



## wwPDB EM Validation Summary Report ⓘ

Nov 29, 2022 – 12:24 AM JST

PDB ID : 7VFW  
EMDB ID : EMD-31961  
Title : Human N-type voltage gated calcium channel CaV2.2-alpha2/delta1-beta1 complex, bound to CaV2.2-blocker1  
Authors : Dong, Y.; Gao, Y.; Wang, Y.; Zhao, Y.  
Deposited on : 2021-09-13  
Resolution : 3.30 Å(reported)

This is a wwPDB EM Validation Summary 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/EMValidationReportHelp>

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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.3

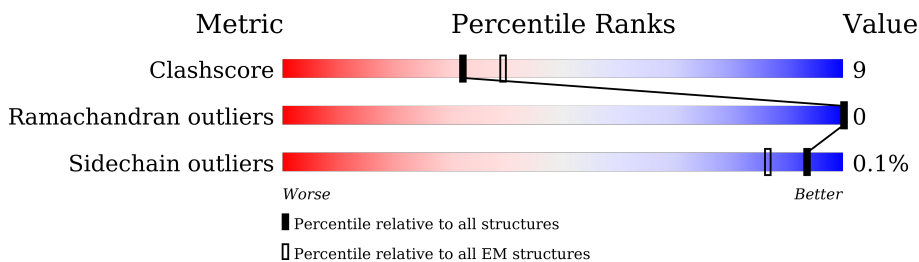
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.30 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)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	2339	
2	B	1103	
3	D	598	
4	C	3	
4	E	3	
5	F	3	

## 2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 19746 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Voltage-dependent N-type calcium channel subunit alpha-1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1266	Total	C	N	O	S	0	0
			10202	6715	1651	1771	65		

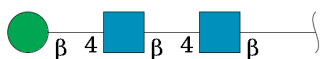
- Molecule 2 is a protein called Voltage-dependent calcium channel subunit alpha-2/delta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	955	Total	C	N	O	S	0	0
			7637	4842	1281	1483	31		

- Molecule 3 is a protein called Voltage-dependent L-type calcium channel subunit beta-1.

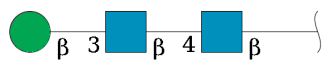
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	162	Total	C	N	O	S	0	0
			1259	805	217	232	5		

- Molecule 4 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



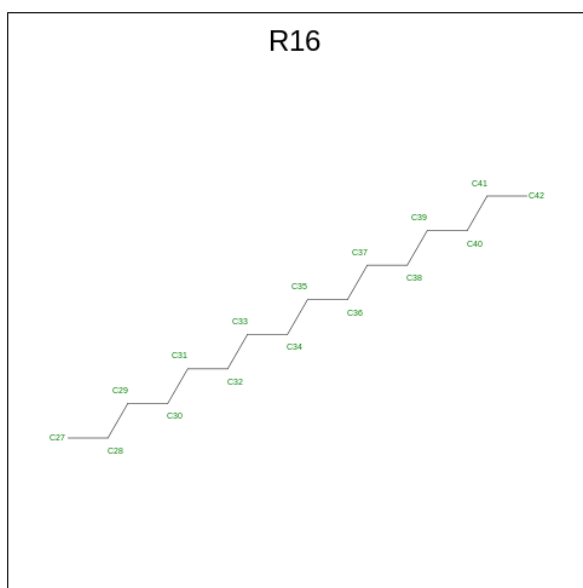
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	C	3	Total	C	N	O	0	0
			39	22	2	15		
4	E	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 5 is an oligosaccharide called beta-D-mannopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
5	F	3	39	22	2	15	0	0

- Molecule 6 is HEXADECANE (three-letter code: R16) (formula: C<sub>16</sub>H<sub>34</sub>).



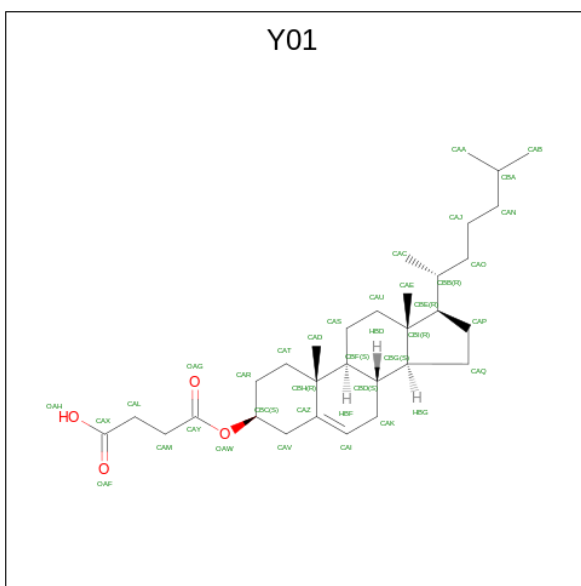
Mol	Chain	Residues	Atoms		AltConf
6	A	1	Total	C	0
			220	220	
6	A	1	Total	C	0
			220	220	
6	A	1	Total	C	0
			220	220	
6	A	1	Total	C	0
			220	220	
6	A	1	Total	C	0
			220	220	
6	A	1	Total	C	0
			220	220	
6	A	1	Total	C	0
			220	220	

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Mol	Chain	Residues	Atoms	AltConf
6	A	1	Total C 220 220	0
6	A	1	Total C 220 220	0
6	A	1	Total C 220 220	0
6	A	1	Total C 220 220	0
6	A	1	Total C 220 220	0
6	A	1	Total C 220 220	0
6	A	1	Total C 220 220	0

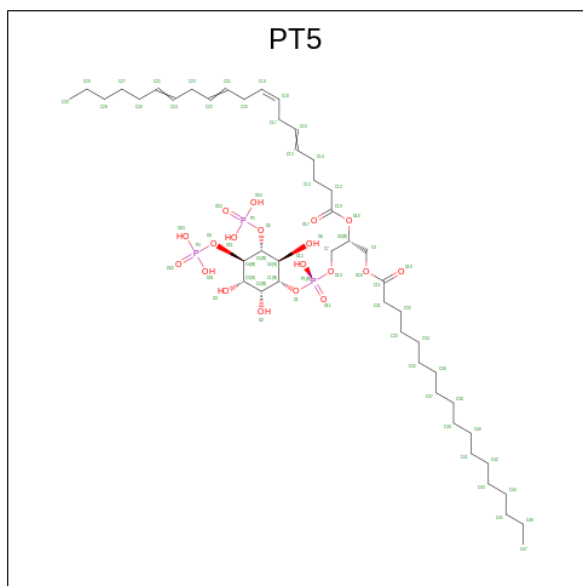
- Molecule 7 is CHOLESTEROL HEMISUCCINATE (three-letter code: Y01) (formula:  $C_{31}H_{50}O_4$ ).



Mol	Chain	Residues	Atoms	AltConf
7	A	1	Total C O 105 93 12	0
7	A	1	Total C O 105 93 12	0
7	A	1	Total C O 105 93 12	0

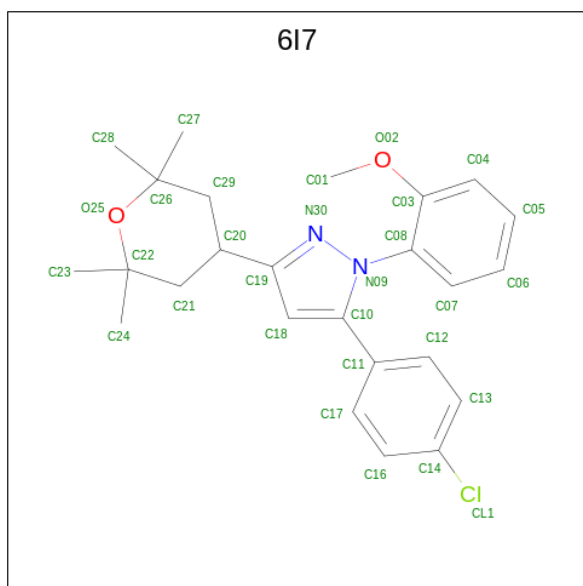
- Molecule 8 is [(2R)-1-octadecanoyloxy-3-[oxidanyl-[(1R,2R,3S,4R,5R,6S)-2,3,6-tris(oxidanyl)-4,5-diphosphonoxy-cyclohexyl]oxy-phosphoryl]oxy-propan-2-yl] (8Z)-icosa-5,8,11,14-tetr

aeoate (three-letter code: PT5) (formula:  $C_{47}H_{85}O_{19}P_3$ ).



Mol	Chain	Residues	Atoms			AltConf	
			Total	C	O		P
8	A	1	62	40	19	3	0

- Molecule 9 is 5-(4-chlorophenyl)-1-(2-methoxyphenyl)-3-(2,2,6,6-tetramethyloxan-4-yl)pyrazole (three-letter code: 6I7) (formula:  $C_{25}H_{29}ClN_2O_2$ ) (labeled as "Ligand of Interest" by depositor).

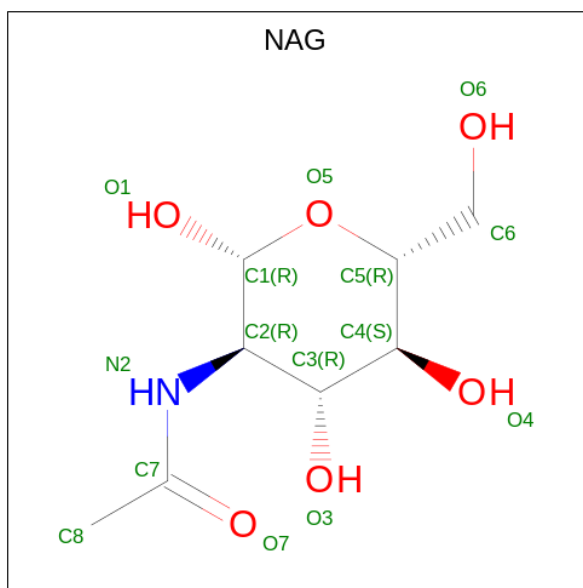


Mol	Chain	Residues	Atoms				AltConf	
			Total	C	Cl	N		O
9	A	1	30	25	1	2	2	0

- Molecule 10 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
10	A	1	Total	Ca	0
			1	1	
10	B	1	Total	Ca	0
			1	1	

- Molecule 11 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



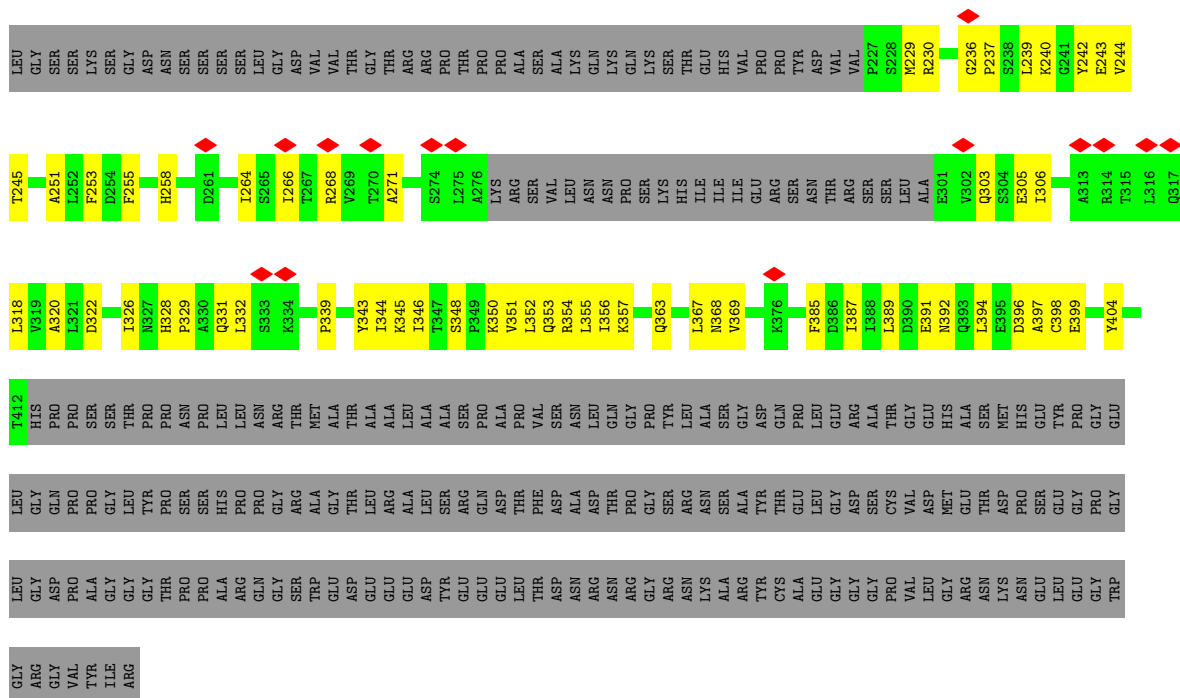
Mol	Chain	Residues	Atoms				AltConf
11	B	1	Total	C	N	O	0
			112	64	8	40	
11	B	1	Total	C	N	O	0
			112	64	8	40	
11	B	1	Total	C	N	O	0
			112	64	8	40	
11	B	1	Total	C	N	O	0
			112	64	8	40	
11	B	1	Total	C	N	O	0
			112	64	8	40	
11	B	1	Total	C	N	O	0
			112	64	8	40	
11	B	1	Total	C	N	O	0
			112	64	8	40	











- Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 5: beta-D-mannopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	399567	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	9.6	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	4.835	Depositor
Minimum map value	-2.541	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.094	Depositor
Recommended contour level	0.3	Depositor
Map size ( $\text{\AA}$ )	332.8, 332.8, 332.8	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.04, 1.04, 1.04	Depositor

## 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: CA, PT5, NAG, 6I7, R16, Y01, BMA

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	0.30	0/10448	0.45	1/14152 (0.0%)
2	B	0.31	0/7799	0.48	0/10578
3	D	0.25	0/1280	0.47	0/1729
All	All	0.30	0/19527	0.46	1/26459 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	253	CYS	C-N-CA	9.44	145.29	121.70

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	10202	0	10178	177	0
2	B	7637	0	7426	147	0
3	D	1259	0	1254	45	0
4	C	39	0	34	0	0
4	E	39	0	34	2	0
5	F	39	0	34	0	0
6	A	220	0	440	12	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	A	105	0	147	6	0
8	A	62	0	63	7	0
9	A	30	0	0	1	0
10	A	1	0	0	0	0
10	B	1	0	0	0	0
11	B	112	0	104	3	0
All	All	19746	0	19714	369	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 9.

The worst 5 of 369 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:679:VAL:HG23	1:A:683:MET:HE3	1.28	1.09
1:A:679:VAL:CG2	1:A:683:MET:HE3	1.91	1.00
1:A:679:VAL:HG23	1:A:683:MET:CE	1.97	0.94
1:A:1800:ARG:HD2	1:A:1821:LEU:HD11	1.58	0.85
1:A:1350:ASN:HD21	7:A:2403:Y01:HAR2	1.42	0.84

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 PDB entries followed by that with respect to all EM entries.

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	1248/2339 (53%)	1192 (96%)	56 (4%)	0	100	100
2	B	947/1103 (86%)	898 (95%)	49 (5%)	0	100	100
3	D	158/598 (26%)	152 (96%)	6 (4%)	0	100	100
All	All	2353/4040 (58%)	2242 (95%)	111 (5%)	0	100	100

There are no Ramachandran outliers to report.

### 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 PDB entries followed by that with respect to all EM entries.

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	1089/1991 (55%)	1087 (100%)	2 (0%)	93	97
2	B	846/971 (87%)	845 (100%)	1 (0%)	93	97
3	D	131/510 (26%)	131 (100%)	0	100	100
All	All	2066/3472 (60%)	2063 (100%)	3 (0%)	93	97

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

Mol	Chain	Res	Type
1	A	495	ASN
1	A	1484	ASN
2	B	1053	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	108	ASN
2	B	392	HIS
3	D	328	HIS
3	D	353	GLN
3	D	363	GLN

### 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

9 monosaccharides 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	NAG	C	1	4,2	14,14,15	0.33	0	17,19,21	0.52	0
4	NAG	C	2	4	14,14,15	0.19	0	17,19,21	0.45	0
4	BMA	C	3	4	11,11,12	0.60	0	15,15,17	0.75	0
4	NAG	E	1	4,2	14,14,15	0.42	0	17,19,21	0.48	0
4	NAG	E	2	4	14,14,15	0.19	0	17,19,21	0.54	0
4	BMA	E	3	4	11,11,12	0.58	0	15,15,17	0.68	0
5	NAG	F	1	2,5	14,14,15	0.79	1 (7%)	17,19,21	0.99	1 (5%)
5	NAG	F	2	5	14,14,15	0.29	0	17,19,21	0.45	0
5	BMA	F	3	5	11,11,12	0.63	0	15,15,17	0.80	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
4	NAG	C	1	4,2	-	2/6/23/26	0/1/1/1
4	NAG	C	2	4	-	0/6/23/26	0/1/1/1
4	BMA	C	3	4	-	0/2/19/22	0/1/1/1
4	NAG	E	1	4,2	-	2/6/23/26	0/1/1/1
4	NAG	E	2	4	-	2/6/23/26	0/1/1/1
4	BMA	E	3	4	-	2/2/19/22	0/1/1/1
5	NAG	F	1	2,5	-	2/6/23/26	0/1/1/1
5	NAG	F	2	5	-	1/6/23/26	0/1/1/1
5	BMA	F	3	5	-	1/2/19/22	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	F	1	NAG	O5-C1	2.71	1.48	1.43



All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	F	1	NAG	C1-O5-C5	3.84	117.40	112.19

There are no chirality outliers.

5 of 12 torsion outliers are listed below:

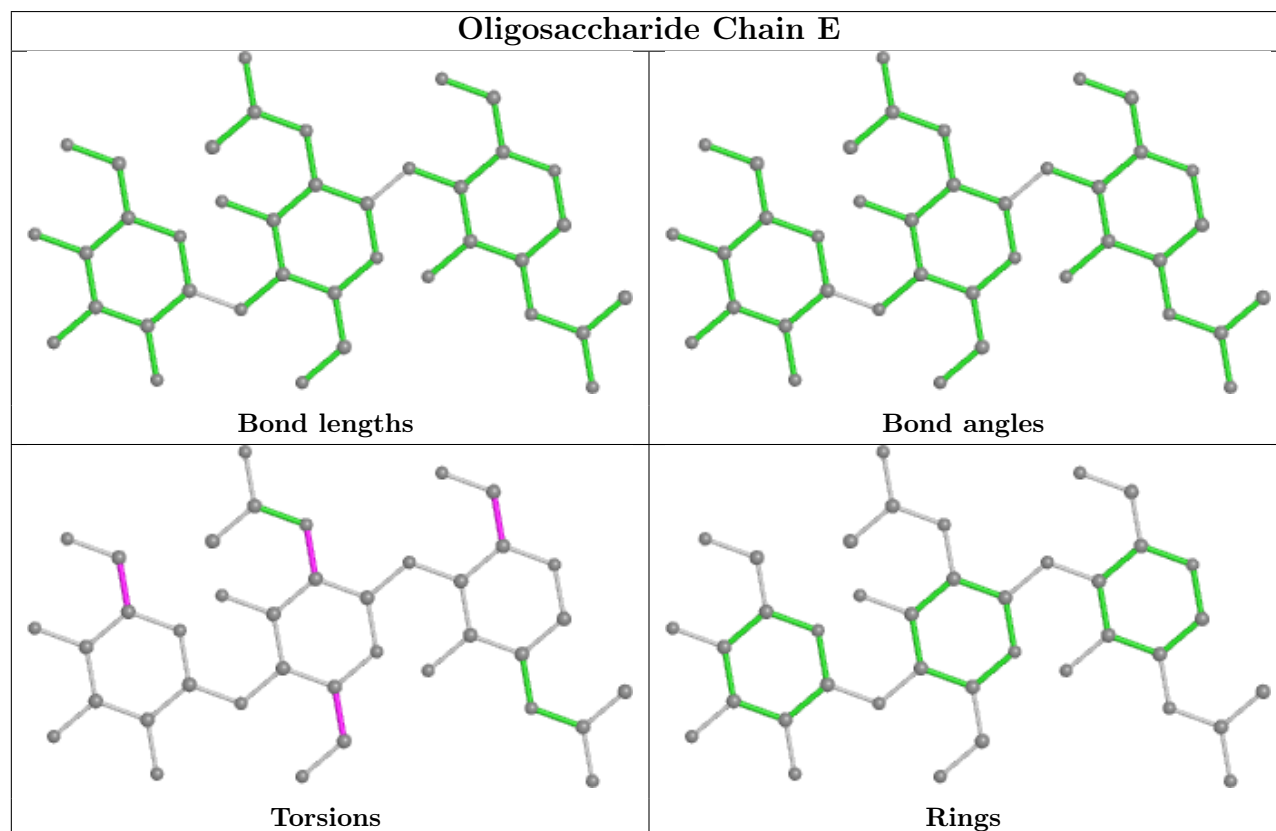
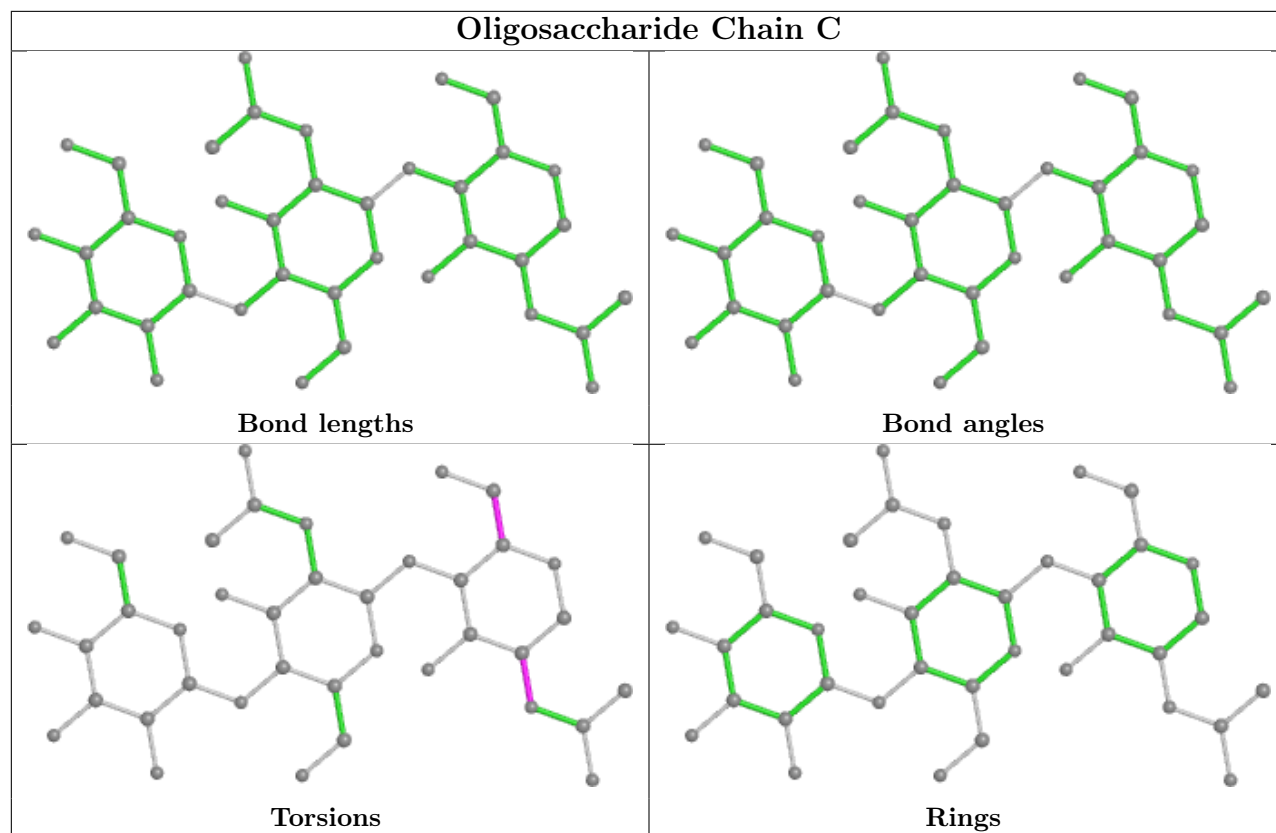
Mol	Chain	Res	Type	Atoms
4	E	1	NAG	O5-C5-C6-O6
5	F	1	NAG	O5-C5-C6-O6
4	E	1	NAG	C4-C5-C6-O6
4	E	3	BMA	O5-C5-C6-O6
5	F	1	NAG	C4-C5-C6-O6

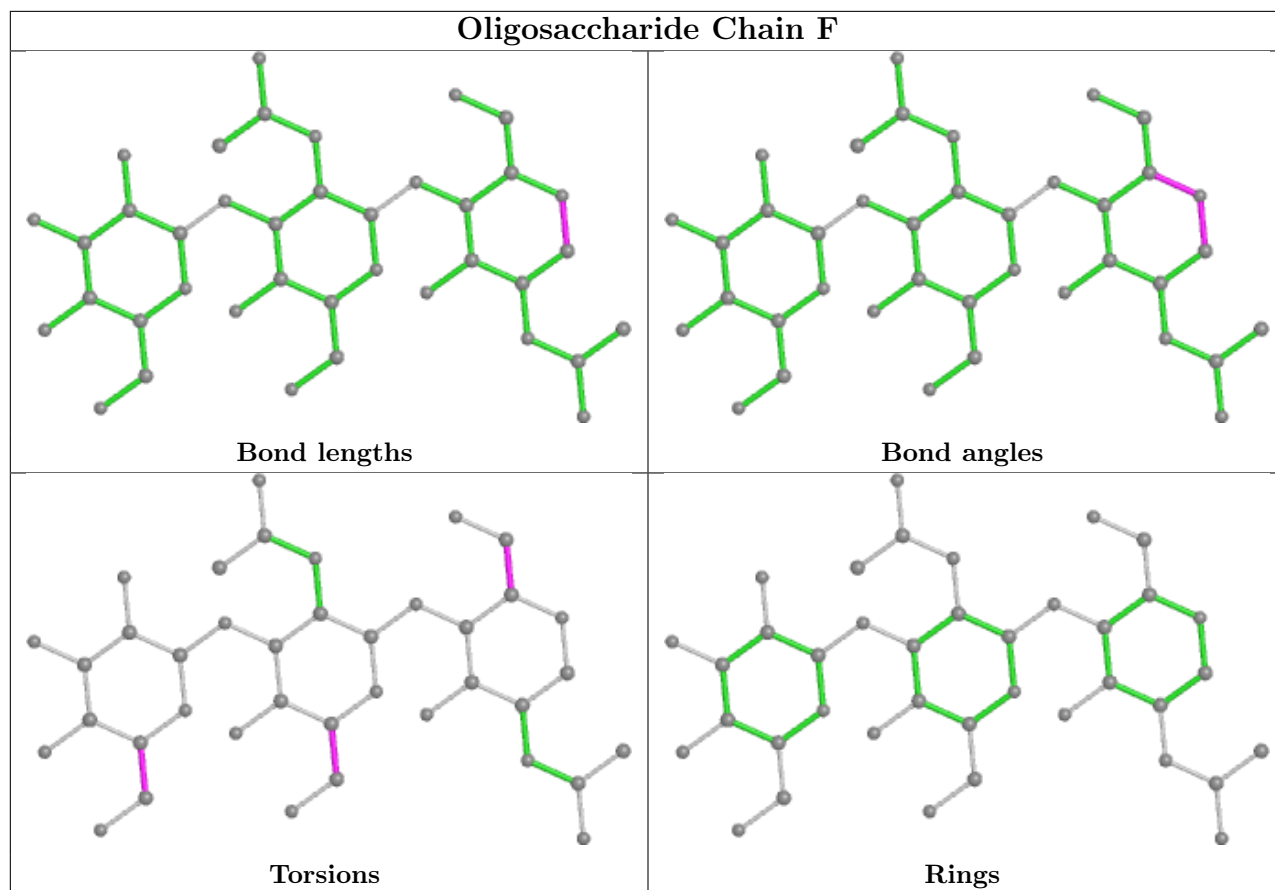
There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	1	NAG	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 oligosaccharide.





## 5.6 Ligand geometry [i](#)

Of 30 ligands modelled in this entry, 2 are monoatomic - leaving 28 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	$\# Z  > 2$
11	NAG	B	1204	2	14,14,15	0.24	0	17,19,21	0.55	0
6	R16	A	2404	-	15,15,15	0.11	0	14,14,14	0.17	0
6	R16	A	2401	-	15,15,15	0.11	0	14,14,14	0.20	0
8	PT5	A	2419	-	62,62,69	1.46	10 (16%)	76,80,87	0.92	2 (2%)
9	6I7	A	2420	-	30,33,33	1.95	7 (23%)	42,50,50	3.20	10 (23%)
7	Y01	A	2418	-	38,38,38	0.49	0	57,57,57	0.94	1 (1%)
11	NAG	B	1203	2	14,14,15	0.25	0	17,19,21	0.45	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	R16	A	2411	-	14,14,15	0.11	0	13,13,14	0.18	0
6	R16	A	2408	-	10,10,15	0.13	0	9,9,14	0.08	0
11	NAG	B	1209	2	14,14,15	0.21	0	17,19,21	0.50	0
11	NAG	B	1208	2	14,14,15	0.24	0	17,19,21	0.53	0
6	R16	A	2407	-	15,15,15	0.10	0	14,14,14	0.20	0
6	R16	A	2406	-	15,15,15	0.10	0	14,14,14	0.14	0
6	R16	A	2415	-	12,12,15	0.19	0	11,11,14	0.09	0
7	Y01	A	2409	-	38,38,38	4.00	12 (31%)	57,57,57	2.10	17 (29%)
11	NAG	B	1205	2	14,14,15	0.34	0	17,19,21	0.49	0
11	NAG	B	1202	2	14,14,15	0.22	0	17,19,21	0.48	0
6	R16	A	2416	-	15,15,15	0.12	0	14,14,14	0.19	0
11	NAG	B	1206	2	14,14,15	0.18	0	17,19,21	0.40	0
6	R16	A	2414	-	14,14,15	0.11	0	13,13,14	0.25	0
6	R16	A	2410	-	12,12,15	0.09	0	11,11,14	0.18	0
11	NAG	B	1207	2	14,14,15	0.20	0	17,19,21	0.40	0
6	R16	A	2412	-	12,12,15	0.10	0	11,11,14	0.20	0
6	R16	A	2417	-	15,15,15	0.09	0	14,14,14	0.07	0
6	R16	A	2402	-	15,15,15	0.12	0	14,14,14	0.08	0
6	R16	A	2413	-	11,11,15	0.10	0	10,10,14	0.19	0
7	Y01	A	2403	-	38,38,38	0.58	0	57,57,57	0.87	2 (3%)
6	R16	A	2405	-	15,15,15	0.12	0	14,14,14	0.17	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
11	NAG	B	1204	2	-	3/6/23/26	0/1/1/1
6	R16	A	2404	-	-	6/13/13/13	-
6	R16	A	2401	-	-	5/13/13/13	-
8	PT5	A	2419	-	-	25/59/83/90	0/1/1/1
9	6I7	A	2420	-	-	4/14/30/30	0/4/4/4
7	Y01	A	2418	-	-	10/19/77/77	0/4/4/4
11	NAG	B	1203	2	-	0/6/23/26	0/1/1/1
6	R16	A	2411	-	-	4/12/12/13	-
6	R16	A	2408	-	-	5/8/8/13	-
11	NAG	B	1209	2	-	0/6/23/26	0/1/1/1
11	NAG	B	1208	2	-	3/6/23/26	0/1/1/1
6	R16	A	2407	-	-	6/13/13/13	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	R16	A	2406	-	-	3/13/13/13	-
6	R16	A	2415	-	-	5/10/10/13	-
7	Y01	A	2409	-	-	9/19/77/77	0/4/4/4
11	NAG	B	1205	2	-	3/6/23/26	0/1/1/1
11	NAG	B	1202	2	-	2/6/23/26	0/1/1/1
6	R16	A	2416	-	-	7/13/13/13	-
11	NAG	B	1206	2	-	2/6/23/26	0/1/1/1
6	R16	A	2414	-	-	4/12/12/13	-
6	R16	A	2410	-	-	5/10/10/13	-
11	NAG	B	1207	2	-	0/6/23/26	0/1/1/1
6	R16	A	2412	-	-	1/10/10/13	-
6	R16	A	2417	-	-	10/13/13/13	-
6	R16	A	2402	-	-	7/13/13/13	-
6	R16	A	2413	-	-	4/9/9/13	-
7	Y01	A	2403	-	-	12/19/77/77	0/4/4/4
6	R16	A	2405	-	-	6/13/13/13	-

The worst 5 of 29 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	2409	Y01	CAI-CAZ	16.33	1.69	1.33
7	A	2409	Y01	CAU-CBI	-6.98	1.41	1.54
7	A	2409	Y01	CBH-CBF	6.93	1.67	1.56
7	A	2409	Y01	CAQ-CAP	6.86	1.72	1.54
7	A	2409	Y01	CAK-CBD	6.00	1.63	1.53

The worst 5 of 32 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	A	2420	6I7	C29-C20-C19	-14.09	83.04	111.62
9	A	2420	6I7	C21-C20-C19	11.58	135.10	111.62
7	A	2409	Y01	CAK-CAI-CAZ	-5.23	115.42	125.06
7	A	2409	Y01	CAU-CBI-CBE	4.66	123.55	116.57
7	A	2409	Y01	CAD-CBH-CBF	-4.61	106.19	111.68

There are no chirality outliers.

5 of 151 torsion outliers are listed below:

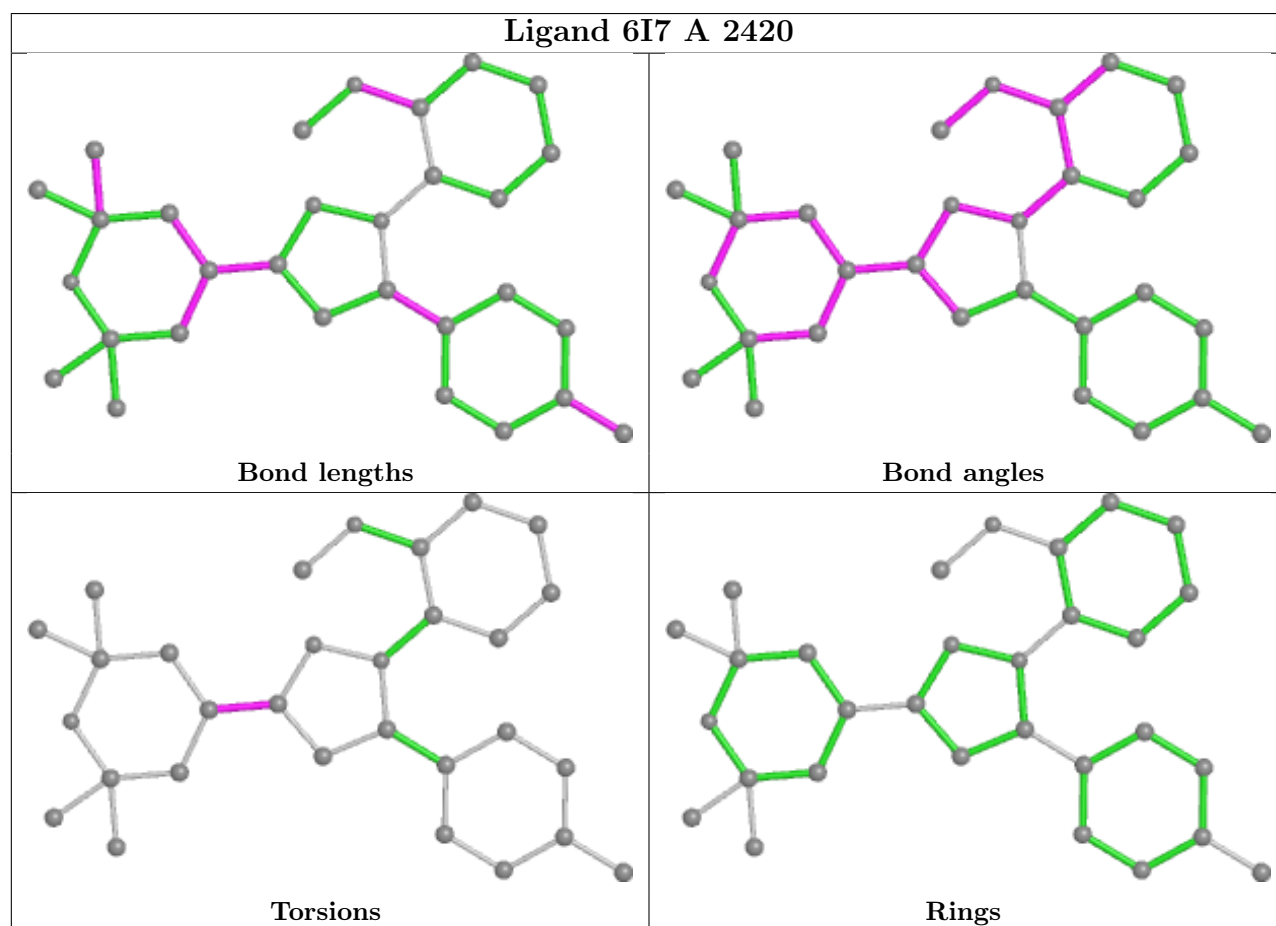
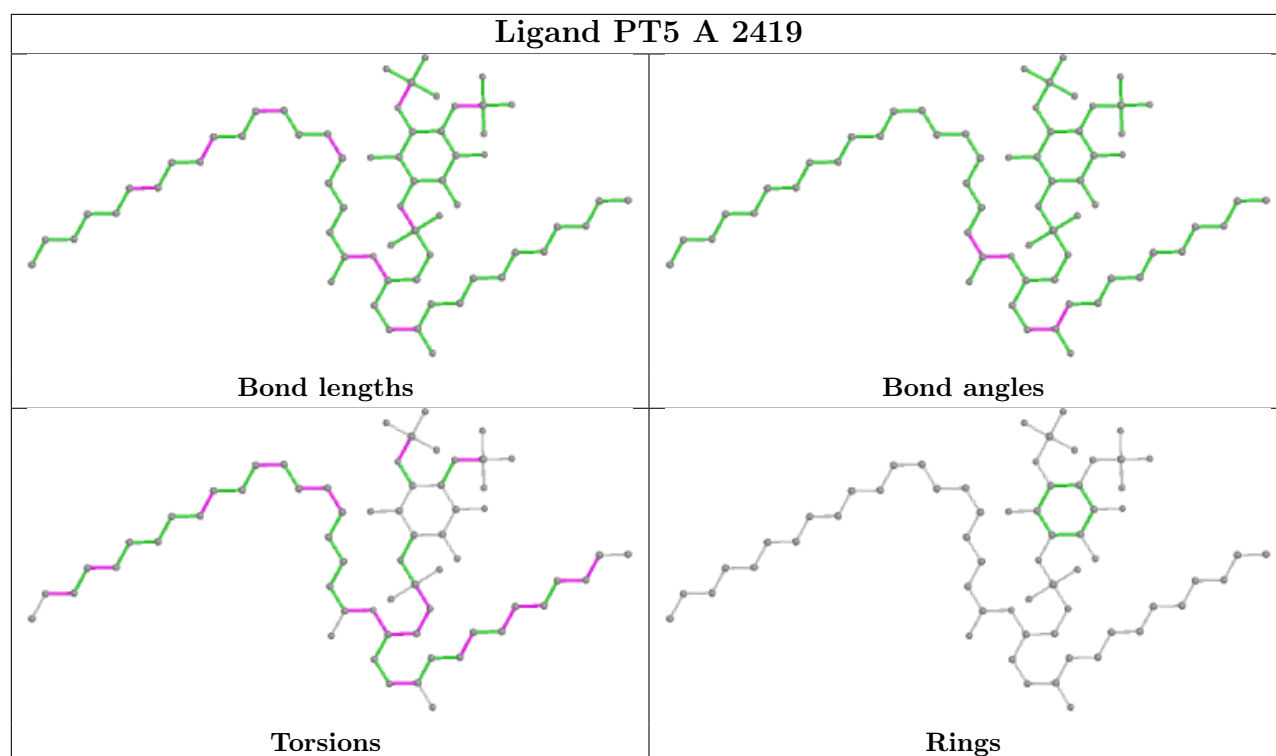
Mol	Chain	Res	Type	Atoms
7	A	2403	Y01	CAO-CBB-CBE-CAP
7	A	2403	Y01	CAO-CBB-CBE-CBI
7	A	2403	Y01	CAC-CBB-CBE-CBI
7	A	2418	Y01	OAG-CAY-OAW-CBC
7	A	2418	Y01	CAM-CAY-OAW-CBC

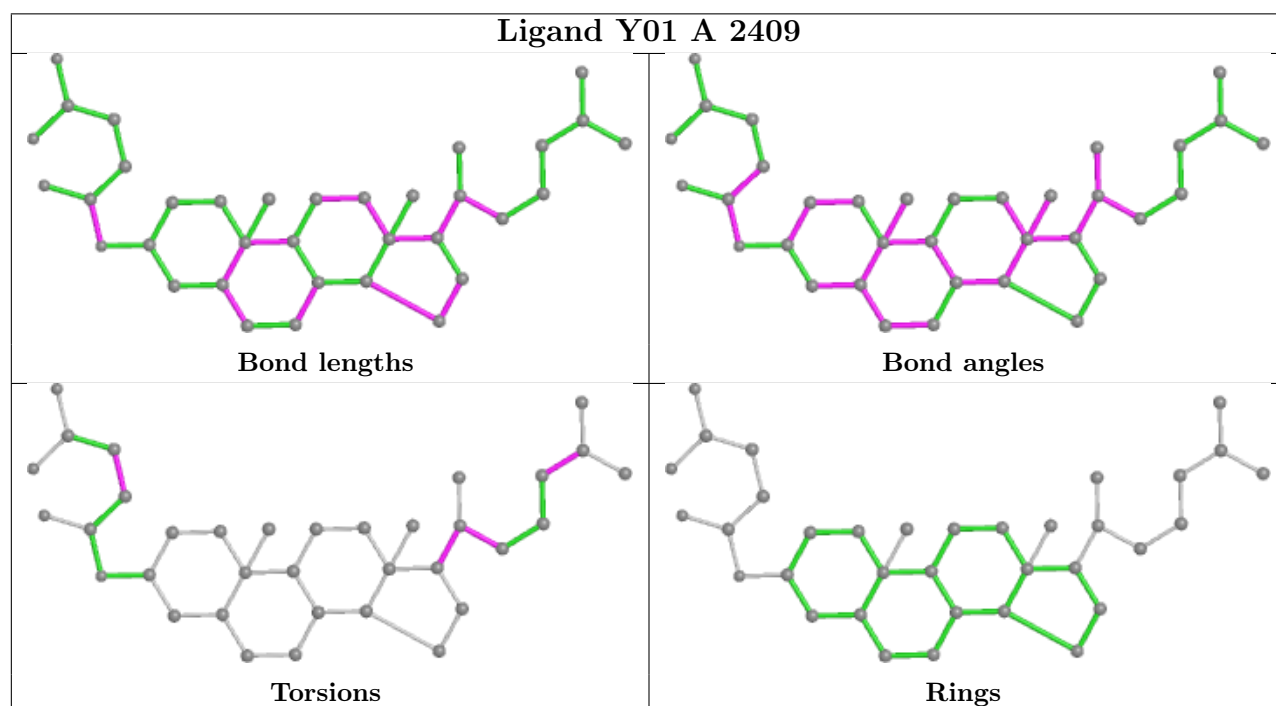
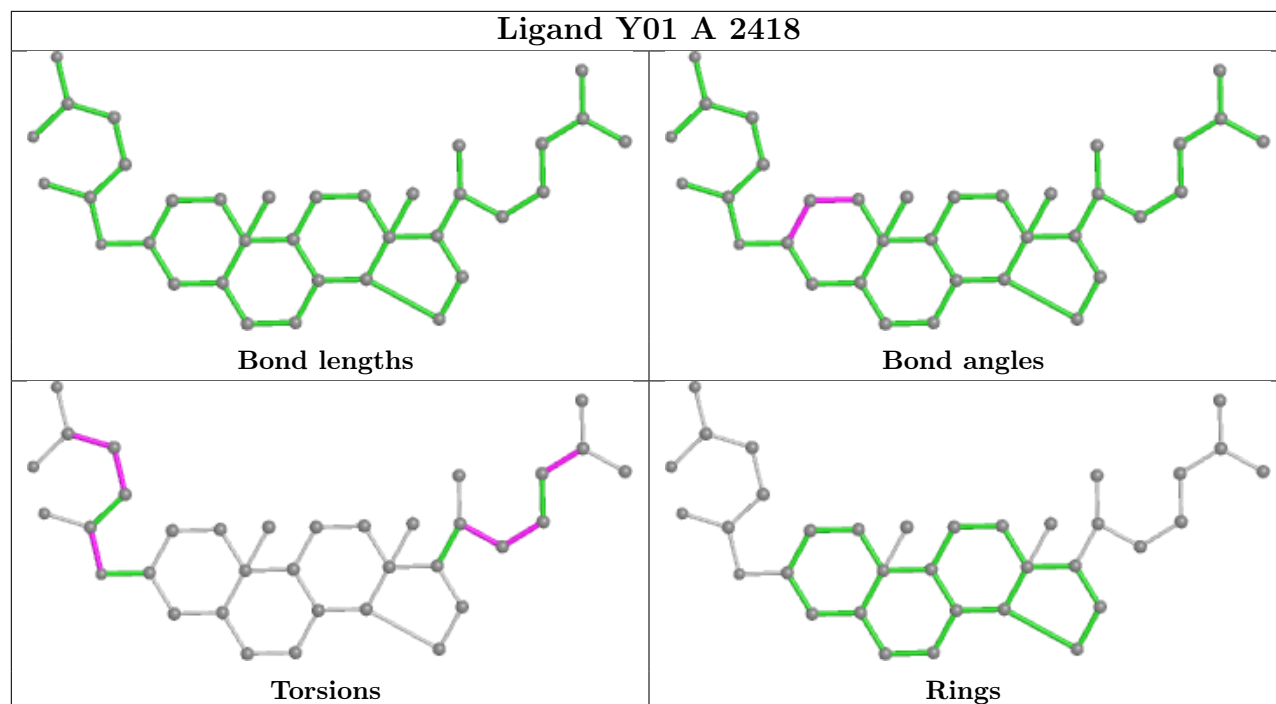
There are no ring outliers.

17 monomers are involved in 28 short contacts:

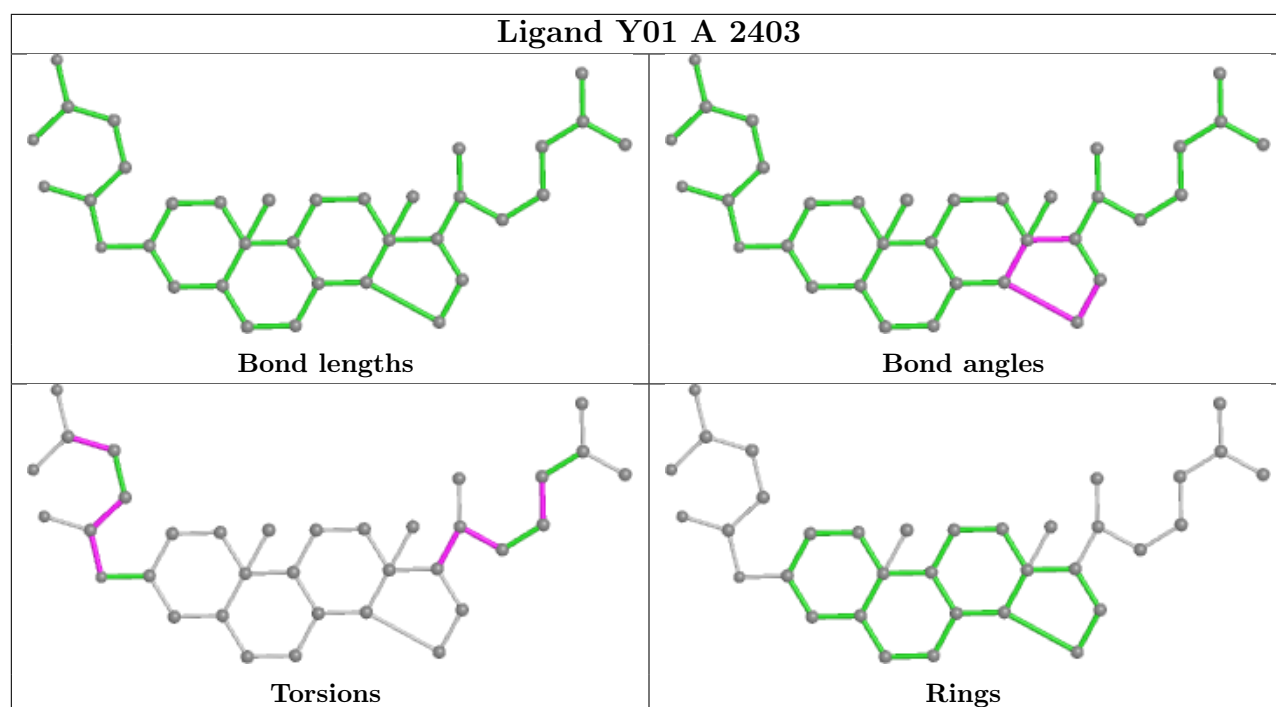
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	2401	R16	3	0
8	A	2419	PT5	7	0
9	A	2420	6I7	1	0
7	A	2418	Y01	1	0
6	A	2408	R16	1	0
11	B	1209	NAG	1	0
6	A	2407	R16	2	0
6	A	2406	R16	1	0
6	A	2415	R16	1	0
7	A	2409	Y01	3	0
11	B	1205	NAG	1	0
11	B	1206	NAG	1	0
6	A	2414	R16	2	0
6	A	2410	R16	1	0
6	A	2417	R16	1	0
6	A	2402	R16	1	0
7	A	2403	Y01	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.

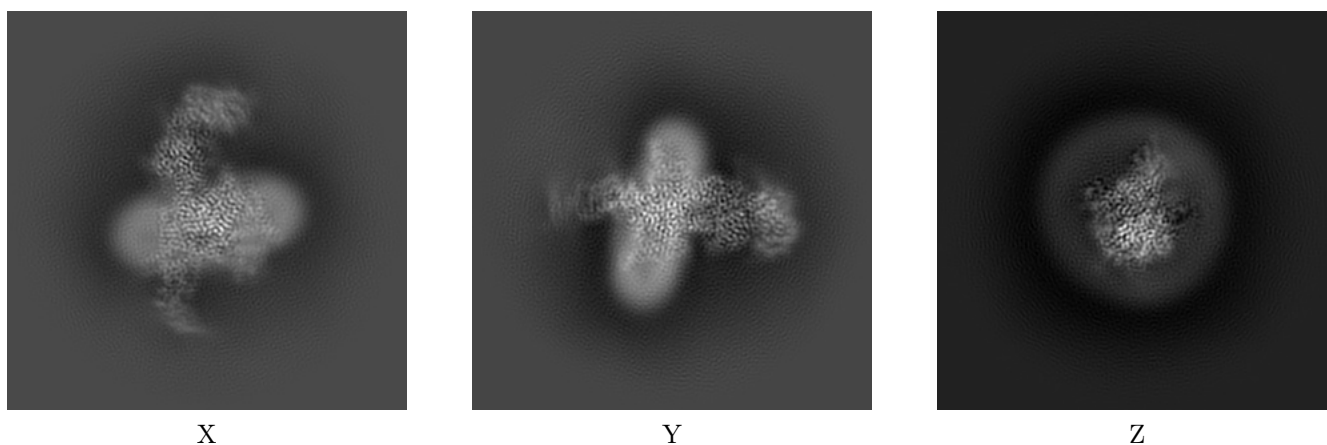
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-31961. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

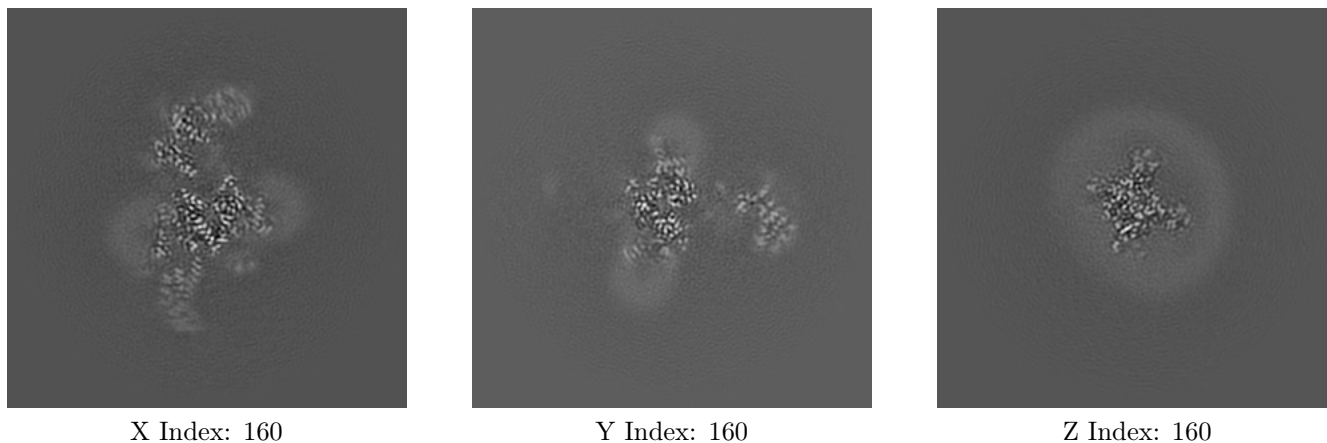
#### 6.1.1 Primary map



The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

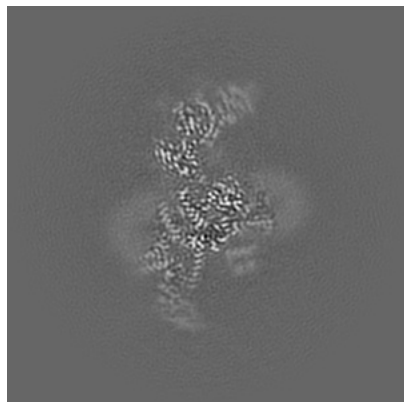
#### 6.2.1 Primary map



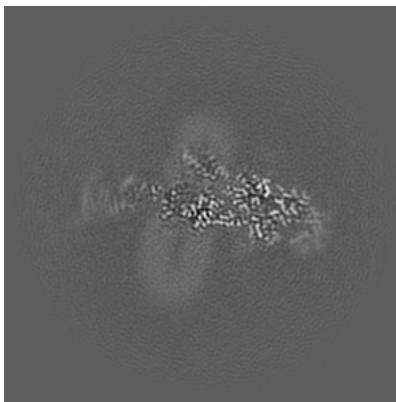
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

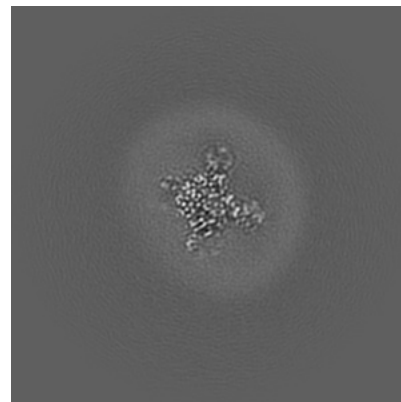
### 6.3.1 Primary map



X Index: 164



Y Index: 144



Z Index: 159

The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal surface views [i](#)

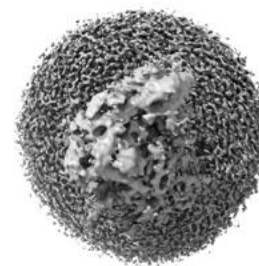
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.3. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

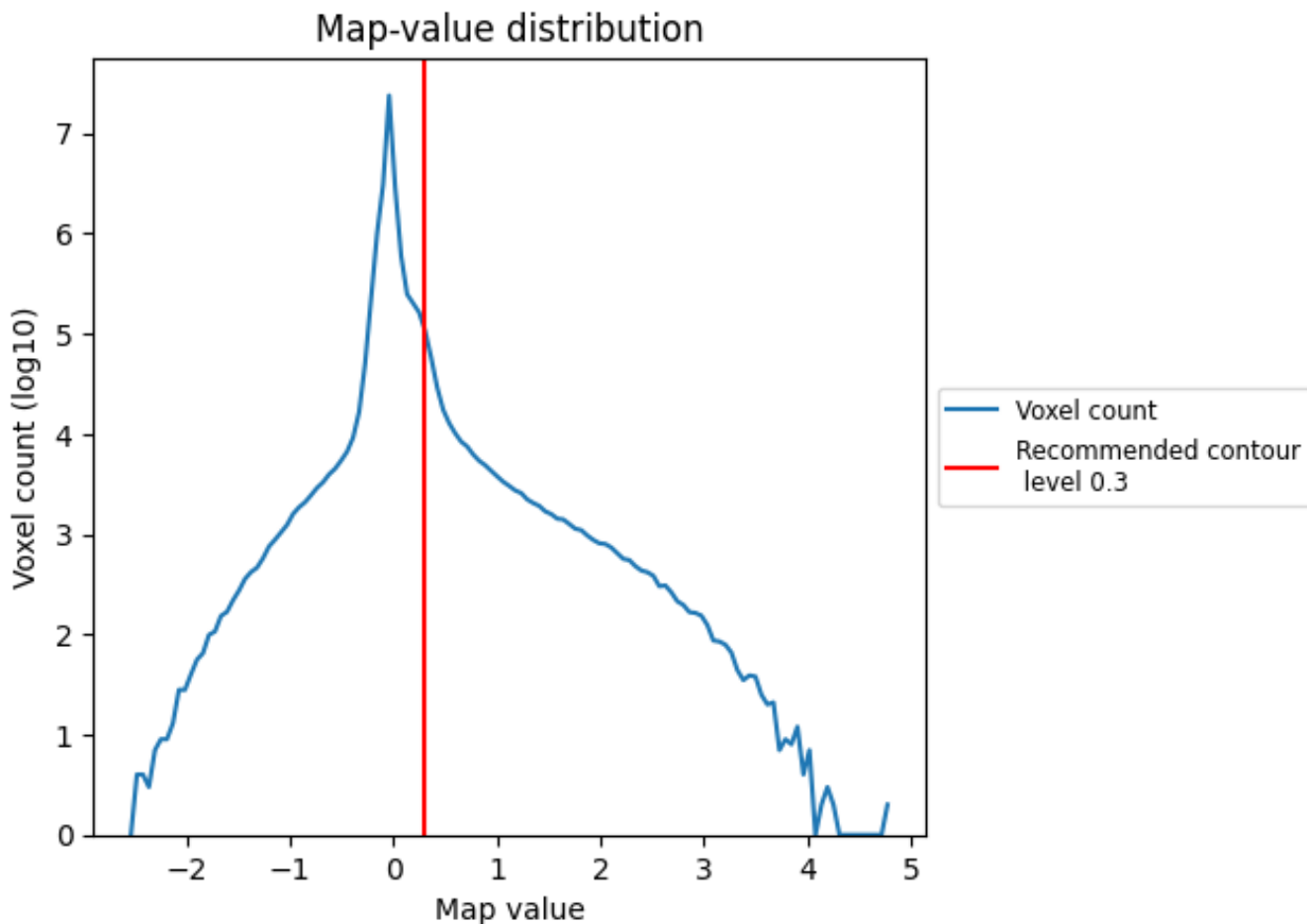
## 6.5 Mask visualisation

This section was not generated. No masks/segmentation were deposited.

## 7 Map analysis [i](#)

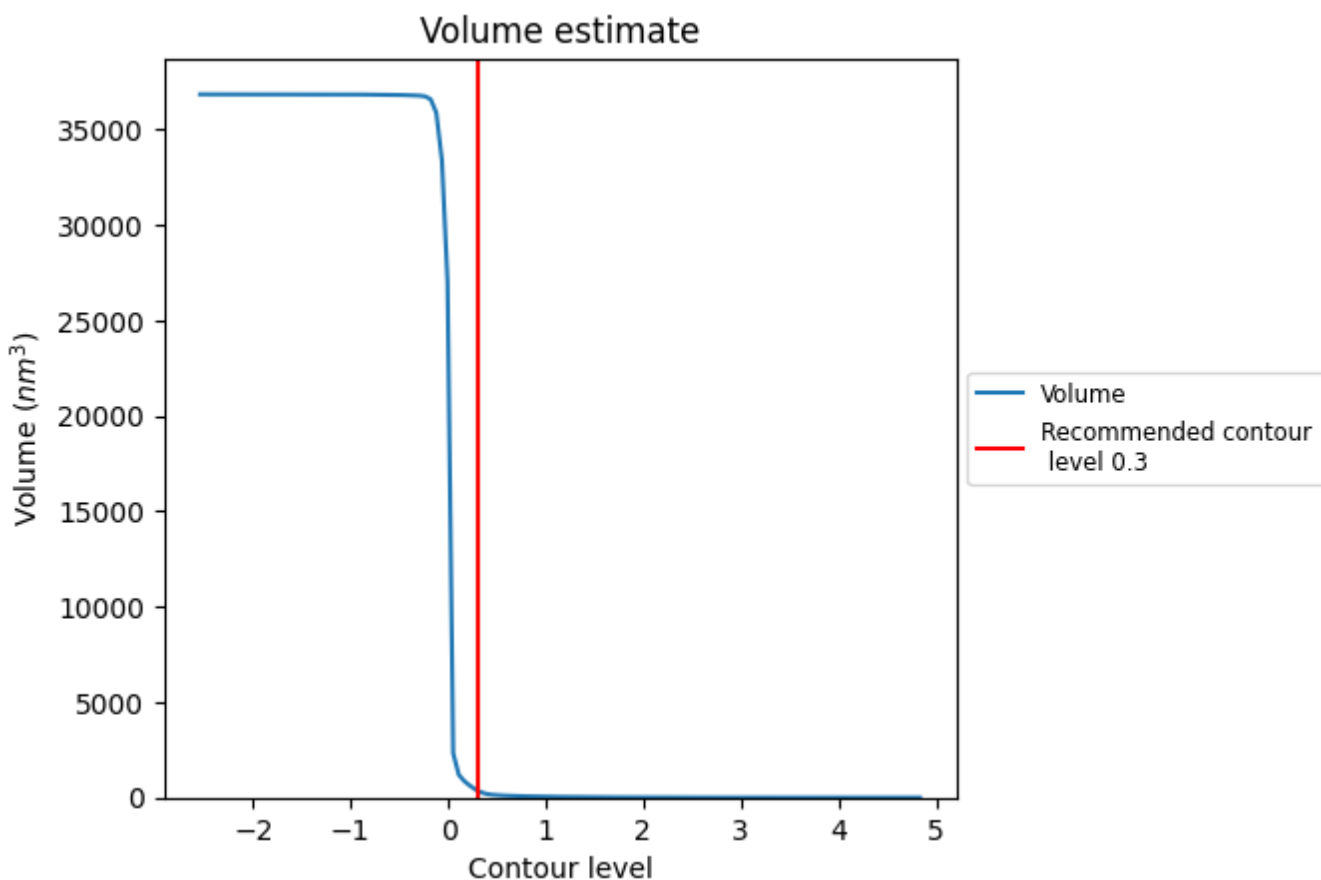
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

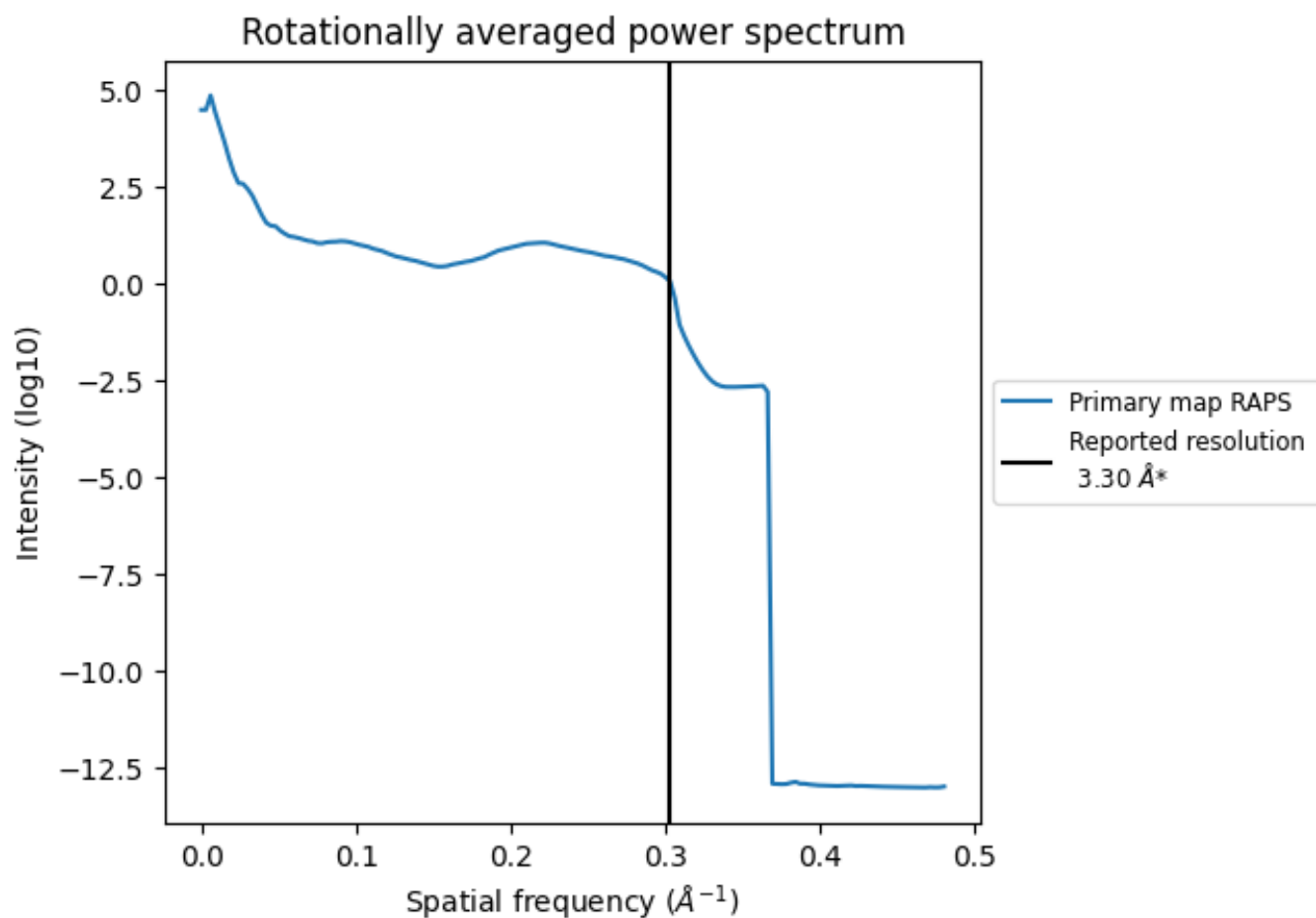
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 372 nm<sup>3</sup>; this corresponds to an approximate mass of 336 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum [i](#)



\*Reported resolution corresponds to spatial frequency of  $0.303 \text{ \AA}^{-1}$

## 8 Fourier-Shell correlation

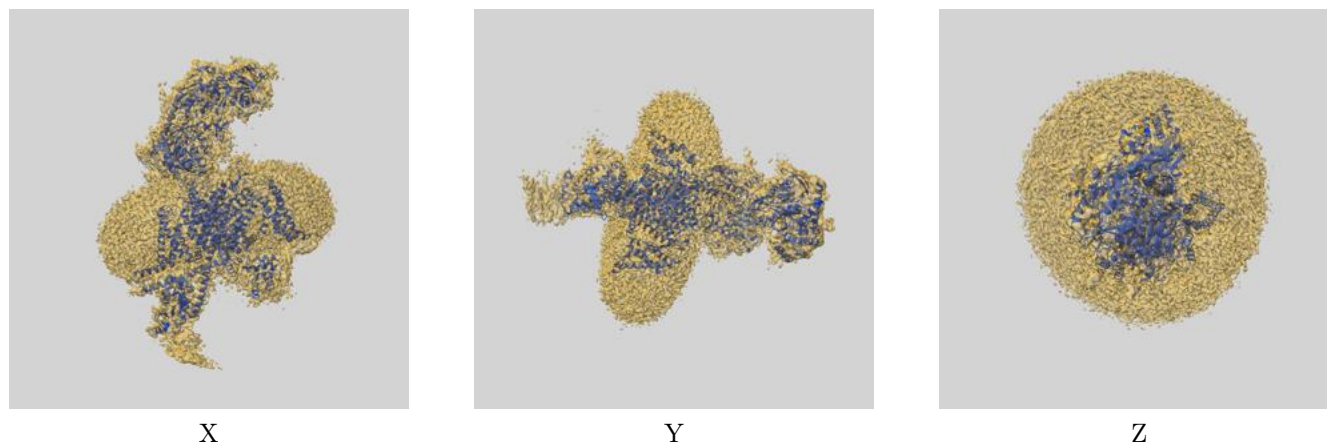
This section was not generated. No FSC curve or half-maps provided.



## 9 Map-model fit [i](#)

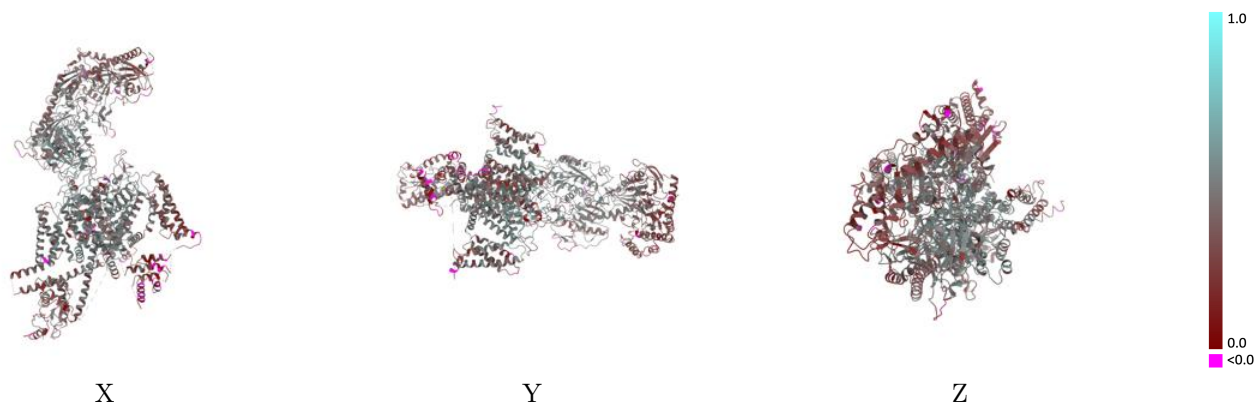
This section contains information regarding the fit between EMDB map EMD-31961 and PDB model 7VFW. Per-residue inclusion information can be found in section [3](#) on page [8](#).

### 9.1 Map-model overlay [i](#)



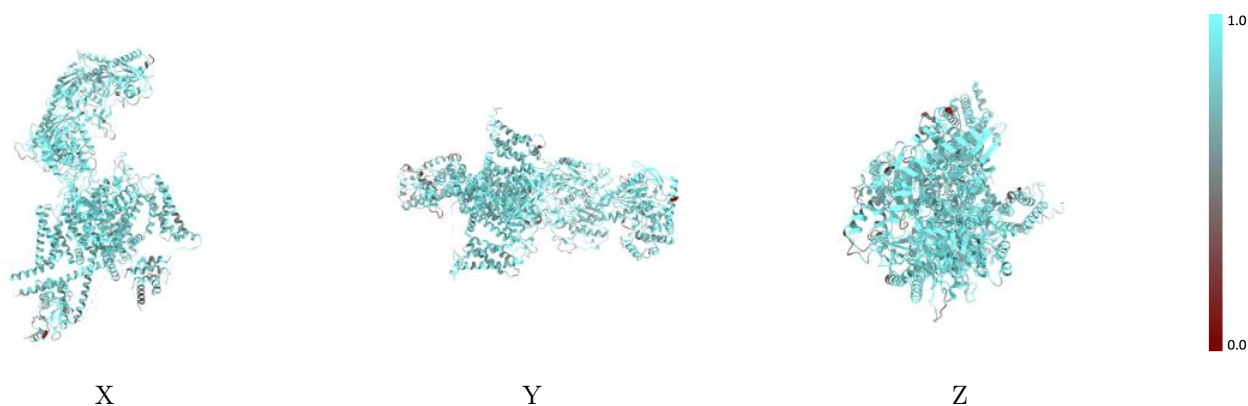
The images above show the 3D surface view of the map at the recommended contour level 0.3 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)



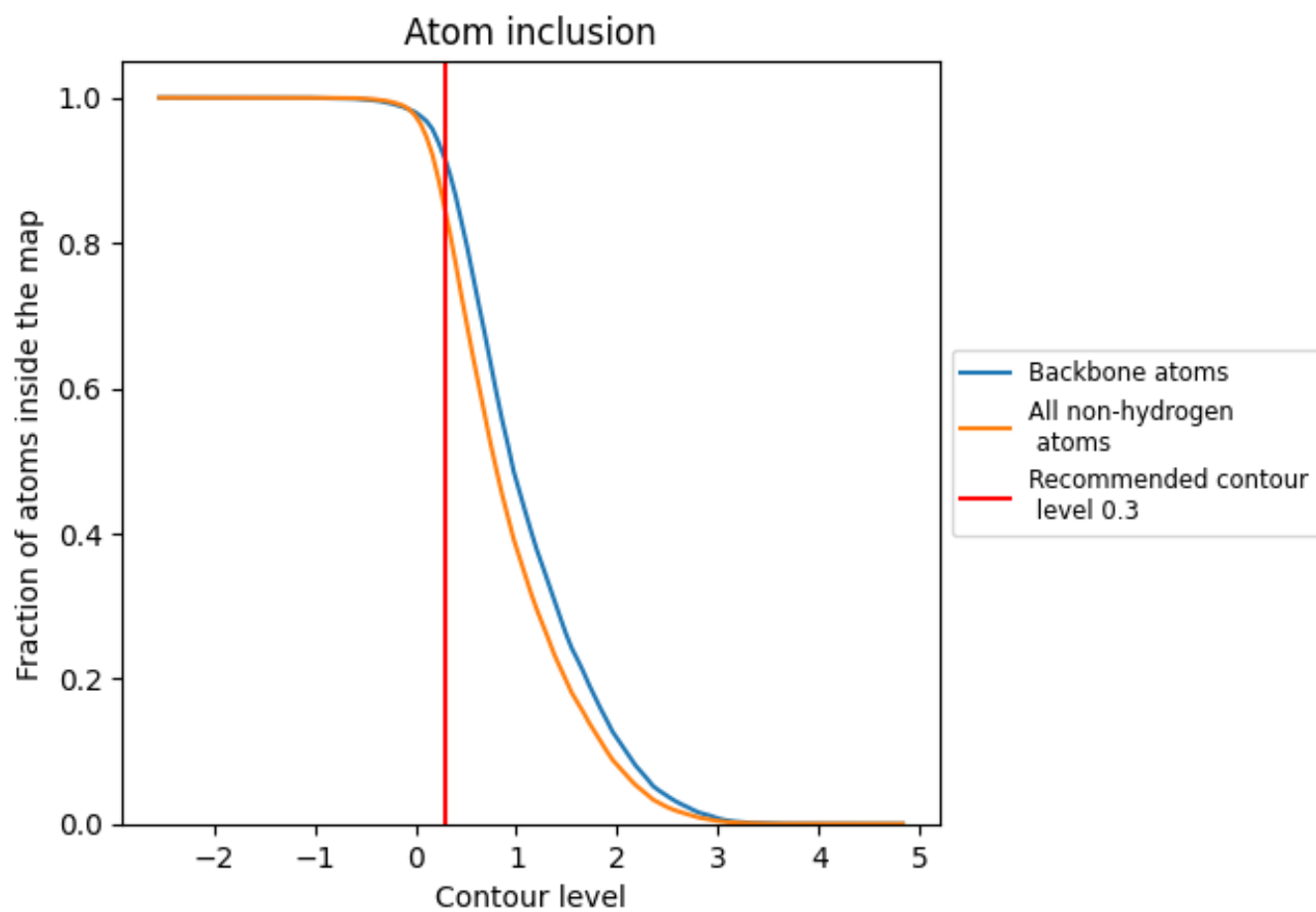
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.3).















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.3) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8411	 0.4070
A	 0.8574	 0.4290
B	 0.8373	 0.3890
C	 0.6667	 0.2760
D	 0.7326	 0.3350
E	 0.9231	 0.4400
F	 0.7436	 0.2810

