



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 15, 2026 – 03:42 AM UTC

PDB ID : 2CJF / pdb_00002cjf
Title : TYPE II DEHYDROQUINASE INHIBITOR COMPLEX
Authors : Payne, R.J.; Riboldi-Tunncliffe, A.; Abell, A.D.; Laphorn, A.J.; Abell, C.
Deposited on : 2006-03-31
Resolution : 1.95 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtrriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

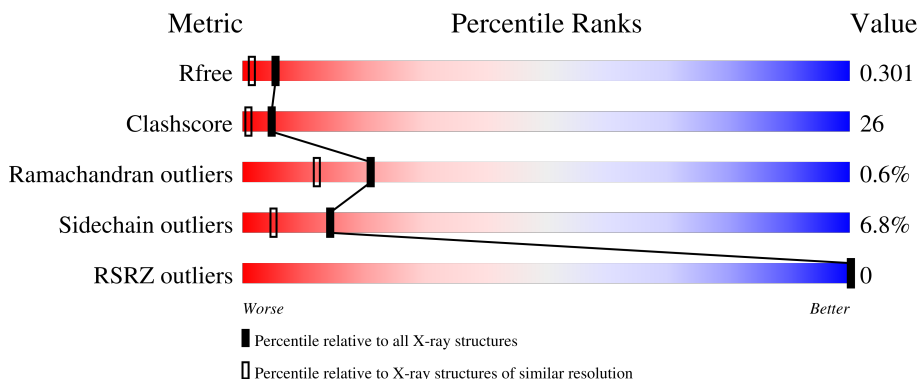
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	3494 (1.96-1.96)
Clashscore	190562	3612 (1.96-1.96)
Ramachandran outliers	187476	3587 (1.96-1.96)
Sidechain outliers	187428	3587 (1.96-1.96)
RSRZ outliers	180081	3495 (1.96-1.96)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	157	 56% 29% 9% 5%
1	B	157	 52% 38% 5% 5%
1	C	157	 49% 38% 8% 5%
1	D	157	 48% 38% 9% 5%
1	E	157	 52% 36% 8% 5%

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Mol	Chain	Length	Quality of chain			
1	F	157				
1	G	157				
1	H	157				
1	I	157				
1	J	157				
1	K	157				
1	L	157				

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
2	RP4	A	1151	-	-	X	-
3	GOL	A	1152	-	-	X	-
3	GOL	D	1753	-	-	X	-
3	GOL	E	1952	-	X	-	-
3	GOL	F	2153	-	-	X	-
3	GOL	G	2353	-	-	X	-
3	GOL	H	2552	-	-	X	-
3	GOL	J	2955	-	-	X	-
3	GOL	K	3153	-	-	X	-

2 Entry composition [i](#)

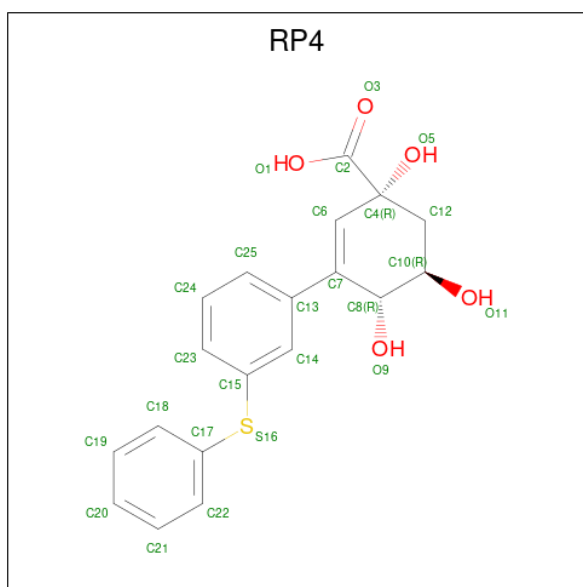
There are 6 unique types of molecules in this entry. The entry contains 15510 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called 3-DEHYDROQUINATE DEHYDRATASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	149	1127	701	210	211	5	0	2	0
1	B	149	1126	701	210	210	5	0	1	0
1	C	149	1127	701	210	211	5	0	2	0
1	D	149	1127	701	210	211	5	0	2	0
1	E	149	1126	701	210	210	5	0	1	0
1	F	149	1126	701	210	210	5	0	1	0
1	G	149	1127	701	210	211	5	0	2	0
1	H	149	1127	701	210	211	5	0	2	0
1	I	149	1127	701	210	211	5	0	2	0
1	J	149	1132	704	213	210	5	0	2	0
1	K	149	1126	701	210	210	5	0	1	0
1	L	149	1127	701	210	211	5	0	2	0

- Molecule 2 is (1S,4S,5S)-1,4,5-TRIHIDROXY-3-[3-(PHENYLTHIO)PHENYL]CYCLOHE X-2-ENE-1-CARBOXYLIC ACID (CCD ID: RP4) (formula: C₁₉H₁₈O₅S).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	O	S	0	0
			25	19	5	1		
2	B	1	Total	C	O	S	0	0
			25	19	5	1		
2	C	1	Total	C	O	S	0	0
			25	19	5	1		
2	D	1	Total	C	O	S	0	0
			25	19	5	1		
2	E	1	Total	C	O	S	0	0
			25	19	5	1		
2	F	1	Total	C	O	S	0	0
			25	19	5	1		
2	G	1	Total	C	O	S	0	0
			25	19	5	1		
2	H	1	Total	C	O	S	0	0
			25	19	5	1		
2	I	1	Total	C	O	S	0	0
			25	19	5	1		
2	J	1	Total	C	O	S	0	0
			25	19	5	1		
2	K	1	Total	C	O	S	0	0
			25	19	5	1		
2	L	1	Total	C	O	S	0	0
			25	19	5	1		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



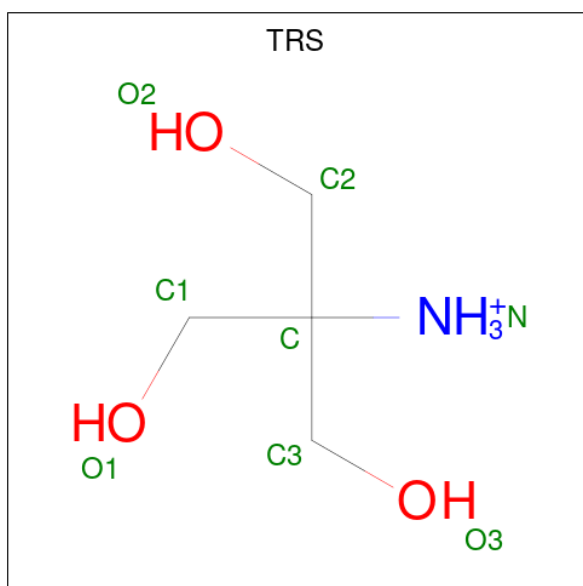
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0
3	E	1	Total C O 6 3 3	0	0
3	F	1	Total C O 6 3 3	0	0
3	G	1	Total C O 6 3 3	0	0
3	H	1	Total C O 6 3 3	0	0
3	J	1	Total C O 6 3 3	0	0
3	J	1	Total C O 6 3 3	0	0
3	K	1	Total C O 6 3 3	0	0
3	K	1	Total C O 6 3 3	0	0
3	L	1	Total C O 6 3 3	0	0

- Molecule 4 is PHOSPHATE ION (CCD ID: PO4) (formula: O₄P).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total O P 5 4 1	0	0
4	F	1	Total O P 5 4 1	0	0
4	G	1	Total O P 5 4 1	0	0
4	J	1	Total O P 5 4 1	0	0

- Molecule 5 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: TRS) (formula: C₄H₁₂NO₃).



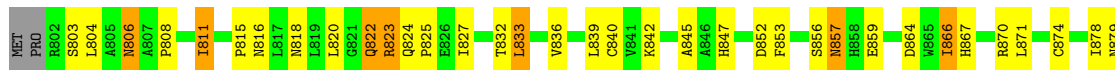
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	N	O	0	0
			8	4	1	3		
5	D	1	Total	C	N	O	0	0
			8	4	1	3		
5	I	1	Total	C	N	O	0	0
			8	4	1	3		
5	J	1	Total	C	N	O	0	0
			8	4	1	3		

- Molecule 6 is water.

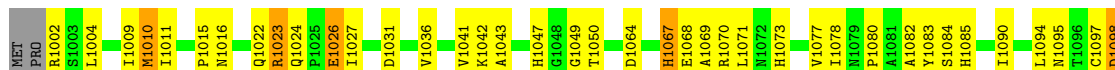
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	118	Total	O	0	0
			118	118		
6	B	142	Total	O	0	0
			142	142		
6	C	127	Total	O	0	0
			127	127		
6	D	140	Total	O	0	0
			140	140		
6	E	164	Total	O	0	0
			164	164		
6	F	133	Total	O	0	0
			133	133		
6	G	133	Total	O	0	0
			133	133		
6	H	105	Total	O	0	0
			105	105		
6	I	139	Total	O	0	0
			139	139		
6	J	111	Total	O	0	0
			111	111		
6	K	117	Total	O	0	0
			117	117		
6	L	132	Total	O	0	0
			132	132		



● Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



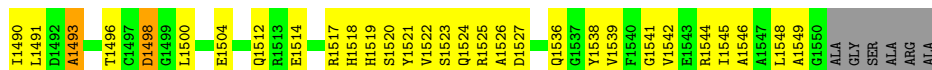
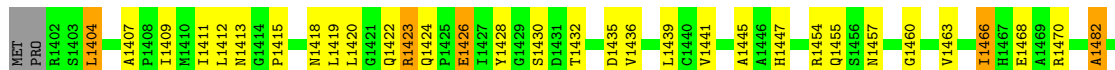
● Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



● Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



● Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



● Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE

4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	195.75Å 195.73Å 239.68Å 65.84° 65.89° 89.97°	Depositor
Resolution (Å)	25.00 – 1.95 25.00 – 1.95	Depositor EDS
% Data completeness (in resolution range)	76.2 (25.00-1.95) 76.0 (25.00-1.95)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.32 (at 1.95Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.274 , 0.334 0.298 , 0.301	Depositor DCC
R_{free} test set	80795 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	25.4	Xtriage
Anisotropy	0.127	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.41 , 63.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.41$, $\langle L^2 \rangle = 0.24$	Xtriage
Estimated twinning fraction	0.406 for k,-h,-h+1 0.406 for -k,h,-k+1 0.417 for -h,k,k-l 0.437 for h,-k,h-l 0.417 for -k,-h,-l 0.407 for k,h,h+k-l 0.416 for -h,-k,-h-k+1	Xtriage
F_o, F_c correlation	0.78	EDS
Total number of atoms	15510	wwPDB-VP
Average B, all atoms (Å ²)	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 17.51% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: PO4, TRS, GOL, RP4

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	1.36	7/1161 (0.6%)	1.37	10/1582 (0.6%)
1	B	1.33	1/1155 (0.1%)	1.46	11/1574 (0.7%)
1	C	1.21	1/1161 (0.1%)	1.38	9/1582 (0.6%)
1	D	1.40	5/1161 (0.4%)	1.39	10/1582 (0.6%)
1	E	1.35	5/1155 (0.4%)	1.41	12/1574 (0.8%)
1	F	1.24	4/1155 (0.3%)	1.31	9/1574 (0.6%)
1	G	1.41	5/1161 (0.4%)	1.46	12/1582 (0.8%)
1	H	1.23	2/1161 (0.2%)	1.32	8/1582 (0.5%)
1	I	1.35	5/1161 (0.4%)	1.41	11/1582 (0.7%)
1	J	1.24	4/1166 (0.3%)	1.38	9/1588 (0.6%)
1	K	1.32	4/1155 (0.3%)	1.33	3/1574 (0.2%)
1	L	1.37	2/1161 (0.2%)	1.42	6/1582 (0.4%)
All	All	1.32	45/13913 (0.3%)	1.39	110/18958 (0.6%)

The worst 5 of 45 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	1090	ILE	CA-CB	-8.84	1.44	1.54
1	G	1305	VAL	CA-CB	7.87	1.64	1.54
1	G	1282	ALA	CA-C	7.30	1.63	1.52
1	I	1709	ASN	CA-C	7.23	1.61	1.53
1	L	2263	VAL	CA-CB	7.14	1.62	1.54

The worst 5 of 110 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	2295	ASN	N-CA-C	-9.08	101.64	112.89
1	G	1284	SER	N-CA-C	-7.95	101.58	111.75
1	D	690	ILE	N-CA-C	7.89	118.00	110.42
1	K	2078	ILE	N-CA-C	7.79	119.02	108.11
1	I	1696	THR	N-CA-C	-7.70	103.89	113.28

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	A	1127	0	1093	54	0
1	B	1126	0	1092	54	0
1	C	1127	0	1093	63	0
1	D	1127	0	1093	66	0
1	E	1126	0	1092	61	0
1	F	1126	0	1092	60	0
1	G	1127	0	1093	57	0
1	H	1127	0	1093	53	0
1	I	1127	0	1093	55	0
1	J	1132	0	1102	71	0
1	K	1126	0	1092	71	0
1	L	1127	0	1093	56	0
2	A	25	0	17	10	0
2	B	25	0	17	2	0
2	C	25	0	17	2	0
2	D	25	0	17	0	0
2	E	25	0	17	2	0
2	F	25	0	17	2	0
2	G	25	0	17	1	0
2	H	25	0	17	2	0
2	I	25	0	17	1	0
2	J	25	0	18	0	0
2	K	25	0	17	4	0
2	L	25	0	17	5	0
3	A	6	0	8	4	0
3	B	6	0	8	0	0
3	D	6	0	8	8	0
3	E	6	0	8	2	0
3	F	6	0	8	5	0
3	G	6	0	8	4	0
3	H	6	0	8	4	0
3	J	12	0	16	8	0
3	K	12	0	16	10	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	L	6	0	8	2	0
4	B	5	0	0	0	0
4	F	5	0	0	0	0
4	G	5	0	0	0	0
4	J	5	0	0	0	0
5	B	8	0	12	0	0
5	D	8	0	12	0	0
5	I	8	0	12	1	0
5	J	8	0	12	1	0
6	A	118	0	0	18	0
6	B	142	0	0	15	0
6	C	127	0	0	14	0
6	D	140	0	0	23	0
6	E	164	0	0	16	0
6	F	133	0	0	16	0
6	G	133	0	0	19	0
6	H	105	0	0	13	0
6	I	139	0	0	17	0
6	J	111	0	0	10	0
6	K	117	0	0	19	0
6	L	132	0	0	17	0
All	All	15510	0	13470	701	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 26.

The worst 5 of 701 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:D:710:ILE:CD1	1:D:710:ILE:CG1	1.74	1.59
1:C:447:HIS:CD2	6:C:2051:HOH:O	1.84	1.28
3:K:3153:GOL:H32	6:K:7116:HOH:O	1.34	1.26
1:C:447:HIS:HD2	6:C:2051:HOH:O	1.16	1.19
1:G:1228:TYR:CE1	6:G:2032:HOH:O	1.96	1.17

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	149/157 (95%)	138 (93%)	11 (7%)	0	100	100
1	B	148/157 (94%)	140 (95%)	8 (5%)	0	100	100
1	C	149/157 (95%)	133 (89%)	15 (10%)	1 (1%)	18	10
1	D	149/157 (95%)	138 (93%)	9 (6%)	2 (1%)	9	3
1	E	148/157 (94%)	137 (93%)	10 (7%)	1 (1%)	18	10
1	F	148/157 (94%)	138 (93%)	8 (5%)	2 (1%)	9	3
1	G	149/157 (95%)	138 (93%)	9 (6%)	2 (1%)	9	3
1	H	149/157 (95%)	140 (94%)	9 (6%)	0	100	100
1	I	149/157 (95%)	133 (89%)	16 (11%)	0	100	100
1	J	148/157 (94%)	135 (91%)	13 (9%)	0	100	100
1	K	148/157 (94%)	134 (90%)	14 (10%)	0	100	100
1	L	149/157 (95%)	140 (94%)	6 (4%)	3 (2%)	6	1
All	All	1783/1884 (95%)	1644 (92%)	128 (7%)	11 (1%)	21	12

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	F	1023	ARG
1	E	949	ALA
1	G	1349	ALA
1	L	2223	ARG
1	C	420	LEU

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	119/121 (98%)	114 (96%)	5 (4%)	26	16
1	B	118/121 (98%)	111 (94%)	7 (6%)	18	7
1	C	119/121 (98%)	108 (91%)	11 (9%)	8	2
1	D	119/121 (98%)	108 (91%)	11 (9%)	8	2
1	E	118/121 (98%)	112 (95%)	6 (5%)	21	10
1	F	118/121 (98%)	112 (95%)	6 (5%)	21	10
1	G	119/121 (98%)	110 (92%)	9 (8%)	12	4
1	H	119/121 (98%)	113 (95%)	6 (5%)	22	11
1	I	119/121 (98%)	108 (91%)	11 (9%)	8	2
1	J	119/121 (98%)	112 (94%)	7 (6%)	18	7
1	K	118/121 (98%)	107 (91%)	11 (9%)	8	2
1	L	119/121 (98%)	109 (92%)	10 (8%)	10	3
All	All	1424/1452 (98%)	1324 (93%)	100 (7%)	14	4

5 of 100 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	1423	ARG
1	I	1724	GLN
1	L	2348	LEU
1	H	1466	ILE
1	I	1668	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 37 such sidechains are listed below:

Mol	Chain	Res	Type
1	J	1906	HIS
1	L	2312	GLN
1	J	1912	GLN
1	K	2058	HIS
1	E	822	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](#)

32 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	GOL	A	1152	-	5,5,5	0.60	0	5,5,5	0.46	0
4	PO4	J	2952	-	4,4,4	0.51	0	6,6,6	1.12	0
5	TRS	D	1752	-	7,7,7	0.60	0	9,9,9	0.91	0
3	GOL	L	3352	-	5,5,5	0.60	0	5,5,5	1.05	0
2	RP4	K	3151	-	25,27,27	1.86	3 (12%)	28,39,39	1.93	10 (35%)
2	RP4	F	2151	-	25,27,27	1.51	3 (12%)	28,39,39	1.48	3 (10%)
2	RP4	D	1751	-	25,27,27	1.79	3 (12%)	28,39,39	2.00	7 (25%)
3	GOL	F	2153	-	5,5,5	0.62	0	5,5,5	1.03	0
3	GOL	D	1753	-	5,5,5	0.64	0	5,5,5	1.29	0
3	GOL	H	2552	-	5,5,5	0.51	0	5,5,5	1.19	0
3	GOL	G	2353	-	5,5,5	0.65	0	5,5,5	0.56	0
3	GOL	K	3153	-	5,5,5	0.50	0	5,5,5	1.66	1 (20%)
3	GOL	J	2955	-	5,5,5	0.54	0	5,5,5	0.74	0
3	GOL	B	1354	-	5,5,5	0.66	0	5,5,5	0.74	0
5	TRS	I	2752	-	7,7,7	1.07	1 (14%)	9,9,9	1.71	2 (22%)
2	RP4	E	1951	-	25,27,27	1.60	4 (16%)	28,39,39	1.11	2 (7%)
5	TRS	J	2953	-	7,7,7	0.59	0	9,9,9	1.11	0
2	RP4	I	2751	-	25,27,27	1.52	3 (12%)	28,39,39	1.58	6 (21%)
3	GOL	J	2954	-	5,5,5	0.52	0	5,5,5	0.64	0
2	RP4	A	1151	-	25,27,27	1.63	3 (12%)	28,39,39	1.55	2 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	TRS	B	1353	-	7,7,7	0.80	0	9,9,9	1.71	1 (11%)
2	RP4	B	1351	-	25,27,27	1.81	4 (16%)	28,39,39	1.71	6 (21%)
2	RP4	H	2551	-	25,27,27	1.65	2 (8%)	28,39,39	1.58	6 (21%)
4	PO4	G	2352	-	4,4,4	1.06	0	6,6,6	1.63	1 (16%)
4	PO4	B	1352	-	4,4,4	0.79	0	6,6,6	0.89	0
2	RP4	J	2951	-	25,27,27	1.77	2 (8%)	28,39,39	2.26	4 (14%)
3	GOL	K	3152	-	5,5,5	0.59	0	5,5,5	0.44	0
2	RP4	L	3351	-	25,27,27	2.24	6 (24%)	28,39,39	1.43	6 (21%)
2	RP4	G	2351	-	25,27,27	1.54	4 (16%)	28,39,39	1.60	5 (17%)
2	RP4	C	1551	-	25,27,27	1.64	3 (12%)	28,39,39	1.48	5 (17%)
3	GOL	E	1952	-	5,5,5	1.11	0	5,5,5	1.75	2 (40%)
4	PO4	F	2152	-	4,4,4	0.75	0	6,6,6	1.36	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	GOL	A	1152	-	-	0/4/4/4	-
5	TRS	D	1752	-	-	0/9/9/9	-
3	GOL	L	3352	-	-	4/4/4/4	-
2	RP4	K	3151	-	-	1/14/32/32	0/3/3/3
2	RP4	F	2151	-	-	1/14/32/32	0/3/3/3
2	RP4	D	1751	-	-	2/14/32/32	0/3/3/3
3	GOL	F	2153	-	-	4/4/4/4	-
3	GOL	D	1753	-	-	2/4/4/4	-
3	GOL	H	2552	-	-	3/4/4/4	-
3	GOL	G	2353	-	-	1/4/4/4	-
3	GOL	K	3153	-	-	3/4/4/4	-
3	GOL	J	2955	-	-	3/4/4/4	-
3	GOL	B	1354	-	-	2/4/4/4	-
5	TRS	I	2752	-	-	4/9/9/9	-
2	RP4	E	1951	-	-	1/14/32/32	0/3/3/3
5	TRS	J	2953	-	-	1/9/9/9	-
2	RP4	I	2751	-	-	3/14/32/32	0/3/3/3
3	GOL	J	2954	-	-	2/4/4/4	-
2	RP4	A	1151	-	-	3/14/32/32	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	TRS	B	1353	-	-	2/9/9/9	-
2	RP4	B	1351	-	-	1/14/32/32	0/3/3/3
2	RP4	H	2551	-	-	2/14/32/32	0/3/3/3
2	RP4	J	2951	-	-	3/14/32/32	0/3/3/3
3	GOL	K	3152	-	-	4/4/4/4	-
2	RP4	L	3351	-	-	2/14/32/32	0/3/3/3
2	RP4	G	2351	-	-	2/14/32/32	0/3/3/3
2	RP4	C	1551	-	-	1/14/32/32	0/3/3/3
3	GOL	E	1952	-	-	4/4/4/4	-

The worst 5 of 41 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	1751	RP4	C15-S16	-6.25	1.66	1.77
2	B	1351	RP4	C15-S16	-5.58	1.67	1.77
2	H	2551	RP4	C17-S16	-5.55	1.67	1.77
2	K	3151	RP4	C17-S16	-5.47	1.67	1.77
2	L	3351	RP4	C17-S16	-5.36	1.67	1.77

The worst 5 of 69 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	J	2951	RP4	O11-C10-C8	-9.99	93.07	109.80
2	A	1151	RP4	C17-S16-C15	5.80	115.75	103.13
2	I	2751	RP4	O11-C10-C8	-4.86	101.67	109.80
2	D	1751	RP4	O11-C10-C8	-4.71	101.92	109.80
2	D	1751	RP4	O5-C4-C2	-4.70	99.25	108.52

There are no chirality outliers.

5 of 61 torsion outliers are listed below:

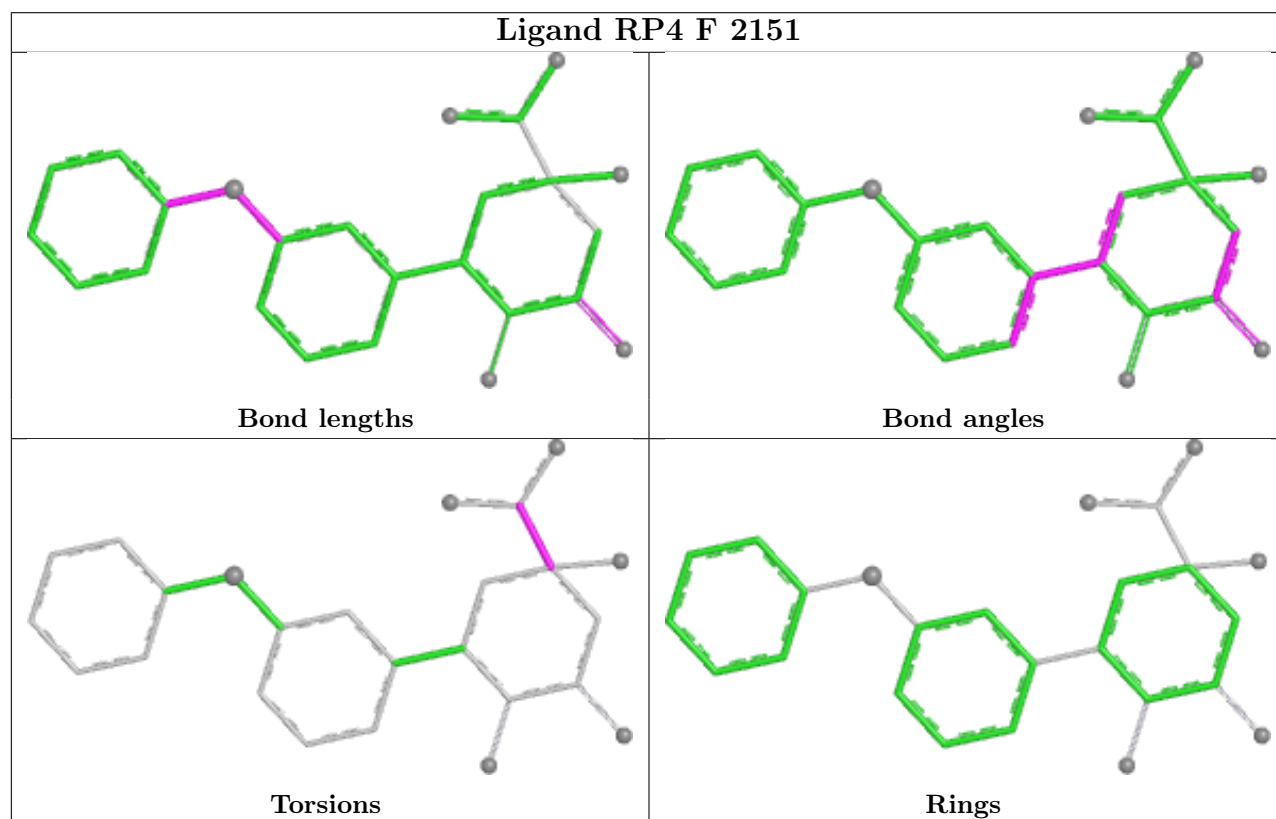
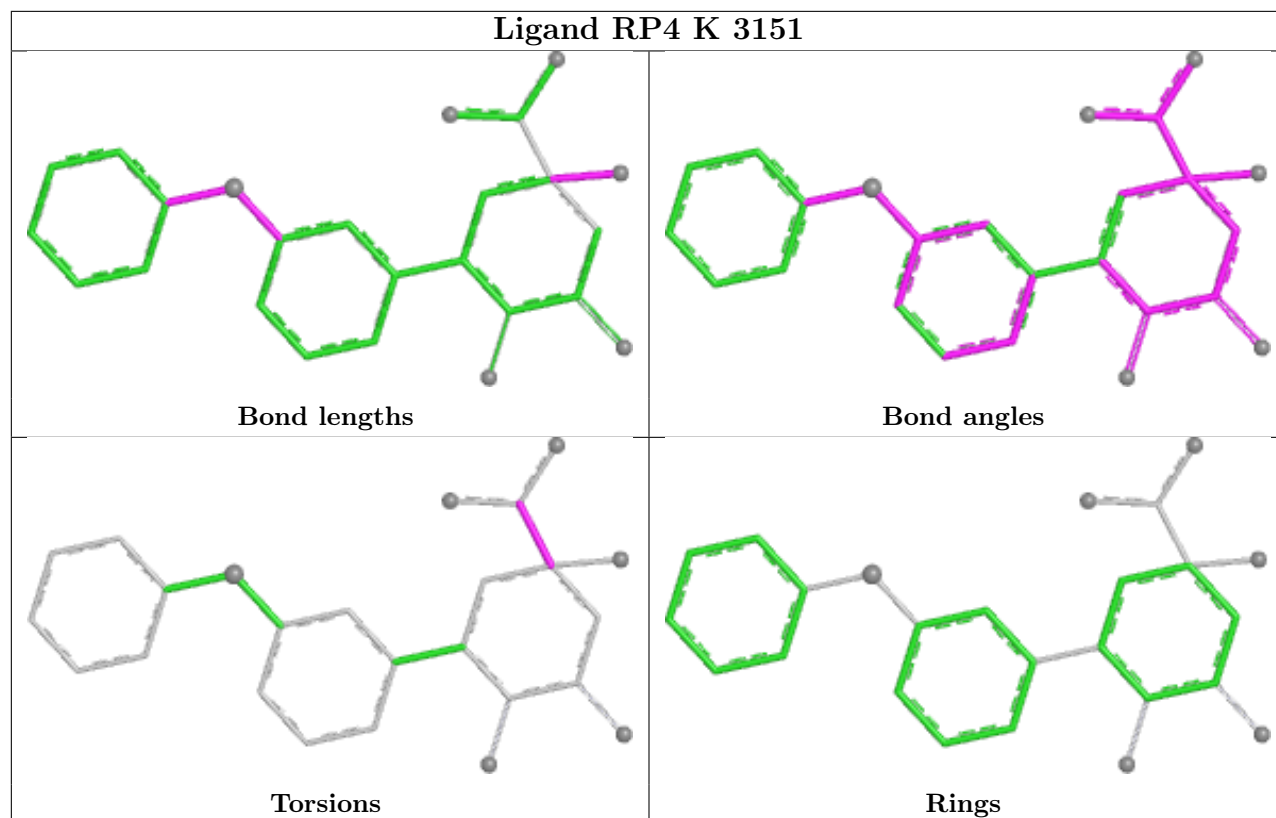
Mol	Chain	Res	Type	Atoms
2	C	1551	RP4	O1-C2-C4-O5
2	I	2751	RP4	O3-C2-C4-C6
3	B	1354	GOL	O1-C1-C2-O2
3	B	1354	GOL	O1-C1-C2-C3
3	D	1753	GOL	C1-C2-C3-O3

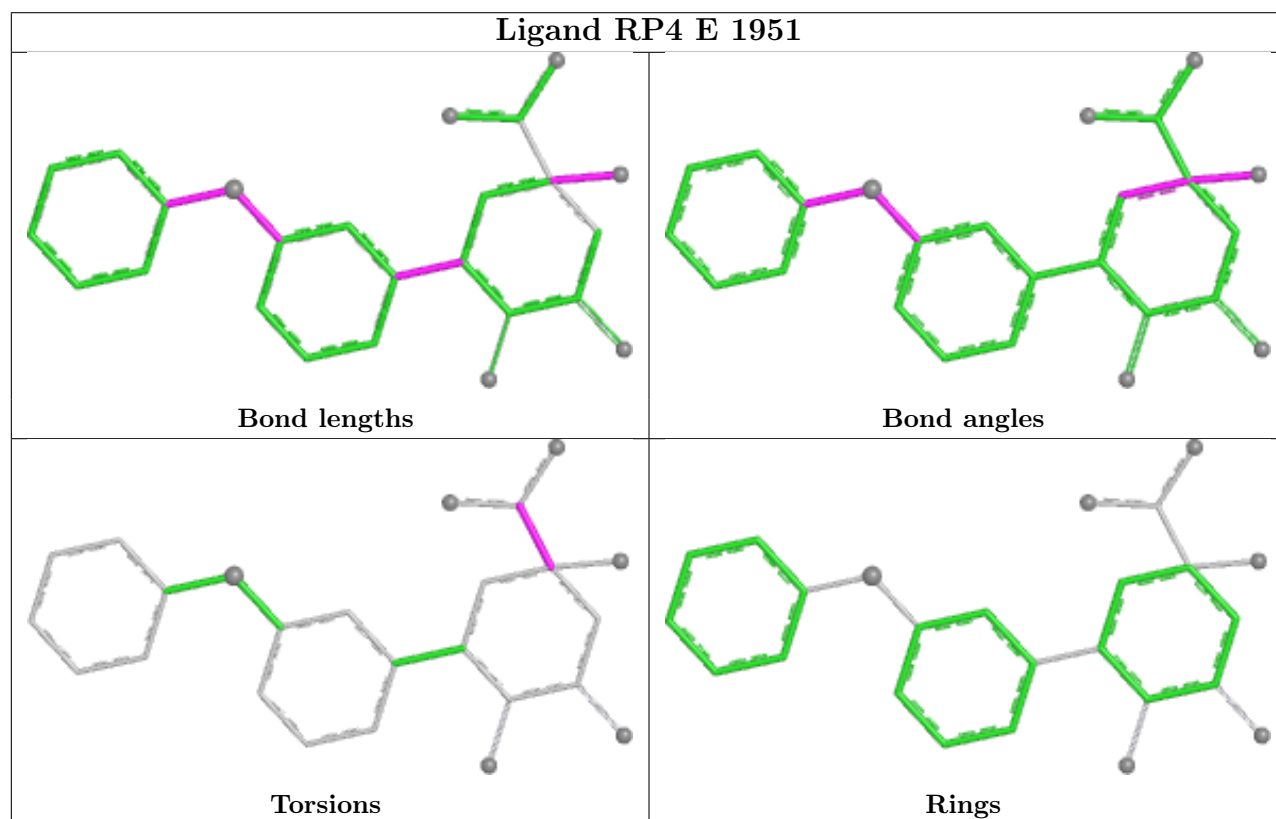
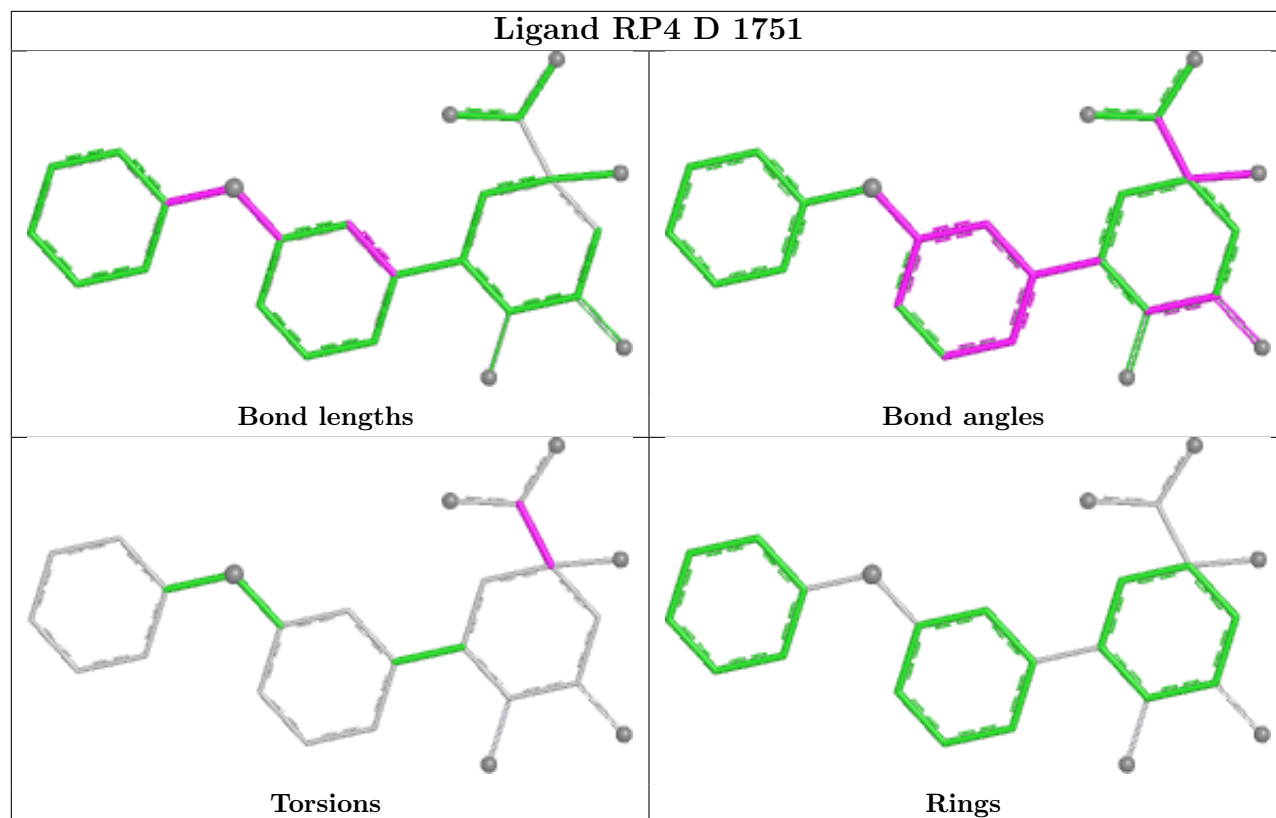
There are no ring outliers.

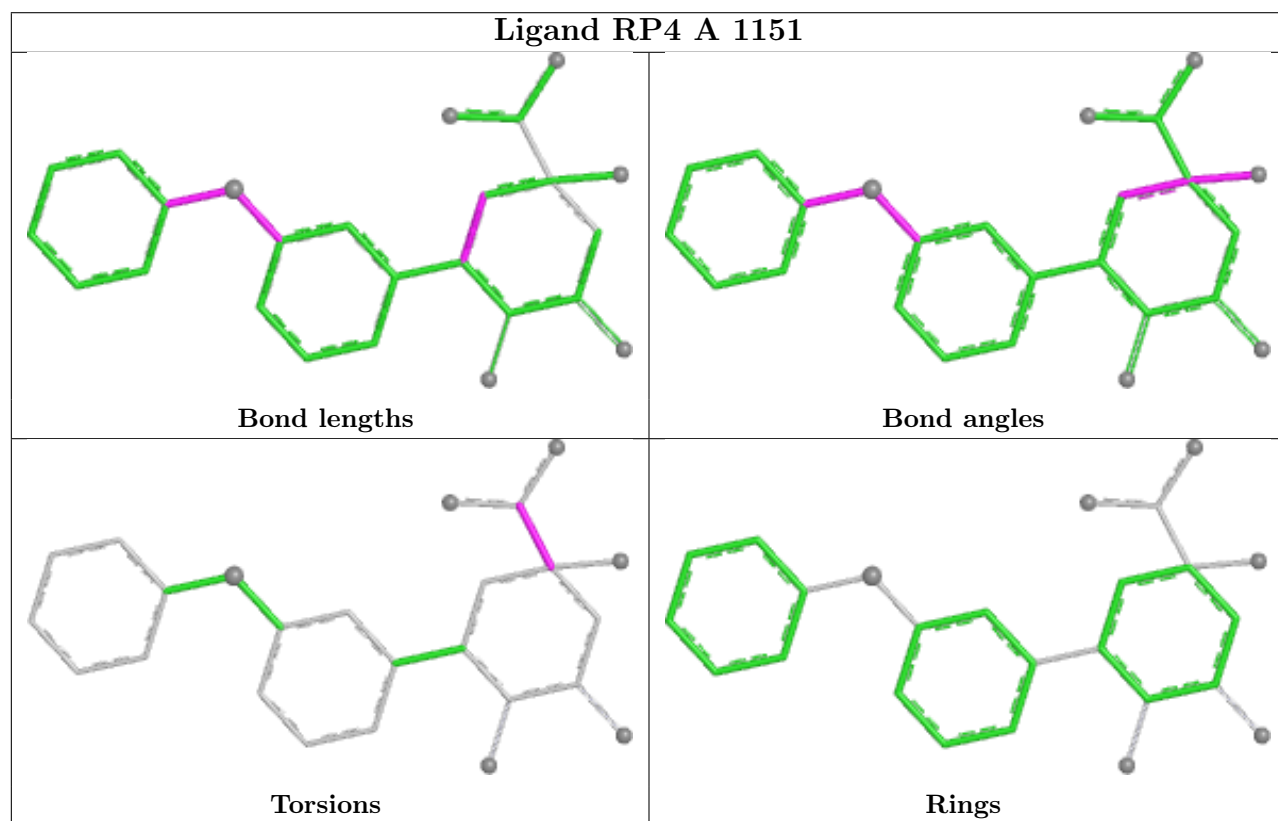
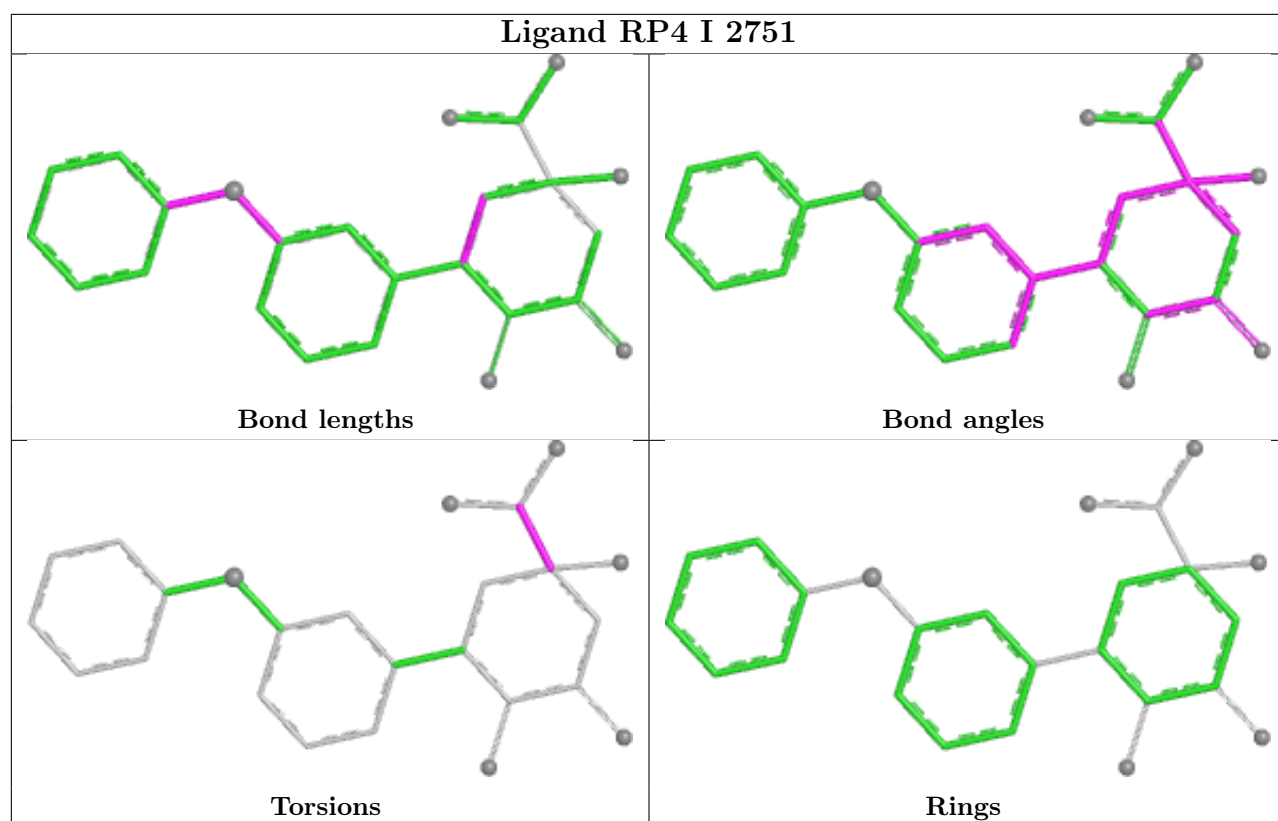
23 monomers are involved in 80 short contacts:

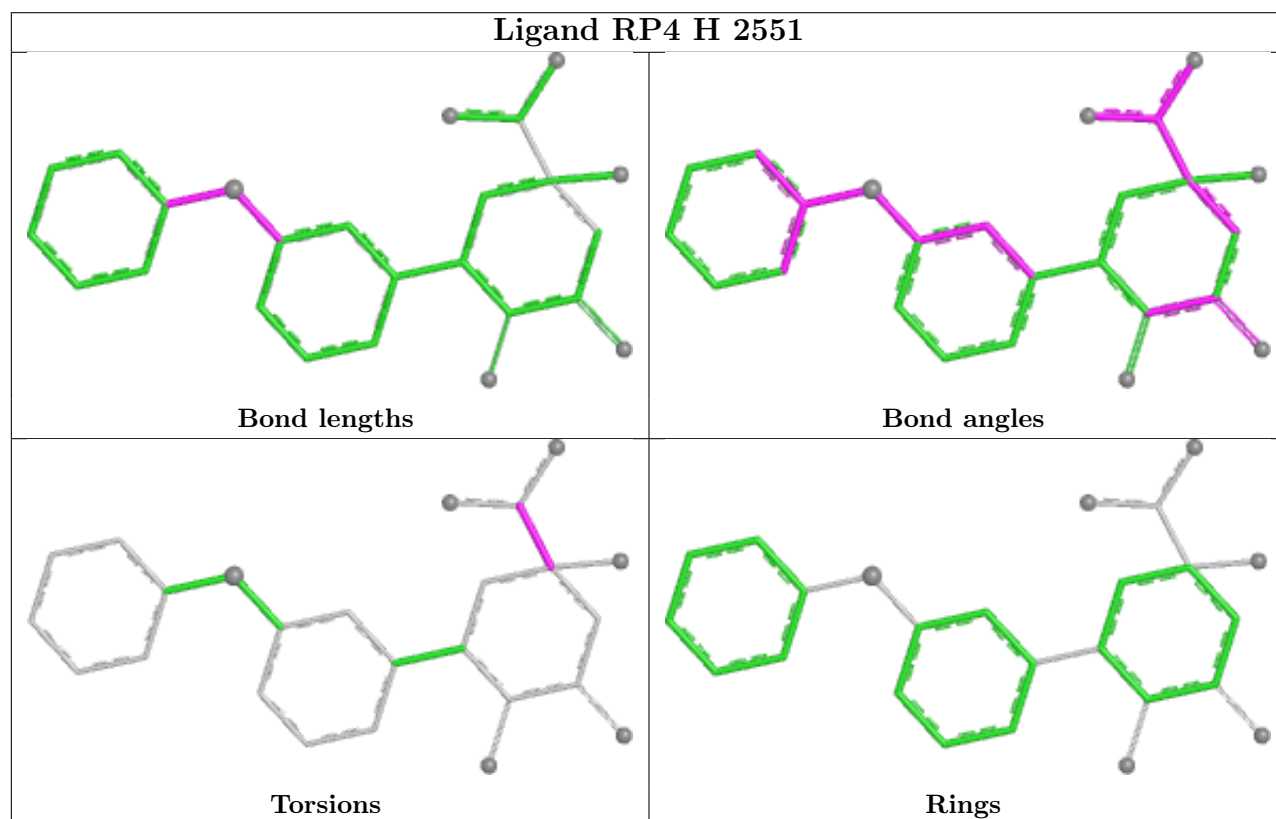
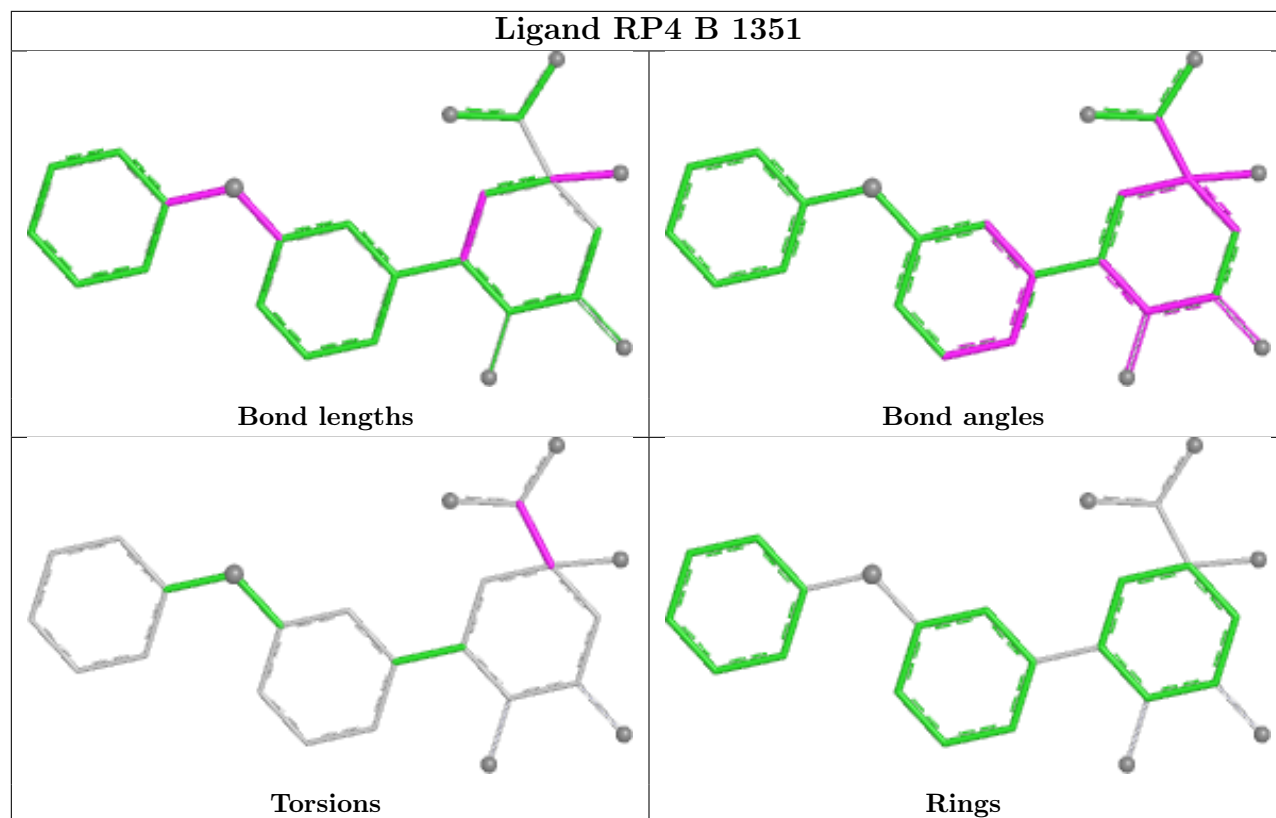
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1152	GOL	4	0
3	L	3352	GOL	2	0
2	K	3151	RP4	4	0
2	F	2151	RP4	2	0
3	F	2153	GOL	5	0
3	D	1753	GOL	8	0
3	H	2552	GOL	4	0
3	G	2353	GOL	4	0
3	K	3153	GOL	7	0
3	J	2955	GOL	5	0
5	I	2752	TRS	1	0
2	E	1951	RP4	2	0
5	J	2953	TRS	1	0
2	I	2751	RP4	1	0
3	J	2954	GOL	3	0
2	A	1151	RP4	10	0
2	B	1351	RP4	2	0
2	H	2551	RP4	2	0
3	K	3152	GOL	3	0
2	L	3351	RP4	5	0
2	G	2351	RP4	1	0
2	C	1551	RP4	2	0
3	E	1952	GOL	2	0

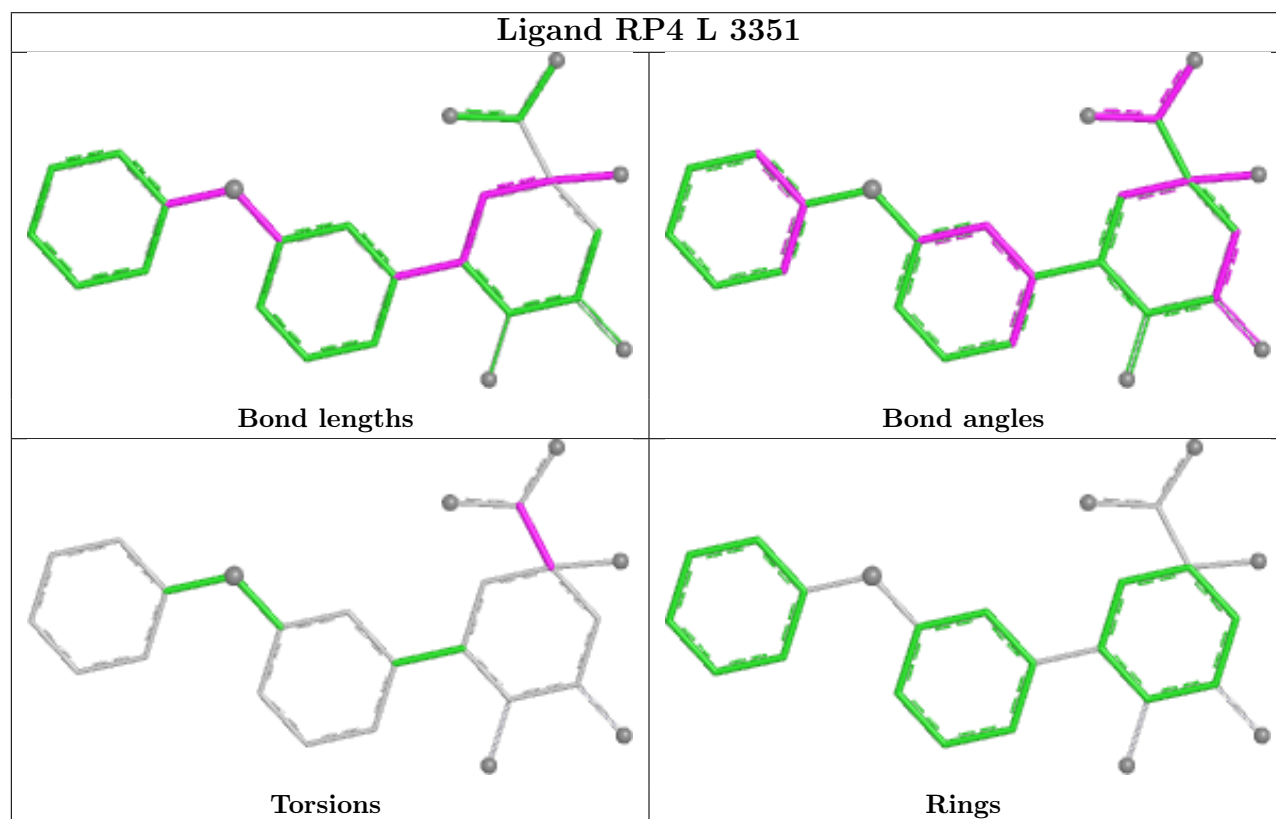
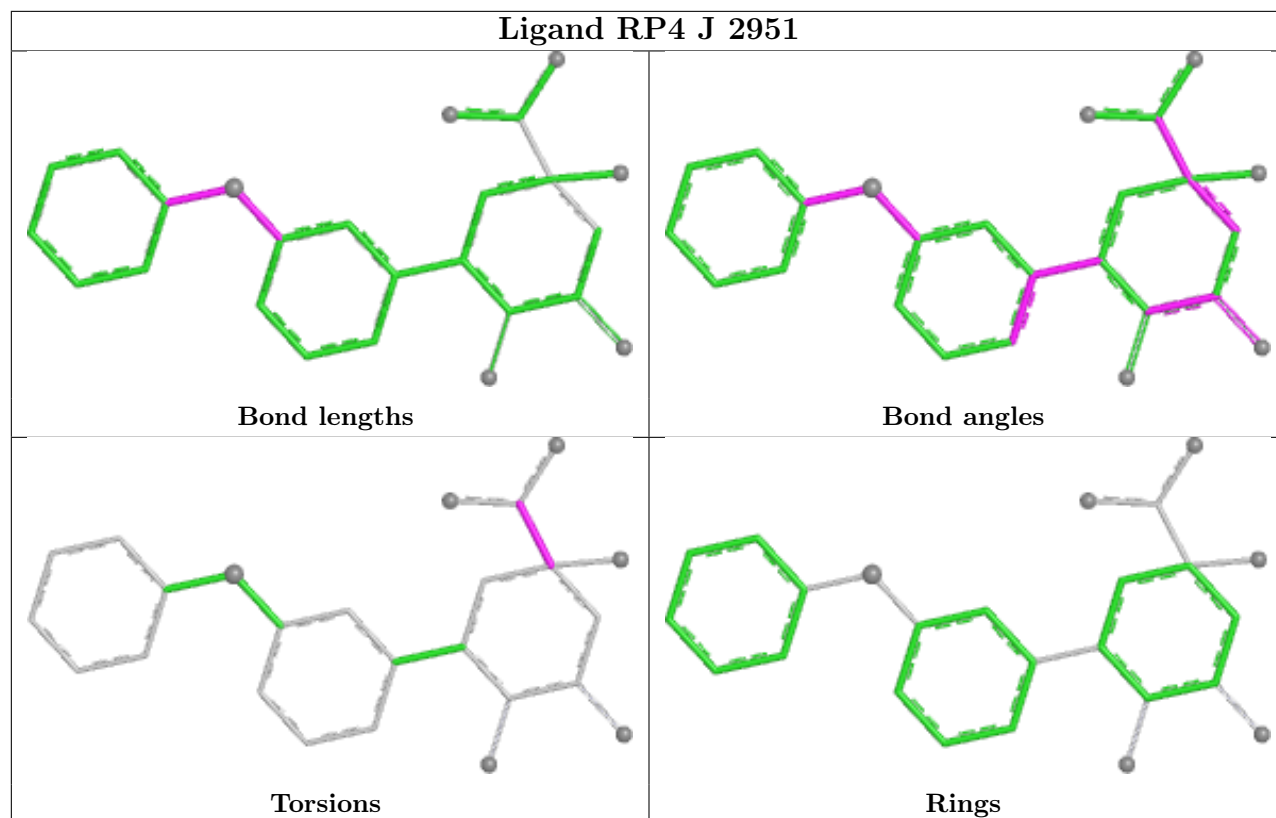
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

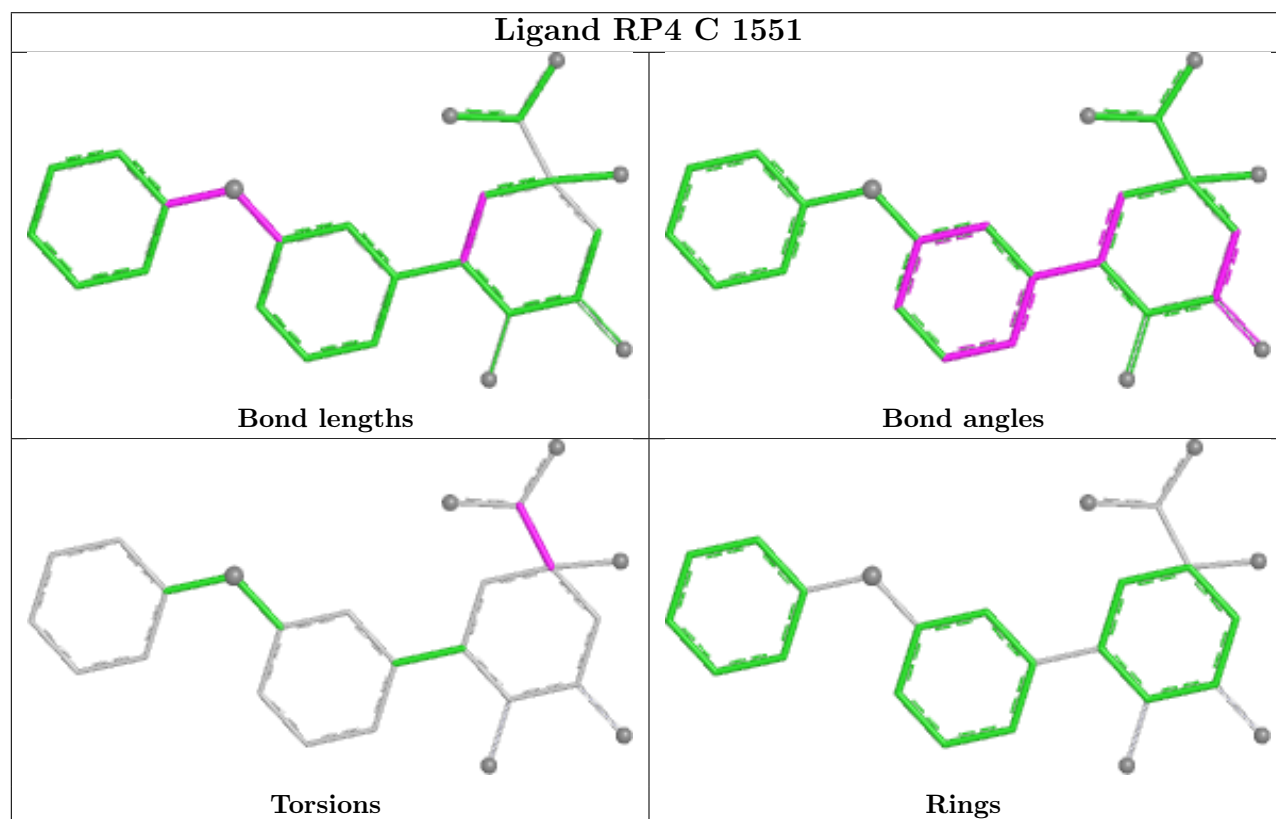
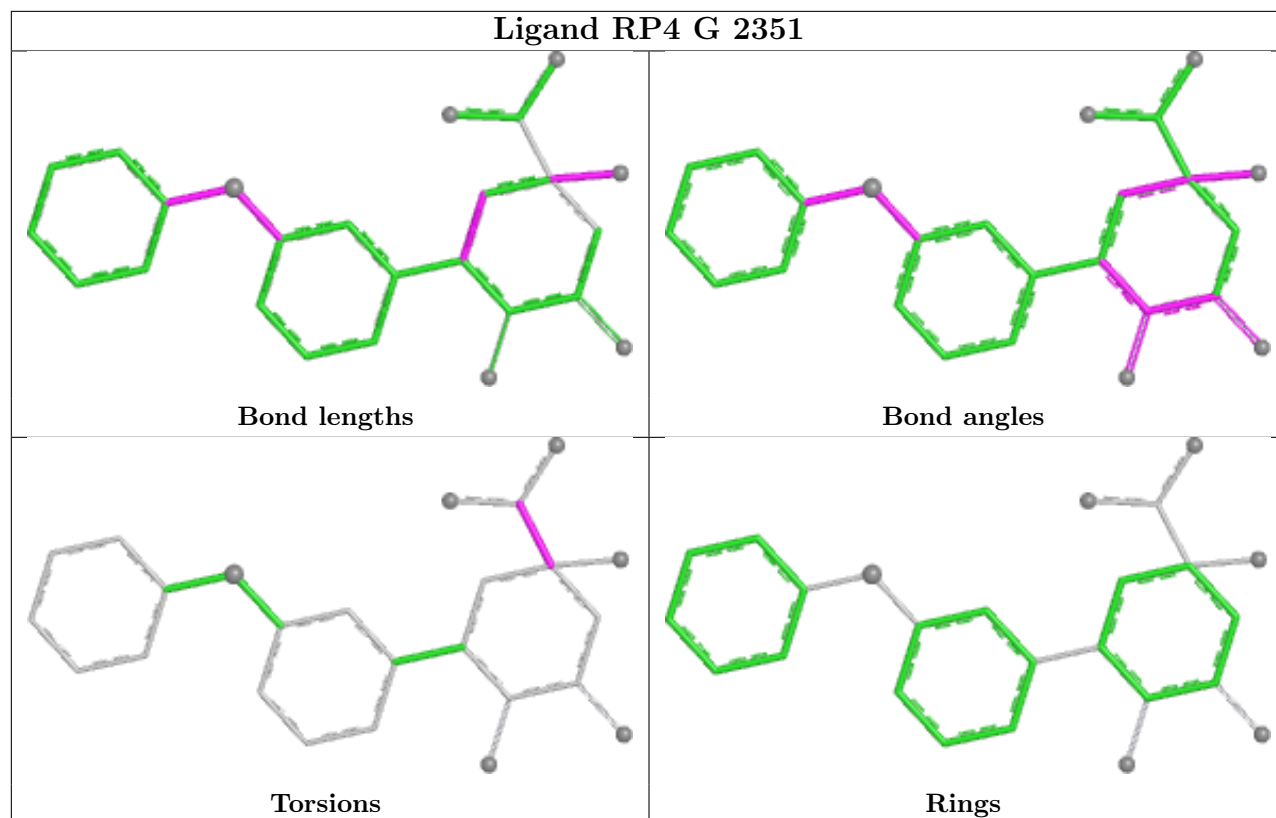












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	149/157 (94%)	-0.78	0 100 100	6, 20, 42, 51	2 (1%)
1	B	149/157 (94%)	-0.76	0 100 100	11, 21, 39, 48	1 (0%)
1	C	149/157 (94%)	-0.68	0 100 100	9, 24, 42, 56	2 (1%)
1	D	149/157 (94%)	-0.75	0 100 100	8, 21, 43, 54	2 (1%)
1	E	149/157 (94%)	-0.72	0 100 100	8, 20, 40, 48	1 (0%)
1	F	149/157 (94%)	-0.71	0 100 100	11, 25, 44, 52	1 (0%)
1	G	149/157 (94%)	-0.81	0 100 100	7, 19, 38, 47	2 (1%)
1	H	149/157 (94%)	-0.68	0 100 100	10, 25, 42, 55	2 (1%)
1	I	149/157 (94%)	-0.75	0 100 100	9, 21, 41, 49	2 (1%)
1	J	149/157 (94%)	-0.72	0 100 100	8, 25, 43, 46	2 (1%)
1	K	149/157 (94%)	-0.72	0 100 100	8, 22, 43, 51	1 (0%)
1	L	149/157 (94%)	-0.80	0 100 100	9, 20, 42, 56	2 (1%)
All	All	1788/1884 (94%)	-0.74	0 100 100	6, 22, 43, 56	20 (1%)

There are no RSRZ outliers to report.

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands

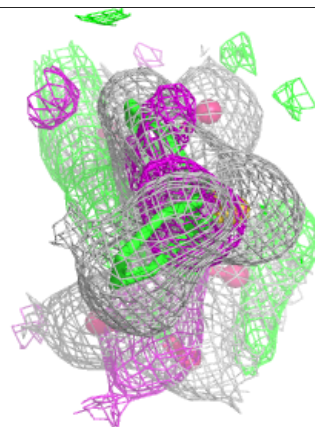
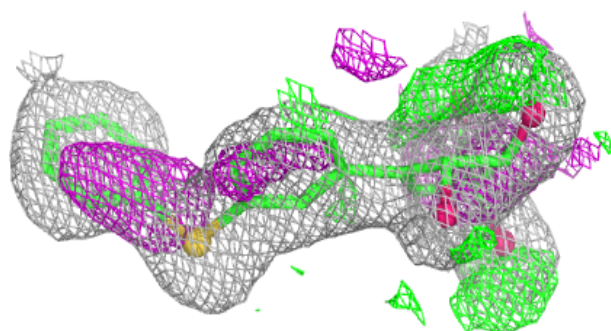
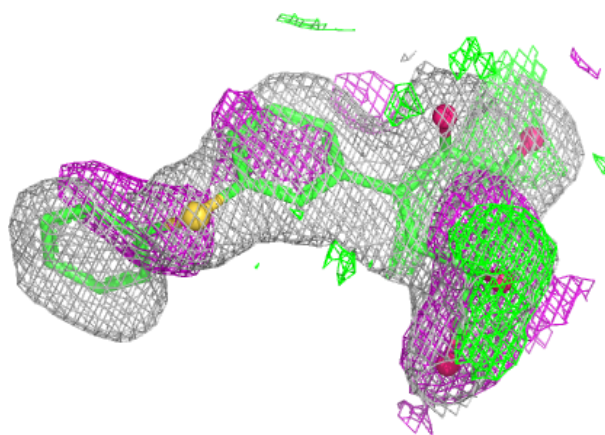
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	RP4	G	2351	25/25	0.97	0.08	14,30,33,35	0
3	GOL	D	1753	6/6	0.97	0.13	27,32,33,34	0
3	GOL	H	2552	6/6	0.97	0.12	41,44,49,53	0
3	GOL	J	2954	6/6	0.97	0.11	40,43,47,49	0
3	GOL	K	3152	6/6	0.97	0.13	39,44,45,47	0
5	TRS	B	1353	8/8	0.97	0.06	13,15,18,18	0
2	RP4	I	2751	25/25	0.98	0.08	24,32,35,38	0
2	RP4	J	2951	25/25	0.98	0.07	16,27,37,38	0
3	GOL	A	1152	6/6	0.98	0.11	31,39,42,45	0
3	GOL	B	1354	6/6	0.98	0.10	34,38,39,40	0
2	RP4	C	1551	25/25	0.98	0.05	18,29,32,33	0
3	GOL	F	2153	6/6	0.98	0.13	46,49,49,50	0
2	RP4	D	1751	25/25	0.98	0.06	21,26,28,30	0
2	RP4	E	1951	25/25	0.98	0.07	16,29,38,39	0
2	RP4	B	1351	25/25	0.98	0.07	16,35,39,39	0
3	GOL	K	3153	6/6	0.98	0.11	29,33,36,37	0
3	GOL	L	3352	6/6	0.98	0.07	33,38,41,42	0
4	PO4	J	2952	5/5	0.98	0.11	46,50,52,55	0
2	RP4	H	2551	25/25	0.98	0.06	15,29,37,38	0
2	RP4	F	2151	25/25	0.99	0.05	21,29,32,33	0
3	GOL	J	2955	6/6	0.99	0.10	44,45,46,47	0
2	RP4	K	3151	25/25	0.99	0.05	20,28,34,34	0
3	GOL	E	1952	6/6	0.99	0.08	20,31,35,35	0
2	RP4	L	3351	25/25	0.99	0.05	5,30,35,37	0
4	PO4	B	1352	5/5	0.99	0.06	60,62,64,64	0
4	PO4	F	2152	5/5	0.99	0.09	48,48,53,53	0
4	PO4	G	2352	5/5	0.99	0.04	41,41,42,46	0
3	GOL	G	2353	6/6	0.99	0.06	10,33,34,36	0
2	RP4	A	1151	25/25	0.99	0.06	14,38,45,46	0
5	TRS	D	1752	8/8	0.99	0.05	11,13,15,15	0
5	TRS	I	2752	8/8	0.99	0.04	4,6,9,13	0
5	TRS	J	2953	8/8	0.99	0.04	6,17,19,21	0

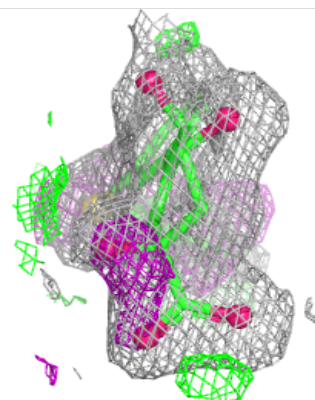
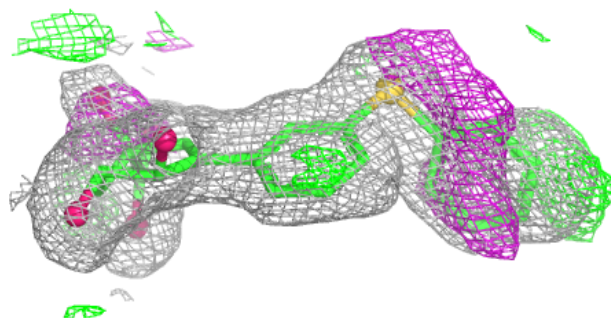
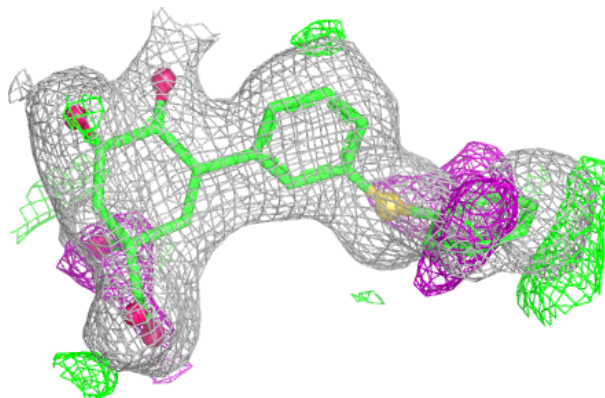
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around RP4 G 2351:

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

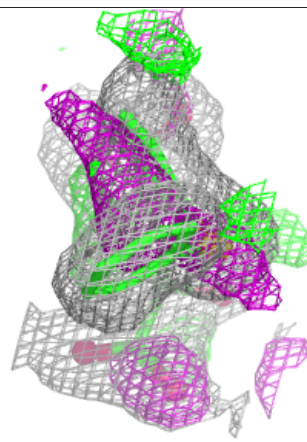
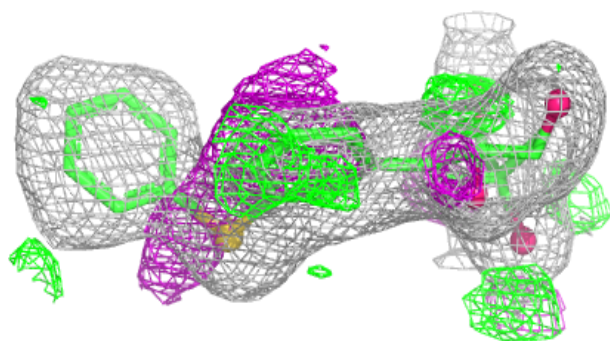
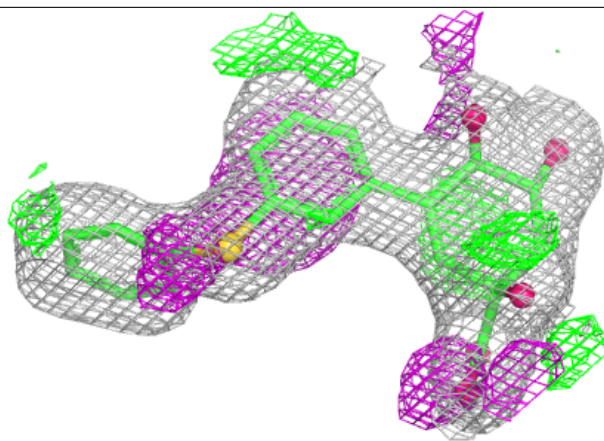
**Electron density around RP4 I 2751:**

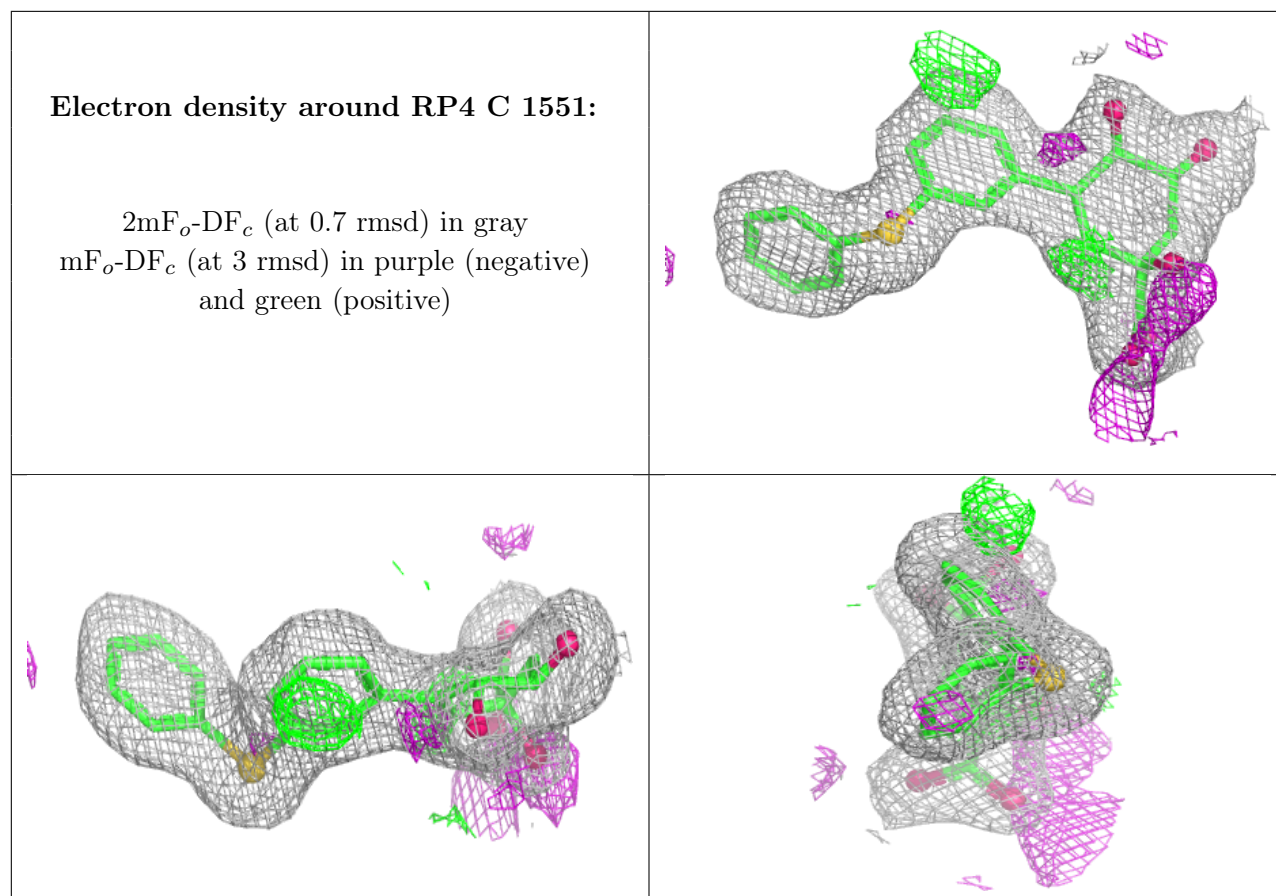
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around RP4 J 2951:

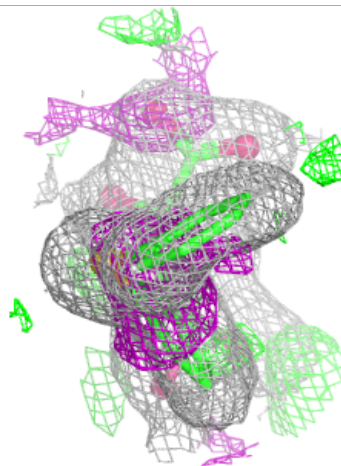
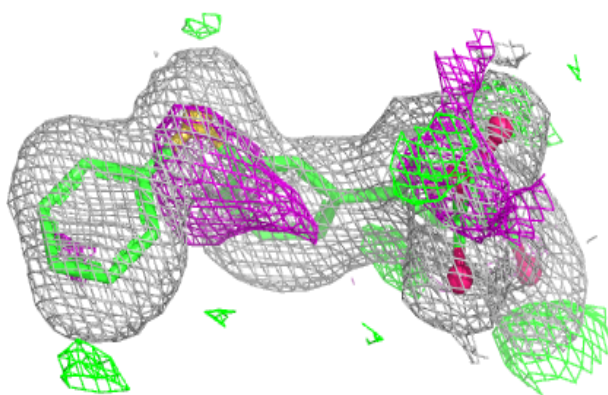
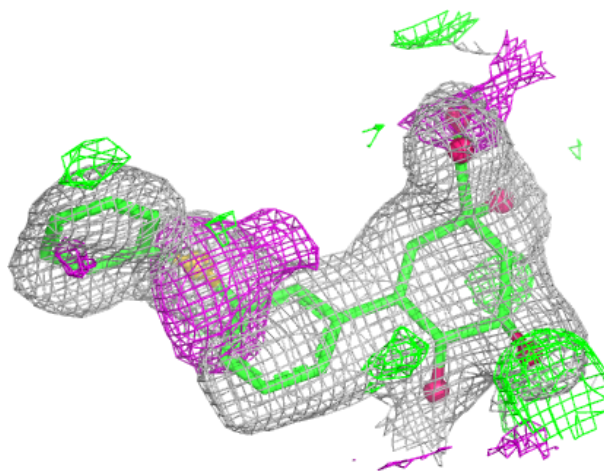
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





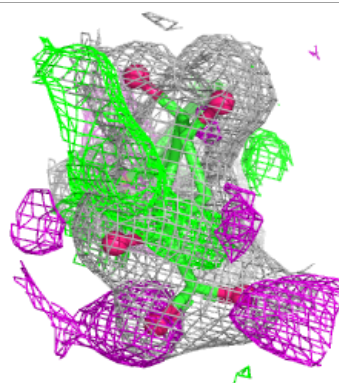
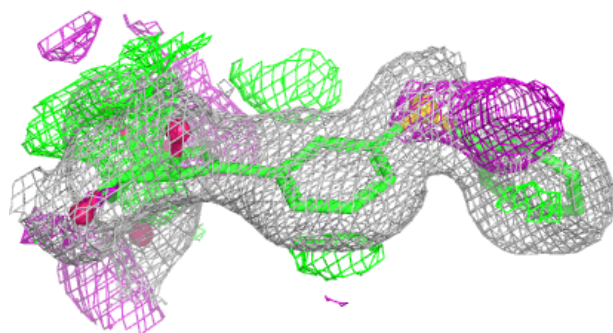
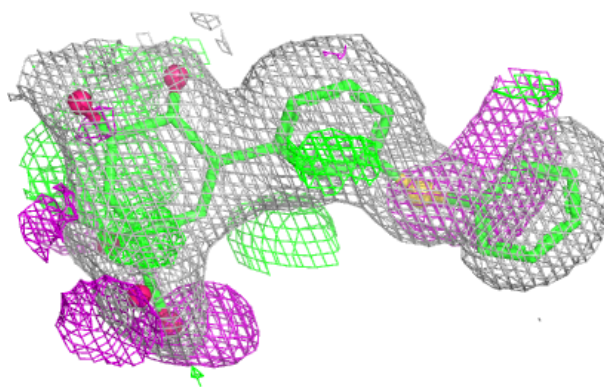
Electron density around RP4 D 1751:

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

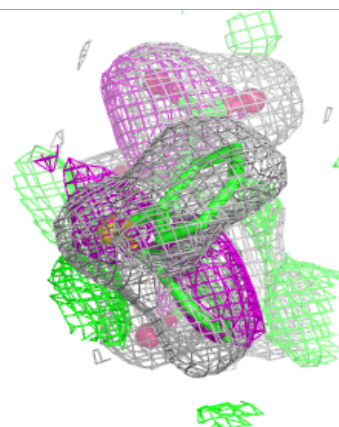
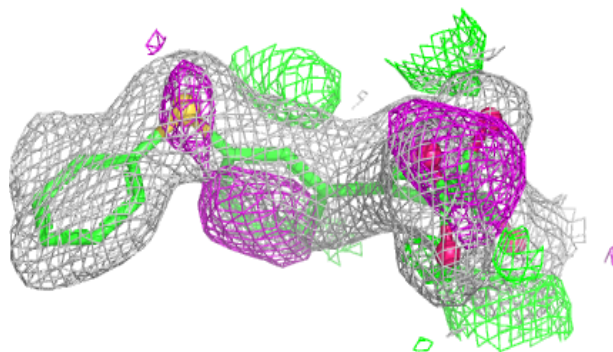
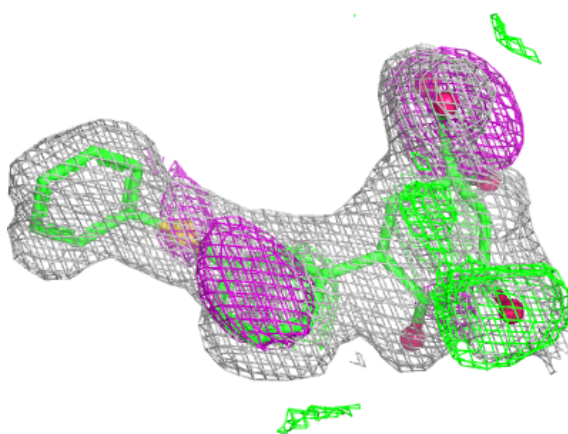


Electron density around RP4 E 1951:

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

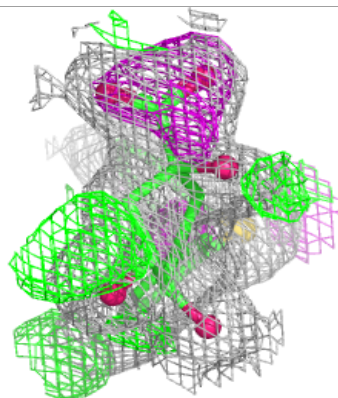
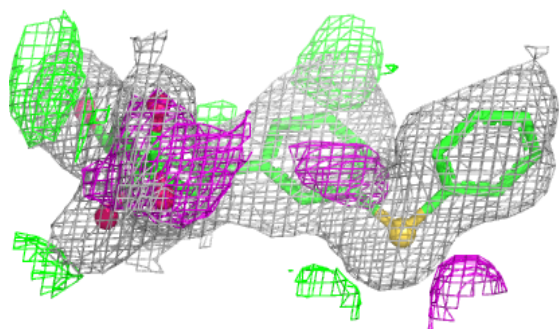
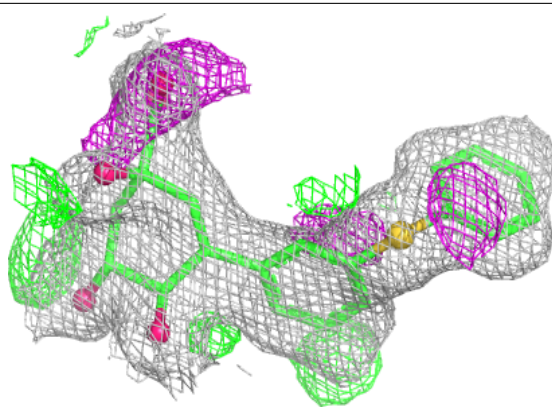
**Electron density around RP4 B 1351:**

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

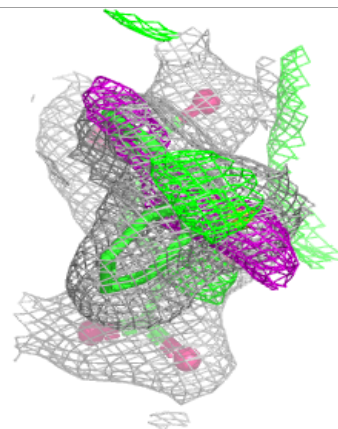
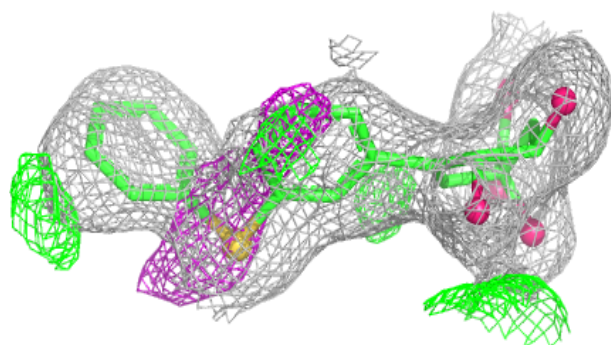
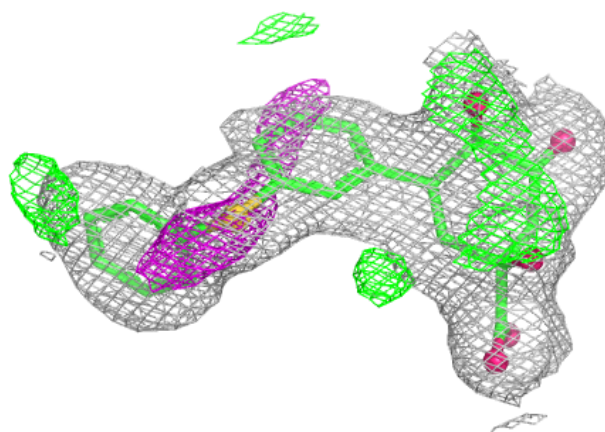


Electron density around RP4 H 2551:

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

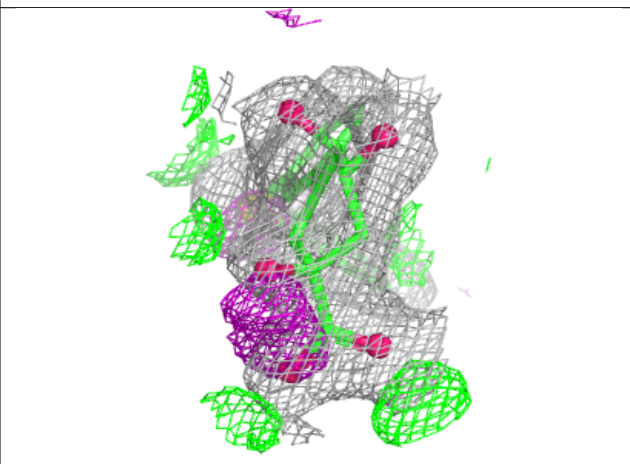
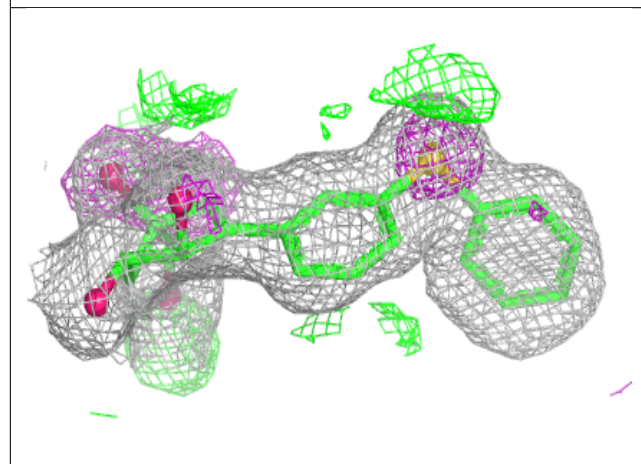
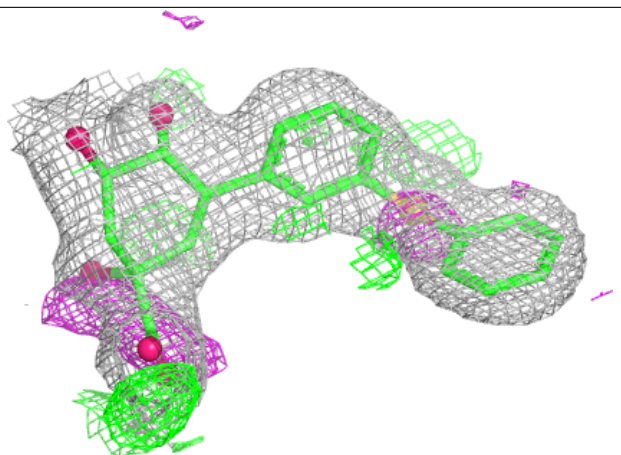
**Electron density around RP4 F 2151:**

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



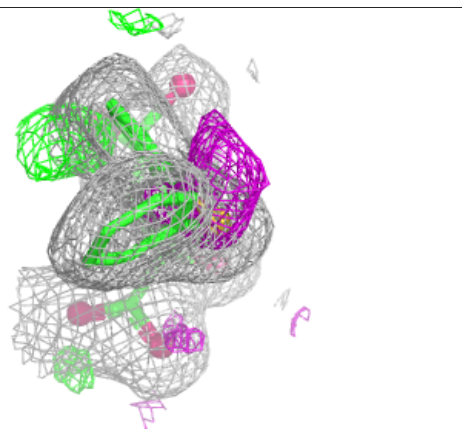
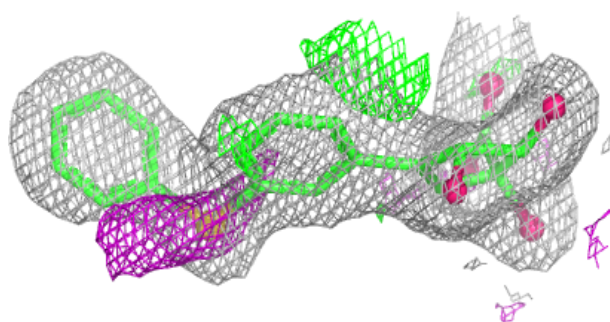
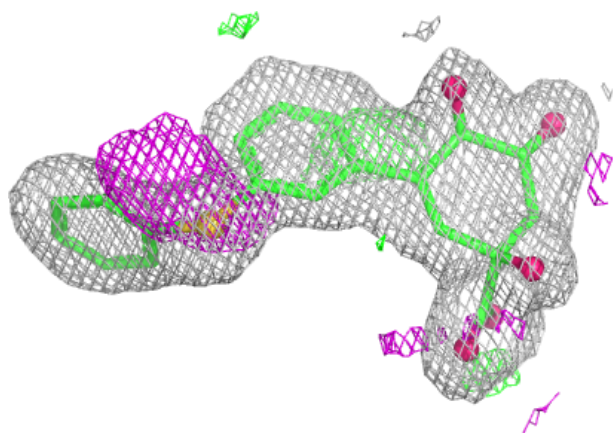
Electron density around RP4 K 3151:

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

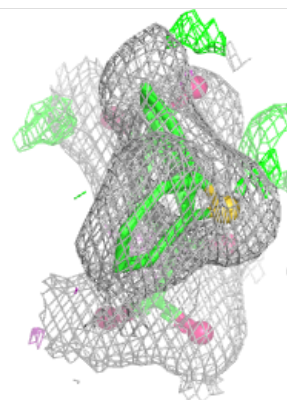
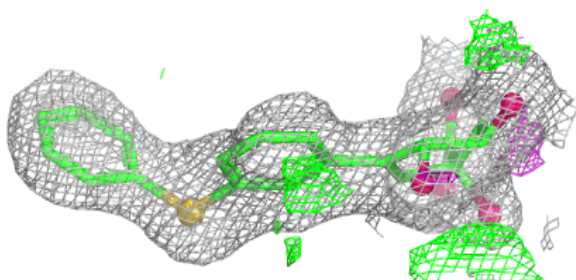
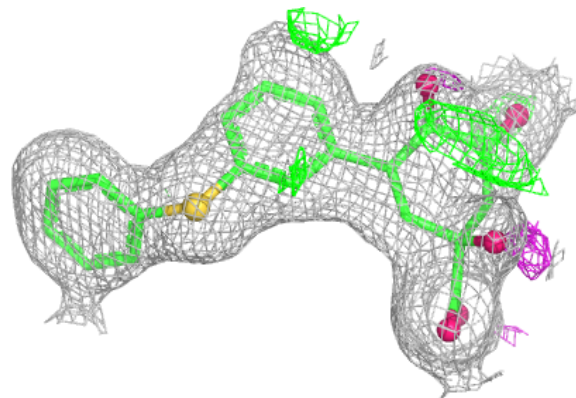


Electron density around RP4 L 3351:

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

**Electron density around RP4 A 1151:**

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



6.5 Other polymers [i](#)

There are no such residues in this entry.