



# wwPDB X-ray Structure Validation Summary Report

May 23, 2024 – 04:36 PM EDT

PDB ID : 8V8P  
Title : Sorghum Chalcone Isomerase  
Authors : Lewis, J.A.; Kang, C.  
Deposited on : 2023-12-05  
Resolution : 3.18 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the  symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : 1.13  
EDS : **FAILED**  
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) : 2.36.2

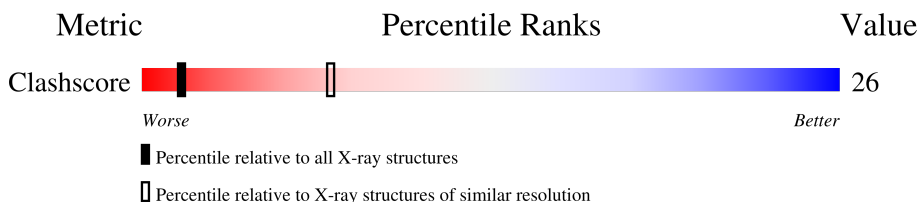
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.18 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))
Clashscore	141614	1599 (3.20-3.16)

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

Note EDS failed to run properly.

Mol	Chain	Length	Quality of chain
1	A	231	 54% 38% 9%
1	B	231	 57% 34% 10%
1	C	231	 51% 40% 9%
1	D	231	 57% 33% 10%
1	E	231	 61% 30% 10%
1	F	231	 50% 41% 9%
1	G	231	 52% 39% 9%
1	H	231	 44% 47% 10%

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	DFV	A	301	-	-	X	-

## 2 Entry composition

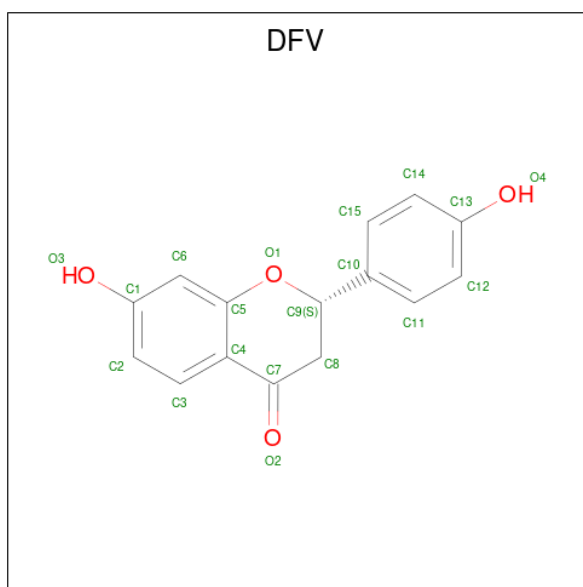
There are 2 unique types of molecules in this entry. The entry contains 12501 atoms, of which 60 are hydrogens and 0 are deuteriums.

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 Chalcone-flavonone isomerase family protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	211	Total 1551	C 1001	N 254	O 293	S 3	0	0	0
1	B	209	Total 1538	C 992	N 251	O 292	S 3	0	0	0
1	C	211	Total 1554	C 1003	N 254	O 294	S 3	0	0	0
1	D	209	Total 1538	C 993	N 251	O 291	S 3	0	0	0
1	E	209	Total 1536	C 990	N 251	O 292	S 3	0	0	0
1	F	210	Total 1543	C 995	N 252	O 293	S 3	0	0	0
1	G	211	Total 1551	C 1001	N 254	O 293	S 3	0	0	0
1	H	209	Total 1535	C 990	N 251	O 291	S 3	0	0	0

- Molecule 2 is 7-HYDROXY-2-(4-HYDROXY-PHENYL)-CHROMAN-4-ONE (three-letter code: DFV) (formula: C<sub>15</sub>H<sub>12</sub>O<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
2	A	1	Total	C	H	O	0	0
			31	15	12	4		
2	A	1	Total	C	H	O	0	0
			31	15	12	4		
2	B	1	Total	C	H	O	0	0
			31	15	12	4		
2	C	1	Total	C	H	O	0	0
			31	15	12	4		
2	D	1	Total	C	H	O	0	0
			31	15	12	4		

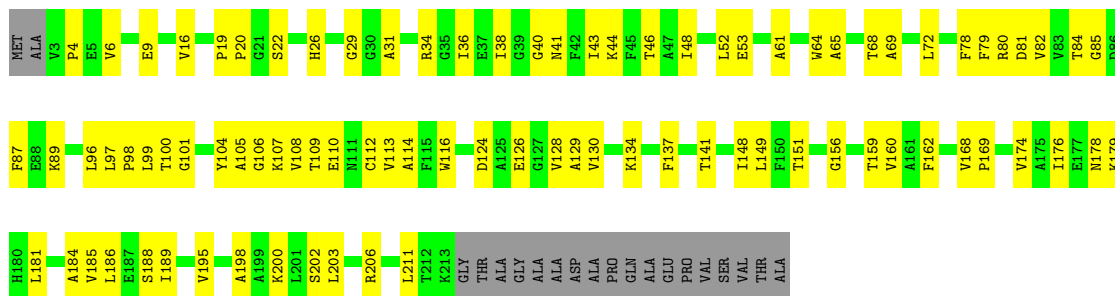
### 3 Residue-property plots

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.

Note EDS failed to run properly.

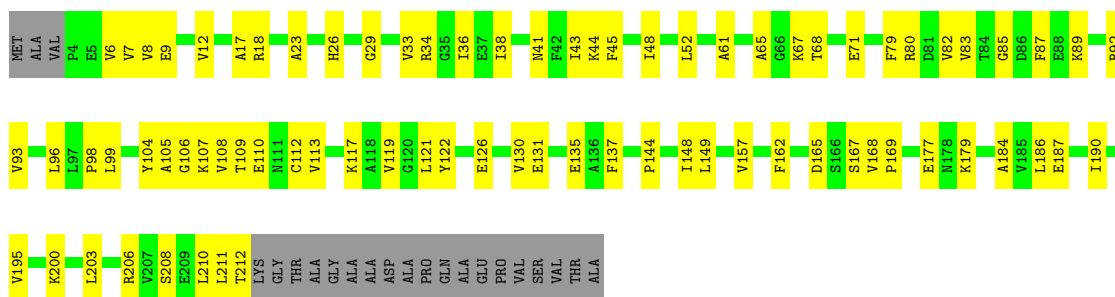
- Molecule 1: Chalcone-flavonone isomerase family protein

Chain A: 



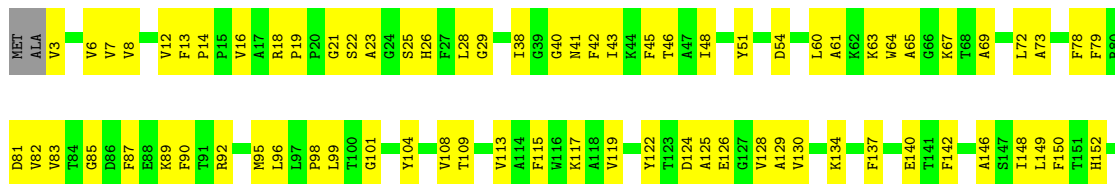
- Molecule 1: Chalcone-flavonone isomerase family protein

Chain B: 



- Molecule 1: Chalcone-flavonone isomerase family protein

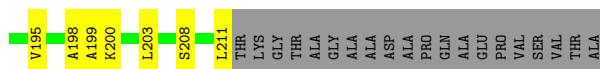
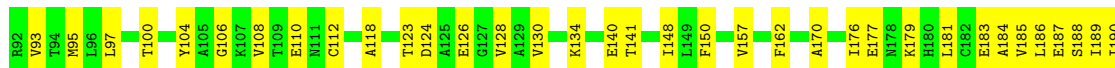
Chain C: 





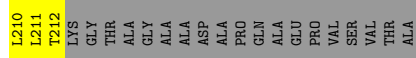
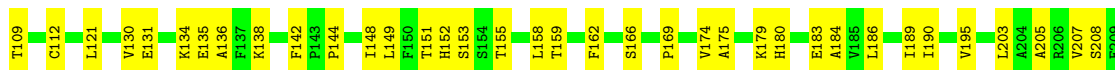
- Molecule 1: Chalcone-flavonone isomerase family protein

Chain D: 57% 33% 10%



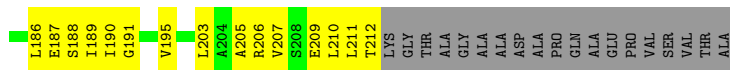
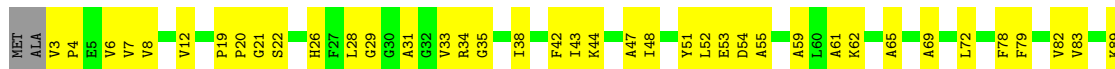
- Molecule 1: Chalcone-flavonone isomerase family protein

Chain E: 61% 30% 10%



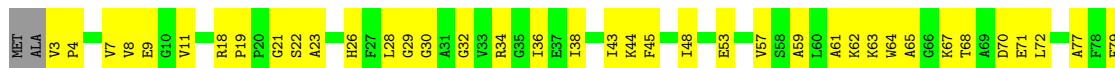
- Molecule 1: Chalcone-flavonone isomerase family protein

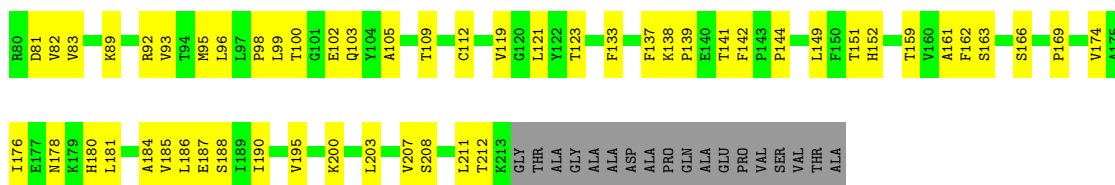
Chain F: 50% 41% 9%



- Molecule 1: Chalcone-flavonone isomerase family protein

Chain G: 52% 39% 9%





- Molecule 1: Chalcone-flavonone isomerase family protein



SER  
VAL  
THR  
ALA



## 4 Data and refinement statistics i

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	92.45Å 127.83Å 95.31Å 90.00° 116.27° 90.00°	Depositor
Resolution (Å)	46.20 – 3.18	Depositor
% Data completeness (in resolution range)	91.9 (46.20-3.18)	Depositor
$R_{merge}$	0.20	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.14 (at 3.19Å)	Xtrriage
Refinement program	PHENIX (1.20_4459: ???)	Depositor
R, $R_{free}$	0.217 , 0.274	Depositor
Wilson B-factor (Å <sup>2</sup> )	39.3	Xtrriage
Anisotropy	0.358	Xtrriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.096 for l,-k,h	Xtrriage
Total number of atoms	12501	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	44.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.39% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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

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	0.27	0/1586	0.47	0/2155
1	B	0.25	0/1573	0.45	0/2137
1	C	0.29	0/1589	0.48	0/2159
1	D	0.26	0/1573	0.45	0/2138
1	E	0.25	0/1571	0.45	0/2134
1	F	0.25	0/1578	0.44	0/2145
1	G	0.25	0/1586	0.43	0/2155
1	H	0.25	0/1570	0.44	0/2133
All	All	0.26	0/12626	0.45	0/17156

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	1551	0	1550	93	1
1	B	1538	0	1539	68	0
1	C	1554	0	1560	83	1
1	D	1538	0	1540	70	0
1	E	1536	0	1532	53	1

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	1543	0	1540	86	1
1	G	1551	0	1550	82	0
1	H	1535	0	1529	122	0
2	A	38	24	24	10	0
2	B	19	12	12	3	0
2	C	19	12	12	0	0
2	D	19	12	12	5	0
All	All	12441	60	12400	635	2

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 635 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:G:68:THR:HG22	1:G:70:ASP:H	1.15	1.12
1:H:151:THR:HB	1:H:159:THR:HB	1.24	1.12
1:H:68:THR:HB	1:H:71:GLU:HG3	1.35	1.06
1:C:149:LEU:HD22	1:C:168:VAL:HG13	1.41	0.98
1:D:38:ILE:HD11	2:D:301:DFV:O3	1.68	0.92

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:53:GLU:OE2	1:C:155:THR:OG1[2_656]	1.91	0.29
1:E:155:THR:OG1	1:F:53:GLU:OE2[2_746]	2.16	0.04

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

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

There are no protein residues with a non-rotameric sidechain to report in this entry.

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

5 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
2	DFV	D	301	-	21,21,21	2.87	4 (19%)	30,30,30	2.93	13 (43%)
2	DFV	C	301	-	21,21,21	2.68	4 (19%)	30,30,30	1.20	4 (13%)
2	DFV	A	302	-	21,21,21	2.52	4 (19%)	30,30,30	1.38	5 (16%)
2	DFV	A	301	-	21,21,21	2.91	7 (33%)	30,30,30	3.02	12 (40%)
2	DFV	B	301	-	21,21,21	2.56	4 (19%)	30,30,30	1.23	5 (16%)

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	DFV	D	301	-	-	2/4/16/16	0/3/3/3
2	DFV	C	301	-	-	4/4/16/16	0/3/3/3
2	DFV	A	302	-	-	0/4/16/16	0/3/3/3
2	DFV	A	301	-	-	0/4/16/16	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	DFV	B	301	-	-	0/4/16/16	0/3/3/3

The worst 5 of 23 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	301	DFV	O1-C5	11.59	1.53	1.38
2	A	301	DFV	O1-C5	10.95	1.52	1.38
2	C	301	DFV	O1-C5	10.57	1.52	1.38
2	B	301	DFV	O1-C5	10.09	1.51	1.38
2	A	302	DFV	O1-C5	10.02	1.51	1.38

The worst 5 of 39 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	301	DFV	C5-C4-C7	-10.65	113.73	119.85
2	A	301	DFV	C5-O1-C9	-7.67	102.62	115.50
2	A	301	DFV	O1-C5-C6	6.76	127.02	116.38
2	A	301	DFV	O1-C5-C4	-6.26	114.92	122.09
2	A	301	DFV	C5-C4-C7	-5.26	116.83	119.85

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	301	DFV	C15-C10-C9-O1
2	C	301	DFV	C15-C10-C9-C8
2	C	301	DFV	C11-C10-C9-O1
2	C	301	DFV	C11-C10-C9-C8
2	D	301	DFV	C11-C10-C9-C8

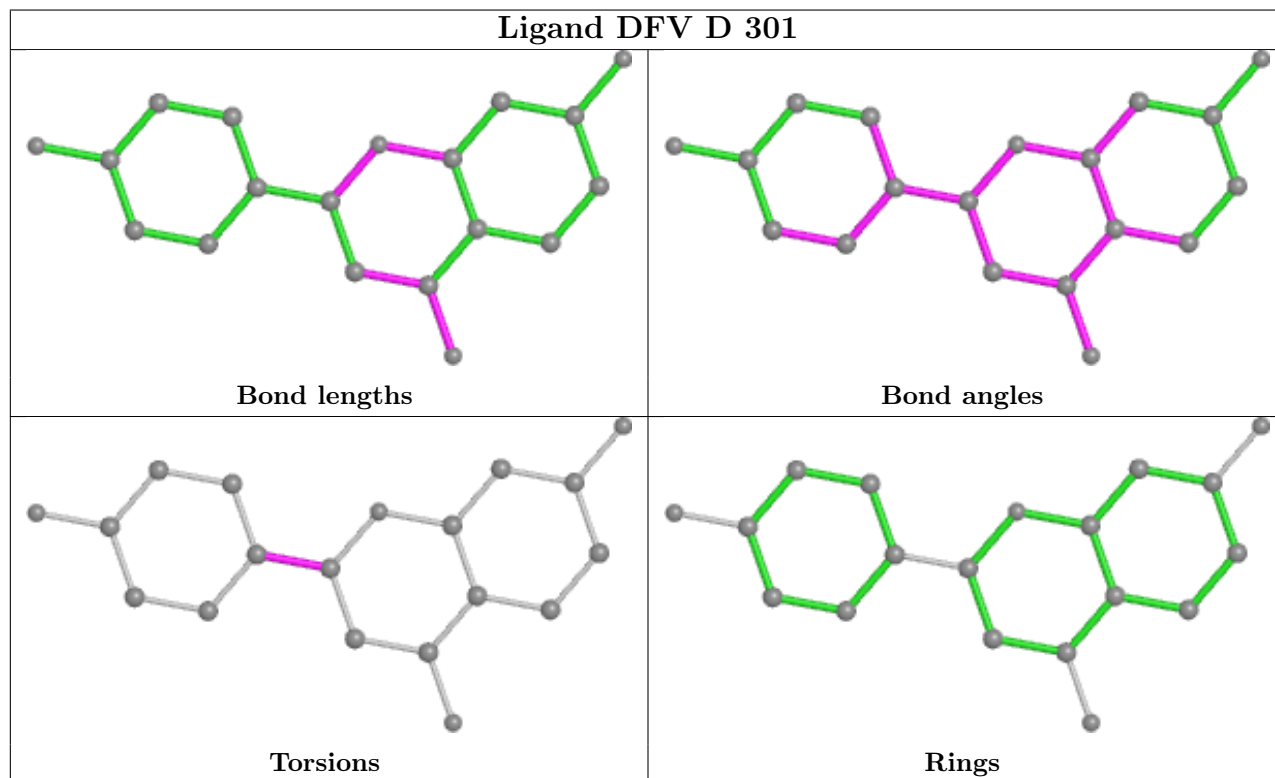
There are no ring outliers.

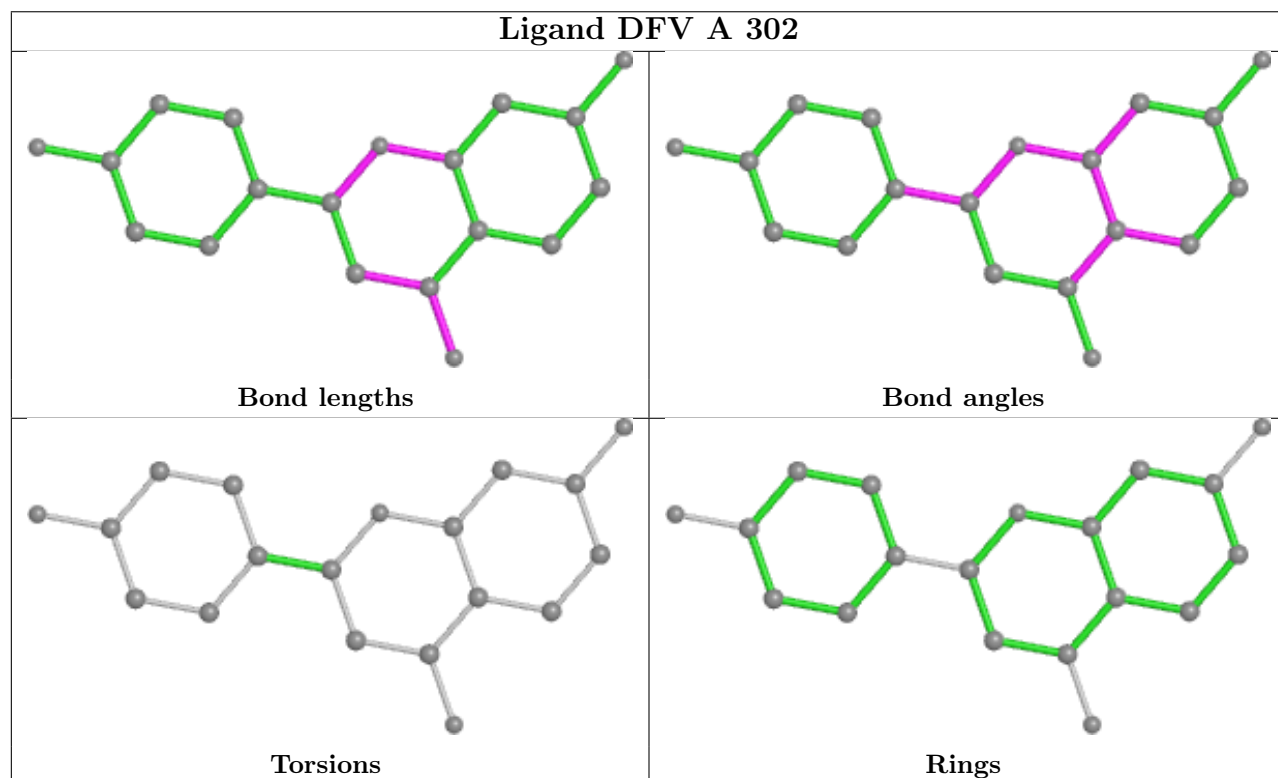
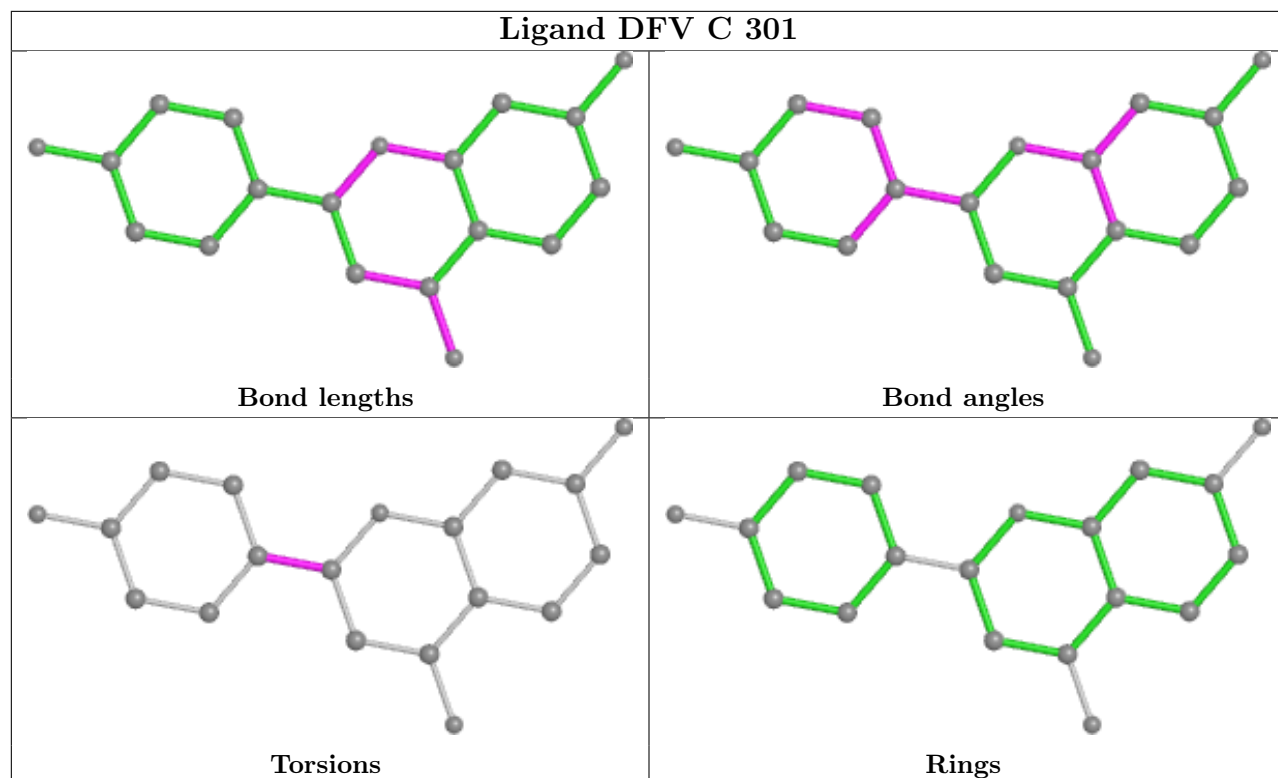
4 monomers are involved in 18 short contacts:

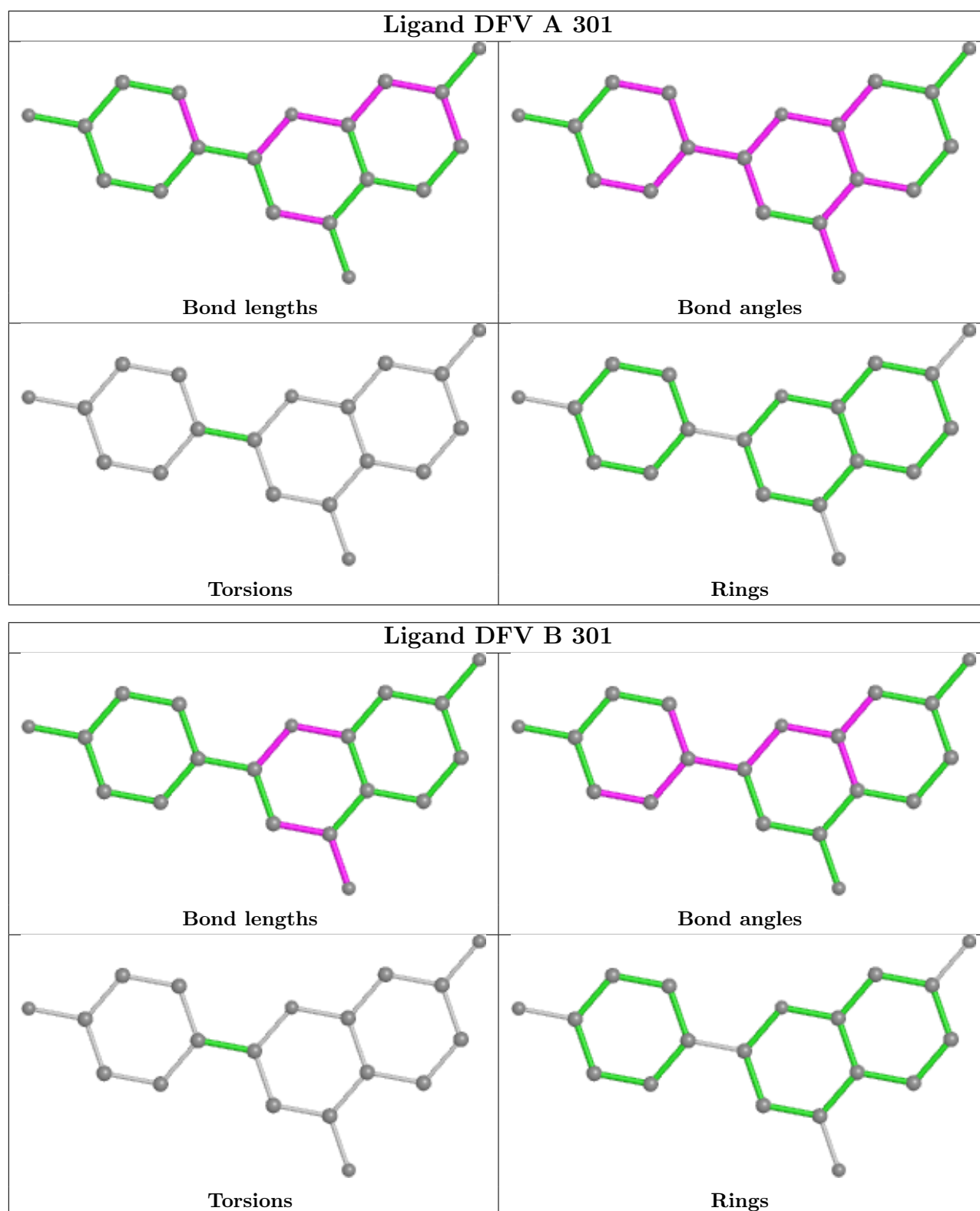
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	301	DFV	5	0
2	A	302	DFV	3	0
2	A	301	DFV	7	0
2	B	301	DFV	3	0

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

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

EDS failed to run properly - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains

EDS failed to run properly - this section is therefore empty.

### 6.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

### 6.4 Ligands

EDS failed to run properly - this section is therefore empty.

### 6.5 Other polymers

EDS failed to run properly - this section is therefore empty.