



## Full wwPDB EM Validation Report ⓘ

Jul 8, 2025 – 03:16 PM JST

PDB ID : 8YK0 / pdb\_00008yk0  
EMDB ID : EMD-39356  
Title : Cryo-EM structure of human GPR156-Gi3 complex  
Authors : Ma, X.Y.; Chen, L.N.; Liao, M.H.; Zhang, L.Y.; Xi, K.; Guo, J.M.  
Deposited on : 2024-03-03  
Resolution : 2.40 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.

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 : **FAILED**  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4-5-2 with Phenix2.0rc1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : **FAILED**  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.44

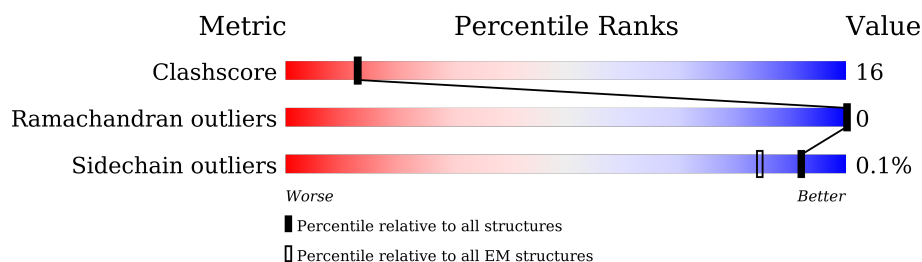
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.40 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	B	298	68% 32%
2	D	338	77% 23%
3	G	57	70% 30%
4	C	349	48% 15% • 36%
5	A	317	69% 30%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
7	CLR	B	407	-	-	X	-

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 9831 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 Probable G-protein coupled receptor 156.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	B	298	Total	C	N	O	S	0	0
			2226	1466	360	384	16		

- Molecule 2 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	338	Total	C	N	O	S	0	0
			2506	1555	442	490	19		

- Molecule 3 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	G	57	Total	C	N	O	S	0	0
			424	265	72	84	3		

- Molecule 4 is a protein called Guanine nucleotide-binding protein G(i) subunit alpha-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	C	222	Total	C	N	O	S	0	0
			1754	1121	292	331	10		

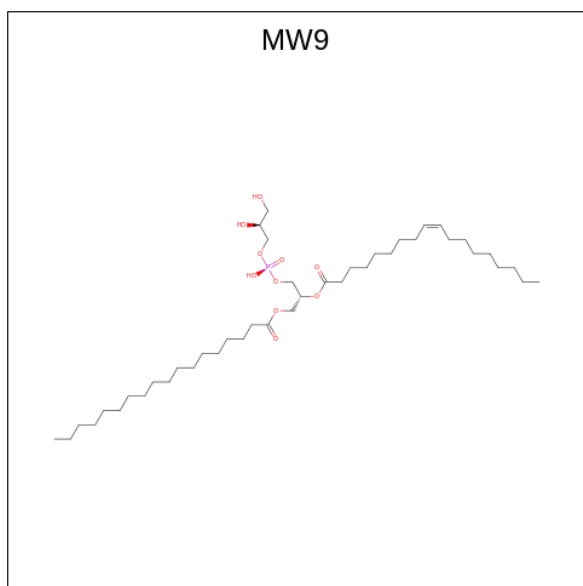
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	47	ASN	SER	conflict	UNP P08754
C	203	ALA	GLY	conflict	UNP P08754
C	245	ALA	GLU	conflict	UNP P08754
C	326	SER	ALA	conflict	UNP P08754

- Molecule 5 is a protein called Probable G-protein coupled receptor 156.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	A	317	Total	C	N	O	S	0	0
			2401	1572	393	418	18		

- Molecule 6 is (21R,24R,27S)-24,27,28-trihydroxy-18,24-dioxo-19,23,25-trioxa-24lambda 5 -p hosphaoctacosan-21-yl (9Z)-octadec-9-enoate (CCD ID: MW9) (formula: C<sub>42</sub>H<sub>81</sub>O<sub>10</sub>P).



Mol	Chain	Residues	Atoms				AltConf
6	B	1	Total	C	O	P	0
			53	42	10	1	
6	B	1	Total	C	O	P	0
			53	42	10	1	
6	A	1	Total	C	O	P	0
			53	42	10	1	
6	A	1	Total	C	O	P	0
			53	42	10	1	

- Molecule 7 is CHOLESTEROL (CCD ID: CLR) (formula: C<sub>27</sub>H<sub>46</sub>O).

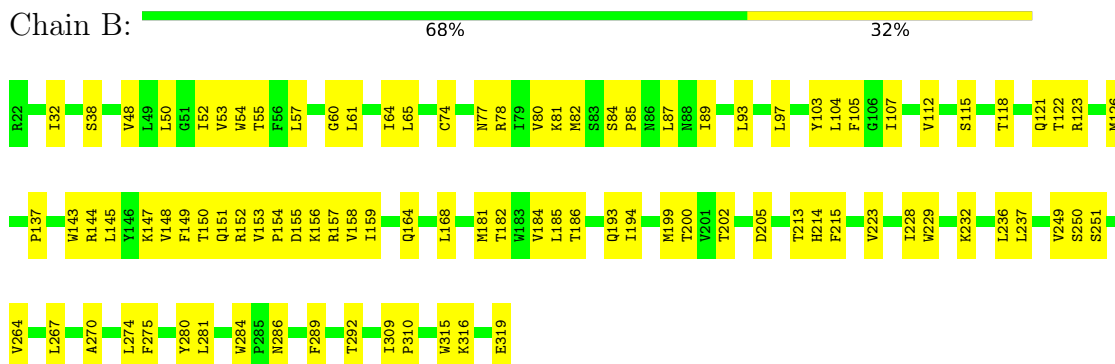


Mol	Chain	Residues	Atoms			AltConf
7	B	1	Total	C	O	0
			28	27	1	
7	B	1	Total	C	O	0
			28	27	1	
7	B	1	Total	C	O	0
			28	27	1	
7	B	1	Total	C	O	0
			28	27	1	
7	B	1	Total	C	O	0
			28	27	1	
7	B	1	Total	C	O	0
			28	27	1	
7	A	1	Total	C	O	0
			28	27	1	
7	A	1	Total	C	O	0
			28	27	1	
7	A	1	Total	C	O	0
			28	27	1	
7	A	1	Total	C	O	0
			28	27	1	

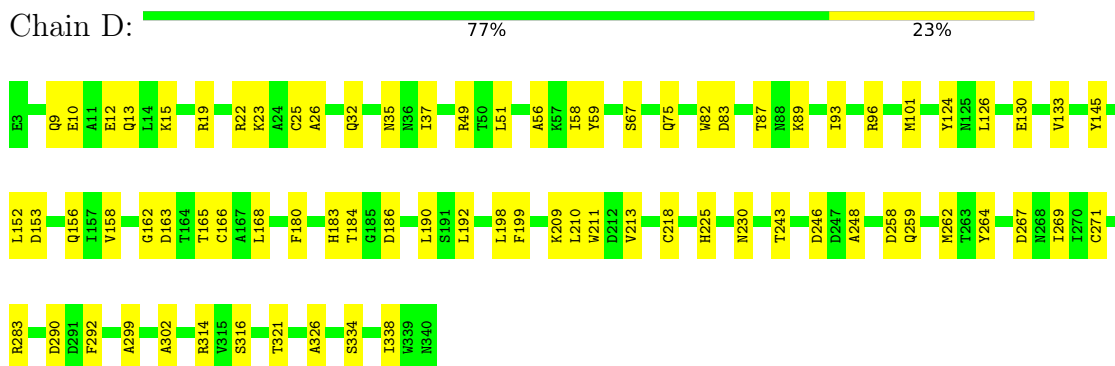
### 3 Residue-property plots

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. 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. 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.

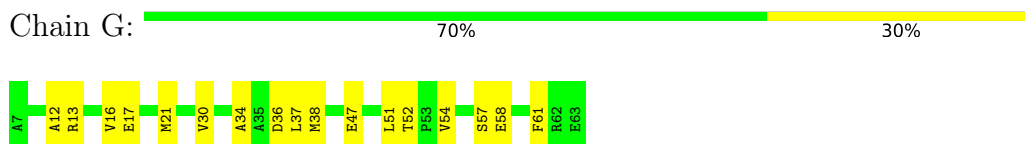
- Molecule 1: Probable G-protein coupled receptor 156



- Molecule 2: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1

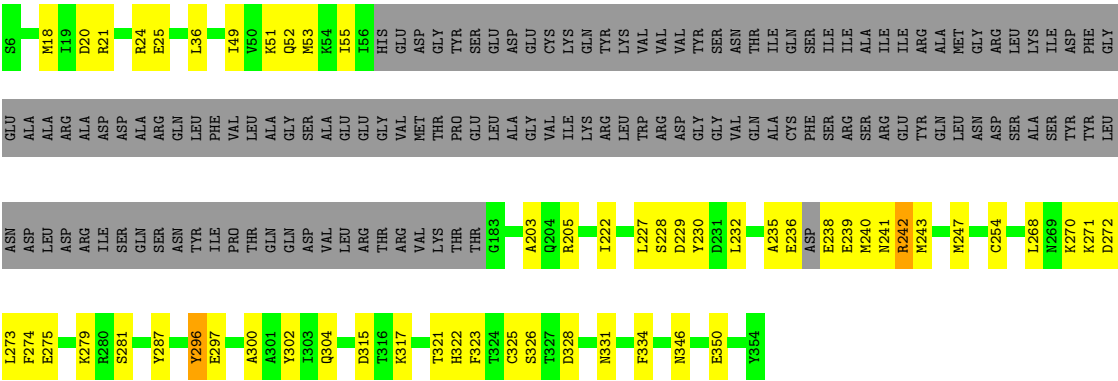


- Molecule 3: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2

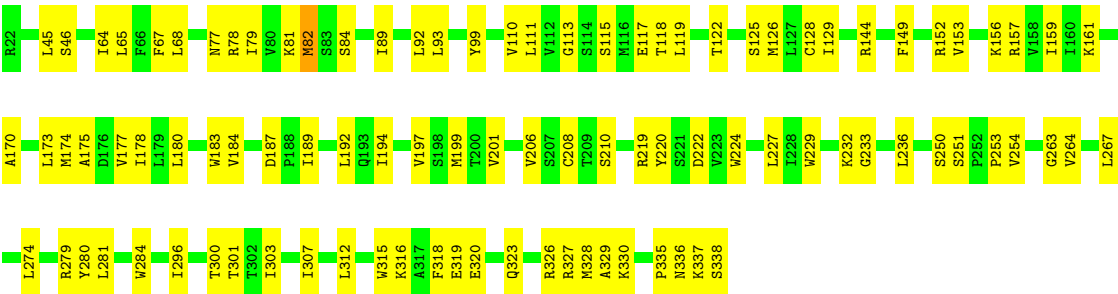


- Molecule 4: Guanine nucleotide-binding protein G(i) subunit alpha-3





● Molecule 5: Probable G-protein coupled receptor 156



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	1153971	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	52	Depositor
Minimum defocus (nm)	700	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor



## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CLR, MW9

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	B	0.32	0/2272	0.57	1/3103 (0.0%)
2	D	0.31	1/2552 (0.0%)	0.46	1/3473 (0.0%)
3	G	0.28	0/430	0.62	0/584
4	C	0.31	0/1783	0.55	2/2397 (0.1%)
5	A	0.38	1/2451 (0.0%)	0.54	3/3341 (0.1%)
All	All	0.33	2/9488 (0.0%)	0.53	7/12898 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	82	MET	C-N	11.47	1.49	1.33
2	D	292	PHE	C-N	5.95	1.42	1.33

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	242	ARG	N-CA-C	-7.96	103.31	112.87
4	C	296	TYR	N-CA-C	6.42	117.94	111.07
5	A	323	GLN	N-CA-C	-6.17	106.39	114.04
1	B	38	SER	CB-CA-C	-5.43	110.29	116.54
2	D	184	THR	N-CA-C	-5.34	105.99	112.88
5	A	336	ASN	CA-C-N	-5.31	115.23	122.93
5	A	336	ASN	C-N-CA	-5.31	115.23	122.93

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts ⓘ

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	B	2226	0	2277	88	0
2	D	2506	0	2348	51	0
3	G	424	0	414	19	0
4	C	1754	0	1710	43	0
5	A	2401	0	2455	95	0
6	A	106	0	0	4	0
6	B	106	0	0	1	0
7	A	140	0	230	32	0
7	B	168	0	276	41	0
All	All	9831	0	9710	319	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 16.

All (319) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:275:PHE:CE2	7:A:401:CLR:H21	1.98	0.98
7:B:407:CLR:H72	7:B:408:CLR:C7	1.95	0.97
5:A:192:LEU:CD1	5:A:194:ILE:HG23	1.97	0.94
5:A:192:LEU:HD13	5:A:194:ILE:HG23	1.52	0.88
7:B:404:CLR:H112	5:A:281:LEU:HD21	1.55	0.88
1:B:149:PHE:CE2	5:A:337:LYS:HD3	2.12	0.84
1:B:309:ILE:HG13	1:B:310:PRO:HD3	1.62	0.82
1:B:286:ASN:ND2	6:B:401:MW9:O4	2.16	0.79
1:B:284:TRP:CH2	7:B:408:CLR:H11	2.21	0.75
1:B:200:THR:HG22	5:A:194:ILE:HG22	1.65	0.75
7:B:407:CLR:H72	7:B:408:CLR:H71	1.68	0.75
1:B:202:THR:OG1	1:B:205:ASP:OD1	2.03	0.75
1:B:156:LYS:HG2	1:B:158:VAL:HG13	1.69	0.74
5:A:192:LEU:HD13	5:A:194:ILE:CG2	2.18	0.73
5:A:149:PHE:HD2	5:A:330:LYS:HD2	1.53	0.73
5:A:224:TRP:CH2	7:A:405:CLR:H151	2.24	0.73
5:A:263:GLY:HA3	5:A:303:ILE:HD11	1.70	0.72
1:B:87:LEU:HB3	1:B:137:PRO:HB3	1.71	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:B:407:CLR:H71	7:A:405:CLR:H122	1.71	0.71
2:D:37:ILE:HD11	3:G:38:MET:HE3	1.72	0.71
1:B:153:VAL:HG23	1:B:155:ASP:H	1.57	0.70
1:B:149:PHE:CD2	5:A:337:LYS:HD3	2.27	0.69
1:B:236:LEU:HD22	1:B:264:VAL:HG12	1.75	0.69
1:B:199:MET:HE2	1:B:199:MET:HA	1.75	0.68
5:A:122:THR:O	5:A:126:MET:HG3	1.93	0.68
5:A:192:LEU:CD1	5:A:194:ILE:CG2	2.70	0.67
5:A:175:ALA:O	5:A:178:ILE:HG12	1.94	0.67
1:B:153:VAL:HB	1:B:154:PRO:HD2	1.76	0.66
1:B:112:VAL:HG22	1:B:115:SER:HB3	1.78	0.66
5:A:129:ILE:HG23	5:A:173:LEU:HD11	1.76	0.66
2:D:23:LYS:HA	2:D:26:ALA:HB3	1.77	0.65
1:B:150:THR:HG22	1:B:151:GLN:H	1.60	0.65
5:A:149:PHE:CD2	5:A:330:LYS:HD2	2.29	0.65
2:D:15:LYS:O	2:D:19:ARG:HG3	1.96	0.65
5:A:274:LEU:HD12	6:A:403:MW9:C32	2.27	0.64
1:B:236:LEU:HD11	1:B:267:LEU:HD23	1.79	0.64
2:D:9:GLN:O	2:D:12:GLU:HG3	1.98	0.63
5:A:224:TRP:CH2	7:A:405:CLR:C15	2.80	0.63
4:C:275:GLU:O	4:C:279:LYS:NZ	2.31	0.63
5:A:284:TRP:CZ2	7:A:402:CLR:H21	2.33	0.63
5:A:194:ILE:HD12	5:A:194:ILE:O	1.99	0.62
5:A:229:TRP:O	7:A:401:CLR:H211	1.99	0.62
1:B:159:ILE:HD12	1:B:159:ILE:H	1.63	0.62
7:B:407:CLR:H71	7:A:405:CLR:C12	2.29	0.62
4:C:49:ILE:HG23	4:C:53:MET:HE3	1.80	0.62
7:B:407:CLR:H72	7:B:408:CLR:C6	2.28	0.62
5:A:236:LEU:HD22	5:A:264:VAL:HG12	1.80	0.62
1:B:121:GLN:NE2	1:B:184:VAL:HG23	2.15	0.61
3:G:57:SER:OG	3:G:58:GLU:OE1	2.18	0.61
5:A:84:SER:OG	5:A:144:ARG:NH2	2.33	0.61
5:A:236:LEU:HD11	5:A:267:LEU:HD23	1.82	0.61
5:A:110:VAL:HG13	5:A:111:LEU:H	1.66	0.61
1:B:84:SER:OG	1:B:144:ARG:NH2	2.34	0.60
1:B:284:TRP:CH2	7:B:408:CLR:H21	2.37	0.60
1:B:281:LEU:HD21	7:B:407:CLR:H192	1.82	0.60
1:B:32:ILE:CA	5:A:199:MET:HE1	2.31	0.60
4:C:325:CYS:SG	4:C:326:SER:N	2.74	0.60
7:B:407:CLR:H152	7:B:408:CLR:H151	1.83	0.60
1:B:270:ALA:O	1:B:274:LEU:HG	2.00	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:34:ALA:O	3:G:38:MET:HG2	2.02	0.59
1:B:52:ILE:O	1:B:55:THR:HG22	2.02	0.59
7:B:407:CLR:H262	5:A:227:LEU:HD23	1.84	0.59
7:B:403:CLR:H9	7:B:404:CLR:H152	1.83	0.59
5:A:326:ARG:HG2	5:A:327:ARG:NH1	2.16	0.59
5:A:152:ARG:NH2	5:A:330:LYS:HG2	2.18	0.59
1:B:157:ARG:HA	1:B:159:ILE:HD12	1.84	0.59
1:B:284:TRP:CH2	7:B:408:CLR:C1	2.84	0.59
1:B:275:PHE:CZ	7:A:401:CLR:H21	2.38	0.59
5:A:128:CYS:HB2	6:A:403:MW9:C9	2.33	0.58
1:B:281:LEU:HD21	7:B:407:CLR:C19	2.34	0.58
7:B:407:CLR:C7	7:B:408:CLR:H71	2.33	0.58
4:C:49:ILE:O	4:C:53:MET:HG2	2.04	0.57
1:B:237:LEU:HG	7:A:401:CLR:H271	1.86	0.57
2:D:183:HIS:CE1	2:D:209:LYS:HD2	2.40	0.57
7:A:402:CLR:H183	7:A:402:CLR:H212	1.87	0.57
7:B:404:CLR:H212	7:B:404:CLR:H183	1.87	0.56
7:A:407:CLR:H212	7:A:407:CLR:H183	1.87	0.56
7:B:406:CLR:H212	7:B:406:CLR:H183	1.87	0.56
7:B:408:CLR:H183	7:B:408:CLR:H212	1.87	0.56
7:B:407:CLR:C6	7:B:408:CLR:C6	2.83	0.56
5:A:159:ILE:HD11	5:A:161:LYS:HD3	1.86	0.56
7:A:405:CLR:H212	7:A:405:CLR:H183	1.87	0.56
1:B:89:ILE:O	1:B:93:LEU:HD23	2.06	0.56
2:D:168:LEU:HD22	2:D:213:VAL:HG12	1.88	0.56
5:A:173:LEU:O	5:A:177:VAL:HG12	2.05	0.56
5:A:174:MET:O	5:A:178:ILE:HG23	2.04	0.56
7:B:407:CLR:H14	7:A:405:CLR:H122	1.88	0.56
5:A:192:LEU:HD12	5:A:194:ILE:HG23	1.85	0.56
5:A:326:ARG:HG2	5:A:327:ARG:HH11	1.70	0.56
7:A:401:CLR:H161	7:A:401:CLR:H242	1.87	0.56
5:A:115:SER:O	5:A:119:LEU:N	2.33	0.56
1:B:77:ASN:OD1	1:B:78:ARG:N	2.40	0.55
1:B:193:GLN:HG2	1:B:214:HIS:CD2	2.42	0.55
5:A:99:TYR:HH	5:A:301:THR:HG1	1.53	0.55
4:C:21:ARG:O	4:C:25:GLU:HG2	2.07	0.55
2:D:271:CYS:HB2	2:D:290:ASP:HB2	1.88	0.55
7:B:403:CLR:H183	7:B:403:CLR:H212	1.87	0.55
5:A:296:ILE:O	5:A:300:THR:HG22	2.06	0.55
7:B:405:CLR:H183	7:B:405:CLR:H212	1.87	0.55
1:B:32:ILE:N	5:A:199:MET:HE1	2.23	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:61:LEU:O	1:B:65:LEU:HG	2.07	0.54
5:A:233:GLY:HA3	7:A:401:CLR:H211	1.90	0.54
5:A:222:ASP:OD1	5:A:279:ARG:NH2	2.40	0.54
1:B:205:ASP:OD1	1:B:205:ASP:N	2.41	0.54
2:D:89:LYS:NZ	4:C:20:ASP:OD1	2.41	0.54
1:B:182:THR:O	1:B:186:THR:HB	2.08	0.54
5:A:201:VAL:HG12	5:A:206:VAL:HG13	1.90	0.54
2:D:59:TYR:CE1	2:D:75:GLN:HG3	2.43	0.54
1:B:122:THR:O	1:B:126:MET:HG3	2.07	0.53
7:B:407:CLR:H71	7:A:405:CLR:C11	2.39	0.53
5:A:303:ILE:O	5:A:307:ILE:HG12	2.07	0.53
4:C:235:ALA:O	4:C:236:GLU:HB2	2.09	0.53
4:C:241:ASN:C	4:C:243:MET:N	2.63	0.53
5:A:79:ILE:HB	5:A:318:PHE:CD2	2.44	0.53
5:A:79:ILE:HB	5:A:318:PHE:CE2	2.44	0.53
5:A:329:ALA:C	5:A:330:LYS:HD3	2.34	0.53
5:A:274:LEU:HD12	6:A:403:MW9:C33	2.38	0.53
1:B:157:ARG:HD2	1:B:159:ILE:HD13	1.91	0.53
4:C:270:LYS:HD3	4:C:273:LEU:HD23	1.91	0.53
5:A:89:ILE:O	5:A:93:LEU:HG	2.09	0.53
2:D:130:GLU:CD	2:D:130:GLU:H	2.17	0.52
7:B:407:CLR:H72	7:B:408:CLR:H72	1.85	0.52
1:B:149:PHE:CG	1:B:249:VAL:HG13	2.45	0.52
1:B:284:TRP:CH2	7:B:408:CLR:C2	2.92	0.52
4:C:271:LYS:HD3	4:C:323:PHE:HB3	1.91	0.52
1:B:78:ARG:HB3	1:B:78:ARG:NH1	2.25	0.52
1:B:149:PHE:CD2	1:B:249:VAL:HG13	2.45	0.52
7:B:403:CLR:H12	7:B:404:CLR:C6	2.41	0.51
1:B:157:ARG:HG3	1:B:157:ARG:O	2.10	0.51
4:C:350:GLU:HG2	5:A:157:ARG:HH11	1.76	0.51
5:A:263:GLY:CA	5:A:303:ILE:HD11	2.40	0.51
1:B:32:ILE:HA	5:A:199:MET:HE1	1.92	0.51
1:B:237:LEU:CG	7:A:401:CLR:H271	2.40	0.50
7:B:403:CLR:H212	7:B:403:CLR:H121	1.93	0.50
7:B:405:CLR:H212	7:B:405:CLR:H121	1.93	0.50
7:A:405:CLR:H212	7:A:405:CLR:H121	1.93	0.50
2:D:126:LEU:HA	2:D:133:VAL:HG12	1.94	0.50
4:C:241:ASN:C	4:C:243:MET:H	2.18	0.50
5:A:110:VAL:HG22	5:A:111:LEU:O	2.11	0.50
1:B:228:ILE:HG22	1:B:229:TRP:HD1	1.76	0.50
1:B:250:SER:OG	1:B:251:SER:N	2.39	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:A:402:CLR:H212	7:A:402:CLR:H121	1.93	0.50
1:B:74:CYS:SG	1:B:315:TRP:NE1	2.85	0.50
4:C:300:ALA:HB1	4:C:323:PHE:CE2	2.47	0.50
4:C:52:GLN:HA	4:C:55:ILE:HG12	1.93	0.50
5:A:45:LEU:O	5:A:46:SER:C	2.54	0.50
7:B:408:CLR:H212	7:B:408:CLR:H121	1.93	0.49
1:B:48:VAL:O	1:B:52:ILE:HD12	2.12	0.49
7:B:406:CLR:H212	7:B:406:CLR:H121	1.93	0.49
7:A:407:CLR:H212	7:A:407:CLR:H121	1.93	0.49
1:B:150:THR:C	1:B:152:ARG:N	2.67	0.49
2:D:211:TRP:CZ3	2:D:218:CYS:HB2	2.47	0.49
5:A:199:MET:HA	5:A:208:CYS:HA	1.94	0.49
2:D:49:ARG:NH1	3:G:61:PHE:O	2.45	0.49
4:C:274:PHE:CE2	4:C:296:TYR:HD1	2.31	0.49
7:B:404:CLR:H212	7:B:404:CLR:H121	1.93	0.49
3:G:17:GLU:O	3:G:21:MET:HG2	2.12	0.49
5:A:64:ILE:HG23	5:A:92:LEU:HD22	1.95	0.49
2:D:101:MET:HE1	2:D:145:TYR:CD2	2.47	0.49
5:A:337:LYS:O	5:A:338:SER:C	2.54	0.49
7:B:407:CLR:H121	7:B:407:CLR:H212	1.93	0.49
4:C:238:GLU:O	4:C:239:GLU:HB3	2.13	0.49
5:A:250:SER:OG	5:A:251:SER:N	2.43	0.49
7:B:407:CLR:H262	5:A:227:LEU:CD2	2.43	0.48
5:A:170:ALA:O	5:A:174:MET:HG2	2.13	0.48
4:C:52:GLN:HG2	4:C:328:ASP:HB2	1.94	0.48
5:A:229:TRP:O	7:A:401:CLR:C21	2.60	0.48
2:D:58:ILE:O	2:D:316:SER:OG	2.22	0.48
1:B:145:LEU:HD21	1:B:249:VAL:HG11	1.96	0.48
3:G:36:ASP:OD1	3:G:37:LEU:N	2.47	0.48
5:A:118:THR:O	5:A:122:THR:OG1	2.23	0.48
1:B:143:TRP:NE1	1:B:147:LYS:HE2	2.29	0.48
4:C:49:ILE:HA	4:C:52:GLN:OE1	2.14	0.48
2:D:162:GLY:HA2	2:D:186:ASP:CB	2.43	0.48
4:C:254:CYS:O	4:C:317:LYS:NZ	2.44	0.48
7:B:407:CLR:H6	7:B:408:CLR:C6	2.44	0.47
1:B:60:GLY:O	1:B:64:ILE:HG12	2.14	0.47
1:B:164:GLN:O	1:B:168:LEU:HG	2.14	0.47
7:B:407:CLR:H6	7:B:408:CLR:H6	1.95	0.47
4:C:18:MET:HA	4:C:18:MET:HE2	1.96	0.47
4:C:243:MET:O	4:C:247:MET:HG3	2.14	0.47
2:D:51:LEU:HB3	2:D:82:TRP:CE3	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:194:ILE:HD11	1:B:213:THR:HB	1.94	0.47
2:D:22:ARG:HD2	2:D:258:ASP:O	2.15	0.47
1:B:104:LEU:HD23	1:B:107:ILE:HD13	1.96	0.47
7:B:407:CLR:H71	7:A:405:CLR:H112	1.96	0.47
4:C:230:TYR:OH	4:C:281:SER:OG	2.21	0.47
1:B:81:LYS:NZ	1:B:81:LYS:HB3	2.29	0.47
4:C:272:ASP:N	4:C:272:ASP:OD1	2.45	0.47
1:B:316:LYS:HA	1:B:319:GLU:OE2	2.15	0.47
2:D:67:SER:HB2	2:D:321:THR:HB	1.95	0.47
5:A:78:ARG:O	5:A:82:MET:N	2.48	0.47
5:A:183:TRP:HZ2	5:A:189:ILE:HD11	1.80	0.47
2:D:153:ASP:OD1	2:D:156:GLN:N	2.40	0.47
2:D:190:LEU:HD22	2:D:199:PHE:CE2	2.49	0.47
2:D:190:LEU:HD22	2:D:199:PHE:HE2	1.78	0.47
5:A:250:SER:HG	5:A:251:SER:H	1.61	0.47
1:B:80:VAL:O	1:B:85:PRO:HD3	2.15	0.47
2:D:26:ALA:HA	3:G:30:VAL:CG1	2.45	0.47
1:B:105:PHE:HA	1:B:123:ARG:HD2	1.97	0.46
3:G:51:LEU:HD23	3:G:51:LEU:HA	1.79	0.46
7:B:407:CLR:C7	7:B:408:CLR:C7	2.81	0.46
1:B:184:VAL:HG13	1:B:185:LEU:HD22	1.96	0.46
3:G:58:GLU:OE1	3:G:58:GLU:N	2.48	0.46
5:A:224:TRP:CH2	7:A:405:CLR:H152	2.51	0.46
2:D:22:ARG:HD2	2:D:259:GLN:HB3	1.97	0.46
2:D:230:ASN:ND2	2:D:246:ASP:OD1	2.47	0.46
2:D:59:TYR:CD1	2:D:75:GLN:HG3	2.51	0.46
4:C:53:MET:HE1	4:C:331:ASN:HB3	1.98	0.46
4:C:322:HIS:HB2	4:C:334:PHE:CZ	2.49	0.46
2:D:163:ASP:OD1	2:D:165:THR:OG1	2.33	0.46
1:B:213:THR:HG22	1:B:215:PHE:HD1	1.81	0.46
1:B:284:TRP:HH2	7:B:408:CLR:C2	2.28	0.46
4:C:287:TYR:CD2	4:C:302:TYR:HE2	2.34	0.46
5:A:280:TYR:C	5:A:281:LEU:HD22	2.41	0.46
5:A:328:MET:SD	5:A:328:MET:N	2.89	0.46
1:B:157:ARG:HA	1:B:159:ILE:CD1	2.45	0.45
2:D:158:VAL:HG11	2:D:192:LEU:HD11	1.99	0.45
2:D:166:CYS:HB2	2:D:180:PHE:HB2	1.97	0.45
5:A:110:VAL:HG13	5:A:111:LEU:N	2.31	0.45
1:B:57:LEU:HB3	1:B:103:TYR:CE1	2.50	0.45
2:D:267:ASP:N	2:D:267:ASP:OD1	2.50	0.45
3:G:16:VAL:HG13	3:G:17:GLU:OE1	2.15	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:C:36:LEU:HD13	4:C:222:ILE:HD11	1.98	0.45
1:B:82:MET:HE2	1:B:82:MET:HB2	1.77	0.45
1:B:193:GLN:HG2	1:B:214:HIS:HD2	1.81	0.45
5:A:67:PHE:HE1	5:A:312:LEU:HD11	1.82	0.45
5:A:177:VAL:HA	5:A:180:LEU:HD12	1.98	0.45
5:A:316:LYS:HE2	5:A:316:LYS:HB3	1.87	0.45
5:A:65:LEU:O	5:A:68:LEU:HG	2.17	0.45
1:B:149:PHE:CD2	1:B:249:VAL:CG1	3.00	0.45
4:C:203:ALA:C	4:C:205:ARG:HH12	2.25	0.45
4:C:229:ASP:HB3	4:C:242:ARG:HB2	1.99	0.45
5:A:77:ASN:HD22	5:A:315:TRP:CD1	2.34	0.44
1:B:149:PHE:CE1	5:A:335:PRO:HD2	2.52	0.44
4:C:18:MET:CE	4:C:21:ARG:HH21	2.30	0.44
1:B:149:PHE:HE2	5:A:337:LYS:HD3	1.76	0.44
2:D:326:ALA:HB1	2:D:338:ILE:HG23	1.99	0.44
3:G:12:ALA:O	3:G:16:VAL:HG12	2.17	0.44
4:C:304:GLN:NE2	4:C:321:THR:HB	2.33	0.44
5:A:233:GLY:CA	7:A:401:CLR:H222	2.47	0.44
5:A:229:TRP:N	5:A:229:TRP:CD1	2.85	0.44
1:B:284:TRP:CZ2	7:B:408:CLR:H21	2.52	0.44
7:B:407:CLR:C7	7:B:408:CLR:C6	2.95	0.44
2:D:25:CYS:O	3:G:30:VAL:HG12	2.18	0.44
2:D:264:TYR:OH	2:D:299:ALA:O	2.22	0.44
5:A:180:LEU:O	5:A:184:VAL:HG12	2.18	0.44
1:B:274:LEU:HD13	1:B:292:THR:HA	2.00	0.44
4:C:205:ARG:HG2	4:C:205:ARG:HH11	1.83	0.44
4:C:315:ASP:OD1	4:C:315:ASP:N	2.32	0.44
3:G:52:THR:O	3:G:52:THR:HG23	2.18	0.43
4:C:24:ARG:NH1	4:C:24:ARG:HB3	2.33	0.43
5:A:197:VAL:HG23	5:A:210:SER:HB3	1.99	0.43
2:D:290:ASP:HA	2:D:314:ARG:HG3	2.01	0.43
4:C:51:LYS:HB3	4:C:51:LYS:HE3	1.75	0.43
5:A:319:GLU:N	5:A:319:GLU:OE1	2.51	0.43
2:D:26:ALA:HA	3:G:30:VAL:HG11	1.99	0.43
3:G:37:LEU:HD23	3:G:37:LEU:HA	1.81	0.43
5:A:81:LYS:HB2	5:A:81:LYS:HE3	1.77	0.43
2:D:198:LEU:HB3	2:D:210:LEU:HD11	2.00	0.43
2:D:248:ALA:HB1	2:D:269:ILE:HG22	2.01	0.43
2:D:262:MET:HE3	2:D:302:ALA:HB2	2.00	0.43
2:D:283:ARG:HA	2:D:283:ARG:HD2	1.88	0.43
1:B:144:ARG:O	1:B:148:VAL:HG22	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:B:407:CLR:H21	5:A:220:TYR:CE1	2.53	0.42
5:A:253:PRO:HG2	5:A:326:ARG:HH21	1.84	0.42
2:D:96:ARG:HB2	2:D:96:ARG:CZ	2.49	0.42
2:D:32:GLN:HA	2:D:35:ASN:OD1	2.19	0.42
1:B:97:LEU:HD22	1:B:126:MET:HB3	2.01	0.42
4:C:18:MET:HE2	4:C:21:ARG:HH21	1.85	0.42
1:B:112:VAL:CG2	1:B:115:SER:HB3	2.48	0.42
5:A:232:LYS:HD3	5:A:232:LYS:HA	1.86	0.42
2:D:152:LEU:HG	2:D:192:LEU:HD21	2.01	0.42
1:B:181:MET:HA	1:B:184:VAL:HG12	2.02	0.42
2:D:56:ALA:O	2:D:334:SER:OG	2.31	0.42
4:C:227:LEU:HD21	4:C:268:LEU:HD22	2.02	0.42
4:C:346:ASN:HB3	5:A:157:ARG:NH1	2.35	0.42
1:B:280:TYR:CZ	5:A:220:TYR:HA	2.54	0.42
1:B:147:LYS:O	1:B:151:GLN:HB2	2.19	0.42
3:G:47:GLU:N	3:G:47:GLU:OE1	2.53	0.42
7:A:401:CLR:H182	7:A:401:CLR:H8	1.79	0.42
7:A:406:CLR:H222	7:A:406:CLR:H162	1.66	0.42
1:B:148:VAL:HG23	1:B:149:PHE:N	2.35	0.41
1:B:228:ILE:O	1:B:232:LYS:HG2	2.19	0.41
2:D:51:LEU:HB3	2:D:82:TRP:CZ3	2.55	0.41
7:A:401:CLR:H193	7:A:401:CLR:H111	1.79	0.41
5:A:254:VAL:HG21	5:A:327:ARG:HG3	2.02	0.41
7:A:406:CLR:H182	7:A:406:CLR:H8	1.70	0.41
2:D:10:GLU:O	2:D:13:GLN:NE2	2.54	0.41
4:C:52:GLN:OE1	4:C:53:MET:HE2	2.21	0.41
1:B:53:VAL:HG11	1:B:289:PHE:CZ	2.55	0.41
2:D:166:CYS:HB2	2:D:180:PHE:CD2	2.56	0.41
2:D:83:ASP:O	2:D:87:THR:N	2.50	0.41
5:A:319:GLU:O	5:A:320:GLU:C	2.62	0.41
1:B:50:LEU:HD22	1:B:54:TRP:CZ2	2.56	0.41
3:G:36:ASP:OD1	3:G:36:ASP:C	2.64	0.41
5:A:113:GLY:O	5:A:117:GLU:HG3	2.20	0.41
1:B:223:VAL:HG23	5:A:280:TYR:CE2	2.56	0.41
2:D:93:ILE:HG21	2:D:124:TYR:CD2	2.56	0.41
2:D:225:HIS:NE2	2:D:243:THR:OG1	2.38	0.41
3:G:13:ARG:HA	3:G:16:VAL:HG12	2.02	0.41
4:C:228:SER:O	4:C:232:LEU:HD23	2.20	0.41
4:C:274:PHE:CD2	4:C:296:TYR:HD1	2.39	0.41
4:C:297:GLU:OE1	4:C:297:GLU:N	2.53	0.41
5:A:128:CYS:HB2	6:A:403:MW9:C10	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:229:TRP:HB3	7:A:401:CLR:H183	2.02	0.41
1:B:150:THR:O	1:B:151:GLN:C	2.63	0.41
4:C:238:GLU:C	4:C:240:MET:H	2.27	0.41
1:B:229:TRP:N	1:B:229:TRP:CD1	2.88	0.40
5:A:125:SER:OG	5:A:180:LEU:HD22	2.22	0.40
5:A:233:GLY:HA2	7:A:401:CLR:H222	2.03	0.40
1:B:115:SER:HA	1:B:118:THR:HG22	2.03	0.40
7:A:405:CLR:H8	7:A:405:CLR:H182	1.76	0.40
5:A:153:VAL:HG12	5:A:156:LYS:H	1.86	0.40
5:A:187:ASP:OD2	5:A:219:ARG:O	2.39	0.40
7:A:401:CLR:H242	7:A:401:CLR:C16	2.52	0.40
1:B:150:THR:O	1:B:152:ARG:N	2.55	0.40
2:D:180:PHE:CE1	2:D:211:TRP:HB3	2.56	0.40
2:D:338:ILE:HG21	3:G:61:PHE:CE1	2.56	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	B	296/298 (99%)	280 (95%)	16 (5%)	0	100	100
2	D	336/338 (99%)	328 (98%)	8 (2%)	0	100	100
3	G	55/57 (96%)	53 (96%)	2 (4%)	0	100	100
4	C	216/349 (62%)	209 (97%)	7 (3%)	0	100	100
5	A	315/317 (99%)	292 (93%)	23 (7%)	0	100	100
All	All	1218/1359 (90%)	1162 (95%)	56 (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	B	241/266 (91%)	241 (100%)	0	100	100
2	D	257/281 (92%)	257 (100%)	0	100	100
3	G	43/46 (94%)	42 (98%)	1 (2%)	45	66
4	C	184/306 (60%)	184 (100%)	0	100	100
5	A	263/284 (93%)	263 (100%)	0	100	100
All	All	988/1183 (84%)	987 (100%)	1 (0%)	92	97

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	G	54	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	214	HIS
1	B	256	GLN
4	C	241	ASN
5	A	193	GLN
5	A	265	ASN
5	A	311	GLN
5	A	314	GLN
5	A	323	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](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

15 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
7	CLR	B	404	-	31,31,31	0.68	1 (3%)	48,48,48	1.80	11 (22%)
6	MW9	B	401	-	52,52,52	1.19	4 (7%)	55,58,58	1.17	3 (5%)
7	CLR	A	406	-	31,31,31	0.84	1 (3%)	48,48,48	1.70	10 (20%)
7	CLR	A	401	-	31,31,31	0.80	1 (3%)	48,48,48	1.39	7 (14%)
6	MW9	A	403	-	52,52,52	1.15	4 (7%)	55,58,58	1.21	3 (5%)
7	CLR	B	408	-	31,31,31	0.66	1 (3%)	48,48,48	1.81	12 (25%)
7	CLR	B	407	-	31,31,31	0.85	0	48,48,48	0.99	2 (4%)
6	MW9	A	404	-	52,52,52	1.14	4 (7%)	55,58,58	1.19	3 (5%)
7	CLR	A	407	-	31,31,31	0.67	1 (3%)	48,48,48	1.81	11 (22%)
7	CLR	B	405	-	31,31,31	0.67	1 (3%)	48,48,48	1.81	11 (22%)
7	CLR	B	403	-	31,31,31	0.67	1 (3%)	48,48,48	1.80	11 (22%)
6	MW9	B	402	-	52,52,52	1.13	4 (7%)	55,58,58	1.22	3 (5%)
7	CLR	B	406	-	31,31,31	0.66	1 (3%)	48,48,48	1.81	11 (22%)
7	CLR	A	405	-	31,31,31	0.66	1 (3%)	48,48,48	1.81	11 (22%)
7	CLR	A	402	-	31,31,31	0.67	1 (3%)	48,48,48	1.81	11 (22%)

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
7	CLR	B	404	-	-	0/10/68/68	0/4/4/4

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	MW9	B	401	-	-	34/57/57/57	-
7	CLR	A	406	-	-	4/10/68/68	0/4/4/4
7	CLR	A	401	-	-	2/10/68/68	0/4/4/4
6	MW9	A	403	-	-	26/57/57/57	-
7	CLR	B	408	-	-	0/10/68/68	0/4/4/4
7	CLR	B	407	-	-	4/10/68/68	0/4/4/4
6	MW9	A	404	-	-	33/57/57/57	-
7	CLR	A	407	-	-	0/10/68/68	0/4/4/4
7	CLR	B	405	-	-	0/10/68/68	0/4/4/4
7	CLR	B	403	-	-	0/10/68/68	0/4/4/4
6	MW9	B	402	-	-	33/57/57/57	-
7	CLR	B	406	-	-	0/10/68/68	0/4/4/4
7	CLR	A	405	-	-	0/10/68/68	0/4/4/4
7	CLR	A	402	-	-	0/10/68/68	0/4/4/4

All (26) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	401	MW9	C9-C8	-3.59	1.31	1.51
6	B	401	MW9	O1-C17	3.56	1.43	1.33
6	B	402	MW9	C9-C8	-3.19	1.33	1.51
6	A	403	MW9	C9-C8	-3.17	1.33	1.51
6	A	404	MW9	C9-C8	-3.17	1.33	1.51
6	B	401	MW9	O8-C24	3.15	1.43	1.34
6	A	404	MW9	O1-C17	3.01	1.42	1.33
6	A	403	MW9	O1-C17	2.94	1.41	1.33
6	B	401	MW9	O8-C19	-2.86	1.39	1.46
6	B	402	MW9	O1-C17	2.83	1.41	1.33
6	B	402	MW9	O8-C19	-2.79	1.39	1.46
6	A	404	MW9	O8-C19	-2.78	1.39	1.46
6	A	403	MW9	O8-C24	2.77	1.42	1.34
6	B	402	MW9	O8-C24	2.66	1.41	1.34
6	A	404	MW9	O8-C24	2.63	1.41	1.34
6	A	403	MW9	O8-C19	-2.58	1.40	1.46
7	B	404	CLR	C10-C9	-2.25	1.52	1.56
7	A	402	CLR	C10-C9	-2.22	1.52	1.56
7	B	406	CLR	C10-C9	-2.14	1.52	1.56
7	B	403	CLR	C10-C9	-2.13	1.52	1.56
7	A	407	CLR	C10-C9	-2.13	1.52	1.56
7	B	405	CLR	C10-C9	-2.13	1.52	1.56
7	A	406	CLR	C13-C14	-2.12	1.51	1.55

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	401	CLR	C13-C14	-2.10	1.51	1.55
7	A	405	CLR	C10-C9	-2.08	1.52	1.56
7	B	408	CLR	C10-C9	-2.04	1.52	1.56

All (120) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	406	CLR	C13-C17-C20	-5.91	110.23	119.49
7	A	402	CLR	C13-C17-C20	-5.89	110.26	119.49
7	B	404	CLR	C13-C17-C20	-5.88	110.27	119.49
7	A	405	CLR	C13-C17-C20	-5.84	110.34	119.49
7	B	408	CLR	C13-C17-C20	-5.84	110.35	119.49
7	A	407	CLR	C13-C17-C20	-5.82	110.37	119.49
7	B	405	CLR	C13-C17-C20	-5.81	110.39	119.49
7	B	403	CLR	C13-C17-C20	-5.80	110.40	119.49
7	A	406	CLR	C8-C7-C6	-4.84	105.78	112.73
7	A	406	CLR	C13-C14-C8	-4.55	107.64	114.38
7	B	404	CLR	C13-C14-C8	-4.38	107.89	114.38
7	A	402	CLR	C13-C14-C8	-4.37	107.91	114.38
7	A	407	CLR	C13-C14-C8	-4.37	107.91	114.38
7	B	405	CLR	C13-C14-C8	-4.36	107.93	114.38
7	A	405	CLR	C13-C14-C8	-4.36	107.93	114.38
7	B	406	CLR	C13-C14-C8	-4.34	107.95	114.38
7	A	406	CLR	C13-C17-C20	-4.33	112.70	119.49
7	B	403	CLR	C13-C14-C8	-4.32	107.98	114.38
7	B	408	CLR	C13-C14-C8	-4.30	108.01	114.38
7	B	408	CLR	C19-C10-C9	-4.25	106.62	111.68
7	B	405	CLR	C19-C10-C9	-4.24	106.63	111.68
7	A	402	CLR	C19-C10-C9	-4.23	106.64	111.68
6	A	403	MW9	O8-C24-C25	4.22	120.60	111.50
7	A	405	CLR	C19-C10-C9	-4.18	106.69	111.68
7	B	406	CLR	C19-C10-C9	-4.18	106.70	111.68
7	B	403	CLR	C19-C10-C9	-4.13	106.76	111.68
7	B	404	CLR	C19-C10-C9	-4.12	106.77	111.68
7	A	407	CLR	C19-C10-C9	-4.11	106.78	111.68
6	B	402	MW9	O8-C24-C25	4.02	120.17	111.50
6	A	403	MW9	C34-C33-C32	3.73	153.39	124.73
6	A	404	MW9	O8-C24-C25	3.67	119.40	111.50
6	A	404	MW9	C34-C33-C32	3.63	152.57	124.73
6	B	401	MW9	O8-C24-C25	3.61	119.27	111.50
7	A	406	CLR	C17-C13-C14	3.60	104.33	100.07
6	B	401	MW9	C34-C33-C32	3.55	151.94	124.73

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	402	MW9	C34-C33-C32	3.54	151.90	124.73
7	A	401	CLR	C13-C14-C8	-3.45	109.27	114.38
7	A	401	CLR	C13-C17-C20	-3.35	114.25	119.49
7	A	401	CLR	C17-C13-C14	3.27	103.95	100.07
7	A	401	CLR	C8-C7-C6	-3.08	108.30	112.73
7	A	406	CLR	C11-C12-C13	-2.98	107.67	112.78
7	A	401	CLR	C11-C12-C13	-2.84	107.91	112.78
7	B	403	CLR	C17-C13-C14	2.76	103.34	100.07
7	A	407	CLR	C9-C10-C5	2.75	113.97	109.65
7	B	408	CLR	C9-C10-C5	2.75	113.96	109.65
7	B	404	CLR	C9-C10-C5	2.74	113.95	109.65
7	A	402	CLR	C9-C10-C5	2.74	113.95	109.65
7	B	408	CLR	C17-C13-C14	2.71	103.28	100.07
7	B	406	CLR	C9-C10-C5	2.71	113.90	109.65
7	B	405	CLR	C17-C13-C14	2.70	103.28	100.07
7	A	405	CLR	C9-C10-C5	2.70	113.88	109.65
7	B	405	CLR	C9-C10-C5	2.69	113.87	109.65
7	A	407	CLR	C17-C13-C14	2.69	103.25	100.07
7	B	403	CLR	C9-C10-C5	2.68	113.86	109.65
7	B	406	CLR	C17-C13-C14	2.68	103.25	100.07
7	A	401	CLR	C4-C5-C10	2.66	119.95	116.42
6	B	402	MW9	O1-C17-C16	2.66	120.25	111.91
7	A	405	CLR	C17-C13-C14	2.66	103.22	100.07
7	B	404	CLR	C17-C13-C14	2.65	103.21	100.07
7	A	402	CLR	C17-C13-C14	2.63	103.19	100.07
7	B	405	CLR	C11-C12-C13	-2.59	108.33	112.78
6	A	404	MW9	O1-C17-C16	2.59	120.03	111.91
7	B	404	CLR	C11-C12-C13	-2.58	108.35	112.78
7	A	402	CLR	C11-C12-C13	-2.58	108.35	112.78
7	A	405	CLR	C11-C12-C13	-2.58	108.36	112.78
7	A	407	CLR	C11-C12-C13	-2.57	108.37	112.78
7	B	403	CLR	C11-C9-C10	-2.57	109.69	113.08
7	B	406	CLR	C11-C12-C13	-2.57	108.38	112.78
7	B	403	CLR	C11-C12-C13	-2.56	108.40	112.78
7	B	406	CLR	C11-C9-C10	-2.54	109.73	113.08
7	B	408	CLR	C11-C12-C13	-2.53	108.44	112.78
7	A	407	CLR	C11-C9-C10	-2.53	109.75	113.08
7	A	405	CLR	C11-C9-C10	-2.52	109.76	113.08
7	B	408	CLR	C11-C9-C10	-2.51	109.77	113.08
7	B	405	CLR	C11-C9-C10	-2.51	109.78	113.08
6	B	401	MW9	O1-C17-C16	2.50	119.77	111.91
7	B	404	CLR	C11-C9-C10	-2.50	109.79	113.08

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	402	CLR	C11-C9-C10	-2.49	109.80	113.08
7	A	405	CLR	C8-C7-C6	-2.49	109.16	112.73
7	B	403	CLR	C8-C7-C6	-2.47	109.18	112.73
6	A	403	MW9	O1-C17-C16	2.47	119.65	111.91
7	B	405	CLR	C8-C7-C6	-2.47	109.19	112.73
7	A	402	CLR	C8-C7-C6	-2.46	109.20	112.73
7	B	408	CLR	C8-C7-C6	-2.44	109.22	112.73
7	B	406	CLR	C8-C7-C6	-2.44	109.23	112.73
7	A	407	CLR	C8-C7-C6	-2.43	109.24	112.73
7	A	401	CLR	C11-C9-C10	-2.39	109.93	113.08
7	B	408	CLR	C18-C13-C14	-2.38	107.27	111.71
7	A	406	CLR	C3-C4-C5	-2.38	107.98	112.03
7	A	406	CLR	C19-C10-C9	-2.38	108.85	111.68
7	B	403	CLR	C18-C13-C14	-2.37	107.29	111.71
7	B	404	CLR	C8-C7-C6	-2.37	109.32	112.73
7	A	406	CLR	C9-C10-C5	2.37	113.37	109.65
7	B	406	CLR	C18-C13-C14	-2.36	107.31	111.71
7	A	407	CLR	C18-C13-C14	-2.36	107.32	111.71
7	B	404	CLR	C18-C13-C14	-2.34	107.34	111.71
7	B	405	CLR	C18-C13-C14	-2.34	107.35	111.71
7	A	402	CLR	C18-C13-C14	-2.32	107.38	111.71
7	A	405	CLR	C18-C13-C14	-2.32	107.38	111.71
7	A	405	CLR	C21-C20-C17	-2.31	109.38	112.92
7	B	403	CLR	C21-C20-C17	-2.31	109.39	112.92
7	B	408	CLR	C21-C20-C17	-2.29	109.41	112.92
7	B	405	CLR	C21-C20-C17	-2.29	109.42	112.92
7	A	407	CLR	C21-C20-C17	-2.26	109.46	112.92
7	B	406	CLR	C21-C20-C17	-2.24	109.49	112.92
7	A	402	CLR	C21-C20-C17	-2.24	109.50	112.92
7	A	406	CLR	C16-C17-C13	2.23	106.54	103.84
7	B	404	CLR	C21-C20-C17	-2.20	109.55	112.92
7	B	406	CLR	C3-C4-C5	-2.19	108.31	112.03
7	A	407	CLR	C3-C4-C5	-2.17	108.34	112.03
7	B	405	CLR	C3-C4-C5	-2.15	108.37	112.03
7	B	408	CLR	C3-C4-C5	-2.14	108.39	112.03
7	B	403	CLR	C3-C4-C5	-2.14	108.40	112.03
7	B	404	CLR	C3-C4-C5	-2.14	108.40	112.03
7	A	405	CLR	C3-C4-C5	-2.14	108.40	112.03
7	A	406	CLR	C11-C9-C10	-2.13	110.27	113.08
7	A	402	CLR	C3-C4-C5	-2.13	108.41	112.03
7	B	407	CLR	C4-C5-C6	-2.10	117.58	120.61
7	B	407	CLR	C4-C5-C10	2.01	119.10	116.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	408	CLR	C15-C14-C8	-2.00	115.79	119.08

There are no chirality outliers.

All (136) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	B	401	MW9	O1-C18-C19-O8
6	B	401	MW9	C21-C22-C23-O6
6	B	401	MW9	C25-C24-O8-C19
6	B	401	MW9	C21-O5-P-O3
6	B	402	MW9	O9-C24-O8-C19
6	B	402	MW9	C20-O2-P-O3
6	B	402	MW9	C20-O2-P-O4
6	A	403	MW9	C25-C24-O8-C19
6	A	403	MW9	O9-C24-O8-C19
6	A	403	MW9	C20-O2-P-O3
6	A	403	MW9	C20-O2-P-O4
6	A	403	MW9	C20-O2-P-O5
6	A	403	MW9	C21-O5-P-O2
6	A	403	MW9	C21-O5-P-O4
6	A	404	MW9	C21-C22-C23-O6
6	A	404	MW9	O7-C22-C23-O6
6	A	404	MW9	C25-C24-O8-C19
6	A	404	MW9	O9-C24-O8-C19
6	A	404	MW9	C20-O2-P-O3
6	B	402	MW9	O-C17-O1-C18
6	B	401	MW9	O9-C24-O8-C19
6	B	402	MW9	C16-C17-O1-C18
6	B	402	MW9	C25-C24-O8-C19
6	A	404	MW9	C16-C17-O1-C18
6	B	401	MW9	C11-C10-C9-C8
6	B	401	MW9	C13-C14-C15-C16
6	B	402	MW9	C11-C10-C9-C8
6	B	402	MW9	O5-C21-C22-O7
6	B	401	MW9	C11-C12-C13-C14
6	A	404	MW9	O-C17-O1-C18
6	B	401	MW9	C3-C4-C5-C6
6	B	402	MW9	C6-C7-C8-C9
6	B	402	MW9	O5-C21-C22-C23
6	A	404	MW9	O5-C21-C22-C23
6	A	404	MW9	C27-C28-C29-C30
6	B	401	MW9	C14-C15-C16-C17

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Mol	Chain	Res	Type	Atoms
6	B	401	MW9	C24-C25-C26-C27
6	B	402	MW9	C34-C35-C36-C37
6	A	404	MW9	C24-C25-C26-C27
6	A	403	MW9	C11-C10-C9-C8
6	B	401	MW9	O7-C22-C23-O6
6	A	403	MW9	C14-C15-C16-C17
6	A	403	MW9	C24-C25-C26-C27
6	A	404	MW9	C14-C15-C16-C17
6	B	401	MW9	C1-C2-C3-C4
6	B	401	MW9	C26-C27-C28-C29
7	A	401	CLR	C22-C23-C24-C25
7	A	401	CLR	C20-C22-C23-C24
6	B	401	MW9	C21-O5-P-O2
6	B	402	MW9	C20-O2-P-O5
6	A	404	MW9	C3-C4-C5-C6
6	B	401	MW9	C10-C11-C12-C13
6	B	402	MW9	C2-C3-C4-C5
6	A	403	MW9	C28-C29-C30-C31
6	A	404	MW9	C11-C10-C9-C8
6	A	404	MW9	C35-C36-C37-C38
6	B	401	MW9	C9-C10-C11-C12
6	B	402	MW9	C4-C5-C6-C7
6	B	401	MW9	C35-C36-C37-C38
6	B	402	MW9	C27-C28-C29-C30
6	A	404	MW9	C10-C11-C12-C13
6	A	404	MW9	O5-C21-C22-O7
6	B	402	MW9	C14-C15-C16-C17
6	B	401	MW9	C27-C28-C29-C30
6	B	402	MW9	C26-C27-C28-C29
6	B	401	MW9	C25-C26-C27-C28
6	A	403	MW9	C36-C37-C38-C39
6	A	404	MW9	C2-C3-C4-C5
6	B	402	MW9	C28-C29-C30-C31
7	B	407	CLR	C20-C22-C23-C24
6	A	404	MW9	C34-C35-C36-C37
6	A	404	MW9	C6-C7-C8-C9
6	A	404	MW9	O1-C18-C19-C20
6	B	402	MW9	C5-C6-C7-C8
6	B	402	MW9	C29-C30-C31-C32
6	B	402	MW9	C9-C10-C11-C12
6	B	402	MW9	C32-C33-C34-C35
7	A	406	CLR	C13-C17-C20-C22

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Mol	Chain	Res	Type	Atoms
6	A	403	MW9	C27-C28-C29-C30
6	B	401	MW9	O5-C21-C22-O7
6	A	403	MW9	C9-C10-C11-C12
6	B	402	MW9	C33-C34-C35-C36
6	B	401	MW9	C34-C35-C36-C37
6	A	404	MW9	C20-O2-P-O5
6	A	403	MW9	C2-C3-C4-C5
6	B	401	MW9	O1-C18-C19-C20
6	A	404	MW9	C1-C2-C3-C4
6	B	402	MW9	C10-C11-C12-C13
6	A	403	MW9	C29-C30-C31-C32
6	A	404	MW9	C33-C34-C35-C36
6	B	402	MW9	C13-C14-C15-C16
6	A	403	MW9	C11-C12-C13-C14
7	A	406	CLR	C13-C17-C20-C21
6	A	404	MW9	O1-C18-C19-O8
6	B	401	MW9	C18-C19-C20-O2
7	A	406	CLR	C16-C17-C20-C21
6	A	404	MW9	C4-C5-C6-C7
7	A	406	CLR	C16-C17-C20-C22
6	A	403	MW9	C38-C39-C40-C41
7	B	407	CLR	C22-C23-C24-C25
6	A	404	MW9	C18-C19-C20-O2
6	B	401	MW9	C16-C17-O1-C18
6	B	402	MW9	C11-C12-C13-C14
6	B	401	MW9	O8-C19-C20-O2
7	B	407	CLR	C23-C24-C25-C27
6	B	401	MW9	O-C17-O1-C18
6	B	401	MW9	C4-C5-C6-C7
6	B	401	MW9	C21-O5-P-O4
6	A	404	MW9	C20-O2-P-O4
6	A	403	MW9	C16-C17-O1-C18
6	A	404	MW9	O8-C19-C20-O2
6	A	403	MW9	O-C17-O1-C18
6	A	403	MW9	C4-C5-C6-C7
7	B	407	CLR	C23-C24-C25-C26
6	B	402	MW9	C36-C37-C38-C39
6	A	404	MW9	C5-C6-C7-C8
6	A	404	MW9	C9-C10-C11-C12
6	B	401	MW9	C19-C20-O2-P
6	B	401	MW9	C29-C30-C31-C32
6	A	403	MW9	C3-C4-C5-C6

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
6	A	404	MW9	C28-C29-C30-C31
6	B	401	MW9	C6-C7-C8-C9
6	B	401	MW9	C36-C37-C38-C39
6	B	402	MW9	C-C1-C2-C3
6	A	403	MW9	C15-C16-C17-O1
6	B	402	MW9	C30-C31-C32-C33
6	A	403	MW9	O8-C24-C25-C26
6	B	402	MW9	C15-C16-C17-O1
6	A	404	MW9	C25-C26-C27-C28
6	B	402	MW9	C15-C16-C17-O
6	B	401	MW9	C32-C33-C34-C35
6	A	403	MW9	O9-C24-C25-C26
6	A	404	MW9	C19-C20-O2-P
6	B	402	MW9	O8-C24-C25-C26
6	A	403	MW9	C34-C35-C36-C37
6	B	402	MW9	O9-C24-C25-C26

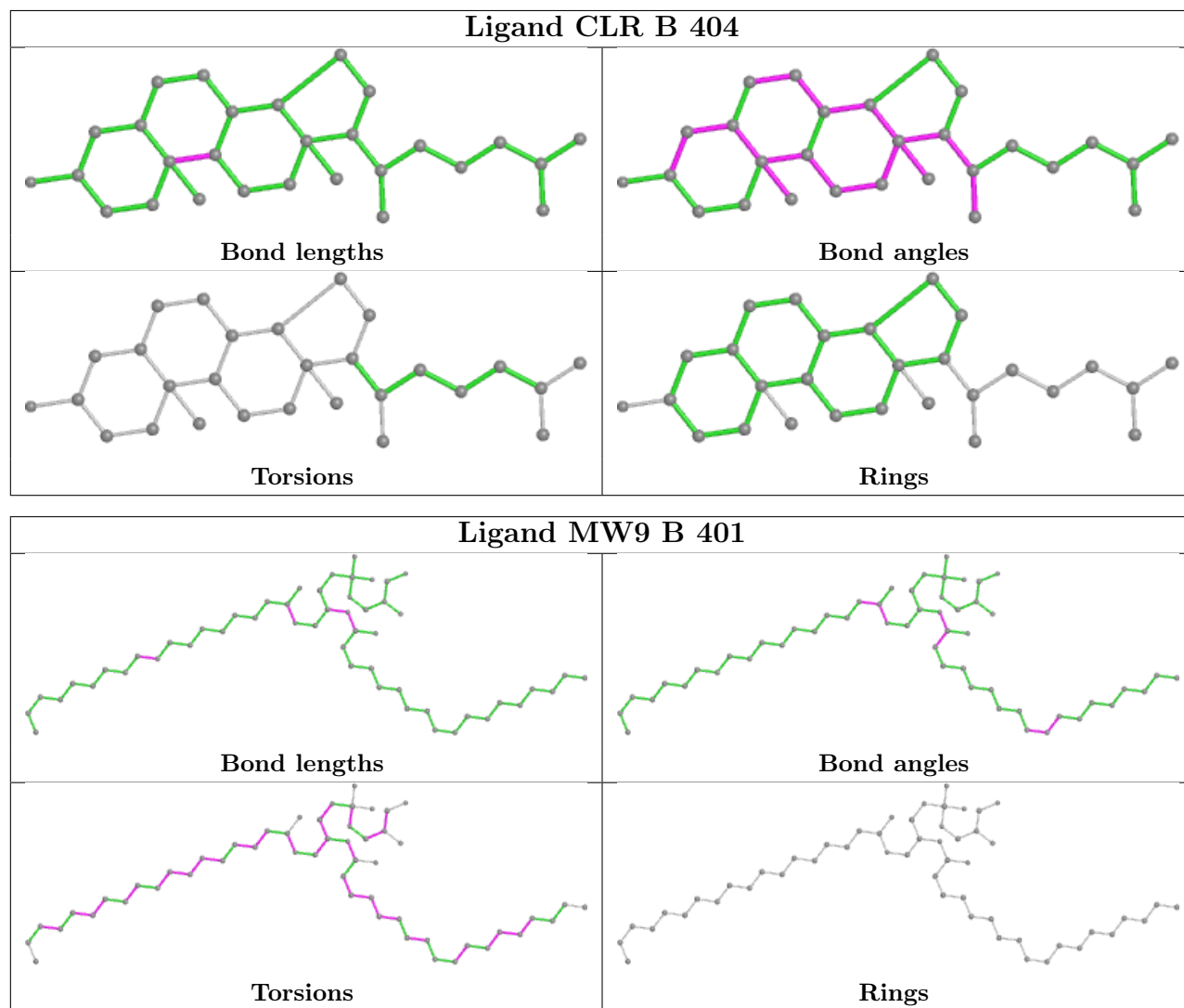
There are no ring outliers.

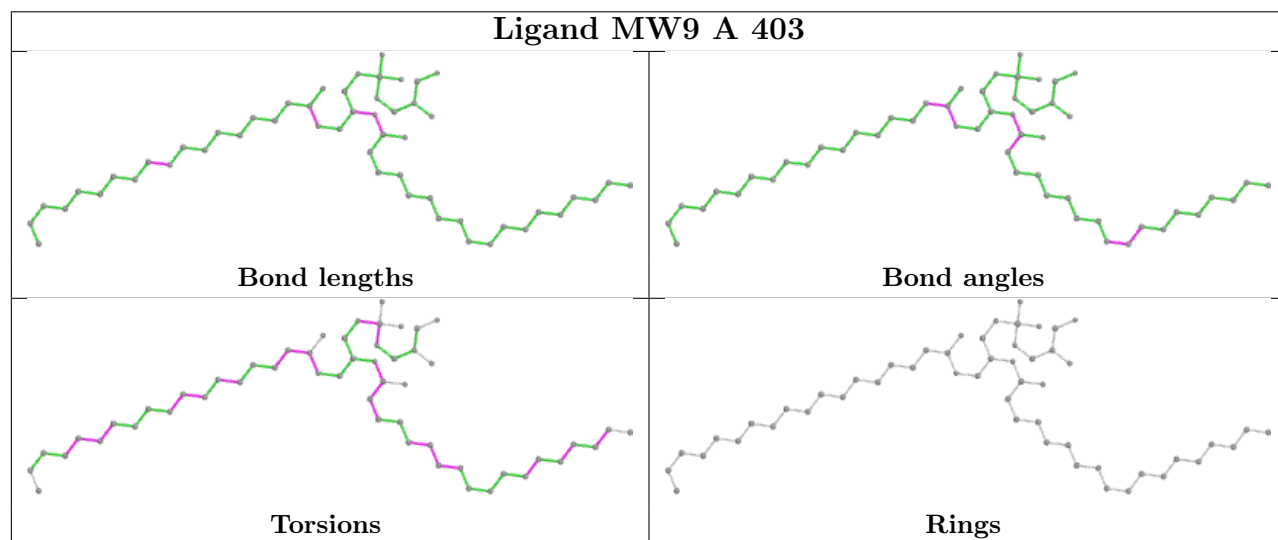
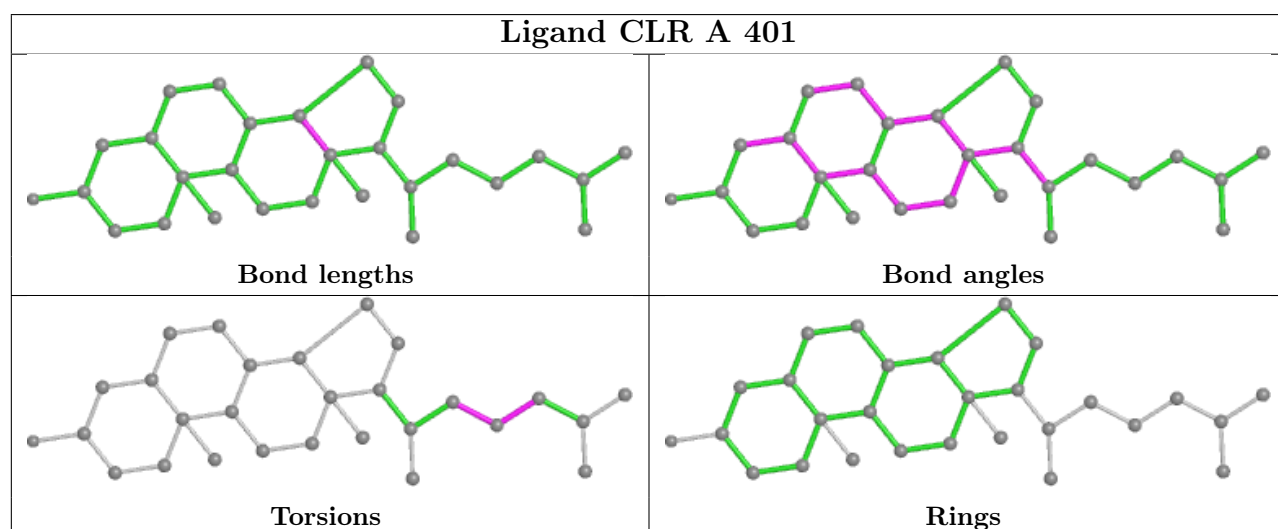
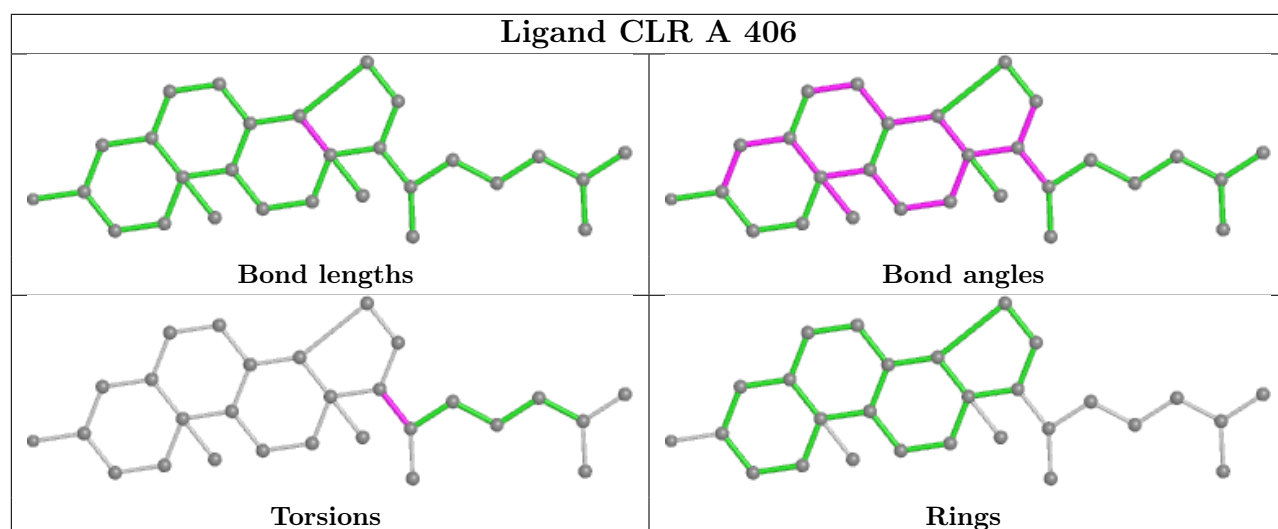
13 monomers are involved in 73 short contacts:

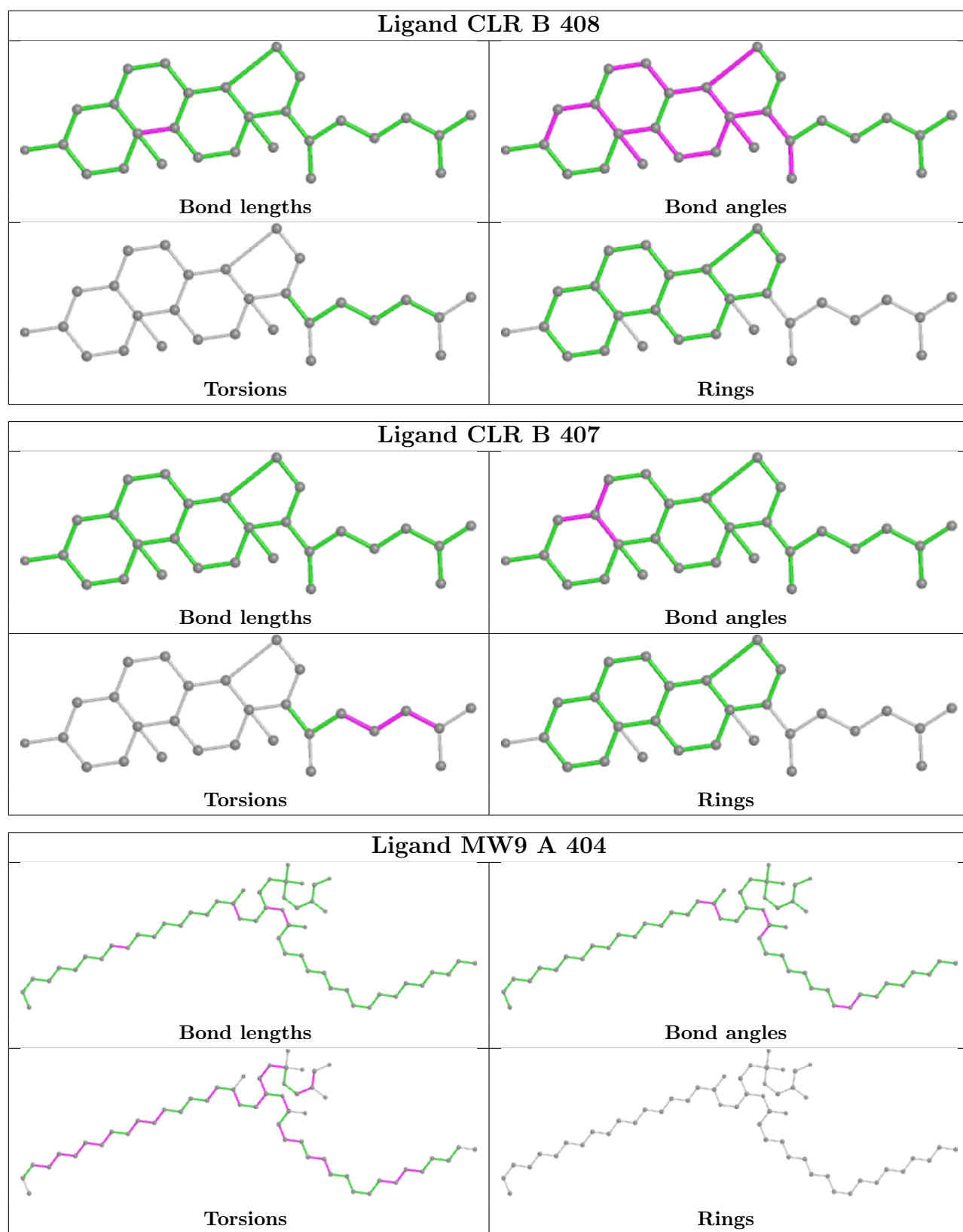
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	404	CLR	5	0
6	B	401	MW9	1	0
7	A	406	CLR	2	0
7	A	401	CLR	14	0
6	A	403	MW9	4	0
7	B	408	CLR	19	0
7	B	407	CLR	22	0
7	A	407	CLR	2	0
7	B	405	CLR	2	0
7	B	403	CLR	4	0
7	B	406	CLR	2	0
7	A	405	CLR	11	0
7	A	402	CLR	3	0

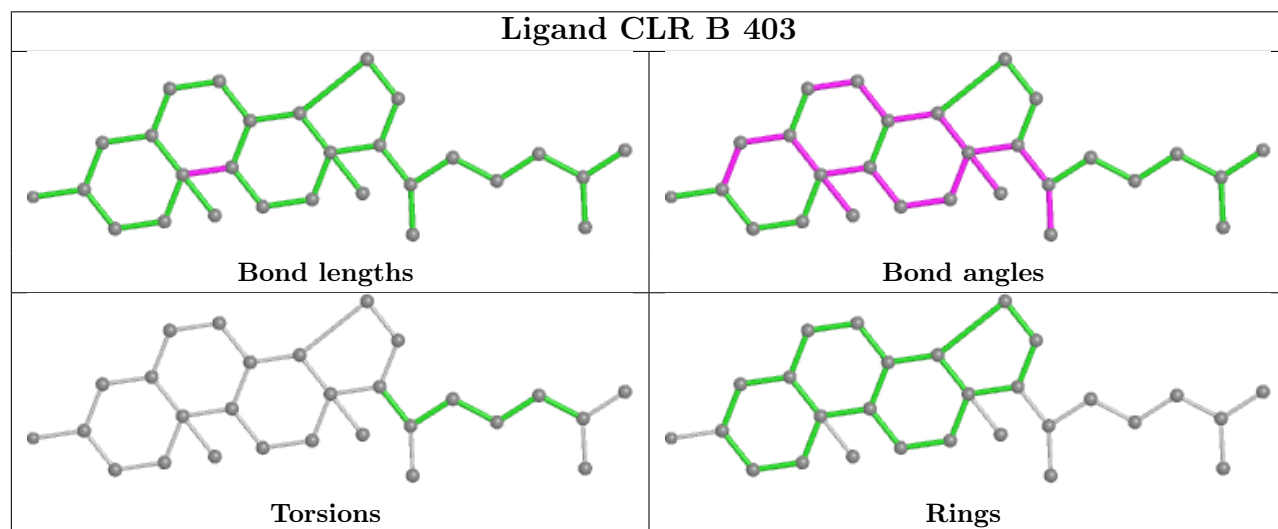
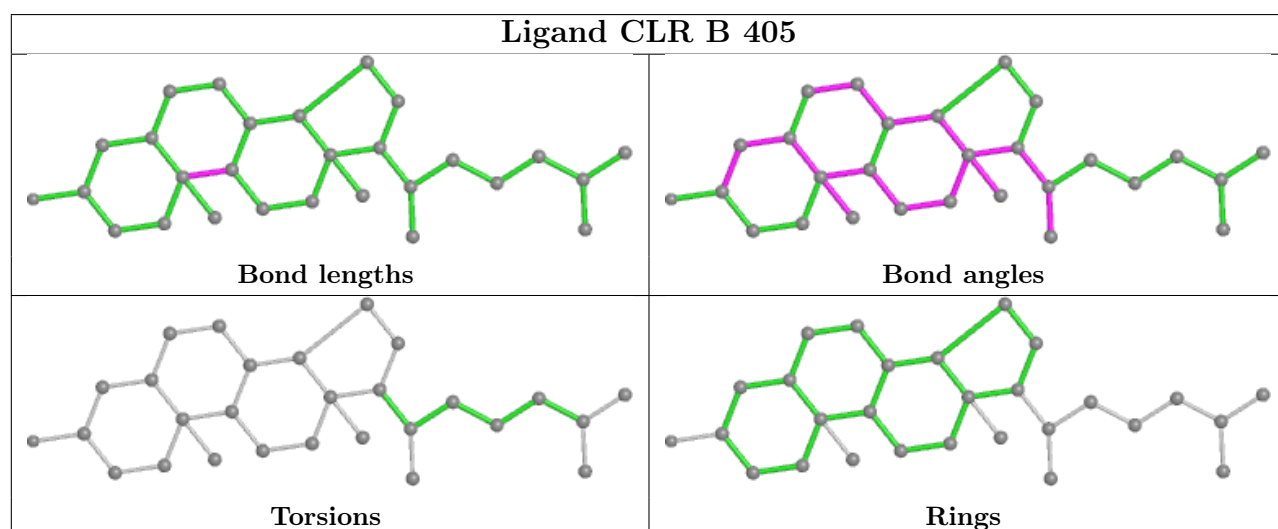
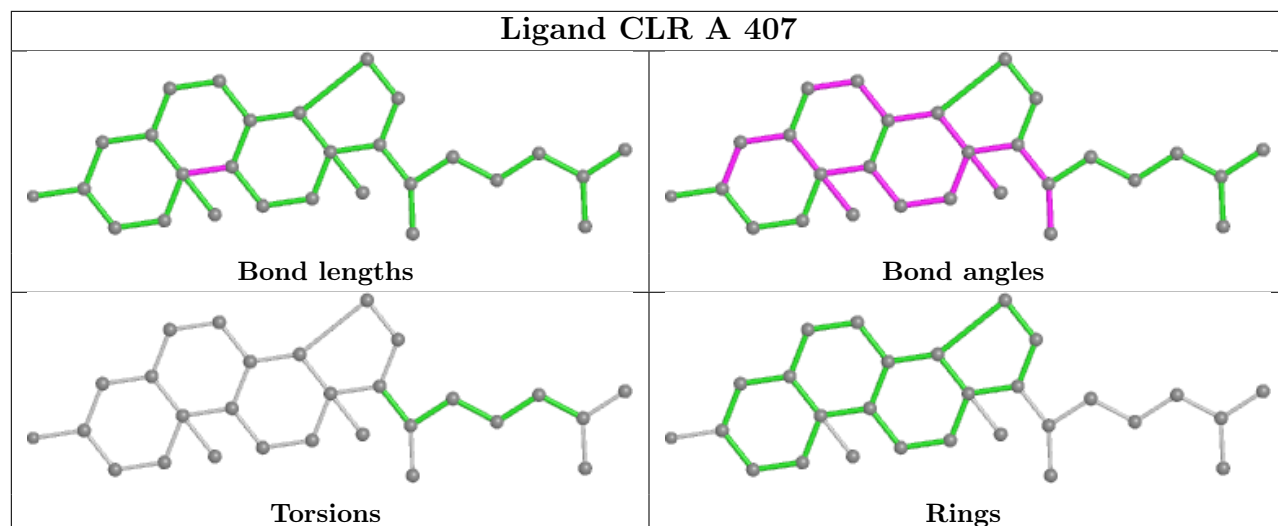
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

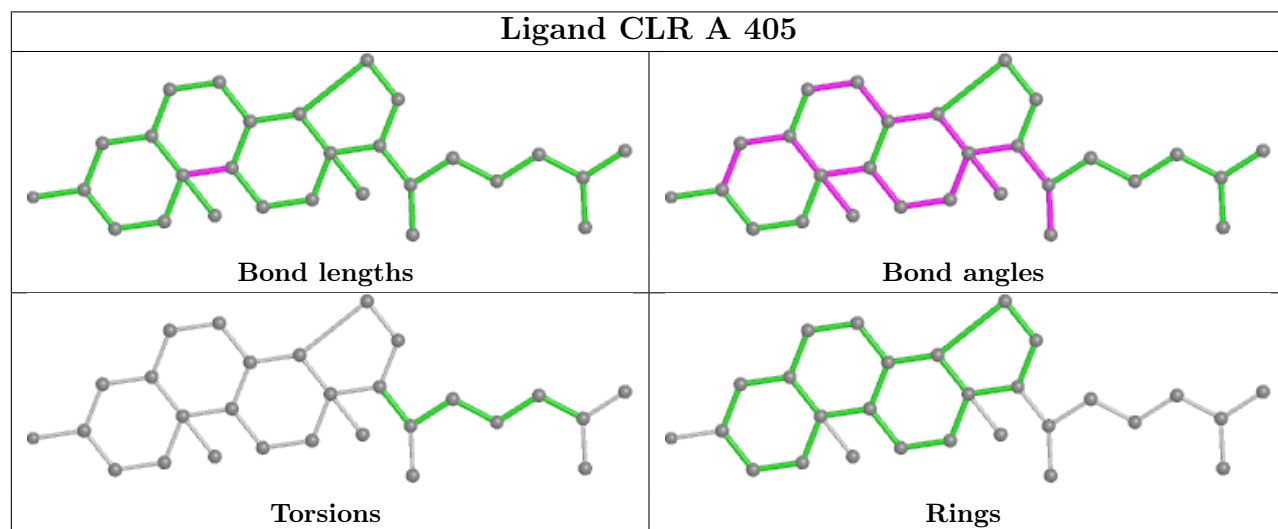
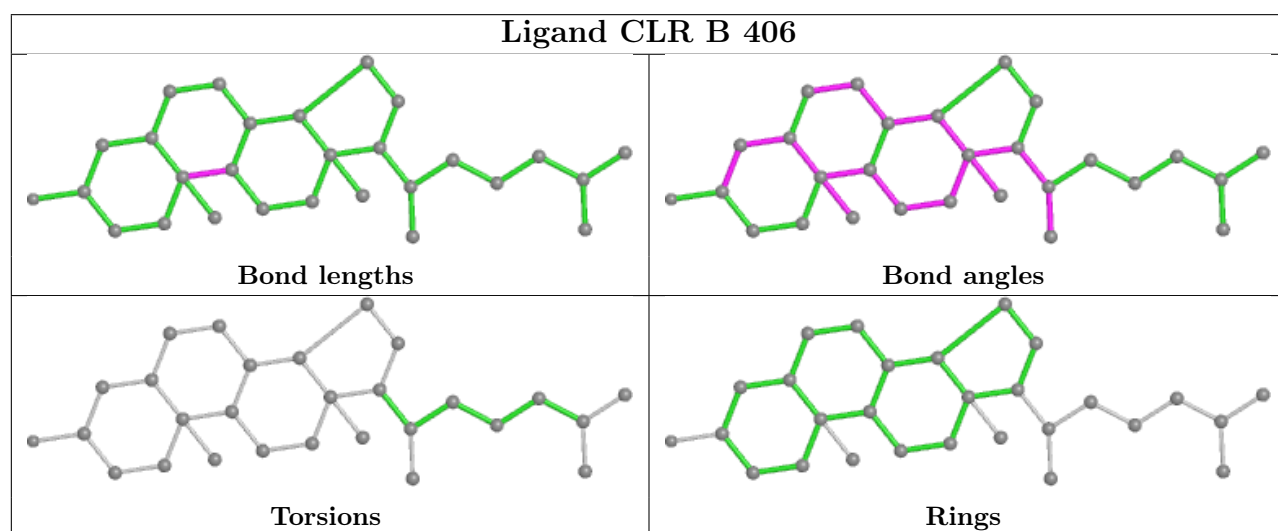
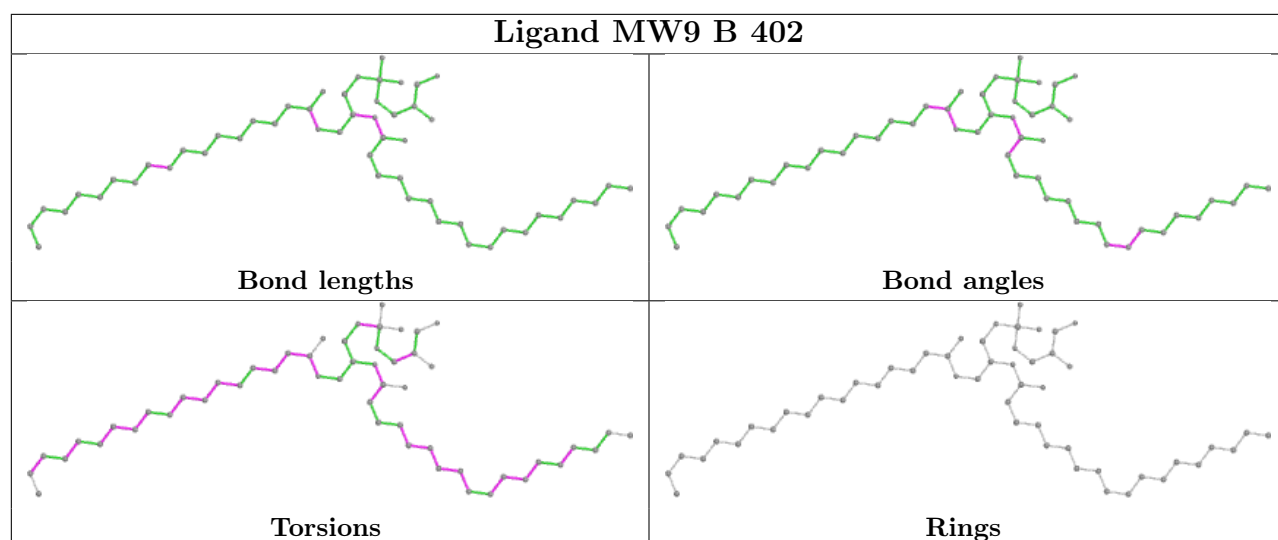


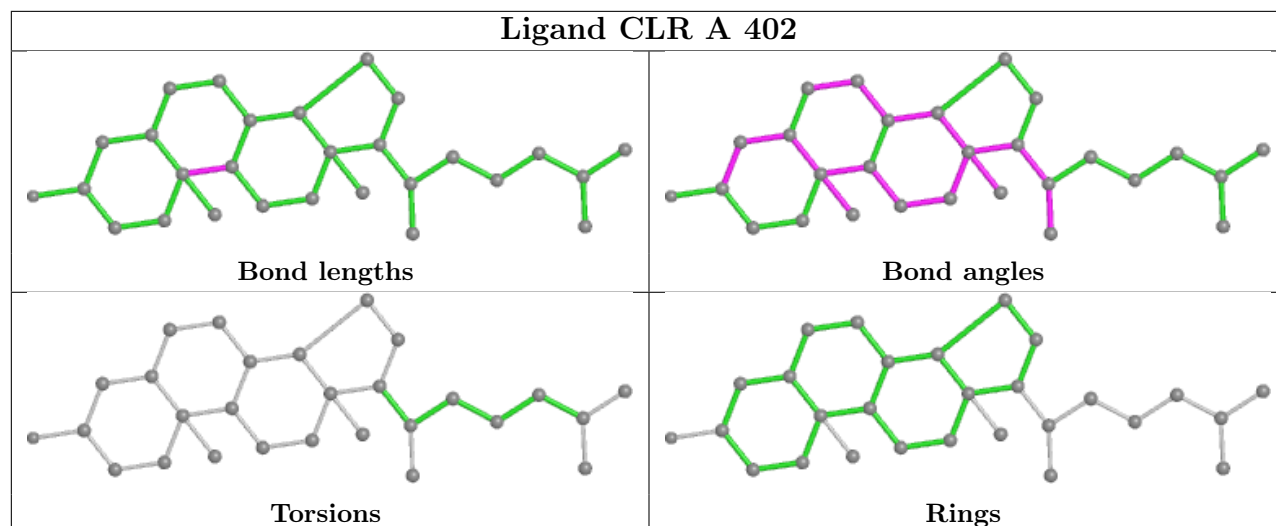












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.