



## Full wwPDB EM Validation Report ⓘ

Mar 10, 2022 – 01:45 am GMT

PDB ID : 7Q1Z  
EMDB ID : EMD-13776  
Title : Structure of formaldehyde cross-linked SARS-CoV-2 S glycoprotein  
Authors : Sulbaran, G.; Effantin, G.; Schoehn, G.; Weissenhorn, W.  
Deposited on : 2021-10-22  
Resolution : 3.40 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

EMDB validation analysis : 0.0.0.dev97  
Mogul : 1.8.4, 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)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.27

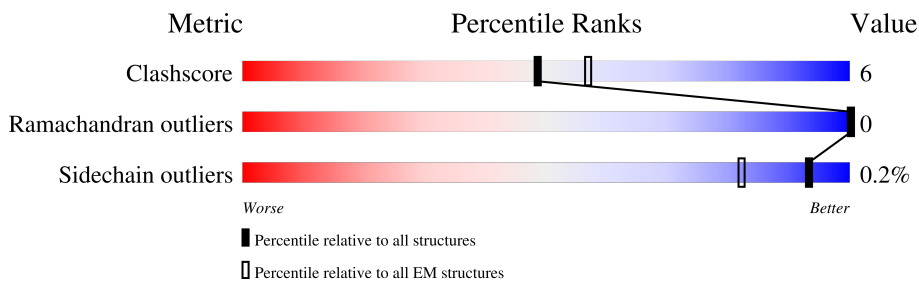
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.40 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	1288	
1	B	1288	
1	C	1288	
2	D	2	
2	E	2	
2	F	2	
2	G	2	
2	H	2	

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Mol	Chain	Length	Quality of chain
2	I	2	 100%
2	J	2	 50%
2	K	2	 100%
2	L	2	 100%
2	M	2	 100%
2	N	2	 100%
2	O	2	 100%
2	P	2	 100%
2	Q	2	 100%
2	R	2	 100%

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 23694 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 Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	972	7604	4861	1262	1448	33	0	0
1	B	972	7604	4861	1262	1448	33	0	0
1	C	972	7604	4861	1262	1448	33	0	0

There are 255 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	682	GLY	ARG	conflict	UNP P0DTC2
A	683	SER	ARG	conflict	UNP P0DTC2
A	685	SER	ARG	conflict	UNP P0DTC2
A	986	PRO	LYS	conflict	UNP P0DTC2
A	987	PRO	VAL	conflict	UNP P0DTC2
A	1209	GLY	-	expression tag	UNP P0DTC2
A	1210	SER	-	expression tag	UNP P0DTC2
A	1211	GLY	-	expression tag	UNP P0DTC2
A	1212	TYR	-	expression tag	UNP P0DTC2
A	1213	ILE	-	expression tag	UNP P0DTC2
A	1214	PRO	-	expression tag	UNP P0DTC2
A	1215	GLU	-	expression tag	UNP P0DTC2
A	1216	ALA	-	expression tag	UNP P0DTC2
A	1217	PRO	-	expression tag	UNP P0DTC2
A	1218	ARG	-	expression tag	UNP P0DTC2
A	1219	ASP	-	expression tag	UNP P0DTC2
A	1220	GLY	-	expression tag	UNP P0DTC2
A	1221	GLN	-	expression tag	UNP P0DTC2
A	1222	ALA	-	expression tag	UNP P0DTC2
A	1223	TYR	-	expression tag	UNP P0DTC2
A	1224	VAL	-	expression tag	UNP P0DTC2
A	1225	ARG	-	expression tag	UNP P0DTC2
A	1226	LYS	-	expression tag	UNP P0DTC2
A	1227	ASP	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1228	GLY	-	expression tag	UNP P0DTC2
A	1229	GLU	-	expression tag	UNP P0DTC2
A	1230	TRP	-	expression tag	UNP P0DTC2
A	1231	VAL	-	expression tag	UNP P0DTC2
A	1232	LEU	-	expression tag	UNP P0DTC2
A	1233	LEU	-	expression tag	UNP P0DTC2
A	1234	SER	-	expression tag	UNP P0DTC2
A	1235	THR	-	expression tag	UNP P0DTC2
A	1236	PHE	-	expression tag	UNP P0DTC2
A	1237	LEU	-	expression tag	UNP P0DTC2
A	1238	GLY	-	expression tag	UNP P0DTC2
A	1239	ARG	-	expression tag	UNP P0DTC2
A	1240	SER	-	expression tag	UNP P0DTC2
A	1241	LEU	-	expression tag	UNP P0DTC2
A	1242	GLU	-	expression tag	UNP P0DTC2
A	1243	VAL	-	expression tag	UNP P0DTC2
A	1244	LEU	-	expression tag	UNP P0DTC2
A	1245	PHE	-	expression tag	UNP P0DTC2
A	1246	GLN	-	expression tag	UNP P0DTC2
A	1247	GLY	-	expression tag	UNP P0DTC2
A	1248	PRO	-	expression tag	UNP P0DTC2
A	1249	GLY	-	expression tag	UNP P0DTC2
A	1250	HIS	-	expression tag	UNP P0DTC2
A	1251	HIS	-	expression tag	UNP P0DTC2
A	1252	HIS	-	expression tag	UNP P0DTC2
A	1253	HIS	-	expression tag	UNP P0DTC2
A	1254	HIS	-	expression tag	UNP P0DTC2
A	1255	HIS	-	expression tag	UNP P0DTC2
A	1256	HIS	-	expression tag	UNP P0DTC2
A	1257	HIS	-	expression tag	UNP P0DTC2
A	1258	SER	-	expression tag	UNP P0DTC2
A	1259	ALA	-	expression tag	UNP P0DTC2
A	1260	TRP	-	expression tag	UNP P0DTC2
A	1261	SER	-	expression tag	UNP P0DTC2
A	1262	HIS	-	expression tag	UNP P0DTC2
A	1263	PRO	-	expression tag	UNP P0DTC2
A	1264	GLN	-	expression tag	UNP P0DTC2
A	1265	PHE	-	expression tag	UNP P0DTC2
A	1266	GLU	-	expression tag	UNP P0DTC2
A	1267	LYS	-	expression tag	UNP P0DTC2
A	1268	GLY	-	expression tag	UNP P0DTC2
A	1269	GLY	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1270	GLY	-	expression tag	UNP P0DTC2
A	1271	SER	-	expression tag	UNP P0DTC2
A	1272	GLY	-	expression tag	UNP P0DTC2
A	1273	GLY	-	expression tag	UNP P0DTC2
A	1274	GLY	-	expression tag	UNP P0DTC2
A	1275	GLY	-	expression tag	UNP P0DTC2
A	1276	SER	-	expression tag	UNP P0DTC2
A	1277	GLY	-	expression tag	UNP P0DTC2
A	1278	GLY	-	expression tag	UNP P0DTC2
A	1279	SER	-	expression tag	UNP P0DTC2
A	1280	ALA	-	expression tag	UNP P0DTC2
A	1281	TRP	-	expression tag	UNP P0DTC2
A	1282	SER	-	expression tag	UNP P0DTC2
A	1283	HIS	-	expression tag	UNP P0DTC2
A	1284	PRO	-	expression tag	UNP P0DTC2
A	1285	GLN	-	expression tag	UNP P0DTC2
A	1286	PHE	-	expression tag	UNP P0DTC2
A	1287	GLU	-	expression tag	UNP P0DTC2
A	1288	LYS	-	expression tag	UNP P0DTC2
B	682	GLY	ARG	conflict	UNP P0DTC2
B	683	SER	ARG	conflict	UNP P0DTC2
B	685	SER	ARG	conflict	UNP P0DTC2
B	986	PRO	LYS	conflict	UNP P0DTC2
B	987	PRO	VAL	conflict	UNP P0DTC2
B	1209	GLY	-	expression tag	UNP P0DTC2
B	1210	SER	-	expression tag	UNP P0DTC2
B	1211	GLY	-	expression tag	UNP P0DTC2
B	1212	TYR	-	expression tag	UNP P0DTC2
B	1213	ILE	-	expression tag	UNP P0DTC2
B	1214	PRO	-	expression tag	UNP P0DTC2
B	1215	GLU	-	expression tag	UNP P0DTC2
B	1216	ALA	-	expression tag	UNP P0DTC2
B	1217	PRO	-	expression tag	UNP P0DTC2
B	1218	ARG	-	expression tag	UNP P0DTC2
B	1219	ASP	-	expression tag	UNP P0DTC2
B	1220	GLY	-	expression tag	UNP P0DTC2
B	1221	GLN	-	expression tag	UNP P0DTC2
B	1222	ALA	-	expression tag	UNP P0DTC2
B	1223	TYR	-	expression tag	UNP P0DTC2
B	1224	VAL	-	expression tag	UNP P0DTC2
B	1225	ARG	-	expression tag	UNP P0DTC2
B	1226	LYS	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1227	ASP	-	expression tag	UNP P0DTC2
B	1228	GLY	-	expression tag	UNP P0DTC2
B	1229	GLU	-	expression tag	UNP P0DTC2
B	1230	TRP	-	expression tag	UNP P0DTC2
B	1231	VAL	-	expression tag	UNP P0DTC2
B	1232	LEU	-	expression tag	UNP P0DTC2
B	1233	LEU	-	expression tag	UNP P0DTC2
B	1234	SER	-	expression tag	UNP P0DTC2
B	1235	THR	-	expression tag	UNP P0DTC2
B	1236	PHE	-	expression tag	UNP P0DTC2
B	1237	LEU	-	expression tag	UNP P0DTC2
B	1238	GLY	-	expression tag	UNP P0DTC2
B	1239	ARG	-	expression tag	UNP P0DTC2
B	1240	SER	-	expression tag	UNP P0DTC2
B	1241	LEU	-	expression tag	UNP P0DTC2
B	1242	GLU	-	expression tag	UNP P0DTC2
B	1243	VAL	-	expression tag	UNP P0DTC2
B	1244	LEU	-	expression tag	UNP P0DTC2
B	1245	PHE	-	expression tag	UNP P0DTC2
B	1246	GLN	-	expression tag	UNP P0DTC2
B	1247	GLY	-	expression tag	UNP P0DTC2
B	1248	PRO	-	expression tag	UNP P0DTC2
B	1249	GLY	-	expression tag	UNP P0DTC2
B	1250	HIS	-	expression tag	UNP P0DTC2
B	1251	HIS	-	expression tag	UNP P0DTC2
B	1252	HIS	-	expression tag	UNP P0DTC2
B	1253	HIS	-	expression tag	UNP P0DTC2
B	1254	HIS	-	expression tag	UNP P0DTC2
B	1255	HIS	-	expression tag	UNP P0DTC2
B	1256	HIS	-	expression tag	UNP P0DTC2
B	1257	HIS	-	expression tag	UNP P0DTC2
B	1258	SER	-	expression tag	UNP P0DTC2
B	1259	ALA	-	expression tag	UNP P0DTC2
B	1260	TRP	-	expression tag	UNP P0DTC2
B	1261	SER	-	expression tag	UNP P0DTC2
B	1262	HIS	-	expression tag	UNP P0DTC2
B	1263	PRO	-	expression tag	UNP P0DTC2
B	1264	GLN	-	expression tag	UNP P0DTC2
B	1265	PHE	-	expression tag	UNP P0DTC2
B	1266	GLU	-	expression tag	UNP P0DTC2
B	1267	LYS	-	expression tag	UNP P0DTC2
B	1268	GLY	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1269	GLY	-	expression tag	UNP P0DTC2
B	1270	GLY	-	expression tag	UNP P0DTC2
B	1271	SER	-	expression tag	UNP P0DTC2
B	1272	GLY	-	expression tag	UNP P0DTC2
B	1273	GLY	-	expression tag	UNP P0DTC2
B	1274	GLY	-	expression tag	UNP P0DTC2
B	1275	GLY	-	expression tag	UNP P0DTC2
B	1276	SER	-	expression tag	UNP P0DTC2
B	1277	GLY	-	expression tag	UNP P0DTC2
B	1278	GLY	-	expression tag	UNP P0DTC2
B	1279	SER	-	expression tag	UNP P0DTC2
B	1280	ALA	-	expression tag	UNP P0DTC2
B	1281	TRP	-	expression tag	UNP P0DTC2
B	1282	SER	-	expression tag	UNP P0DTC2
B	1283	HIS	-	expression tag	UNP P0DTC2
B	1284	PRO	-	expression tag	UNP P0DTC2
B	1285	GLN	-	expression tag	UNP P0DTC2
B	1286	PHE	-	expression tag	UNP P0DTC2
B	1287	GLU	-	expression tag	UNP P0DTC2
B	1288	LYS	-	expression tag	UNP P0DTC2
C	682	GLY	ARG	conflict	UNP P0DTC2
C	683	SER	ARG	conflict	UNP P0DTC2
C	685	SER	ARG	conflict	UNP P0DTC2
C	986	PRO	LYS	conflict	UNP P0DTC2
C	987	PRO	VAL	conflict	UNP P0DTC2
C	1209	GLY	-	expression tag	UNP P0DTC2
C	1210	SER	-	expression tag	UNP P0DTC2
C	1211	GLY	-	expression tag	UNP P0DTC2
C	1212	TYR	-	expression tag	UNP P0DTC2
C	1213	ILE	-	expression tag	UNP P0DTC2
C	1214	PRO	-	expression tag	UNP P0DTC2
C	1215	GLU	-	expression tag	UNP P0DTC2
C	1216	ALA	-	expression tag	UNP P0DTC2
C	1217	PRO	-	expression tag	UNP P0DTC2
C	1218	ARG	-	expression tag	UNP P0DTC2
C	1219	ASP	-	expression tag	UNP P0DTC2
C	1220	GLY	-	expression tag	UNP P0DTC2
C	1221	GLN	-	expression tag	UNP P0DTC2
C	1222	ALA	-	expression tag	UNP P0DTC2
C	1223	TYR	-	expression tag	UNP P0DTC2
C	1224	VAL	-	expression tag	UNP P0DTC2
C	1225	ARG	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1226	LYS	-	expression tag	UNP P0DTC2
C	1227	ASP	-	expression tag	UNP P0DTC2
C	1228	GLY	-	expression tag	UNP P0DTC2
C	1229	GLU	-	expression tag	UNP P0DTC2
C	1230	TRP	-	expression tag	UNP P0DTC2
C	1231	VAL	-	expression tag	UNP P0DTC2
C	1232	LEU	-	expression tag	UNP P0DTC2
C	1233	LEU	-	expression tag	UNP P0DTC2
C	1234	SER	-	expression tag	UNP P0DTC2
C	1235	THR	-	expression tag	UNP P0DTC2
C	1236	PHE	-	expression tag	UNP P0DTC2
C	1237	LEU	-	expression tag	UNP P0DTC2
C	1238	GLY	-	expression tag	UNP P0DTC2
C	1239	ARG	-	expression tag	UNP P0DTC2
C	1240	SER	-	expression tag	UNP P0DTC2
C	1241	LEU	-	expression tag	UNP P0DTC2
C	1242	GLU	-	expression tag	UNP P0DTC2
C	1243	VAL	-	expression tag	UNP P0DTC2
C	1244	LEU	-	expression tag	UNP P0DTC2
C	1245	PHE	-	expression tag	UNP P0DTC2
C	1246	GLN	-	expression tag	UNP P0DTC2
C	1247	GLY	-	expression tag	UNP P0DTC2
C	1248	PRO	-	expression tag	UNP P0DTC2
C	1249	GLY	-	expression tag	UNP P0DTC2
C	1250	HIS	-	expression tag	UNP P0DTC2
C	1251	HIS	-	expression tag	UNP P0DTC2
C	1252	HIS	-	expression tag	UNP P0DTC2
C	1253	HIS	-	expression tag	UNP P0DTC2
C	1254	HIS	-	expression tag	UNP P0DTC2
C	1255	HIS	-	expression tag	UNP P0DTC2
C	1256	HIS	-	expression tag	UNP P0DTC2
C	1257	HIS	-	expression tag	UNP P0DTC2
C	1258	SER	-	expression tag	UNP P0DTC2
C	1259	ALA	-	expression tag	UNP P0DTC2
C	1260	TRP	-	expression tag	UNP P0DTC2
C	1261	SER	-	expression tag	UNP P0DTC2
C	1262	HIS	-	expression tag	UNP P0DTC2
C	1263	PRO	-	expression tag	UNP P0DTC2
C	1264	GLN	-	expression tag	UNP P0DTC2
C	1265	PHE	-	expression tag	UNP P0DTC2
C	1266	GLU	-	expression tag	UNP P0DTC2
C	1267	LYS	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	1268	GLY	-	expression tag	UNP P0DTC2
C	1269	GLY	-	expression tag	UNP P0DTC2
C	1270	GLY	-	expression tag	UNP P0DTC2
C	1271	SER	-	expression tag	UNP P0DTC2
C	1272	GLY	-	expression tag	UNP P0DTC2
C	1273	GLY	-	expression tag	UNP P0DTC2
C	1274	GLY	-	expression tag	UNP P0DTC2
C	1275	GLY	-	expression tag	UNP P0DTC2
C	1276	SER	-	expression tag	UNP P0DTC2
C	1277	GLY	-	expression tag	UNP P0DTC2
C	1278	GLY	-	expression tag	UNP P0DTC2
C	1279	SER	-	expression tag	UNP P0DTC2
C	1280	ALA	-	expression tag	UNP P0DTC2
C	1281	TRP	-	expression tag	UNP P0DTC2
C	1282	SER	-	expression tag	UNP P0DTC2
C	1283	HIS	-	expression tag	UNP P0DTC2
C	1284	PRO	-	expression tag	UNP P0DTC2
C	1285	GLN	-	expression tag	UNP P0DTC2
C	1286	PHE	-	expression tag	UNP P0DTC2
C	1287	GLU	-	expression tag	UNP P0DTC2
C	1288	LYS	-	expression tag	UNP P0DTC2

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



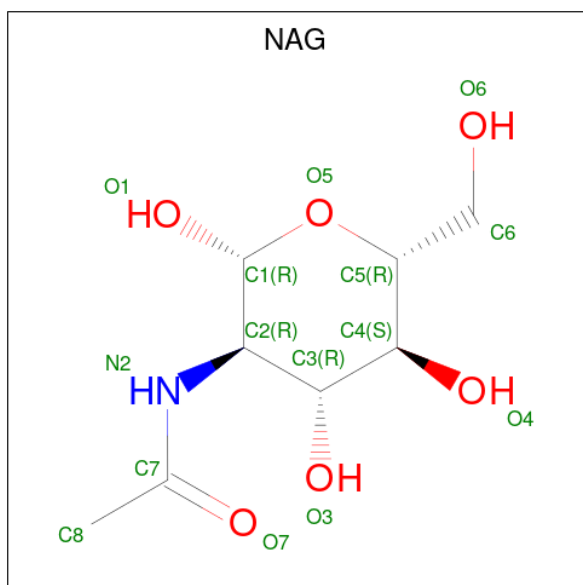
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	D	2	28	16	2	10	0	0
2	E	2	28	16	2	10	0	0
2	F	2	28	16	2	10	0	0
2	G	2	28	16	2	10	0	0
2	H	2	28	16	2	10	0	0
2	I	2	28	16	2	10	0	0

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Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	J	2	Total 28	C 16	N 2	O 10	0	0
2	K	2	Total 28	C 16	N 2	O 10	0	0
2	L	2	Total 28	C 16	N 2	O 10	0	0
2	M	2	Total 28	C 16	N 2	O 10	0	0
2	N	2	Total 28	C 16	N 2	O 10	0	0
2	O	2	Total 28	C 16	N 2	O 10	0	0
2	P	2	Total 28	C 16	N 2	O 10	0	0
2	Q	2	Total 28	C 16	N 2	O 10	0	0
2	R	2	Total 28	C 16	N 2	O 10	0	0

- Molecule 3 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>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	A	1	Total 154	C 88	N 11	O 55	0
3	A	1	Total 154	C 88	N 11	O 55	0

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	A	1	154	88	11	55	0
3	A	1	154	88	11	55	0
3	A	1	154	88	11	55	0
3	A	1	154	88	11	55	0
3	A	1	154	88	11	55	0
3	A	1	154	88	11	55	0
3	A	1	154	88	11	55	0
3	A	1	154	88	11	55	0
3	A	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	B	1	154	88	11	55	0
3	C	1	154	88	11	55	0

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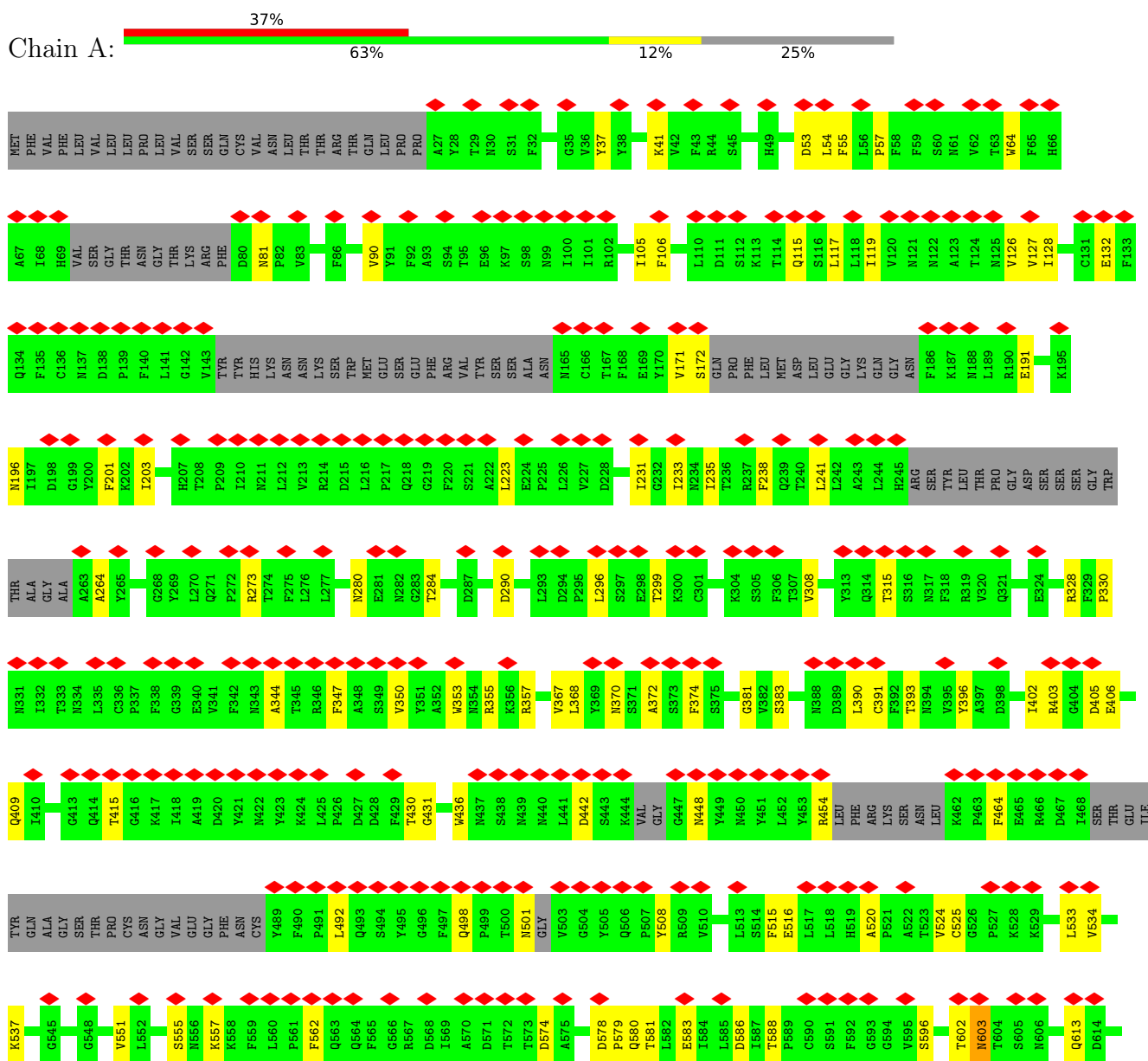
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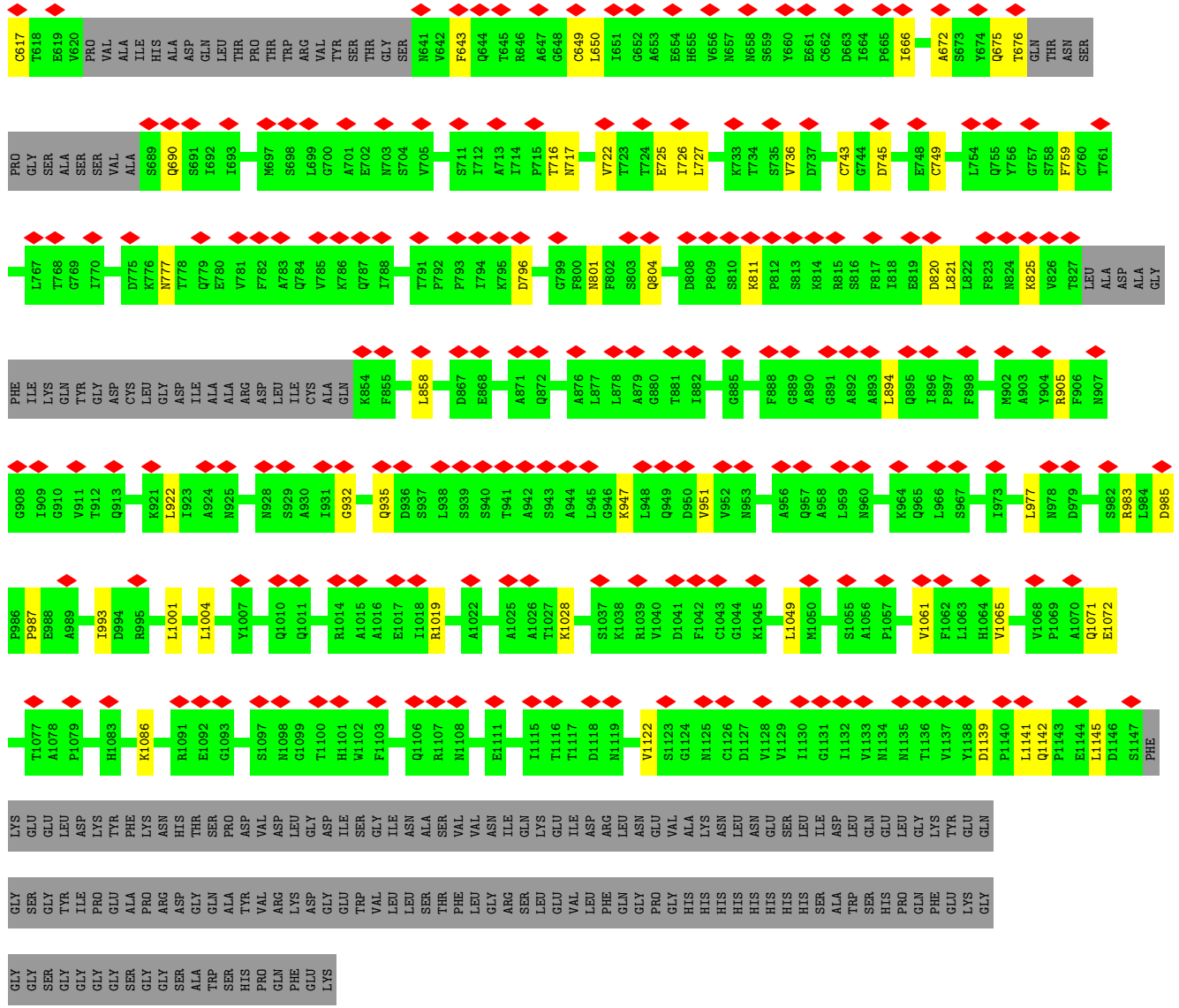
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0
3	C	1	Total 154	88	11	55	0

### 3 Residue-property plots

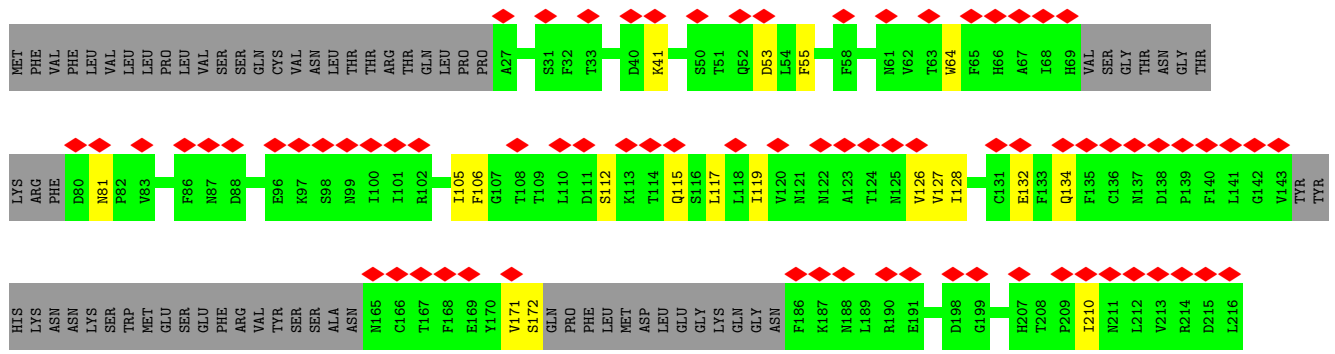
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: Spike glycoprotein





• Molecule 1: Spike glycoprotein



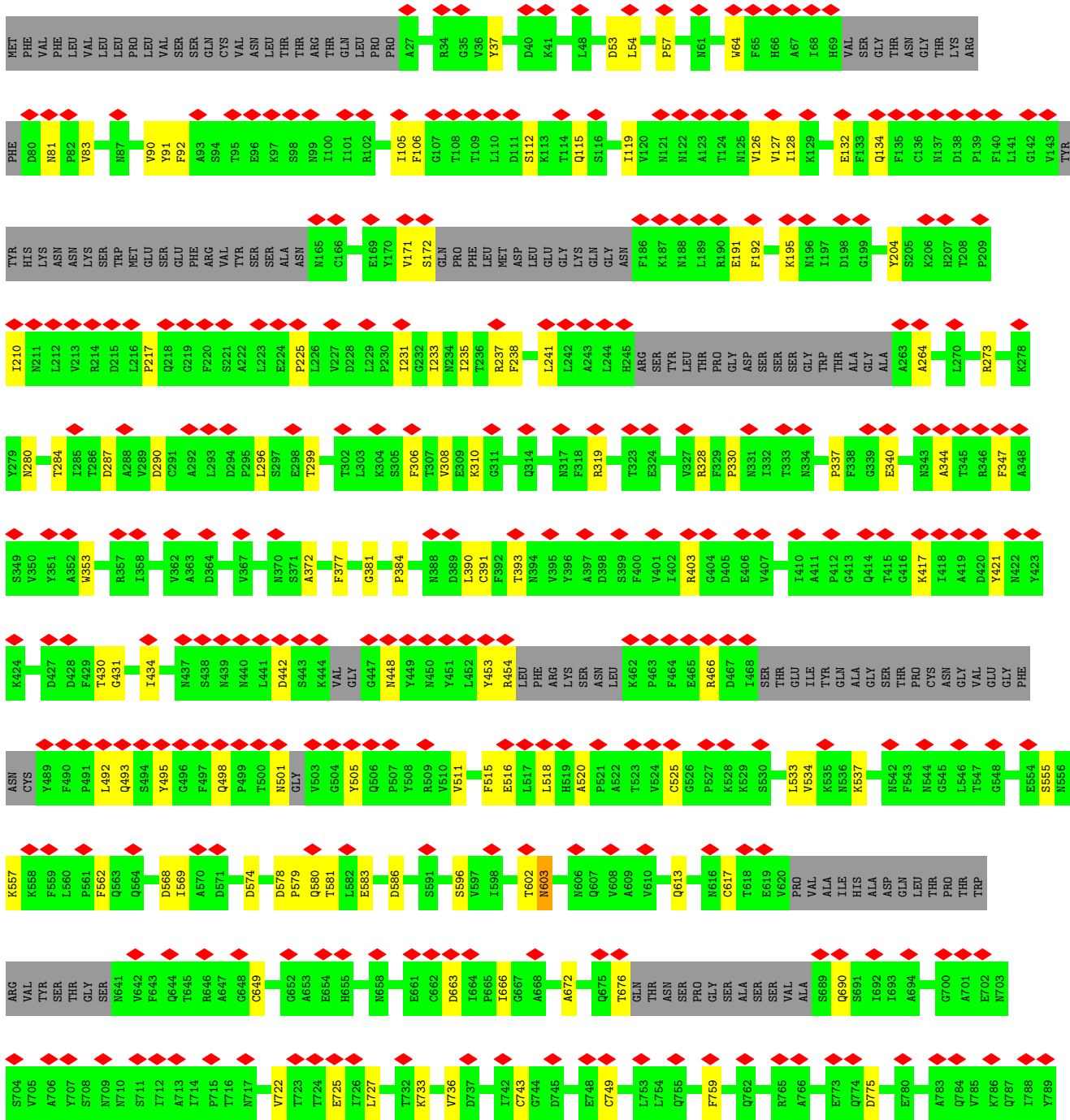
THR	P217	A363	M437	F497	1569	THR	8704	8556	A930	A1022	F1089	THR	M135
SER	0218	D364	S438	Q498	A570	GLY	W705	G857	I931	A1026	P1090	SER	T1136
PRO	G219	D294	M439	P499	D571	SER	A706	L858	G932	R1028	R1091	PRO	L1137
ASP	A222	P296	M440	T500	T572	M641	T707	T859	K933	K1027	E1092	GLY	Y1138
VAL	L223	P295	M441	M501	T573	V642	S708	F785	L934	G1028	G1093	GLY	D1139
LEU	E224	L296	D442	G503	D574	F643	N709	L894	Q935	M1029	V1094	LEU	P1140
GLY	P225	E298	L444	V503	A575	R646	R710	R800	L936	S1030	F1095	LEU	V1065
ASP	L229	T299	K300	G504	V505	A647	R712	F802	L938	E1031	G1099	ASP	V1068
ILE	P230	T299	K301	G506	V505	A647	A713	R804	S939	C1032	G1099	GLY	Q1071
SER	T231	L303	C301	Q506	G505	A647	I714	R805	S940	T1033	W1102	GLY	E1072
GLY	G932	L303	T302	Q507	G506	G648	I714	L806	T941	L1034	R1107	TYR	K1073
ASN	I233	K304	L303	Q508	Q508	G649	I717	L807	A876	G1035	R1107	ILE	N1074
SER	M230	G932	L304	V508	Q508	L650	T716	D808	A877	G1035	GLY	L1145	
VAL	E281	I233	G381	V510	T581	L651	R717	D809	M869	K1038	ILE	D1146	
VAL	N282	I234	G382	V511	L582	L652	R717	P809	A877	R1039	PRO	PHE	
THR	G283	I235	V382	V511	E583	L653	F718	F809	O872	V1040	GLY	LYS	
ASP	I285	T236	V382	S514	E584	L654	F719	S810	O873	V1040	THR	ASP	
PRO	T286	T236	V382	S515	L584	L655	T719	S811	O874	V1041	THR	ASN	
GLY	D289	R237	G314	S516	L585	L656	I720	P812	O875	D1041	GLN	ASN	
TRP	C291	ARG	Q317	E517	L586	L657	S721	S813	O876	G1044	GLY	ASN	
THR	NB60	SER	N317	E518	L587	L658	I722	R814	O877	G1045	GLY	VAL	
ALA	A340	SER	F318	L517	T588	L659	E725	R815	O878	K1045	GLY	ALA	
GLY	V341	SER	F318	L517	T588	L659	L726	R816	O879	R1045	GLY	ALA	
ALA	E340	SER	F318	L517	T588	L659	L727	S816	O880	V1046	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	L728	F817	O881	G1046	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	F728	L818	O882	Y1047	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	L733	L819	O883	L1049	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	V736	D820	O884	M1050	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	L737	L821	O885	I1051	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	T602	L822	O886	F1052	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	N603	L823	O887	G1053	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	T604	F823	O888	A1056	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	G626	N824	O889	P1057	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	S605	K825	O890	H1058	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	G627	R826	O891	L1129	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	Q607	G743	O892	T1129	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	V608	E748	O893	L1132	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	L611	C749	O894	V1060	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	Y612	S760	O895	F1062	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	Q613	N751	O896	L1063	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	D614	L762	O897	H1064	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	V615	L762	O898	V1065	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	N616	O755	O899	T1066	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	E619	F759	G908	Y1067	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	V620	O762	I909	Y1067	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	PRD	O762	T912	G1071	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	VAL	O762	N914	E1072	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	ALA	O762	V915	K1073	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	ALA	O762	L916	N1074	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	ALA	O762	E917	F1075	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	ALA	O762	Y917	T1076	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	ALA	O762	E918	T1077	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	ALA	O762	N919	A1078	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	ALA	O762	O920	P1079	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	ALA	O762	K921	C1082	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	ALA	O762	L922	H1083	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	ALA	O762	L923	T1084	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	ALA	O762	A924	G1085	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	ALA	O762	N925	K1086	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	ALA	O762	Q926	A1087	GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	ALA	O762	F927	H1088	GLY	VAL	
ALA	E340	SER	F318	L517	T588	L659	ALA	O762	N928		GLY	VAL	
GLY	V342	SER	F318	L517	T588	L659	ALA	O762	S929		GLY	VAL	

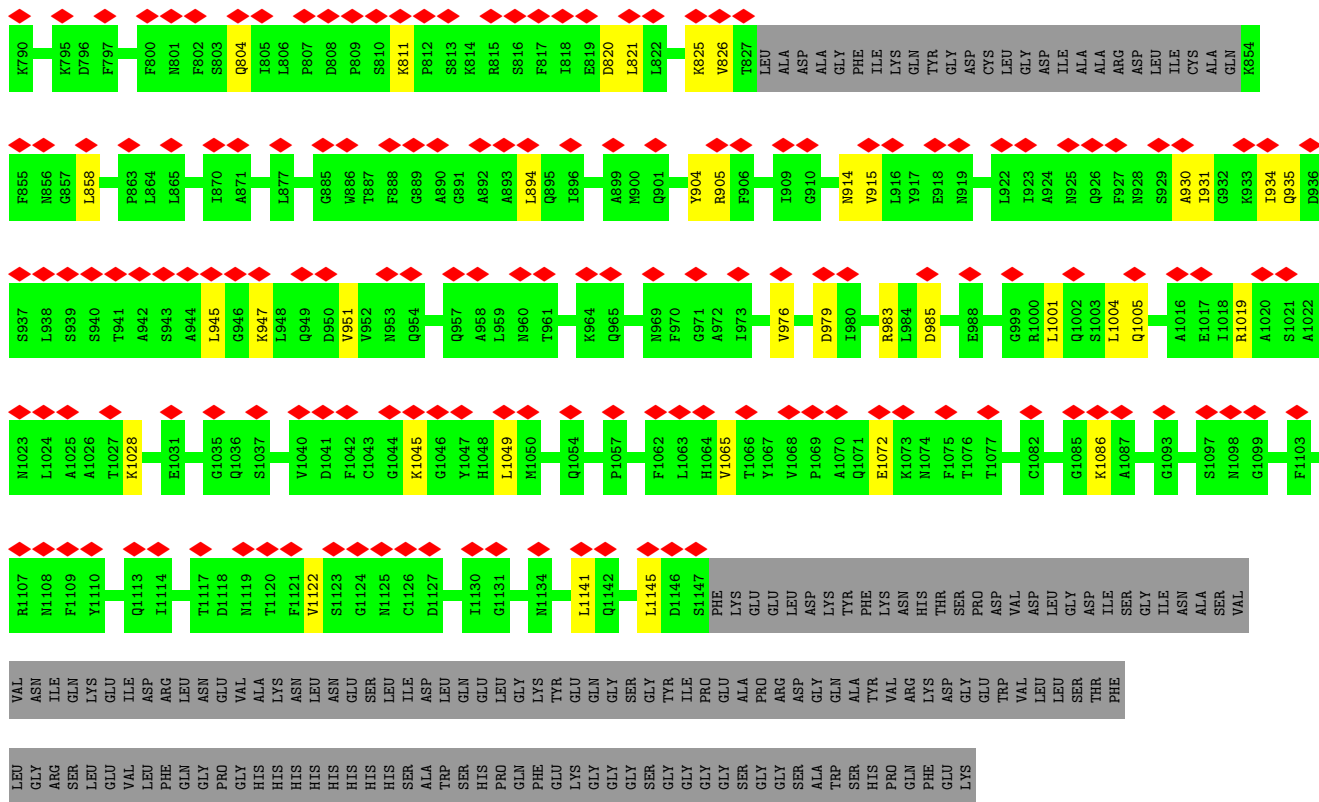


GLY	GLN	ALA	TRP	HIS	VAL	ARG	LYS	ASP	GLY	GLU	TRP	VAL	LEU	LEU	SER	THR	PHE	LEU	GLY	ARG	SER	SER	GLU	LEU	VAL	LEU	PHE	GLN	GLY	PRO	PRO	GLY	GLY	HIS	HIS	HIS	HIS	HIS	HIS	SER	ALA	ALA	TRP	SER	SER	HIS	PRO	PRO	GLN	GLU	GLY	GLY	GLY	GLY	SER	GLY	GLY	SER
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ALA	TRP	SER	HIS	PRO	GLN	PHE	GLU	LYS
-----	-----	-----	-----	-----	-----	-----	-----	-----

• Molecule 1: Spike glycoprotein





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



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



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



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



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



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



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



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



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





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



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



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



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



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



- Molecule 2: 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	126719	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40	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	1.770	Depositor
Minimum map value	-0.002	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.14	Depositor
Map size (Å)	460.0, 460.0, 460.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.15, 1.15, 1.15	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: NAG

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	0.28	0/7772	0.48	0/10572
1	B	0.28	0/7772	0.48	0/10572
1	C	0.27	0/7772	0.48	0/10572
All	All	0.28	0/23316	0.48	0/31716

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	7604	0	7419	105	0
1	B	7604	0	7419	107	0
1	C	7604	0	7417	102	0
2	D	28	0	25	0	0
2	E	28	0	25	3	0
2	F	28	0	25	1	0
2	G	28	0	25	0	0
2	H	28	0	25	0	0
2	I	28	0	25	0	0
2	J	28	0	25	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	K	28	0	25	0	0
2	L	28	0	25	0	0
2	M	28	0	25	0	0
2	N	28	0	25	0	0
2	O	28	0	25	0	0
2	P	28	0	25	0	0
2	Q	28	0	25	0	0
2	R	28	0	25	0	0
3	A	154	0	142	1	0
3	B	154	0	142	1	0
3	C	154	0	142	1	0
All	All	23694	0	23056	289	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 6.

All (289) 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:C:391:CYS:HB2	1:C:525:CYS:HA	1.53	0.90
1:B:391:CYS:HB2	1:B:525:CYS:HA	1.54	0.89
1:A:196:ASN:HD21	1:A:235:ILE:HD12	1.54	0.72
1:A:393:THR:OG1	1:A:516:GLU:OE2	2.07	0.72
1:A:191:GLU:HG2	1:A:223:LEU:HD21	1.70	0.72
1:C:557:LYS:NZ	1:C:574:ASP:OD2	2.23	0.71
1:B:355:ARG:HH22	1:B:464:PHE:HB3	1.54	0.71
1:B:557:LYS:NZ	1:B:574:ASP:OD2	2.26	0.69
1:A:557:LYS:NZ	1:A:574:ASP:OD2	2.25	0.68
1:C:83:VAL:HB	1:C:237:ARG:HH21	1.60	0.67
1:A:390:LEU:HD22	1:B:983:ARG:HG2	1.76	0.67
1:B:403:ARG:HE	1:B:495:TYR:HB2	1.58	0.67
1:A:355:ARG:HH12	1:A:464:PHE:HB3	1.59	0.66
1:A:391:CYS:HB2	1:A:525:CYS:HA	1.77	0.65
1:A:328:ARG:NH1	1:A:580:GLN:OE1	2.29	0.65
1:C:454:ARG:HH21	1:C:492:LEU:HD21	1.62	0.65
1:C:328:ARG:NH1	1:C:580:GLN:OE1	2.29	0.65
1:B:328:ARG:HH21	1:B:533:LEU:HB3	1.63	0.64
1:B:555:SER:HB3	1:B:586:ASP:HB2	1.79	0.64
1:A:983:ARG:HG2	1:C:390:LEU:HD22	1.79	0.64
1:B:328:ARG:NH1	1:B:580:GLN:OE1	2.30	0.64
1:B:390:LEU:HD22	1:C:983:ARG:HG2	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:91:TYR:OH	1:C:191:GLU:OE2	2.15	0.63
1:A:555:SER:HB3	1:A:586:ASP:HB2	1.81	0.62
1:A:403:ARG:HD2	1:A:403:ARG:N	2.14	0.62
1:A:894:LEU:HD22	1:C:1072:GLU:HG2	1.81	0.62
1:B:722:VAL:HG22	1:B:1065:VAL:HG22	1.82	0.62
1:A:393:THR:HG21	1:A:520:ALA:HB3	1.80	0.61
1:C:555:SER:HB3	1:C:586:ASP:HB2	1.82	0.61
1:C:826:VAL:HG23	1:C:945:LEU:HD13	1.82	0.61
1:A:357:ARG:HG3	1:A:396:TYR:HE2	1.66	0.61
1:B:1102:TRP:HB2	1:B:1135:ASN:ND2	2.16	0.61
1:C:64:TRP:HE1	1:C:264:ALA:HB1	1.66	0.61
1:C:759:PHE:HD2	1:C:1001:LEU:HD21	1.65	0.61
1:A:454:ARG:HH21	1:A:492:LEU:HD21	1.66	0.60
1:A:722:VAL:HG22	1:A:1065:VAL:HG22	1.83	0.60
1:A:115:GLN:NE2	1:A:132:GLU:OE2	2.35	0.59
1:B:377:PHE:HE2	1:B:384:PRO:HB3	1.67	0.59
1:A:562:PHE:HD2	1:B:41:LYS:HG2	1.68	0.59
1:A:64:TRP:HE1	1:A:264:ALA:HB1	1.67	0.58
1:A:328:ARG:HH21	1:A:533:LEU:HB3	1.69	0.58
1:B:236:THR:HG23	1:B:237:ARG:HG3	1.85	0.58
1:C:393:THR:HG21	1:C:520:ALA:HB3	1.86	0.58
1:A:1072:GLU:HG2	1:B:894:LEU:HD22	1.85	0.58
1:B:568:ASP:OD1	1:B:569:ILE:N	2.35	0.57
1:C:328:ARG:HH21	1:C:533:LEU:HB3	1.68	0.57
1:B:759:PHE:HD2	1:B:1001:LEU:HD21	1.70	0.57
1:B:1072:GLU:HG2	1:C:894:LEU:HD22	1.87	0.57
1:C:330:PRO:HB3	3:C:1304:NAG:H82	1.87	0.56
1:B:115:GLN:NE2	1:B:132:GLU:OE2	2.37	0.56
1:B:717:ASN:ND2	2:J:1:NAG:O7	2.39	0.56
1:B:1107:ARG:HG2	1:C:904:TYR:OH	2.06	0.56
1:A:372:ALA:HA	1:C:417:LYS:HE2	1.87	0.56
1:B:64:TRP:HE1	1:B:264:ALA:HB1	1.70	0.56
1:C:722:VAL:HG22	1:C:1065:VAL:HG22	1.87	0.56
1:B:330:PRO:HB3	3:B:1304:NAG:H82	1.88	0.55
1:A:105:ILE:HD11	1:A:241:LEU:HD21	1.88	0.55
1:B:448:ASN:HB3	1:B:497:PHE:HB2	1.87	0.55
1:C:115:GLN:NE2	1:C:132:GLU:OE2	2.37	0.55
1:C:905:ARG:HD2	1:C:1049:LEU:O	2.06	0.55
1:C:804:GLN:OE1	1:C:935:GLN:NE2	2.39	0.55
1:B:905:ARG:HD2	1:B:1049:LEU:O	2.06	0.55
1:C:442:ASP:O	1:C:448:ASN:ND2	2.35	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:126:VAL:H	1:B:172:SER:HB2	1.72	0.54
1:C:37:TYR:OH	1:C:53:ASP:OD2	2.23	0.54
1:A:905:ARG:HD2	1:A:1049:LEU:O	2.07	0.54
1:C:377:PHE:HE2	1:C:384:PRO:HB3	1.72	0.54
1:C:105:ILE:HD11	1:C:241:LEU:HD21	1.88	0.54
1:B:454:ARG:HH21	1:B:492:LEU:HD21	1.73	0.54
1:B:947:LYS:NZ	1:C:1019:ARG:HH22	2.05	0.54
1:B:546:LEU:HD21	1:B:573:THR:HG21	1.90	0.54
1:A:409:GLN:NE2	1:A:415:THR:O	2.40	0.54
1:B:1102:TRP:HB2	1:B:1135:ASN:HD22	1.73	0.54
1:B:119:ILE:HG12	1:B:128:ILE:HG12	1.90	0.53
1:C:231:ILE:HD12	1:C:233:ILE:HD12	1.91	0.53
1:A:1141:LEU:HG	1:A:1145:LEU:HD13	1.90	0.53
1:B:393:THR:HG21	1:B:520:ALA:HB3	1.90	0.53
1:A:330:PRO:HB3	3:A:1304:NAG:H82	1.91	0.53
1:C:568:ASP:OD1	1:C:569:ILE:N	2.36	0.53
1:A:126:VAL:H	1:A:172:SER:HB2	1.73	0.52
1:C:1141:LEU:HG	1:C:1145:LEU:HD13	1.90	0.52
1:B:442:ASP:O	1:B:448:ASN:ND2	2.37	0.52
1:C:126:VAL:H	1:C:172:SER:HB2	1.74	0.52
1:B:231:ILE:HD12	1:B:233:ILE:HD12	1.92	0.52
1:B:280:ASN:OD1	1:B:284:THR:N	2.38	0.52
1:B:417:LYS:HE2	1:C:372:ALA:HA	1.91	0.52
1:A:106:PHE:HB3	1:A:235:ILE:HD13	1.91	0.52
1:A:736:VAL:HG22	1:A:858:LEU:HG	1.92	0.52
1:B:105:ILE:HD11	1:B:241:LEU:HD21	1.91	0.52
1:A:759:PHE:HD2	1:A:1001:LEU:HD21	1.74	0.51
1:B:404:GLY:HA2	1:B:508:TYR:HD1	1.73	0.51
1:C:1086:LYS:HD2	1:C:1122:VAL:HG11	1.92	0.51
1:A:596:SER:OG	1:A:613:GLN:OE1	2.24	0.51
1:A:1139:ASP:HB3	1:A:1142:GLN:HG2	1.92	0.51
1:A:725:GLU:OE1	1:A:1028:LYS:HE3	2.11	0.51
1:B:1086:LYS:HD2	1:B:1122:VAL:HG11	1.92	0.51
1:C:337:PRO:HB2	1:C:340:GLU:HG2	1.92	0.51
1:B:1141:LEU:HG	1:B:1145:LEU:HD13	1.93	0.50
1:B:603:ASN:O	1:B:603:ASN:ND2	2.45	0.50
1:C:596:SER:OG	1:C:613:GLN:OE1	2.29	0.50
1:A:391:CYS:CB	1:A:525:CYS:HA	2.40	0.50
1:A:717:ASN:ND2	2:E:1:NAG:O7	2.45	0.50
1:C:676:THR:HA	1:C:690:GLN:HA	1.94	0.50
1:B:377:PHE:CD1	1:B:434:ILE:HG12	2.47	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:603:ASN:O	1:C:603:ASN:ND2	2.45	0.49
1:A:745:ASP:HB2	1:C:319:ARG:NH2	2.28	0.49
1:B:117:LEU:HD12	1:B:231:ILE:HD13	1.95	0.49
1:B:811:LYS:NZ	1:B:820:ASP:OD2	2.45	0.49
1:C:811:LYS:NZ	1:C:820:ASP:OD2	2.46	0.49
1:A:804:GLN:NE2	1:A:935:GLN:HB2	2.28	0.49
1:B:326:ILE:HD12	1:B:539:VAL:HG21	1.94	0.49
1:A:383:SER:OG	1:B:985:ASP:N	2.45	0.48
1:B:404:GLY:HA2	1:B:508:TYR:CD1	2.47	0.48
1:C:377:PHE:CD1	1:C:434:ILE:HG12	2.49	0.48
1:C:37:TYR:OH	1:C:54:LEU:O	2.31	0.48
1:A:442:ASP:O	1:A:448:ASN:ND2	2.38	0.48
1:A:676:THR:HA	1:A:690:GLN:HA	1.96	0.48
1:A:603:ASN:O	1:A:603:ASN:ND2	2.45	0.47
1:B:676:THR:HA	1:B:690:GLN:HA	1.95	0.47
1:C:534:VAL:HG11	1:C:537:LYS:HE2	1.96	0.47
1:C:725:GLU:OE2	1:C:1028:LYS:HE3	2.13	0.47
1:A:796:ASP:OD1	1:A:796:ASP:N	2.45	0.47
1:B:344:ALA:HB3	1:B:347:PHE:HE1	1.80	0.47
1:C:119:ILE:HG12	1:C:128:ILE:HG12	1.95	0.47
1:B:736:VAL:HG11	1:B:1004:LEU:HD21	1.96	0.47
1:A:344:ALA:HB3	1:A:347:PHE:HE1	1.80	0.47
1:A:1086:LYS:HD2	1:A:1122:VAL:HG11	1.97	0.47
1:A:273:ARG:HH21	1:A:290:ASP:CG	2.18	0.47
1:B:337:PRO:HB2	1:B:340:GLU:HG2	1.97	0.47
1:A:119:ILE:HG12	1:A:128:ILE:HG12	1.95	0.47
1:A:41:LYS:HZ1	1:C:562:PHE:HB2	1.80	0.47
1:B:922:LEU:HD11	2:J:1:NAG:H5	1.97	0.47
1:B:804:GLN:NE2	1:B:935:GLN:HB2	2.30	0.46
1:A:391:CYS:HB2	1:A:524:VAL:O	2.15	0.46
1:A:617:CYS:HB3	1:A:649:CYS:HB3	1.85	0.46
1:A:381:GLY:HA3	1:A:430:THR:HG23	1.97	0.46
1:C:666:ILE:HD11	1:C:672:ALA:HB2	1.98	0.46
1:B:381:GLY:HA3	1:B:430:THR:HG23	1.97	0.46
1:B:562:PHE:CE1	1:C:225:PRO:HD2	2.50	0.46
1:B:725:GLU:OE2	1:B:1028:LYS:HE3	2.15	0.46
1:B:743:CYS:HB3	1:B:749:CYS:HB3	1.82	0.46
1:A:367:VAL:HG13	1:A:368:LEU:HD22	1.98	0.46
1:B:776:LYS:NZ	1:B:780:GLU:OE2	2.47	0.46
1:B:350:VAL:O	1:B:353:TRP:HD1	1.99	0.46
1:A:922:LEU:HD11	2:E:1:NAG:H5	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:367:VAL:HG13	1:B:368:LEU:HD22	1.98	0.46
1:B:1086:LYS:HB3	1:B:1122:VAL:HG13	1.98	0.46
1:B:399:SER:HA	1:B:511:VAL:HG12	1.98	0.45
1:C:106:PHE:HB3	1:C:235:ILE:HD12	1.98	0.45
1:C:344:ALA:HB3	1:C:347:PHE:HE1	1.81	0.45
1:A:117:LEU:HD12	1:A:231:ILE:HD13	1.98	0.45
1:A:280:ASN:OD1	1:A:284:THR:N	2.38	0.45
1:B:736:VAL:HG22	1:B:858:LEU:HG	1.98	0.45
1:C:310:LYS:NZ	1:C:663:ASP:OD1	2.36	0.45
1:A:821:LEU:O	1:A:825:LYS:HG2	2.16	0.45
1:A:1086:LYS:HB3	1:A:1122:VAL:HG13	1.98	0.45
1:B:727:LEU:HD11	1:B:1028:LYS:HD2	1.97	0.45
1:C:308:VAL:HB	1:C:602:THR:HG23	1.98	0.45
1:A:431:GLY:HA2	1:A:515:PHE:HD1	1.80	0.45
1:C:287:ASP:HB3	1:C:306:PHE:CE2	2.52	0.45
1:C:381:GLY:HA3	1:C:430:THR:HG23	1.98	0.45
1:A:308:VAL:HB	1:A:602:THR:HG23	1.98	0.45
1:B:127:VAL:HG22	1:B:171:VAL:HG13	1.98	0.45
1:C:516:GLU:HG2	1:C:518:LEU:H	1.81	0.45
1:A:804:GLN:HE22	1:A:935:GLN:HB2	1.82	0.45
1:A:811:LYS:NZ	1:A:820:ASP:OD2	2.49	0.45
1:B:434:ILE:HB	1:B:511:VAL:HG23	1.98	0.45
1:C:57:PRO:HG3	1:C:273:ARG:HD2	1.98	0.45
1:B:804:GLN:NE2	1:B:935:GLN:OE1	2.50	0.45
1:C:287:ASP:HB3	1:C:306:PHE:HE2	1.81	0.45
1:B:308:VAL:HB	1:B:602:THR:HG23	1.99	0.45
1:B:516:GLU:HG2	1:B:518:LEU:H	1.82	0.45
1:C:403:ARG:HD3	1:C:495:TYR:CD2	2.51	0.45
1:B:112:SER:HB2	1:B:134:GLN:HA	1.98	0.45
1:B:1002:GLN:NE2	1:C:1005:GLN:OE1	2.50	0.45
1:C:403:ARG:HH12	1:C:505:TYR:HD1	1.65	0.45
1:A:41:LYS:NZ	1:C:562:PHE:HB2	2.33	0.44
1:A:357:ARG:HG3	1:A:396:TYR:CE2	2.51	0.44
1:A:581:THR:HG23	1:A:583:GLU:HG2	1.98	0.44
1:A:717:ASN:HD21	2:E:1:NAG:C1	2.31	0.44
1:A:745:ASP:HB2	1:C:319:ARG:HH22	1.81	0.44
1:A:977:LEU:HD11	1:A:993:ILE:HG12	1.99	0.44
1:C:617:CYS:HB3	1:C:649:CYS:HB3	1.85	0.44
1:C:743:CYS:HB3	1:C:749:CYS:HB3	1.85	0.44
1:C:976:VAL:HG12	1:C:979:ASP:H	1.81	0.44
1:A:57:PRO:HG3	1:A:273:ARG:HD2	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:947:LYS:O	1:C:951:VAL:HG23	2.17	0.44
1:B:326:ILE:HD11	1:B:534:VAL:H	1.81	0.44
1:B:422:ASN:HD22	1:B:453:TYR:HB2	1.83	0.44
1:C:578:ASP:HB3	1:C:581:THR:O	2.17	0.44
1:C:1086:LYS:HB3	1:C:1122:VAL:HG13	2.00	0.44
1:B:106:PHE:HB3	1:B:235:ILE:HD12	2.00	0.44
1:C:273:ARG:HH21	1:C:290:ASP:CG	2.21	0.44
1:C:736:VAL:HG11	1:C:1004:LEU:HD21	1.99	0.44
1:B:439:ASN:HD21	1:B:499:PRO:HA	1.82	0.44
1:C:127:VAL:HG22	1:C:171:VAL:HG13	1.99	0.44
1:C:434:ILE:HB	1:C:511:VAL:HG23	2.00	0.44
1:A:804:GLN:NE2	1:A:935:GLN:OE1	2.51	0.43
1:C:821:LEU:O	1:C:825:LYS:HG2	2.18	0.43
1:A:498:GLN:H	1:A:501:ASN:ND2	2.16	0.43
1:B:383:SER:OG	1:C:985:ASP:N	2.51	0.43
1:B:1135:ASN:OD1	1:B:1136:THR:N	2.42	0.43
1:C:498:GLN:HB2	1:C:501:ASN:ND2	2.33	0.43
1:A:350:VAL:O	1:A:353:TRP:HD1	2.02	0.43
1:A:374:PHE:HA	1:A:436:TRP:HB3	2.00	0.43
1:A:777:ASN:OD1	1:A:1019:ARG:HD2	2.17	0.43
1:B:578:ASP:HB3	1:B:581:THR:O	2.19	0.43
1:A:727:LEU:HD11	1:A:1028:LYS:HD2	2.01	0.43
1:B:947:LYS:O	1:B:951:VAL:HG23	2.19	0.43
1:C:280:ASN:OD1	1:C:284:THR:N	2.42	0.43
1:A:370:ASN:OD1	1:C:421:TYR:OH	2.25	0.43
1:B:310:LYS:NZ	1:B:663:ASP:OD1	2.36	0.43
1:C:296:LEU:O	1:C:299:THR:OG1	2.29	0.43
1:A:947:LYS:O	1:A:951:VAL:HG23	2.18	0.43
1:B:231:ILE:HG13	1:B:233:ILE:H	1.84	0.43
1:B:717:ASN:HD21	2:J:1:NAG:C1	2.31	0.43
1:A:947:LYS:NZ	1:B:1019:ARG:HH22	2.16	0.43
1:C:112:SER:HB2	1:C:134:GLN:HA	2.00	0.43
1:C:431:GLY:HA2	1:C:515:PHE:HD1	1.82	0.43
1:A:726:ILE:HG13	1:A:1061:VAL:HG22	2.01	0.43
1:A:736:VAL:HG11	1:A:1004:LEU:HD21	2.00	0.43
1:B:921:LYS:NZ	1:B:925:ASN:OD1	2.51	0.43
1:C:90:VAL:HG21	1:C:238:PHE:CE1	2.53	0.43
1:A:643:PHE:O	1:A:650:LEU:N	2.47	0.43
1:C:328:ARG:HG3	1:C:579:PRO:HG2	2.01	0.42
1:C:453:TYR:CE1	1:C:493:GLN:HB2	2.54	0.42
1:A:743:CYS:HB3	1:A:749:CYS:HB3	1.87	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:290:ASP:HB3	1:B:293:LEU:HB2	2.01	0.42
1:B:581:THR:HG23	1:B:583:GLU:HG2	2.00	0.42
1:A:90:VAL:HG21	1:A:238:PHE:CE1	2.54	0.42
1:B:534:VAL:HG11	1:B:537:LYS:HE2	2.01	0.42
1:B:821:LEU:O	1:B:825:LYS:HG2	2.19	0.42
1:A:231:ILE:HG13	1:A:233:ILE:H	1.85	0.42
1:B:53:ASP:HB3	1:B:55:PHE:CE2	2.54	0.42
1:A:299:THR:HG22	1:A:315:THR:HG21	2.01	0.42
1:A:551:VAL:HG12	1:A:588:THR:HB	2.01	0.42
1:A:578:ASP:HB3	1:A:581:THR:O	2.19	0.42
1:C:727:LEU:HD11	1:C:1028:LYS:HD2	2.01	0.42
1:B:930:ALA:O	1:B:934:ILE:HG12	2.19	0.42
1:A:405:ASP:OD1	1:A:406:GLU:HG3	2.20	0.42
1:A:666:ILE:HD11	1:A:672:ALA:HB2	2.02	0.41
1:B:210:ILE:HG21	1:B:217:PRO:HG2	2.02	0.41
1:C:736:VAL:HG22	1:C:858:LEU:HG	2.01	0.41
1:C:92:PHE:O	1:C:192:PHE:N	2.41	0.41
1:B:675:GLN:HE21	1:B:675:GLN:HB3	1.74	0.41
1:B:716:THR:N	1:B:1071:GLN:O	2.44	0.41
1:A:37:TYR:OH	1:A:54:LEU:O	2.39	0.41
1:B:296:LEU:O	1:B:299:THR:OG1	2.30	0.41
1:B:805:ILE:HG22	1:B:818:ILE:HD12	2.03	0.41
1:C:195:LYS:HE2	1:C:204:TYR:CE1	2.55	0.41
1:C:914:ASN:OD1	1:C:915:VAL:N	2.53	0.41
1:C:1045:LYS:HB3	1:C:1045:LYS:HE3	1.80	0.41
1:A:1142:GLN:HA	1:A:1142:GLN:OE1	2.21	0.41
1:B:914:ASN:OD1	1:B:915:VAL:N	2.54	0.41
1:B:350:VAL:HG21	1:B:402:ILE:HD11	2.01	0.41
1:B:1107:ARG:HG2	1:C:904:TYR:CZ	2.55	0.41
1:B:81:ASN:N	1:B:81:ASN:OD1	2.54	0.41
1:A:231:ILE:HD12	1:A:233:ILE:HB	2.03	0.41
1:A:1072:GLU:HG2	1:B:894:LEU:CD2	2.51	0.41
1:B:535:LYS:HE2	1:B:535:LYS:HB3	1.71	0.41
1:B:726:ILE:HG13	1:B:1061:VAL:HG22	2.01	0.41
1:B:1072:GLU:HG2	1:C:894:LEU:CD2	2.51	0.41
1:C:127:VAL:HG13	1:C:171:VAL:HG22	2.03	0.41
1:A:127:VAL:HG22	1:A:171:VAL:HG13	2.03	0.41
1:A:296:LEU:O	1:A:299:THR:OG1	2.29	0.41
1:A:534:VAL:HG11	1:A:537:LYS:HE2	2.02	0.41
1:A:801:ASN:HD21	2:F:1:NAG:C1	2.34	0.41
1:A:932:GLY:O	1:A:935:GLN:HB3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:749:CYS:HB2	1:B:977:LEU:HD21	2.03	0.41
1:C:581:THR:HG23	1:C:583:GLU:HG2	2.02	0.41
1:A:81:ASN:OD1	1:A:81:ASN:N	2.54	0.40
1:C:930:ALA:O	1:C:934:ILE:HG12	2.21	0.40
1:A:53:ASP:HB3	1:A:55:PHE:CE2	2.56	0.40
1:B:303:LEU:HD12	1:B:308:VAL:HG22	2.03	0.40
1:B:377:PHE:HD1	1:B:434:ILE:HG12	1.86	0.40
1:A:716:THR:N	1:A:1071:GLN:O	2.40	0.40
1:B:405:ASP:OD1	1:B:406:GLU:HG3	2.21	0.40
1:C:115:GLN:HA	1:C:132:GLU:HG2	2.02	0.40
1:C:353:TRP:O	1:C:466:ARG:NE	2.55	0.40
1:C:403:ARG:HD3	1:C:495:TYR:CG	2.56	0.40
1:C:733:LYS:NZ	1:C:775:ASP:OD2	2.43	0.40
1:A:328:ARG:HG3	1:A:579:PRO:HG2	2.04	0.40
1:A:1019:ARG:HH22	1:C:947:LYS:NZ	2.19	0.40
1:C:210:ILE:HG21	1:C:217:PRO:HG2	2.04	0.40
1:A:201:PHE:HE1	1:A:203:ILE:HD11	1.87	0.40
1:A:402:ILE:O	1:A:508:TYR:HB2	2.22	0.40
1:A:985:ASP:CG	1:A:987:PRO:HD2	2.42	0.40
1:C:81:ASN:OD1	1:C:81:ASN:N	2.55	0.40
1:C:804:GLN:HG2	1:C:931:ILE:HG22	2.03	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 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	948/1288 (74%)	929 (98%)	19 (2%)	0	100	100
1	B	948/1288 (74%)	923 (97%)	25 (3%)	0	100	100
1	C	948/1288 (74%)	930 (98%)	18 (2%)	0	100	100
All	All	2844/3864 (74%)	2782 (98%)	62 (2%)	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	852/1113 (76%)	850 (100%)	2 (0%)	93	98
1	B	852/1113 (76%)	849 (100%)	3 (0%)	91	95
1	C	852/1113 (76%)	851 (100%)	1 (0%)	93	98
All	All	2556/3339 (76%)	2550 (100%)	6 (0%)	93	98

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	603	ASN
1	A	675	GLN
1	B	394	ASN
1	B	603	ASN
1	B	675	GLN
1	C	603	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	196	ASN
1	B	949	GLN
1	B	1002	GLN
1	C	804	GLN
1	C	935	GLN
1	C	1005	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](#)

30 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
2	NAG	D	1	2	14,14,15	0.23	0	17,19,21	0.42	0
2	NAG	D	2	2	14,14,15	0.21	0	17,19,21	0.45	0
2	NAG	E	1	2	14,14,15	0.46	0	17,19,21	0.43	0
2	NAG	E	2	2	14,14,15	0.20	0	17,19,21	0.42	0
2	NAG	F	1	2	14,14,15	0.36	0	17,19,21	0.37	0
2	NAG	F	2	2	14,14,15	0.20	0	17,19,21	0.42	0
2	NAG	G	1	2,1	14,14,15	0.23	0	17,19,21	0.47	0
2	NAG	G	2	2	14,14,15	0.28	0	17,19,21	0.41	0
2	NAG	H	1	2,1	14,14,15	0.18	0	17,19,21	0.45	0
2	NAG	H	2	2	14,14,15	0.24	0	17,19,21	0.44	0
2	NAG	I	1	2	14,14,15	0.22	0	17,19,21	0.42	0
2	NAG	I	2	2	14,14,15	0.19	0	17,19,21	0.46	0
2	NAG	J	1	2	14,14,15	0.45	0	17,19,21	0.42	0
2	NAG	J	2	2	14,14,15	0.18	0	17,19,21	0.42	0
2	NAG	K	1	2	14,14,15	0.32	0	17,19,21	0.37	0
2	NAG	K	2	2	14,14,15	0.20	0	17,19,21	0.43	0
2	NAG	L	1	2,1	14,14,15	0.23	0	17,19,21	0.47	0
2	NAG	L	2	2	14,14,15	0.28	0	17,19,21	0.41	0
2	NAG	M	1	2,1	14,14,15	0.19	0	17,19,21	0.46	0
2	NAG	M	2	2	14,14,15	0.22	0	17,19,21	0.44	0
2	NAG	N	1	2	14,14,15	0.22	0	17,19,21	0.41	0
2	NAG	N	2	2	14,14,15	0.19	0	17,19,21	0.46	0
2	NAG	O	1	2,1	14,14,15	0.20	0	17,19,21	0.45	0
2	NAG	O	2	2	14,14,15	0.21	0	17,19,21	0.40	0
2	NAG	P	1	2,1	14,14,15	0.24	0	17,19,21	0.39	0
2	NAG	P	2	2	14,14,15	0.19	0	17,19,21	0.41	0
2	NAG	Q	1	2,1	14,14,15	0.25	0	17,19,21	0.47	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	NAG	Q	2	2	14,14,15	0.27	0	17,19,21	0.41	0
2	NAG	R	1	2,1	14,14,15	0.17	0	17,19,21	0.45	0
2	NAG	R	2	2	14,14,15	0.24	0	17,19,21	0.43	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
2	NAG	D	1	2	-	2/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
2	NAG	E	1	2	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	2/6/23/26	0/1/1/1
2	NAG	F	1	2	-	1/6/23/26	0/1/1/1
2	NAG	F	2	2	-	0/6/23/26	0/1/1/1
2	NAG	G	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	G	2	2	-	2/6/23/26	0/1/1/1
2	NAG	H	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	H	2	2	-	0/6/23/26	0/1/1/1
2	NAG	I	1	2	-	2/6/23/26	0/1/1/1
2	NAG	I	2	2	-	0/6/23/26	0/1/1/1
2	NAG	J	1	2	-	1/6/23/26	0/1/1/1
2	NAG	J	2	2	-	2/6/23/26	0/1/1/1
2	NAG	K	1	2	-	0/6/23/26	0/1/1/1
2	NAG	K	2	2	-	0/6/23/26	0/1/1/1
2	NAG	L	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	L	2	2	-	2/6/23/26	0/1/1/1
2	NAG	M	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	M	2	2	-	0/6/23/26	0/1/1/1
2	NAG	N	1	2	-	2/6/23/26	0/1/1/1
2	NAG	N	2	2	-	1/6/23/26	0/1/1/1
2	NAG	O	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	O	2	2	-	0/6/23/26	0/1/1/1
2	NAG	P	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	P	2	2	-	2/6/23/26	0/1/1/1
2	NAG	Q	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	Q	2	2	-	2/6/23/26	0/1/1/1
2	NAG	R	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	R	2	2	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (25) torsion outliers are listed below:

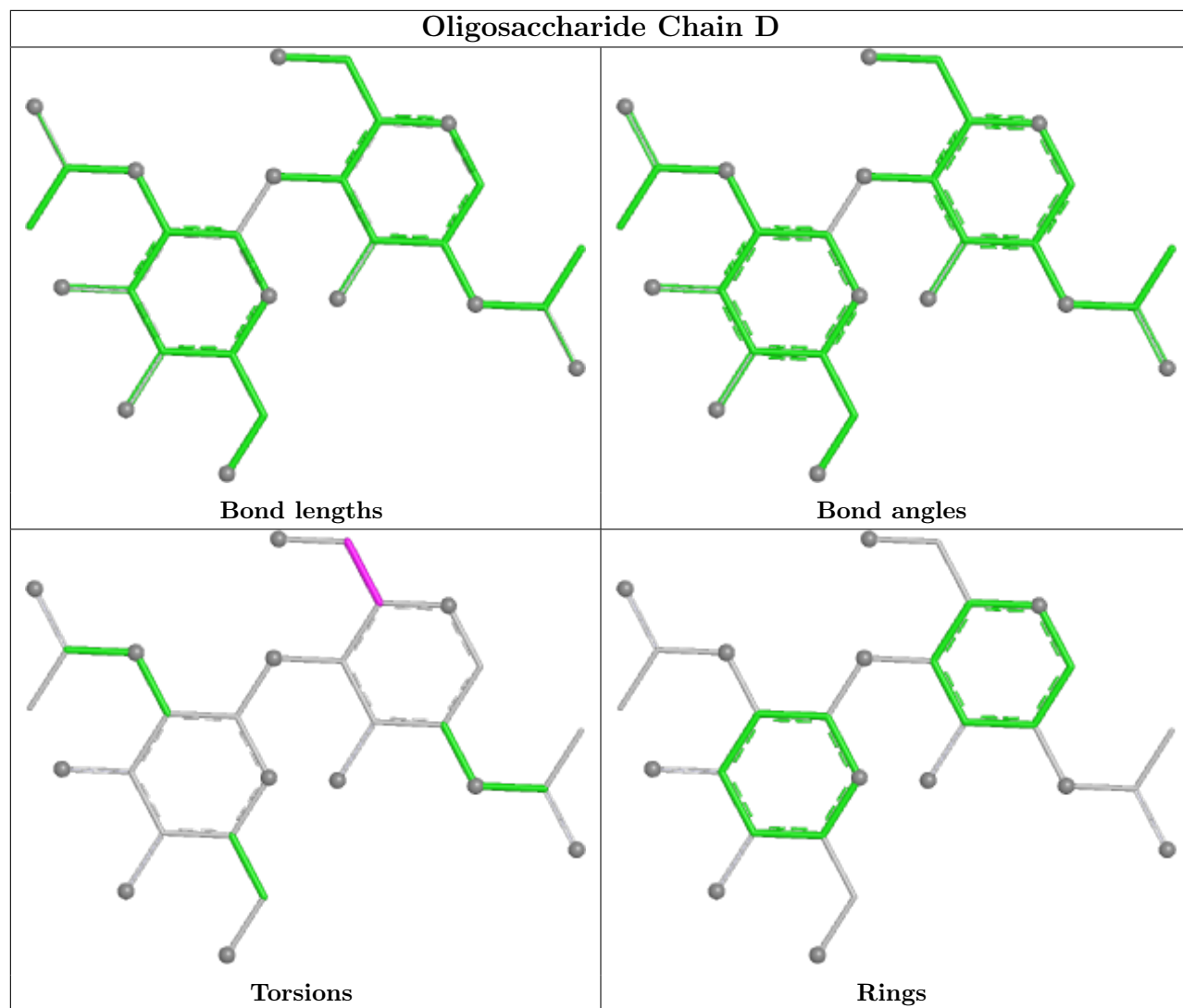
Mol	Chain	Res	Type	Atoms
2	N	1	NAG	O5-C5-C6-O6
2	D	1	NAG	O5-C5-C6-O6
2	I	1	NAG	O5-C5-C6-O6
2	L	2	NAG	O5-C5-C6-O6
2	Q	2	NAG	O5-C5-C6-O6
2	G	2	NAG	O5-C5-C6-O6
2	D	1	NAG	C4-C5-C6-O6
2	G	2	NAG	C4-C5-C6-O6
2	Q	2	NAG	C4-C5-C6-O6
2	O	1	NAG	C4-C5-C6-O6
2	N	1	NAG	C4-C5-C6-O6
2	L	2	NAG	C4-C5-C6-O6
2	O	1	NAG	O5-C5-C6-O6
2	I	1	NAG	C4-C5-C6-O6
2	P	2	NAG	C4-C5-C6-O6
2	E	2	NAG	O5-C5-C6-O6
2	P	1	NAG	C4-C5-C6-O6
2	P	2	NAG	O5-C5-C6-O6
2	J	2	NAG	O5-C5-C6-O6
2	P	1	NAG	O5-C5-C6-O6
2	E	2	NAG	C4-C5-C6-O6
2	J	1	NAG	O5-C5-C6-O6
2	F	1	NAG	C4-C5-C6-O6
2	J	2	NAG	C4-C5-C6-O6
2	N	2	NAG	C4-C5-C6-O6

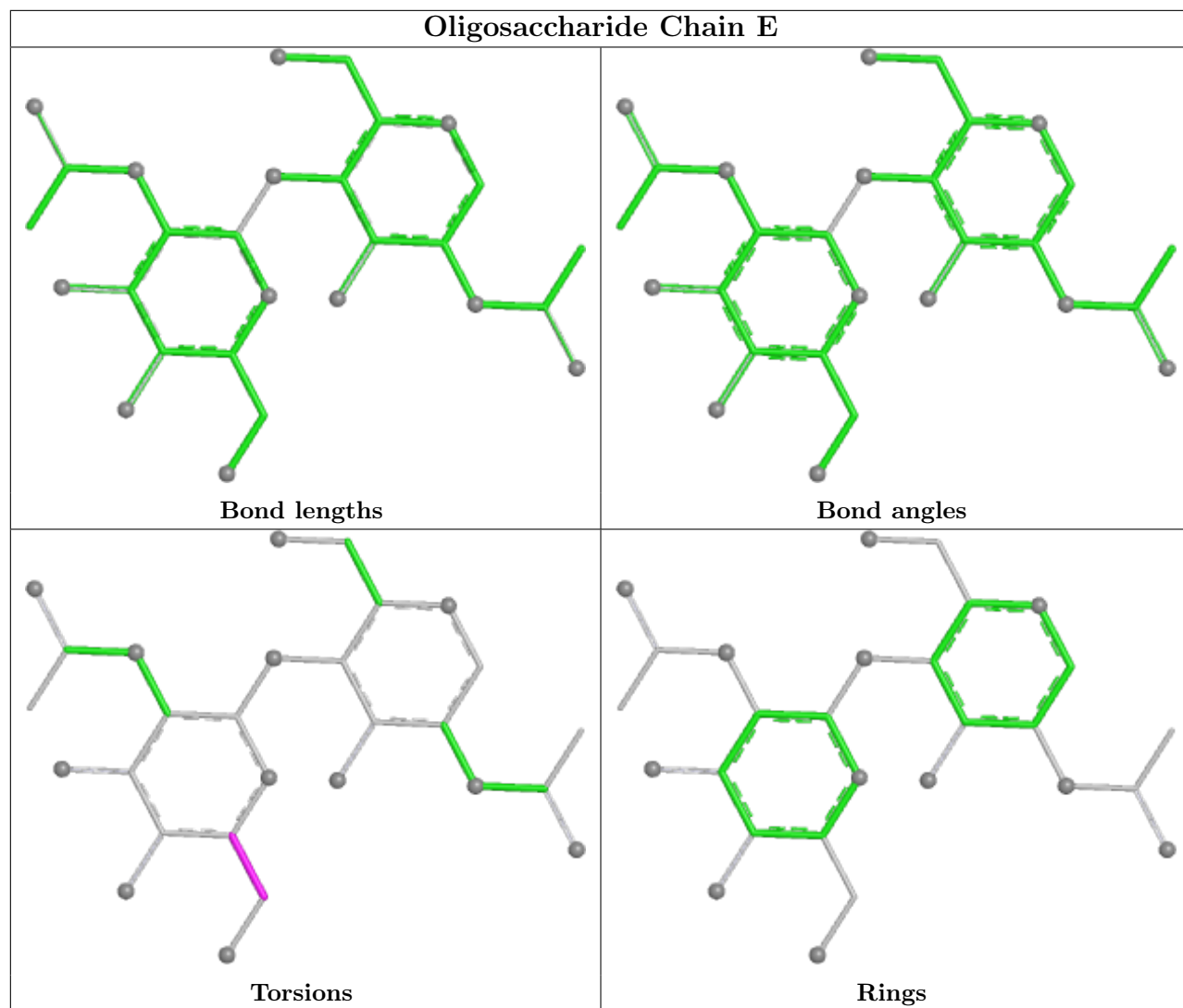
There are no ring outliers.

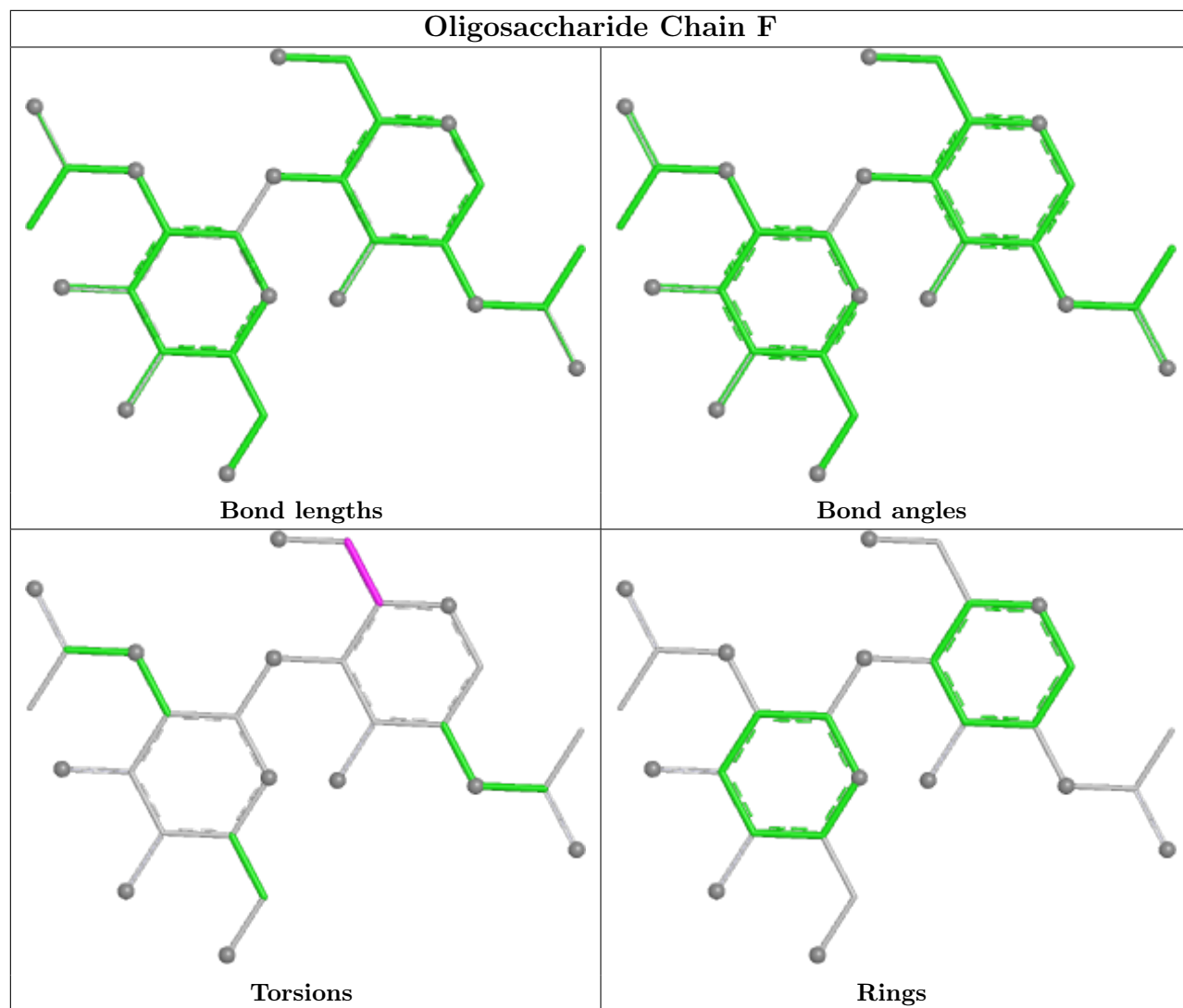
3 monomers are involved in 7 short contacts:

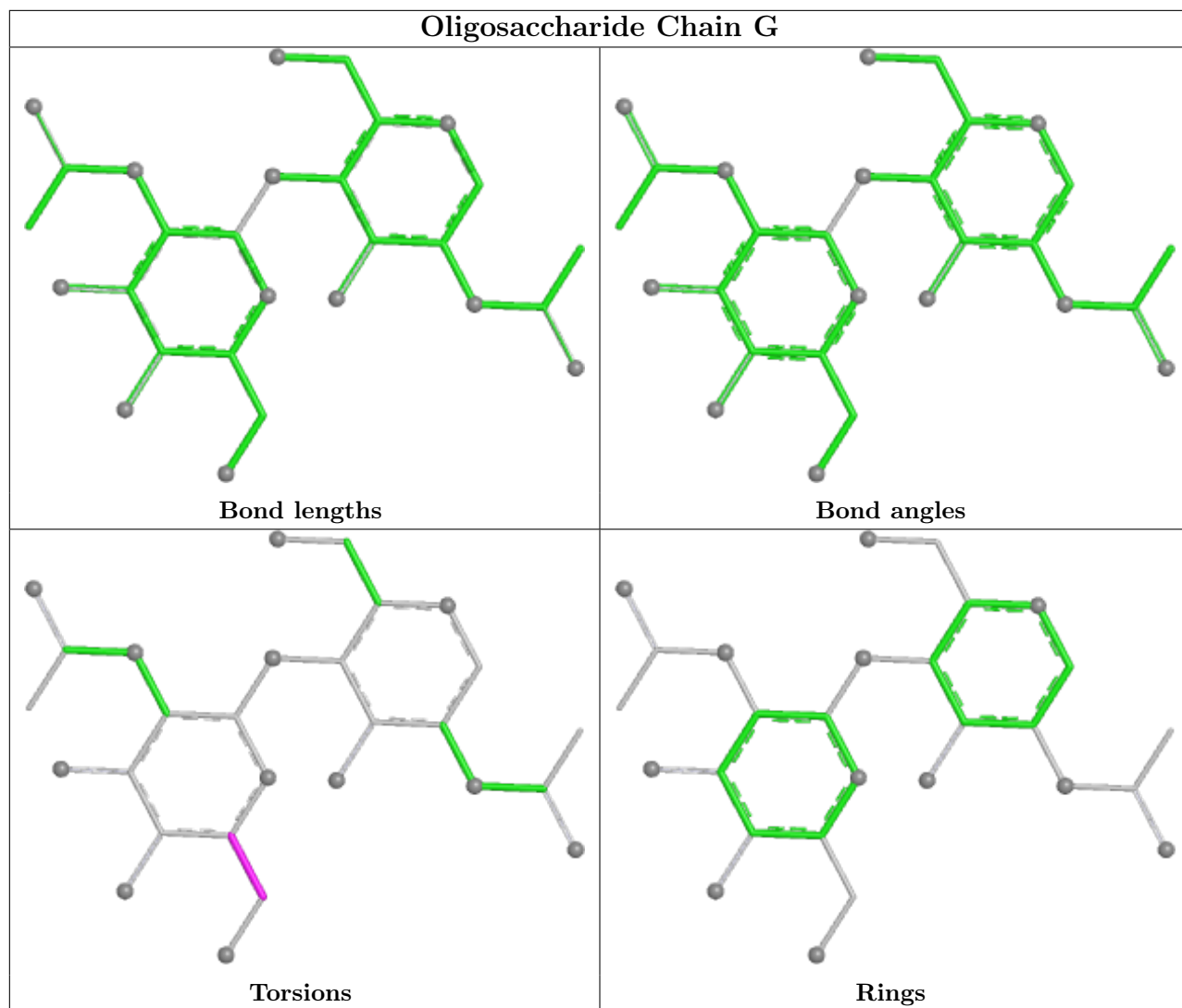
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	F	1	NAG	1	0
2	E	1	NAG	3	0
2	J	1	NAG	3	0

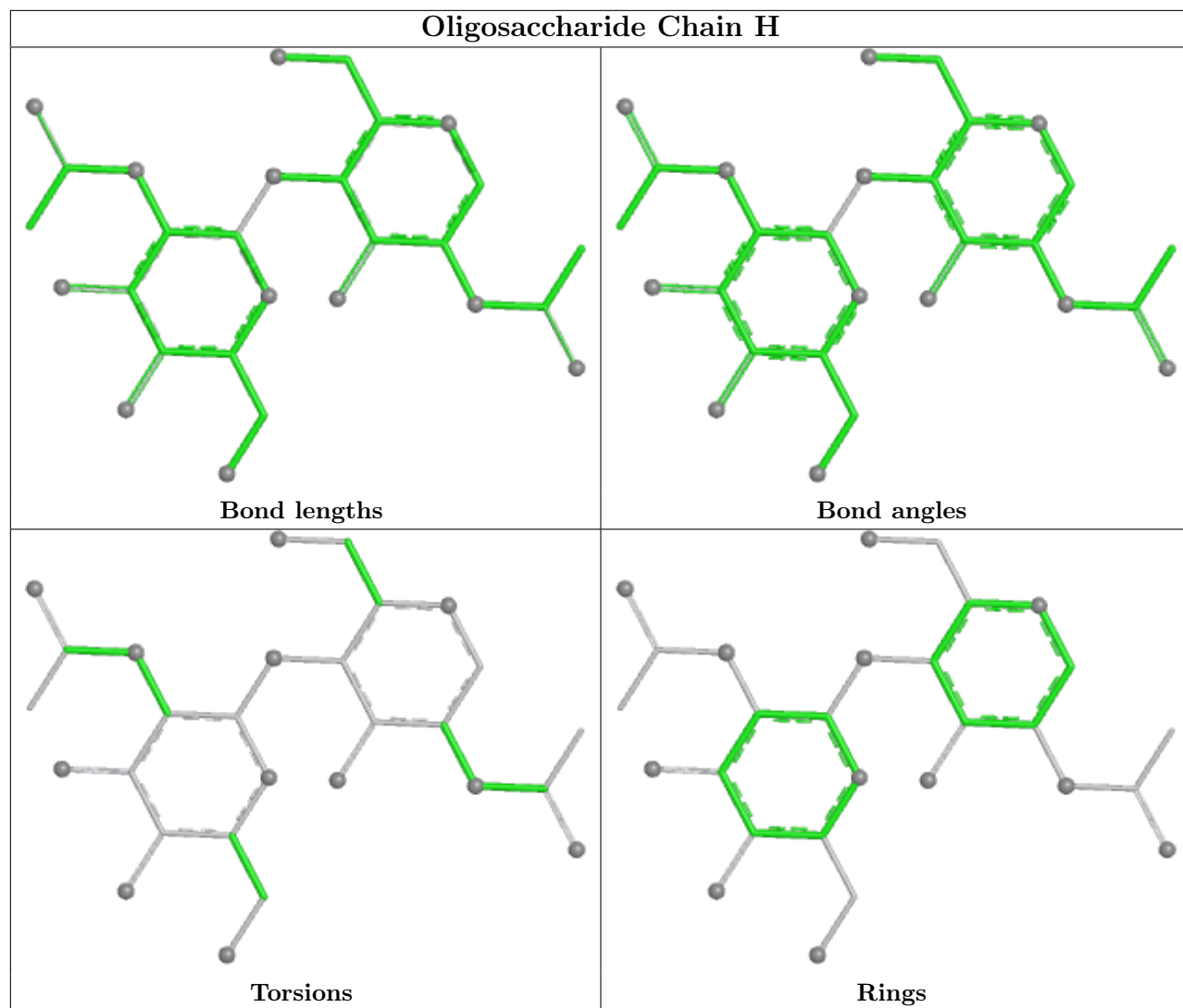
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



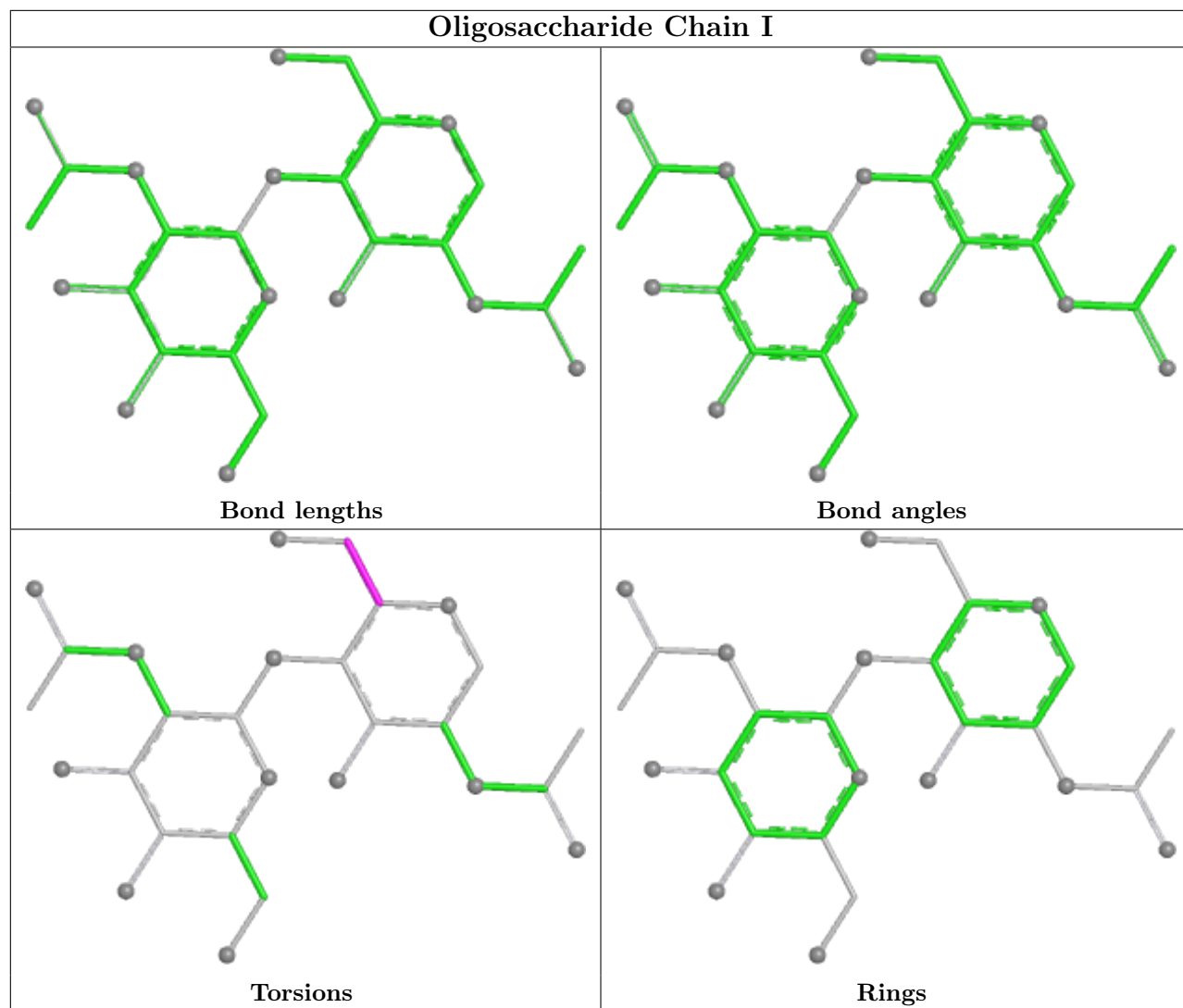


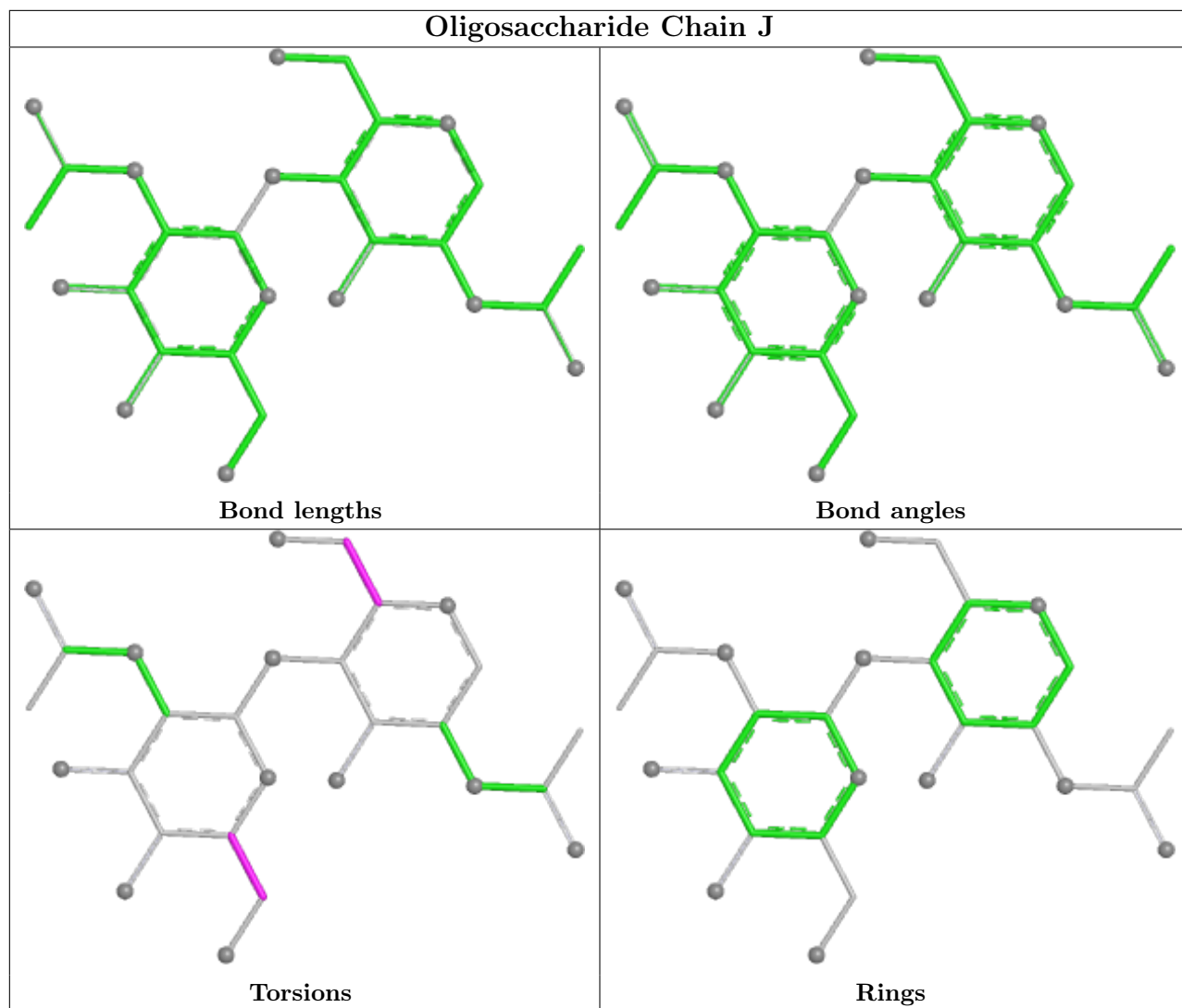


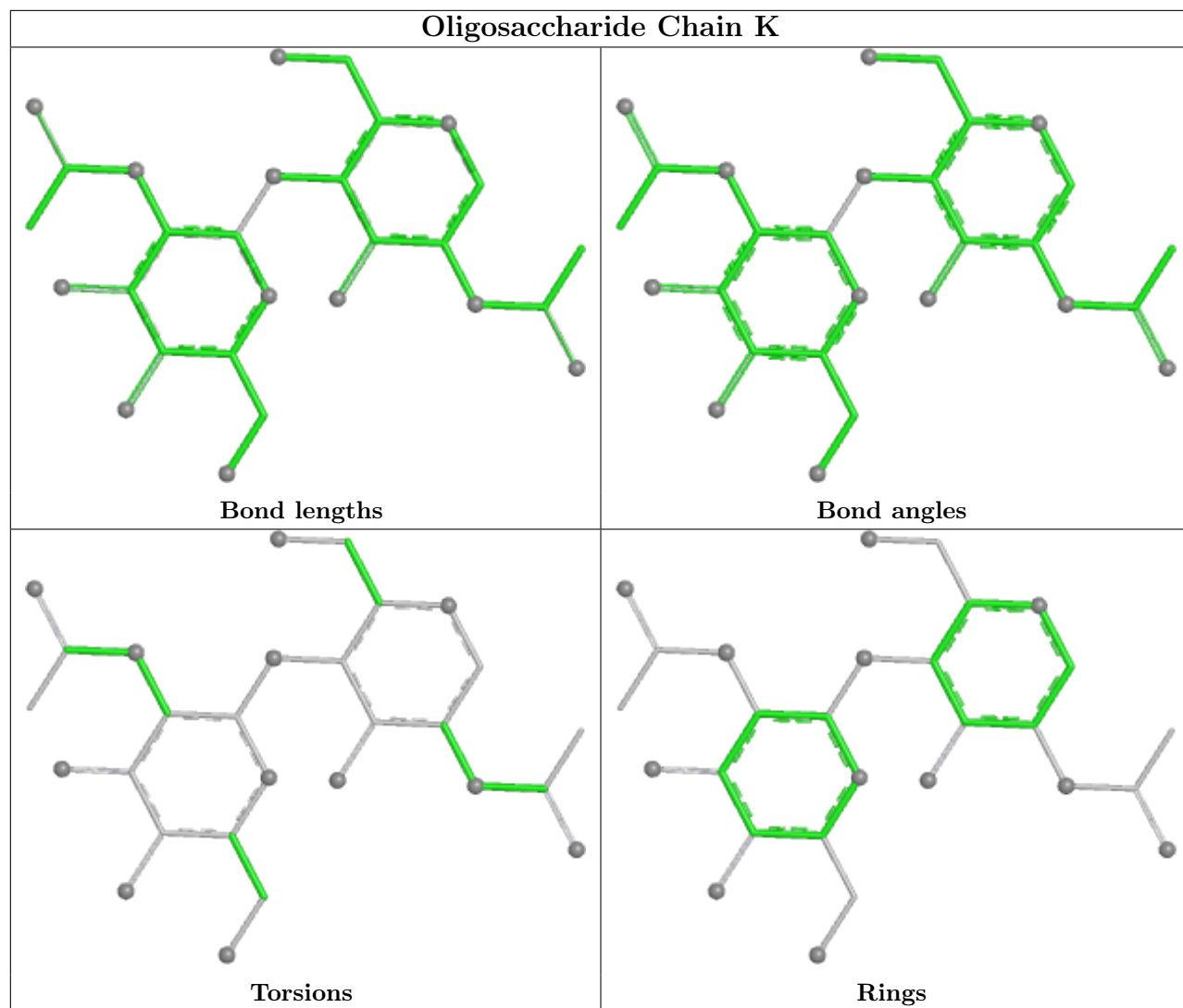


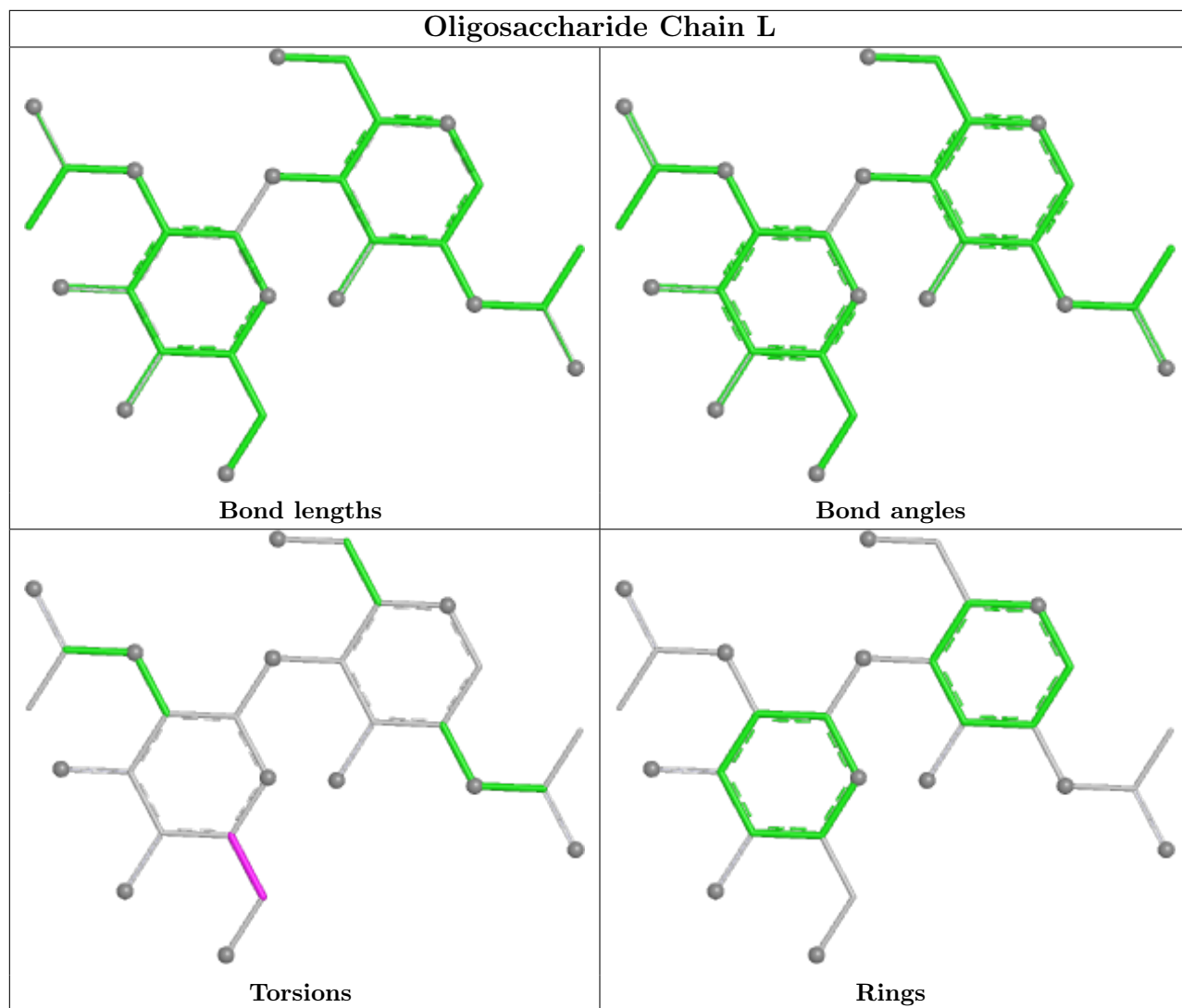


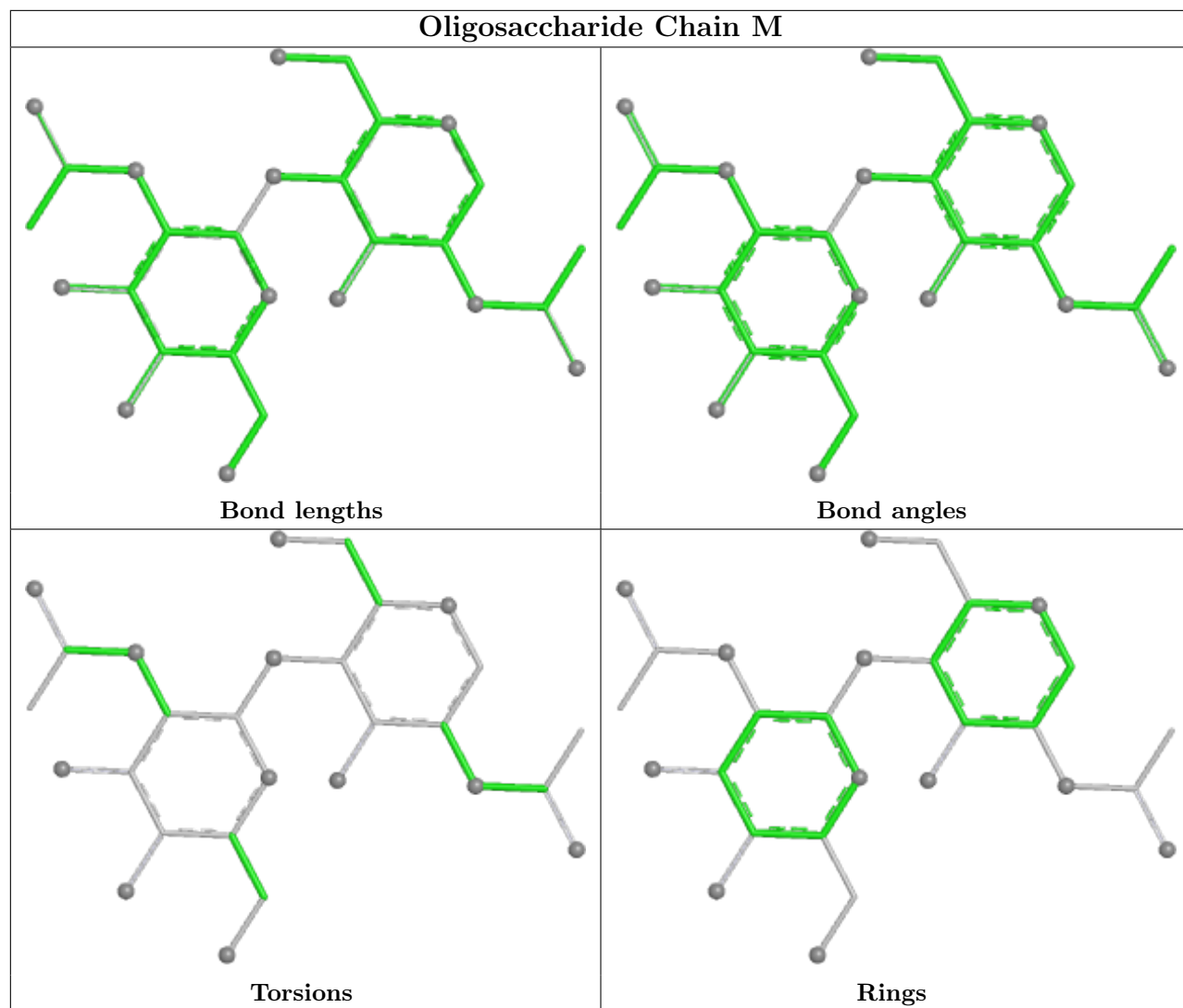


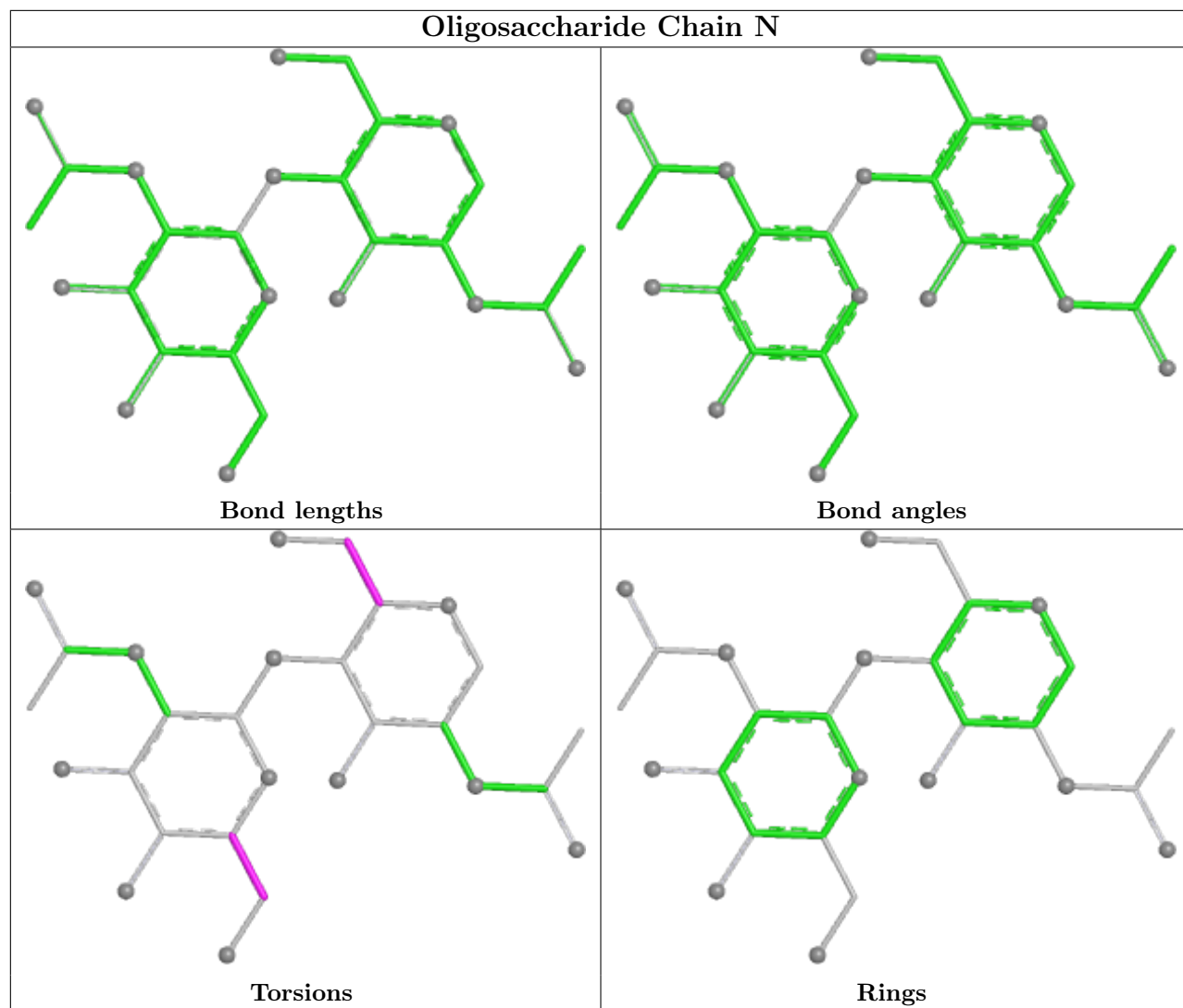


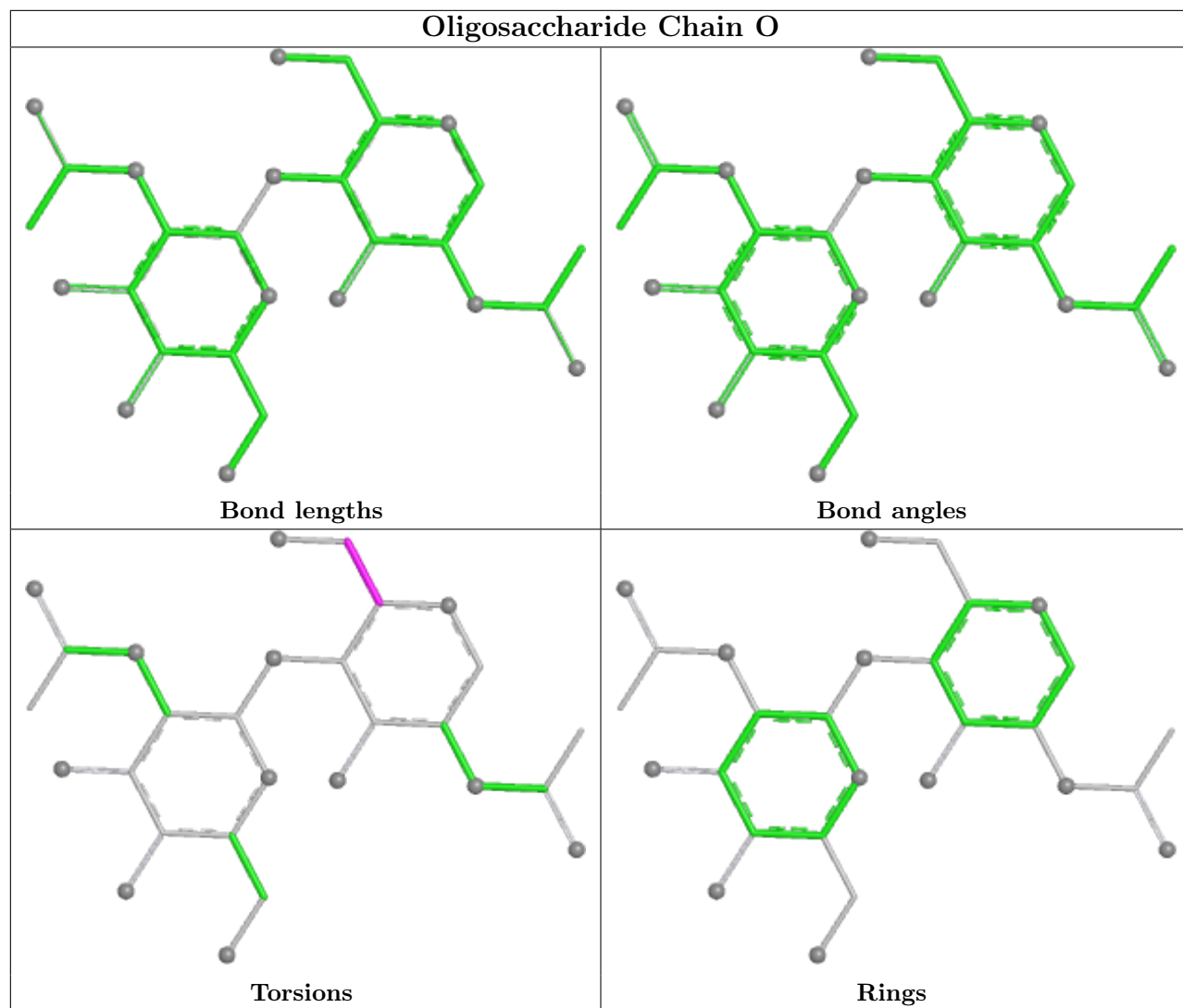


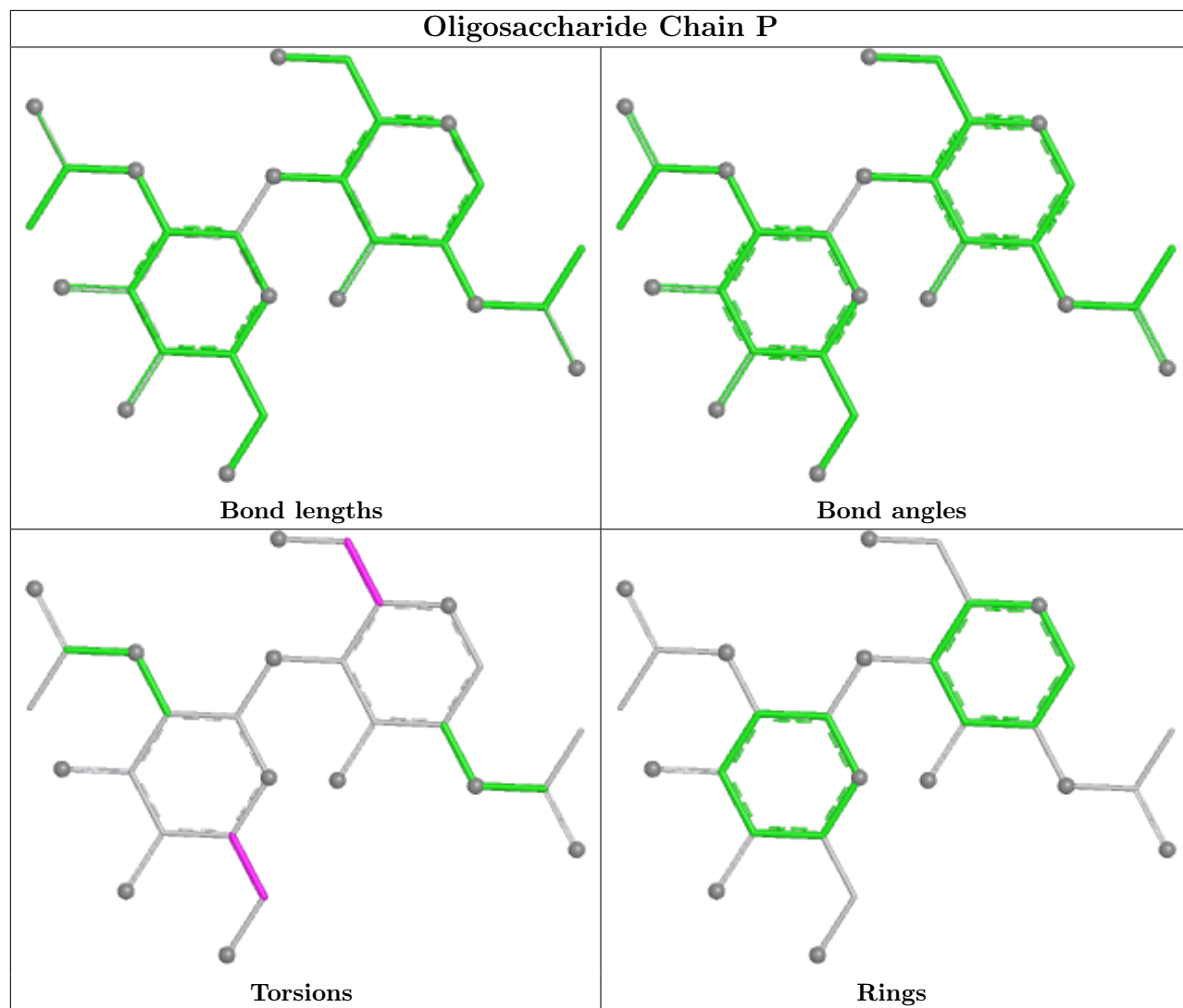




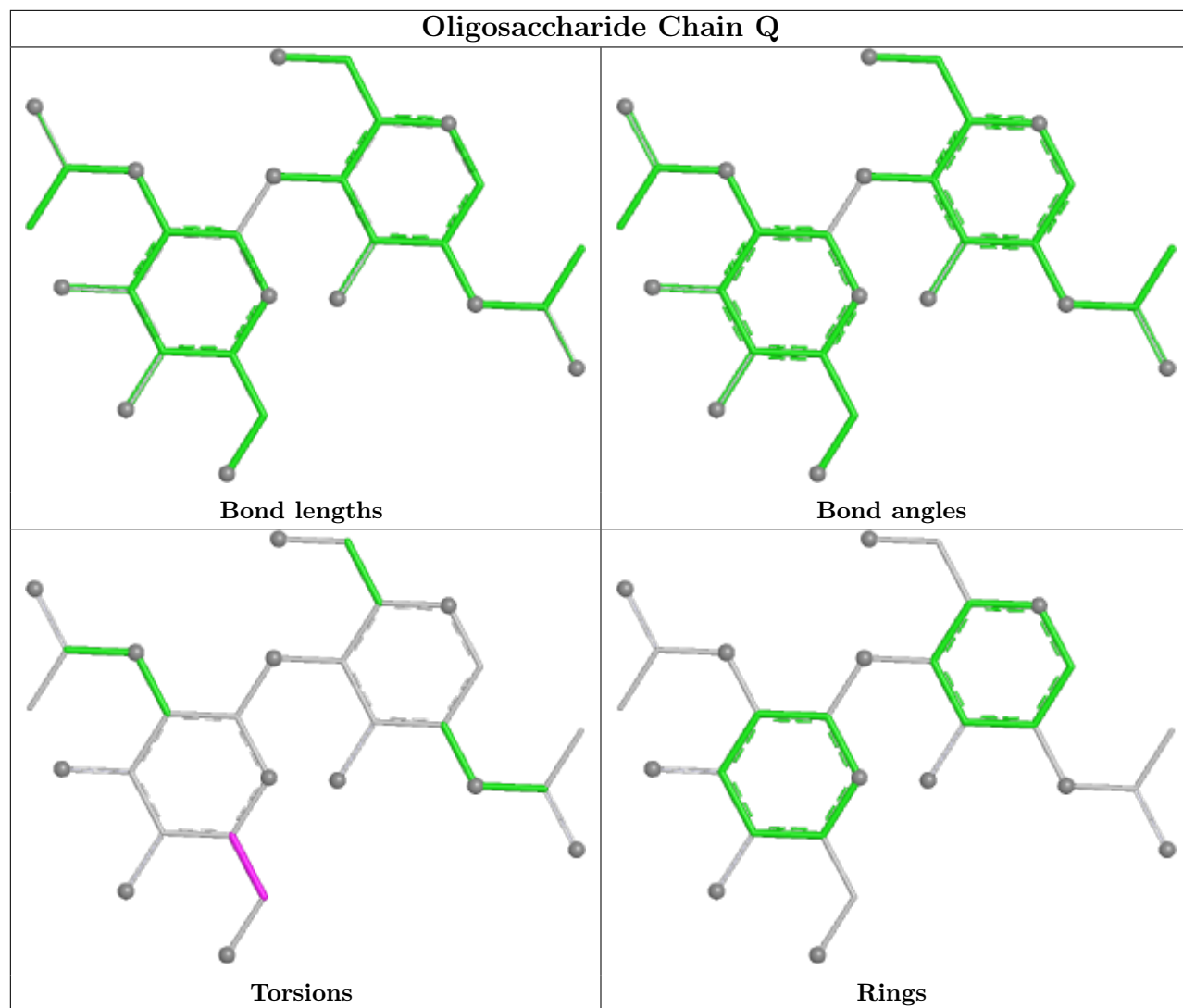


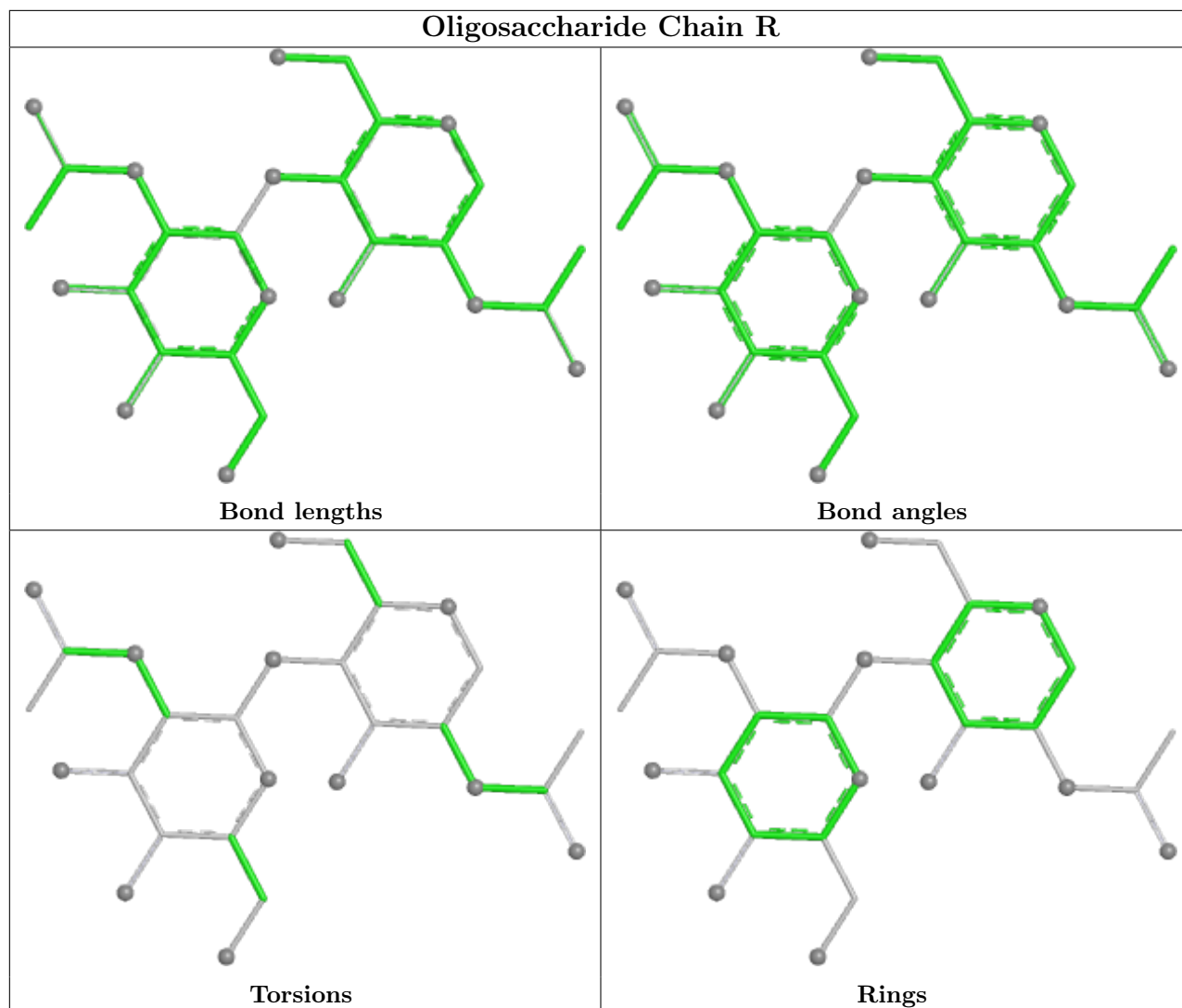












## 5.6 Ligand geometry [i](#)

33 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	NAG	B	1306	-	14,14,15	0.19	0	17,19,21	0.43	0
3	NAG	A	1304	1	14,14,15	0.23	0	17,19,21	0.45	0
3	NAG	C	1306	-	14,14,15	0.19	0	17,19,21	0.42	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	C	1311	-	14,14,15	0.21	0	17,19,21	0.43	0
3	NAG	B	1311	-	14,14,15	0.20	0	17,19,21	0.43	0
3	NAG	B	1305	1	14,14,15	0.25	0	17,19,21	0.46	0
3	NAG	C	1304	1	14,14,15	0.25	0	17,19,21	0.45	0
3	NAG	B	1301	1	14,14,15	0.19	0	17,19,21	0.42	0
3	NAG	C	1309	1	14,14,15	0.19	0	17,19,21	0.42	0
3	NAG	C	1302	-	14,14,15	0.24	0	17,19,21	0.53	0
3	NAG	C	1307	1	14,14,15	0.27	0	17,19,21	0.45	0
3	NAG	A	1307	1	14,14,15	0.26	0	17,19,21	0.45	0
3	NAG	A	1305	1	14,14,15	0.26	0	17,19,21	0.46	0
3	NAG	A	1311	-	14,14,15	0.21	0	17,19,21	0.43	0
3	NAG	C	1305	1	14,14,15	0.21	0	17,19,21	0.43	0
3	NAG	A	1301	1	14,14,15	0.19	0	17,19,21	0.41	0
3	NAG	C	1308	1	14,14,15	0.21	0	17,19,21	0.45	0
3	NAG	B	1307	1	14,14,15	0.24	0	17,19,21	0.43	0
3	NAG	B	1308	1	14,14,15	0.21	0	17,19,21	0.47	0
3	NAG	B	1302	-	14,14,15	0.24	0	17,19,21	0.54	0
3	NAG	B	1303	1	14,14,15	0.30	0	17,19,21	0.43	0
3	NAG	A	1309	1	14,14,15	0.19	0	17,19,21	0.41	0
3	NAG	A	1302	-	14,14,15	0.25	0	17,19,21	0.53	0
3	NAG	A	1310	1	14,14,15	0.23	0	17,19,21	0.48	0
3	NAG	C	1301	1	14,14,15	0.20	0	17,19,21	0.42	0
3	NAG	B	1304	1	14,14,15	0.26	0	17,19,21	0.44	0
3	NAG	A	1303	1	14,14,15	0.29	0	17,19,21	0.44	0
3	NAG	C	1310	1	14,14,15	0.26	0	17,19,21	0.50	0
3	NAG	B	1309	1	14,14,15	0.19	0	17,19,21	0.43	0
3	NAG	C	1303	1	14,14,15	0.29	0	17,19,21	0.43	0
3	NAG	B	1310	1	14,14,15	0.25	0	17,19,21	0.48	0
3	NAG	A	1308	1	14,14,15	0.22	0	17,19,21	0.47	0
3	NAG	A	1306	-	14,14,15	0.20	0	17,19,21	0.43	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	B	1306	-	-	2/6/23/26	0/1/1/1
3	NAG	A	1304	1	-	1/6/23/26	0/1/1/1
3	NAG	C	1306	-	-	2/6/23/26	0/1/1/1
3	NAG	C	1311	-	-	2/6/23/26	0/1/1/1
3	NAG	B	1311	-	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	B	1305	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1304	1	-	2/6/23/26	0/1/1/1
3	NAG	B	1301	1	-	1/6/23/26	0/1/1/1
3	NAG	C	1309	1	-	1/6/23/26	0/1/1/1
3	NAG	C	1302	-	-	1/6/23/26	0/1/1/1
3	NAG	C	1307	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1307	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1305	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1311	-	-	2/6/23/26	0/1/1/1
3	NAG	C	1305	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1301	1	-	1/6/23/26	0/1/1/1
3	NAG	C	1308	1	-	2/6/23/26	0/1/1/1
3	NAG	B	1307	1	-	0/6/23/26	0/1/1/1
3	NAG	B	1308	1	-	2/6/23/26	0/1/1/1
3	NAG	B	1302	-	-	1/6/23/26	0/1/1/1
3	NAG	B	1303	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1309	1	-	1/6/23/26	0/1/1/1
3	NAG	A	1302	-	-	1/6/23/26	0/1/1/1
3	NAG	A	1310	1	-	1/6/23/26	0/1/1/1
3	NAG	C	1301	1	-	0/6/23/26	0/1/1/1
3	NAG	B	1304	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1303	1	-	2/6/23/26	0/1/1/1
3	NAG	C	1310	1	-	1/6/23/26	0/1/1/1
3	NAG	B	1309	1	-	1/6/23/26	0/1/1/1
3	NAG	C	1303	1	-	2/6/23/26	0/1/1/1
3	NAG	B	1310	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1308	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1306	-	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	1308	NAG	O5-C5-C6-O6
3	A	1308	NAG	O5-C5-C6-O6
3	B	1308	NAG	O5-C5-C6-O6
3	A	1303	NAG	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
3	B	1303	NAG	O5-C5-C6-O6
3	C	1303	NAG	O5-C5-C6-O6
3	B	1310	NAG	O5-C5-C6-O6
3	B	1306	NAG	O5-C5-C6-O6
3	B	1303	NAG	C4-C5-C6-O6
3	C	1303	NAG	C4-C5-C6-O6
3	A	1303	NAG	C4-C5-C6-O6
3	C	1308	NAG	C4-C5-C6-O6
3	A	1311	NAG	C4-C5-C6-O6
3	A	1308	NAG	C4-C5-C6-O6
3	B	1308	NAG	C4-C5-C6-O6
3	A	1306	NAG	O5-C5-C6-O6
3	A	1310	NAG	O5-C5-C6-O6
3	C	1306	NAG	O5-C5-C6-O6
3	B	1306	NAG	C4-C5-C6-O6
3	C	1311	NAG	C4-C5-C6-O6
3	A	1311	NAG	O5-C5-C6-O6
3	C	1310	NAG	O5-C5-C6-O6
3	C	1304	NAG	C4-C5-C6-O6
3	B	1311	NAG	C4-C5-C6-O6
3	C	1311	NAG	O5-C5-C6-O6
3	A	1306	NAG	C4-C5-C6-O6
3	C	1306	NAG	C4-C5-C6-O6
3	C	1304	NAG	O5-C5-C6-O6
3	A	1304	NAG	C4-C5-C6-O6
3	B	1311	NAG	O5-C5-C6-O6
3	B	1310	NAG	C4-C5-C6-O6
3	B	1301	NAG	C4-C5-C6-O6
3	C	1309	NAG	C4-C5-C6-O6
3	A	1302	NAG	C3-C2-N2-C7
3	B	1302	NAG	C3-C2-N2-C7
3	C	1302	NAG	C3-C2-N2-C7
3	A	1309	NAG	C4-C5-C6-O6
3	A	1301	NAG	C4-C5-C6-O6
3	B	1309	NAG	C4-C5-C6-O6

There are no ring outliers.

3 monomers are involved in 3 short contacts:

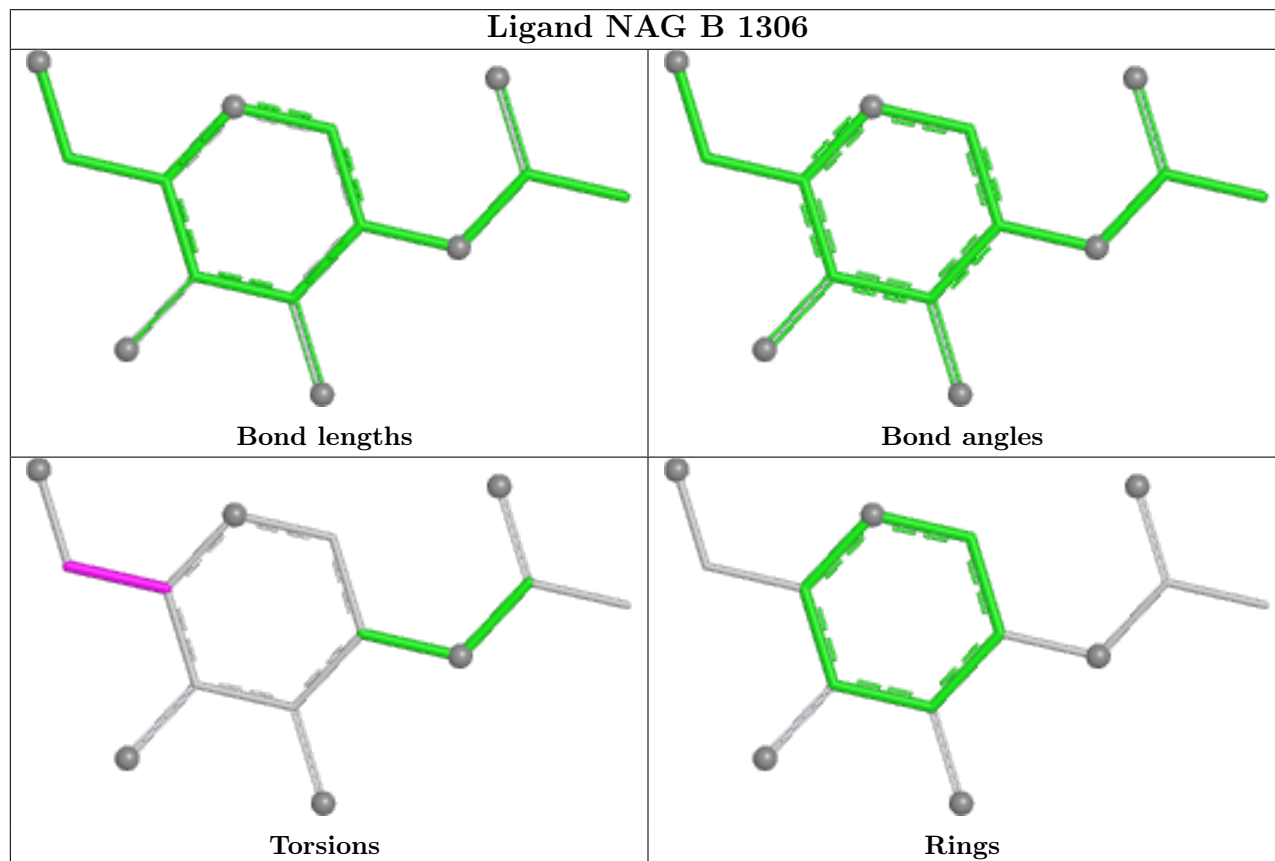
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1304	NAG	1	0
3	C	1304	NAG	1	0

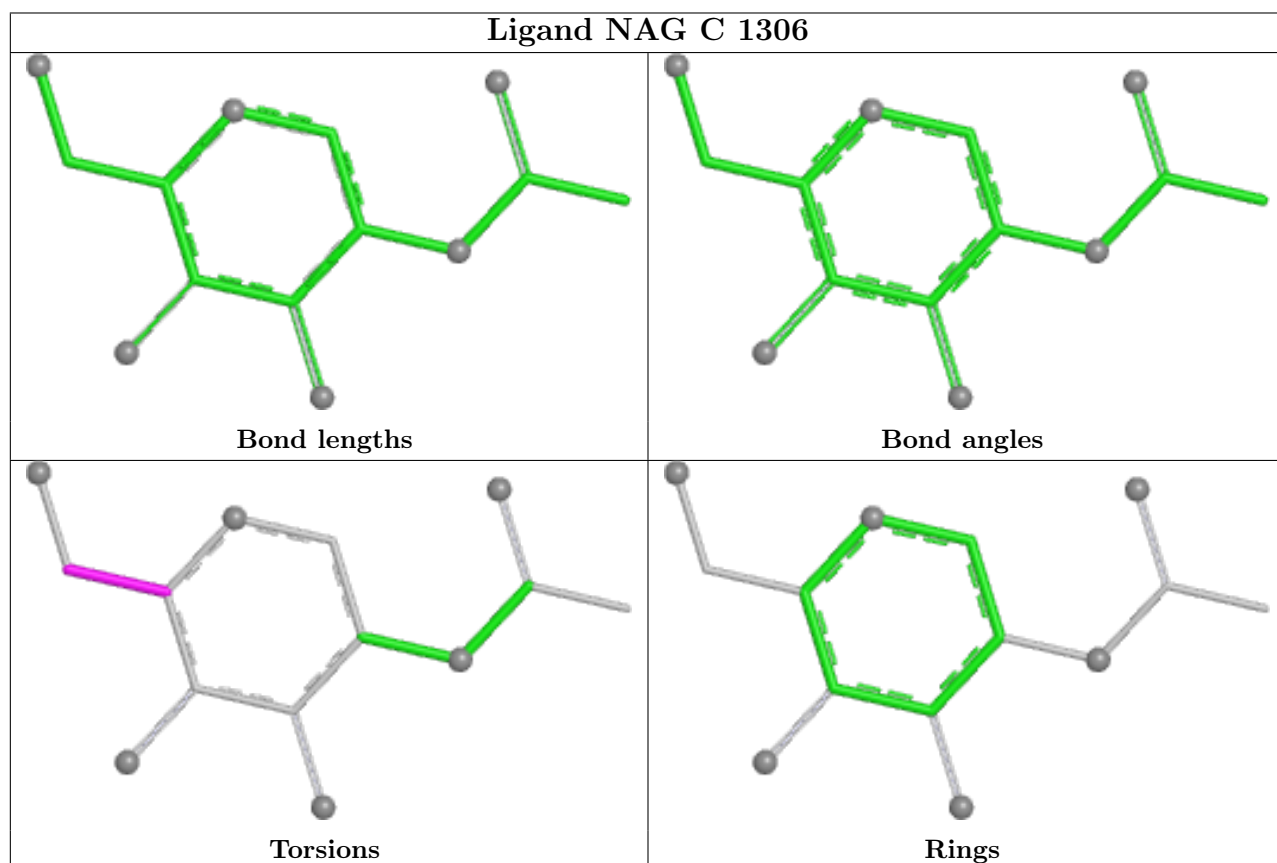
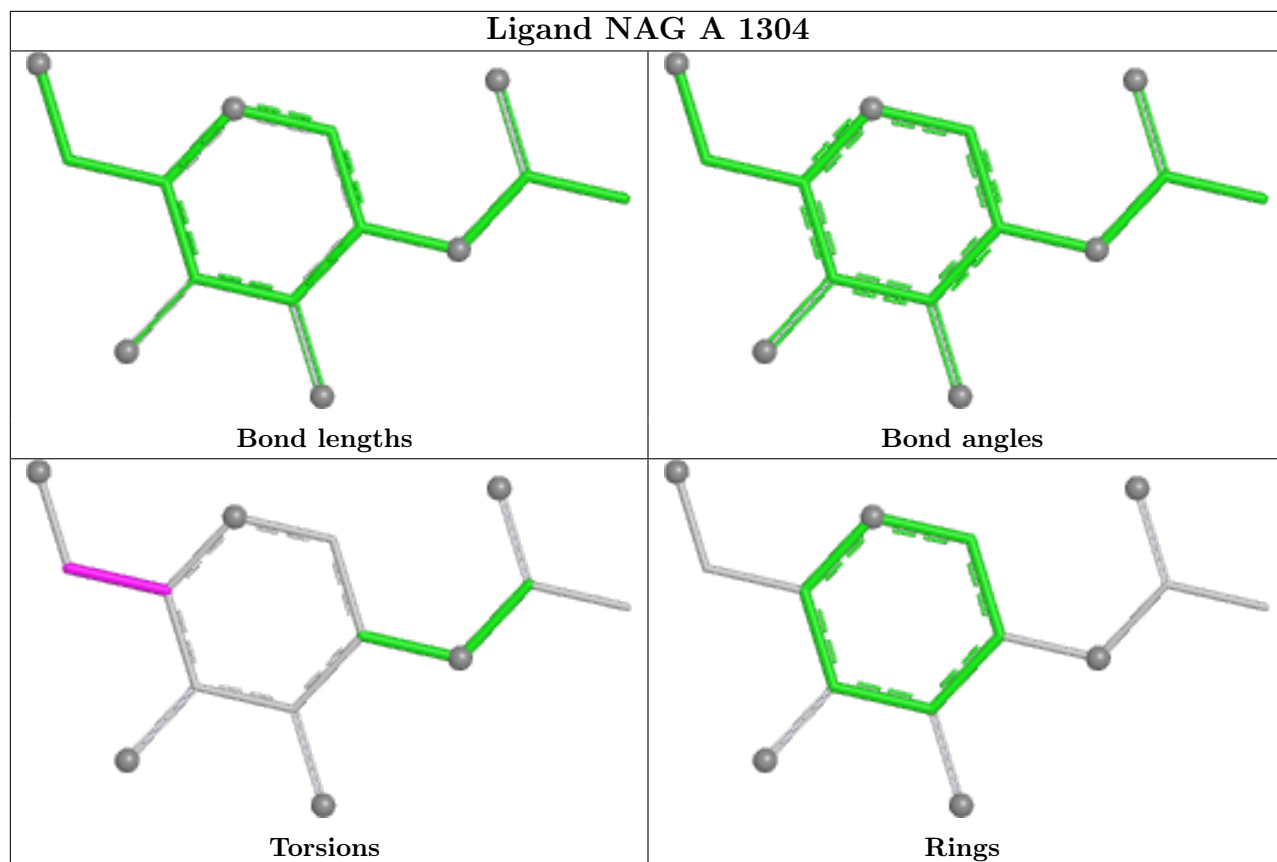
*Continued on next page...*

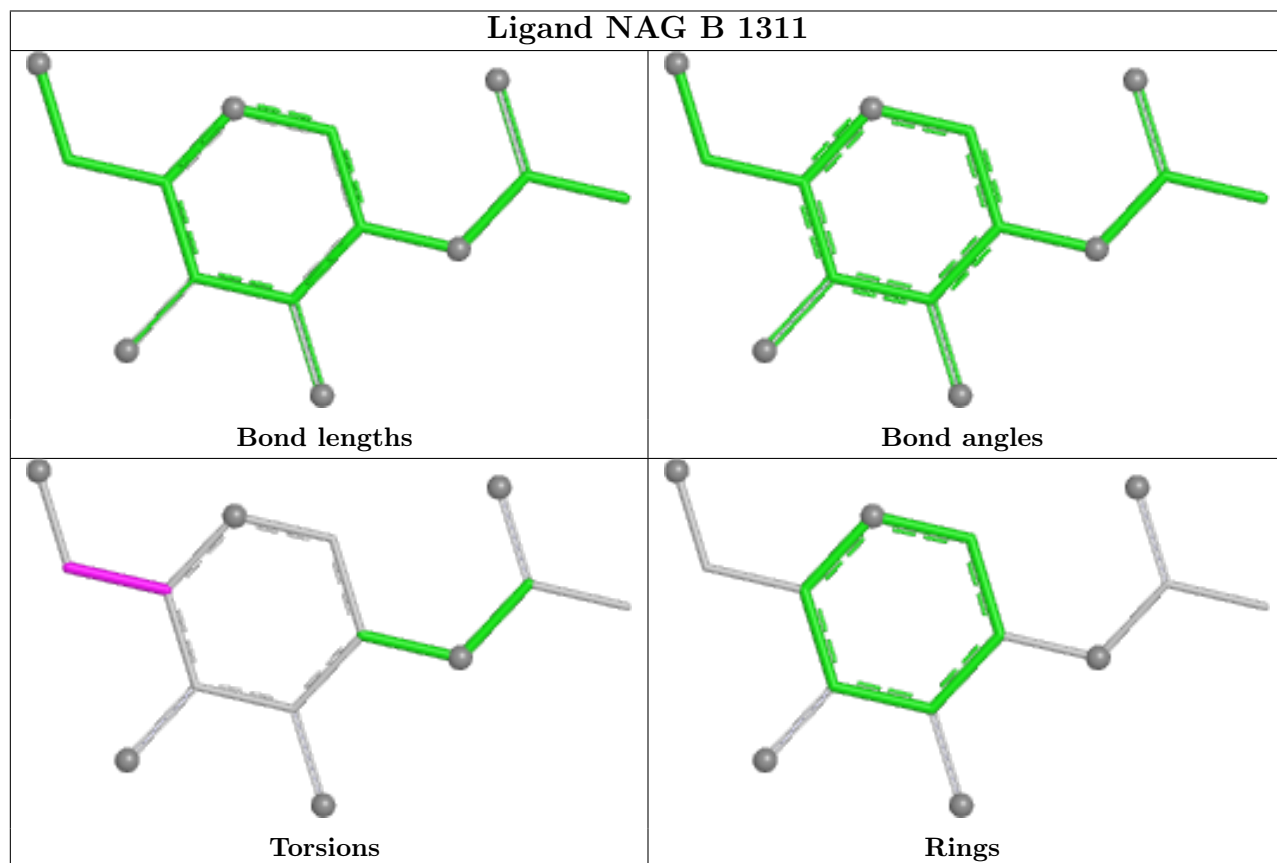
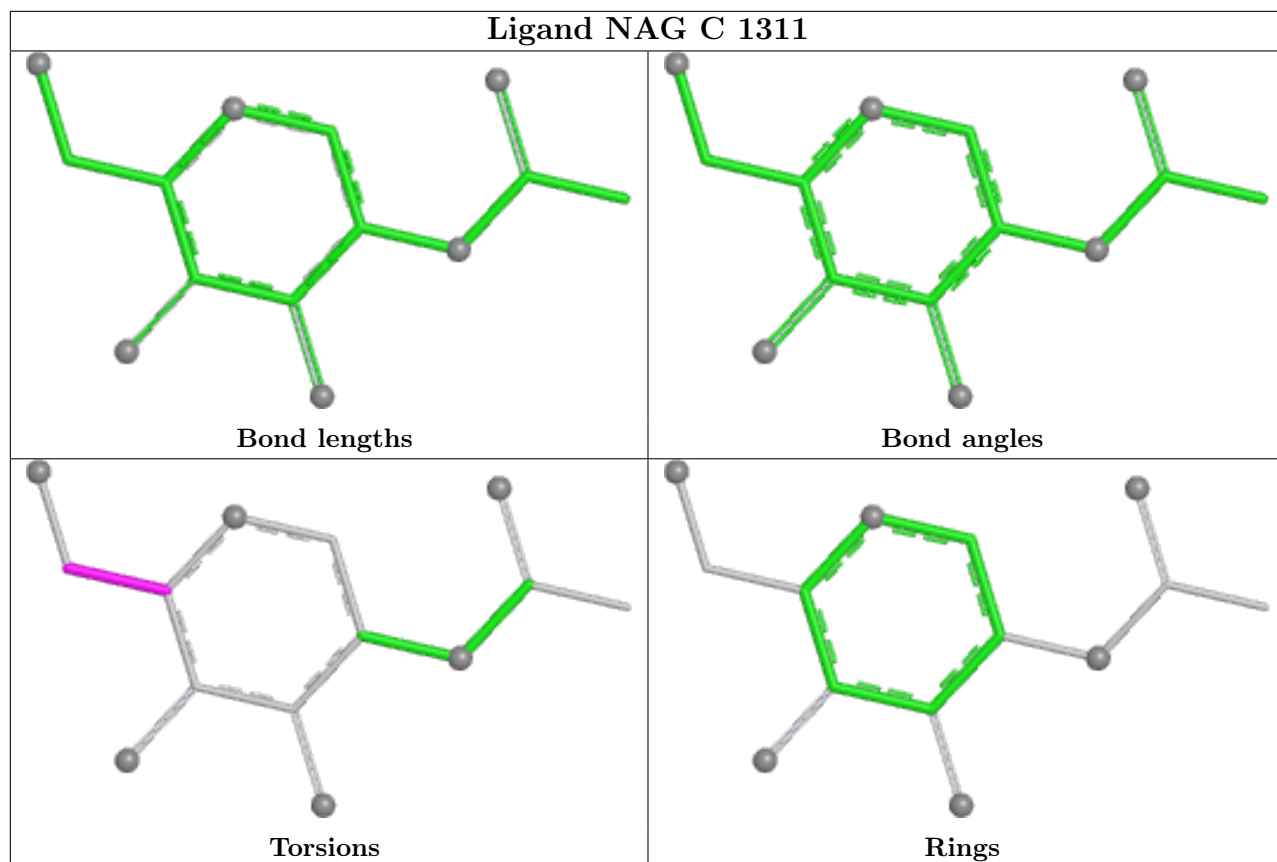
Continued from previous page...

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	1304	NAG	1	0

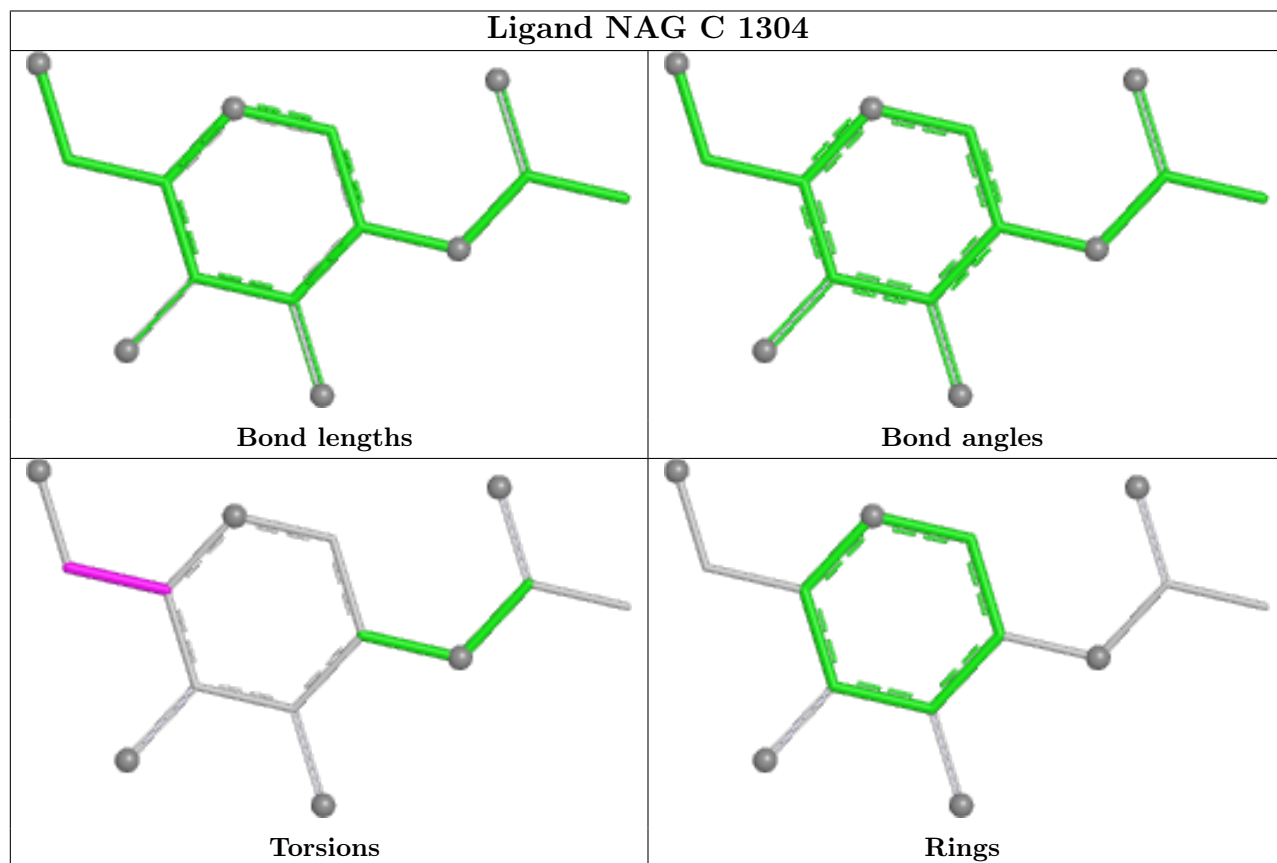
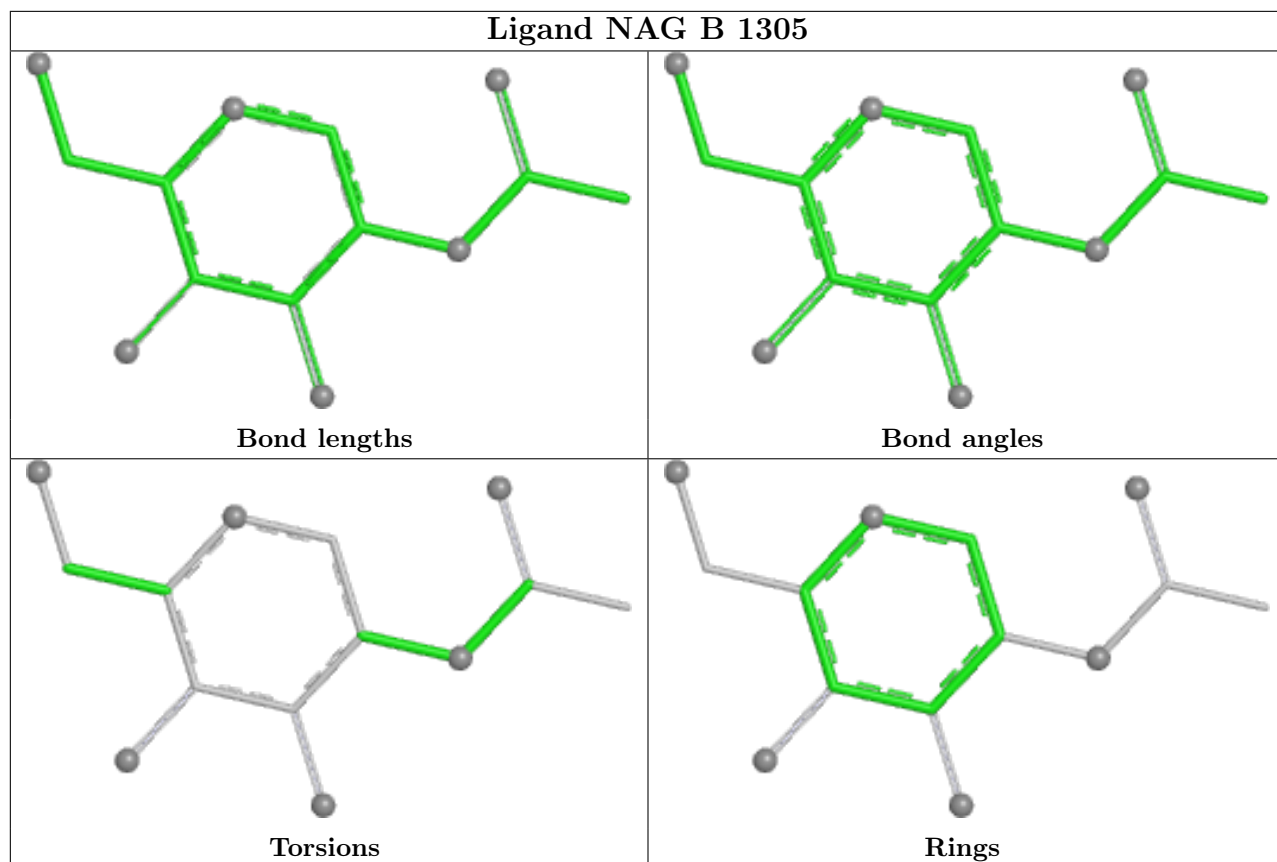
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

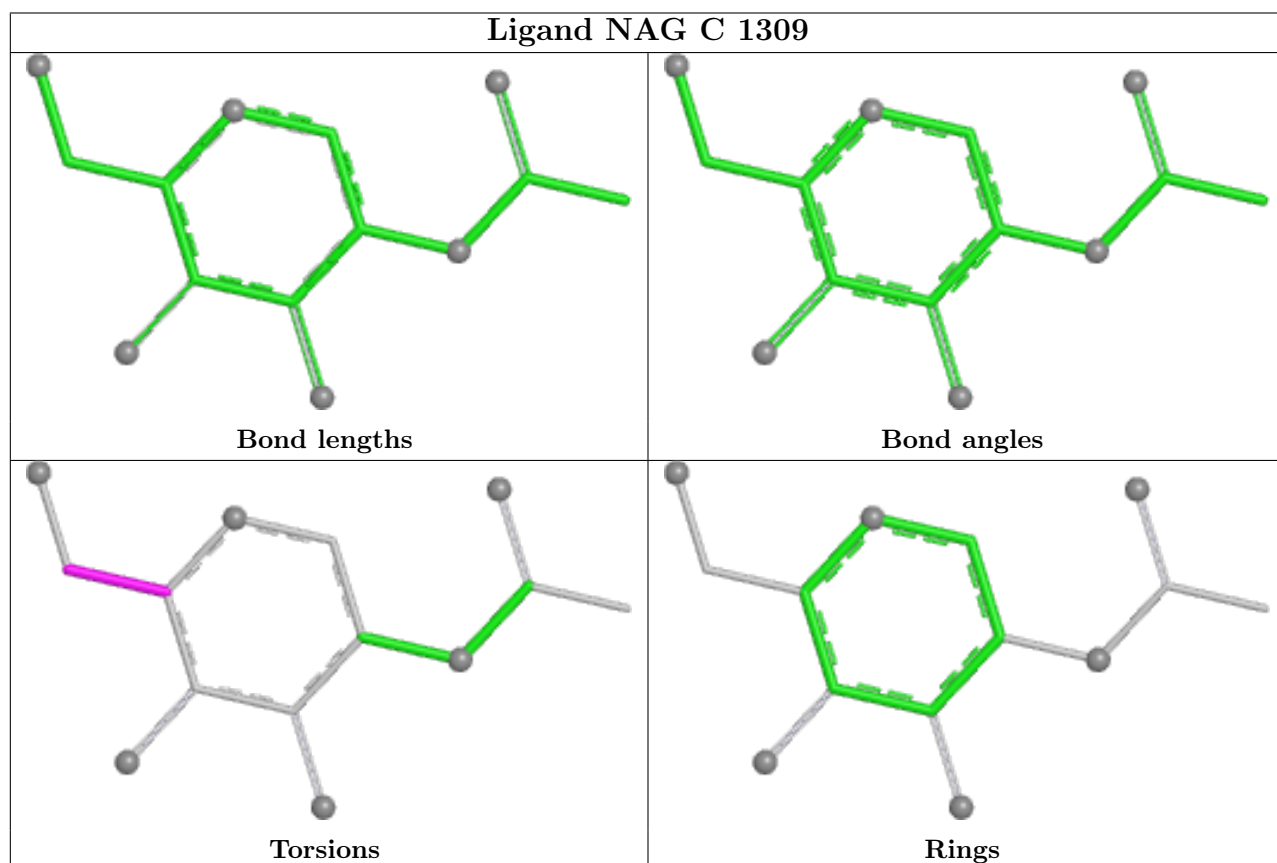
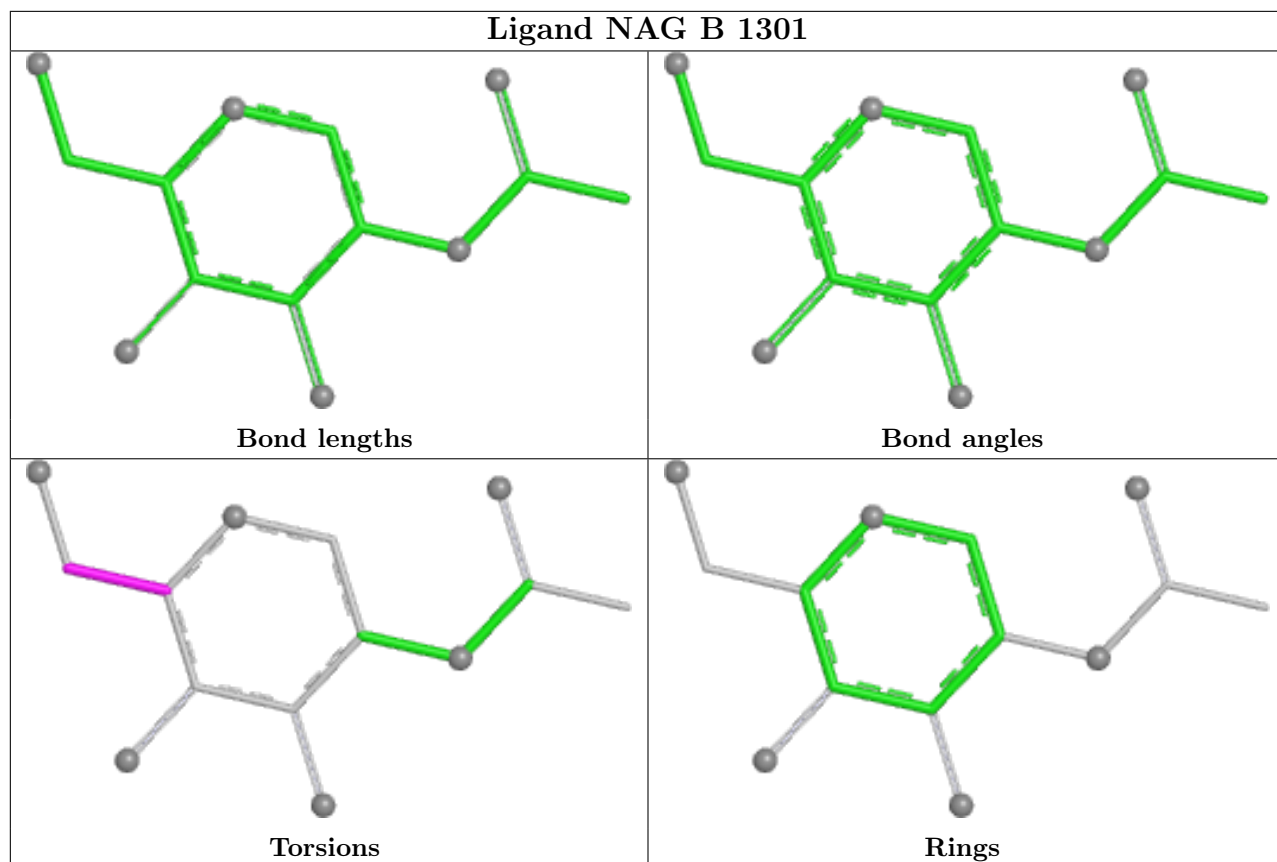


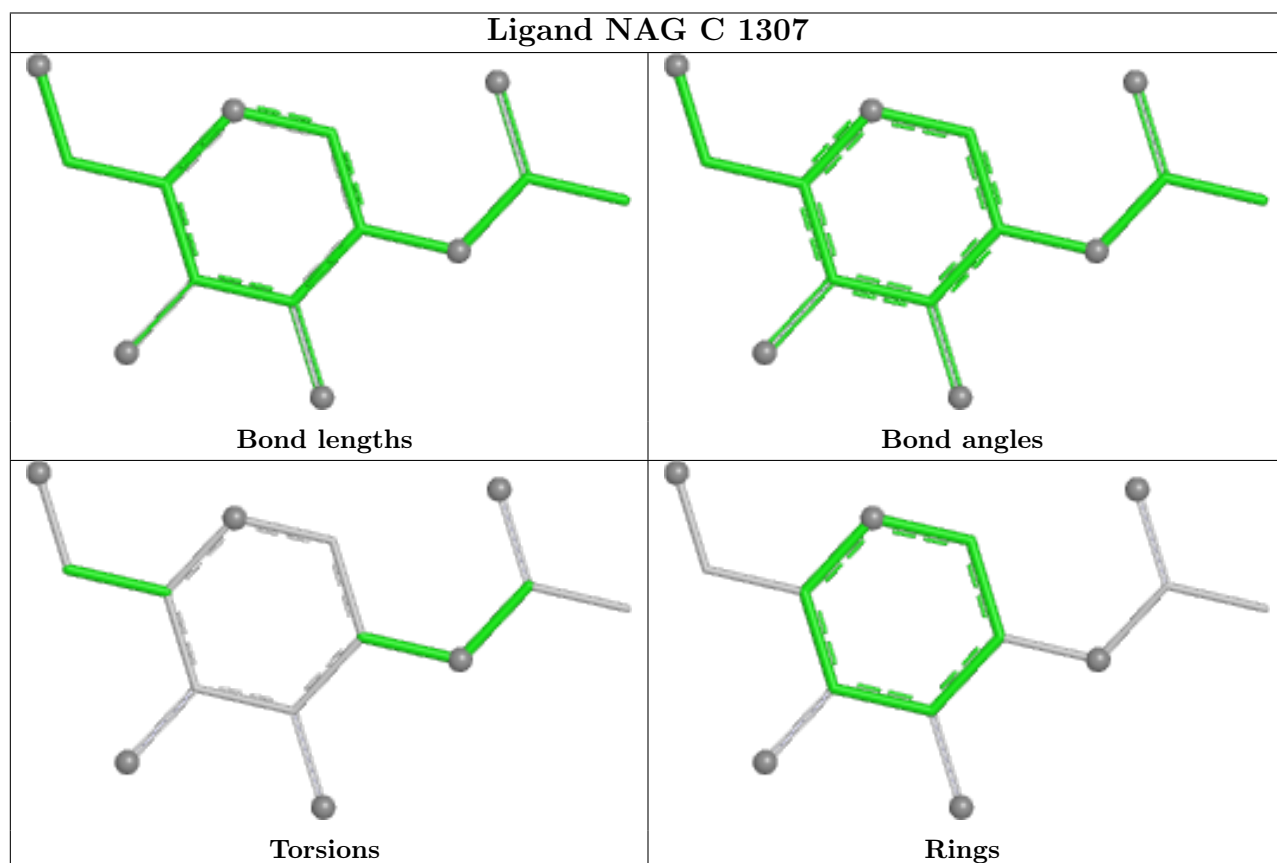
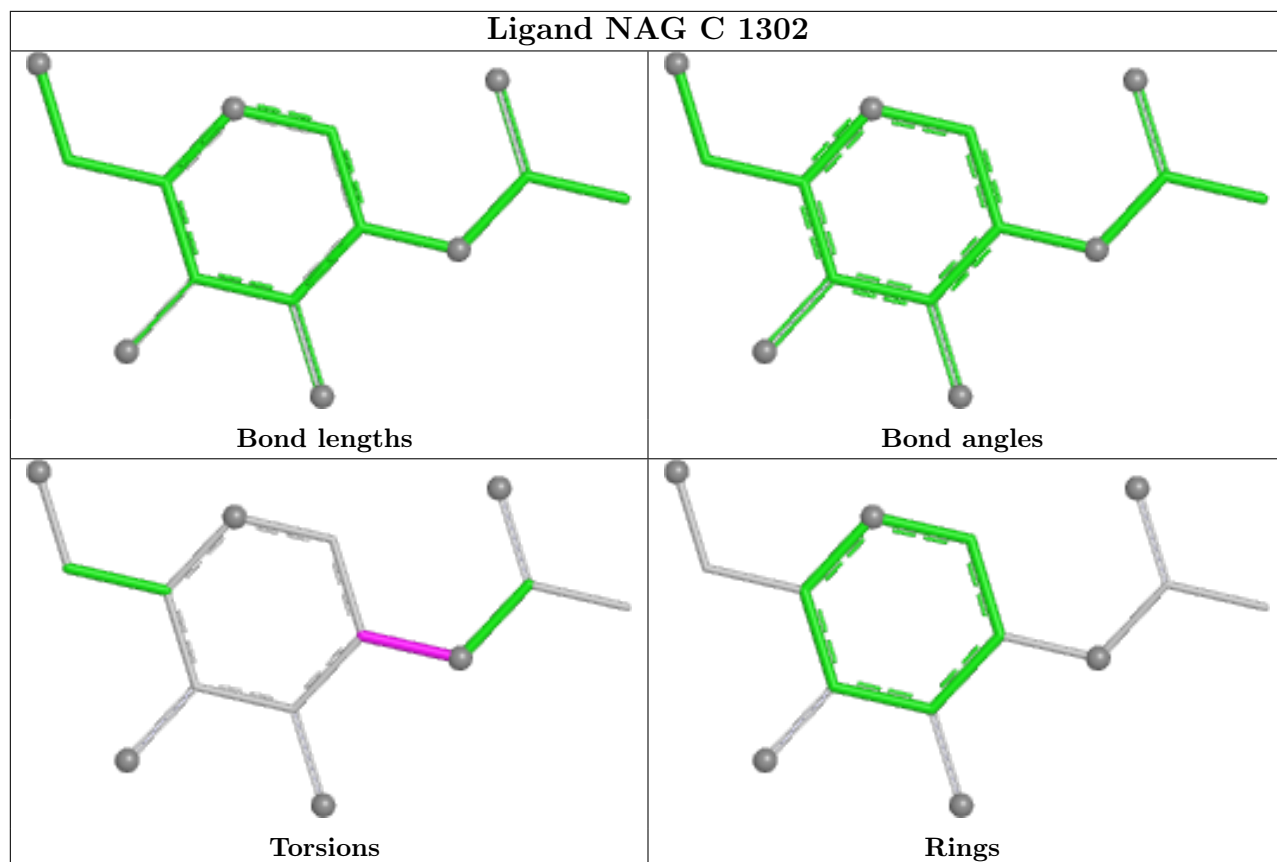


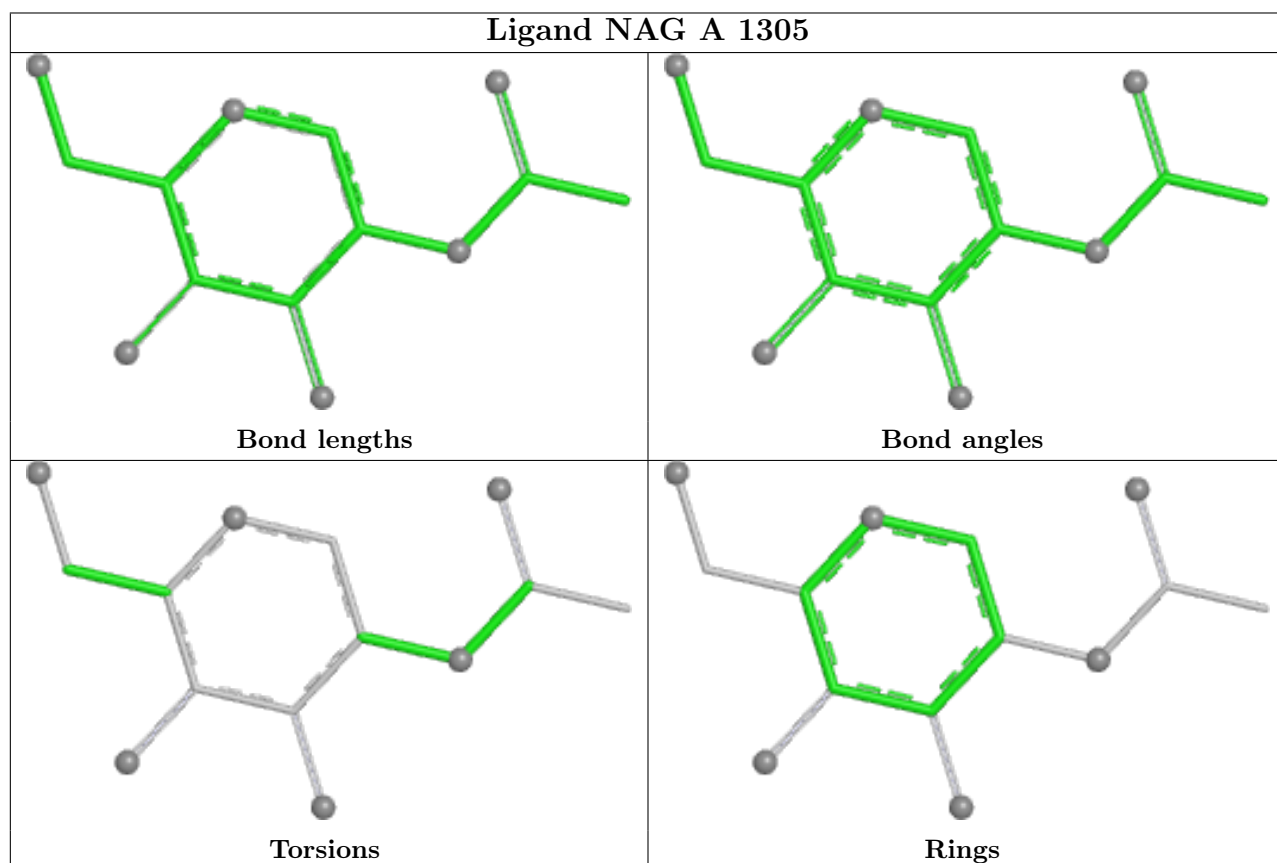
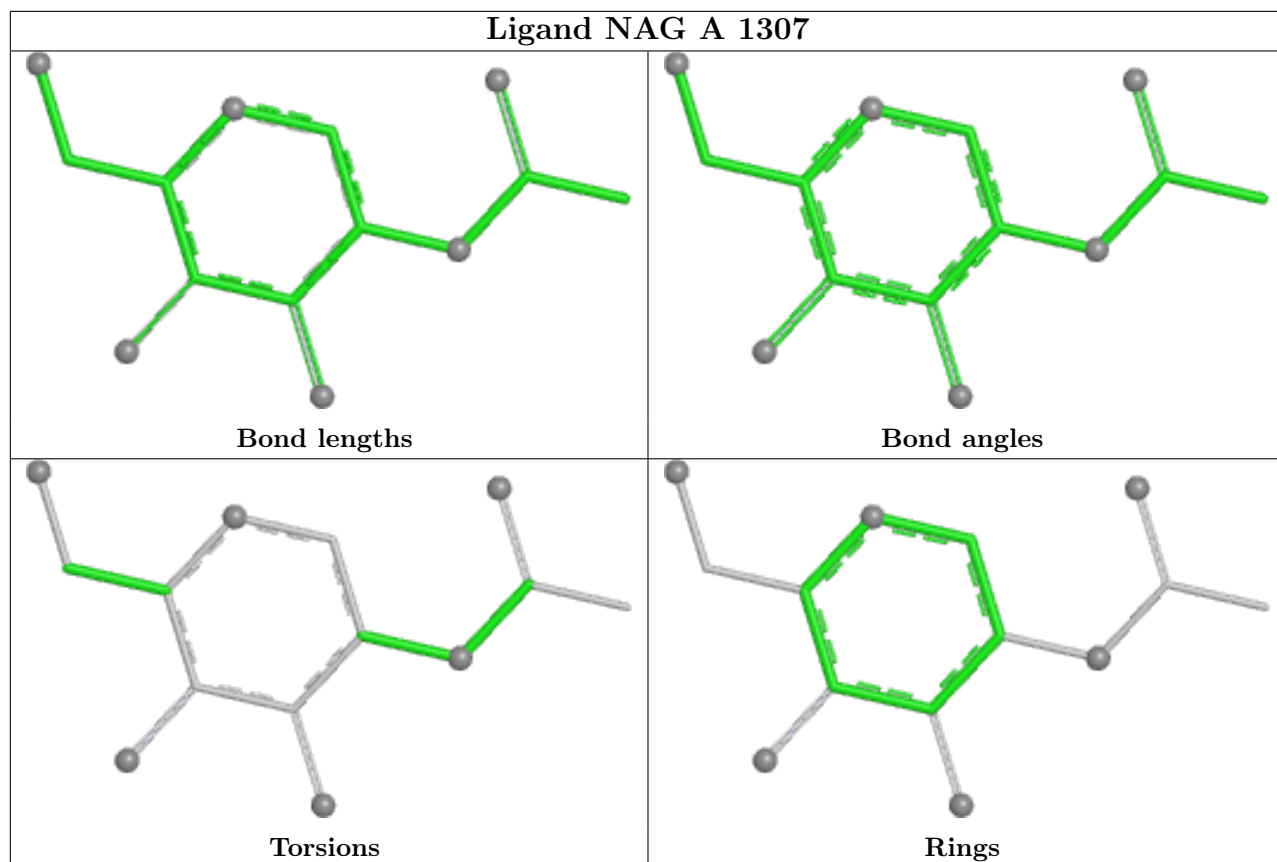


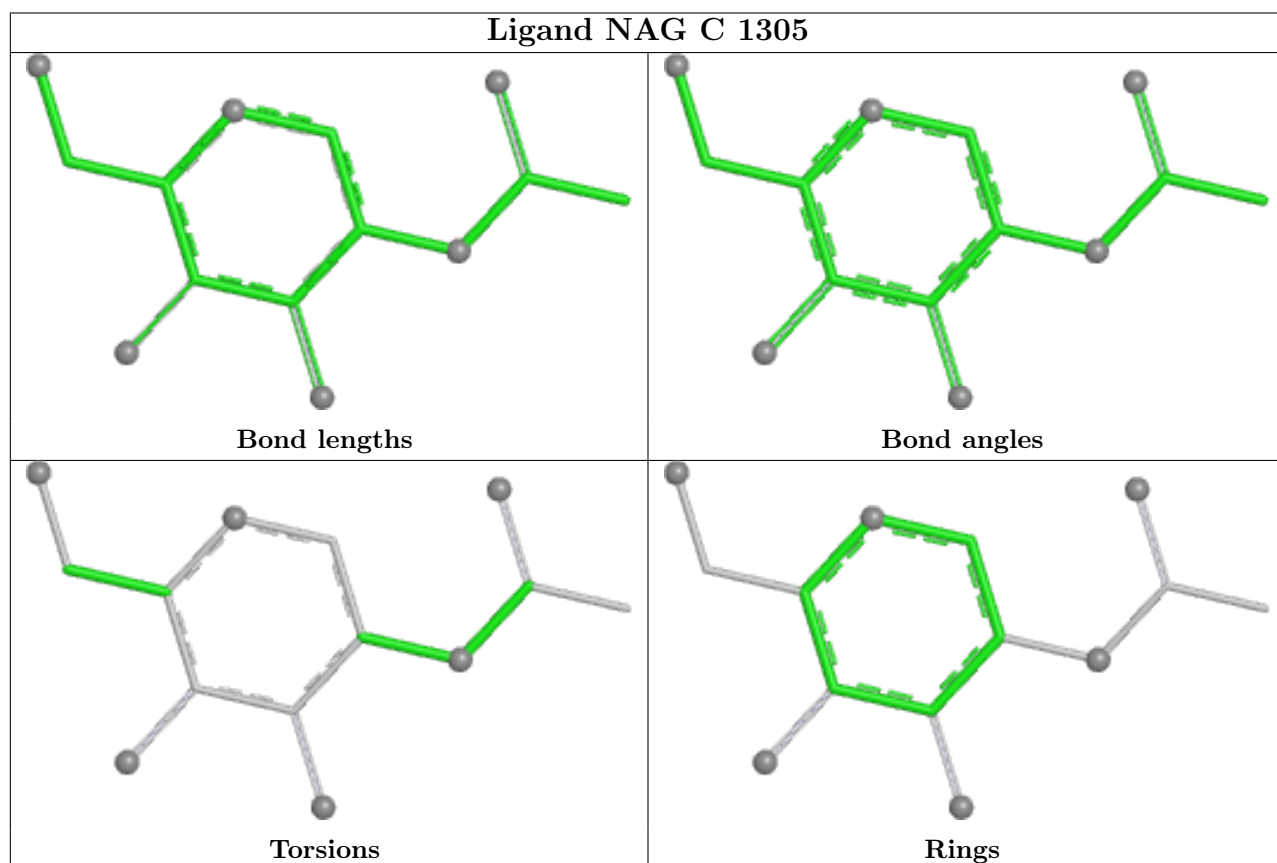
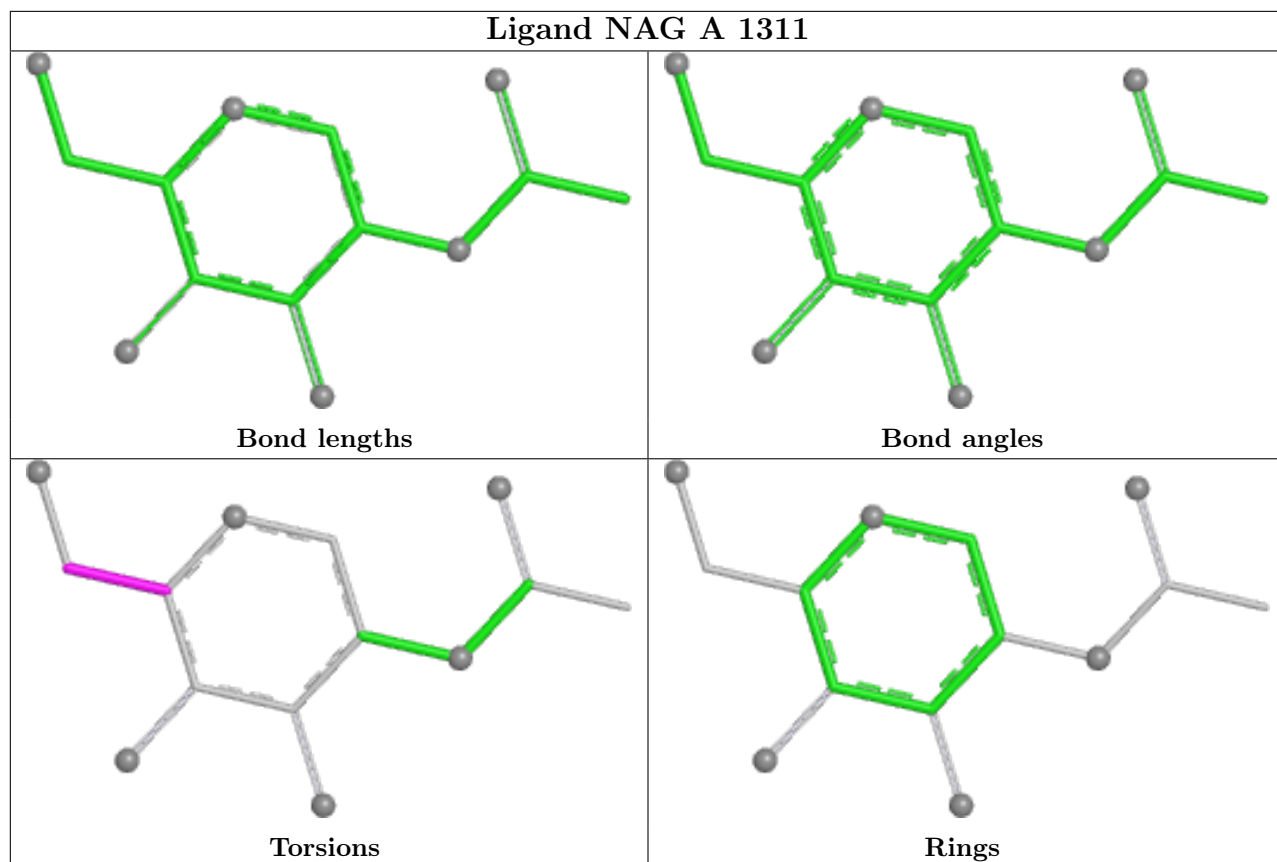


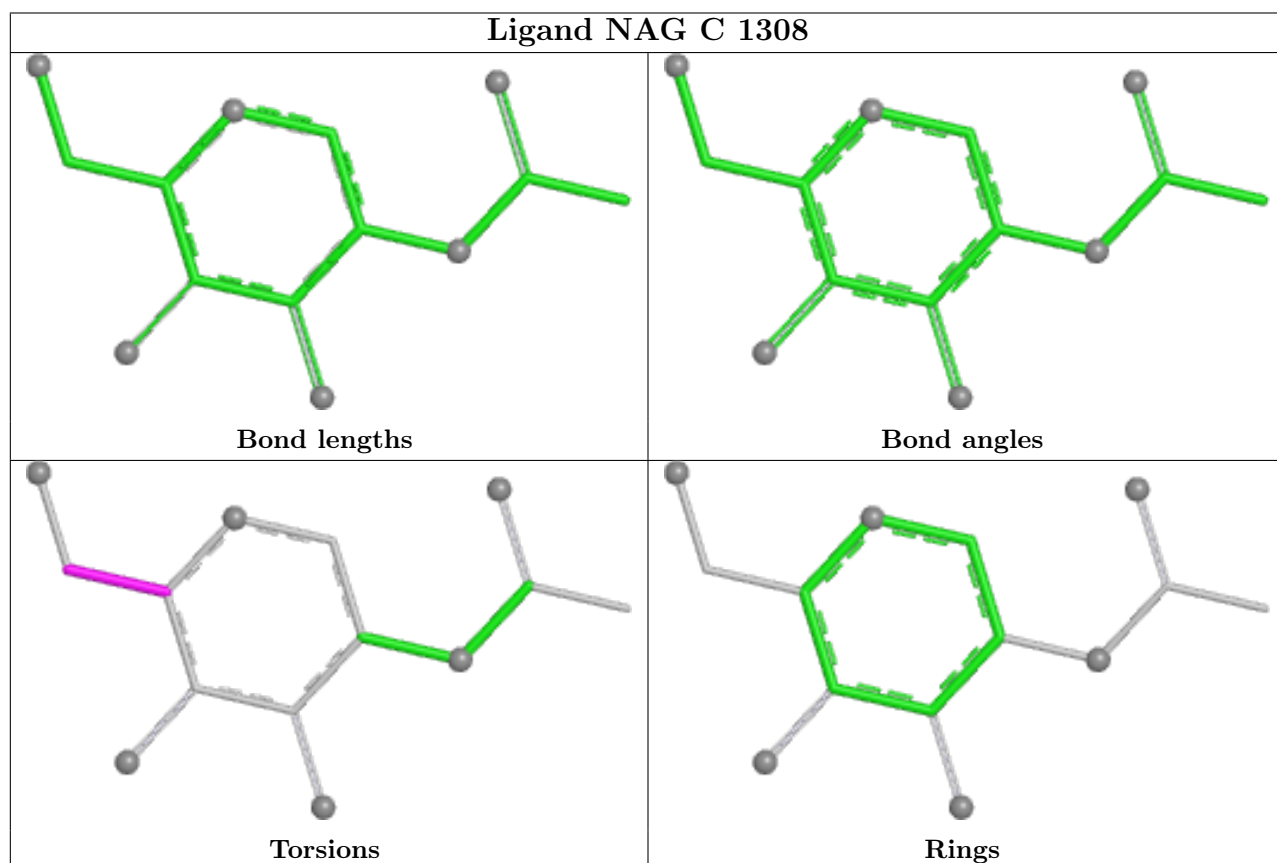
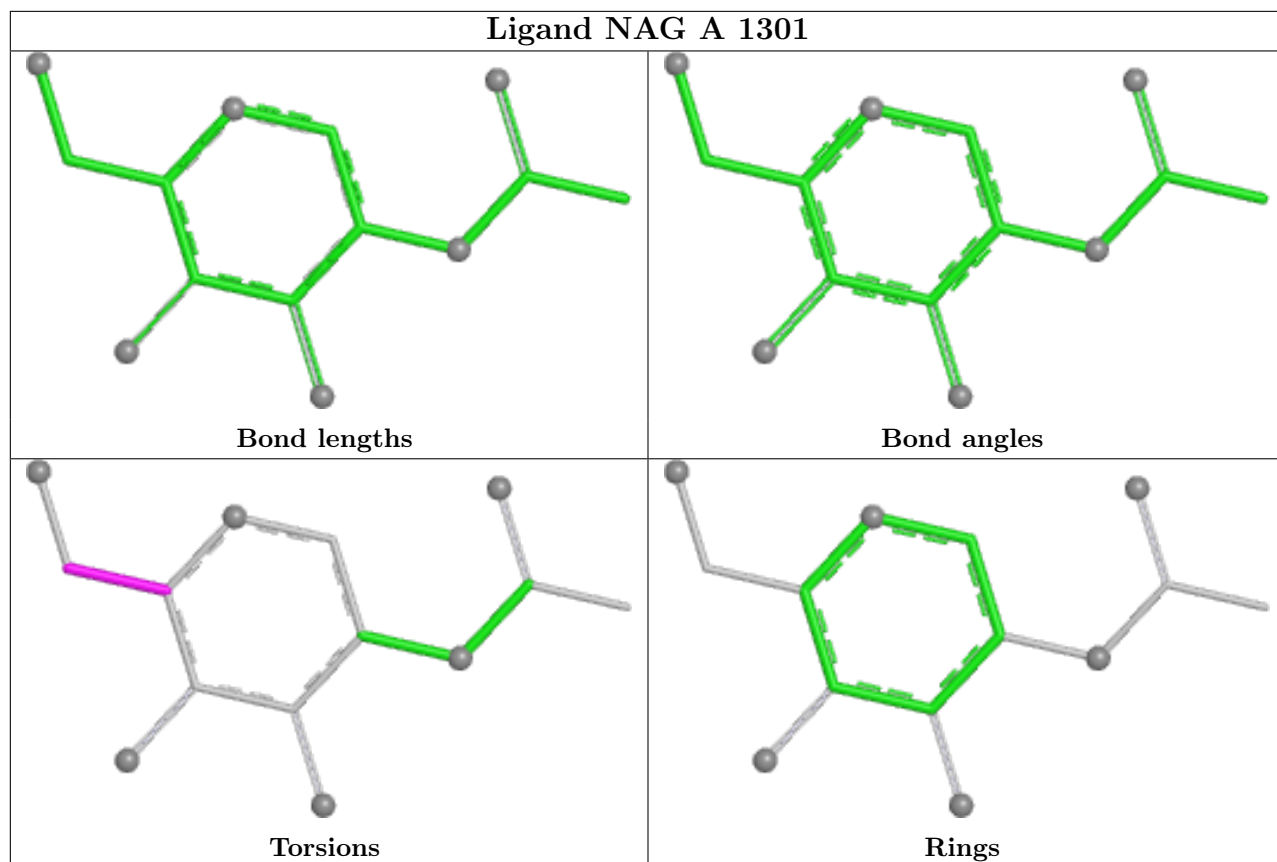


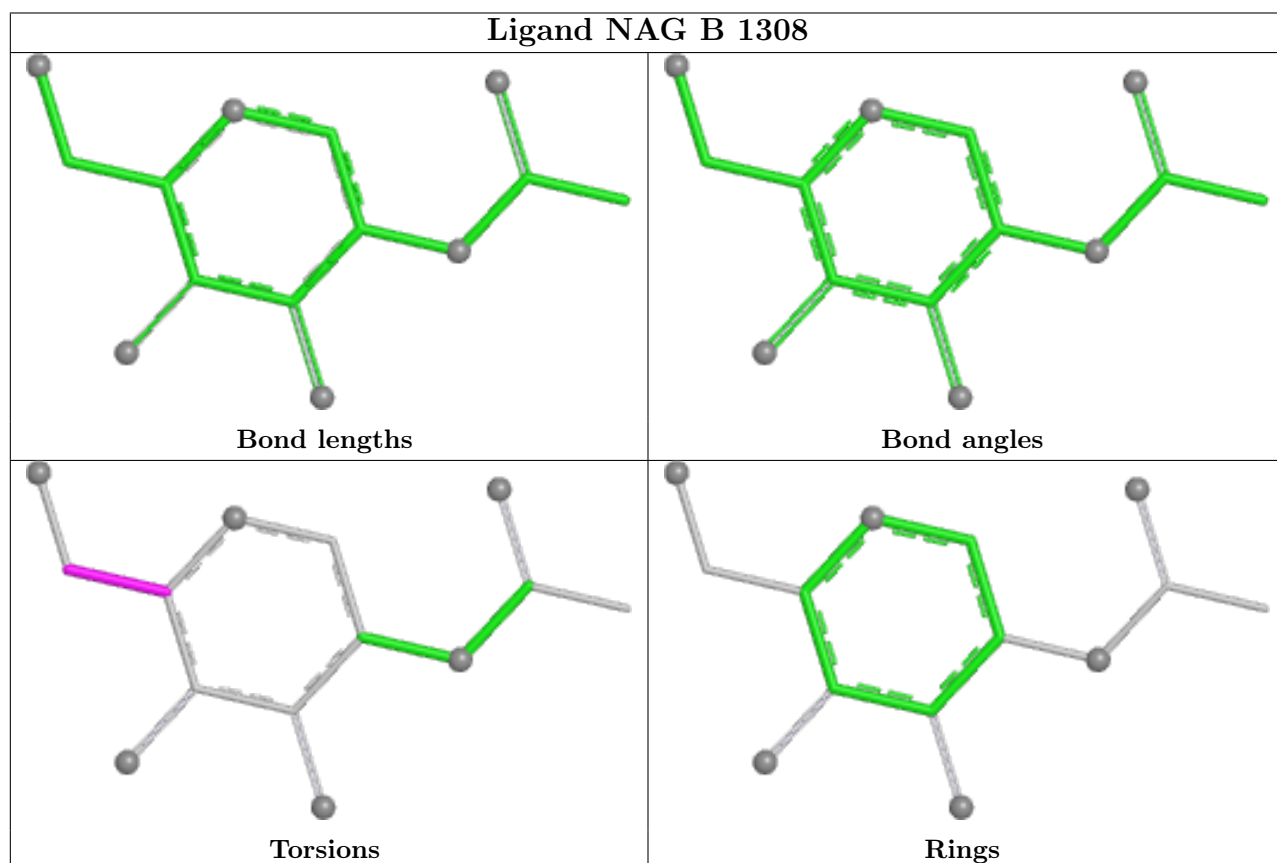
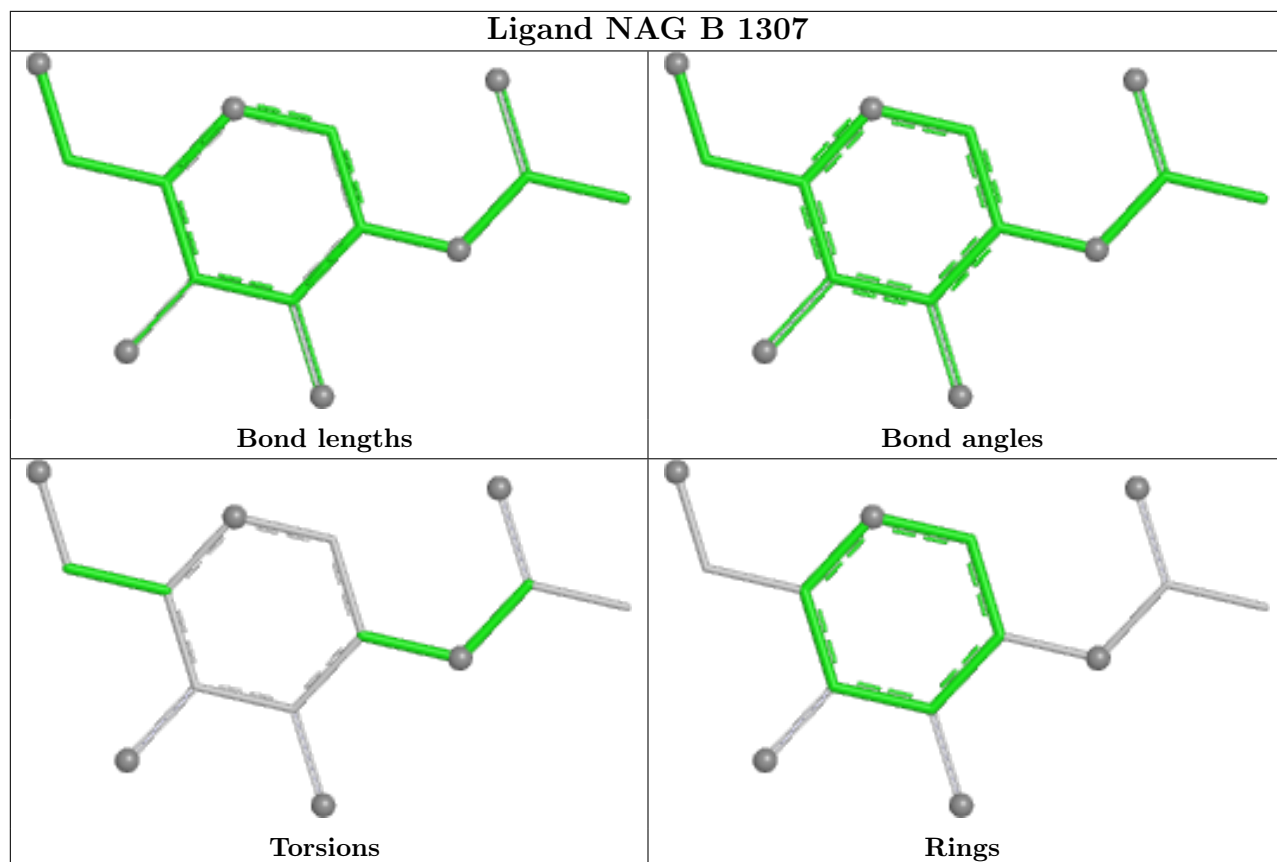


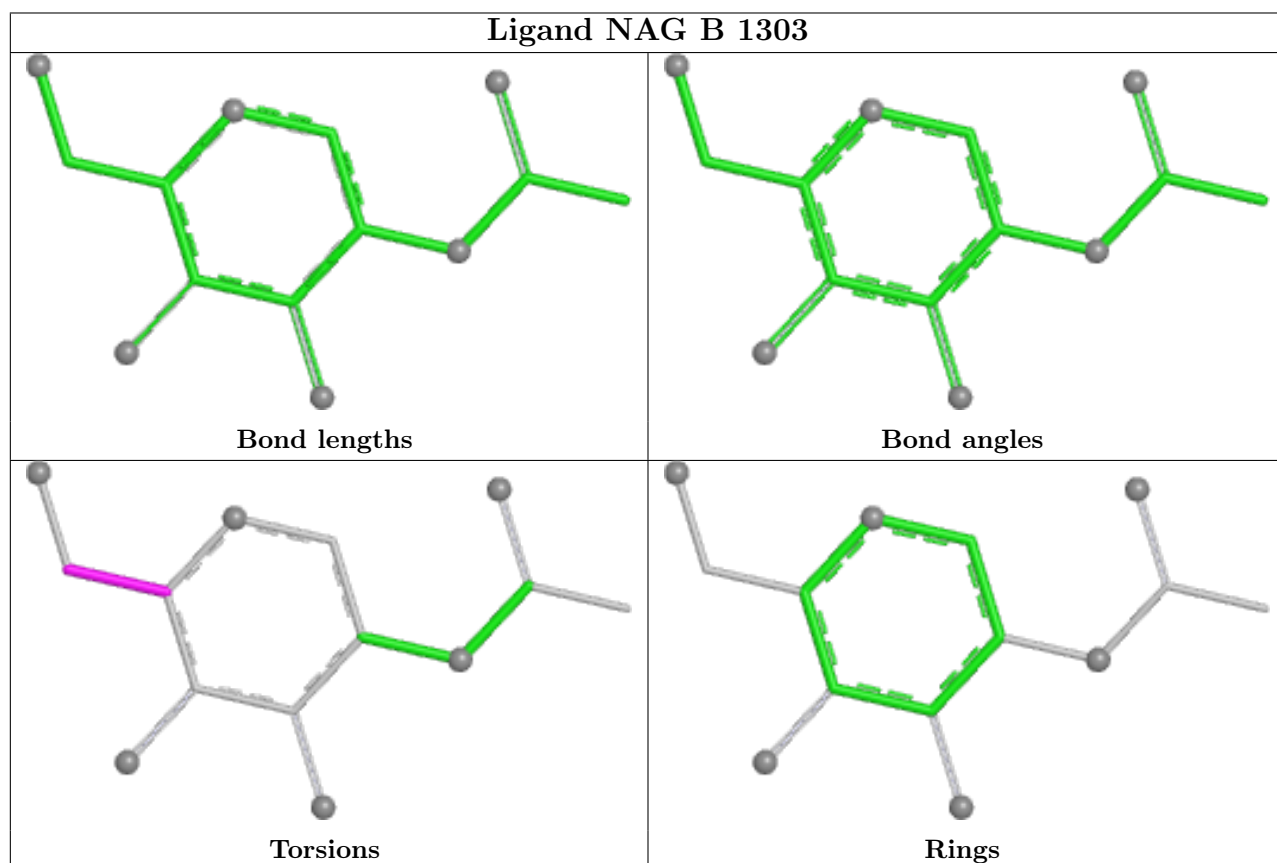
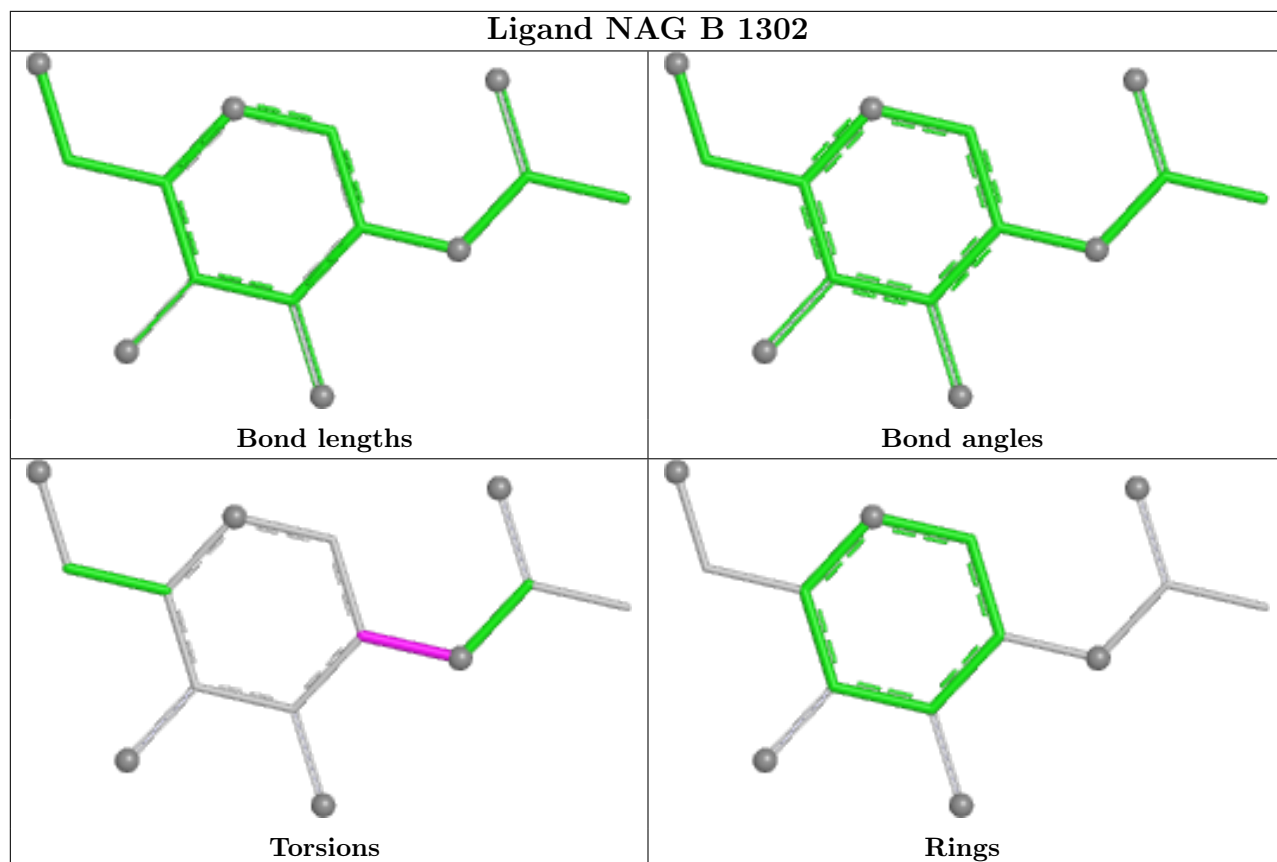




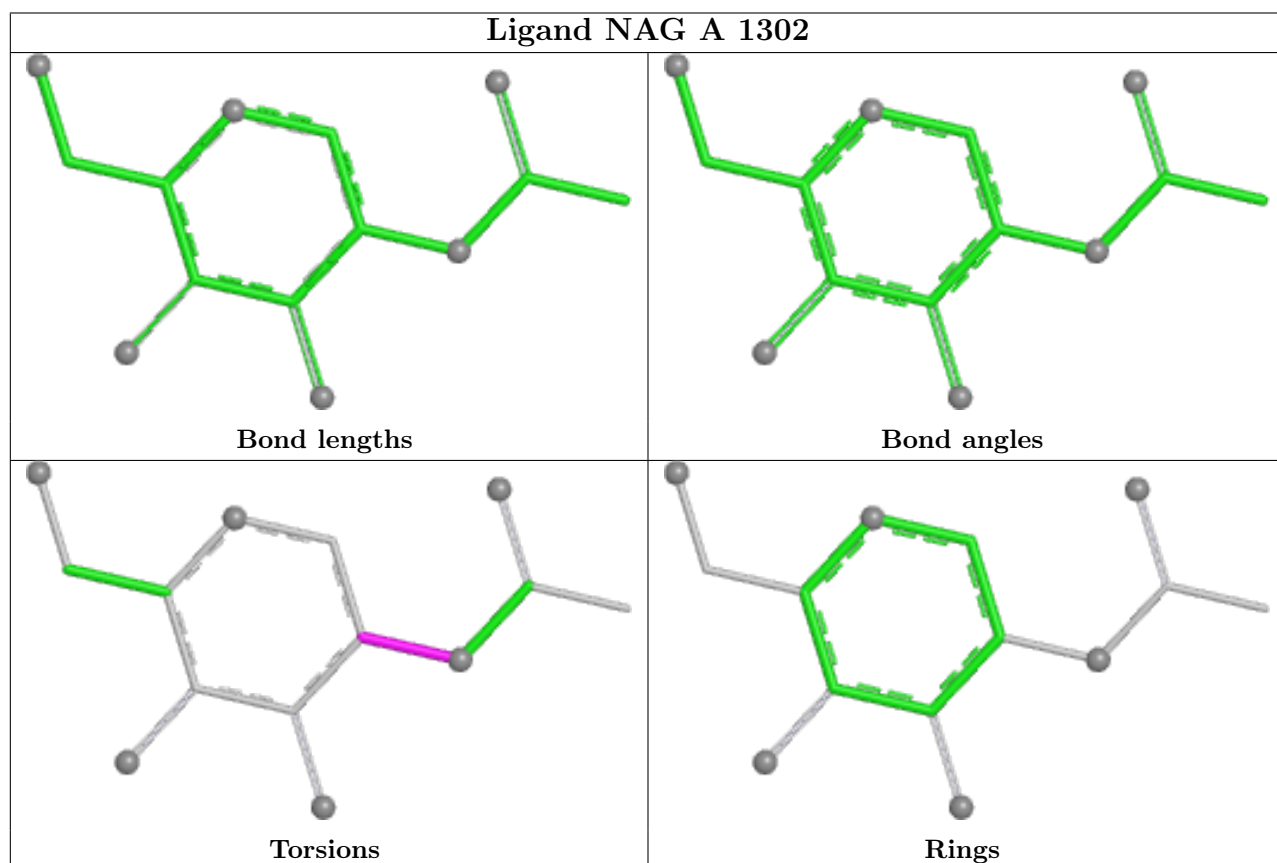
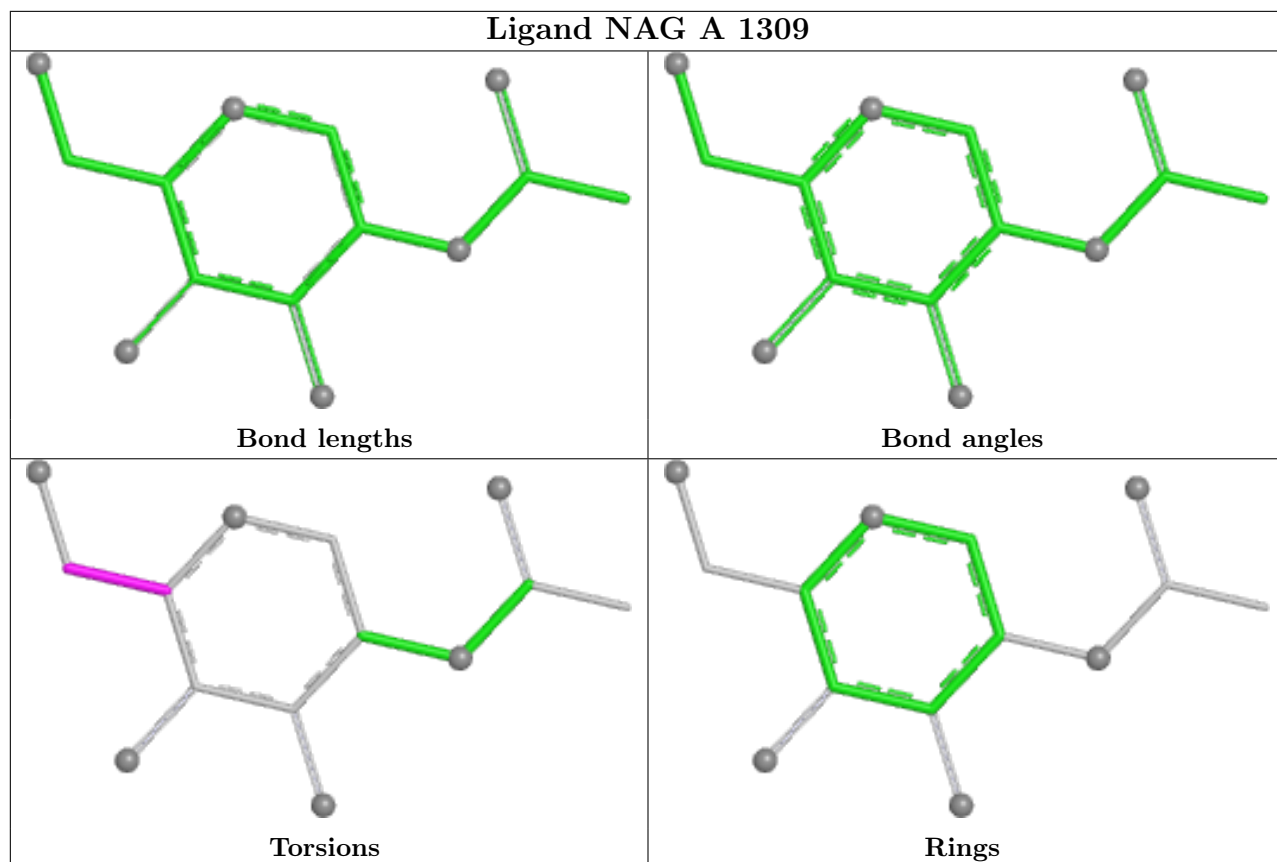


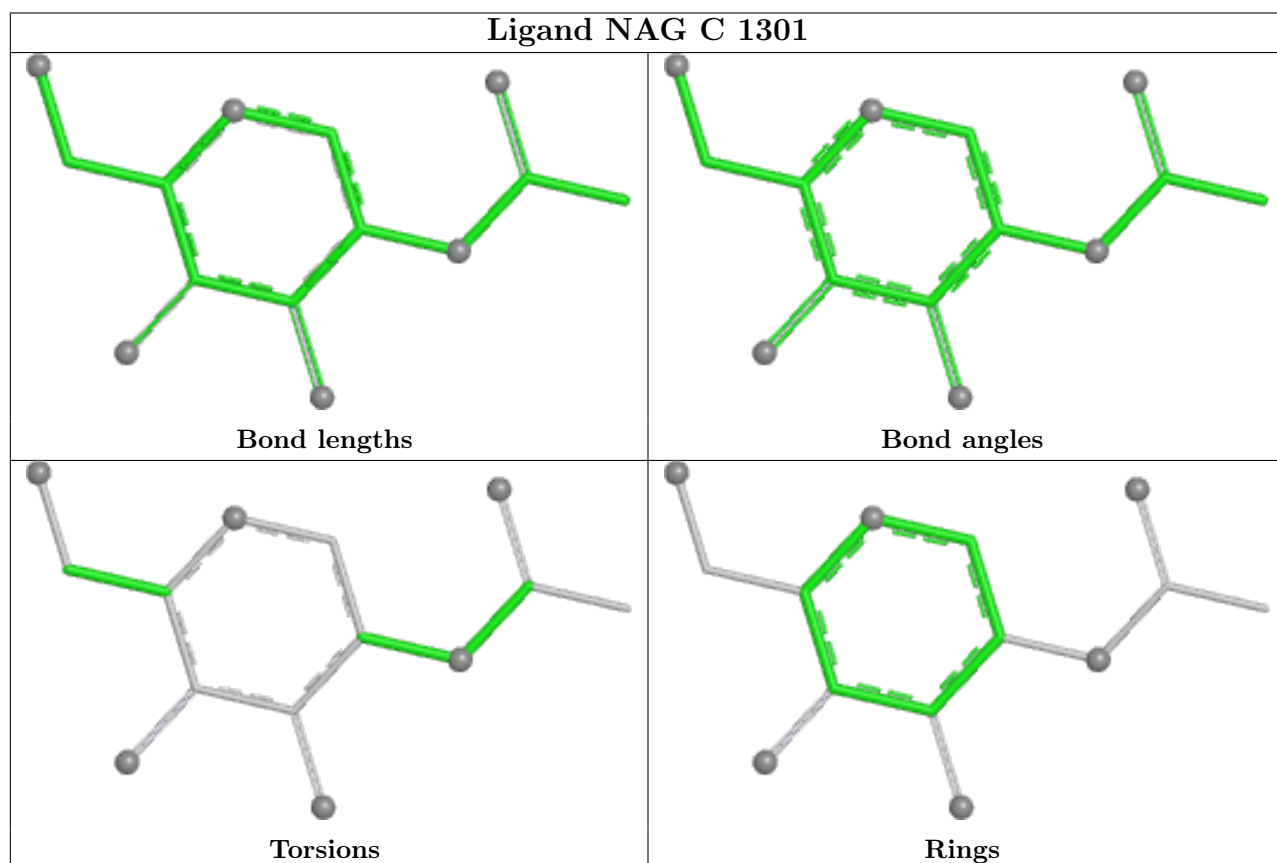
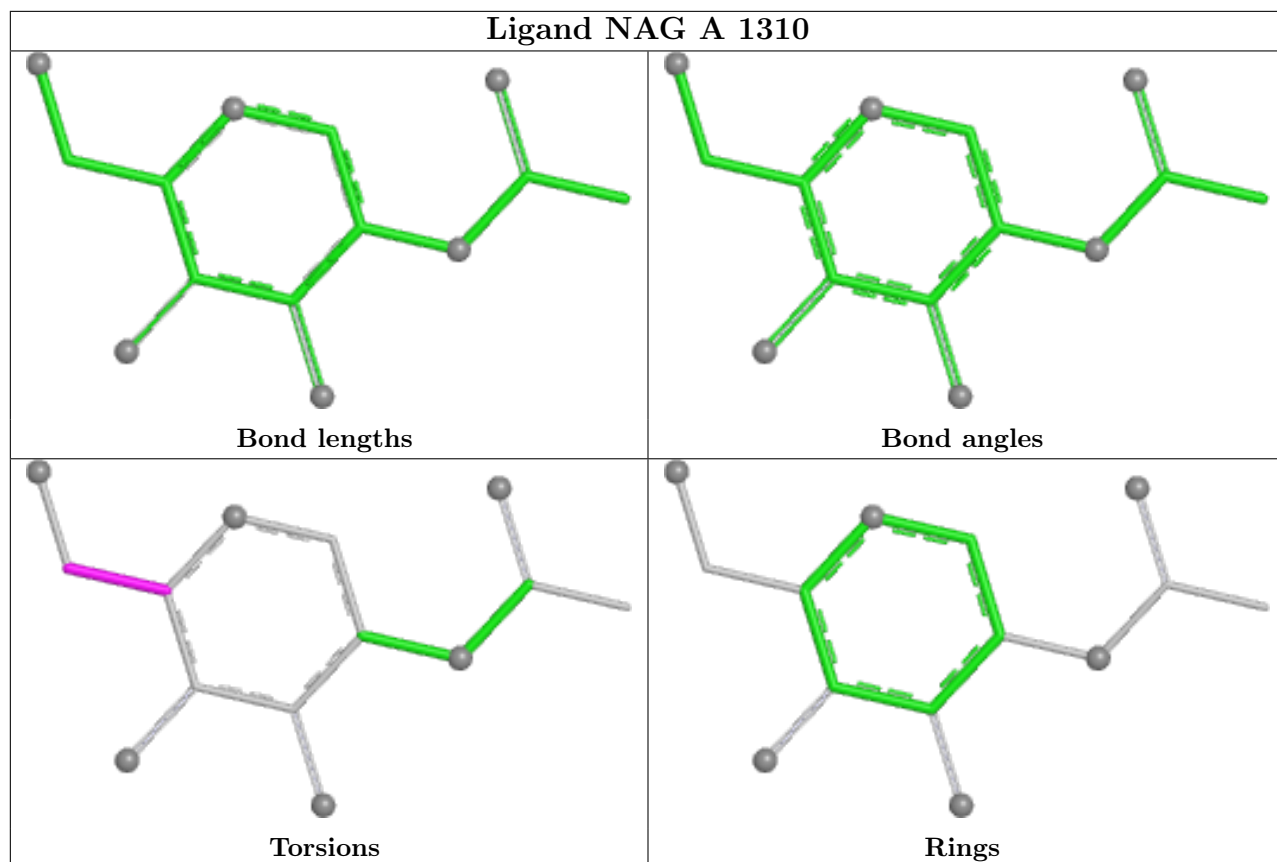


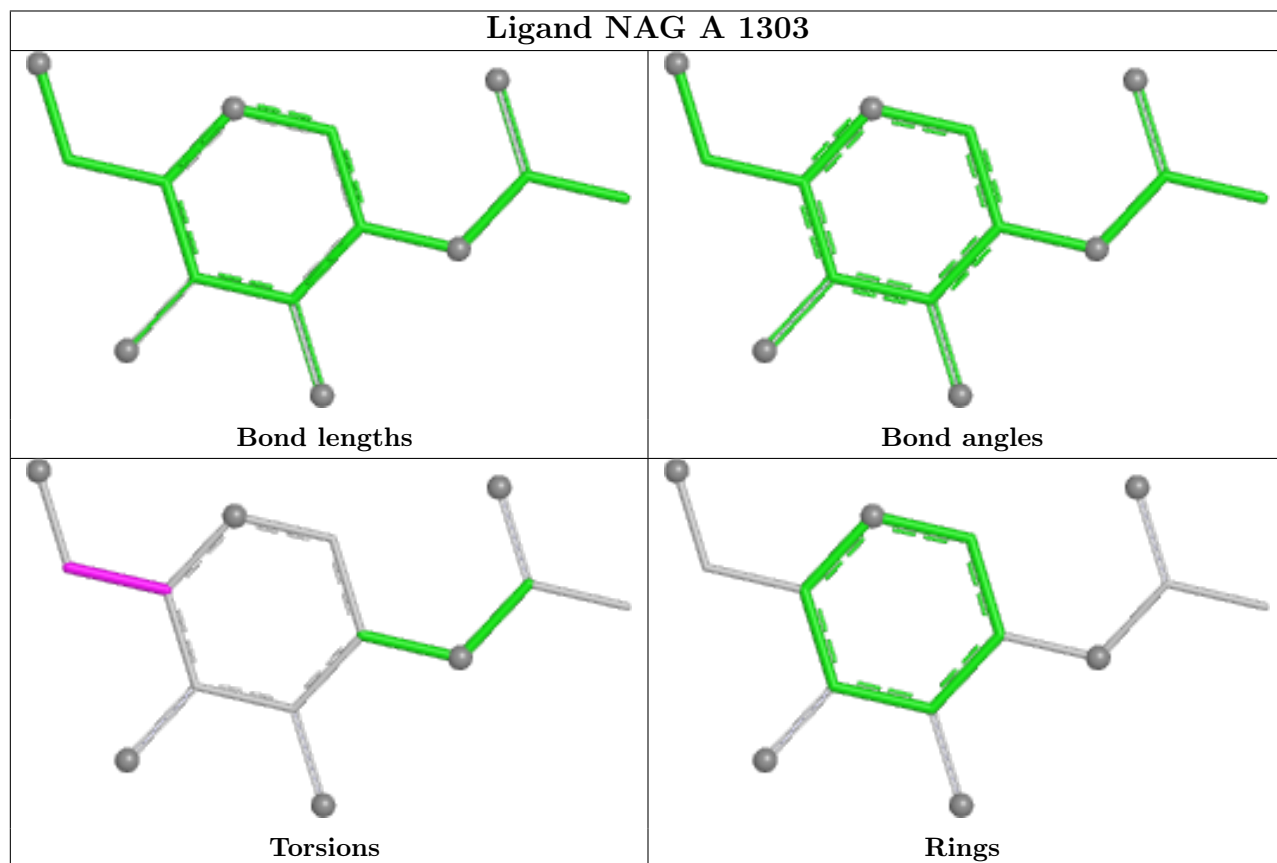
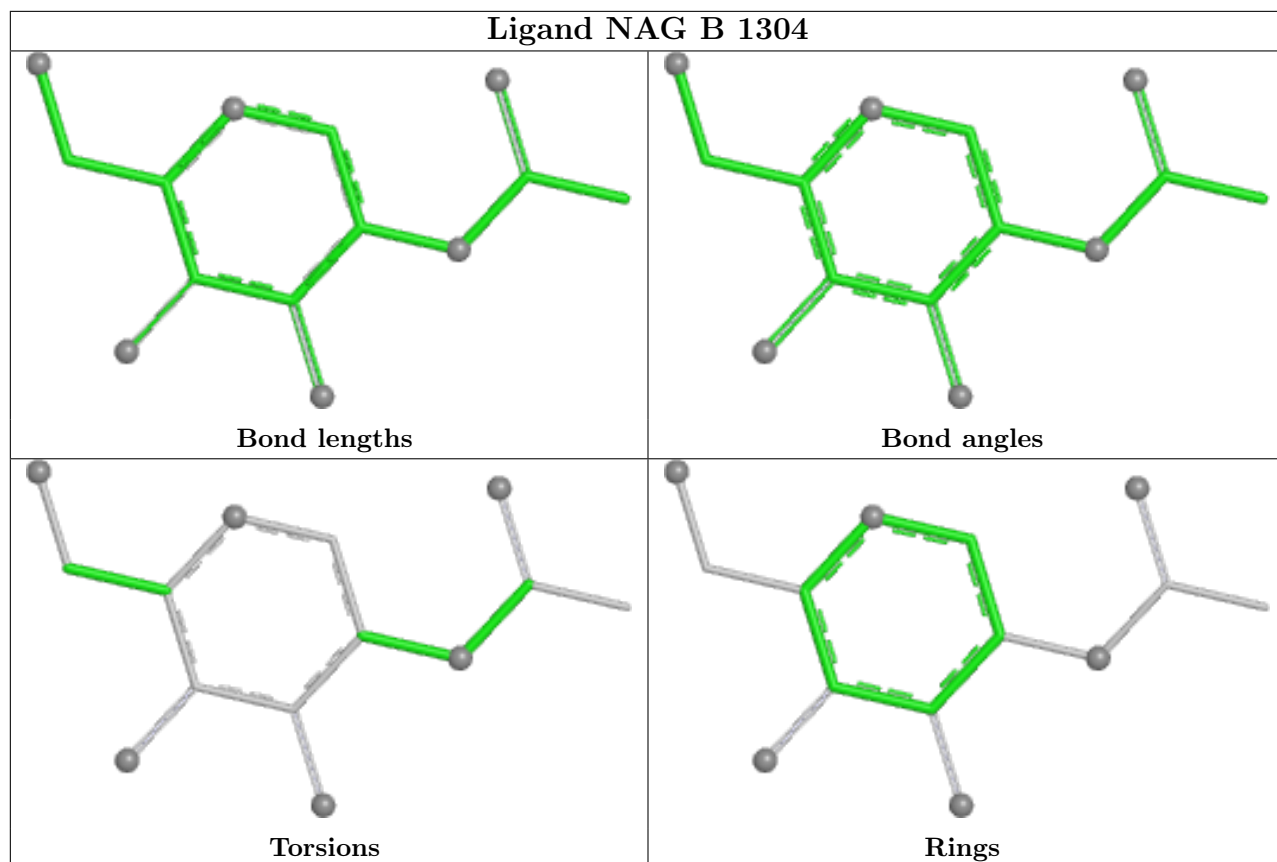


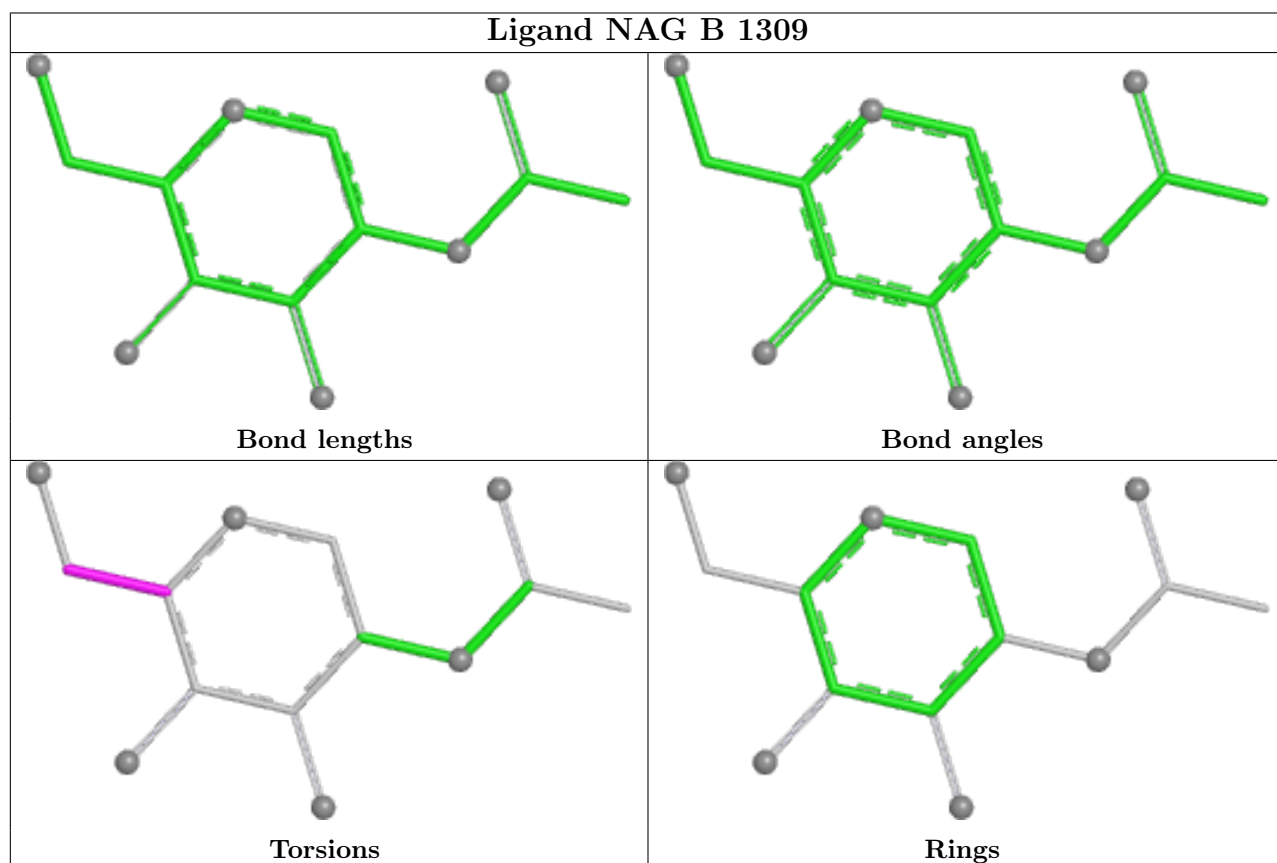
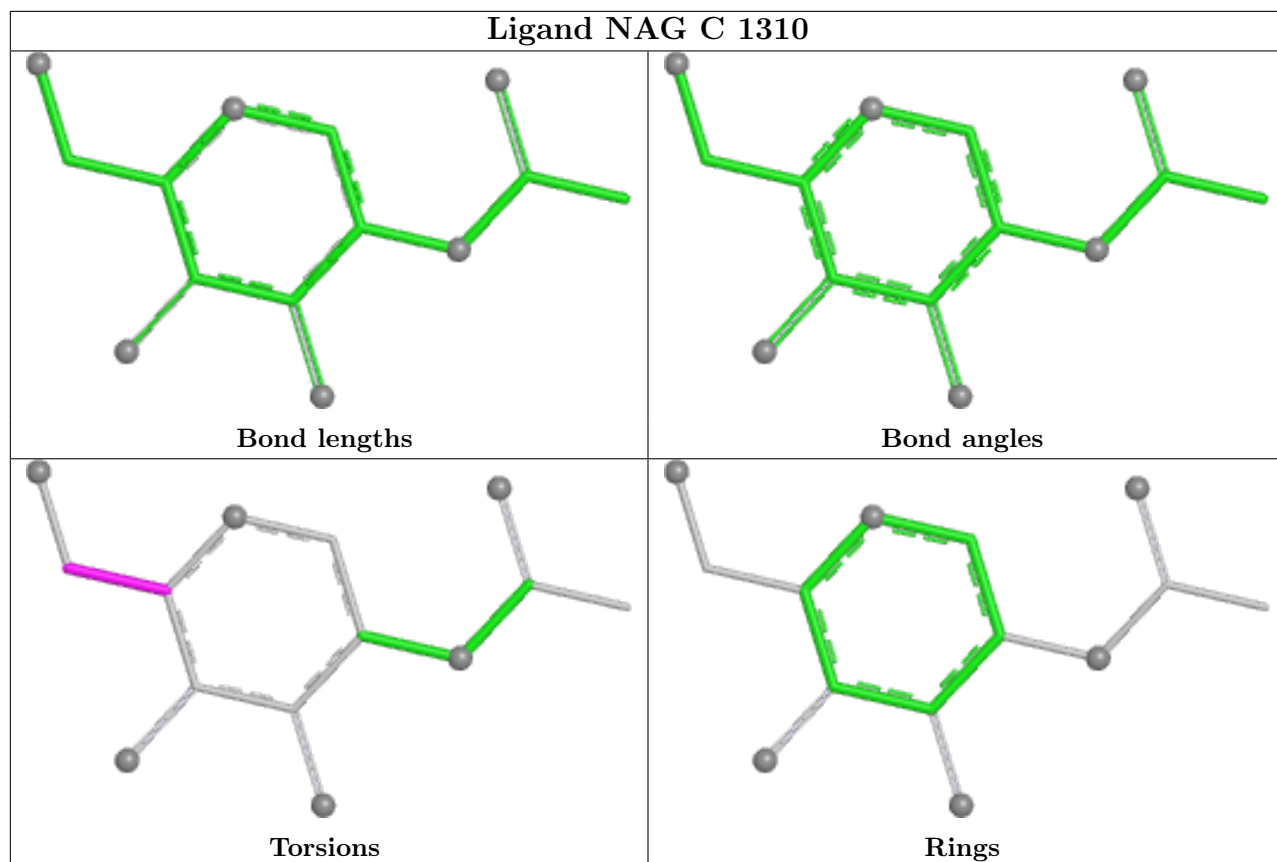


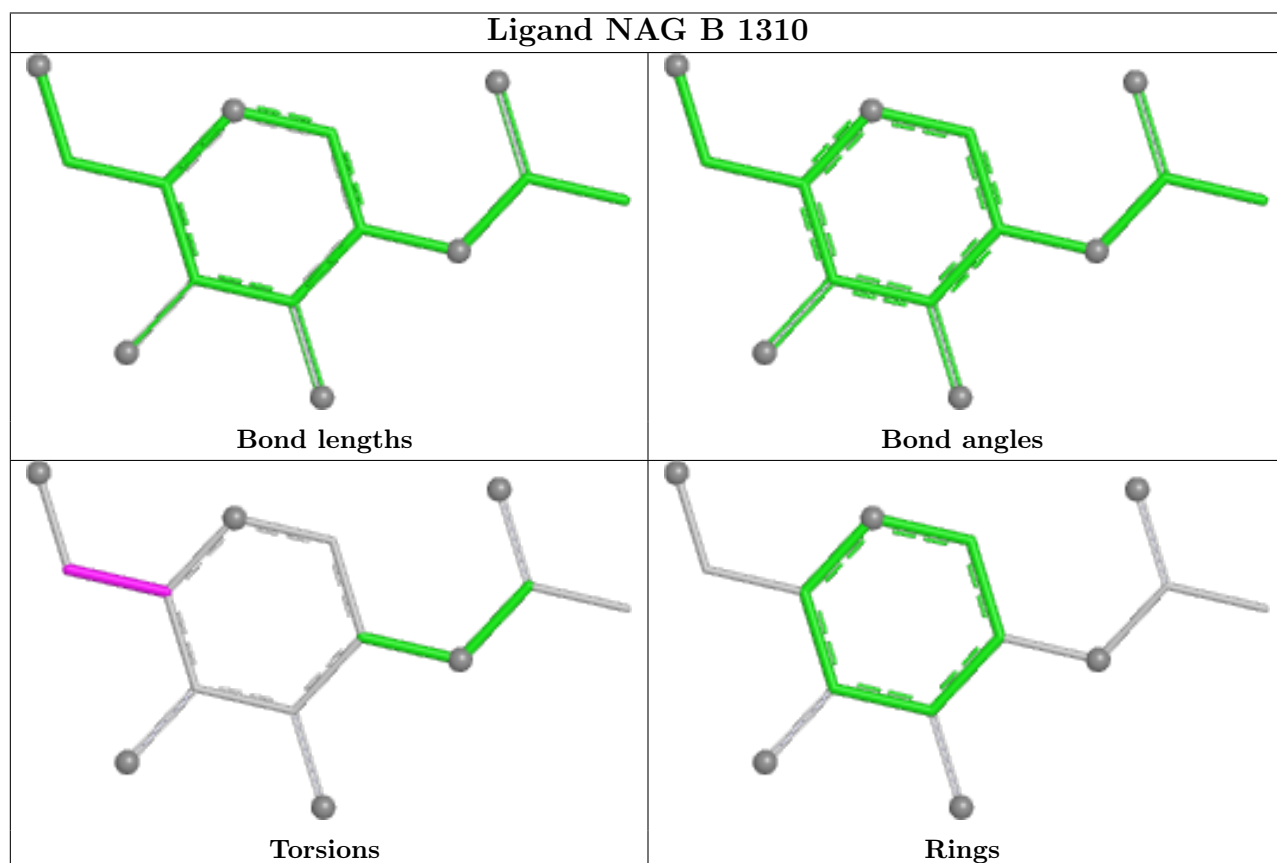
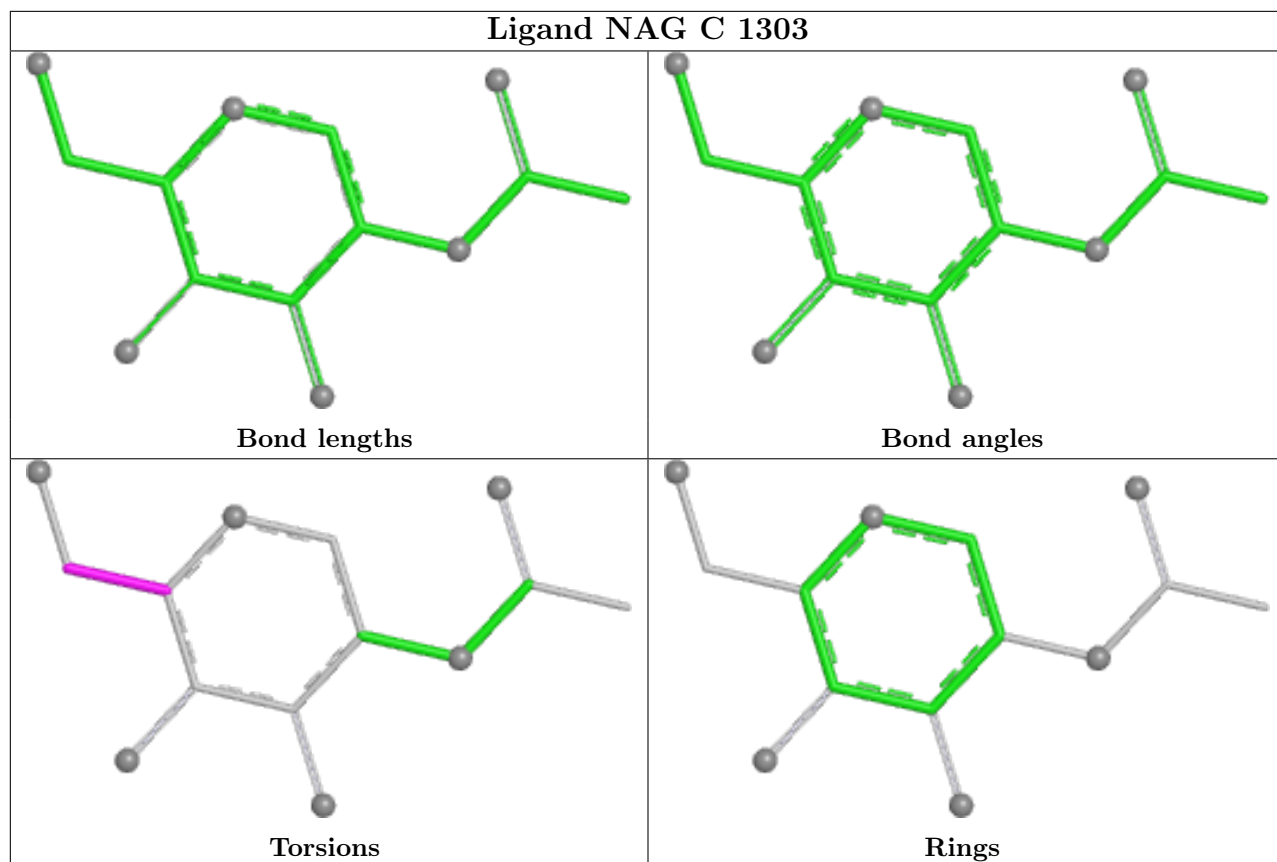


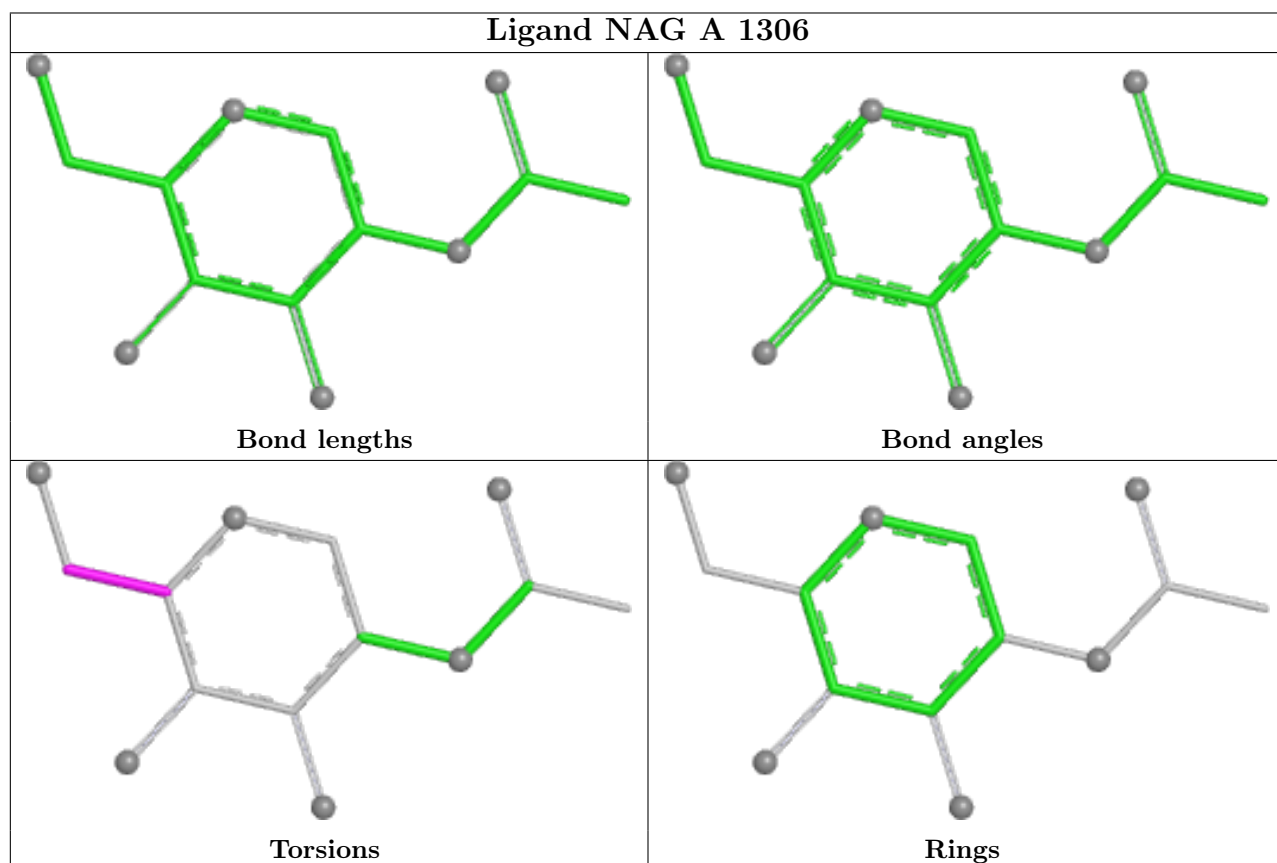
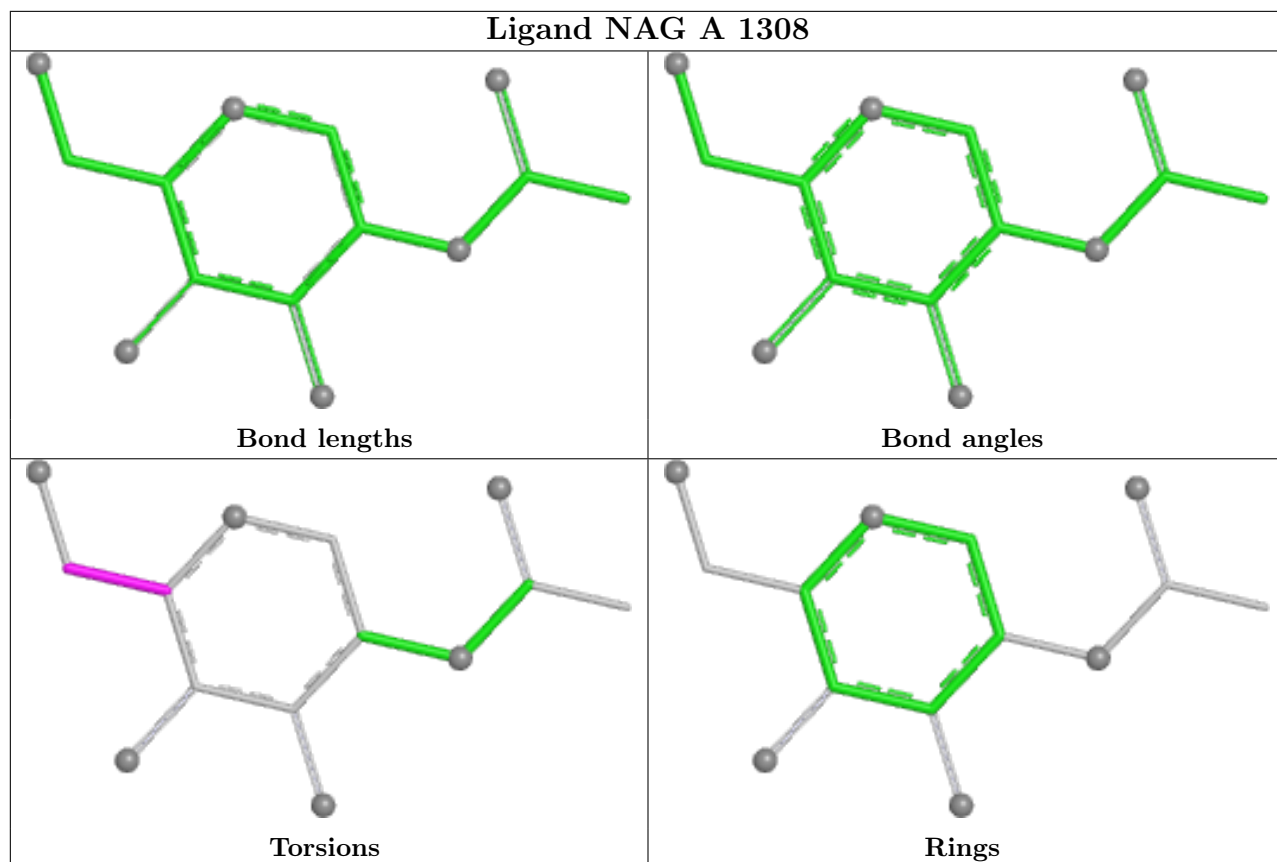












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

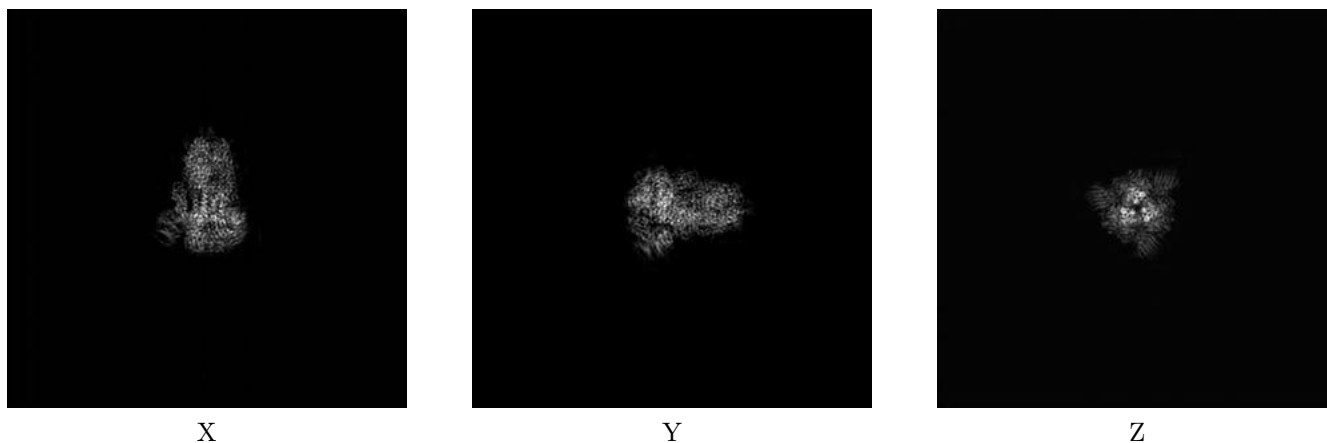
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13776. 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](#)

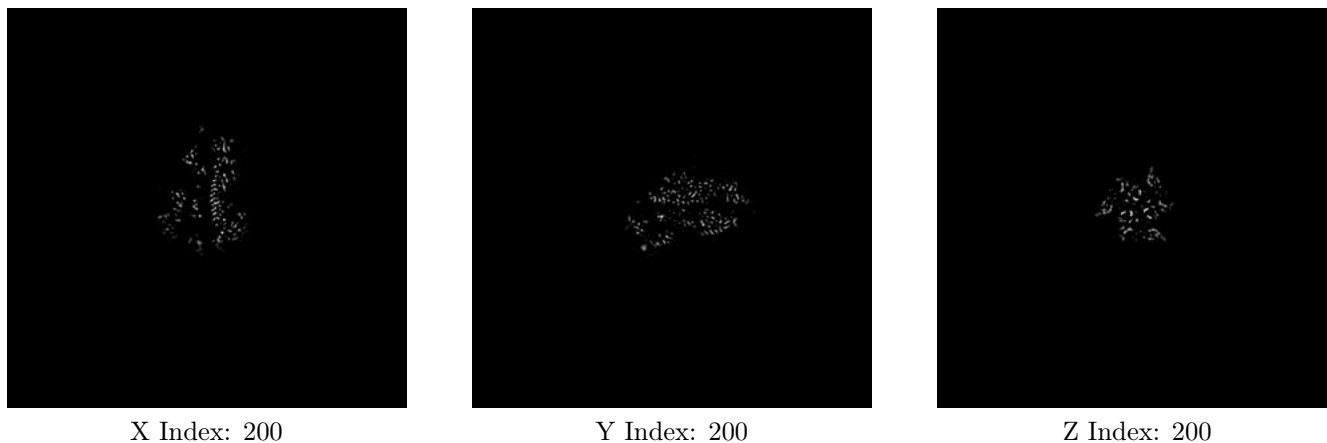
#### 6.1.1 Primary map



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

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

#### 6.2.1 Primary map

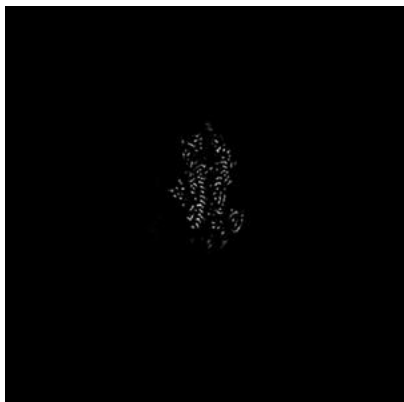




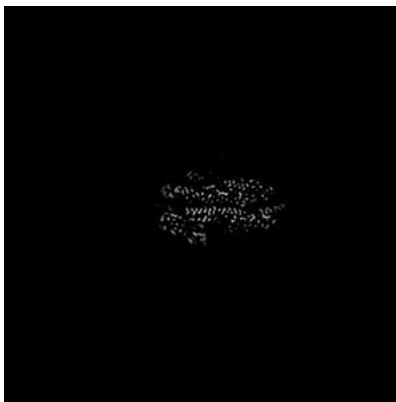
The images above show central slices of the map in three orthogonal directions.

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

### 6.3.1 Primary map



X Index: 194



Y Index: 195



Z Index: 192

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 0.14. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

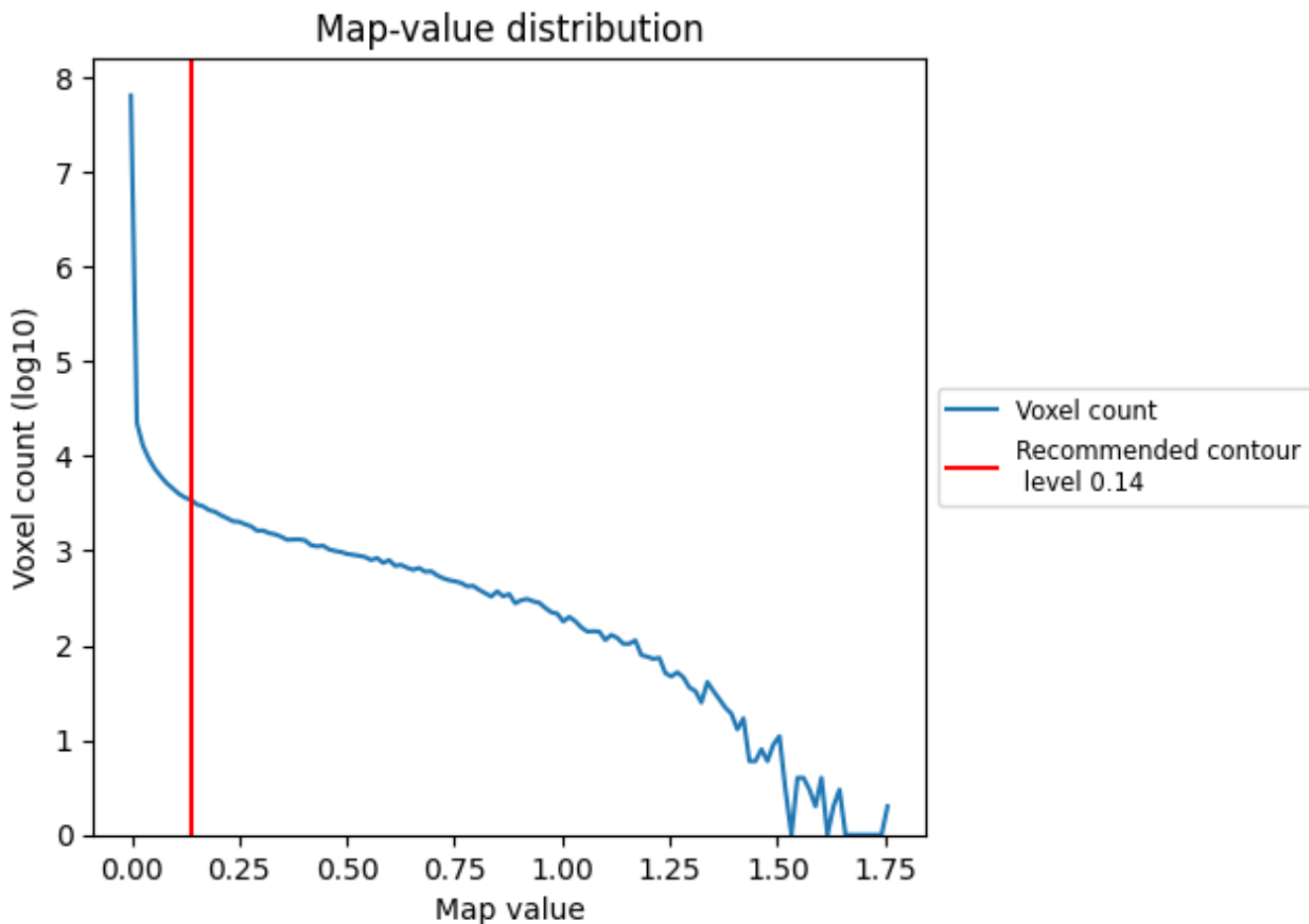
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

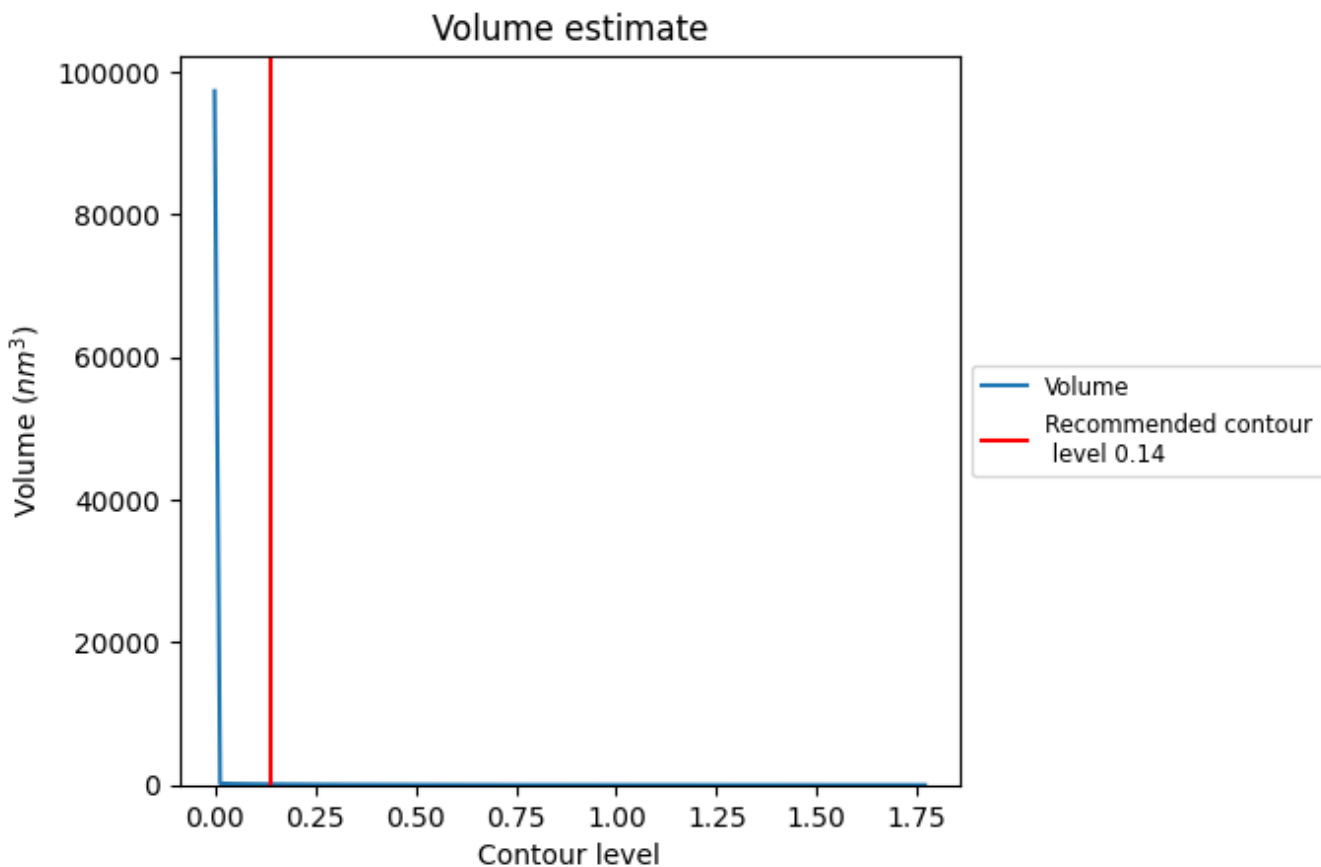
This section contains the results of statistical analysis of the map.

### 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.

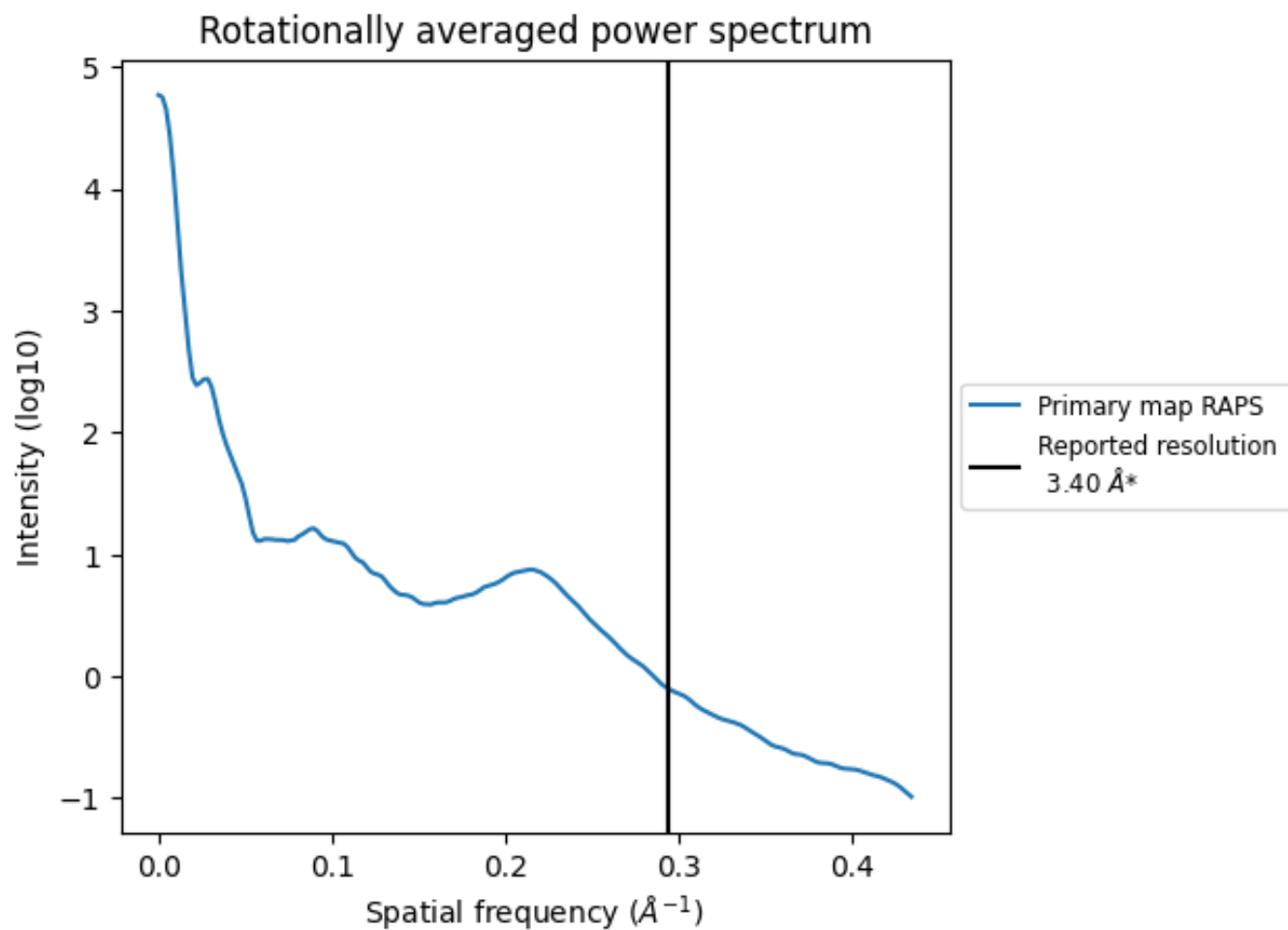
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 102 nm<sup>3</sup>; this corresponds to an approximate mass of 93 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](#)

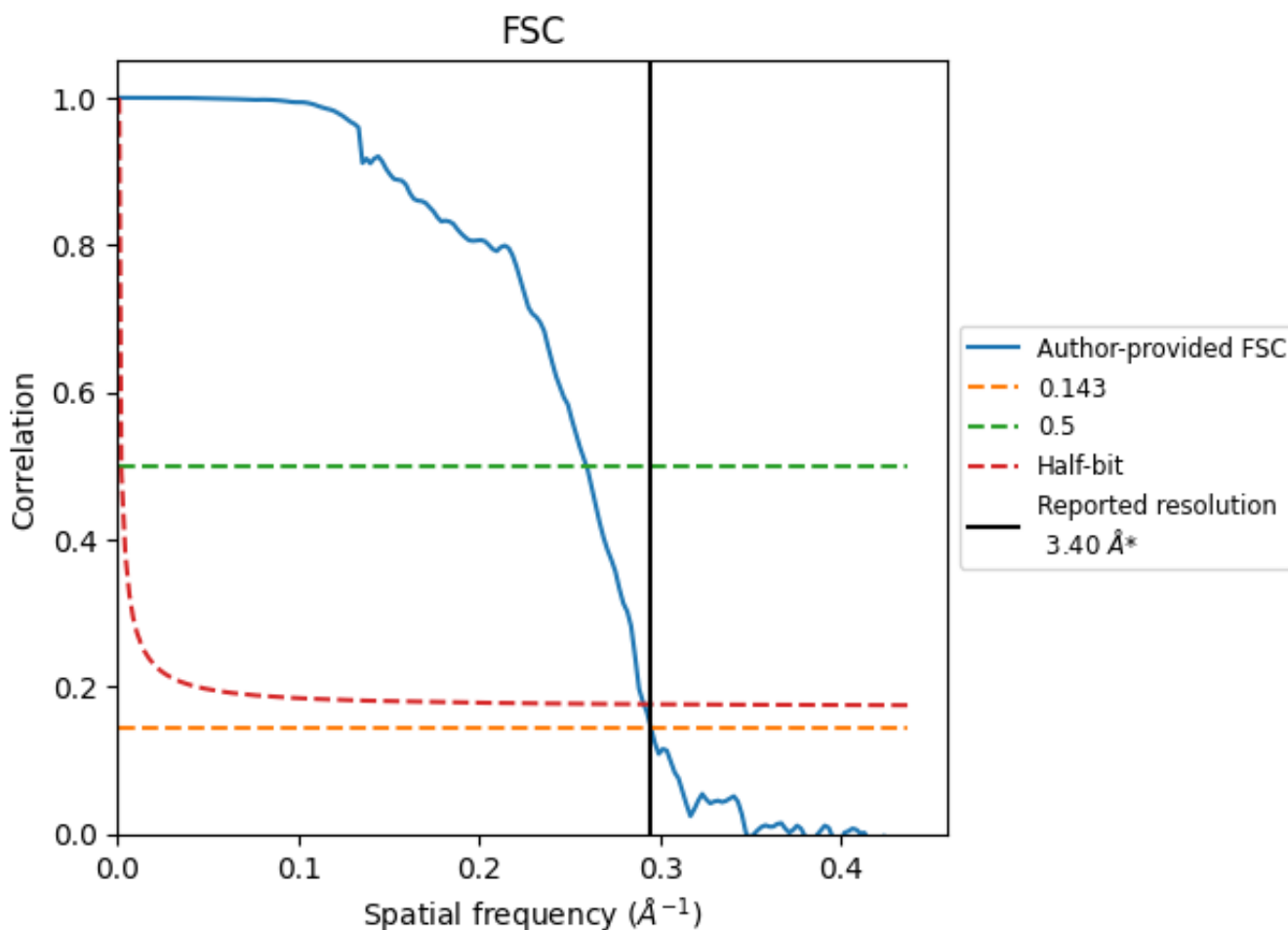


\*Reported resolution corresponds to spatial frequency of 0.294 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [\(i\)](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [\(i\)](#)



\*Reported resolution corresponds to spatial frequency of 0.294 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

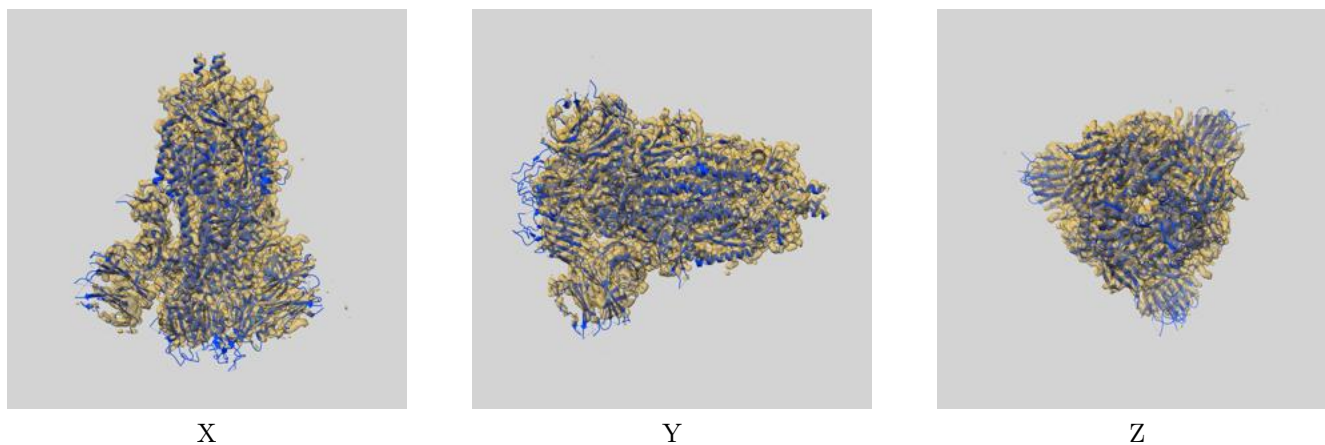
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.39	3.86	3.44
Unmasked-calculated*	-	-	-

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

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

This section contains information regarding the fit between EMDB map EMD-13776 and PDB model 7Q1Z. Per-residue inclusion information can be found in section 3 on page 14.

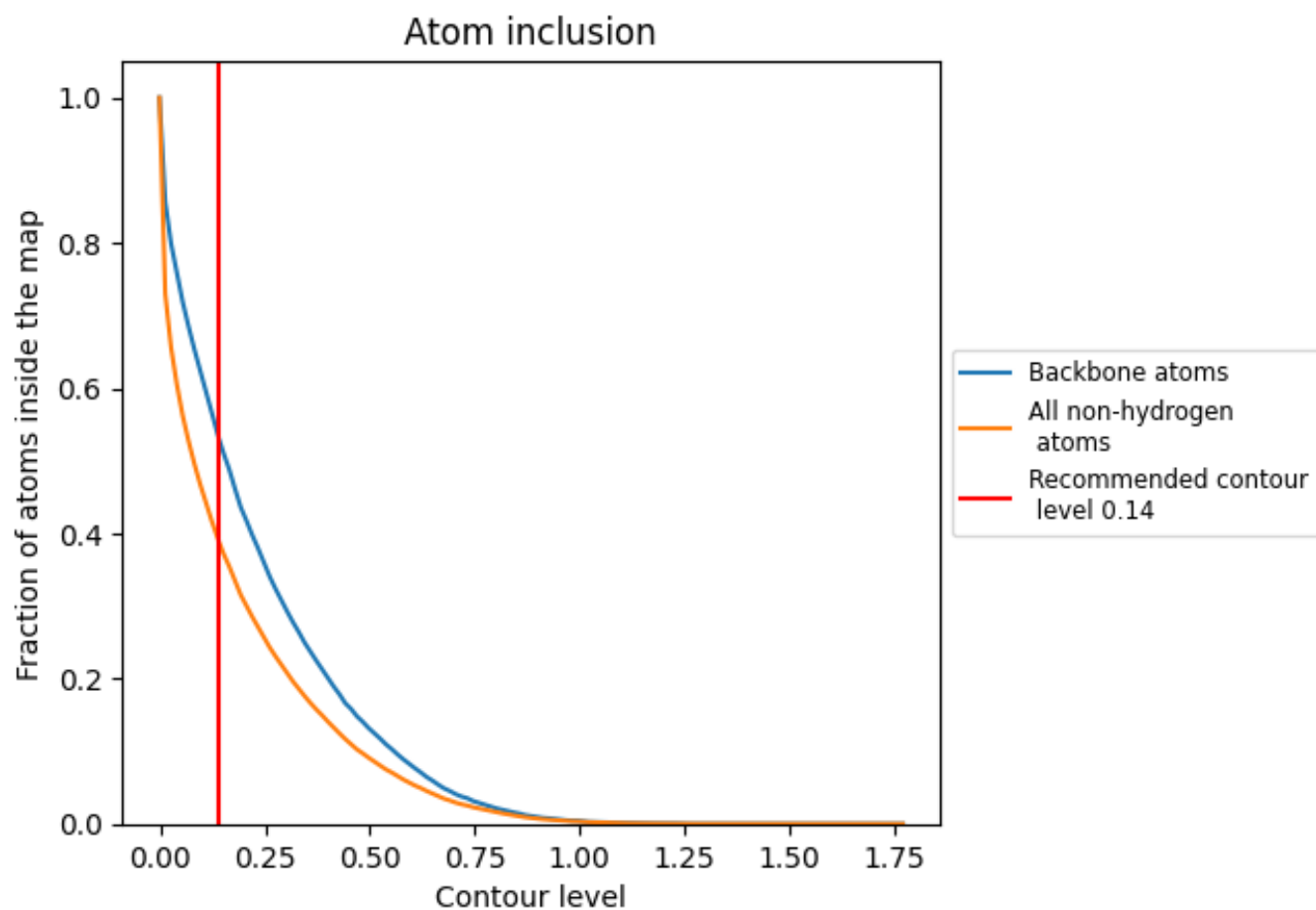
### 9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.14 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 Atom inclusion [i](#)



At the recommended contour level, 53% of all backbone atoms, 39% of all non-hydrogen atoms, are inside the map.