



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 17, 2022 – 12:25 PM JST

PDB ID : 6KEB  
Title : Structure basis for Diltiazem block of a voltage-gated calcium channel  
Authors : Tang, L.  
Deposited on : 2019-07-04  
Resolution : 3.20 Å(reported)

This is a Full wwPDB X-ray Structure 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/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.27  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.27

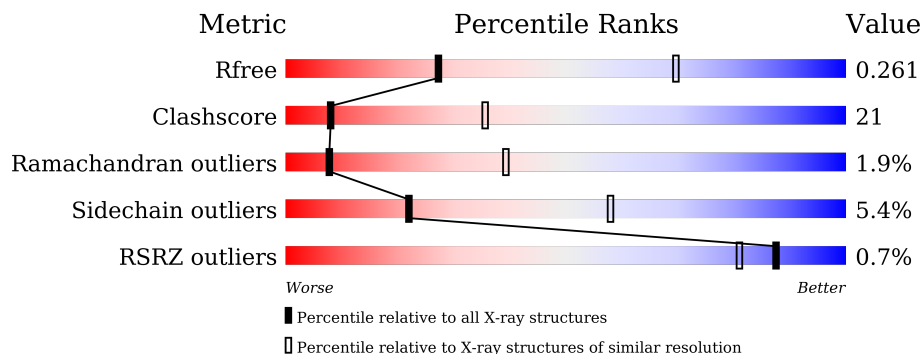
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.20 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))
$R_{free}$	130704	1133 (3.20-3.20)
Clashscore	141614	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)
RSRZ outliers	127900	1095 (3.20-3.20)

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  $\leq 5\%$ . 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	284	 43% 31% 23%
1	B	284	 47% 27% 23%
1	C	284	 48% 27% 23%
1	D	284	 45% 34% 20%

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 7469 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 Ion transport protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	219	1800	1227	269	294	10	0	0	0
1	B	219	1800	1227	269	294	10	0	0	0
1	C	219	1800	1227	269	294	10	0	0	0
1	D	228	1869	1270	281	307	11	0	0	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	984	ASP	-	expression tag	UNP A8EVM5
A	985	TYR	-	expression tag	UNP A8EVM5
A	986	LYS	-	expression tag	UNP A8EVM5
A	987	ASP	-	expression tag	UNP A8EVM5
A	988	ASP	-	expression tag	UNP A8EVM5
A	989	ASP	-	expression tag	UNP A8EVM5
A	990	ASP	-	expression tag	UNP A8EVM5
A	991	LYS	-	expression tag	UNP A8EVM5
A	992	GLY	-	expression tag	UNP A8EVM5
A	993	SER	-	expression tag	UNP A8EVM5
A	994	LEU	-	expression tag	UNP A8EVM5
A	995	VAL	-	expression tag	UNP A8EVM5
A	996	PRO	-	expression tag	UNP A8EVM5
A	997	ARG	-	expression tag	UNP A8EVM5
A	998	GLY	-	expression tag	UNP A8EVM5
A	999	SER	-	expression tag	UNP A8EVM5
A	1000	HIS	-	expression tag	UNP A8EVM5
A	1177	ASP	GLU	conflict	UNP A8EVM5
A	1178	ASP	SER	conflict	UNP A8EVM5
A	1181	ASN	MET	conflict	UNP A8EVM5
B	984	ASP	-	expression tag	UNP A8EVM5

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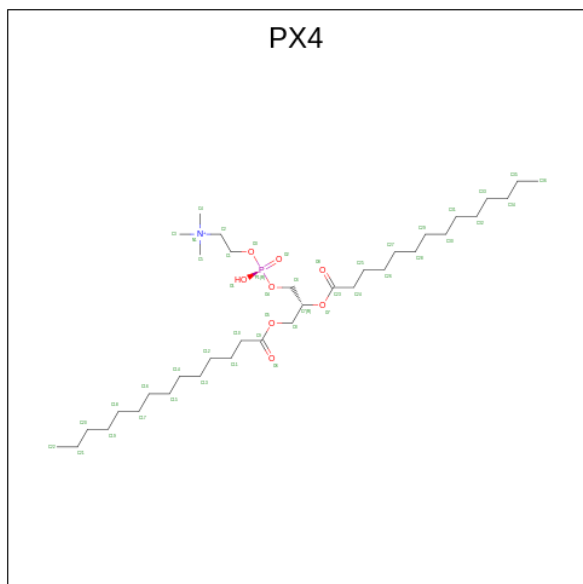
Chain	Residue	Modelled	Actual	Comment	Reference
B	985	TYR	-	expression tag	UNP A8EVM5
B	986	LYS	-	expression tag	UNP A8EVM5
B	987	ASP	-	expression tag	UNP A8EVM5
B	988	ASP	-	expression tag	UNP A8EVM5
B	989	ASP	-	expression tag	UNP A8EVM5
B	990	ASP	-	expression tag	UNP A8EVM5
B	991	LYS	-	expression tag	UNP A8EVM5
B	992	GLY	-	expression tag	UNP A8EVM5
B	993	SER	-	expression tag	UNP A8EVM5
B	994	LEU	-	expression tag	UNP A8EVM5
B	995	VAL	-	expression tag	UNP A8EVM5
B	996	PRO	-	expression tag	UNP A8EVM5
B	997	ARG	-	expression tag	UNP A8EVM5
B	998	GLY	-	expression tag	UNP A8EVM5
B	999	SER	-	expression tag	UNP A8EVM5
B	1000	HIS	-	expression tag	UNP A8EVM5
B	1177	ASP	GLU	conflict	UNP A8EVM5
B	1178	ASP	SER	conflict	UNP A8EVM5
B	1181	ASN	MET	conflict	UNP A8EVM5
C	984	ASP	-	expression tag	UNP A8EVM5
C	985	TYR	-	expression tag	UNP A8EVM5
C	986	LYS	-	expression tag	UNP A8EVM5
C	987	ASP	-	expression tag	UNP A8EVM5
C	988	ASP	-	expression tag	UNP A8EVM5
C	989	ASP	-	expression tag	UNP A8EVM5
C	990	ASP	-	expression tag	UNP A8EVM5
C	991	LYS	-	expression tag	UNP A8EVM5
C	992	GLY	-	expression tag	UNP A8EVM5
C	993	SER	-	expression tag	UNP A8EVM5
C	994	LEU	-	expression tag	UNP A8EVM5
C	995	VAL	-	expression tag	UNP A8EVM5
C	996	PRO	-	expression tag	UNP A8EVM5
C	997	ARG	-	expression tag	UNP A8EVM5
C	998	GLY	-	expression tag	UNP A8EVM5
C	999	SER	-	expression tag	UNP A8EVM5
C	1000	HIS	-	expression tag	UNP A8EVM5
C	1177	ASP	GLU	conflict	UNP A8EVM5
C	1178	ASP	SER	conflict	UNP A8EVM5
C	1181	ASN	MET	conflict	UNP A8EVM5
D	984	ASP	-	expression tag	UNP A8EVM5
D	985	TYR	-	expression tag	UNP A8EVM5
D	986	LYS	-	expression tag	UNP A8EVM5

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Chain	Residue	Modelled	Actual	Comment	Reference
D	987	ASP	-	expression tag	UNP A8EVM5
D	988	ASP	-	expression tag	UNP A8EVM5
D	989	ASP	-	expression tag	UNP A8EVM5
D	990	ASP	-	expression tag	UNP A8EVM5
D	991	LYS	-	expression tag	UNP A8EVM5
D	992	GLY	-	expression tag	UNP A8EVM5
D	993	SER	-	expression tag	UNP A8EVM5
D	994	LEU	-	expression tag	UNP A8EVM5
D	995	VAL	-	expression tag	UNP A8EVM5
D	996	PRO	-	expression tag	UNP A8EVM5
D	997	ARG	-	expression tag	UNP A8EVM5
D	998	GLY	-	expression tag	UNP A8EVM5
D	999	SER	-	expression tag	UNP A8EVM5
D	1000	HIS	-	expression tag	UNP A8EVM5
D	1177	ASP	GLU	conflict	UNP A8EVM5
D	1178	ASP	SER	conflict	UNP A8EVM5
D	1181	ASN	MET	conflict	UNP A8EVM5

- Molecule 2 is 1,2-DIMYRISTOYL-SN-GLYCERO-3-PHOSPHOCHOLINE (three-letter code: PX4) (formula: C<sub>36</sub>H<sub>73</sub>NO<sub>8</sub>P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	P		
2	A	1	10	3	6	1	0	0
2	A	1	21	13	7	1	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	O	P	0	0
			10	3	6	1		
2	A	1	Total	C	O	P	0	0
			10	3	6	1		
2	B	1	Total	C	O	P	0	0
			10	3	6	1		
2	B	1	Total	C	O	P	0	0
			21	13	7	1		
2	C	1	Total	C	O	P	0	0
			21	13	7	1		
2	C	1	Total	C	O	P	0	0
			10	3	6	1		
2	C	1	Total	C	O	P	0	0
			21	13	7	1		
2	D	1	Total	C	O	P	0	0
			10	3	6	1		
2	D	1	Total	C	O	P	0	0
			10	3	6	1		
2	D	1	Total	C	O	P	0	0
			10	3	6	1		

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	Ca	0	0
			1	1		
3	C	1	Total	Ca	0	0
			1	1		

- Molecule 4 is [(2 {S},3 {R})-5-[2-(dimethylamino)ethyl]-2-(4-methoxyphenyl)-4-oxidan ylidene-2,3-dihydro-1,5-benzothiazepin-3-yl] ethanoate (three-letter code: D6C) (formula: C<sub>22</sub>H<sub>26</sub>N<sub>2</sub>O<sub>4</sub>S) (labeled as "Ligand of Interest" by depositor).









## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 2 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	125.60Å 125.63Å 191.84Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.85 – 3.20 29.85 – 3.20	Depositor EDS
% Data completeness (in resolution range)	89.9 (29.85-3.20) 89.9 (29.85-3.20)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.98 (at 3.18Å)	Xtriage
Refinement program	REFMAC 5.8.0151	Depositor
R, $R_{free}$	0.243 , 0.277 0.228 , 0.261	Depositor DCC
$R_{free}$ test set	2296 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	76.2	Xtriage
Anisotropy	0.427	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 48.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.39$ , $\langle L^2 \rangle = 0.21$	Xtriage
Estimated twinning fraction	0.440 for k,h,-l	Xtriage
Reported twinning fraction	0.528 for H, K, L 0.472 for K, H, -L	Depositor
Outliers	0 of 45638 reflections	Xtriage
$F_o, F_c$ correlation	0.89	EDS
Total number of atoms	7469	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	85.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.86% 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: CA, D6C, PX4

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	0.82	0/1851	0.84	0/2520
1	B	0.83	1/1851 (0.1%)	0.83	0/2520
1	C	0.88	1/1851 (0.1%)	0.89	4/2520 (0.2%)
1	D	0.80	1/1920 (0.1%)	0.80	1/2612 (0.0%)
All	All	0.83	3/7473 (0.0%)	0.84	5/10172 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	1195	TRP	CB-CG	-5.59	1.40	1.50
1	B	1159	TRP	CB-CG	-5.30	1.40	1.50
1	D	1179	TRP	CB-CG	-5.19	1.41	1.50

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	1116	MET	N-CA-C	-5.61	95.86	111.00
1	C	1155	ARG	NE-CZ-NH1	5.49	123.05	120.30
1	C	1212	LEU	CA-CB-CG	5.19	127.24	115.30
1	D	1178	ASP	CB-CG-OD1	5.16	122.94	118.30
1	C	1105	ARG	NE-CZ-NH2	-5.07	117.76	120.30

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	1800	0	1869	92	0
1	B	1800	0	1869	92	0
1	C	1800	0	1869	72	0
1	D	1869	0	1943	112	0
2	A	51	0	34	0	0
2	B	31	0	24	0	0
2	C	52	0	43	3	0
2	D	30	0	15	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
4	D	29	0	0	2	0
5	B	2	0	0	0	0
5	C	3	0	0	3	0
All	All	7469	0	7666	323	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 21.

All (323) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1089:VAL:HG12	1:A:1090:PRO:CD	1.67	1.22
1:A:1089:VAL:CG1	1:A:1090:PRO:HD2	1.77	1.12
1:B:1168:TYR:HE2	1:D:1185:ARG:NE	1.48	1.10
1:D:1180:SER:O	1:D:1185:ARG:HG2	1.59	1.02
1:B:1217:ILE:HD12	1:D:1217:ILE:HG12	1.47	0.95
1:B:1127:ILE:HB	1:B:1128:PRO:HD3	1.48	0.94
1:B:1168:TYR:CE2	1:D:1185:ARG:NE	2.40	0.89
1:A:1089:VAL:HG12	1:A:1090:PRO:HD2	0.92	0.89
1:B:1217:ILE:CD1	1:D:1217:ILE:HG12	2.03	0.88
1:D:1126:VAL:HG11	1:D:1216:ILE:HG23	1.56	0.88
1:C:1196:VAL:O	1:C:1200:PRO:HG2	1.74	0.86
1:B:1095:PHE:HB2	1:B:1097:ILE:HG13	1.57	0.86
1:B:1018:ILE:HG21	1:B:1059:GLU:OE1	1.76	0.85
1:C:1160:PHE:HB2	5:C:1401:HOH:O	1.76	0.85
1:C:1198:PHE:O	1:C:1202:ILE:HG13	1.77	0.84
1:A:1162:THR:HG23	1:A:1165:GLU:H	1.43	0.83
1:A:1090:PRO:O	1:A:1091:THR:HG22	1.79	0.82
1:B:1105:ARG:O	1:B:1108:ARG:HB3	1.80	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1096:GLU:OE2	1:B:1099:ARG:CZ	2.30	0.80
1:C:1068:ARG:HG3	1:C:1069:ILE:N	1.96	0.79
1:A:1091:THR:HB	1:A:1102:ARG:NH2	1.97	0.79
1:A:1155:ARG:O	1:A:1157:PRO:HD2	1.82	0.78
1:C:1076:TRP:HB3	1:C:1111:THR:HG23	1.66	0.77
1:B:1155:ARG:HB3	1:B:1155:ARG:NH1	2.00	0.75
1:A:1090:PRO:O	1:A:1091:THR:CG2	2.35	0.75
1:D:1111:THR:O	1:D:1117:ARG:HD2	1.86	0.75
1:B:1080:ASP:OD1	1:B:1111:THR:HG21	1.86	0.74
1:D:1173:VAL:O	1:D:1176:LEU:HD23	1.88	0.74
1:C:1188:MET:HE2	1:D:1168:TYR:CZ	2.24	0.72
1:B:1152:PHE:O	1:B:1154:GLU:N	2.22	0.72
1:D:1185:ARG:N	1:D:1186:PRO:CD	2.52	0.71
1:C:1146:ILE:HD12	1:D:1103:VAL:HG21	1.72	0.71
1:D:1174:MET:HG3	1:D:1205:VAL:HG11	1.72	0.71
1:C:1091:THR:O	1:C:1099:ARG:NH2	2.22	0.71
1:A:1079:PHE:CE1	1:A:1083:VAL:HG21	2.26	0.71
1:B:1155:ARG:HB3	1:B:1155:ARG:HH11	1.54	0.70
1:D:1213:VAL:HA	1:D:1216:ILE:HG13	1.72	0.70
1:A:1172:GLN:OE1	1:A:1183:ILE:HG13	1.92	0.70
1:A:1149:THR:HG21	1:C:1033:THR:HG23	1.74	0.69
1:C:1197:PHE:O	1:C:1200:PRO:HD2	1.93	0.69
1:D:1214:VAL:HA	1:D:1217:ILE:CG2	2.24	0.67
1:C:1195:TRP:CH2	2:C:1304:PX4:H16	2.28	0.67
1:D:1215:ALA:O	1:D:1219:ASP:N	2.24	0.67
1:A:1155:ARG:O	1:A:1157:PRO:CD	2.42	0.67
1:D:1218:VAL:HG22	1:D:1221:MET:CE	2.24	0.67
1:D:1185:ARG:HB2	1:D:1186:PRO:HD3	1.77	0.67
1:B:1022:ILE:CG2	1:B:1109:LEU:HB2	2.25	0.66
1:C:1025:ASN:HA	1:C:1028:THR:HG22	1.78	0.66
1:A:1089:VAL:CG1	1:A:1090:PRO:CD	2.55	0.66
1:B:1177:ASP:OD2	1:D:1180:SER:N	2.28	0.66
1:C:1188:MET:CE	1:D:1168:TYR:CZ	2.79	0.65
1:D:1126:VAL:CG1	1:D:1216:ILE:HG23	2.24	0.65
1:D:1218:VAL:CG2	1:D:1221:MET:CE	2.74	0.65
1:B:1106:LEU:HB2	1:D:1143:ILE:HG12	1.79	0.65
1:B:1169:THR:O	1:B:1172:GLN:HB3	1.97	0.65
1:D:1068:ARG:HG3	1:D:1069:ILE:H	1.63	0.64
1:C:1156:PHE:HB2	5:C:1401:HOH:O	1.98	0.64
1:B:1112:ALA:O	1:B:1114:PRO:HD3	1.97	0.64
1:A:1006:THR:HG23	1:A:1066:VAL:HG13	1.80	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1170:LEU:HD21	1:D:1197:PHE:HE1	1.61	0.64
1:B:1168:TYR:CE2	1:D:1185:ARG:CZ	2.81	0.64
1:B:1095:PHE:HB2	1:B:1097:ILE:CG1	2.27	0.63
1:C:1199:ILE:O	1:C:1202:ILE:HB	1.98	0.63
1:C:1083:VAL:HG11	1:C:1105:ARG:HA	1.81	0.63
1:B:1157:PRO:O	1:B:1158:GLU:C	2.33	0.63
1:C:1167:PHE:HB3	2:C:1302:PX4:O6	1.99	0.63
1:A:1177:ASP:OD2	1:B:1180:SER:N	2.32	0.62
1:C:1068:ARG:CG	1:C:1069:ILE:H	2.11	0.62
1:A:1172:GLN:NE2	1:B:1180:SER:OG	2.31	0.62
1:B:1022:ILE:HG21	1:B:1109:LEU:HB2	1.80	0.62
1:C:1068:ARG:HG3	1:C:1069:ILE:H	1.62	0.62
1:A:1155:ARG:C	1:A:1157:PRO:CD	2.69	0.61
1:D:1068:ARG:HG3	1:D:1069:ILE:N	2.15	0.61
1:D:1048:PHE:HA	1:D:1051:ILE:HD12	1.82	0.61
1:D:1185:ARG:N	1:D:1186:PRO:HD2	2.15	0.61
1:A:1172:GLN:OE1	1:A:1183:ILE:CG1	2.49	0.60
1:A:1155:ARG:C	1:A:1157:PRO:HD3	2.22	0.60
1:B:1096:GLU:O	1:B:1099:ARG:N	2.34	0.59
1:D:1079:PHE:CZ	1:D:1083:VAL:HG21	2.37	0.59
1:D:1218:VAL:HG22	1:D:1221:MET:HE3	1.85	0.59
1:A:1116:MET:HA	1:A:1119:ILE:HG22	1.84	0.59
1:A:1164:GLY:O	1:A:1167:PHE:N	2.36	0.59
1:B:1022:ILE:HD11	1:B:1108:ARG:HG3	1.83	0.59
1:B:1159:TRP:O	1:B:1165:GLU:O	2.21	0.59
1:B:1168:TYR:HE2	1:D:1185:ARG:CZ	2.11	0.59
1:B:1160:PHE:CZ	1:B:1169:THR:HG21	2.38	0.58
1:C:1150:GLN:HE21	1:D:1100:VAL:HG13	1.69	0.58
1:C:1195:TRP:CZ3	2:C:1304:PX4:H16	2.38	0.58
1:B:1110:VAL:HG23	1:D:1139:LEU:CD2	2.33	0.58
1:D:1217:ILE:HG13	1:D:1217:ILE:O	2.01	0.57
1:A:1068:ARG:HG3	1:A:1069:ILE:H	1.70	0.56
1:C:1067:HIS:HB3	1:C:1070:SER:HB2	1.87	0.56
1:C:1121:SER:HA	1:C:1124:ILE:HD12	1.87	0.56
1:A:1194:ALA:O	1:A:1198:PHE:HD1	1.88	0.56
1:B:1196:VAL:O	1:B:1200:PRO:HG2	2.05	0.56
1:D:1155:ARG:O	1:D:1157:PRO:HD3	2.06	0.56
1:A:1033:THR:HG21	1:B:1163:LEU:HB2	1.86	0.56
1:A:1124:ILE:O	1:A:1127:ILE:HB	2.06	0.56
1:A:1089:VAL:HG12	1:A:1090:PRO:HD3	1.79	0.56
1:C:1183:ILE:O	1:C:1187:LEU:HD13	2.06	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1068:ARG:HG3	1:A:1069:ILE:N	2.22	0.55
1:B:1105:ARG:HG3	1:B:1106:LEU:HD23	1.87	0.55
1:A:1089:VAL:CB	1:A:1090:PRO:HD2	2.34	0.55
1:B:1050:GLN:HA	1:B:1053:ILE:HG22	1.89	0.55
1:A:1091:THR:HB	1:A:1102:ARG:HH21	1.71	0.54
1:B:1100:VAL:HG12	1:D:1147:MET:HG2	1.88	0.54
1:D:1212:LEU:O	1:D:1216:ILE:HG13	2.07	0.54
1:A:1171:PHE:HE1	1:A:1175:THR:HG23	1.73	0.54
1:B:1022:ILE:CD1	1:B:1108:ARG:HG3	2.38	0.54
1:B:1168:TYR:HE2	1:D:1185:ARG:CD	2.21	0.54
1:C:1112:ALA:O	1:C:1114:PRO:HD3	2.08	0.53
1:D:1147:MET:HB3	1:D:1197:PHE:HE2	1.74	0.53
1:D:1176:LEU:HD23	1:D:1176:LEU:N	2.23	0.53
1:D:1148:ALA:HB1	1:D:1160:PHE:CD1	2.44	0.53
1:A:1168:TYR:OH	1:B:1184:VAL:HB	2.07	0.53
1:B:1172:GLN:NE2	1:D:1180:SER:HB3	2.24	0.53
1:B:1058:ILE:HD13	1:B:1061:ILE:HD12	1.91	0.53
1:B:1118:LYS:HD3	1:B:1118:LYS:N	2.23	0.53
1:D:1043:VAL:HA	1:D:1046:THR:OG1	2.09	0.53
1:D:1218:VAL:HG23	1:D:1221:MET:CE	2.39	0.53
1:A:1064:ILE:O	1:A:1068:ARG:N	2.42	0.52
1:D:1124:ILE:HG23	1:D:1127:ILE:HD12	1.90	0.52
1:A:1104:LEU:O	1:A:1107:PHE:HB2	2.09	0.52
1:B:1162:THR:HG22	1:B:1164:GLY:N	2.24	0.52
1:A:1198:PHE:O	1:A:1201:PHE:HB3	2.09	0.52
1:A:1025:ASN:O	1:A:1028:THR:HG22	2.09	0.52
1:D:1029:MET:SD	1:D:1103:VAL:HG23	2.49	0.52
1:D:1180:SER:C	1:D:1185:ARG:HG2	2.28	0.52
1:D:1214:VAL:HA	1:D:1217:ILE:HG23	1.90	0.52
1:C:1025:ASN:HA	1:C:1028:THR:CG2	2.40	0.52
1:B:1106:LEU:HD23	1:B:1106:LEU:N	2.25	0.52
1:A:1178:ASP:HA	1:C:1177:ASP:OD1	2.10	0.52
1:B:1067:HIS:HB3	1:B:1070:SER:HB3	1.92	0.52
1:B:1158:GLU:O	1:B:1165:GLU:HG2	2.10	0.51
1:D:1003:LEU:HA	1:D:1006:THR:HB	1.92	0.51
1:B:1162:THR:HB	1:B:1165:GLU:HB2	1.91	0.51
1:C:1198:PHE:O	1:C:1202:ILE:CG1	2.56	0.51
1:D:1174:MET:HG3	1:D:1205:VAL:CG1	2.39	0.51
1:D:1203:PHE:O	1:D:1207:PHE:N	2.43	0.51
1:A:1171:PHE:CE2	1:B:1199:ILE:HG23	2.46	0.51
1:B:1022:ILE:HD11	1:B:1108:ARG:CG	2.41	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1214:VAL:O	1:D:1218:VAL:HB	2.10	0.51
1:A:1090:PRO:C	1:A:1091:THR:HG22	2.31	0.51
1:B:1127:ILE:HB	1:B:1128:PRO:CD	2.32	0.50
1:A:1024:LEU:HB3	1:A:1048:PHE:HZ	1.76	0.50
1:B:1025:ASN:OD1	1:B:1105:ARG:HD2	2.10	0.50
1:A:1185:ARG:N	1:A:1186:PRO:CD	2.74	0.50
1:D:1127:ILE:HB	1:D:1128:PRO:HD3	1.92	0.50
1:B:1083:VAL:HG11	1:B:1105:ARG:HA	1.93	0.50
1:D:1076:TRP:CH2	1:D:1117:ARG:O	2.65	0.50
1:D:1080:ASP:OD1	1:D:1108:ARG:HG2	2.11	0.50
1:D:1218:VAL:O	1:D:1222:ALA:N	2.41	0.50
1:C:1137:MET:O	1:C:1140:PHE:N	2.44	0.50
1:A:1024:LEU:HB3	1:A:1048:PHE:CZ	2.47	0.50
1:A:1147:MET:HA	1:A:1150:GLN:HG2	1.94	0.50
1:D:1111:THR:O	1:D:1117:ARG:CD	2.57	0.50
1:C:1059:GLU:OE2	1:C:1063:ARG:NH1	2.45	0.49
1:C:1188:MET:HE2	1:D:1168:TYR:CE1	2.46	0.49
1:D:1107:PHE:O	1:D:1110:VAL:HB	2.12	0.49
1:C:1018:ILE:HG13	1:C:1059:GLU:OE2	2.12	0.49
1:D:1174:MET:C	1:D:1176:LEU:H	2.15	0.49
1:B:1185:ARG:N	1:B:1186:PRO:CD	2.76	0.49
1:C:1122:ALA:O	1:C:1125:SER:OG	2.31	0.49
1:D:1052:VAL:HA	1:D:1055:ILE:HD12	1.95	0.48
1:A:1147:MET:HG3	1:C:1103:VAL:HG11	1.95	0.48
1:C:1102:ARG:O	1:C:1105:ARG:HG2	2.13	0.48
1:A:1162:THR:CG2	1:A:1165:GLU:H	2.21	0.48
1:A:1124:ILE:HA	1:A:1127:ILE:HD12	1.96	0.48
1:B:1127:ILE:CB	1:B:1128:PRO:HD3	2.31	0.48
1:A:1144:PHE:O	1:A:1147:MET:N	2.46	0.48
1:D:1079:PHE:CE2	1:D:1083:VAL:HG21	2.49	0.48
1:A:1197:PHE:CD1	1:A:1197:PHE:C	2.87	0.48
1:A:1199:ILE:HB	1:A:1200:PRO:HD3	1.95	0.48
1:B:1105:ARG:O	1:B:1108:ARG:CB	2.55	0.48
1:B:1110:VAL:HG23	1:D:1139:LEU:HD22	1.96	0.48
1:D:1218:VAL:HG23	1:D:1221:MET:HE2	1.94	0.48
1:C:1050:GLN:O	1:C:1054:THR:OG1	2.28	0.48
1:C:1083:VAL:CG1	1:C:1105:ARG:HA	2.42	0.48
1:D:1091:THR:O	1:D:1099:ARG:NH2	2.43	0.48
1:B:1210:ILE:C	1:B:1212:LEU:H	2.18	0.47
1:D:1128:PRO:HA	1:D:1131:LEU:HB2	1.96	0.47
1:C:1172:GLN:O	1:C:1175:THR:N	2.42	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1038:MET:HA	1:D:1042:GLY:HA2	1.95	0.47
1:D:1218:VAL:CG2	1:D:1221:MET:HE2	2.44	0.47
1:A:1115:GLN:N	1:A:1115:GLN:OE1	2.48	0.47
1:A:1133:VAL:HB	1:A:1212:LEU:HD12	1.97	0.47
1:C:1181:ASN:O	1:C:1186:PRO:CD	2.63	0.47
1:A:1162:THR:HG22	1:A:1165:GLU:HG3	1.96	0.47
1:A:1177:ASP:OD2	1:B:1179:TRP:CD1	2.68	0.47
1:D:1126:VAL:HG11	1:D:1216:ILE:CG2	2.38	0.47
1:B:1131:LEU:HA	1:B:1134:ILE:HB	1.96	0.47
1:D:1098:LEU:HA	1:D:1101:LEU:HD12	1.97	0.47
4:D:1304:D6C:C15	4:D:1304:D6C:C19	2.92	0.47
1:A:1200:PRO:O	1:A:1203:PHE:N	2.44	0.47
1:A:1143:ILE:HD12	1:C:1107:PHE:CE1	2.50	0.47
1:C:1199:ILE:N	1:C:1200:PRO:CD	2.78	0.47
1:A:1091:THR:HB	1:A:1102:ARG:HH22	1.76	0.46
1:A:1180:SER:HG	1:C:1168:TYR:HE1	1.61	0.46
1:A:1169:THR:O	1:A:1172:GLN:N	2.48	0.46
1:C:1024:LEU:HD23	1:C:1048:PHE:CZ	2.50	0.46
1:C:1162:THR:HG22	1:C:1163:LEU:H	1.80	0.46
1:C:1199:ILE:HB	1:C:1200:PRO:HD3	1.96	0.46
1:A:1091:THR:O	1:A:1091:THR:OG1	2.33	0.46
1:A:1171:PHE:CE1	1:A:1175:THR:HG23	2.48	0.46
1:B:1177:ASP:OD2	1:D:1180:SER:CB	2.63	0.46
1:A:1136:LEU:O	1:A:1139:LEU:HB3	2.16	0.46
1:D:1109:LEU:O	1:D:1113:VAL:HB	2.16	0.46
1:D:1110:VAL:O	1:D:1117:ARG:HG3	2.16	0.46
1:A:1147:MET:HG2	1:C:1100:VAL:CG1	2.45	0.46
1:D:1181:ASN:O	1:D:1186:PRO:HD3	2.16	0.46
1:D:1188:MET:SD	1:D:1195:TRP:HD1	2.39	0.46
1:B:1171:PHE:O	1:B:1175:THR:HG23	2.16	0.46
1:C:1149:THR:HG23	1:C:1162:THR:O	2.16	0.46
1:B:1213:VAL:O	1:B:1217:ILE:HG22	2.15	0.45
1:D:1028:THR:HG23	1:D:1045:THR:HG23	1.97	0.45
1:A:1076:TRP:HB3	1:A:1111:THR:HG23	1.98	0.45
1:A:1098:LEU:HA	1:A:1101:LEU:HD12	1.98	0.45
1:C:1120:VAL:HG12	1:C:1124:ILE:HD11	1.97	0.45
1:B:1029:MET:SD	1:B:1103:VAL:HG23	2.56	0.45
1:B:1213:VAL:HA	1:B:1216:ILE:HB	1.98	0.45
1:D:1210:ILE:O	1:D:1214:VAL:HG23	2.17	0.45
1:A:1206:THR:HA	1:A:1209:MET:HB2	1.98	0.45
1:C:1147:MET:HE2	1:D:1100:VAL:HG12	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1052:VAL:HG13	1:A:1056:PHE:CE1	2.52	0.45
1:B:1162:THR:HG22	1:B:1164:GLY:H	1.80	0.45
1:D:1176:LEU:HD12	4:D:1304:D6C:C07	2.46	0.45
1:B:1168:TYR:HE2	1:D:1185:ARG:HE	1.49	0.45
1:D:1005:ILE:HA	1:D:1008:ILE:HG13	1.98	0.45
1:D:1213:VAL:O	1:D:1217:ILE:HG22	2.16	0.45
1:B:1168:TYR:CE2	1:D:1185:ARG:CD	2.98	0.45
1:C:1147:MET:CE	1:D:1100:VAL:O	2.65	0.45
1:C:1149:THR:CG2	1:C:1162:THR:O	2.64	0.45
1:C:1174:MET:SD	1:C:1205:VAL:CG1	3.05	0.45
1:A:1180:SER:O	1:A:1185:ARG:N	2.40	0.45
1:B:1159:TRP:CD1	1:B:1159:TRP:N	2.78	0.45
1:C:1120:VAL:CG1	1:C:1124:ILE:HD11	2.47	0.45
1:B:1155:ARG:NH2	1:B:1190:VAL:CG2	2.80	0.45
1:B:1109:LEU:O	1:B:1109:LEU:HD12	2.17	0.44
1:D:1153:GLY:HA3	1:D:1160:PHE:O	2.17	0.44
1:A:1091:THR:CB	1:A:1102:ARG:HH22	2.31	0.44
1:A:1149:THR:CG2	1:C:1033:THR:HG23	2.44	0.44
1:B:1044:TYR:O	1:B:1048:PHE:HB2	2.17	0.44
1:B:1103:VAL:HG11	1:D:1147:MET:HG3	2.00	0.44
1:B:1217:ILE:HD11	1:D:1217:ILE:HG12	1.94	0.44
1:B:1169:THR:O	1:B:1172:GLN:N	2.51	0.44
1:D:1116:MET:O	1:D:1120:VAL:HG23	2.18	0.44
1:A:1105:ARG:HG3	1:A:1106:LEU:HD23	2.00	0.44
1:A:1101:LEU:O	1:A:1103:VAL:N	2.51	0.43
1:A:1105:ARG:HG3	1:A:1106:LEU:N	2.33	0.43
1:B:1148:ALA:HB1	1:B:1160:PHE:CD1	2.52	0.43
1:B:1009:VAL:HA	1:B:1014:PHE:CD2	2.53	0.43
1:B:1158:GLU:HG2	1:B:1159:TRP:CD1	2.53	0.43
1:D:1076:TRP:CE3	1:D:1117:ARG:HG2	2.52	0.43
1:B:1009:VAL:CG2	1:B:1062:LEU:HB3	2.49	0.43
1:A:1172:GLN:HG3	1:A:1177:ASP:HB3	2.01	0.43
1:D:1067:HIS:HB3	1:D:1070:SER:HB3	2.00	0.43
1:D:1174:MET:C	1:D:1176:LEU:N	2.72	0.43
1:C:1188:MET:CE	1:D:1168:TYR:CE1	3.01	0.43
1:A:1174:MET:C	1:A:1176:LEU:H	2.22	0.43
1:C:1167:PHE:O	1:C:1171:PHE:N	2.40	0.43
1:D:1096:GLU:HA	1:D:1096:GLU:OE1	2.19	0.43
1:A:1132:SER:O	1:A:1135:ALA:HB3	2.19	0.43
1:B:1022:ILE:HG21	1:B:1109:LEU:CB	2.49	0.43
1:B:1188:MET:HA	1:B:1191:TYR:O	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1076:TRP:CD1	1:A:1076:TRP:N	2.85	0.43
1:D:1163:LEU:HA	1:D:1163:LEU:HD23	1.78	0.43
1:D:1199:ILE:O	1:D:1202:ILE:HB	2.18	0.43
1:B:1025:ASN:HA	1:B:1028:THR:HG22	2.01	0.42
1:C:1173:VAL:HG12	1:C:1202:ILE:HG12	2.00	0.42
1:C:1184:VAL:O	1:C:1187:LEU:N	2.50	0.42
1:A:1059:GLU:OE1	1:A:1108:ARG:NH2	2.52	0.42
1:C:1112:ALA:O	1:C:1114:PRO:CD	2.66	0.42
1:A:1019:ILE:HD11	1:A:1112:ALA:O	2.19	0.42
1:B:1033:THR:HG23	1:D:1149:THR:HG21	2.01	0.42
1:D:1006:THR:O	1:D:1006:THR:HG22	2.20	0.42
1:D:1197:PHE:CD1	1:D:1197:PHE:O	2.72	0.42
1:A:1161:GLY:HA3	1:A:1165:GLU:OE2	2.19	0.42
1:A:1181:ASN:OD1	1:C:1178:ASP:OD2	2.37	0.42
1:B:1059:GLU:HG2	1:B:1060:ILE:HD12	2.02	0.42
1:C:1144:PHE:CE2	1:C:1201:PHE:HB2	2.54	0.42
1:A:1156:PHE:CZ	1:A:1187:LEU:HA	2.55	0.42
1:B:1096:GLU:O	1:B:1098:LEU:N	2.52	0.42
1:B:1155:ARG:NH2	1:B:1190:VAL:HG22	2.35	0.42
1:C:1197:PHE:C	1:C:1200:PRO:HD2	2.39	0.42
1:D:1068:ARG:CG	1:D:1069:ILE:H	2.22	0.42
1:D:1021:LEU:HD11	1:D:1055:ILE:HD13	2.01	0.42
1:A:1188:MET:HA	1:A:1191:TYR:O	2.19	0.42
1:B:1160:PHE:CE2	1:B:1169:THR:HG21	2.55	0.42
1:C:1152:PHE:C	5:C:1401:HOH:O	2.58	0.42
1:B:1025:ASN:O	1:B:1028:THR:HG22	2.19	0.42
1:B:1106:LEU:CB	1:D:1143:ILE:HG12	2.49	0.42
1:C:1113:VAL:HG12	1:C:1114:PRO:O	2.19	0.42
1:D:1146:ILE:O	1:D:1147:MET:C	2.58	0.42
1:C:1029:MET:HA	1:C:1032:GLU:HB2	2.02	0.41
1:D:1173:VAL:O	1:D:1176:LEU:CD2	2.64	0.41
1:A:1152:PHE:O	1:A:1156:PHE:HB2	2.20	0.41
1:C:1134:ILE:O	1:C:1135:ALA:C	2.56	0.41
1:C:1197:PHE:C	1:C:1197:PHE:CD1	2.93	0.41
1:A:1090:PRO:O	1:A:1091:THR:HG23	2.19	0.41
1:A:1172:GLN:HA	1:A:1175:THR:OG1	2.20	0.41
1:C:1024:LEU:O	1:C:1028:THR:N	2.39	0.41
1:A:1147:MET:O	1:A:1151:LEU:N	2.53	0.41
1:C:1199:ILE:N	1:C:1200:PRO:HD3	2.34	0.41
1:A:1181:ASN:O	1:A:1186:PRO:HD3	2.20	0.41
1:B:1109:LEU:HD23	1:D:1139:LEU:HD13	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1181:ASN:HA	1:D:1185:ARG:HG3	2.03	0.41
1:A:1062:LEU:O	1:A:1066:VAL:HG23	2.21	0.41
1:A:1105:ARG:O	1:A:1107:PHE:N	2.54	0.41
1:A:1196:VAL:O	1:A:1200:PRO:HD2	2.20	0.41
1:B:1022:ILE:HG21	1:B:1109:LEU:CA	2.50	0.41
1:C:1099:ARG:O	1:C:1099:ARG:HG2	2.20	0.41
1:C:1147:MET:HE3	1:D:1100:VAL:O	2.21	0.41
1:A:1168:TYR:HE2	1:B:1185:ARG:HG2	1.86	0.41
1:C:1032:GLU:OE1	1:C:1049:ASN:ND2	2.54	0.41
1:D:1076:TRP:HB3	1:D:1111:THR:HG23	2.01	0.41
1:D:1217:ILE:O	1:D:1221:MET:HB2	2.21	0.41
1:B:1168:TYR:CD2	1:D:1185:ARG:CZ	3.04	0.40
1:D:1071:PHE:CD1	1:D:1071:PHE:C	2.95	0.40
1:A:1104:LEU:HD23	1:A:1104:LEU:HA	1.83	0.40
1:A:1125:SER:O	1:A:1128:PRO:HD2	2.22	0.40
1:D:1197:PHE:HB3	1:D:1198:PHE:CD2	2.56	0.40
1:D:1175:THR:OG1	1:D:1177:ASP:HB2	2.21	0.40
1:B:1106:LEU:O	1:B:1109:LEU:HB3	2.21	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 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	217/284 (76%)	181 (83%)	29 (13%)	7 (3%)	4	26
1	B	217/284 (76%)	186 (86%)	26 (12%)	5 (2%)	6	34
1	C	217/284 (76%)	193 (89%)	21 (10%)	3 (1%)	11	46
1	D	226/284 (80%)	188 (83%)	36 (16%)	2 (1%)	17	56
All	All	877/1136 (77%)	748 (85%)	112 (13%)	17 (2%)	8	39

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1102	ARG
1	B	1153	GLY
1	B	1177	ASP
1	C	1132	SER
1	A	1175	THR
1	C	1075	PRO
1	C	1076	TRP
1	A	1022	ILE
1	A	1109	LEU
1	A	1127	ILE
1	A	1156	PHE
1	A	1178	ASP
1	B	1189	GLU
1	D	1156	PHE
1	B	1097	ILE
1	B	1211	ASN
1	D	1027	ILE

### 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	202/263 (77%)	190 (94%)	12 (6%)	19	54
1	B	202/263 (77%)	189 (94%)	13 (6%)	17	52
1	C	202/263 (77%)	195 (96%)	7 (4%)	36	69
1	D	209/263 (80%)	197 (94%)	12 (6%)	20	56
All	All	815/1052 (78%)	771 (95%)	44 (5%)	22	58

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1001	MET
1	A	1010	GLU
1	A	1044	TYR
1	A	1089	VAL
1	A	1093	SER

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	1114	PRO
1	A	1115	GLN
1	A	1118	LYS
1	A	1141	PHE
1	A	1171	PHE
1	A	1172	GLN
1	A	1207	PHE
1	B	1001	MET
1	B	1059	GLU
1	B	1114	PRO
1	B	1118	LYS
1	B	1121	SER
1	B	1125	SER
1	B	1132	SER
1	B	1150	GLN
1	B	1163	LEU
1	B	1167	PHE
1	B	1172	GLN
1	B	1183	ILE
1	B	1203	PHE
1	C	1091	THR
1	C	1118	LYS
1	C	1150	GLN
1	C	1167	PHE
1	C	1203	PHE
1	C	1206	THR
1	C	1217	ILE
1	D	1004	ARG
1	D	1010	GLU
1	D	1091	THR
1	D	1093	SER
1	D	1095	PHE
1	D	1106	LEU
1	D	1162	THR
1	D	1175	THR
1	D	1217	ILE
1	D	1218	VAL
1	D	1226	GLN
1	D	1228	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1181	ASN
1	C	1150	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 15 ligands modelled in this entry, 2 are monoatomic - leaving 13 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	PX4	C	1302	-	20,20,45	1.77	5 (25%)	22,24,53	1.65	2 (9%)
2	PX4	B	1302	-	9,9,45	1.36	1 (11%)	11,12,53	0.90	0
2	PX4	C	1303	-	9,9,45	1.38	2 (22%)	11,12,53	1.25	0
2	PX4	D	1302	-	9,9,45	1.25	1 (11%)	11,12,53	0.91	0
2	PX4	A	1301	-	9,9,45	1.53	2 (22%)	11,12,53	0.87	0
2	PX4	A	1304	-	9,9,45	1.53	2 (22%)	11,12,53	1.13	0
2	PX4	A	1303	-	9,9,45	1.73	2 (22%)	11,12,53	0.97	0
4	D6C	D	1304	-	31,31,31	2.01	7 (22%)	41,43,43	3.19	11 (26%)
2	PX4	B	1303	-	20,20,45	1.99	3 (15%)	22,24,53	1.47	2 (9%)
2	PX4	A	1302	-	20,20,45	2.04	3 (15%)	22,24,53	1.61	3 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	PX4	D	1301	-	9,9,45	1.68	1 (11%)	11,12,53	1.29	2 (18%)
2	PX4	C	1304	-	20,20,45	1.97	3 (15%)	22,24,53	1.39	2 (9%)
2	PX4	D	1303	-	9,9,45	1.91	2 (22%)	11,12,53	1.26	1 (9%)

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	PX4	C	1302	-	-	14/22/22/49	-
2	PX4	B	1302	-	-	3/8/8/49	-
2	PX4	C	1303	-	-	3/8/8/49	-
2	PX4	D	1302	-	-	6/8/8/49	-
2	PX4	A	1301	-	-	3/8/8/49	-
2	PX4	A	1304	-	-	4/8/8/49	-
2	PX4	A	1303	-	-	5/8/8/49	-
4	D6C	D	1304	-	-	5/15/35/35	0/3/3/3
2	PX4	B	1303	-	-	12/22/22/49	-
2	PX4	A	1302	-	-	12/22/22/49	-
2	PX4	D	1301	-	-	3/8/8/49	-
2	PX4	C	1304	-	-	7/22/22/49	-
2	PX4	D	1303	-	-	3/8/8/49	-

All (34) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1302	PX4	O6-C9	7.14	1.43	1.22
2	B	1303	PX4	O6-C9	6.40	1.41	1.22
2	C	1304	PX4	O6-C9	6.17	1.40	1.22
4	D	1304	D6C	C16-N17	5.57	1.48	1.43
2	C	1302	PX4	O6-C9	5.47	1.38	1.22
4	D	1304	D6C	C09-S10	-5.43	1.79	1.84
4	D	1304	D6C	C23-N17	5.15	1.47	1.37
2	D	1303	PX4	P1-O2	4.57	1.65	1.50
2	A	1303	PX4	P1-O2	4.39	1.64	1.50
2	B	1303	PX4	O5-C9	4.30	1.45	1.33
2	D	1301	PX4	P1-O2	4.21	1.64	1.50
2	C	1304	PX4	O5-C9	4.01	1.45	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	1304	D6C	C16-C11	-3.40	1.36	1.40
2	C	1303	PX4	P1-O3	3.27	1.67	1.54
2	C	1304	PX4	P1-O3	3.21	1.70	1.59
2	A	1302	PX4	O5-C9	3.14	1.42	1.33
2	B	1302	PX4	P1-O3	3.14	1.66	1.54
2	D	1303	PX4	P1-O4	3.02	1.69	1.60
2	A	1304	PX4	P1-O3	3.01	1.66	1.54
2	A	1301	PX4	P1-O3	2.88	1.65	1.54
2	A	1304	PX4	P1-O4	2.72	1.69	1.60
2	C	1302	PX4	P1-O4	2.64	1.70	1.59
2	B	1303	PX4	P1-O4	2.48	1.69	1.59
2	D	1302	PX4	P1-O3	2.41	1.64	1.54
2	A	1301	PX4	P1-O4	2.36	1.67	1.60
2	C	1302	PX4	O5-C9	2.36	1.40	1.33
4	D	1304	D6C	C11-S10	2.35	1.79	1.77
2	A	1302	PX4	P1-O3	2.34	1.67	1.59
2	C	1302	PX4	P1-O3	2.32	1.67	1.59
2	C	1302	PX4	C10-C9	2.24	1.57	1.50
4	D	1304	D6C	O26-C27	2.20	1.40	1.35
4	D	1304	D6C	O26-C25	-2.06	1.40	1.44
2	A	1303	PX4	P1-O4	2.05	1.66	1.60
2	C	1303	PX4	P1-O4	2.04	1.66	1.60

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	1304	D6C	C25-C09-S10	9.19	118.76	109.03
4	D	1304	D6C	C25-C23-N17	7.66	124.16	115.48
4	D	1304	D6C	C11-S10-C09	7.16	113.10	102.66
4	D	1304	D6C	C16-N17-C23	7.14	134.79	122.99
4	D	1304	D6C	C18-N17-C16	-6.82	110.84	118.41
2	C	1302	PX4	O5-C9-O6	-5.60	109.46	123.59
4	D	1304	D6C	O26-C27-C28	5.59	121.38	111.09
4	D	1304	D6C	C06-C09-C25	-4.94	105.66	116.49
4	D	1304	D6C	O24-C23-C25	-4.65	115.33	121.49
2	C	1304	PX4	O6-C9-C10	-4.54	106.03	123.73
2	B	1303	PX4	O5-C9-O6	-4.52	112.18	123.59
2	C	1302	PX4	O6-C9-C10	-4.33	106.85	123.73
2	A	1302	PX4	O6-C9-C10	-4.17	107.48	123.73
2	B	1303	PX4	O6-C9-C10	-4.11	107.68	123.73
2	A	1302	PX4	O5-C9-O6	-3.92	113.69	123.59
2	D	1301	PX4	O4-P1-O2	3.04	115.00	106.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	1303	PX4	O4-P1-O2	2.53	113.58	106.47
4	D	1304	D6C	C01-O02-C03	-2.42	112.26	117.51
2	C	1304	PX4	O5-C9-O6	-2.39	117.56	123.59
4	D	1304	D6C	C18-N17-C23	-2.29	114.30	117.82
2	A	1302	PX4	O1-P1-O2	-2.23	101.22	112.24
4	D	1304	D6C	C19-C18-N17	-2.22	107.63	111.56
2	D	1301	PX4	O3-P1-O1	2.09	115.62	107.64

There are no chirality outliers.

All (80) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1301	PX4	C6-C7-C8-O5
2	A	1302	PX4	C6-O4-P1-O1
2	A	1302	PX4	C6-O4-P1-O2
2	A	1303	PX4	C6-O4-P1-O1
2	A	1303	PX4	C6-C7-C8-O5
2	A	1303	PX4	O7-C7-C8-O5
2	B	1303	PX4	C6-O4-P1-O1
2	B	1303	PX4	O4-C6-C7-C8
2	B	1303	PX4	O7-C7-C8-O5
2	C	1302	PX4	O4-C6-C7-O7
2	C	1303	PX4	C6-C7-C8-O5
2	C	1303	PX4	O7-C7-C8-O5
2	C	1304	PX4	C6-O4-P1-O1
2	C	1304	PX4	C6-O4-P1-O2
2	C	1304	PX4	C6-O4-P1-O3
2	D	1301	PX4	C6-C7-C8-O5
2	D	1302	PX4	C6-O4-P1-O1
2	D	1302	PX4	C6-O4-P1-O3
2	D	1303	PX4	C6-O4-P1-O3
4	D	1304	D6C	C28-C27-O26-C25
4	D	1304	D6C	O29-C27-O26-C25
2	B	1303	PX4	O4-C6-C7-O7
2	A	1302	PX4	O7-C7-C8-O5
4	D	1304	D6C	C04-C03-O02-C01
4	D	1304	D6C	C08-C03-O02-C01
2	B	1303	PX4	O6-C9-O5-C8
2	C	1302	PX4	O4-C6-C7-C8
2	A	1302	PX4	O6-C9-O5-C8
2	B	1303	PX4	C9-C10-C11-C12
2	A	1303	PX4	O4-C6-C7-O7

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Mol	Chain	Res	Type	Atoms
2	A	1304	PX4	O4-C6-C7-O7
2	C	1302	PX4	O7-C7-C8-O5
2	A	1302	PX4	C6-O4-P1-O3
2	B	1303	PX4	C6-O4-P1-O3
2	A	1303	PX4	O4-C6-C7-C8
2	A	1304	PX4	O4-C6-C7-C8
2	C	1302	PX4	C6-C7-C8-O5
2	C	1302	PX4	C11-C12-C13-C14
2	C	1304	PX4	O4-C6-C7-O7
2	C	1302	PX4	C1-O3-P1-O2
2	A	1304	PX4	C6-C7-C8-O5
2	B	1302	PX4	C6-C7-C8-O5
2	A	1301	PX4	O7-C7-C8-O5
2	D	1301	PX4	O7-C7-C8-O5
2	C	1304	PX4	C12-C13-C14-C15
2	C	1304	PX4	C10-C9-O5-C8
2	C	1302	PX4	C9-C10-C11-C12
2	B	1303	PX4	C6-C7-C8-O5
2	A	1302	PX4	C10-C11-C12-C13
2	B	1303	PX4	C12-C13-C14-C15
2	A	1302	PX4	C14-C15-C16-C17
2	D	1302	PX4	C6-O4-P1-O2
2	D	1303	PX4	C6-O4-P1-O2
2	C	1302	PX4	C10-C11-C12-C13
2	C	1302	PX4	C10-C9-O5-C8
2	C	1302	PX4	C12-C13-C14-C15
2	A	1302	PX4	C9-C10-C11-C12
2	A	1302	PX4	C11-C12-C13-C14
2	D	1301	PX4	C7-C6-O4-P1
2	D	1302	PX4	C7-C6-O4-P1
2	C	1304	PX4	C13-C14-C15-C16
2	D	1303	PX4	C6-O4-P1-O1
2	B	1303	PX4	C14-C15-C16-C17
2	A	1301	PX4	C7-C6-O4-P1
2	A	1302	PX4	C1-O3-P1-O2
2	A	1304	PX4	O7-C7-C8-O5
2	C	1302	PX4	O6-C9-O5-C8
2	D	1302	PX4	C6-C7-C8-O5
2	B	1303	PX4	C6-O4-P1-O2
4	D	1304	D6C	C23-C25-O26-C27
2	A	1302	PX4	C13-C14-C15-C16
2	B	1302	PX4	O7-C7-C8-O5

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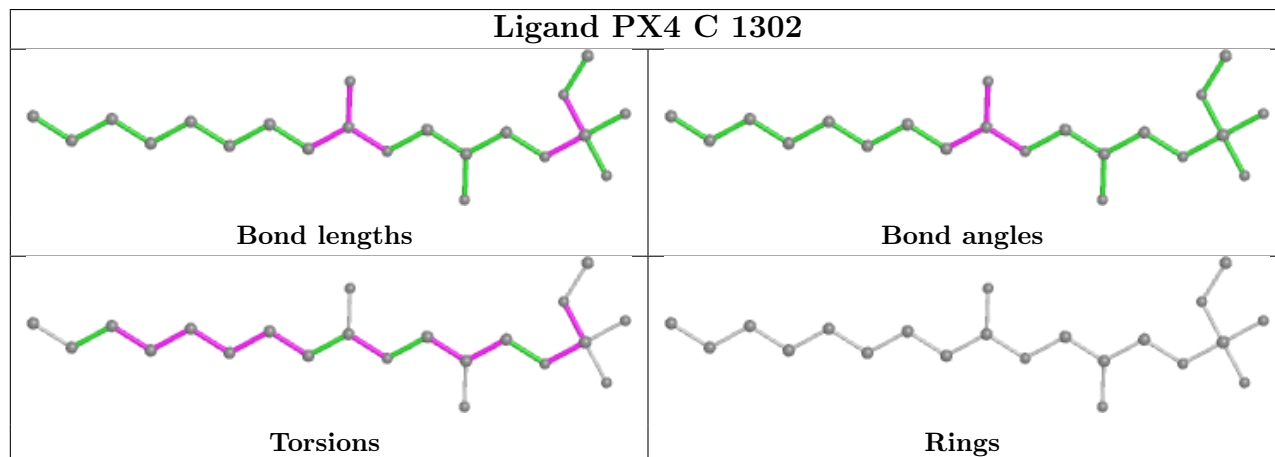
Mol	Chain	Res	Type	Atoms
2	C	1303	PX4	C7-C6-O4-P1
2	C	1302	PX4	C6-O4-P1-O3
2	B	1303	PX4	C1-O3-P1-O1
2	C	1302	PX4	C1-O3-P1-O1
2	A	1302	PX4	C6-C7-C8-O5
2	C	1302	PX4	C13-C14-C15-C16
2	D	1302	PX4	O7-C7-C8-O5
2	B	1302	PX4	C7-C6-O4-P1

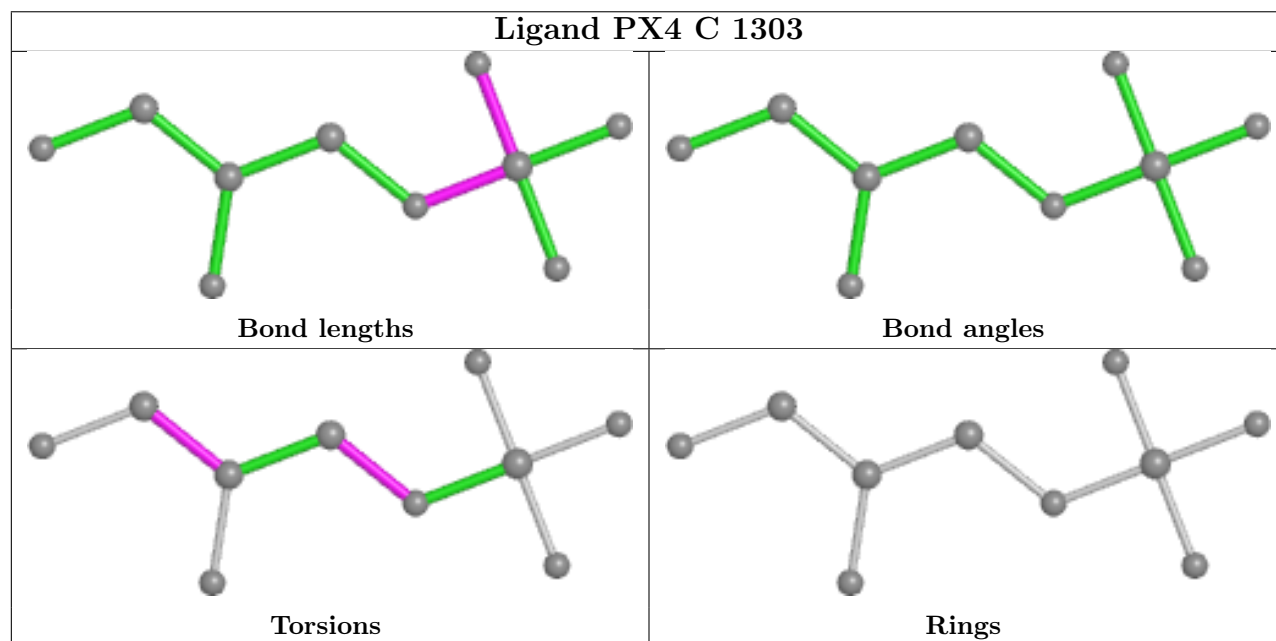
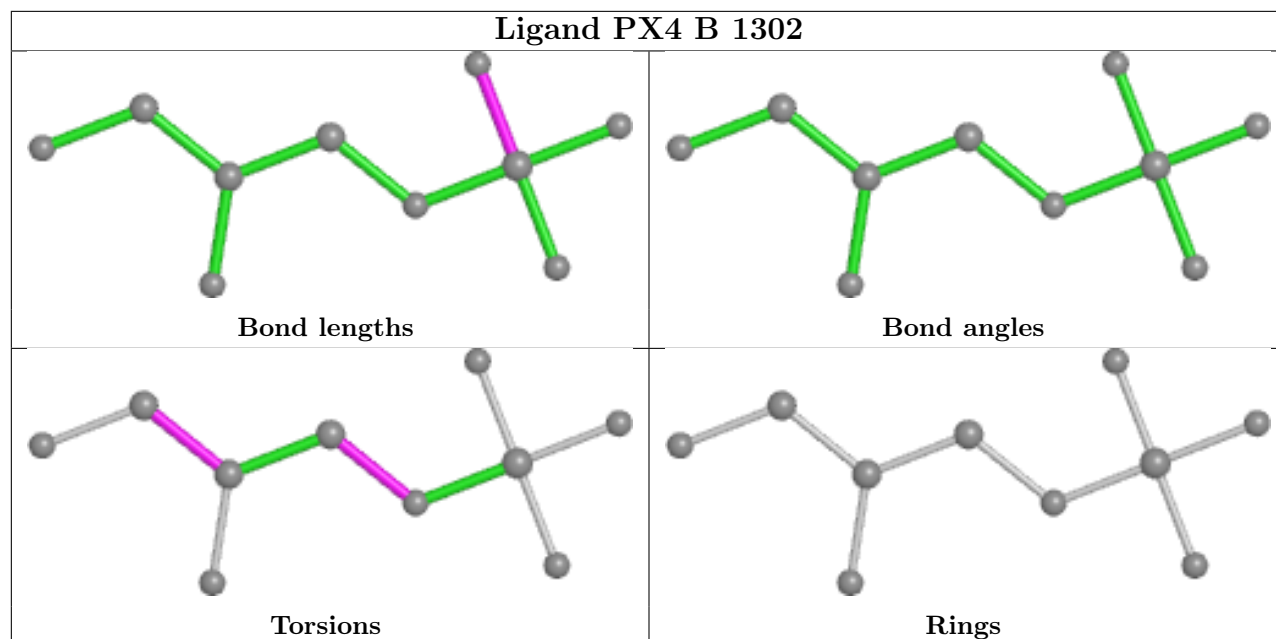
There are no ring outliers.

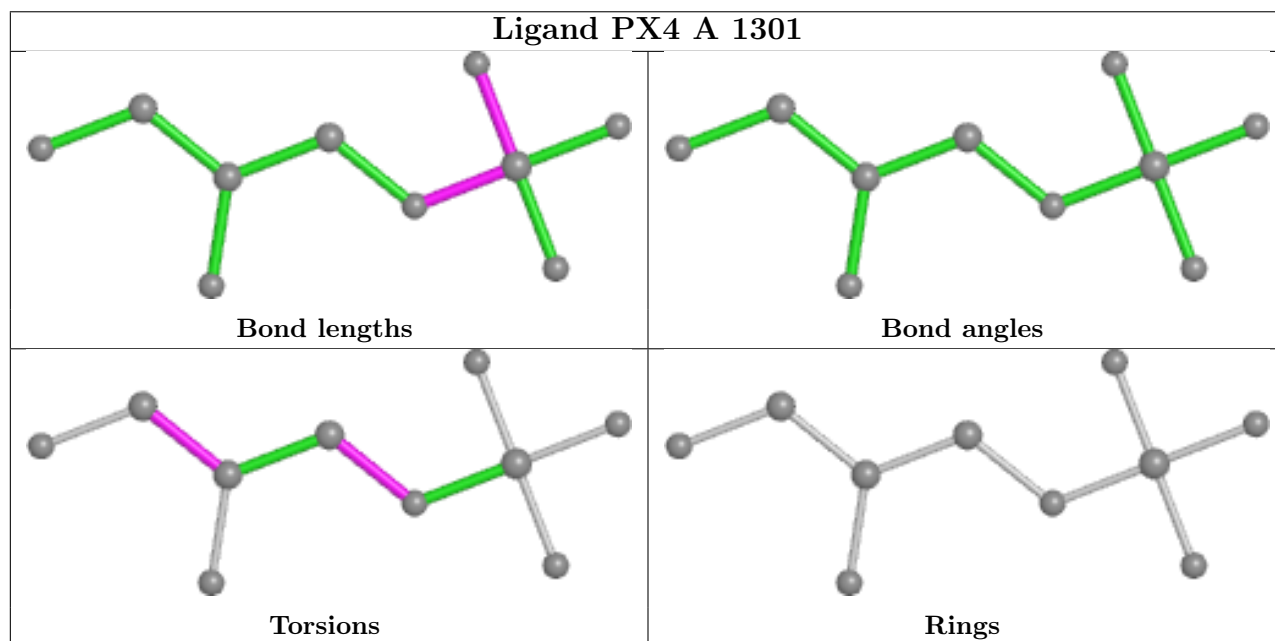
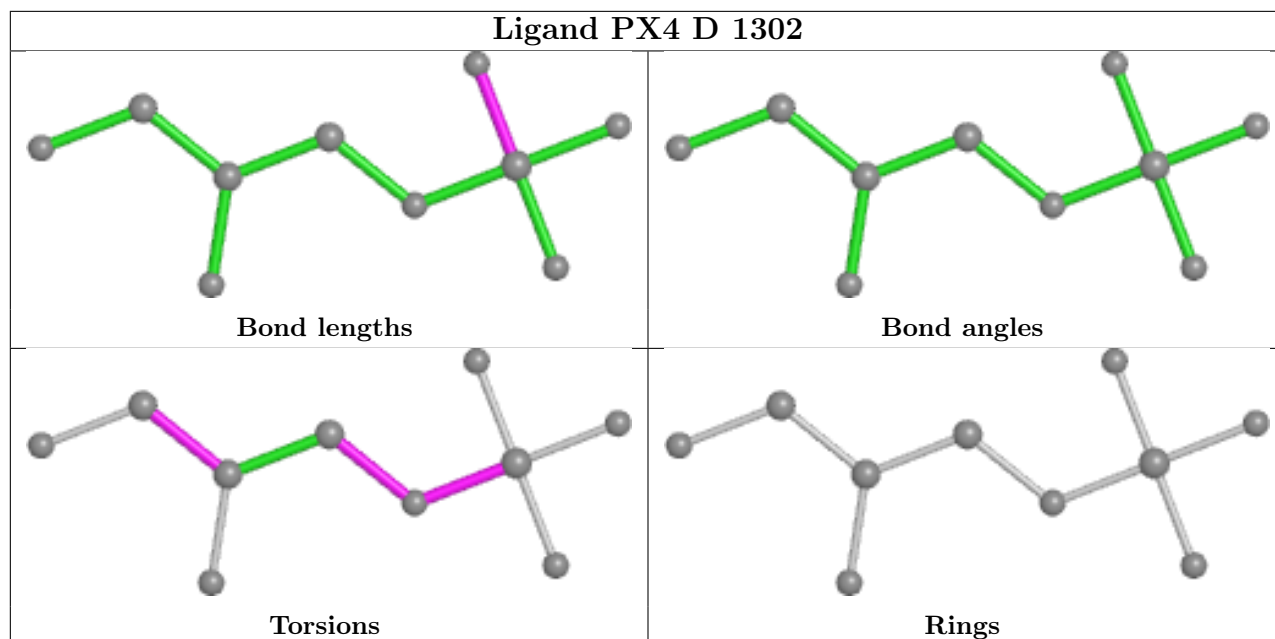
3 monomers are involved in 5 short contacts:

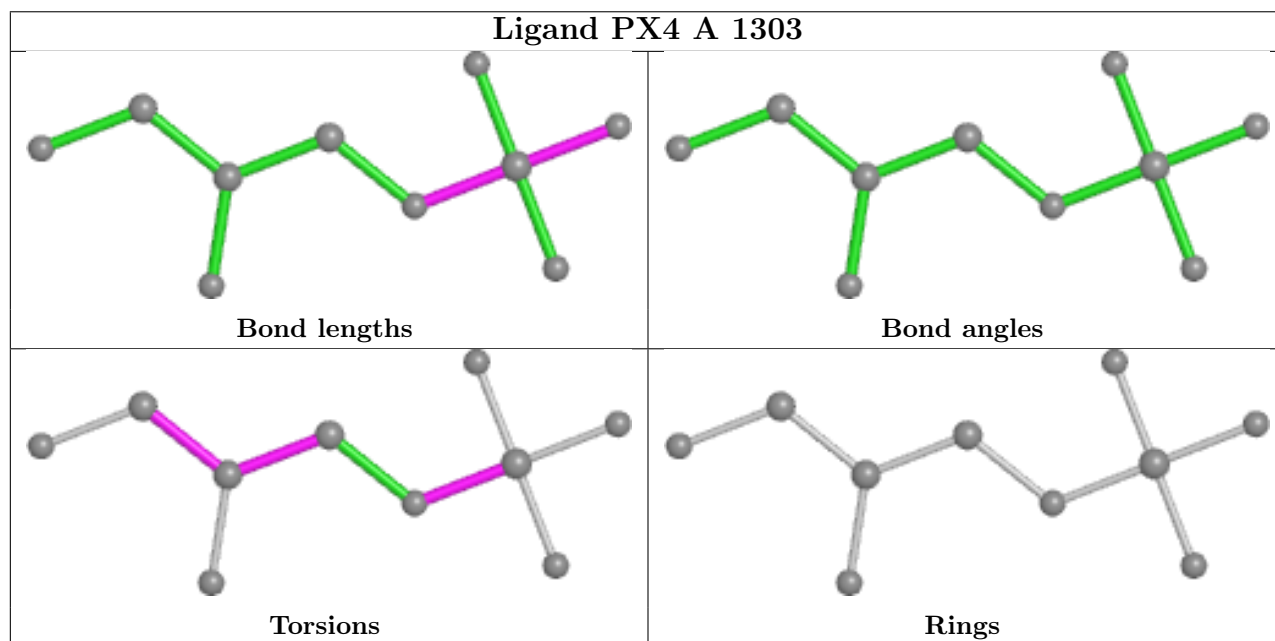
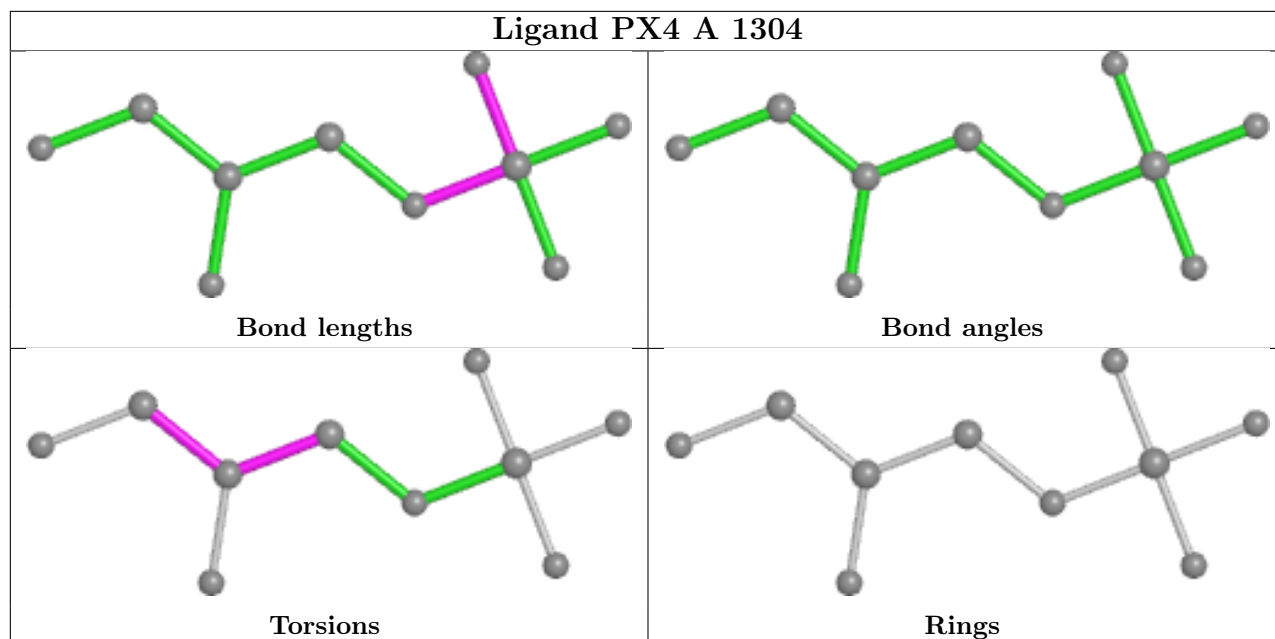
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1302	PX4	1	0
4	D	1304	D6C	2	0
2	C	1304	PX4	2	0

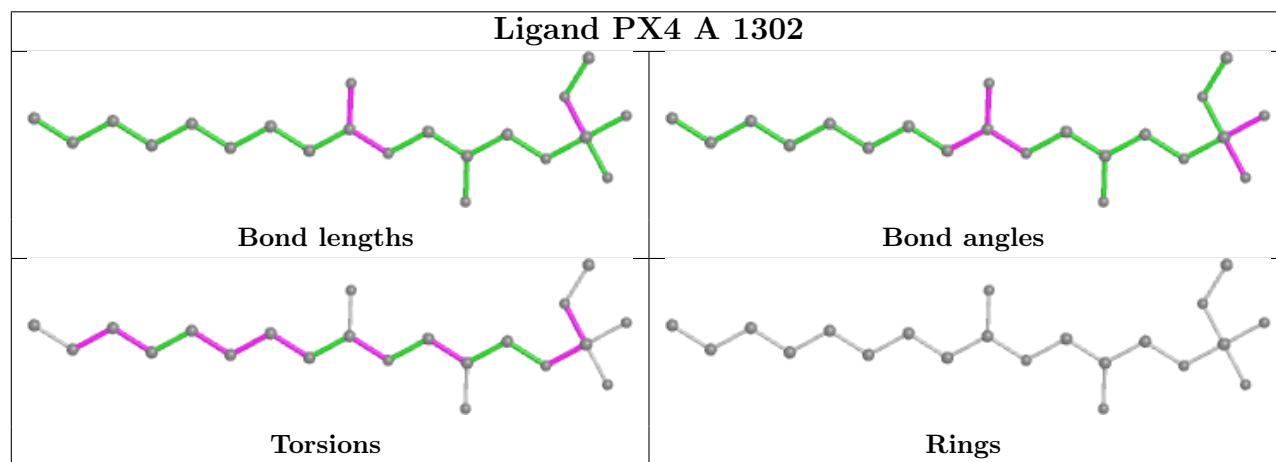
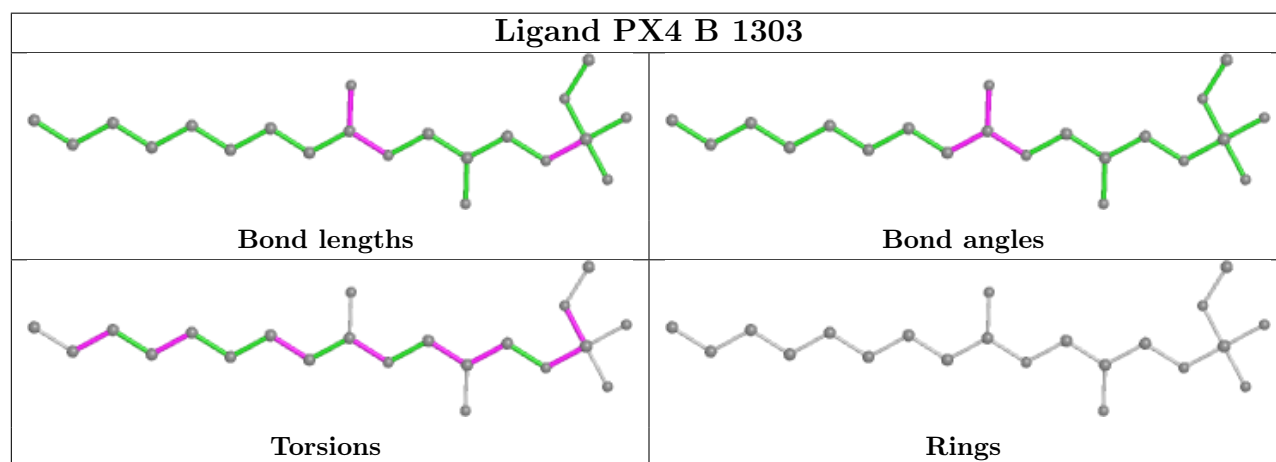
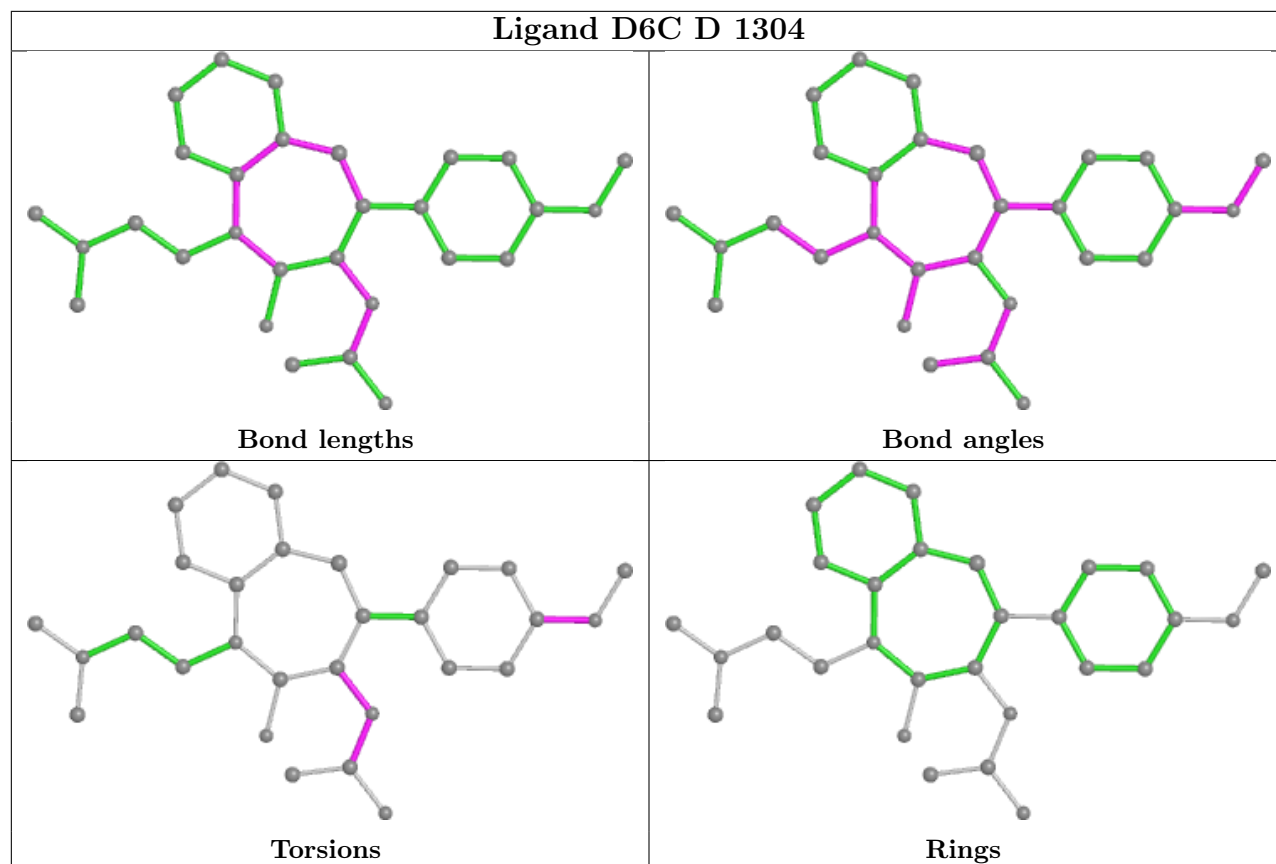
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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



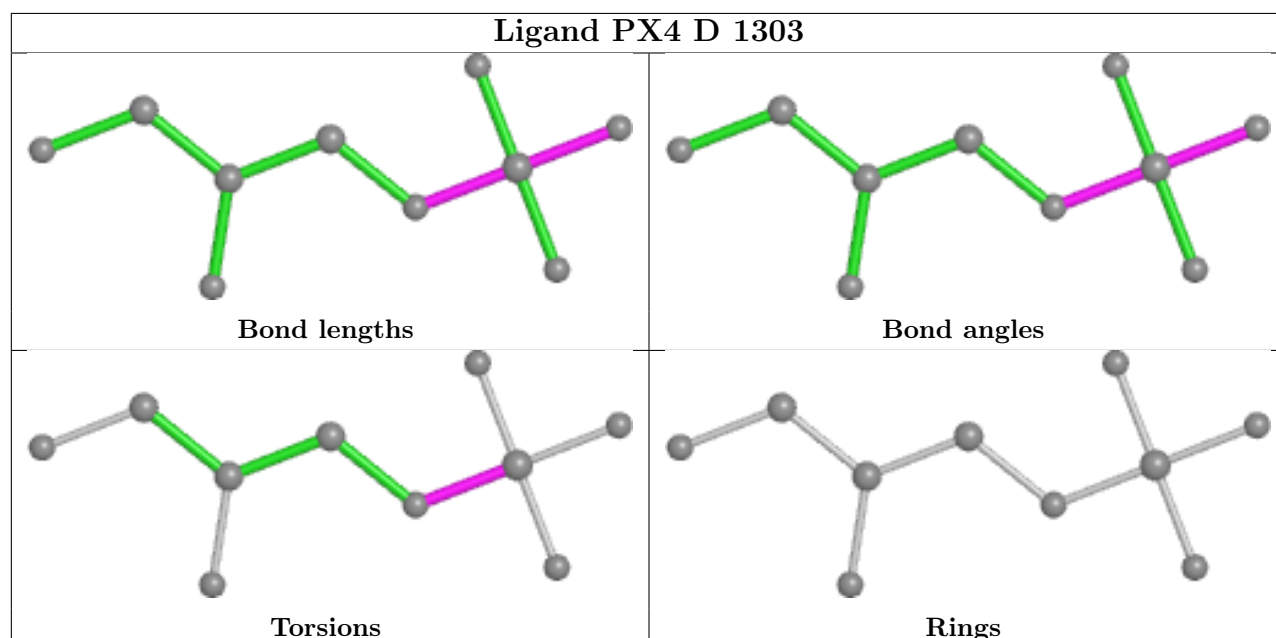
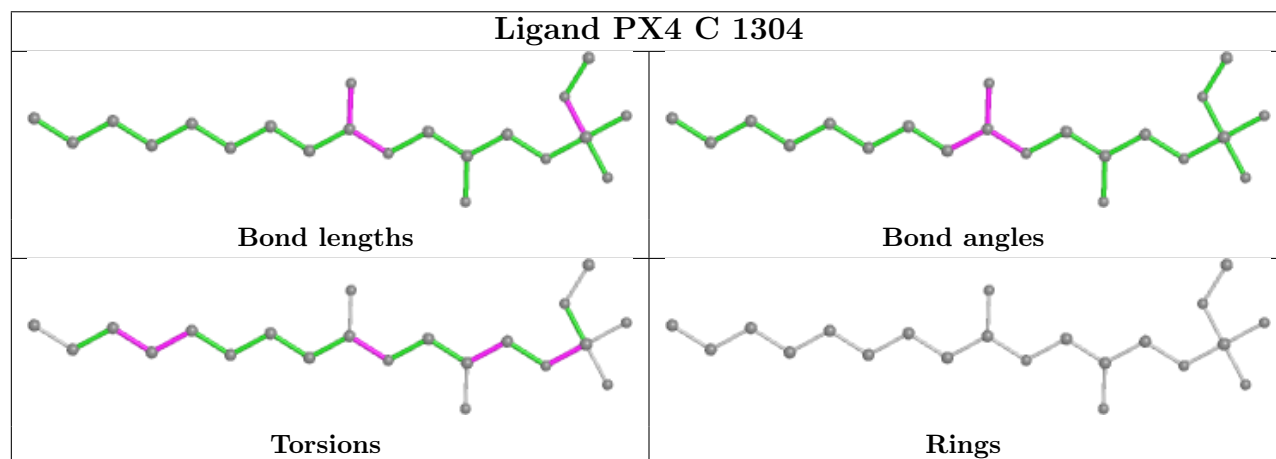
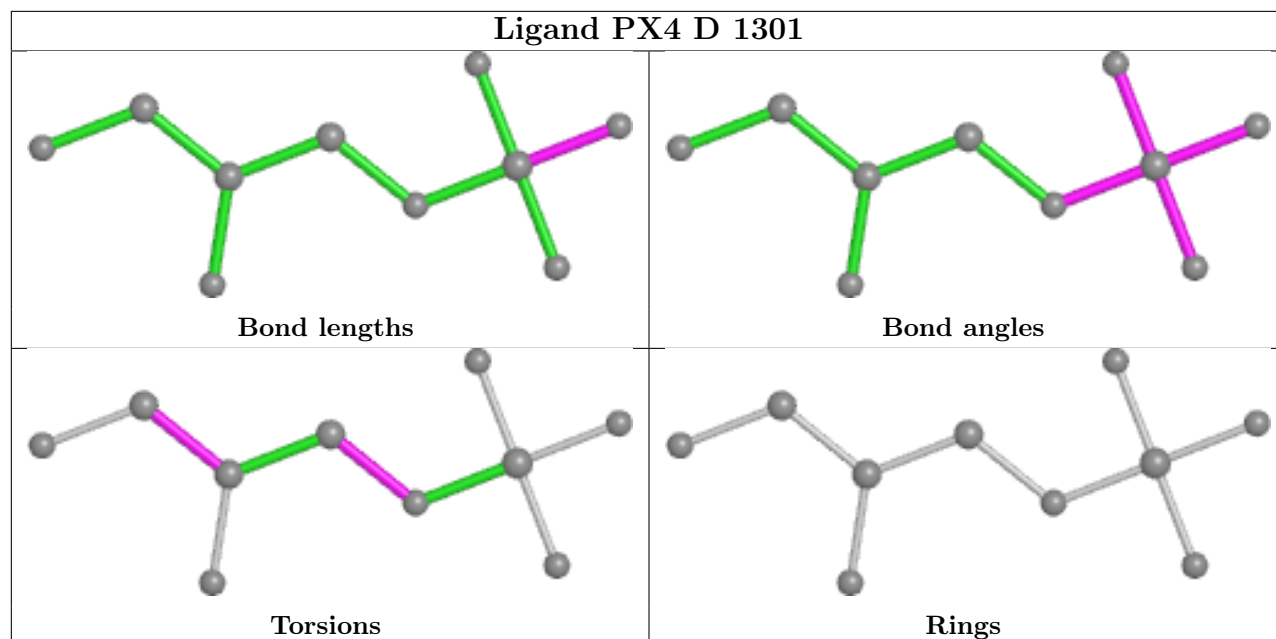












## 5.7 Other polymers [i](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	219/284 (77%)	0.07	1 (0%) 91 86	28, 89, 129, 156	0
1	B	219/284 (77%)	0.02	3 (1%) 75 63	34, 91, 125, 149	0
1	C	219/284 (77%)	-0.01	1 (0%) 91 86	27, 91, 127, 145	0
1	D	228/284 (80%)	-0.02	1 (0%) 92 89	30, 87, 131, 162	0
All	All	885/1136 (77%)	0.01	6 (0%) 87 81	27, 89, 128, 162	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1001	MET	4.3
1	C	1093	SER	2.6
1	D	1095	PHE	2.6
1	B	1001	MET	2.2
1	B	1013	PHE	2.2
1	B	1095	PHE	2.1

### 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 monosaccharides in this entry.

### 6.4 Ligands [i](#)

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,

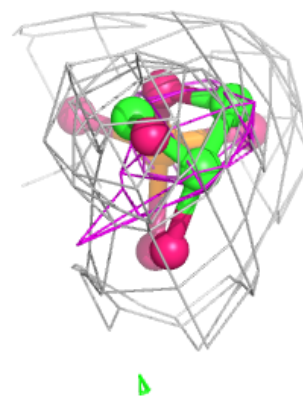
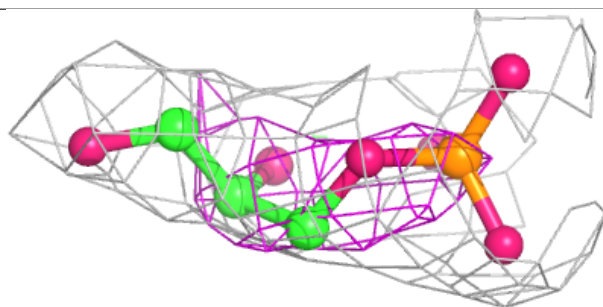
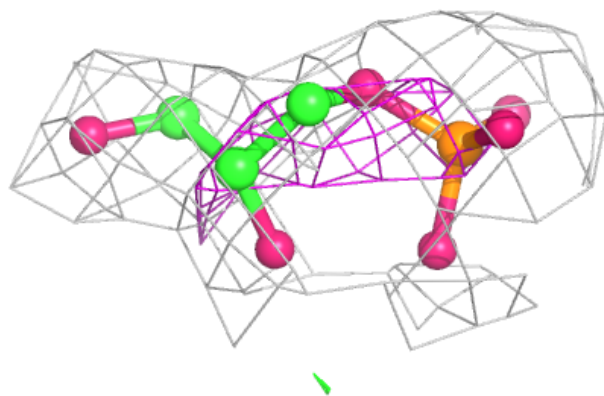
median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	PX4	A	1301	10/46	0.81	0.28	62,77,88,92	0
2	PX4	A	1303	10/46	0.87	0.18	67,88,100,104	0
2	PX4	A	1304	10/46	0.87	0.20	79,92,107,109	0
2	PX4	B	1302	10/46	0.87	0.19	80,101,114,126	0
2	PX4	D	1303	10/46	0.87	0.17	66,85,111,115	0
2	PX4	D	1302	10/46	0.88	0.18	51,77,94,102	0
2	PX4	C	1304	21/46	0.88	0.24	57,68,81,87	0
2	PX4	B	1303	21/46	0.89	0.27	53,66,71,76	0
4	D6C	D	1304	29/29	0.89	0.26	68,85,100,107	0
2	PX4	C	1302	21/46	0.90	0.28	49,63,73,75	0
2	PX4	D	1301	10/46	0.92	0.18	62,84,96,98	0
2	PX4	C	1303	10/46	0.93	0.23	60,72,85,89	0
2	PX4	A	1302	21/46	0.94	0.28	52,67,84,92	0
3	CA	C	1301	1/1	0.98	0.23	62,62,62,62	0
3	CA	B	1301	1/1	0.99	0.19	52,52,52,52	0

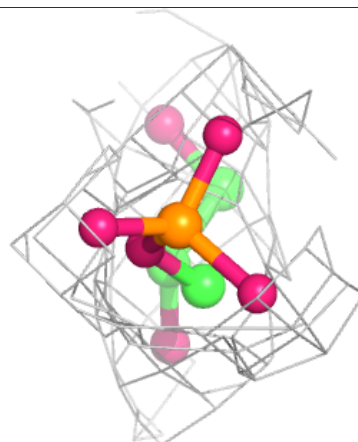
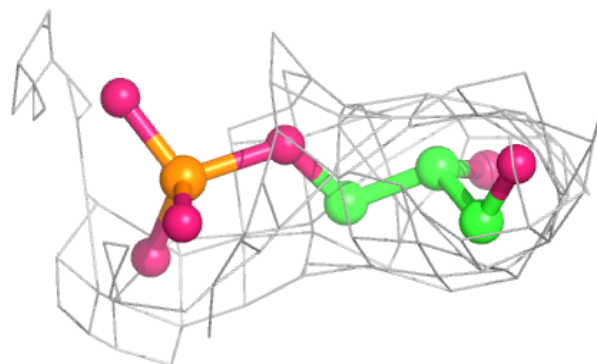
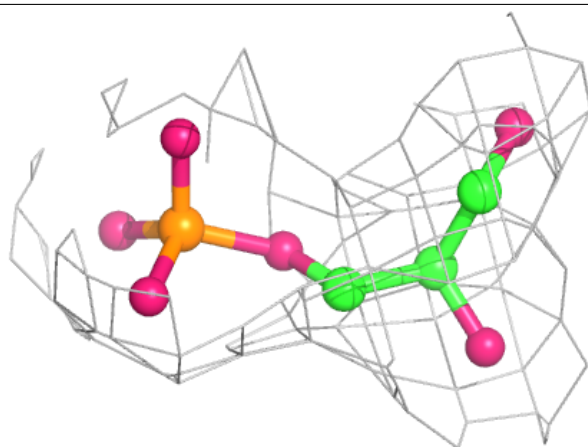
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around PX4 A 1301:**

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

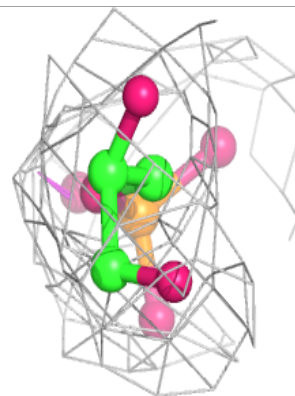
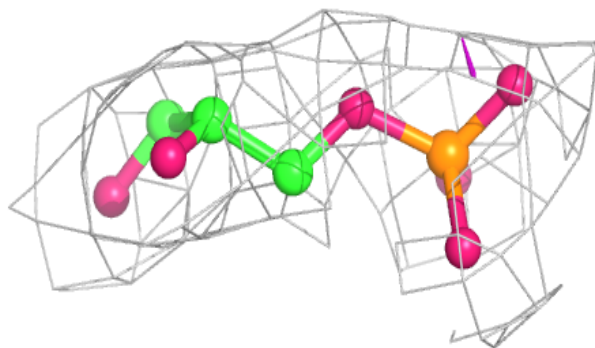
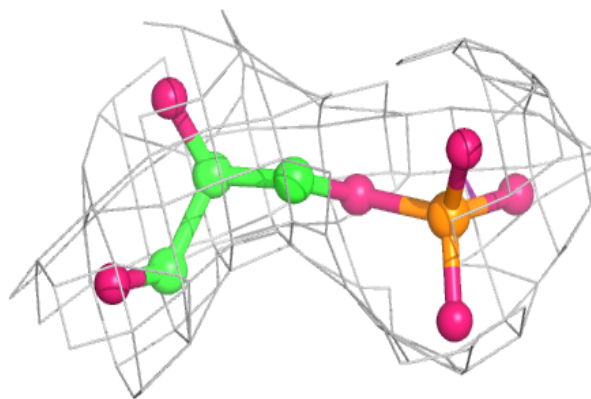
**Electron density around PX4 A 1303:**

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

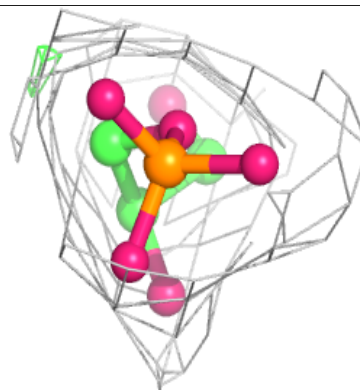
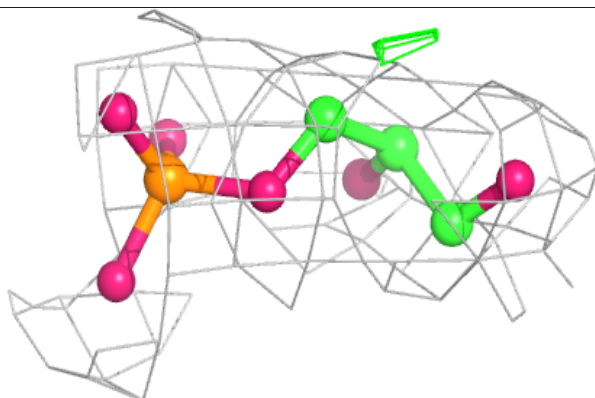
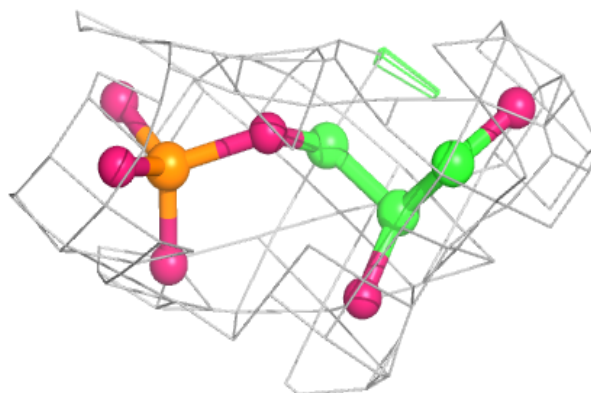


**Electron density around PX4 A 1304:**

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

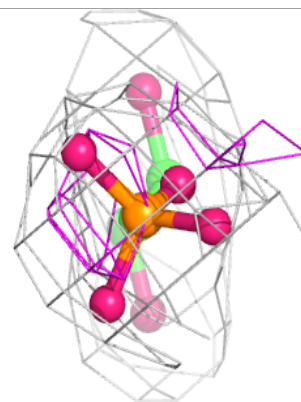
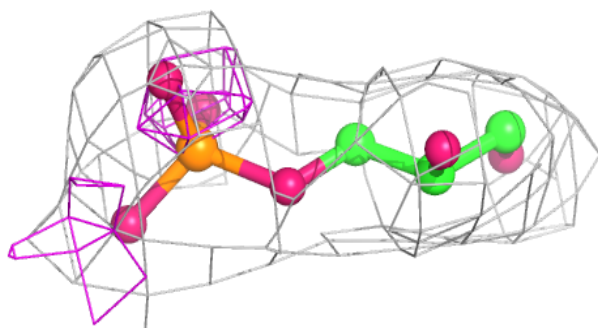
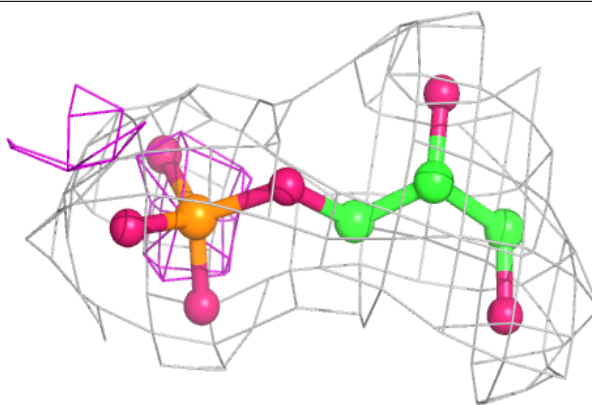
**Electron density around PX4 B 1302:**

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

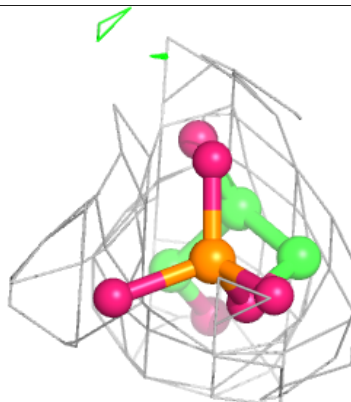
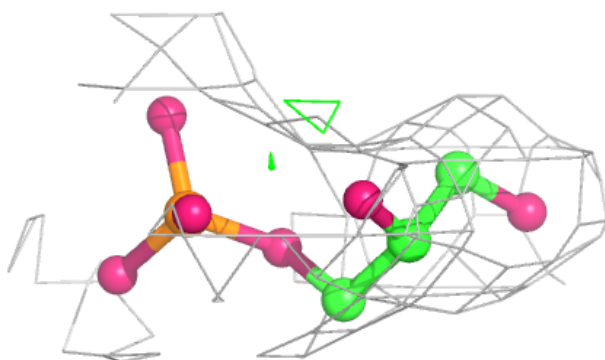
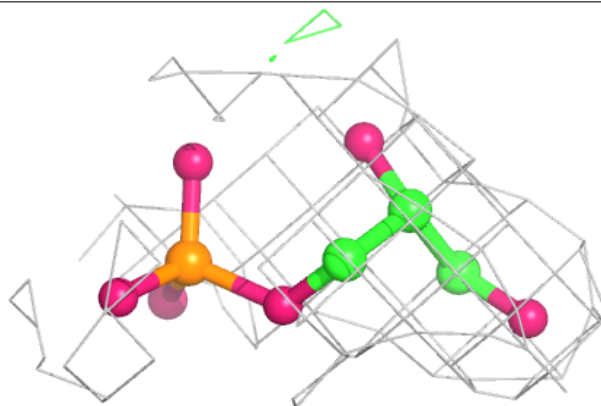


**Electron density around PX4 D 1303:**

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

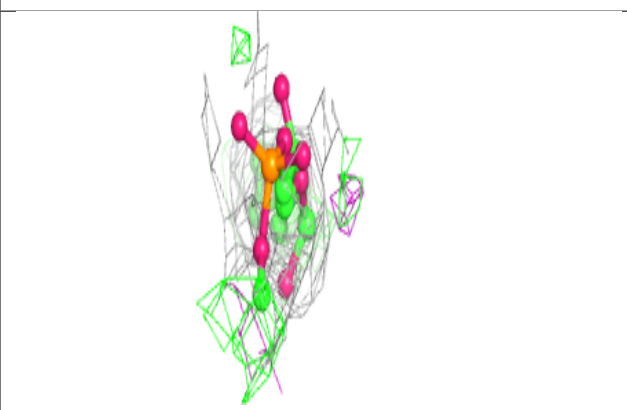
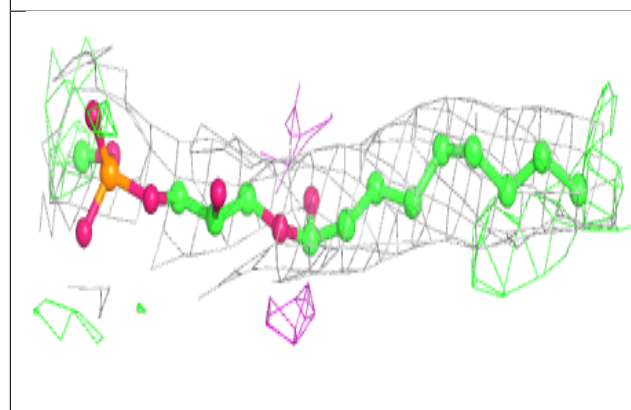
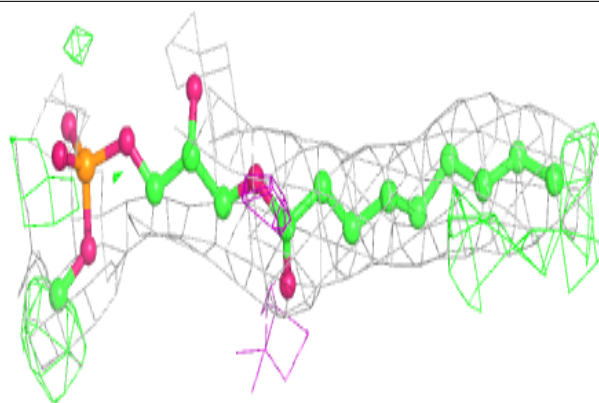
**Electron density around PX4 D 1302:**

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

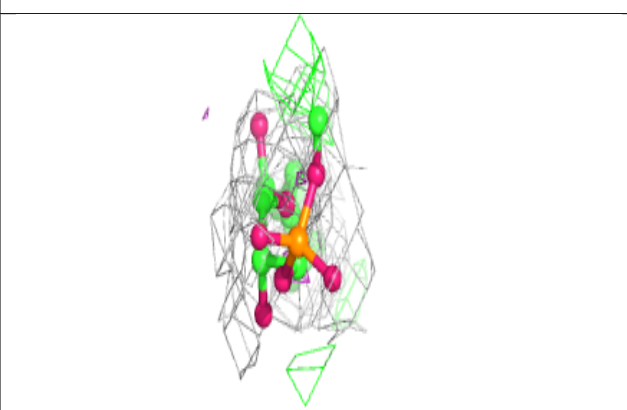
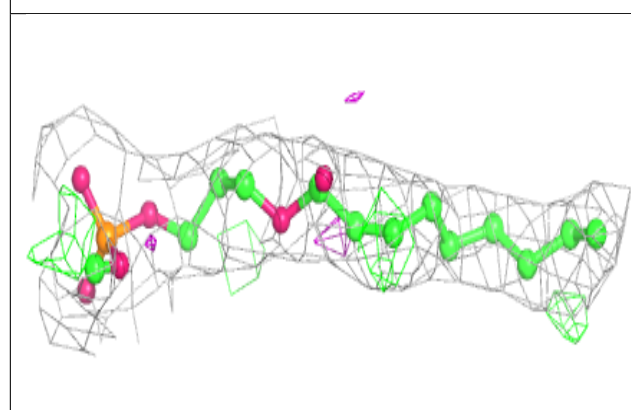
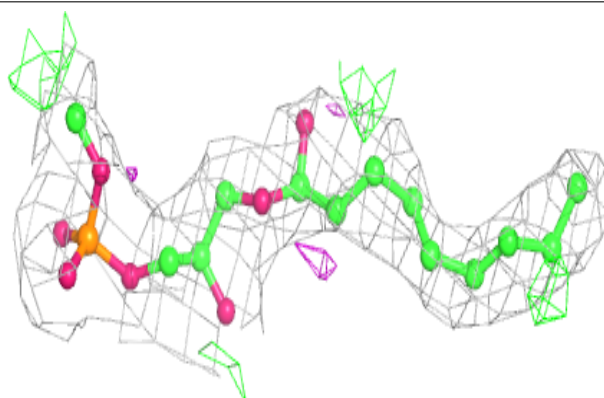


**Electron density around PX4 C 1304:**

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

**Electron density around PX4 B 1303:**

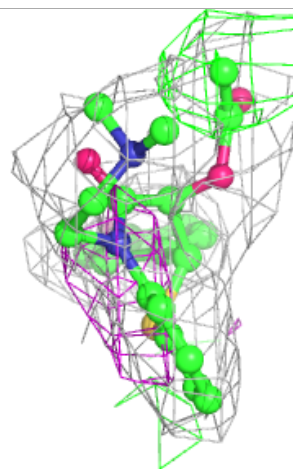
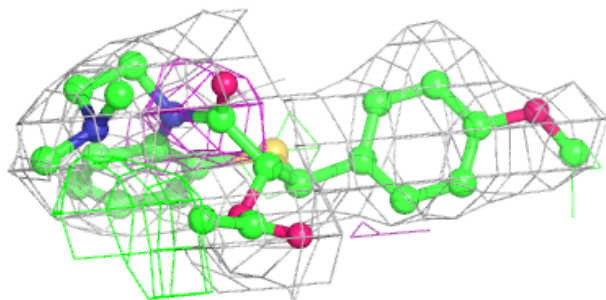
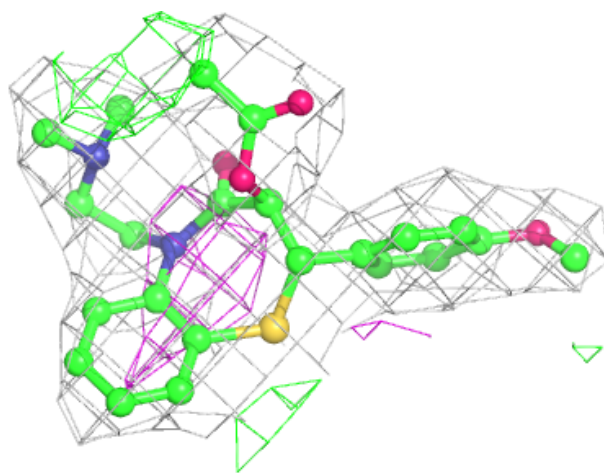
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





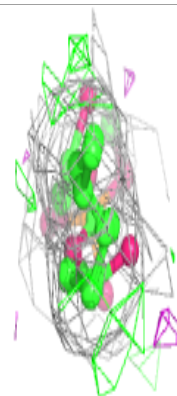
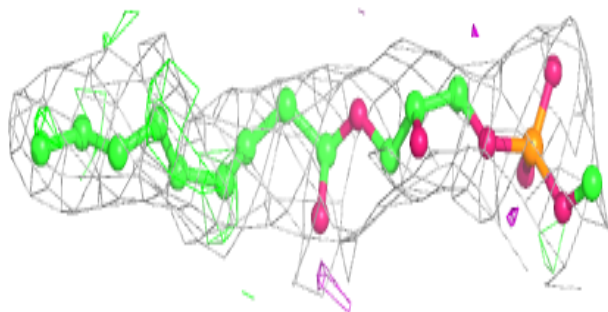
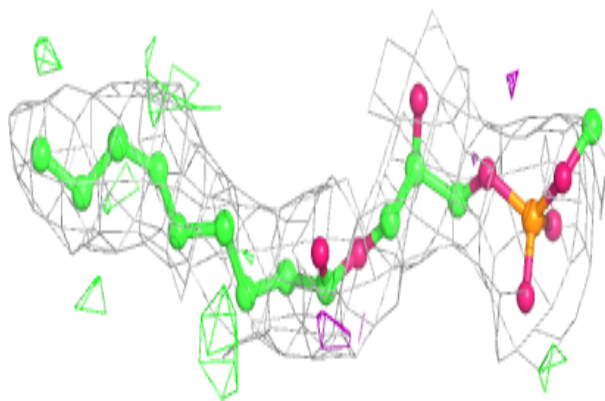
**Electron density around D6C D 1304:**

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

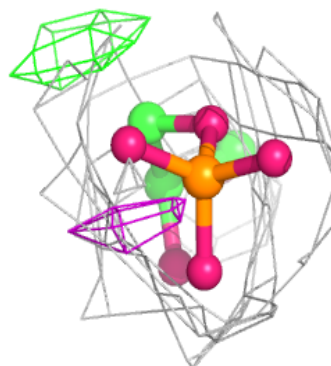
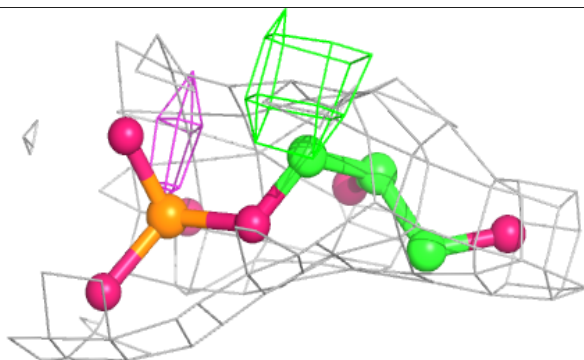
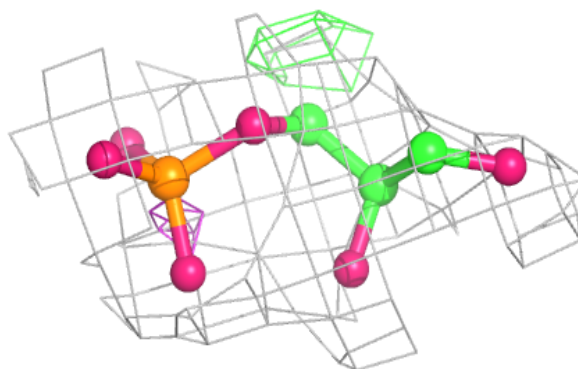


**Electron density around PX4 C 1302:**

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

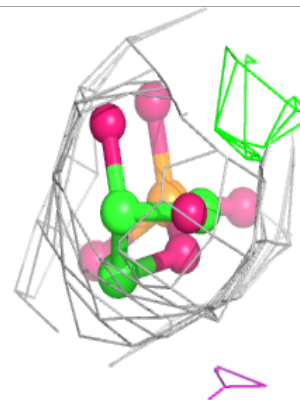
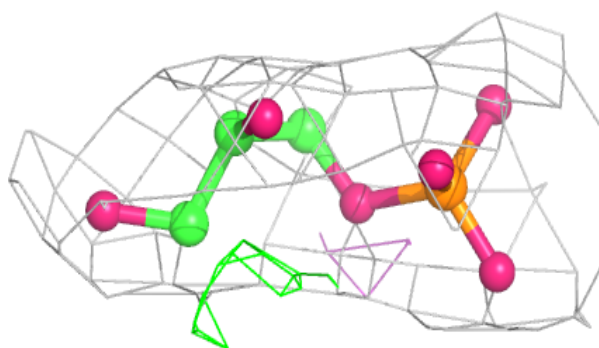
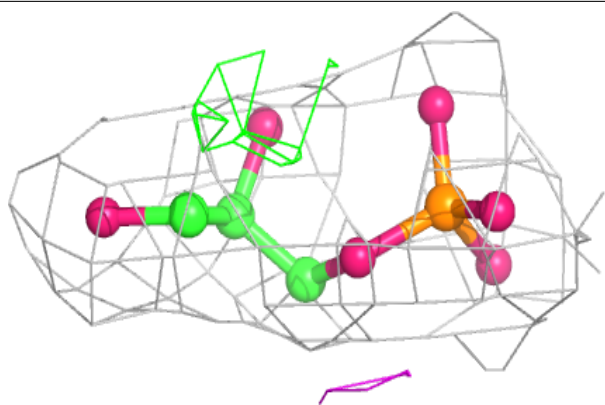
**Electron density around PX4 D 1301:**

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

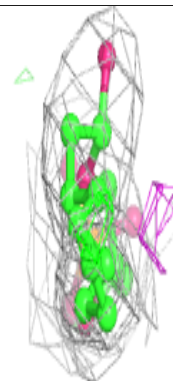
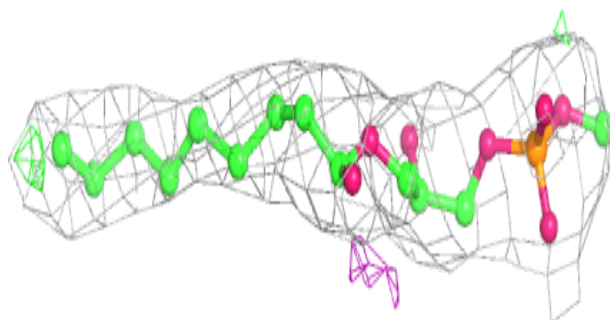
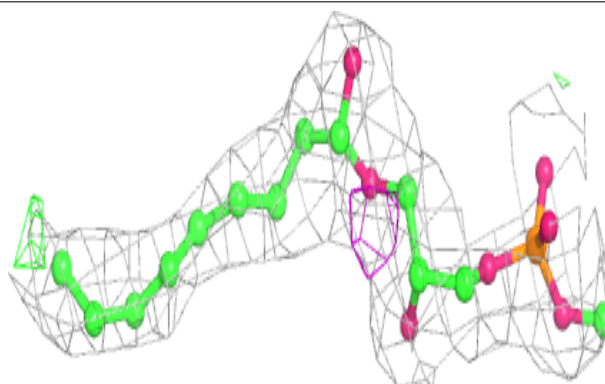


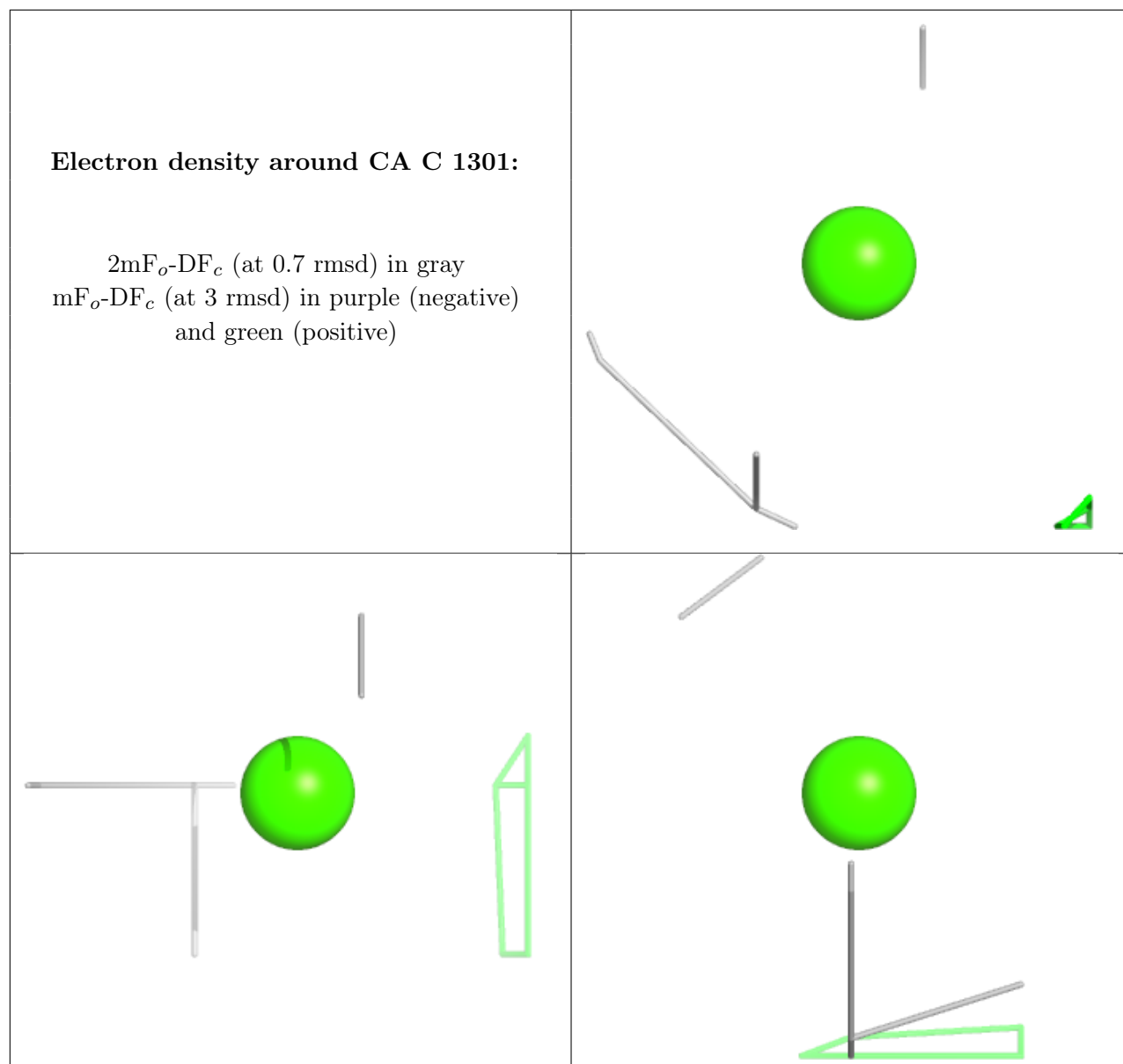
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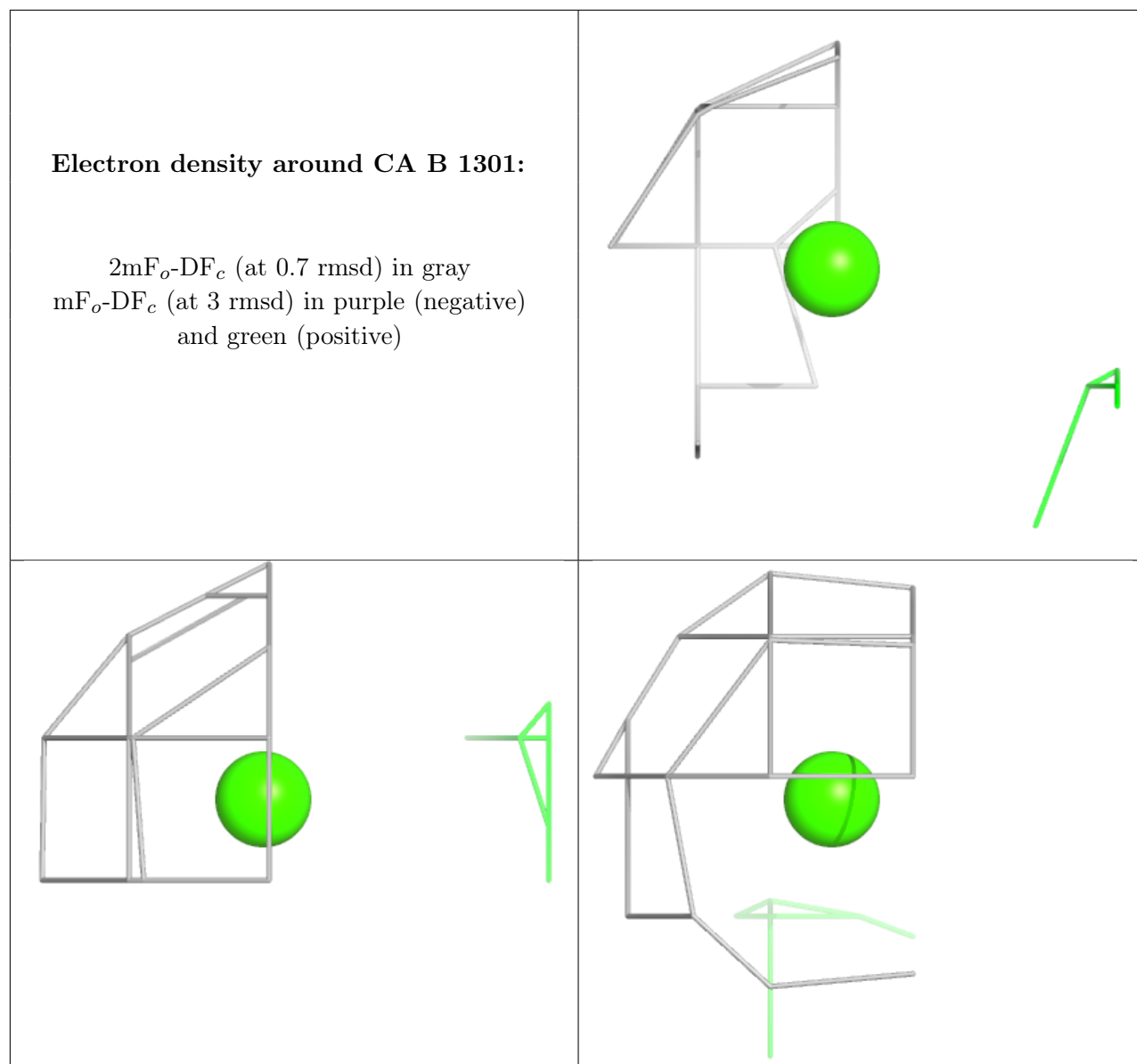
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around PX4 A 1302:**

$2mF_o-DF_c$  (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.