	O	0	0
			145	145		

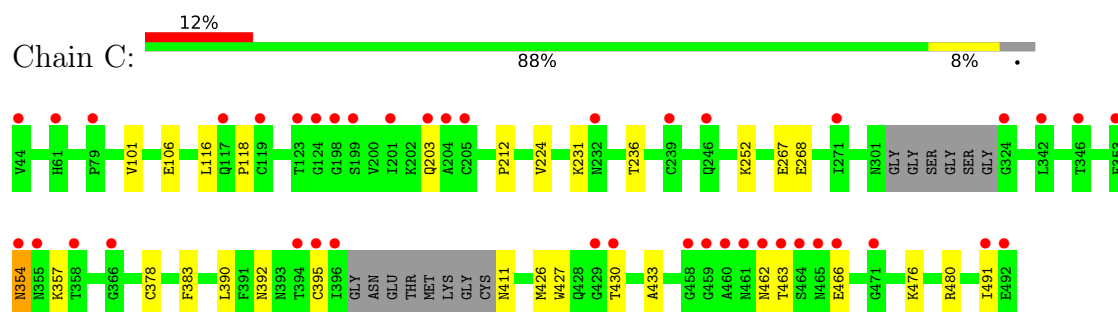
3 Residue-property plots [i](#)

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: HIV-1 gp120 core



• Molecule 1: HIV-1 gp120 core



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	65.44Å 68.60Å 94.54Å 90.00° 91.38° 90.00°	Depositor
Resolution (Å)	33.74 – 1.80 33.74 – 1.80	Depositor EDS
% Data completeness (in resolution range)	93.5 (33.74-1.80) 89.1 (33.74-1.80)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.53 (at 1.70Å)	Xtriage
Refinement program	PHENIX 1.7.3_928	Depositor
R, R_{free}	0.190 , 0.208 0.189 , 0.203	Depositor DCC
R_{free} test set	3949 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	27.6	Xtriage
Anisotropy	0.204	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 47.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.015 for -k,-h,-l 0.016 for k,h,-l 0.027 for h,-k,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	6143	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.96% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, 0LJ, EPE

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	0.27	0/2709	0.65	0/3678
1	C	0.32	1/2709 (0.0%)	0.67	1/3678 (0.0%)
All	All	0.29	1/5418 (0.0%)	0.66	1/7356 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	354	ASN	C-N	-6.75	1.24	1.33

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	354	ASN	O-C-N	5.78	129.97	122.86

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	2654	0	2589	25	0
1	C	2654	0	2589	20	0
2	A	154	0	143	1	0
2	C	154	0	143	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	15	0	17	0	0
3	C	15	0	17	0	0
4	A	27	0	16	1	0
4	C	27	0	16	1	0
5	A	298	0	0	7	0
5	C	145	0	0	4	1
All	All	6143	0	5530	46	1

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 4.

All (46) 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:A:480:ARG:NH2	5:A:850:HOH:O	2.00	0.92
1:A:361:PHE:N	1:A:393:ASN:HD21	1.80	0.80
1:A:461:ASN:ND2	5:A:891:HOH:O	2.10	0.78
1:A:361:PHE:O	1:A:393:ASN:ND2	2.20	0.75
1:C:106:GLU:OE1	5:C:640:HOH:O	2.08	0.72
1:A:344:GLN:OE1	5:A:657:HOH:O	2.07	0.71
1:A:346:THR:HG23	1:A:359:ILE:HB	1.78	0.64
1:A:361:PHE:H	1:A:393:ASN:HD21	1.46	0.61
1:A:392:ASN:O	1:A:394:THR:N	2.34	0.60
1:C:118:PRO:O	1:C:203:GLN:NE2	2.35	0.59
1:A:361:PHE:H	1:A:393:ASN:ND2	2.03	0.56
1:C:236:THR:OG1	5:C:722:HOH:O	2.16	0.56
1:C:231:LYS:NZ	1:C:267:GLU:OE2	2.40	0.55
1:A:120:VAL:HG22	1:A:434:MET:HB3	1.88	0.55
1:C:212:PRO:O	1:C:252:LYS:HE2	2.07	0.55
1:C:426:MET:HE3	1:C:433:ALA:HB2	1.91	0.52
1:C:392:ASN:HB3	1:C:395:CYS:SG	2.50	0.51
1:C:354:ASN:ND2	5:C:742:HOH:O	2.42	0.51
1:A:267:GLU:H	1:A:267:GLU:CD	2.19	0.51
1:C:466:GLU:OE1	5:C:733:HOH:O	2.19	0.50
1:A:392:ASN:C	1:A:394:THR:H	2.20	0.49
1:A:395:CYS:SG	5:A:636:HOH:O	2.60	0.49
1:A:46:LYS:NZ	5:A:801:HOH:O	2.43	0.49
1:C:101:VAL:HG21	1:C:480:ARG:HG2	1.95	0.48
1:C:426:MET:SD	1:C:430:THR:OG1	2.70	0.48
1:A:118:PRO:HG2	1:A:121:LYS:HG2	1.95	0.47
1:A:360:ILE:HG23	1:A:393:ASN:ND2	2.30	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:44:VAL:HG13	1:A:492:GLU:HB3	1.97	0.46
1:A:392:ASN:C	1:A:394:THR:N	2.73	0.46
1:A:246:GLN:OE1	5:A:684:HOH:O	2.21	0.46
1:C:224:VAL:HG22	1:C:491:ILE:HD11	1.97	0.45
1:C:231:LYS:HD3	1:C:268:GLU:HG3	1.97	0.45
2:A:508:NAG:H81	1:C:252:LYS:NZ	2.32	0.45
1:C:462:ASN:OD1	1:C:463:THR:N	2.50	0.44
1:A:85:HIS:HD2	5:A:874:HOH:O	2.00	0.43
1:C:427:TRP:HB3	4:C:513:OLJ:C05	2.48	0.43
1:A:93:PHE:HB2	1:A:233:PHE:HZ	1.83	0.43
1:A:361:PHE:H	1:A:393:ASN:CG	2.26	0.43
1:C:476:LYS:O	1:C:480:ARG:HG3	2.19	0.43
1:C:357:LYS:HE3	1:C:466:GLU:HG2	2.02	0.42
1:A:45:TRP:HB3	1:A:491:ILE:HD13	2.02	0.41
1:A:333:ILE:HD12	1:A:390:LEU:HD21	2.02	0.41
1:C:390:LEU:HD23	1:C:390:LEU:HA	1.94	0.41
1:A:123:THR:OG1	1:A:199:SER:OG	2.38	0.41
4:A:513:OLJ:O11	4:A:513:OLJ:H8	2.21	0.41
1:C:378:CYS:HB3	1:C:383:PHE:CE1	2.57	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:C:717:HOH:O	5:C:728:HOH:O[2_545]	1.98	0.22

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	333/353 (94%)	324 (97%)	8 (2%)	1 (0%)	36 25

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	333/353 (94%)	323 (97%)	10 (3%)	0	100	100
All	All	666/706 (94%)	647 (97%)	18 (3%)	1 (0%)	43	31

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	393	ASN

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	303/311 (97%)	302 (100%)	1 (0%)	86	86
1	C	303/311 (97%)	301 (99%)	2 (1%)	76	73
All	All	606/622 (97%)	603 (100%)	3 (0%)	81	80

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	116	LEU
1	C	116	LEU
1	C	411	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	114	GLN
1	A	229	ASN
1	A	232	ASN
1	A	354	ASN
1	A	393	ASN
1	C	114	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 ⓘ

26 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	NAG	A	509	1	14,14,15	0.54	0	17,19,21	0.57	0
4	OLJ	C	513	-	29,29,29	3.59	7 (24%)	38,41,41	1.68	7 (18%)
2	NAG	A	503	1	14,14,15	0.48	0	17,19,21	0.80	0
2	NAG	A	506	1	14,14,15	0.49	0	17,19,21	0.78	0
3	EPE	C	512	-	15,15,15	0.80	1 (6%)	19,20,20	1.66	4 (21%)
2	NAG	C	506	1	14,14,15	0.52	0	17,19,21	0.55	0
2	NAG	C	502	1	14,14,15	0.49	0	17,19,21	0.84	1 (5%)
2	NAG	C	508	1	14,14,15	0.55	0	17,19,21	0.63	0
2	NAG	A	507	1	14,14,15	0.49	0	17,19,21	0.72	0
2	NAG	C	505	1	14,14,15	0.48	0	17,19,21	0.77	0
2	NAG	A	510	1	14,14,15	0.26	0	17,19,21	0.79	0
2	NAG	A	504	1	14,14,15	0.49	0	17,19,21	0.58	0
2	NAG	A	501	1	14,14,15	0.53	0	17,19,21	0.56	0
2	NAG	A	511	1	14,14,15	0.50	0	17,19,21	0.94	1 (5%)
2	NAG	C	511	1	14,14,15	0.50	0	17,19,21	0.61	0
4	OLJ	A	513	-	29,29,29	3.62	7 (24%)	38,41,41	1.43	7 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	C	501	1	14,14,15	0.26	0	17,19,21	0.68	0
2	NAG	C	510	1	14,14,15	0.52	0	17,19,21	0.58	0
2	NAG	C	504	1	14,14,15	0.51	0	17,19,21	0.63	0
2	NAG	C	507	1	14,14,15	0.52	0	17,19,21	0.68	0
2	NAG	C	503	1	14,14,15	0.46	0	17,19,21	0.95	1 (5%)
2	NAG	A	502	1	14,14,15	0.50	0	17,19,21	0.67	0
2	NAG	A	508	1	14,14,15	0.54	0	17,19,21	1.39	2 (11%)
2	NAG	A	505	1	14,14,15	0.51	0	17,19,21	0.66	0
2	NAG	C	509	1	14,14,15	0.50	0	17,19,21	0.64	0
3	EPE	A	512	-	15,15,15	0.78	1 (6%)	19,20,20	1.71	5 (26%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	A	509	1	-	0/6/23/26	0/1/1/1
4	0LJ	C	513	-	-	0/16/28/28	0/3/3/3
2	NAG	A	503	1	-	0/6/23/26	0/1/1/1
2	NAG	A	506	1	-	0/6/23/26	0/1/1/1
3	EPE	C	512	-	-	3/9/19/19	0/1/1/1
2	NAG	C	506	1	-	0/6/23/26	0/1/1/1
2	NAG	C	502	1	-	2/6/23/26	0/1/1/1
2	NAG	C	508	1	-	2/6/23/26	0/1/1/1
2	NAG	A	507	1	-	0/6/23/26	0/1/1/1
2	NAG	C	505	1	-	0/6/23/26	0/1/1/1
2	NAG	A	510	1	-	3/6/23/26	0/1/1/1
2	NAG	A	504	1	-	0/6/23/26	0/1/1/1
2	NAG	A	501	1	-	0/6/23/26	0/1/1/1
2	NAG	A	511	1	-	2/6/23/26	0/1/1/1
2	NAG	C	511	1	-	2/6/23/26	0/1/1/1
4	0LJ	A	513	-	-	0/16/28/28	0/3/3/3
2	NAG	C	501	1	-	0/6/23/26	0/1/1/1
2	NAG	C	510	1	-	2/6/23/26	0/1/1/1
2	NAG	C	504	1	-	0/6/23/26	0/1/1/1
2	NAG	C	507	1	-	2/6/23/26	0/1/1/1
2	NAG	C	503	1	-	0/6/23/26	0/1/1/1
2	NAG	A	502	1	-	0/6/23/26	0/1/1/1
2	NAG	A	508	1	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	A	505	1	-	0/6/23/26	0/1/1/1
2	NAG	C	509	1	-	0/6/23/26	0/1/1/1
3	EPE	A	512	-	-	2/9/19/19	0/1/1/1

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	513	OLJ	C17-C16	-15.48	1.44	1.53
4	C	513	OLJ	C17-C16	-15.35	1.45	1.53
4	A	513	OLJ	C15-C16	-6.44	1.48	1.55
4	C	513	OLJ	C15-C16	-6.08	1.48	1.55
4	C	513	OLJ	C25-N20	5.55	1.42	1.33
4	A	513	OLJ	C25-N20	5.39	1.42	1.33
4	C	513	OLJ	C12-N13	4.71	1.44	1.34
4	A	513	OLJ	C12-N13	4.54	1.43	1.34
4	C	513	OLJ	C10-N09	4.40	1.44	1.35
4	A	513	OLJ	C10-N09	4.29	1.44	1.35
4	A	513	OLJ	C15-N13	-3.48	1.39	1.46
4	C	513	OLJ	C15-N13	-3.31	1.39	1.46
3	C	512	EPE	C10-S	2.74	1.81	1.77
3	A	512	EPE	C10-S	2.66	1.81	1.77
4	C	513	OLJ	C05-N09	2.21	1.46	1.41
4	A	513	OLJ	C05-N09	2.03	1.45	1.41

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	512	EPE	C5-N4-C3	4.76	119.09	108.84
4	C	513	OLJ	C18-C17-C16	4.75	107.57	102.81
3	C	512	EPE	C5-N4-C3	4.52	118.57	108.84
4	C	513	OLJ	C12-C10-N09	3.99	118.99	112.25
2	A	508	NAG	C1-O5-C5	3.90	117.41	112.19
4	C	513	OLJ	C19-C15-C16	3.82	106.02	102.70
4	A	513	OLJ	C12-C10-N09	3.39	117.97	112.25
4	C	513	OLJ	C15-C16-N20	-3.19	109.09	113.39
2	A	508	NAG	C2-N2-C7	-3.13	118.70	122.90
4	A	513	OLJ	C15-C16-N20	-3.05	109.27	113.39
4	C	513	OLJ	C10-C12-N13	2.63	120.05	113.73
4	A	513	OLJ	C10-C12-N13	2.50	119.71	113.73
4	A	513	OLJ	C16-C15-N13	-2.50	110.44	114.65
4	C	513	OLJ	C16-C15-N13	-2.48	110.47	114.65
3	C	512	EPE	O1S-S-C10	2.46	110.44	106.73

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	512	EPE	O1S-S-C10	2.42	110.38	106.73
4	A	513	0LJ	C18-C17-C16	2.41	105.23	102.81
3	A	512	EPE	C5-C6-N1	-2.38	105.84	110.65
2	A	511	NAG	O7-C7-C8	-2.32	117.92	122.05
4	C	513	0LJ	C19-C15-N13	-2.30	108.05	114.77
4	A	513	0LJ	C19-C15-N13	-2.26	108.17	114.77
2	C	503	NAG	C1-O5-C5	2.24	115.19	112.19
3	C	512	EPE	C7-N4-C3	2.18	117.04	111.24
4	A	513	0LJ	C17-C18-C19	-2.15	107.98	110.95
3	A	512	EPE	C7-N4-C3	2.14	116.94	111.24
3	A	512	EPE	C2-C3-N4	2.12	114.92	110.65
2	C	502	NAG	C1-O5-C5	2.03	114.91	112.19
3	C	512	EPE	C7-N4-C5	2.01	116.61	111.24

There are no chirality outliers.

All (22) torsion outliers are listed below:

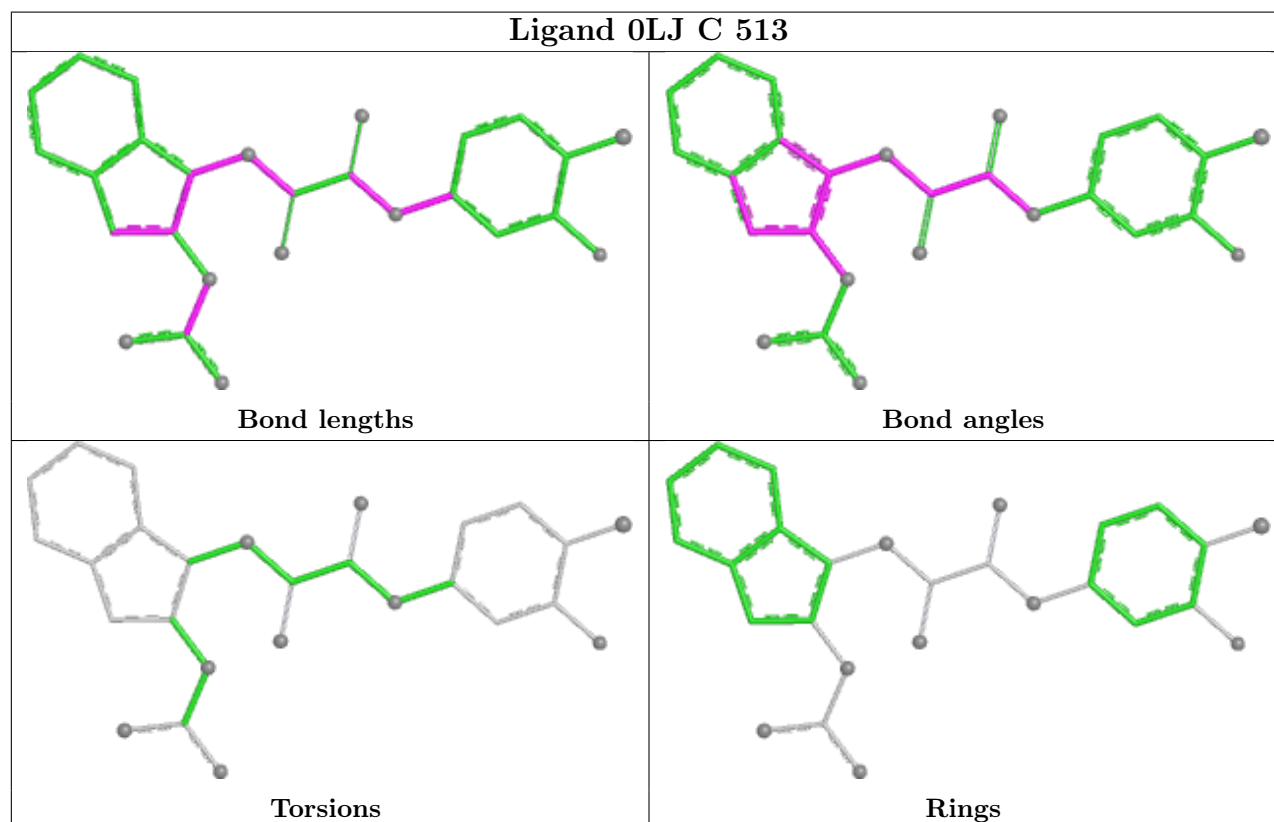
Mol	Chain	Res	Type	Atoms
2	A	511	NAG	C8-C7-N2-C2
2	A	511	NAG	O7-C7-N2-C2
2	C	510	NAG	C8-C7-N2-C2
2	C	510	NAG	O7-C7-N2-C2
3	C	512	EPE	C10-C9-N1-C2
2	C	508	NAG	C4-C5-C6-O6
2	C	508	NAG	O5-C5-C6-O6
2	A	508	NAG	C8-C7-N2-C2
2	A	508	NAG	O7-C7-N2-C2
2	A	510	NAG	C8-C7-N2-C2
2	A	510	NAG	O7-C7-N2-C2
2	C	507	NAG	C8-C7-N2-C2
2	C	507	NAG	O7-C7-N2-C2
2	C	511	NAG	C8-C7-N2-C2
2	C	511	NAG	O7-C7-N2-C2
2	C	502	NAG	O5-C5-C6-O6
2	A	510	NAG	O5-C5-C6-O6
3	A	512	EPE	C10-C9-N1-C2
2	C	502	NAG	C4-C5-C6-O6
3	C	512	EPE	N4-C7-C8-O8
3	C	512	EPE	C9-C10-S-O3S
3	A	512	EPE	N4-C7-C8-O8

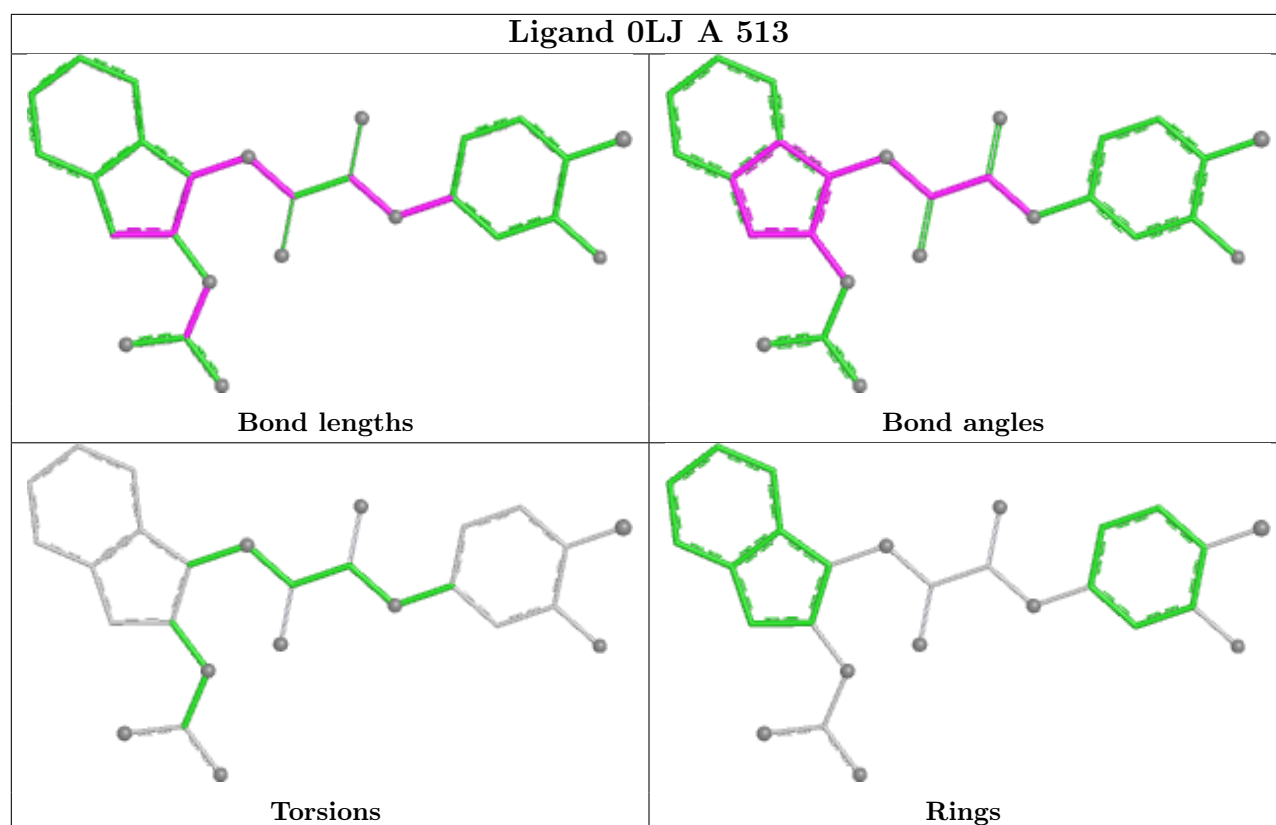
There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	513	0LJ	1	0
4	A	513	0LJ	1	0
2	A	508	NAG	1	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	339/353 (96%)	0.17	20 (5%) 28 27	20, 32, 62, 97	0
1	C	339/353 (96%)	0.76	42 (12%) 8 6	25, 49, 91, 145	0
All	All	678/706 (96%)	0.47	62 (9%) 15 13	20, 40, 87, 145	0

All (62) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	392	ASN	4.8
1	C	355	ASN	4.1
1	C	395	CYS	4.0
1	A	123	THR	3.7
1	A	124	GLY	3.5
1	C	117	GLN	3.3
1	C	460	ALA	3.3
1	C	44	VAL	3.3
1	A	267	GLU	3.2
1	A	200	VAL	3.2
1	C	324	GLY	3.1
1	A	393	ASN	3.0
1	C	205	CYS	3.0
1	C	396	ILE	3.0
1	A	394	THR	2.9
1	C	198	GLY	2.9
1	C	491	ILE	2.9
1	A	324	GLY	2.9
1	C	232	ASN	2.9
1	C	394	THR	2.9
1	C	462	ASN	2.8
1	C	366	GLY	2.8
1	C	459	GLY	2.8
1	C	201	ILE	2.8

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Mol	Chain	Res	Type	RSRZ
1	C	430	THR	2.8
1	C	492	GLU	2.8
1	A	120	VAL	2.7
1	C	346	THR	2.6
1	A	301	ASN	2.6
1	A	44	VAL	2.6
1	C	466	GLU	2.5
1	C	61	HIS	2.5
1	A	365	SER	2.5
1	C	79	PRO	2.5
1	C	239	CYS	2.4
1	C	353	PHE	2.4
1	A	396	ILE	2.4
1	C	465	ASN	2.4
1	C	464	SER	2.4
1	C	246	GLN	2.3
1	C	123	THR	2.3
1	A	232	ASN	2.3
1	A	119	CYS	2.3
1	C	463	THR	2.3
1	C	458	GLY	2.3
1	C	203	GLN	2.3
1	C	354	ASN	2.3
1	C	124	GLY	2.2
1	A	411	ASN	2.2
1	A	122	LEU	2.2
1	C	199	SER	2.2
1	C	119	CYS	2.2
1	C	342	LEU	2.2
1	A	202	LYS	2.2
1	C	471	GLY	2.1
1	C	204	ALA	2.1
1	C	429	GLY	2.1
1	C	271	ILE	2.0
1	A	82	GLN	2.0
1	A	246	GLN	2.0
1	C	358	THR	2.0
1	C	461	ASN	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

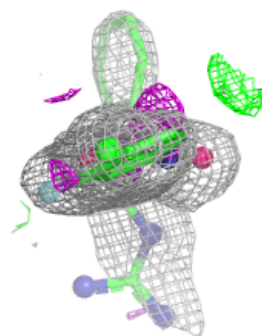
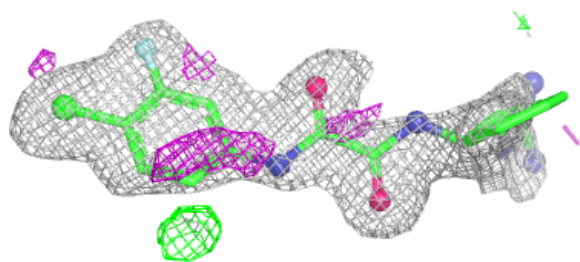
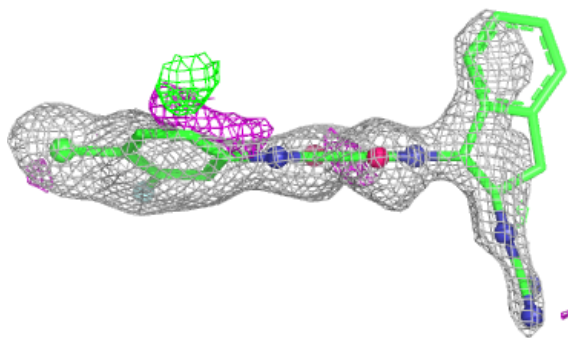
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	NAG	C	508	14/15	0.22	0.24	27,43,67,76	0
2	NAG	A	511	14/15	0.36	0.18	71,82,92,95	0
2	NAG	A	510	14/15	0.36	0.19	64,72,75,76	0
2	NAG	A	502	14/15	0.43	0.21	62,86,97,102	0
2	NAG	C	501	14/15	0.44	0.18	57,68,76,77	0
2	NAG	C	510	14/15	0.51	0.14	67,79,86,87	0
2	NAG	C	504	14/15	0.64	0.17	63,84,90,92	0
2	NAG	C	507	14/15	0.64	0.17	55,75,81,82	0
2	NAG	C	506	14/15	0.77	0.14	37,53,70,77	0
2	NAG	A	508	14/15	0.77	0.18	41,48,72,82	0
2	NAG	A	507	14/15	0.80	0.15	48,53,60,70	0
2	NAG	C	511	14/15	0.81	0.12	30,52,68,76	0
2	NAG	C	502	14/15	0.83	0.13	60,70,75,80	0
2	NAG	C	509	14/15	0.83	0.11	48,58,64,67	0
2	NAG	A	501	14/15	0.85	0.12	37,56,63,66	0
4	OLJ	C	513	27/27	0.87	0.15	33,58,89,91	0
2	NAG	C	505	14/15	0.88	0.10	40,54,59,59	0
2	NAG	A	509	14/15	0.88	0.10	38,49,58,64	0
2	NAG	A	506	14/15	0.89	0.11	36,55,68,77	0
2	NAG	A	505	14/15	0.90	0.10	29,43,54,64	0
2	NAG	A	504	14/15	0.92	0.09	31,42,55,60	0
4	OLJ	A	513	27/27	0.93	0.09	23,38,48,50	0
2	NAG	A	503	14/15	0.95	0.06	22,27,35,42	0
3	EPE	C	512	15/15	0.96	0.09	27,33,41,50	0
2	NAG	C	503	14/15	0.97	0.05	22,26,28,28	0
3	EPE	A	512	15/15	0.98	0.06	20,26,30,31	0

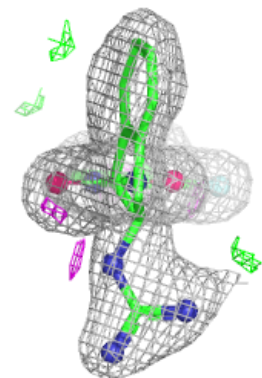
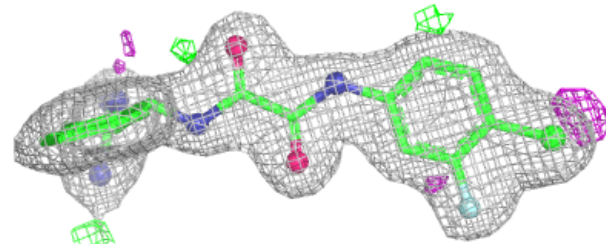
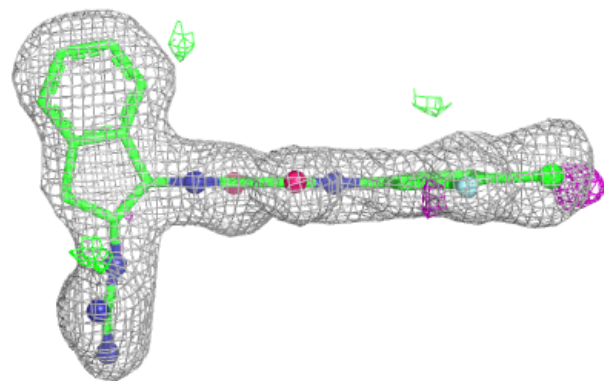
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 0LJ C 513:

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

**Electron density around 0LJ A 513:**

$2mF_o-DF_c$ (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.