



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 28, 2023 – 05:48 PM EDT

PDB ID : 8TGD  
Title : STX-478, a Mutant-Selective, Allosteric Inhibitor bound to H1047R PI3Kalpha  
Authors : Hilbert, B.; Brooijmans, N.; Buckbinder, L.; St.Jean Jr., D.J.  
Deposited on : 2023-07-12  
Resolution : 2.93 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](mailto: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 : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35  
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) : 2.35

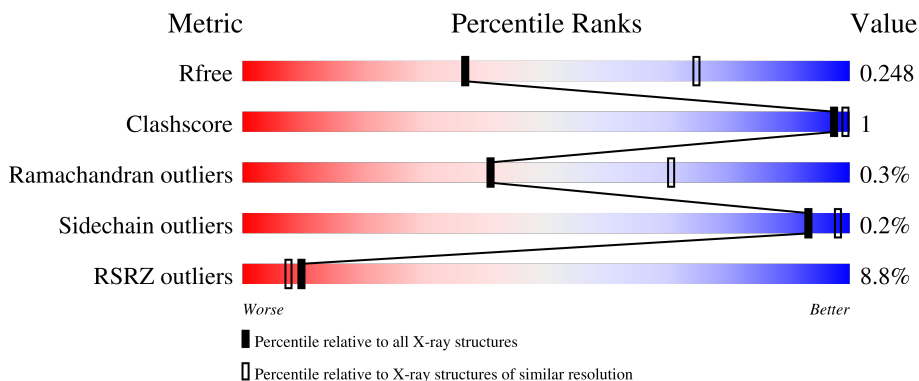
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.93 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	2307 (2.94-2.90)
Clashscore	141614	2531 (2.94-2.90)
Ramachandran outliers	138981	2462 (2.94-2.90)
Sidechain outliers	138945	2464 (2.94-2.90)
RSRZ outliers	127900	2248 (2.94-2.90)

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  $\geq 3$ , 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	1068	 3% 94% 2% 1% 1%
1	C	1068	 7% 92% 6% 1% 1%
2	B	293	 14% 80% 16% 1% 1%
2	D	293	 29% 81% 16% 1% 1%

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
3	EDO	A	1504	-	-	-	X

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 42029 atoms, of which 20849 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 Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit alpha isoform.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	1027	16899	5397	8467	1444	1522	69	8467	4	0
1	C	1008	16530	5284	8270	1411	1497	68	8270	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1047	ARG	HIS	variant	UNP P42336
C	1047	ARG	HIS	variant	UNP P42336

- Molecule 2 is a protein called Phosphatidylinositol 3-kinase regulatory subunit alpha.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
2	B	245	4155	1311	2059	373	406	6	2059	2	0
2	D	245	4139	1306	2053	371	403	6	2053	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	301	MET	-	initiating methionine	UNP P27986
B	302	HIS	-	expression tag	UNP P27986
B	303	HIS	-	expression tag	UNP P27986
B	304	HIS	-	expression tag	UNP P27986
B	305	HIS	-	expression tag	UNP P27986
B	306	HIS	-	expression tag	UNP P27986
B	307	HIS	-	expression tag	UNP P27986
D	301	MET	-	initiating methionine	UNP P27986
D	302	HIS	-	expression tag	UNP P27986

*Continued on next page...*

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
D	303	HIS	-	expression tag	UNP P27986
D	304	HIS	-	expression tag	UNP P27986
D	305	HIS	-	expression tag	UNP P27986
D	306	HIS	-	expression tag	UNP P27986
D	307	HIS	-	expression tag	UNP P27986

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



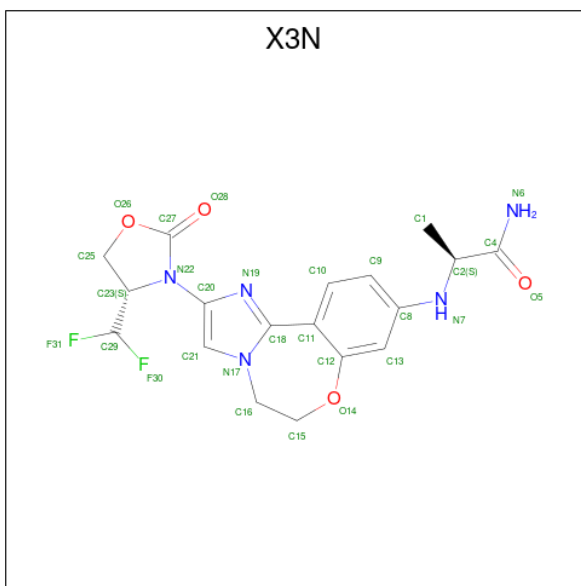
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0

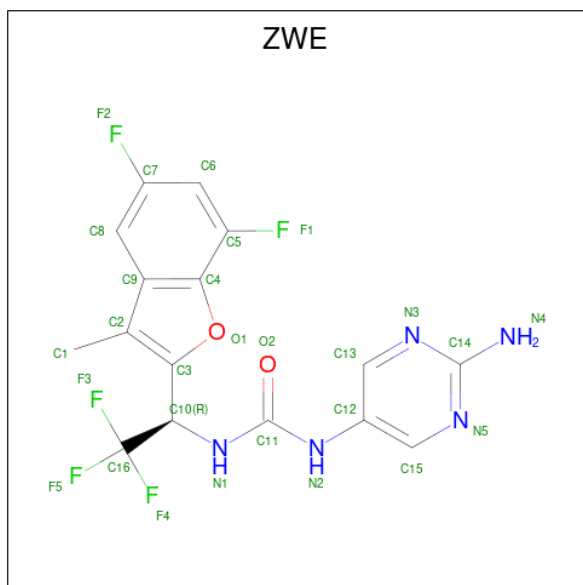
Continued on next page...

Continued from previous page...

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

- Molecule 4 is N 2 -{(4S,11aP)-2-[(4S)-4-(difluoromethyl)-2-oxo-1,3-oxazolidin-3-yl]-5,6-dihydroimidazo[1,2-d][1,4]benzoxazepin-9-yl}-L-alaninamide (three-letter code: X3N) (formula: C<sub>18</sub>H<sub>19</sub>F<sub>2</sub>N<sub>5</sub>O<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).





Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total	C	F	N	O	0	0
			28	16	5	5	2		
5	C	1	Total	C	F	N	O	0	0
			28	16	5	5	2		

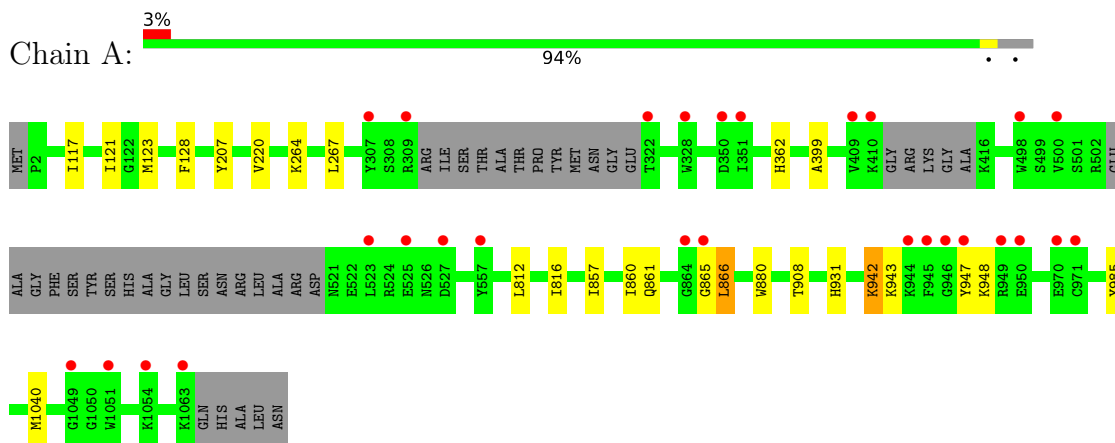
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	104	Total	O	0	0
			104	104		
6	B	5	Total	O	0	0
			5	5		
6	C	31	Total	O	0	0
			31	31		

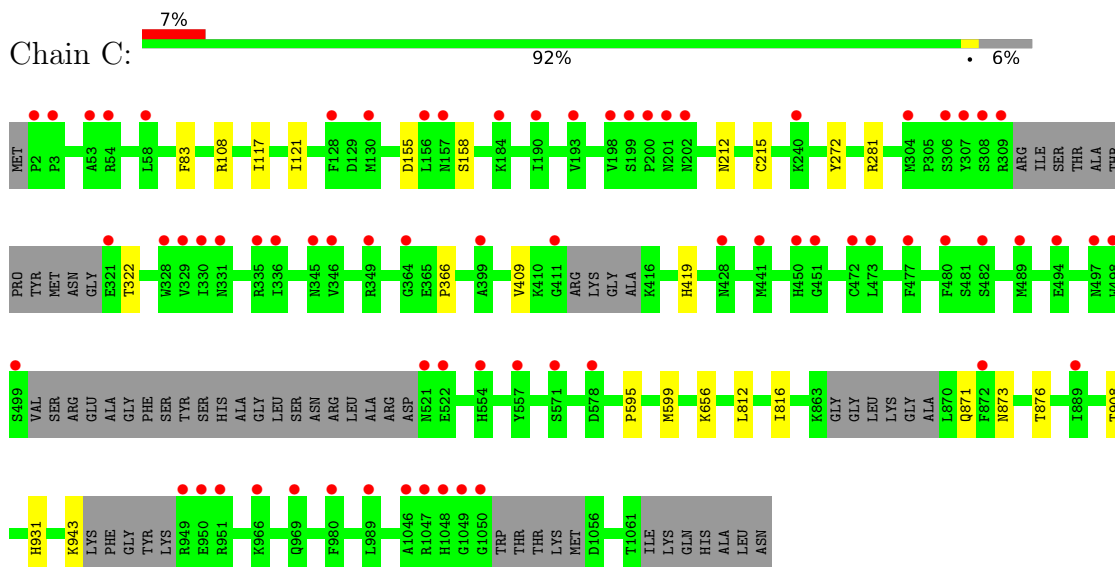
### 3 Residue-property plots [i](#)

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.

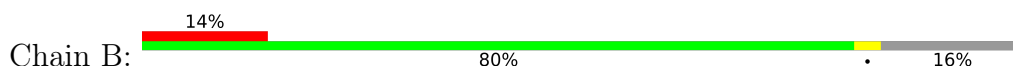
- Molecule 1: Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit alpha isoform



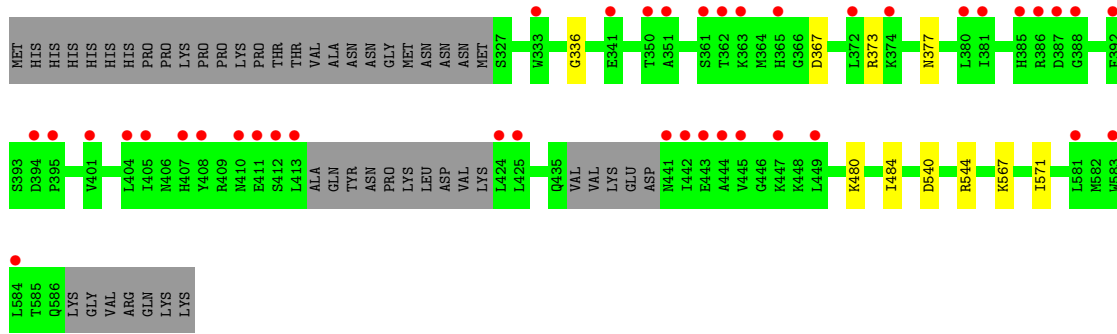
- Molecule 1: Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit alpha isoform



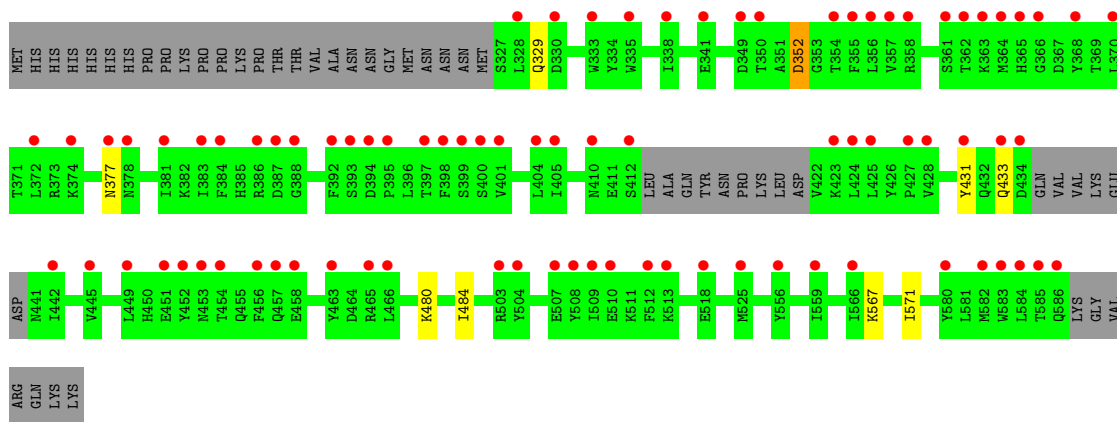
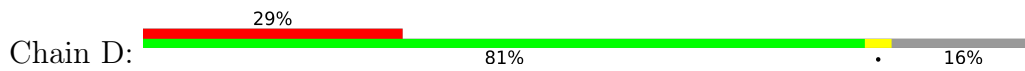
- Molecule 2: Phosphatidylinositol 3-kinase regulatory subunit alpha







● Molecule 2: Phosphatidylinositol 3-kinase regulatory subunit alpha



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	86.15Å 124.50Å 165.42Å 90.00° 92.86° 90.00°	Depositor
Resolution (Å)	34.42 – 2.93 34.42 – 2.93	Depositor EDS
% Data completeness (in resolution range)	74.5 (34.42-2.93) 74.4 (34.42-2.93)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.77 (at 2.95Å)	Xtrriage
Refinement program	BUSTER 2.11.8, BUSTER 2.11.8	Depositor
R, $R_{free}$	0.217 , 0.252 0.214 , 0.248	Depositor DCC
$R_{free}$ test set	2840 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	96.3	Xtrriage
Anisotropy	0.157	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 75.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.029 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	42029	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	132.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.52% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>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: X3N, ZWE, EDO

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	0.41	0/8637	0.56	0/11669
1	C	0.39	0/8444	0.54	0/11409
2	B	0.40	0/2139	0.50	0/2862
2	D	0.39	0/2120	0.52	0/2836
All	All	0.40	0/21340	0.54	0/28776

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	8432	8467	8449	15	0
1	C	8260	8270	8270	12	0
2	B	2096	2059	2052	4	0
2	D	2086	2053	2053	4	0
3	A	40	0	60	1	0
3	C	12	0	18	1	0
4	A	29	0	0	0	0
4	C	29	0	0	0	0
5	A	28	0	0	0	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	C	28	0	0	0	0
6	A	104	0	0	0	0
6	B	5	0	0	0	0
6	C	31	0	0	0	0
All	All	21180	20849	20902	34	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 (34) 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:117:ILE:O	1:A:121:ILE:HG12	1.97	0.65
1:C:117:ILE:O	1:C:121:ILE:HG12	1.96	0.64
1:A:207:TYR:HA	3:A:1505:EDO:H22	1.82	0.61
1:C:409:VAL:HG12	1:C:419:HIS:CE1	2.41	0.55
1:C:83:PHE:HD1	1:C:108:ARG:NH2	2.10	0.49
1:A:123:MET:SD	1:A:128:PHE:CZ	3.06	0.49
1:C:155:ASP:HA	1:C:158:SER:OG	2.14	0.47
1:A:362:HIS:CE1	1:A:399:ALA:HB3	2.49	0.47
1:A:865:GLY:O	1:A:866:LEU:HB2	2.14	0.46
1:C:595:PRO:O	1:C:599:MET:HG3	2.15	0.46
1:A:942:LYS:O	1:A:943:LYS:HG2	2.16	0.46
2:B:540:ASP:O	2:B:544:ARG:HB2	2.16	0.46
1:A:908:THR:HG21	1:A:931:HIS:CE1	2.52	0.44
2:B:567:LYS:O	2:B:571:ILE:HG12	2.17	0.44
1:C:212:ASN:HB2	1:C:215:CYS:SG	2.57	0.44
1:C:812:LEU:O	1:C:816:ILE:HG12	2.17	0.44
1:C:366:PRO:HD2	2:D:377:ASN:OD1	2.18	0.44
1:A:947:TYR:O	1:A:948:LYS:HG2	2.18	0.43
1:A:812:LEU:O	1:A:816:ILE:HG12	2.17	0.43
1:A:220:VAL:HG21	1:A:267:LEU:HD13	2.00	0.43
2:D:567:LYS:O	2:D:571:ILE:HG12	2.18	0.43
1:A:857:ILE:O	1:A:861:GLN:HG2	2.19	0.43
1:A:985:TYR:CE1	1:A:1040:MET:HG2	2.54	0.43
1:A:865:GLY:O	1:A:866:LEU:CB	2.66	0.42
1:C:873:ASN:OD1	1:C:876:THR:OG1	2.34	0.42
2:B:373:ARG:O	2:B:377:ASN:O	2.37	0.42
1:A:860:ILE:HD12	1:A:880:TRP:CE2	2.55	0.41
1:C:272:TYR:OH	1:C:281:ARG:NH2	2.50	0.41
2:D:329:GLN:O	2:D:431:TYR:OH	2.36	0.41

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:656:LYS:NZ	3:C:1503:EDO:H21	2.36	0.41
1:A:860:ILE:HD12	1:A:880:TRP:CD2	2.57	0.40
2:B:480:LYS:O	2:B:484:ILE:HG12	2.21	0.40
1:C:908:THR:HG21	1:C:931:HIS:CE1	2.56	0.40
2:D:480:LYS:O	2:D:484:ILE:HG12	2.21	0.40

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	1023/1068 (96%)	980 (96%)	40 (4%)	3 (0%)	41	70
1	C	994/1068 (93%)	950 (96%)	42 (4%)	2 (0%)	47	77
2	B	241/293 (82%)	224 (93%)	16 (7%)	1 (0%)	34	65
2	D	239/293 (82%)	224 (94%)	14 (6%)	1 (0%)	34	65
All	All	2497/2722 (92%)	2378 (95%)	112 (4%)	7 (0%)	41	70

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	866	LEU
2	B	336	GLY
1	A	942	LYS
2	D	352	ASP
1	C	871	GLN
1	A	264	LYS
1	C	322	THR

### 5.3.2 Protein sidechains [i](#)

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	948/974 (97%)	948 (100%)	0	100	100
1	C	929/974 (95%)	928 (100%)	1 (0%)	93	98
2	B	230/272 (85%)	229 (100%)	1 (0%)	91	97
2	D	228/272 (84%)	226 (99%)	2 (1%)	78	92
All	All	2335/2492 (94%)	2331 (100%)	4 (0%)	93	98

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

Mol	Chain	Res	Type
2	B	367	ASP
1	C	943	LYS
2	D	352	ASP
2	D	433	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA [i](#)

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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

17 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
3	EDO	C	1501	-	3,3,3	0.29	0	2,2,2	0.22	0
3	EDO	C	1503	-	3,3,3	0.31	0	2,2,2	0.18	0
5	ZWE	A	1512	-	25,30,30	1.84	5 (20%)	30,45,45	2.10	6 (20%)
3	EDO	A	1505	-	3,3,3	0.36	0	2,2,2	0.08	0
3	EDO	A	1507	-	3,3,3	0.38	0	2,2,2	0.06	0
3	EDO	A	1509	-	3,3,3	0.43	0	2,2,2	0.10	0
4	X3N	A	1511	-	28,32,32	1.96	5 (17%)	34,47,47	1.74	4 (11%)
5	ZWE	C	1505	-	25,30,30	1.76	6 (24%)	30,45,45	2.12	5 (16%)
3	EDO	A	1502	-	3,3,3	0.25	0	2,2,2	0.28	0
3	EDO	A	1504	-	3,3,3	0.38	0	2,2,2	0.14	0
3	EDO	A	1506	-	3,3,3	0.41	0	2,2,2	0.10	0
4	X3N	C	1504	-	28,32,32	1.91	4 (14%)	34,47,47	1.71	5 (14%)
3	EDO	C	1502	-	3,3,3	0.31	0	2,2,2	0.23	0
3	EDO	A	1503	-	3,3,3	0.28	0	2,2,2	0.14	0
3	EDO	A	1501	-	3,3,3	0.40	0	2,2,2	0.13	0
3	EDO	A	1508	-	3,3,3	0.34	0	2,2,2	0.09	0
3	EDO	A	1510	-	3,3,3	0.40	0	2,2,2	0.08	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. <sup>1,2</sup> means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	C	1501	-	-	0/1/1/1	-
3	EDO	C	1503	-	-	1/1/1/1	-
5	ZWE	A	1512	-	-	2/14/18/18	0/3/3/3
3	EDO	A	1505	-	-	1/1/1/1	-
3	EDO	A	1507	-	-	1/1/1/1	-
3	EDO	A	1509	-	-	0/1/1/1	-

*Continued on next page...*

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	X3N	A	1511	-	-	3/12/39/39	0/3/4/4
5	ZWE	C	1505	-	-	2/14/18/18	0/3/3/3
3	EDO	A	1502	-	-	1/1/1/1	-
3	EDO	A	1504	-	-	0/1/1/1	-
3	EDO	A	1506	-	-	0/1/1/1	-
4	X3N	C	1504	-	-	3/12/39/39	0/3/4/4
3	EDO	C	1502	-	-	1/1/1/1	-
3	EDO	A	1503	-	-	1/1/1/1	-
3	EDO	A	1501	-	-	0/1/1/1	-
3	EDO	A	1508	-	-	0/1/1/1	-
3	EDO	A	1510	-	-	0/1/1/1	-

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1511	X3N	C16-N17	-5.90	1.44	1.49
4	C	1504	X3N	C16-N17	-5.88	1.44	1.49
4	A	1511	X3N	C27-N22	4.75	1.43	1.36
5	A	1512	ZWE	C2-C9	4.58	1.45	1.40
4	C	1504	X3N	C27-N22	4.47	1.43	1.36
5	C	1505	ZWE	C2-C9	4.33	1.45	1.40
5	A	1512	ZWE	C14-N3	4.21	1.41	1.35
4	C	1504	X3N	C11-C18	-3.84	1.43	1.48
4	A	1511	X3N	C11-C18	-3.69	1.43	1.48
5	C	1505	ZWE	C14-N3	3.43	1.40	1.35
4	A	1511	X3N	O14-C15	-2.95	1.39	1.44
5	C	1505	ZWE	F1-C5	-2.78	1.31	1.36
5	A	1512	ZWE	F1-C5	-2.66	1.31	1.36
4	C	1504	X3N	O14-C15	-2.65	1.40	1.44
5	C	1505	ZWE	C11-N1	2.59	1.41	1.35
5	A	1512	ZWE	C14-N5	2.33	1.38	1.35
5	A	1512	ZWE	C11-N1	2.31	1.40	1.35
5	C	1505	ZWE	C14-N5	2.30	1.38	1.35
4	A	1511	X3N	O26-C27	2.17	1.37	1.35
5	C	1505	ZWE	C8-C9	-2.06	1.38	1.42

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	1505	ZWE	F1-C5-C4	9.33	121.17	117.40
5	A	1512	ZWE	F1-C5-C4	8.93	121.01	117.40

Continued on next page...



Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1511	X3N	O14-C15-C16	-6.59	107.99	112.62
4	C	1504	X3N	O14-C15-C16	-5.94	108.44	112.62
4	C	1504	X3N	F30-C29-C23	3.70	113.41	109.33
4	A	1511	X3N	F30-C29-C23	3.50	113.18	109.33
5	A	1512	ZWE	C2-C9-C4	-3.04	105.31	108.19
5	C	1505	ZWE	C12-N2-C11	-2.96	120.56	126.61
5	A	1512	ZWE	C7-C8-C9	-2.94	116.50	118.80
5	C	1505	ZWE	C7-C8-C9	-2.86	116.56	118.80
5	A	1512	ZWE	C12-N2-C11	-2.85	120.79	126.61
5	C	1505	ZWE	C2-C9-C4	-2.81	105.53	108.19
4	C	1504	X3N	O28-C27-N22	2.42	131.42	128.68
4	A	1511	X3N	O28-C27-N22	2.38	131.38	128.68
4	C	1504	X3N	C15-C16-N17	-2.27	109.34	111.17
5	A	1512	ZWE	C5-C6-C7	2.22	118.66	116.64
5	C	1505	ZWE	C5-C6-C7	2.22	118.65	116.64
5	A	1512	ZWE	C12-C13-N3	-2.18	122.17	124.13
4	C	1504	X3N	O26-C27-O28	-2.09	120.03	122.53
4	A	1511	X3N	O26-C27-O28	-2.04	120.08	122.53

There are no chirality outliers.

All (16) torsion outliers are listed below:

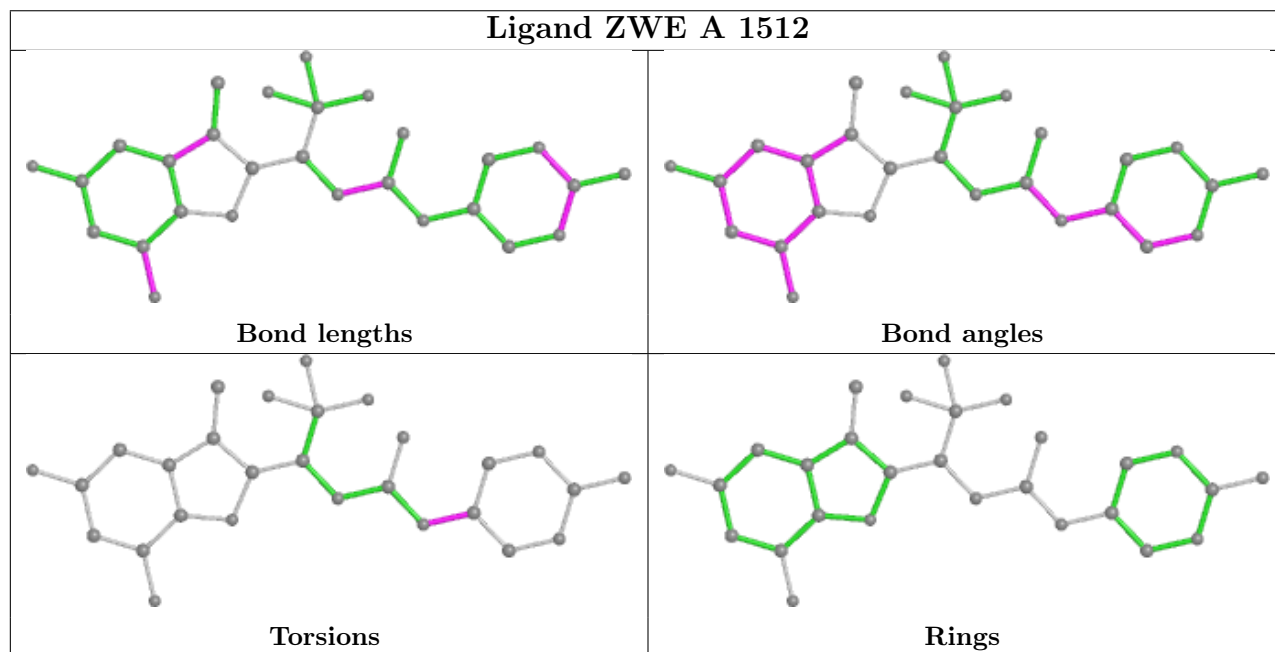
Mol	Chain	Res	Type	Atoms
4	A	1511	X3N	N22-C23-C29-F30
4	A	1511	X3N	N22-C23-C29-F31
4	A	1511	X3N	C25-C23-C29-F31
4	C	1504	X3N	N22-C23-C29-F30
4	C	1504	X3N	N22-C23-C29-F31
4	C	1504	X3N	C25-C23-C29-F31
5	A	1512	ZWE	C13-C12-N2-C11
5	A	1512	ZWE	C15-C12-N2-C11
5	C	1505	ZWE	C13-C12-N2-C11
5	C	1505	ZWE	C15-C12-N2-C11
3	A	1507	EDO	O1-C1-C2-O2
3	C	1502	EDO	O1-C1-C2-O2
3	C	1503	EDO	O1-C1-C2-O2
3	A	1502	EDO	O1-C1-C2-O2
3	A	1503	EDO	O1-C1-C2-O2
3	A	1505	EDO	O1-C1-C2-O2

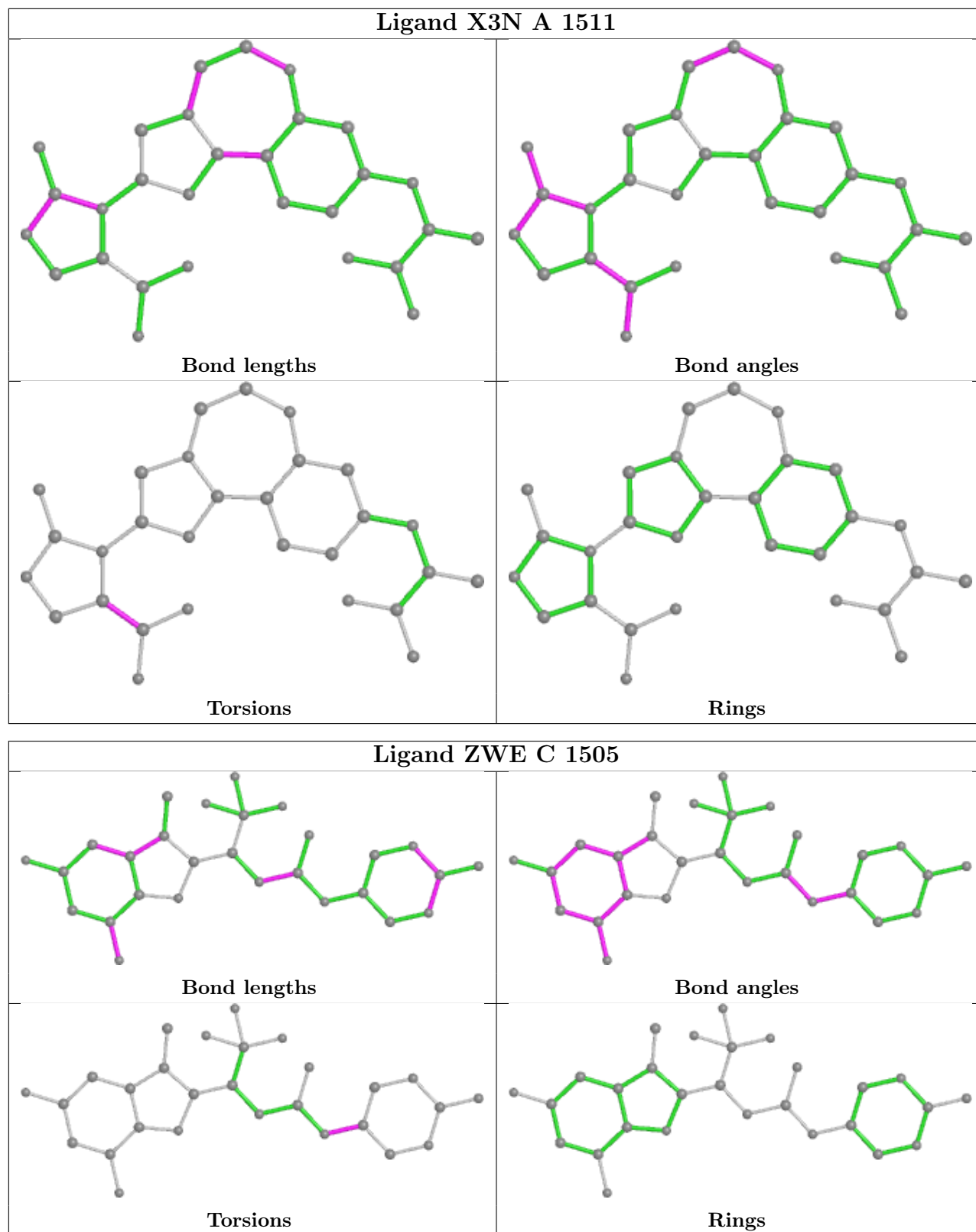
There are no ring outliers.

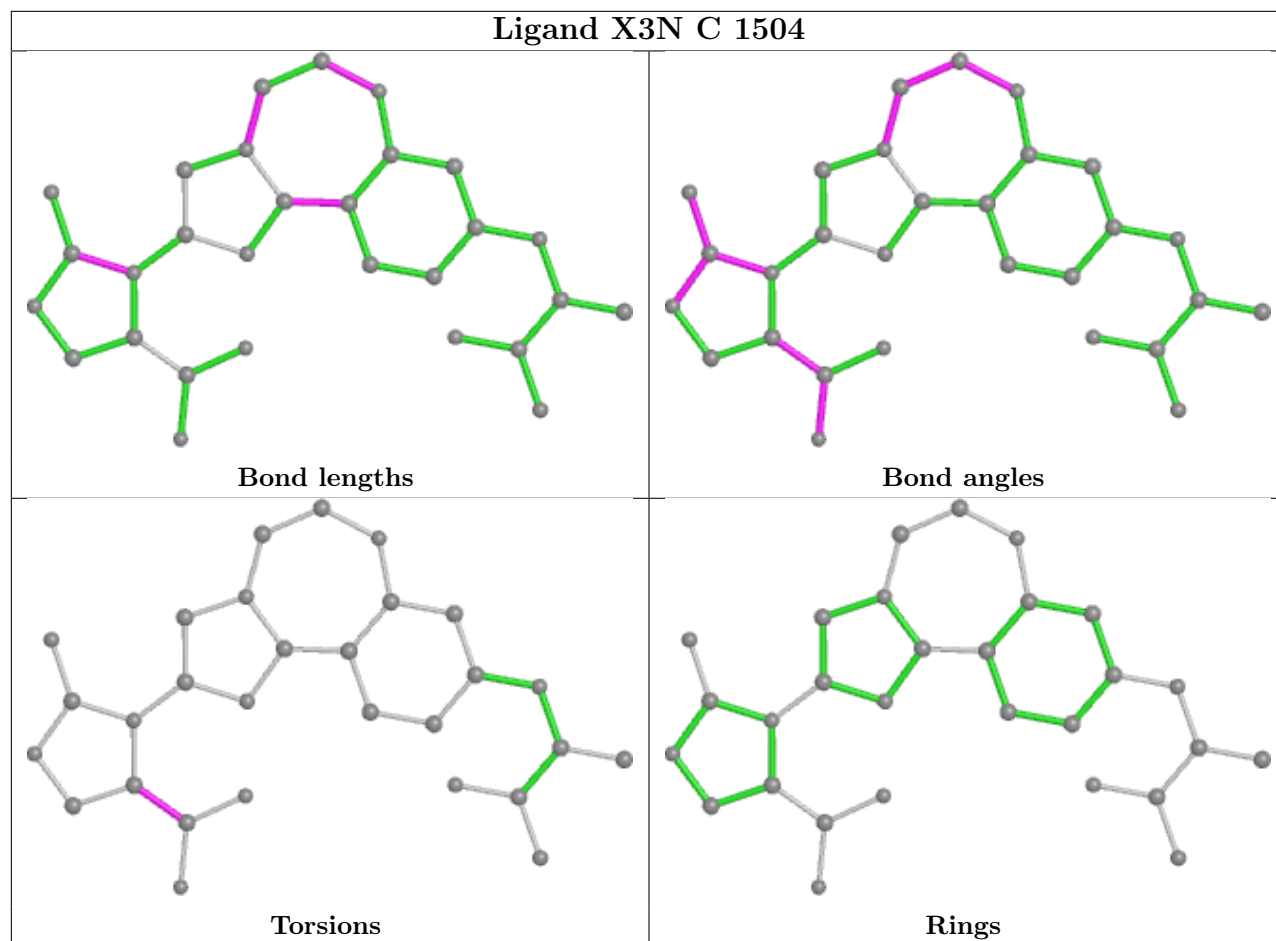
2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1503	EDO	1	0
3	A	1505	EDO	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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	1027/1068 (96%)	0.13	28 (2%) 54 51	56, 92, 138, 177	0
1	C	1008/1068 (94%)	0.43	70 (6%) 16 13	83, 131, 196, 220	0
2	B	245/293 (83%)	0.76	40 (16%) 1 1	81, 154, 210, 214	0
2	D	245/293 (83%)	1.67	84 (34%) 0 0	139, 217, 260, 266	0
All	All	2525/2722 (92%)	0.46	222 (8%) 10 7	56, 118, 217, 266	0

All (222) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	392	PHE	8.9
2	D	387	ASP	8.7
2	D	363	LYS	7.7
2	D	341	GLU	7.5
2	D	372	LEU	7.3
2	D	355	PHE	7.2
2	D	504	TYR	7.0
2	D	393	SER	6.9
1	A	947	TYR	6.8
2	D	335	TRP	6.7
2	D	362	THR	5.9
2	D	395	PRO	5.7
1	C	498	TRP	5.5
2	D	449	LEU	5.4
2	D	364	MET	5.3
2	D	410	ASN	5.2
2	D	412	SER	5.1
1	A	1051	TRP	5.1
2	D	394	ASP	5.0
1	C	473	LEU	4.9
2	D	508	TYR	4.9

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	B	333	TRP	4.9
2	D	586	GLN	4.8
1	A	350	ASP	4.8
2	D	445	VAL	4.7
1	C	330	ILE	4.7
1	C	200	PRO	4.7
2	D	397	THR	4.7
2	D	354	THR	4.6
2	B	410	ASN	4.4
1	C	201	ASN	4.4
1	C	321	GLU	4.4
1	A	949	ARG	4.3
2	B	372	LEU	4.2
2	D	400	SER	4.2
1	C	329	VAL	4.2
2	D	401	VAL	4.2
1	A	1054	LYS	4.2
2	D	358	ARG	4.1
2	D	583	TRP	4.1
2	B	362	THR	4.1
2	D	377	ASN	4.1
2	B	425	LEU	4.1
1	A	945	PHE	4.1
2	D	424	LEU	4.1
2	D	350	THR	4.0
2	D	384	PHE	4.0
2	D	453	ASN	3.9
2	B	583	TRP	3.9
2	D	442	ILE	3.9
2	D	404	LEU	3.9
2	D	431	TYR	3.8
1	C	969	GLN	3.8
2	B	387	ASP	3.8
2	D	349	ASP	3.7
2	B	341	GLU	3.7
1	C	308	SER	3.6
2	B	584	LEU	3.6
1	C	450	HIS	3.6
2	D	328	LEU	3.6
2	D	428	VAL	3.6
1	A	1049	GLY	3.6
1	C	1049	GLY	3.6

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	D	378	ASN	3.6
2	D	458	GLU	3.6
1	C	480	PHE	3.5
2	B	407	HIS	3.5
1	C	328	TRP	3.5
2	D	386	ARG	3.5
1	C	557	TYR	3.5
2	D	509	ILE	3.4
2	B	443	GLU	3.4
2	D	518	GLU	3.4
2	D	452	TYR	3.4
1	C	1048	HIS	3.4
1	C	309	ARG	3.4
2	D	405	ILE	3.4
2	B	381	ILE	3.3
2	B	394	ASP	3.3
2	D	510	GLU	3.3
2	D	454	THR	3.3
1	A	865	GLY	3.3
1	C	497	ASN	3.3
2	B	408	TYR	3.3
1	C	346	VAL	3.3
2	B	395	PRO	3.3
2	D	333	TRP	3.2
1	C	399	ALA	3.2
1	C	2	PRO	3.2
2	B	412	SER	3.2
2	D	503	ARG	3.1
2	D	457	GLN	3.1
2	D	463	TYR	3.1
1	C	331	ASN	3.1
2	B	444	ALA	3.1
1	A	309	ARG	3.1
1	C	202	ASN	3.1
1	A	498	TRP	3.1
2	D	365	HIS	3.0
1	C	307	TYR	3.0
2	D	368	TYR	3.0
1	C	345	ASN	3.0
2	D	388	GLY	3.0
1	C	571	SER	3.0
2	B	385	HIS	3.0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
2	B	401	VAL	3.0
1	C	472	CYS	2.9
1	C	304	MET	2.9
1	C	53	ALA	2.9
1	A	864	GLY	2.9
1	C	966	LYS	2.9
2	D	433	GLN	2.9
1	C	949	ARG	2.9
2	D	338	ILE	2.9
2	B	361	SER	2.9
1	C	951	ARG	2.9
2	D	580	TYR	2.8
2	B	386	ARG	2.8
2	B	404	LEU	2.8
1	C	482	SER	2.8
1	A	946	GLY	2.8
1	C	872	PHE	2.8
2	B	447	LYS	2.8
2	B	581	LEU	2.8
2	B	392	PHE	2.8
2	D	357	VAL	2.8
2	D	361	SER	2.8
1	C	58	LEU	2.8
1	A	944	LYS	2.8
1	C	451	GLY	2.7
1	C	578	ASP	2.7
1	A	557	TYR	2.7
2	B	351	ALA	2.7
2	B	445	VAL	2.7
1	A	410	LYS	2.7
1	A	525	GLU	2.7
2	B	374	LYS	2.7
1	A	322	THR	2.7
2	D	512	PHE	2.7
2	D	330	ASP	2.7
2	D	582	MET	2.7
1	C	3	PRO	2.6
1	C	1050	GLY	2.6
2	D	556	TYR	2.6
1	C	335	ARG	2.6
2	D	513	LYS	2.6
2	B	365	HIS	2.6

*Continued on next page...*



*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	D	399	SER	2.6
2	B	405	ILE	2.6
1	C	156	LEU	2.6
1	C	190	ILE	2.5
1	C	989	LEU	2.5
1	C	54	ARG	2.5
1	C	1046	ALA	2.5
2	D	465	ARG	2.5
2	D	381	ILE	2.5
2	D	366	GLY	2.5
1	C	130	MET	2.5
2	D	559	ILE	2.5
1	C	521	ASN	2.4
1	C	157	ASN	2.4
2	D	525	MET	2.4
2	B	424	LEU	2.4
2	D	584	LEU	2.4
1	A	971	CYS	2.4
1	C	336	ILE	2.4
1	C	950	GLU	2.4
2	D	356	LEU	2.4
2	D	434	ASP	2.3
1	C	441	MET	2.3
1	A	307	TYR	2.3
2	D	383	ILE	2.3
1	C	499	SER	2.3
1	C	349	ARG	2.3
1	A	328	TRP	2.3
1	C	411	GLY	2.3
1	A	970	GLU	2.3
2	D	370	LEU	2.3
2	D	456	PHE	2.2
1	C	494	GLU	2.2
2	B	411	GLU	2.2
1	A	500	VAL	2.2
1	A	527	ASP	2.2
1	C	477	PHE	2.2
2	D	425	LEU	2.2
2	D	466	LEU	2.2
2	B	363	LYS	2.2
1	C	364	GLY	2.2
2	D	374	LYS	2.2

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	C	428	ASN	2.2
2	B	413	LEU	2.2
2	B	449	LEU	2.2
1	A	950	GLU	2.2
1	C	240	LYS	2.1
2	D	451	GLU	2.1
1	A	1063	LYS	2.1
1	C	306	SER	2.1
2	B	350	THR	2.1
2	B	442	ILE	2.1
1	C	184	LYS	2.1
1	C	199	SER	2.1
1	C	128	PHE	2.1
2	D	423	LYS	2.1
2	B	388	GLY	2.1
1	C	1047	ARG	2.1
1	C	198	VAL	2.1
1	C	889	ILE	2.1
2	D	585	THR	2.1
2	D	507	GLU	2.1
2	D	398	PHE	2.1
1	A	351	ILE	2.0
1	A	409	VAL	2.0
1	C	980	PHE	2.0
2	B	380	LEU	2.0
2	D	427	PRO	2.0
1	C	554	HIS	2.0
1	C	522	GLU	2.0
1	C	193	VAL	2.0
2	B	441	ASN	2.0
2	D	566	ILE	2.0
1	C	489	MET	2.0
1	A	523	LEU	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 monosaccharides in this entry.

## 6.4 Ligands

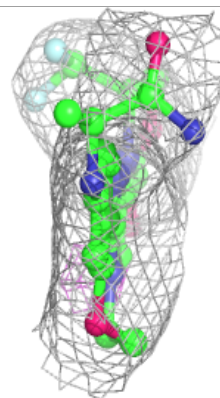
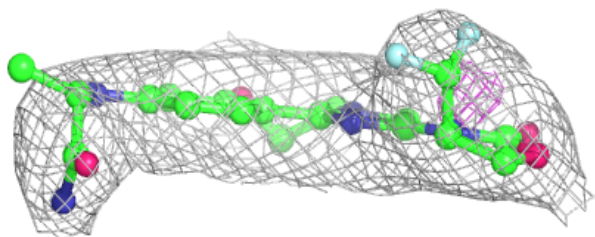
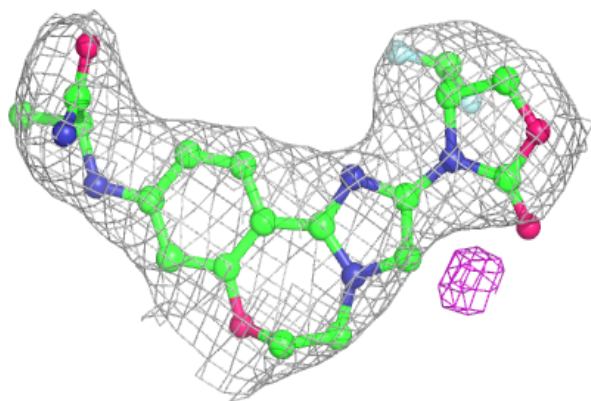
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	EDO	A	1504	4/4	0.67	0.41	99,99,100,100	0
3	EDO	A	1502	4/4	0.75	0.38	94,94,94,94	0
3	EDO	A	1501	4/4	0.76	0.28	97,98,98,98	0
3	EDO	C	1501	4/4	0.78	0.30	120,120,120,120	0
3	EDO	C	1503	4/4	0.78	0.24	133,133,133,133	0
3	EDO	A	1505	4/4	0.80	0.29	107,107,107,107	0
3	EDO	A	1509	4/4	0.81	0.44	101,101,101,101	0
3	EDO	A	1508	4/4	0.84	0.38	100,100,101,101	0
3	EDO	A	1506	4/4	0.86	0.28	97,97,97,97	0
3	EDO	A	1507	4/4	0.87	0.52	94,94,95,95	0
3	EDO	A	1510	4/4	0.88	0.20	104,104,104,104	0
3	EDO	C	1502	4/4	0.89	0.29	98,98,98,98	0
3	EDO	A	1503	4/4	0.93	0.22	93,93,93,93	0
4	X3N	C	1504	29/29	0.93	0.23	109,110,111,111	0
5	ZWE	C	1505	28/28	0.95	0.22	108,111,113,114	0
5	ZWE	A	1512	28/28	0.97	0.20	69,73,77,77	0
4	X3N	A	1511	29/29	0.97	0.19	60,61,66,66	0

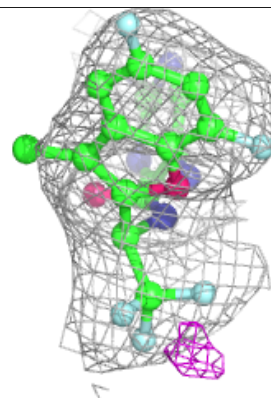
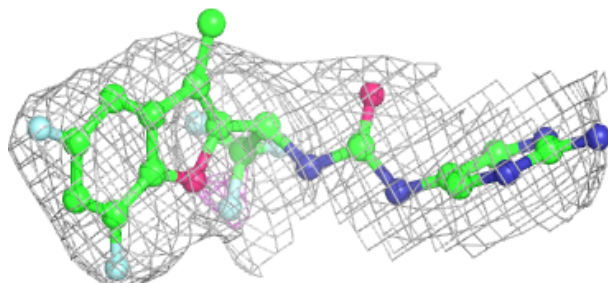
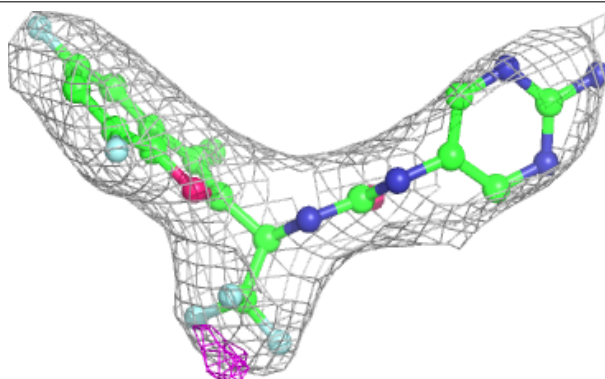
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around X3N C 1504:**

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

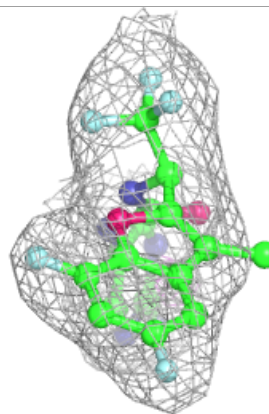
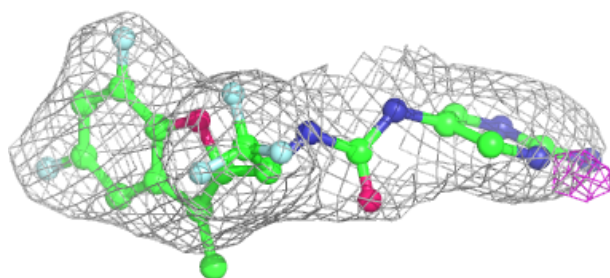
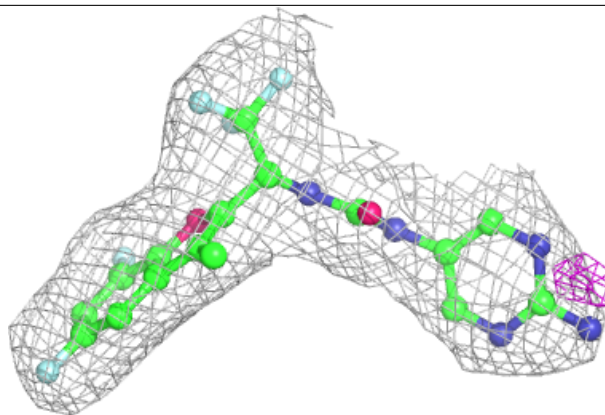
**Electron density around ZWE C 1505:**

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

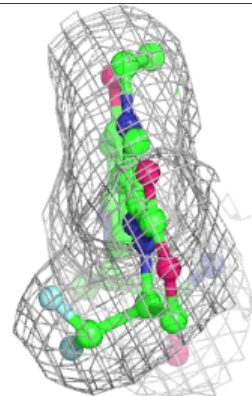
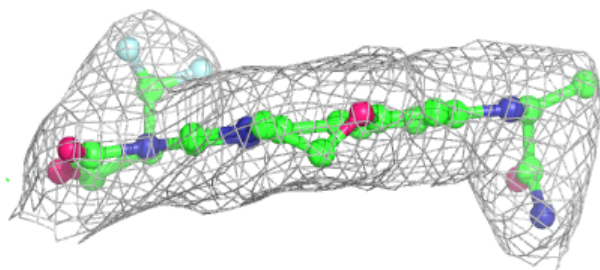
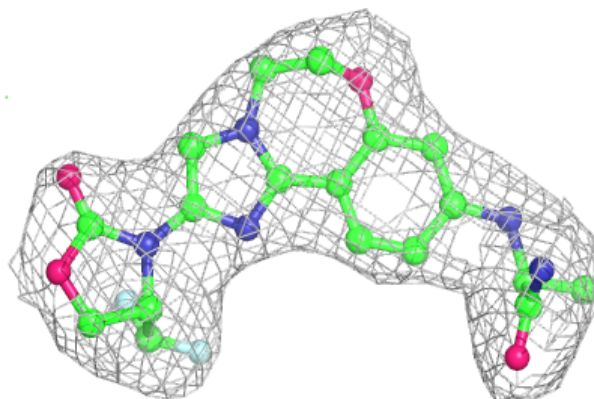


**Electron density around ZWE A 1512:**

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

**Electron density around X3N A 1511:**

$2mF_o-DF_c$  (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.