



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 06:30 PM UTC

PDB ID : 4MW8 / pdb_00004mw8
Title : Structural Basis for Ca²⁺ Selectivity of a Voltage-gated Calcium Channel
Authors : Tang, L.; Gamal El-Din, T.M.; Payandeh, J.; Martinez, G.Q.; Heard, T.M.; Scheuer, T.; Zheng, N.; Catterall, W.A.
Deposited on : 2013-09-24
Resolution : 3.26 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

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)
Xtriage (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

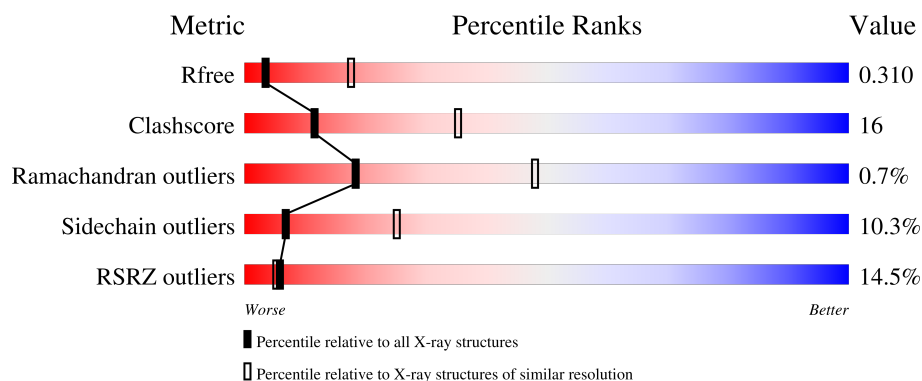
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.26 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	1605 (3.30-3.22)
Clashscore	190562	1660 (3.30-3.22)
Ramachandran outliers	187476	1630 (3.30-3.22)
Sidechain outliers	187428	1629 (3.30-3.22)
RSRZ outliers	180081	1605 (3.30-3.22)

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	237	
1	B	237	
1	C	237	
1	D	237	

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
3	PX4	B	1303	-	-	-	X

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 7378 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
1	A	219	Total	C	N	O	S	0	0	0
			1797	1225	268	292	12			
1	B	219	Total	C	N	O	S	0	0	0
			1797	1225	268	292	12			
1	C	219	Total	C	N	O	S	0	0	0
			1797	1225	268	292	12			
1	D	219	Total	C	N	O	S	0	0	0
			1797	1225	268	292	12			

There are 76 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	983	MET	-	expression tag	UNP A8EVM5
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	1217	CYS	ILE	conflict	UNP A8EVM5
B	983	MET	-	expression tag	UNP A8EVM5
B	984	ASP	-	expression tag	UNP A8EVM5

Continued on next page...

Continued from previous page...

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	1217	CYS	ILE	conflict	UNP A8EVM5
C	983	MET	-	expression tag	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	1217	CYS	ILE	conflict	UNP A8EVM5
D	983	MET	-	expression tag	UNP A8EVM5
D	984	ASP	-	expression tag	UNP A8EVM5
D	985	TYR	-	expression tag	UNP A8EVM5
D	986	LYS	-	expression tag	UNP A8EVM5
D	987	ASP	-	expression tag	UNP A8EVM5
D	988	ASP	-	expression tag	UNP A8EVM5

Continued on next page...

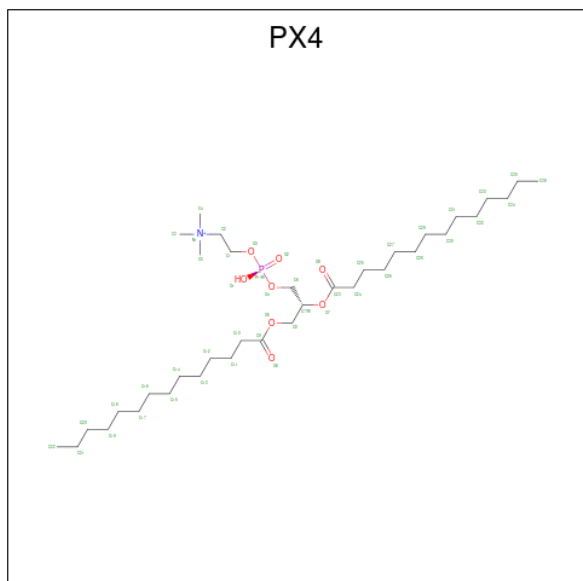
Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
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	1217	CYS	ILE	conflict	UNP A8EVM5

- Molecule 2 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Ca 2 2	0	0

- Molecule 3 is 1,2-DIMYRISTOYL-SN-GLYCERO-3-PHOSPHOCHOLINE (CCD ID: PX4) (formula: C₃₆H₇₃NO₈P).



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

Continued on next page...

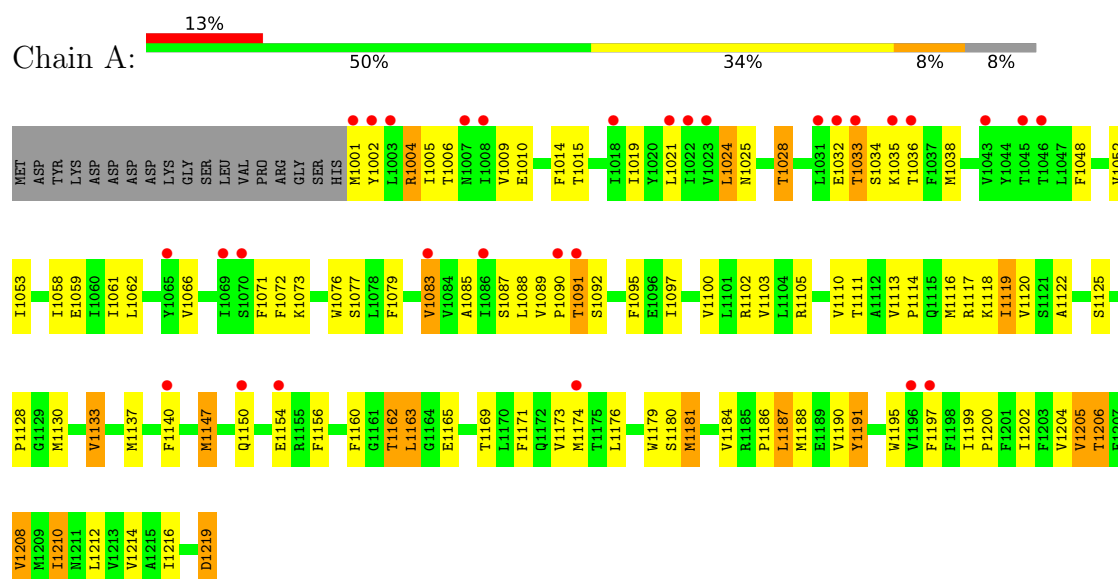
Continued from previous page...

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

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

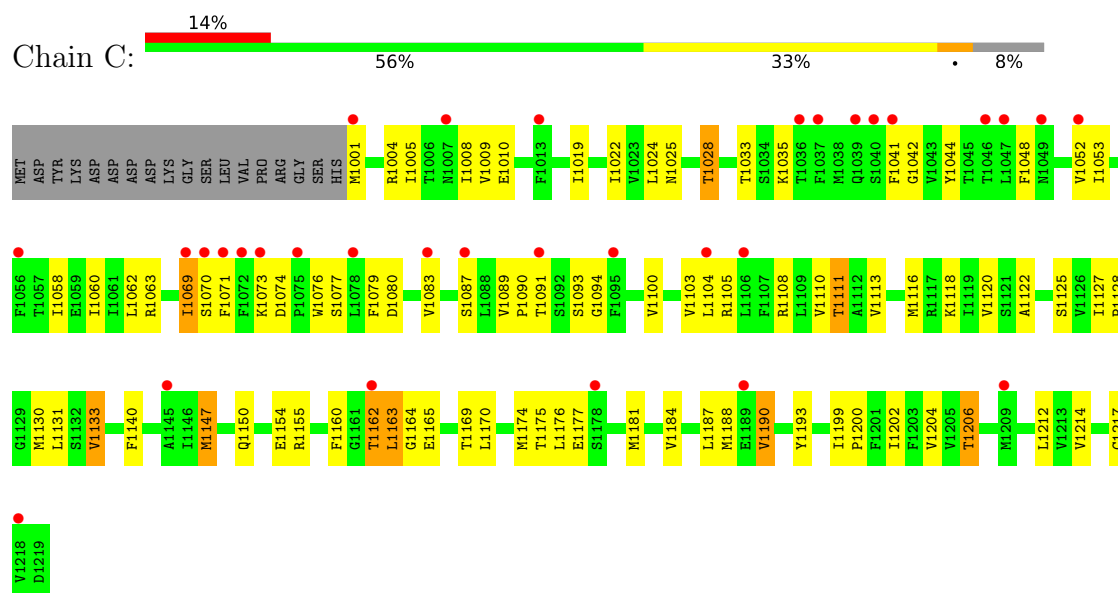
• Molecule 1: Ion transport protein



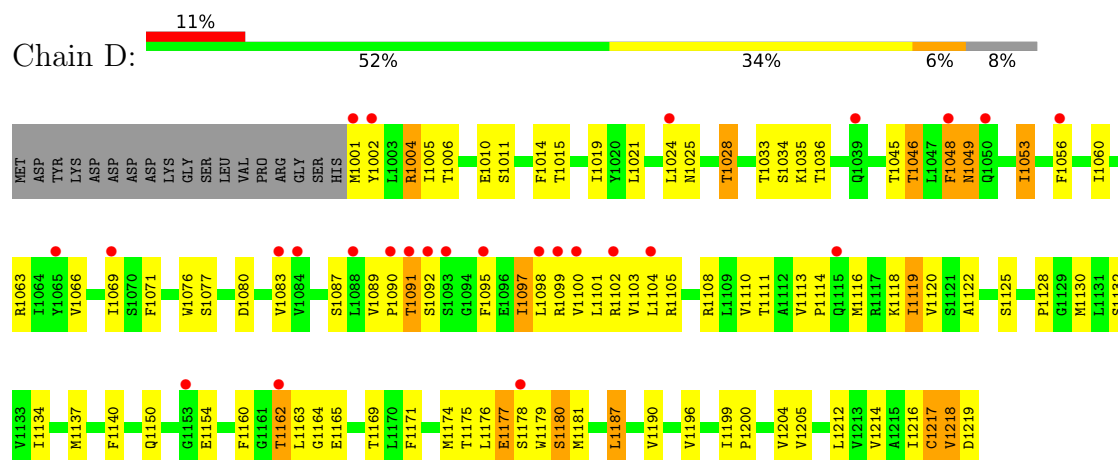
• Molecule 1: Ion transport protein



• Molecule 1: Ion transport protein



- Molecule 1: Ion transport protein



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	229.22Å 124.88Å 124.76Å 90.00° 122.95° 90.00°	Depositor
Resolution (Å)	48.13 – 3.26 48.13 – 3.26	Depositor EDS
% Data completeness (in resolution range)	85.8 (48.13-3.26) 85.8 (48.13-3.26)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.73 (at 3.25Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.276 , 0.314 0.269 , 0.310	Depositor DCC
R_{free} test set	2030 reflections (4.38%)	wwPDB-VP
Wilson B-factor (Å ²)	101.3	Xtriage
Anisotropy	0.273	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 44.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	0.377 for -h-k-l,l,k 0.388 for -h+k-l,-l,-k 0.399 for -h-2*l,-k,l	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	7378	wwPDB-VP
Average B, all atoms (Å ²)	94.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.99% 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: CA, 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	0.86	1/1848 (0.1%)	1.12	9/2514 (0.4%)
1	B	0.83	0/1848	1.11	4/2514 (0.2%)
1	C	0.81	0/1848	1.12	5/2514 (0.2%)
1	D	0.82	0/1848	1.13	7/2514 (0.3%)
All	All	0.83	1/7392 (0.0%)	1.12	25/10056 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1156	PHE	C-O	-5.53	1.18	1.24

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1190	VAL	CB-CA-C	-7.58	104.39	111.06
1	A	1190	VAL	CB-CA-C	-6.82	105.06	111.06
1	D	1190	VAL	CB-CA-C	-6.53	104.04	111.55
1	D	1046	THR	N-CA-C	-6.18	104.44	112.23
1	C	1042	GLY	N-CA-C	6.04	120.20	112.83
1	B	1004	ARG	N-CA-C	-6.00	104.43	110.97
1	D	1004	ARG	N-CA-C	-5.89	104.55	110.97
1	C	1190	VAL	CB-CA-C	-5.81	104.87	111.55
1	D	1097	ILE	N-CA-C	-5.60	104.20	112.04
1	C	1193	TYR	N-CA-C	5.54	119.67	113.02
1	D	1180	SER	N-CA-C	5.52	118.37	111.24
1	D	1190	VAL	N-CA-C	5.49	116.53	111.81
1	B	1046	THR	N-CA-C	-5.45	105.25	111.14
1	A	1004	ARG	N-CA-C	-5.41	105.08	110.97
1	C	1116	MET	N-CA-C	-5.40	105.31	111.14
1	A	1191	TYR	CA-C-N	5.38	125.71	119.47

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1191	TYR	C-N-CA	5.38	125.71	119.47
1	B	1190	VAL	N-CA-C	5.25	118.21	112.96
1	A	1073	LYS	N-CA-C	-5.25	104.90	113.19
1	A	1181	MET	CA-CB-CG	-5.15	103.79	114.10
1	C	1009	VAL	N-CA-C	5.14	115.35	110.42
1	D	1035	LYS	N-CA-C	-5.10	105.90	111.82
1	A	1208	VAL	CB-CA-C	-5.07	105.40	112.04
1	A	1061	ILE	N-CA-C	-5.06	105.77	110.53
1	A	1210	ILE	CB-CA-C	-5.04	105.42	112.02

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	1797	0	1869	67	0
1	B	1797	0	1869	69	0
1	C	1797	0	1869	62	0
1	D	1797	0	1869	66	0
2	A	2	0	0	0	0
3	A	26	0	21	0	0
3	B	47	0	40	9	0
3	C	78	0	64	2	0
3	D	37	0	35	5	0
All	All	7378	0	7636	240	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 16.

All (240) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:1162:THR:HG22	1:C:1165:GLU:H	1.30	0.95
1:D:1162:THR:HG22	1:D:1165:GLU:H	1.34	0.93

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1164:GLY:CA	3:D:1301:PX4:H14	2.10	0.81
1:C:1130:MET:HE3	1:C:1212:LEU:HD11	1.63	0.81
1:C:1089:VAL:HG13	1:C:1090:PRO:HD2	1.66	0.77
1:B:1162:THR:HG22	1:B:1165:GLU:H	1.50	0.76
1:A:1085:ALA:HA	1:A:1088:LEU:HD12	1.68	0.74
1:D:1083:VAL:HG11	1:D:1105:ARG:HA	1.71	0.72
1:D:1164:GLY:HA2	3:D:1301:PX4:H14	1.72	0.71
1:D:1089:VAL:O	1:D:1102:ARG:NH2	2.25	0.70
1:A:1090:PRO:O	1:A:1092:SER:N	2.24	0.70
1:C:1025:ASN:OD1	1:C:1105:ARG:HD2	1.91	0.69
1:A:1071:PHE:CE1	1:A:1077:SER:HB3	2.28	0.69
1:C:1089:VAL:CG1	1:C:1090:PRO:HD2	2.23	0.69
1:B:1130:MET:SD	1:B:1216:ILE:HD11	2.33	0.68
1:C:1001:MET:HE3	1:C:1004:ARG:CZ	2.23	0.68
1:A:1130:MET:HE3	1:A:1212:LEU:HD11	1.76	0.68
1:A:1033:THR:HG21	1:C:1163:LEU:HB2	1.75	0.68
1:A:1150:GLN:HG3	1:B:1100:VAL:HG22	1.75	0.67
1:C:1071:PHE:CE1	1:C:1077:SER:HB3	2.30	0.67
1:A:1162:THR:HG22	1:A:1165:GLU:H	1.60	0.66
1:D:1090:PRO:C	1:D:1092:SER:H	2.05	0.65
1:A:1195:TRP:CE3	3:B:1302:PX4:H19	2.32	0.65
1:D:1091:THR:O	1:D:1099:ARG:NH2	2.30	0.64
1:C:1133:VAL:HG11	1:C:1212:LEU:HD12	1.79	0.64
1:C:1175:THR:HB	1:D:1176:LEU:HD13	1.80	0.63
1:A:1130:MET:SD	1:A:1216:ILE:HD11	2.38	0.63
1:B:1071:PHE:CE1	1:B:1077:SER:HB3	2.33	0.63
1:C:1155:ARG:HG3	1:C:1190:VAL:HG11	1.81	0.62
1:B:1025:ASN:OD1	1:B:1105:ARG:HD2	2.00	0.62
1:B:1180:SER:N	1:D:1177:GLU:OE2	2.27	0.62
1:D:1019:ILE:HD13	1:D:1113:VAL:HG22	1.82	0.62
1:D:1025:ASN:OD1	1:D:1105:ARG:HD2	1.99	0.62
1:D:1063:ARG:HH12	1:D:1108:ARG:NH2	2.00	0.60
1:A:1025:ASN:OD1	1:A:1105:ARG:HD2	2.01	0.60
1:C:1083:VAL:HG11	1:C:1105:ARG:HA	1.83	0.60
1:D:1164:GLY:HA3	3:D:1301:PX4:H14	1.81	0.60
1:C:1125:SER:O	1:C:1128:PRO:HD2	2.02	0.59
1:C:1184:VAL:O	1:C:1188:MET:HG3	2.02	0.59
1:A:1181:MET:HE1	1:B:1182:GLY:HA3	1.85	0.59
1:B:1001:MET:HG3	1:B:1004:ARG:HD3	1.85	0.58
1:D:1001:MET:HE3	1:D:1004:ARG:CZ	2.33	0.58
1:B:1164:GLY:CA	3:B:1302:PX4:H15	2.34	0.58

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1133:VAL:HG11	1:A:1212:LEU:HD12	1.85	0.58
1:B:1110:VAL:HG11	1:B:1120:VAL:HG21	1.85	0.58
1:D:1063:ARG:HH12	1:D:1108:ARG:HH22	1.52	0.58
1:C:1019:ILE:HD13	1:C:1113:VAL:HG22	1.86	0.58
1:C:1217:CYS:HB2	1:D:1214:VAL:HG22	1.86	0.58
1:D:1080:ASP:OD2	1:D:1108:ARG:NH2	2.36	0.57
1:A:1147:MET:HB3	1:A:1197:PHE:HE2	1.69	0.57
1:D:1056:PHE:HE2	1:D:1108:ARG:HD3	1.69	0.57
1:A:1087:SER:HB3	1:A:1105:ARG:HH21	1.70	0.57
1:C:1164:GLY:CA	3:C:1302:PX4:H15	2.35	0.57
1:D:1095:PHE:HB3	1:D:1097:ILE:HG12	1.88	0.56
1:A:1091:THR:HB	1:A:1102:ARG:HH12	1.71	0.55
1:B:1126:VAL:HG11	1:B:1216:ILE:HG23	1.88	0.55
1:C:1100:VAL:O	1:C:1103:VAL:HG12	2.06	0.55
1:A:1089:VAL:O	1:A:1102:ARG:NH2	2.38	0.55
1:C:1063:ARG:HH12	1:C:1108:ARG:HH22	1.54	0.55
1:C:1202:ILE:O	1:C:1206:THR:OG1	2.21	0.55
1:A:1001:MET:HE3	1:A:1004:ARG:CZ	2.37	0.55
1:C:1080:ASP:OD1	1:C:1111:THR:HG21	2.06	0.54
1:D:1140:PHE:CZ	1:D:1204:VAL:HG11	2.43	0.54
1:C:1164:GLY:HA3	3:C:1302:PX4:H15	1.88	0.54
1:D:1130:MET:HE3	1:D:1212:LEU:HD11	1.90	0.54
1:D:1001:MET:HG3	1:D:1004:ARG:HD3	1.90	0.54
1:A:1171:PHE:CE2	1:C:1199:ILE:HD12	2.43	0.53
1:B:1089:VAL:O	1:B:1102:ARG:NH2	2.41	0.53
1:B:1150:GLN:HG3	1:D:1100:VAL:HG22	1.88	0.53
1:A:1083:VAL:HG11	1:A:1105:ARG:HA	1.89	0.53
1:A:1100:VAL:HG22	1:C:1150:GLN:HG3	1.91	0.53
1:A:1103:VAL:HG11	1:C:1147:MET:HG3	1.89	0.53
1:B:1164:GLY:HA2	3:B:1302:PX4:H15	1.91	0.53
1:D:1053:ILE:HD11	1:D:1087:SER:HB2	1.90	0.52
1:B:1063:ARG:HH12	1:B:1108:ARG:HH22	1.57	0.52
1:C:1074:ASP:OD2	1:C:1077:SER:OG	2.27	0.52
1:A:1024:LEU:HD23	1:A:1048:PHE:CZ	2.44	0.52
1:C:1001:MET:HG3	1:C:1004:ARG:HD3	1.92	0.52
1:B:1137:MET:HE1	1:B:1205:VAL:HG22	1.91	0.52
1:C:1041:PHE:O	1:C:1044:TYR:HB2	2.10	0.51
1:A:1019:ILE:HD13	1:A:1113:VAL:HG22	1.92	0.51
1:C:1122:ALA:O	1:C:1125:SER:OG	2.23	0.51
1:B:1198:PHE:O	1:B:1202:ILE:HG13	2.11	0.51
1:D:1071:PHE:CE1	1:D:1077:SER:HB3	2.45	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1100:VAL:O	1:D:1103:VAL:HG12	2.10	0.51
1:A:1038:MET:HA	1:A:1038:MET:HE2	1.91	0.51
1:B:1038:MET:HE2	1:B:1038:MET:HA	1.92	0.51
1:A:1184:VAL:O	1:A:1188:MET:HG3	2.11	0.51
1:B:1164:GLY:HA3	3:B:1302:PX4:H14	1.91	0.51
1:D:1113:VAL:HG12	1:D:1114:PRO:O	2.11	0.51
1:B:1164:GLY:CA	3:B:1302:PX4:C6	2.89	0.50
1:C:1174:MET:C	1:C:1176:LEU:H	2.19	0.50
1:D:1164:GLY:HA3	3:D:1301:PX4:C6	2.42	0.50
1:D:1002:TYR:O	1:D:1005:ILE:HG12	2.12	0.50
1:B:1110:VAL:CG1	1:B:1120:VAL:HG21	2.42	0.50
1:B:1133:VAL:HG11	1:B:1212:LEU:HD12	1.94	0.50
1:B:1164:GLY:HA3	3:B:1302:PX4:C6	2.41	0.50
1:A:1206:THR:O	1:A:1210:ILE:HG13	2.11	0.50
1:A:1137:MET:HE1	1:A:1205:VAL:HG22	1.93	0.50
1:A:1199:ILE:HB	1:A:1200:PRO:HD3	1.94	0.49
1:C:1087:SER:HB3	1:C:1105:ARG:HH21	1.78	0.49
1:B:1113:VAL:HG12	1:B:1114:PRO:O	2.12	0.49
1:D:1090:PRO:C	1:D:1092:SER:N	2.71	0.49
1:D:1199:ILE:HB	1:D:1200:PRO:HD3	1.95	0.49
1:B:1079:PHE:CZ	1:B:1083:VAL:HG21	2.47	0.49
1:B:1122:ALA:O	1:B:1125:SER:OG	2.30	0.49
1:A:1180:SER:N	1:B:1177:GLU:OE2	2.42	0.49
1:A:1028:THR:O	1:A:1032:GLU:HG3	2.12	0.49
1:C:1069:ILE:O	1:C:1073:LYS:HG3	2.13	0.48
1:D:1048:PHE:CD1	1:D:1048:PHE:C	2.92	0.48
1:D:1164:GLY:CA	3:D:1301:PX4:C6	2.89	0.48
1:A:1219:ASP:N	1:A:1219:ASP:OD1	2.46	0.48
1:C:1058:ILE:O	1:C:1062:LEU:HG	2.12	0.48
1:B:1002:TYR:O	1:B:1005:ILE:HG12	2.14	0.48
1:A:1058:ILE:O	1:A:1062:LEU:HG	2.14	0.48
1:B:1214:VAL:HG22	1:D:1217:CYS:HB2	1.96	0.48
1:A:1087:SER:CB	1:A:1105:ARG:HH21	2.28	0.47
1:A:1119:ILE:HD11	1:C:1133:VAL:HG23	1.96	0.47
1:B:1004:ARG:O	1:B:1008:ILE:HG13	2.14	0.47
1:A:1110:VAL:HG11	1:A:1120:VAL:HG21	1.97	0.47
1:D:1087:SER:HB3	1:D:1105:ARG:HH21	1.80	0.47
1:D:1130:MET:SD	1:D:1216:ILE:HD11	2.55	0.47
1:A:1083:VAL:CG1	1:A:1105:ARG:HA	2.45	0.47
1:D:1101:LEU:HD22	1:D:1104:LEU:HD11	1.96	0.47
1:B:1076:TRP:CD1	1:B:1076:TRP:H	2.33	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1160:PHE:CZ	1:B:1169:THR:HG21	2.50	0.47
1:C:1128:PRO:HA	1:C:1131:LEU:HG	1.96	0.47
1:D:1130:MET:HE2	1:D:1134:ILE:HD11	1.97	0.46
1:B:1137:MET:SD	1:B:1208:VAL:HG11	2.55	0.46
1:C:1177:GLU:OE2	1:D:1180:SER:N	2.40	0.46
1:A:1133:VAL:HG23	1:B:1119:ILE:HD11	1.98	0.46
1:B:1051:ILE:O	1:B:1055:ILE:HG13	2.16	0.46
1:C:1025:ASN:O	1:C:1028:THR:HG22	2.16	0.46
1:C:1022:ILE:HD11	1:C:1108:ARG:HB3	1.97	0.46
1:B:1028:THR:O	1:B:1032:GLU:HG3	2.16	0.46
1:A:1001:MET:HG3	1:A:1004:ARG:HD3	1.97	0.46
1:B:1172:GLN:HG3	1:B:1177:GLU:OE1	2.16	0.46
1:C:1140:PHE:CZ	1:C:1204:VAL:HG11	2.51	0.46
1:B:1101:LEU:HD22	1:B:1104:LEU:HD11	1.97	0.46
1:A:1169:THR:O	1:A:1173:VAL:HG23	2.16	0.45
1:D:1090:PRO:O	1:D:1092:SER:N	2.50	0.45
1:A:1160:PHE:CZ	1:A:1169:THR:HG21	2.51	0.45
1:D:1011:SER:OG	1:D:1014:PHE:HB2	2.17	0.45
1:A:1009:VAL:HA	1:A:1014:PHE:CD2	2.51	0.45
1:A:1188:MET:HA	1:A:1191:TYR:O	2.16	0.45
1:B:1118:LYS:HA	1:B:1118:LYS:HD3	1.75	0.45
1:A:1113:VAL:O	1:A:1116:MET:HB2	2.17	0.45
1:A:1113:VAL:HG12	1:A:1114:PRO:O	2.16	0.45
1:C:1080:ASP:CG	1:C:1111:THR:HG21	2.41	0.45
1:A:1048:PHE:O	1:A:1052:VAL:HG23	2.17	0.45
1:A:1140:PHE:CZ	1:A:1204:VAL:HG11	2.52	0.45
1:B:1019:ILE:HD13	1:B:1113:VAL:HG22	1.98	0.45
1:B:1174:MET:C	1:B:1176:LEU:H	2.23	0.45
1:B:1199:ILE:HB	1:B:1200:PRO:HD3	1.98	0.45
1:C:1076:TRP:H	1:C:1076:TRP:CD1	2.34	0.45
1:D:1001:MET:O	1:D:1004:ARG:HB3	2.17	0.45
1:D:1034:SER:OG	1:D:1036:THR:HB	2.17	0.45
1:B:1164:GLY:HA3	3:B:1302:PX4:O3	2.16	0.45
1:C:1110:VAL:HG11	1:C:1120:VAL:HG21	1.98	0.45
1:B:1001:MET:HE3	1:B:1004:ARG:CZ	2.47	0.45
1:C:1127:ILE:HG22	1:C:1131:LEU:HD21	1.98	0.45
1:D:1076:TRP:CD1	1:D:1076:TRP:H	2.35	0.45
1:B:1176:LEU:HD13	1:D:1175:THR:HB	1.98	0.44
1:B:1032:GLU:HA	1:B:1038:MET:HE3	1.99	0.44
1:D:1110:VAL:CG1	1:D:1120:VAL:HG21	2.47	0.44
1:C:1160:PHE:CZ	1:C:1169:THR:HG21	2.52	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1137:MET:SD	1:A:1208:VAL:HG11	2.58	0.44
1:B:1206:THR:O	1:B:1210:ILE:HG13	2.17	0.44
1:C:1199:ILE:HB	1:C:1200:PRO:HD3	1.98	0.44
1:B:1058:ILE:O	1:B:1062:LEU:HG	2.18	0.44
1:B:1163:LEU:HD23	1:B:1163:LEU:HA	1.84	0.44
1:A:1006:THR:HG23	1:A:1066:VAL:HG13	2.00	0.44
1:B:1080:ASP:O	1:B:1084:VAL:HG23	2.18	0.43
1:B:1167:PHE:HB3	3:B:1302:PX4:O6	2.17	0.43
1:A:1071:PHE:HD2	1:A:1072:PHE:CD2	2.36	0.43
1:D:1125:SER:O	1:D:1128:PRO:HD2	2.17	0.43
1:B:1199:ILE:HD12	1:D:1171:PHE:CE2	2.53	0.43
1:A:1002:TYR:O	1:A:1005:ILE:HG12	2.18	0.43
1:C:1069:ILE:O	1:C:1069:ILE:HG12	2.17	0.43
1:A:1095:PHE:HB3	1:A:1097:ILE:HG12	1.99	0.43
1:B:1067:HIS:HB2	1:B:1071:PHE:HB2	2.01	0.43
1:B:1202:ILE:O	1:B:1206:THR:OG1	2.23	0.43
1:C:1133:VAL:CG1	1:C:1212:LEU:HD12	2.47	0.43
1:B:1162:THR:HG21	3:B:1302:PX4:C1	2.49	0.43
1:D:1122:ALA:O	1:D:1125:SER:OG	2.36	0.43
1:C:1005:ILE:HA	1:C:1008:ILE:HG13	2.01	0.42
1:D:1006:THR:HG23	1:D:1066:VAL:HG13	2.00	0.42
1:D:1216:ILE:C	1:D:1218:VAL:H	2.26	0.42
1:A:1110:VAL:CG1	1:A:1120:VAL:HG21	2.49	0.42
1:C:1100:VAL:HG22	1:D:1150:GLN:HG3	2.01	0.42
1:C:1177:GLU:OE2	1:D:1179:TRP:N	2.52	0.42
1:B:1141:PHE:CZ	1:B:1174:MET:HE2	2.54	0.42
1:C:1181:MET:HE3	1:C:1181:MET:HA	2.01	0.42
1:B:1133:VAL:HG23	1:D:1119:ILE:HD11	2.02	0.42
1:C:1087:SER:CB	1:C:1105:ARG:HH21	2.32	0.42
1:D:1160:PHE:CZ	1:D:1169:THR:HG21	2.55	0.42
1:C:1130:MET:HE3	1:C:1212:LEU:HD21	2.01	0.42
1:D:1137:MET:HE1	1:D:1205:VAL:HG13	2.01	0.42
1:D:1181:MET:HE3	1:D:1181:MET:HA	2.02	0.42
1:A:1114:PRO:HA	1:A:1117:ARG:HB2	2.01	0.42
1:D:1098:LEU:HD23	1:D:1101:LEU:HD12	2.01	0.42
1:D:1021:LEU:HD23	1:D:1021:LEU:HA	1.76	0.42
1:B:1133:VAL:O	1:B:1136:LEU:HB3	2.20	0.42
1:D:1028:THR:HG23	1:D:1045:THR:HG23	2.02	0.42
1:A:1125:SER:O	1:A:1128:PRO:HD2	2.19	0.41
1:D:1174:MET:C	1:D:1176:LEU:H	2.28	0.41
1:A:1079:PHE:CZ	1:A:1083:VAL:HG21	2.54	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1163:LEU:HD23	1:A:1163:LEU:HA	1.85	0.41
1:C:1048:PHE:O	1:C:1052:VAL:HG23	2.20	0.41
1:A:1034:SER:OG	1:A:1036:THR:HB	2.20	0.41
1:A:1202:ILE:O	1:A:1206:THR:OG1	2.37	0.41
1:C:1104:LEU:HD23	1:C:1104:LEU:HA	1.78	0.41
1:C:1162:THR:HG23	1:C:1164:GLY:H	1.85	0.41
1:C:1174:MET:C	1:C:1176:LEU:N	2.78	0.41
1:A:1014:PHE:CE2	1:A:1059:GLU:HG3	2.55	0.41
1:A:1174:MET:C	1:A:1176:LEU:H	2.29	0.41
1:A:1186:PRO:O	1:A:1187:LEU:C	2.62	0.41
1:C:1177:GLU:OE2	1:D:1178:SER:C	2.63	0.41
1:D:1187:LEU:HA	1:D:1187:LEU:HD12	1.83	0.41
1:B:1022:ILE:HD11	1:B:1108:ARG:HB3	2.02	0.41
1:B:1135:ALA:HB1	1:D:1116:MET:HE1	2.02	0.41
1:C:1079:PHE:CZ	1:C:1083:VAL:HG21	2.55	0.41
1:A:1179:TRP:N	1:B:1177:GLU:OE2	2.54	0.41
1:D:1110:VAL:HG11	1:D:1120:VAL:HG21	2.03	0.41
1:A:1122:ALA:O	1:A:1125:SER:OG	2.38	0.41
1:B:1123:LEU:O	1:B:1126:VAL:HG23	2.21	0.41
1:C:1105:ARG:HD2	1:C:1105:ARG:HH11	1.77	0.41
1:B:1048:PHE:O	1:B:1052:VAL:HG23	2.20	0.41
1:B:1137:MET:CE	1:B:1205:VAL:HG22	2.51	0.41
1:B:1184:VAL:O	1:B:1188:MET:HG3	2.20	0.41
1:A:1133:VAL:CG1	1:A:1212:LEU:HD12	2.49	0.41
1:B:1176:LEU:HD21	1:B:1202:ILE:HG23	2.03	0.41
1:C:1110:VAL:CG1	1:C:1120:VAL:HG21	2.51	0.41
1:C:1170:LEU:HD23	1:C:1170:LEU:HA	1.89	0.41
1:A:1076:TRP:CD1	1:A:1076:TRP:H	2.38	0.41
1:A:1181:MET:HE2	1:B:1178:SER:HB3	2.02	0.40
1:B:1037:PHE:CE1	1:B:1041:PHE:HD2	2.40	0.40
1:D:1045:THR:O	1:D:1049:ASN:HB2	2.20	0.40
1:A:1021:LEU:HD23	1:A:1021:LEU:HA	1.70	0.40
1:B:1125:SER:O	1:B:1128:PRO:HD2	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	217/237 (92%)	203 (94%)	13 (6%)	1 (0%)	24	55
1	B	217/237 (92%)	198 (91%)	19 (9%)	0	100	100
1	C	217/237 (92%)	202 (93%)	13 (6%)	2 (1%)	14	42
1	D	217/237 (92%)	197 (91%)	17 (8%)	3 (1%)	9	33
All	All	868/948 (92%)	800 (92%)	62 (7%)	6 (1%)	18	48

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1091	THR
1	D	1091	THR
1	D	1217	CYS
1	C	1093	SER
1	C	1094	GLY
1	D	1218	VAL

5.3.2 Protein sidechains

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	202/218 (93%)	181 (90%)	21 (10%)	7	25
1	B	202/218 (93%)	182 (90%)	20 (10%)	7	26
1	C	202/218 (93%)	182 (90%)	20 (10%)	7	26
1	D	202/218 (93%)	180 (89%)	22 (11%)	6	23

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	808/872 (93%)	725 (90%)	83 (10%)	7	25

All (83) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1010	GLU
1	A	1015	THR
1	A	1024	LEU
1	A	1028	THR
1	A	1033	THR
1	A	1035	LYS
1	A	1053	ILE
1	A	1083	VAL
1	A	1111	THR
1	A	1118	LYS
1	A	1119	ILE
1	A	1133	VAL
1	A	1147	MET
1	A	1154	GLU
1	A	1162	THR
1	A	1163	LEU
1	A	1187	LEU
1	A	1205	VAL
1	A	1206	THR
1	A	1214	VAL
1	A	1219	ASP
1	B	1010	GLU
1	B	1015	THR
1	B	1024	LEU
1	B	1028	THR
1	B	1031	LEU
1	B	1033	THR
1	B	1035	LYS
1	B	1049	ASN
1	B	1053	ILE
1	B	1070	SER
1	B	1083	VAL
1	B	1118	LYS
1	B	1119	ILE
1	B	1162	THR
1	B	1163	LEU
1	B	1187	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	1205	VAL
1	B	1206	THR
1	B	1214	VAL
1	B	1218	VAL
1	C	1010	GLU
1	C	1024	LEU
1	C	1028	THR
1	C	1033	THR
1	C	1035	LYS
1	C	1053	ILE
1	C	1060	ILE
1	C	1069	ILE
1	C	1070	SER
1	C	1091	THR
1	C	1111	THR
1	C	1118	LYS
1	C	1133	VAL
1	C	1147	MET
1	C	1154	GLU
1	C	1162	THR
1	C	1163	LEU
1	C	1187	LEU
1	C	1206	THR
1	C	1214	VAL
1	D	1010	GLU
1	D	1015	THR
1	D	1024	LEU
1	D	1028	THR
1	D	1033	THR
1	D	1046	THR
1	D	1048	PHE
1	D	1049	ASN
1	D	1053	ILE
1	D	1060	ILE
1	D	1069	ILE
1	D	1111	THR
1	D	1118	LYS
1	D	1119	ILE
1	D	1132	SER
1	D	1154	GLU
1	D	1162	THR
1	D	1163	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	1177	GLU
1	D	1187	LEU
1	D	1196	VAL
1	D	1219	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1211	ASN
1	C	1211	ASN
1	D	1211	ASN

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](#)

Of 18 ligands modelled in this entry, 2 are monoatomic - leaving 16 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	$\# Z > 2$
3	PX4	D	1302	-	5,5,45	0.41	0	4,4,53	0.46	0
3	PX4	C	1301	-	9,9,45	0.58	0	10,12,53	0.97	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	PX4	D	1303	-	9,9,45	0.99	0	10,12,53	1.50	3 (30%)
3	PX4	A	1304	-	5,5,45	0.36	0	4,4,53	0.36	0
3	PX4	B	1304	-	9,9,45	0.84	0	10,12,53	1.32	2 (20%)
3	PX4	C	1306	-	9,9,45	0.83	0	10,12,53	1.45	2 (20%)
3	PX4	C	1302	-	20,20,45	1.40	2 (10%)	22,24,53	1.58	2 (9%)
3	PX4	D	1301	-	20,20,45	1.25	2 (10%)	22,24,53	1.84	2 (9%)
3	PX4	C	1304	-	9,9,45	0.63	0	10,12,53	1.52	1 (10%)
3	PX4	B	1302	-	20,20,45	1.59	2 (10%)	22,24,53	1.58	2 (9%)
3	PX4	C	1303	-	5,5,45	0.38	0	4,4,53	0.21	0
3	PX4	C	1305	-	20,20,45	1.48	2 (10%)	22,24,53	1.38	2 (9%)
3	PX4	B	1301	-	9,9,45	0.61	0	10,12,53	1.25	1 (10%)
3	PX4	A	1303	-	9,9,45	0.62	0	10,12,53	1.20	1 (10%)
3	PX4	A	1305	-	9,9,45	1.01	0	10,12,53	1.41	1 (10%)
3	PX4	B	1303	-	5,5,45	0.56	0	4,4,53	0.49	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	PX4	D	1302	-	-	0/3/3/49	-
3	PX4	C	1301	-	-	5/8/8/49	-
3	PX4	D	1303	-	-	6/8/8/49	-
3	PX4	A	1304	-	-	1/3/3/49	-
3	PX4	B	1304	-	-	7/8/8/49	-
3	PX4	C	1306	-	-	5/8/8/49	-
3	PX4	C	1302	-	-	10/22/22/49	-
3	PX4	D	1301	-	-	11/22/22/49	-
3	PX4	C	1304	-	-	1/8/8/49	-
3	PX4	B	1302	-	-	10/22/22/49	-
3	PX4	C	1303	-	-	2/3/3/49	-
3	PX4	C	1305	-	-	6/22/22/49	-
3	PX4	B	1301	-	-	6/8/8/49	-
3	PX4	A	1303	-	-	5/8/8/49	-
3	PX4	A	1305	-	-	3/8/8/49	-
3	PX4	B	1303	-	-	1/3/3/49	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1302	PX4	O6-C9	5.44	1.38	1.22
3	C	1305	PX4	O6-C9	5.31	1.38	1.22
3	C	1302	PX4	O6-C9	4.90	1.37	1.22
3	D	1301	PX4	O6-C9	4.55	1.36	1.22
3	B	1302	PX4	O5-C9	3.87	1.44	1.33
3	C	1305	PX4	O5-C9	3.31	1.43	1.33
3	C	1302	PX4	O5-C9	3.13	1.42	1.33
3	D	1301	PX4	O5-C9	2.25	1.39	1.33

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	1301	PX4	O5-C9-O6	-7.01	106.08	123.63
3	C	1302	PX4	O5-C9-O6	-5.51	109.84	123.63
3	B	1302	PX4	O5-C9-O6	-4.96	111.22	123.63
3	B	1302	PX4	O6-C9-C10	-4.50	106.19	123.78
3	C	1305	PX4	O5-C9-O6	-4.35	112.75	123.63
3	C	1302	PX4	O6-C9-C10	-4.22	107.28	123.78
3	D	1301	PX4	O6-C9-C10	-3.71	109.25	123.78
3	C	1305	PX4	O6-C9-C10	-3.60	109.72	123.78
3	C	1304	PX4	O3-P1-O4	3.33	115.35	106.67
3	C	1306	PX4	O1-P1-O4	3.18	114.97	106.67
3	A	1305	PX4	O3-P1-O4	3.06	114.64	106.67
3	B	1304	PX4	O1-P1-O4	2.72	113.76	106.67
3	D	1303	PX4	O1-P1-O4	2.64	113.56	106.67
3	A	1303	PX4	O4-P1-O2	2.57	113.38	106.44
3	C	1306	PX4	O3-P1-O4	2.51	113.20	106.67
3	B	1301	PX4	O1-P1-O4	2.50	113.19	106.67
3	D	1303	PX4	O3-P1-O4	2.26	112.55	106.67
3	D	1303	PX4	O3-P1-O2	-2.20	102.25	110.83
3	B	1304	PX4	O4-P1-O2	2.18	112.33	106.44

There are no chirality outliers.

All (79) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1303	PX4	C6-O4-P1-O1
3	A	1303	PX4	C6-O4-P1-O2
3	A	1303	PX4	C6-O4-P1-O3
3	A	1303	PX4	C6-C7-C8-O5
3	A	1303	PX4	O7-C7-C8-O5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	A	1305	PX4	C6-C7-C8-O5
3	B	1301	PX4	C6-O4-P1-O1
3	B	1301	PX4	C6-O4-P1-O3
3	B	1302	PX4	C6-O4-P1-O1
3	B	1304	PX4	C6-O4-P1-O1
3	B	1304	PX4	C6-O4-P1-O3
3	B	1304	PX4	C6-C7-C8-O5
3	C	1301	PX4	C6-O4-P1-O1
3	C	1301	PX4	C6-O4-P1-O2
3	C	1301	PX4	C6-O4-P1-O3
3	C	1301	PX4	C6-C7-C8-O5
3	C	1302	PX4	C1-O3-P1-O4
3	C	1302	PX4	C6-O4-P1-O2
3	C	1302	PX4	C6-O4-P1-O3
3	C	1302	PX4	O7-C7-C8-O5
3	C	1306	PX4	C6-O4-P1-O1
3	C	1306	PX4	C6-O4-P1-O3
3	C	1306	PX4	C6-C7-C8-O5
3	C	1306	PX4	O7-C7-C8-O5
3	D	1301	PX4	C6-O4-P1-O1
3	D	1301	PX4	O4-C6-C7-C8
3	D	1301	PX4	O7-C7-C8-O5
3	D	1303	PX4	C6-O4-P1-O1
3	D	1303	PX4	C6-O4-P1-O3
3	D	1303	PX4	C6-C7-C8-O5
3	B	1302	PX4	C10-C9-O5-C8
3	B	1301	PX4	O4-C6-C7-O7
3	D	1301	PX4	O6-C9-O5-C8
3	B	1301	PX4	O4-C6-C7-C8
3	D	1303	PX4	O4-C6-C7-C8
3	D	1301	PX4	O4-C6-C7-O7
3	A	1305	PX4	O7-C7-C8-O5
3	D	1303	PX4	O7-C7-C8-O5
3	C	1302	PX4	C9-C10-C11-C12
3	B	1304	PX4	O4-C6-C7-O7
3	D	1303	PX4	O4-C6-C7-O7
3	B	1304	PX4	O4-C6-C7-C8
3	D	1301	PX4	C6-C7-C8-O5
3	C	1302	PX4	C1-O3-P1-O2
3	B	1302	PX4	O6-C9-O5-C8
3	C	1301	PX4	O7-C7-C8-O5
3	D	1301	PX4	C10-C11-C12-C13

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	D	1301	PX4	C12-C13-C14-C15
3	C	1305	PX4	C10-C9-O5-C8
3	C	1305	PX4	C9-C10-C11-C12
3	C	1305	PX4	C13-C14-C15-C16
3	C	1302	PX4	O6-C9-O5-C8
3	C	1302	PX4	C6-C7-C8-O5
3	C	1303	PX4	C32-C33-C34-C35
3	D	1301	PX4	C9-C10-C11-C12
3	B	1302	PX4	C12-C13-C14-C15
3	B	1302	PX4	C10-C11-C12-C13
3	B	1302	PX4	C11-C12-C13-C14
3	C	1305	PX4	C11-C12-C13-C14
3	B	1302	PX4	C13-C14-C15-C16
3	B	1301	PX4	C6-O4-P1-O2
3	B	1304	PX4	C6-O4-P1-O2
3	C	1306	PX4	C6-O4-P1-O2
3	B	1304	PX4	O7-C7-C8-O5
3	C	1304	PX4	O7-C7-C8-O5
3	C	1302	PX4	C14-C15-C16-C17
3	C	1303	PX4	C31-C32-C33-C34
3	B	1301	PX4	O7-C7-C8-O5
3	A	1305	PX4	C6-O4-P1-O3
3	C	1305	PX4	C12-C13-C14-C15
3	B	1302	PX4	C6-O4-P1-O2
3	B	1302	PX4	C6-O4-P1-O3
3	D	1301	PX4	C6-O4-P1-O2
3	D	1301	PX4	C6-O4-P1-O3
3	C	1305	PX4	C1-O3-P1-O1
3	B	1302	PX4	C14-C15-C16-C17
3	C	1302	PX4	C11-C12-C13-C14
3	B	1303	PX4	C33-C34-C35-C36
3	A	1304	PX4	C33-C34-C35-C36

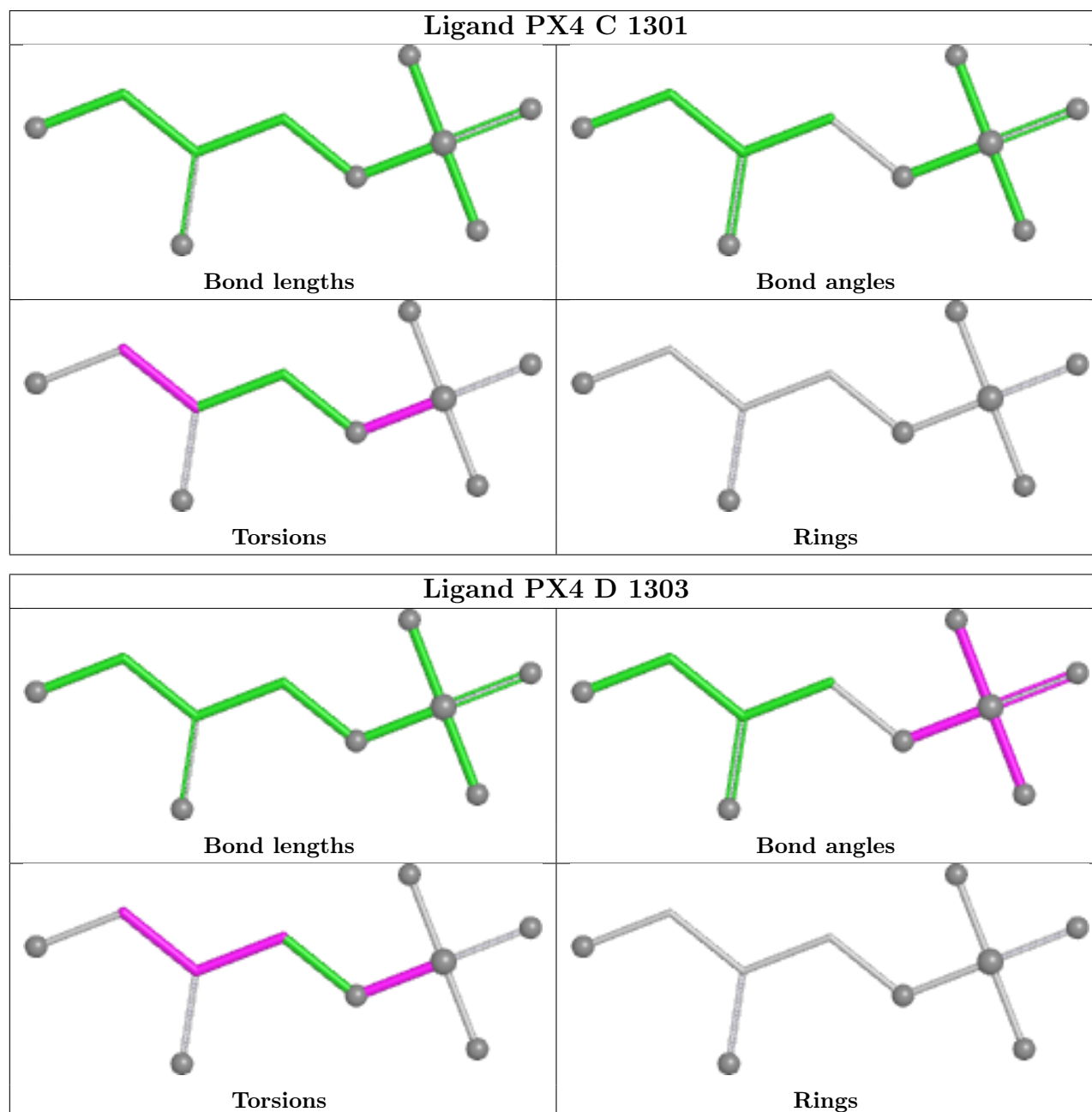
There are no ring outliers.

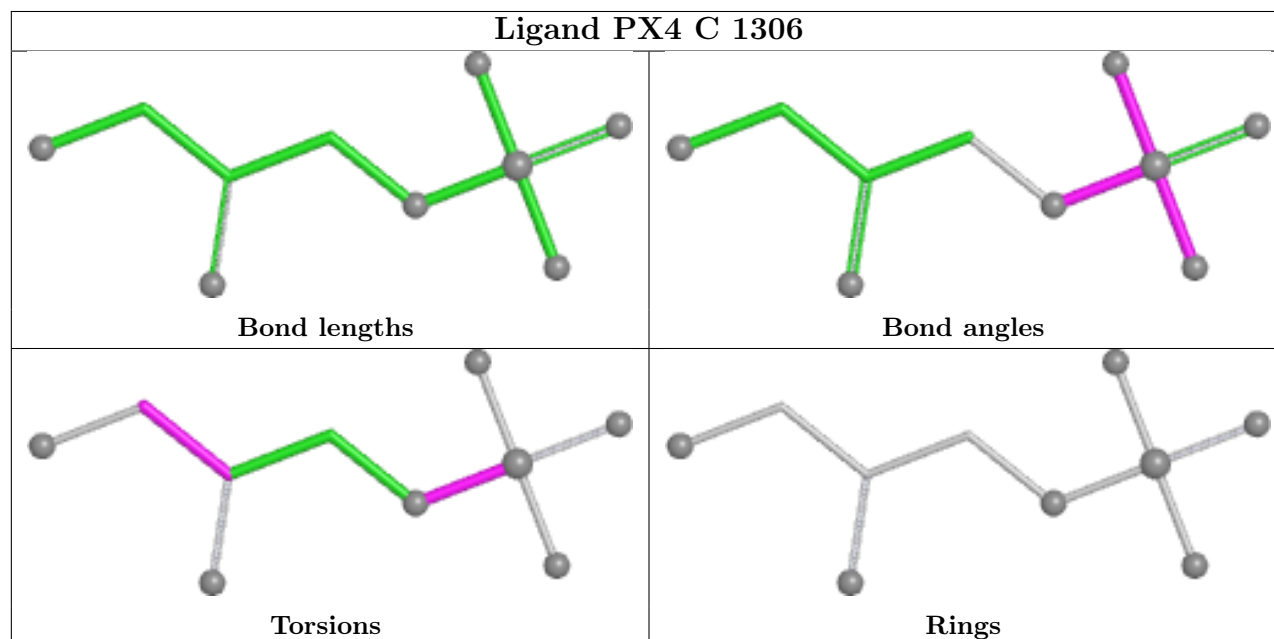
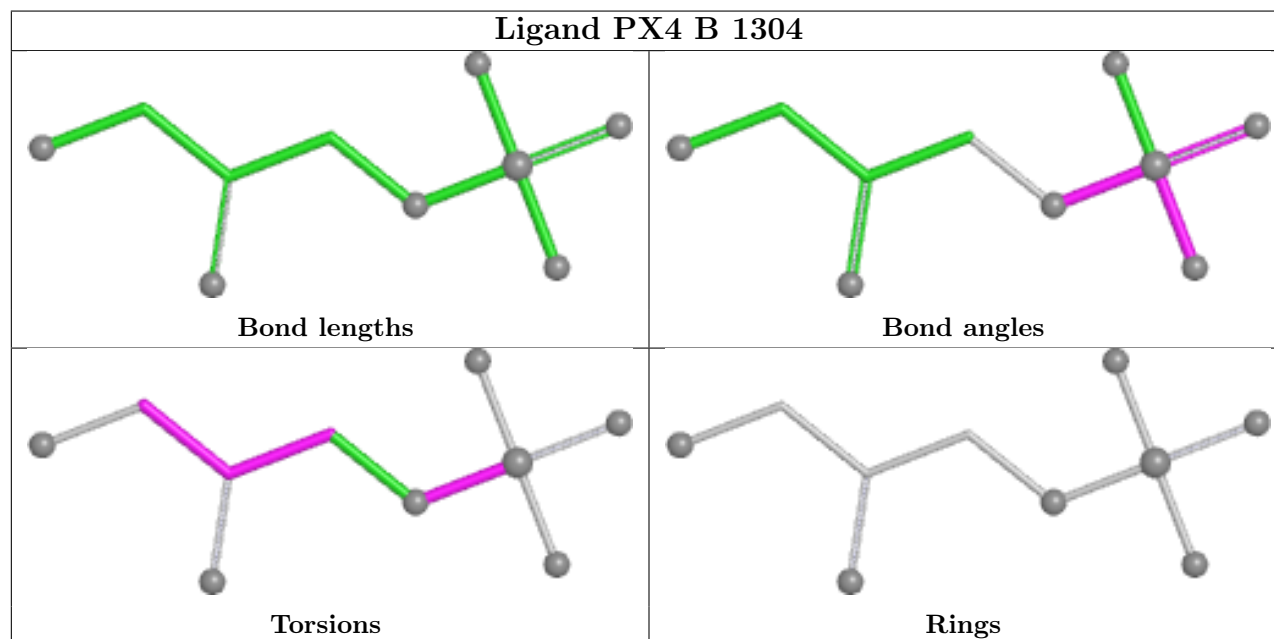
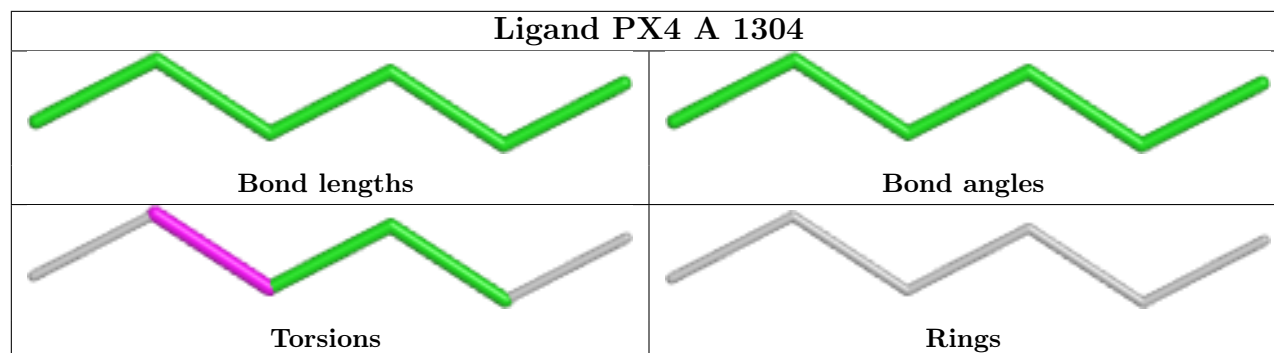
3 monomers are involved in 16 short contacts:

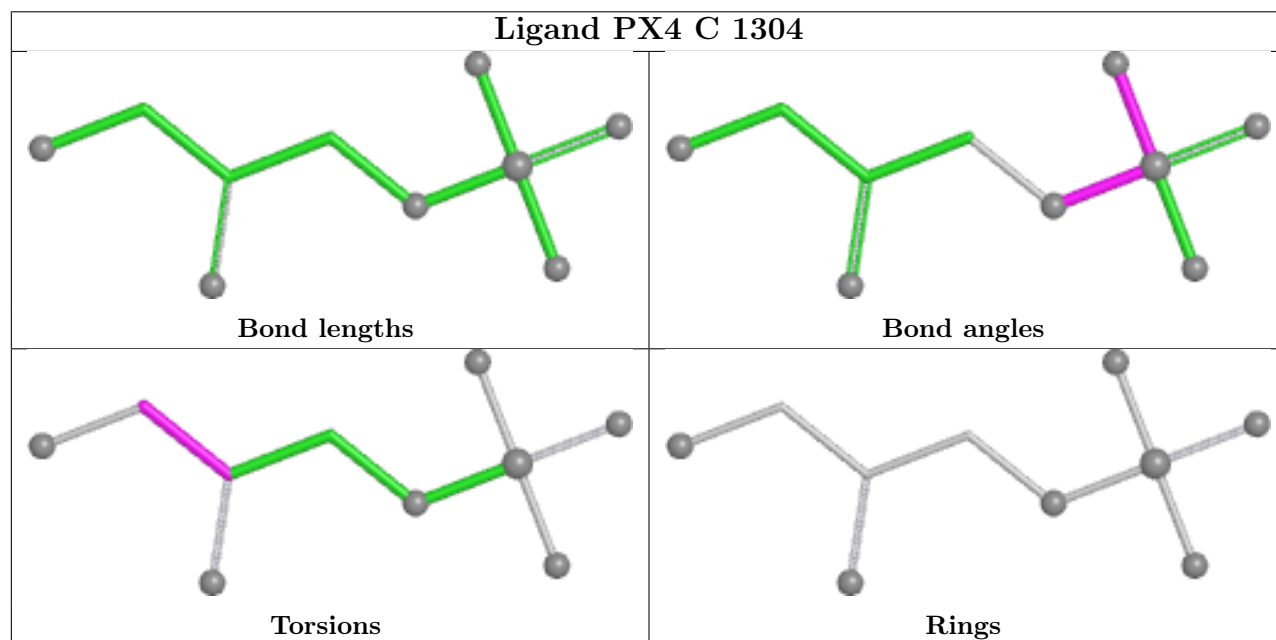
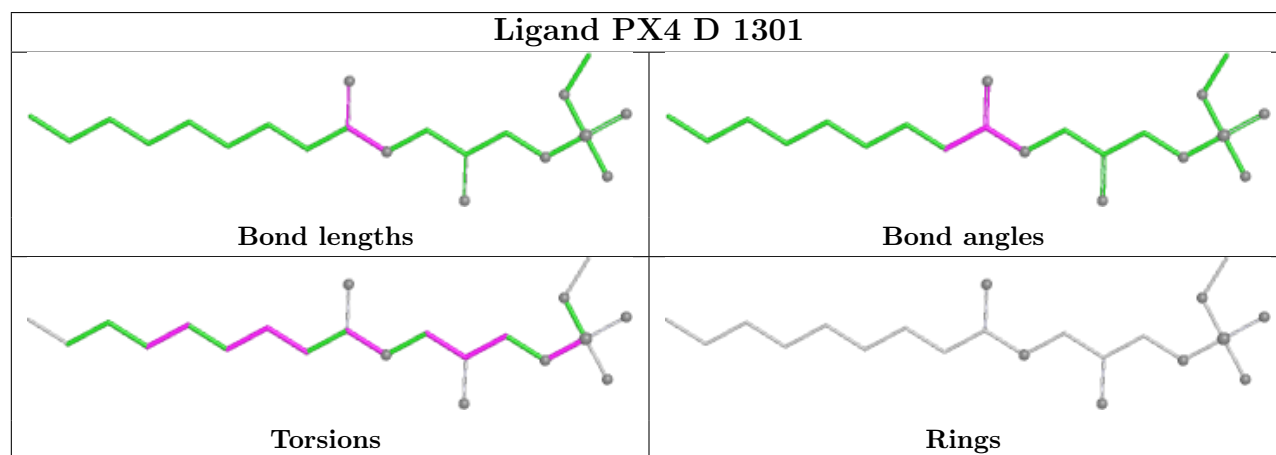
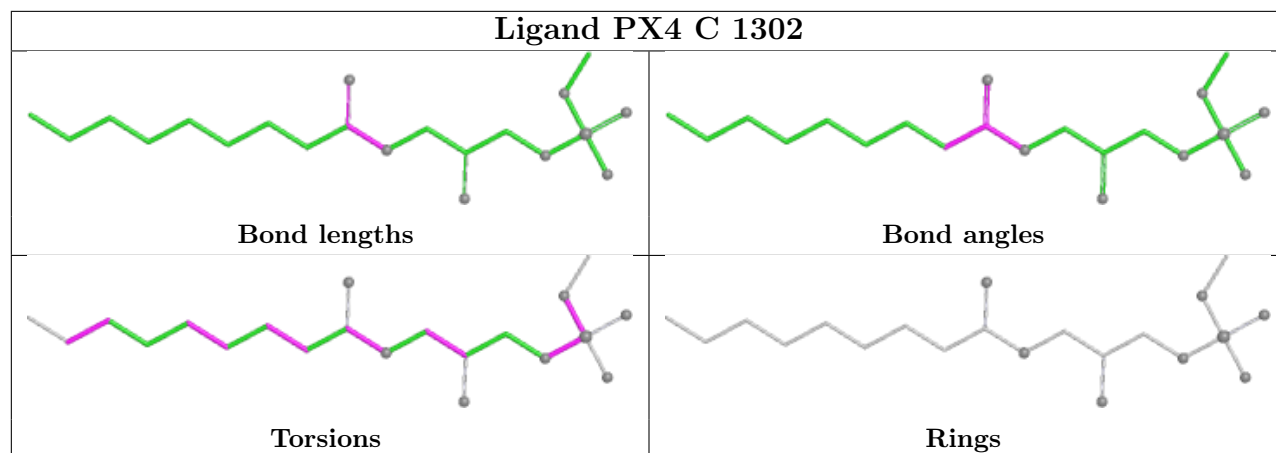
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1302	PX4	2	0
3	D	1301	PX4	5	0
3	B	1302	PX4	9	0

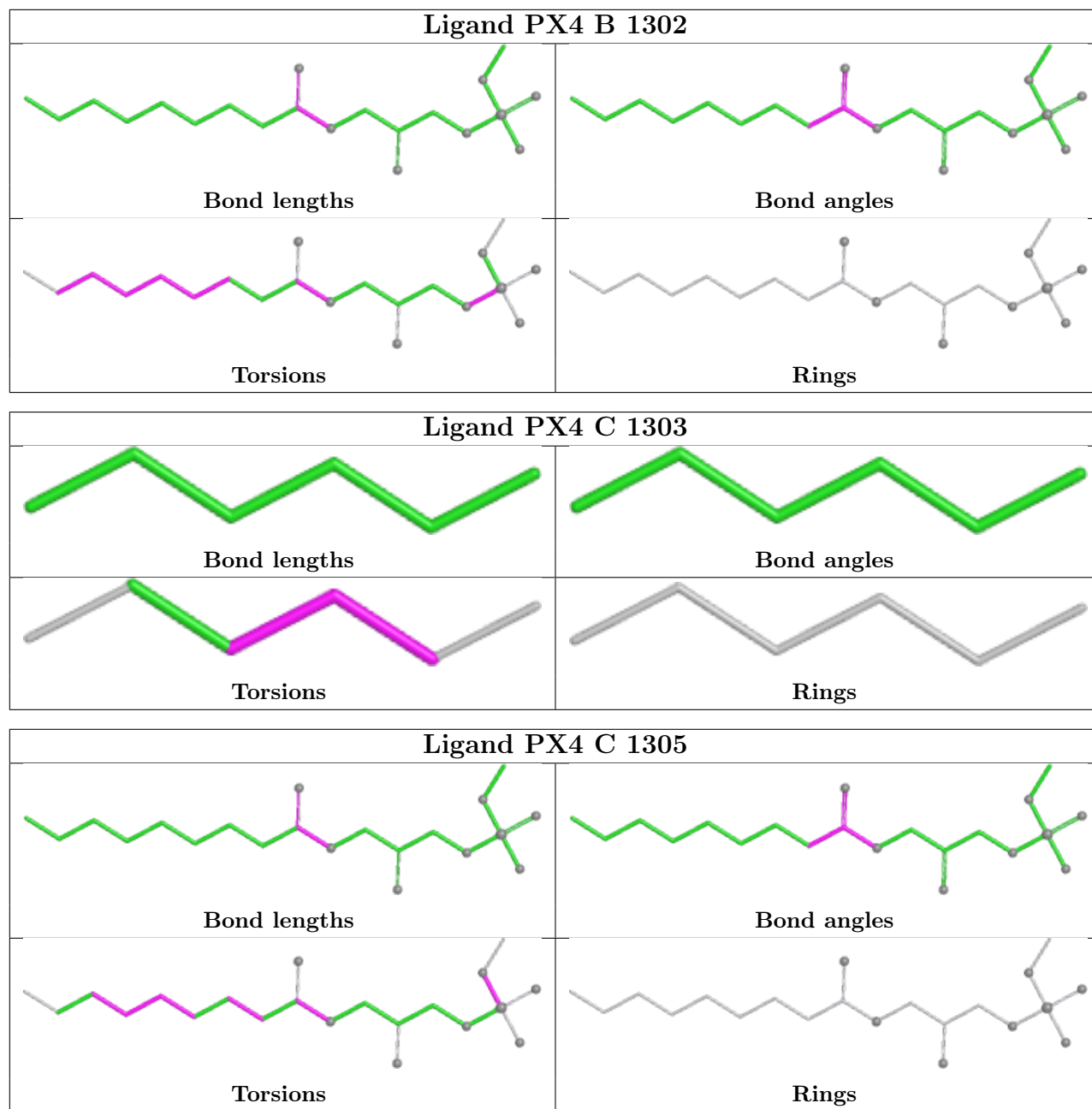
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

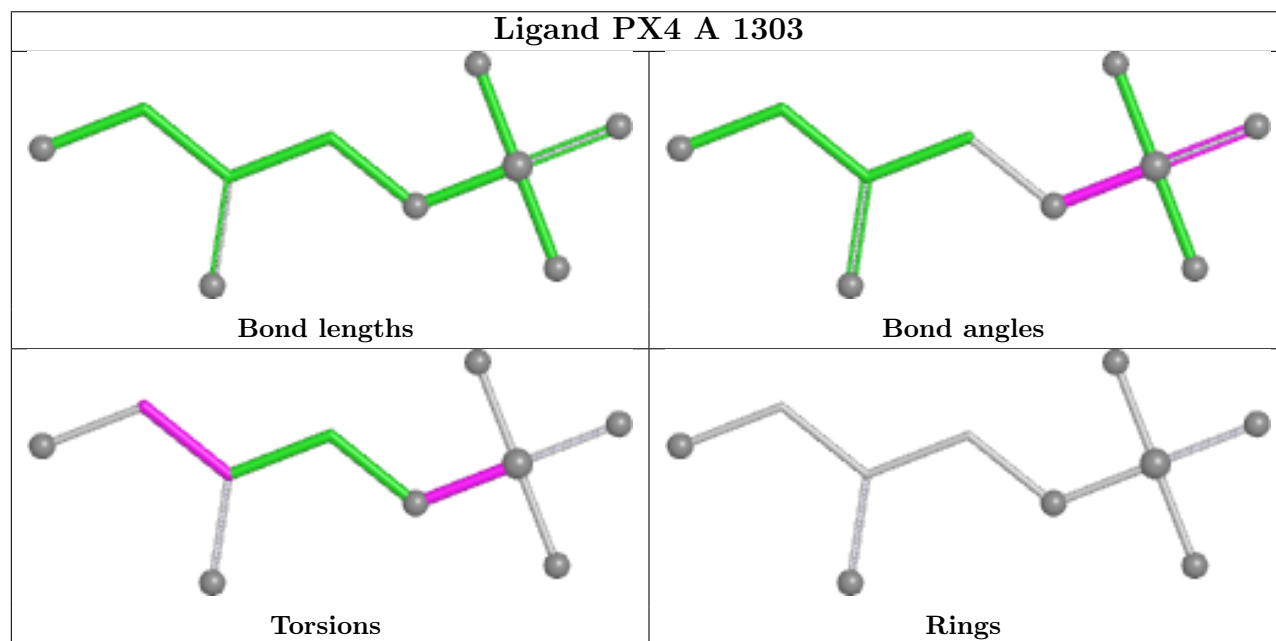
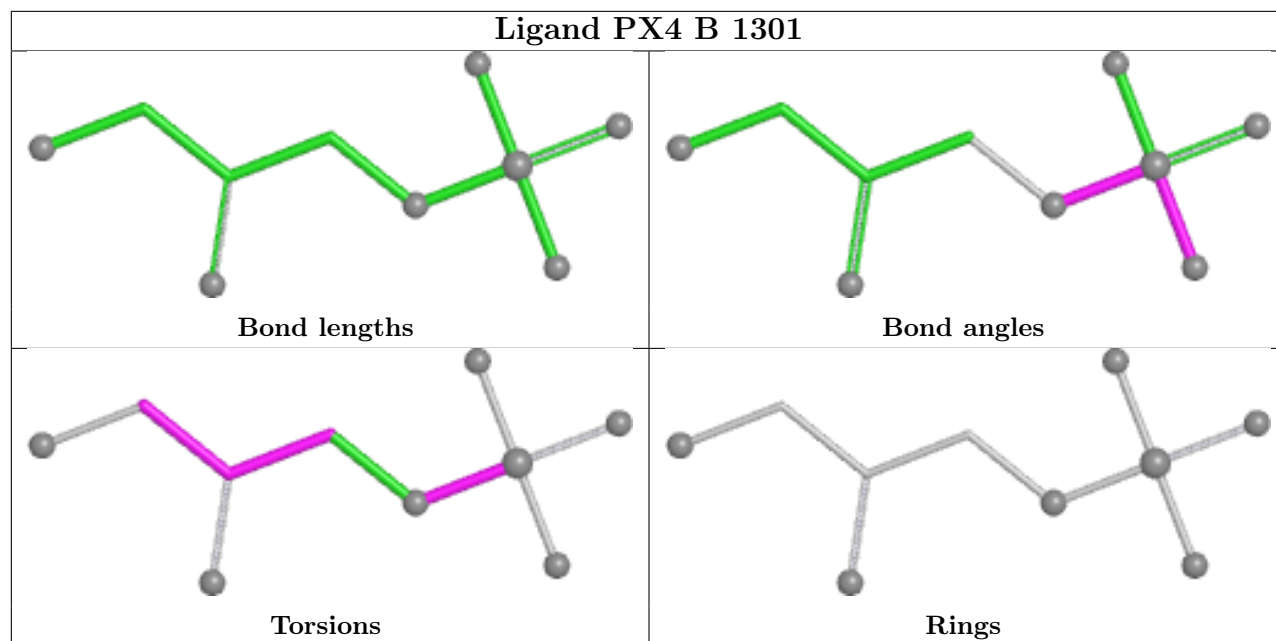
bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 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.

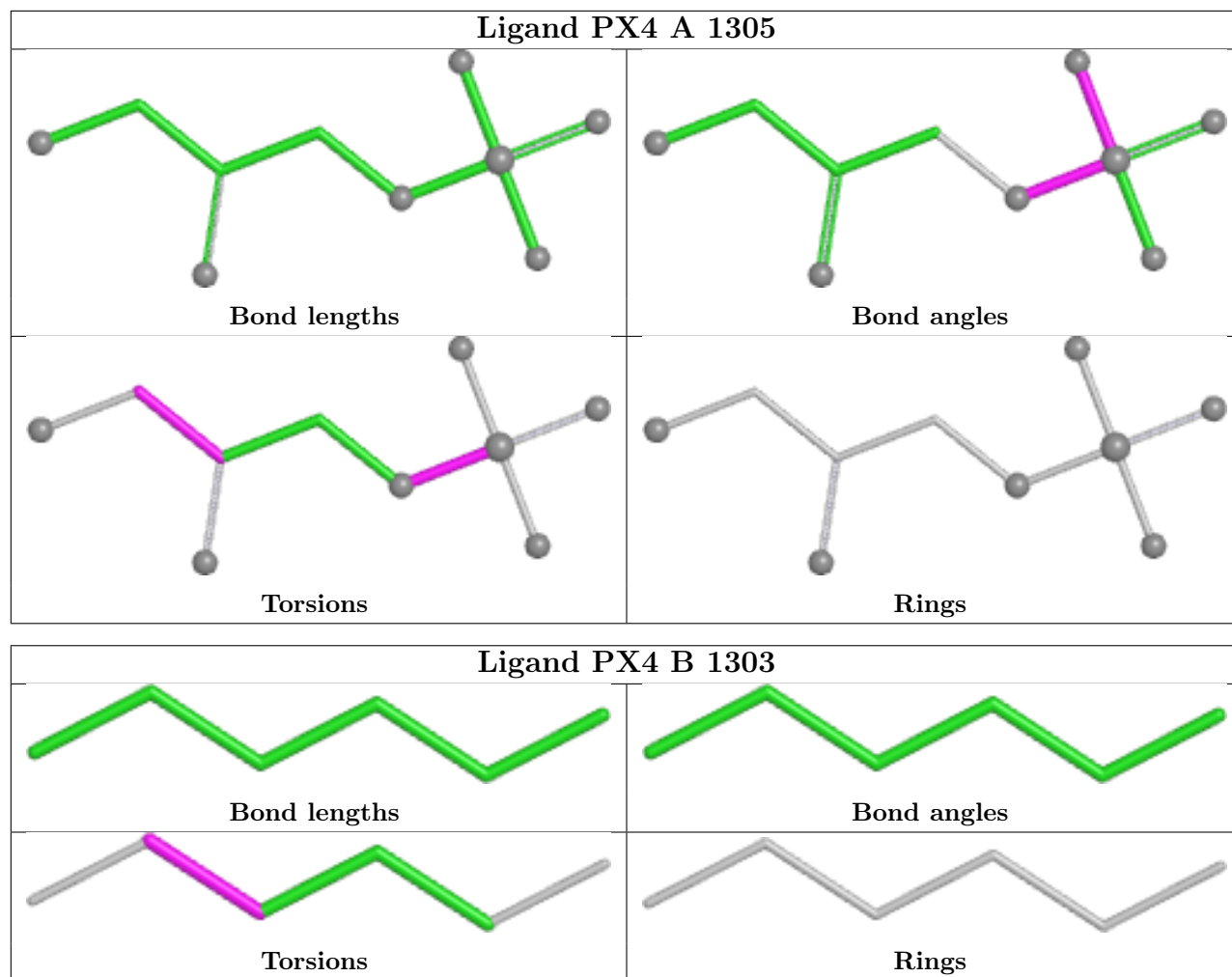












5.7 Other polymers [i](#)

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

6.1 Protein, DNA and RNA chains

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	219/237 (92%)	0.93	30 (13%) 6 6	62, 96, 125, 151	0
1	B	219/237 (92%)	1.06	39 (17%) 4 3	62, 96, 126, 152	0
1	C	219/237 (92%)	0.90	32 (14%) 6 5	62, 95, 129, 152	0
1	D	219/237 (92%)	0.86	26 (11%) 9 8	62, 95, 125, 154	0
All	All	876/948 (92%)	0.94	127 (14%) 6 5	62, 96, 128, 154	0

All (127) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	1097	ILE	9.9
1	D	1092	SER	9.2
1	D	1090	PRO	7.8
1	B	1013	PHE	7.6
1	B	1095	PHE	7.3
1	C	1040	SER	6.4
1	A	1007	ASN	6.4
1	B	1196	VAL	5.6
1	D	1083	VAL	5.6
1	B	1007	ASN	5.3
1	D	1091	THR	5.3
1	A	1036	THR	5.1
1	B	1070	SER	5.0
1	C	1073	LYS	5.0
1	B	1012	SER	4.8
1	A	1022	ILE	4.5
1	C	1095	PHE	4.5
1	A	1090	PRO	4.5
1	B	1098	LEU	4.4
1	A	1197	PHE	4.3
1	D	1084	VAL	4.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	D	1093	SER	4.1
1	A	1002	TYR	4.0
1	B	1020	TYR	4.0
1	C	1001	MET	3.9
1	B	1002	TYR	3.9
1	C	1039	GLN	3.9
1	A	1035	LYS	3.9
1	B	1154	GLU	3.8
1	C	1036	THR	3.8
1	D	1039	GLN	3.8
1	A	1032	GLU	3.8
1	B	1094	GLY	3.8
1	C	1106	LEU	3.7
1	C	1037	PHE	3.7
1	C	1075	PRO	3.6
1	A	1065	TYR	3.6
1	C	1070	SER	3.6
1	B	1189	GLU	3.5
1	C	1072	PHE	3.5
1	A	1033	THR	3.4
1	C	1013	PHE	3.3
1	B	1216	ILE	3.3
1	B	1217	CYS	3.3
1	D	1100	VAL	3.2
1	B	1110	VAL	3.2
1	D	1162	THR	3.2
1	C	1104	LEU	3.1
1	C	1162	THR	3.1
1	C	1046	THR	3.1
1	C	1056	PHE	3.1
1	D	1056	PHE	3.1
1	B	1106	LEU	3.0
1	D	1095	PHE	3.0
1	B	1004	ARG	3.0
1	D	1050	GLN	3.0
1	C	1007	ASN	3.0
1	B	1193	TYR	2.9
1	A	1070	SER	2.9
1	B	1072	PHE	2.9
1	B	1039	GLN	2.9
1	C	1052	VAL	2.9
1	B	1044	TYR	2.8

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	1091	THR	2.8
1	C	1091	THR	2.8
1	B	1130	MET	2.7
1	D	1048	PHE	2.7
1	D	1065	TYR	2.7
1	A	1069	ILE	2.7
1	A	1140	PHE	2.7
1	C	1178	SER	2.7
1	C	1069	ILE	2.6
1	A	1046	THR	2.6
1	B	1001	MET	2.6
1	D	1104	LEU	2.6
1	A	1083	VAL	2.6
1	A	1031	LEU	2.6
1	B	1083	VAL	2.6
1	B	1073	LYS	2.6
1	D	1088	LEU	2.5
1	C	1041	PHE	2.5
1	D	1002	TYR	2.5
1	D	1102	ARG	2.5
1	C	1047	LEU	2.5
1	B	1016	LYS	2.4
1	D	1115	GLN	2.4
1	A	1021	LEU	2.4
1	A	1023	VAL	2.4
1	B	1118	LYS	2.4
1	B	1181	MET	2.4
1	B	1150	GLN	2.4
1	C	1218	VAL	2.4
1	C	1049	ASN	2.3
1	D	1099	ARG	2.3
1	A	1174	MET	2.3
1	C	1071	PHE	2.3
1	C	1083	VAL	2.3
1	A	1045	THR	2.3
1	B	1008	ILE	2.3
1	A	1003	LEU	2.3
1	B	1104	LEU	2.3
1	A	1008	ILE	2.3
1	B	1036	THR	2.3
1	D	1024	LEU	2.3
1	D	1098	LEU	2.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	1162	THR	2.2
1	A	1196	VAL	2.2
1	A	1001	MET	2.2
1	C	1209	MET	2.2
1	A	1043	VAL	2.2
1	A	1150	GLN	2.2
1	A	1154	GLU	2.1
1	B	1011	SER	2.1
1	A	1018	ILE	2.1
1	C	1078	LEU	2.1
1	D	1069	ILE	2.1
1	A	1091	THR	2.1
1	D	1001	MET	2.1
1	C	1189	GLU	2.1
1	D	1178	SER	2.1
1	B	1069	ILE	2.1
1	B	1206	THR	2.1
1	A	1086	ILE	2.0
1	C	1145	ALA	2.0
1	B	1056	PHE	2.0
1	C	1087	SER	2.0
1	D	1153	GLY	2.0

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 [\(i\)](#)

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, 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($\text{\AA}^2$)	Q<0.9
3	PX4	A	1305	10/46	0.66	0.21	83,100,131,139	0

Continued on next page...

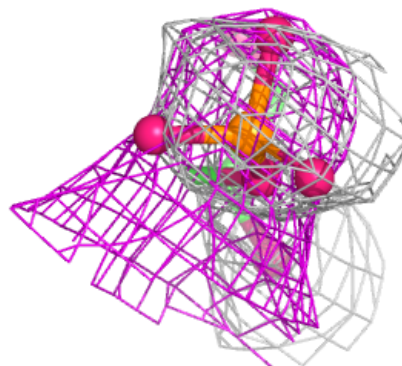
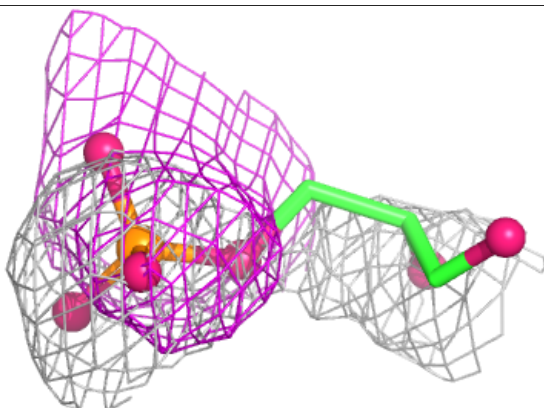
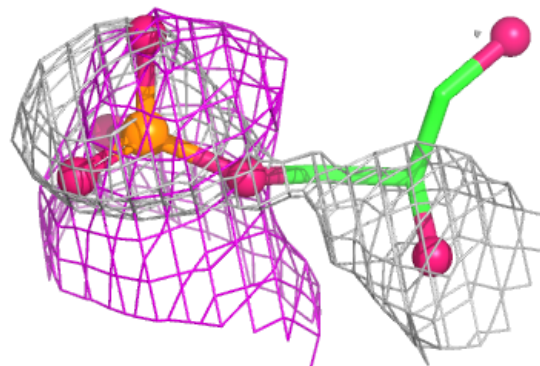
Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	PX4	D	1303	10/46	0.66	0.20	87,106,132,137	0
3	PX4	B	1303	6/46	0.69	0.46	62,63,65,66	0
3	PX4	B	1304	10/46	0.70	0.19	81,95,121,135	0
3	PX4	C	1306	10/46	0.72	0.18	86,106,133,142	0
3	PX4	D	1302	6/46	0.74	0.39	62,63,65,66	0
3	PX4	D	1301	21/46	0.78	0.24	69,77,89,97	0
3	PX4	C	1301	10/46	0.80	0.12	71,81,115,133	0
3	PX4	C	1305	21/46	0.81	0.25	65,77,92,101	0
3	PX4	A	1303	10/46	0.82	0.13	78,92,109,136	0
3	PX4	B	1301	10/46	0.82	0.13	68,83,123,126	0
3	PX4	A	1304	6/46	0.83	0.36	62,63,65,65	0
3	PX4	C	1304	10/46	0.85	0.11	64,78,114,121	0
3	PX4	C	1303	6/46	0.87	0.38	62,62,62,62	0
3	PX4	C	1302	21/46	0.89	0.21	64,72,85,86	0
3	PX4	B	1302	21/46	0.92	0.17	66,74,98,108	0
2	CA	A	1301	1/1	0.96	0.38	62,62,62,62	0
2	CA	A	1302	1/1	0.96	0.38	89,89,89,89	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.

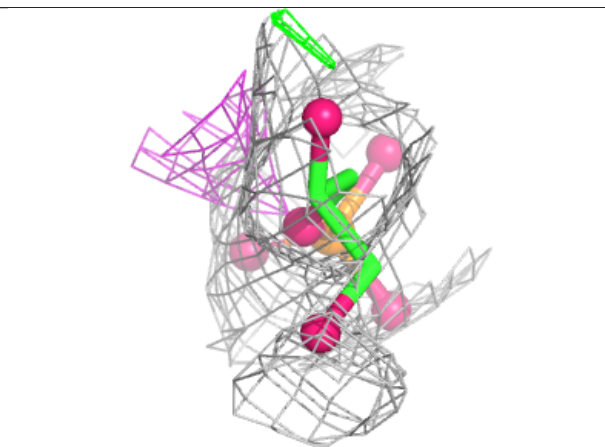
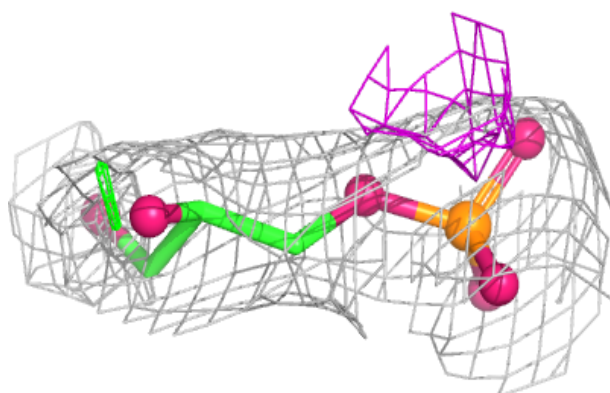
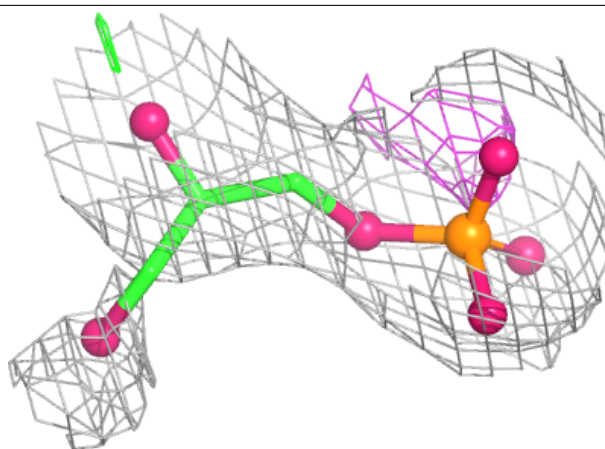
Electron density around PX4 A 1305:

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

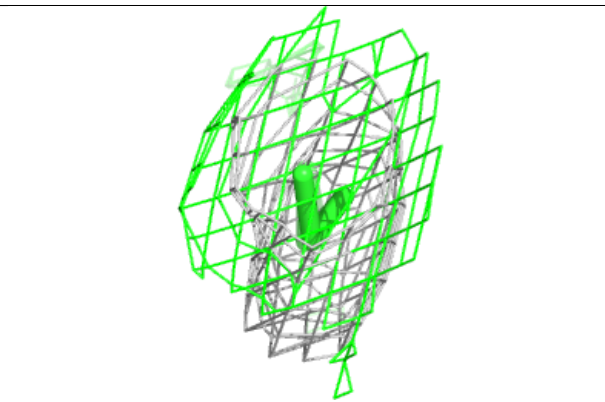
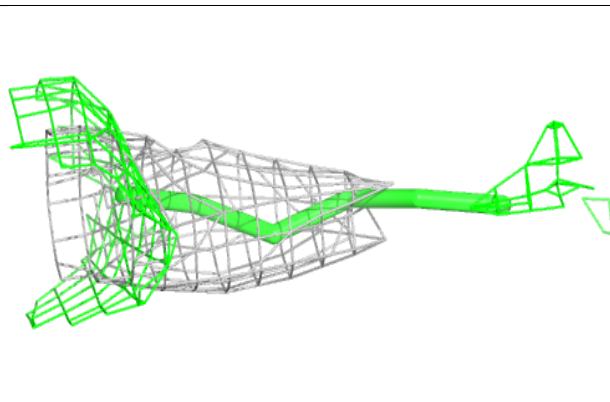
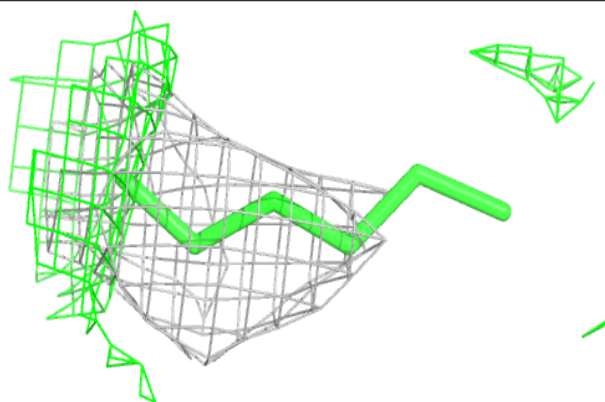


Electron density around PX4 D 1303:

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

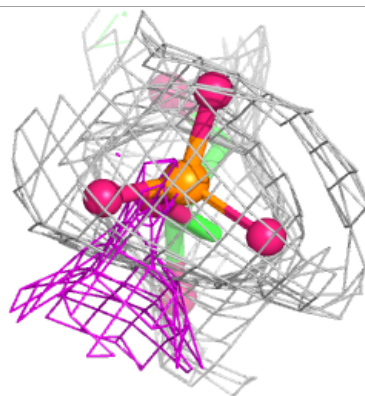
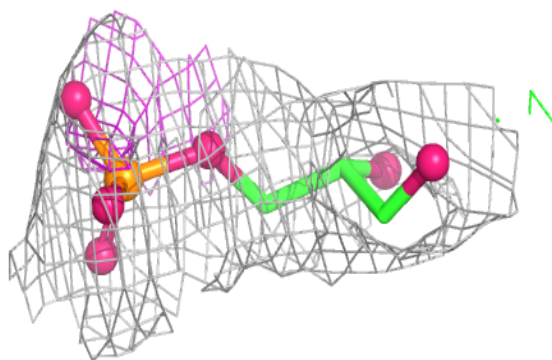
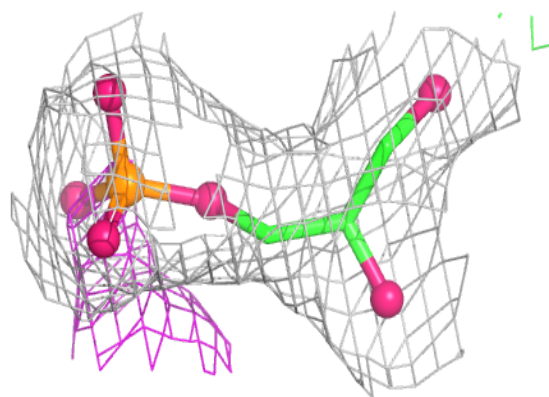
**Electron density around PX4 B 1303:**

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

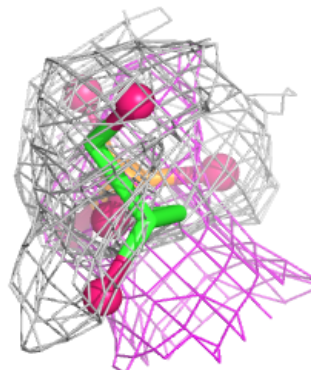
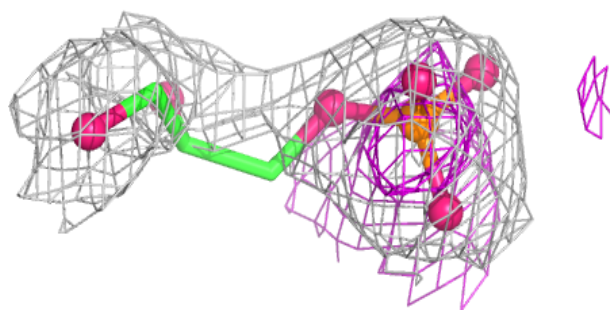
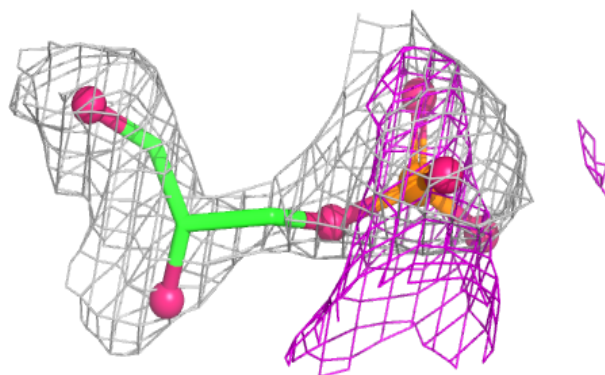


Electron density around PX4 B 1304:

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

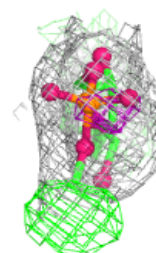
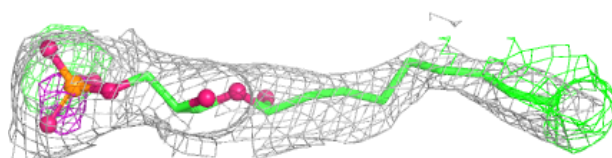
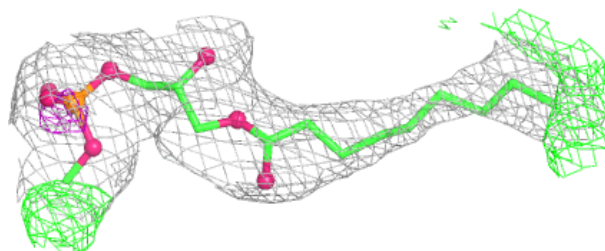
**Electron density around PX4 C 1306:**

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

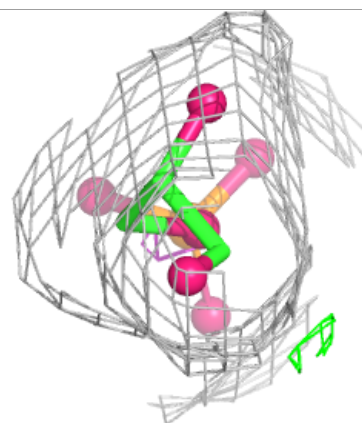
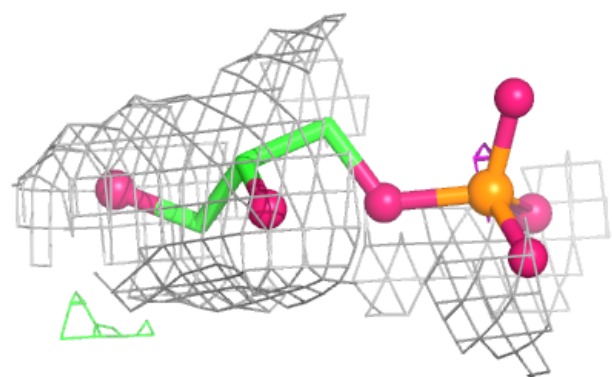
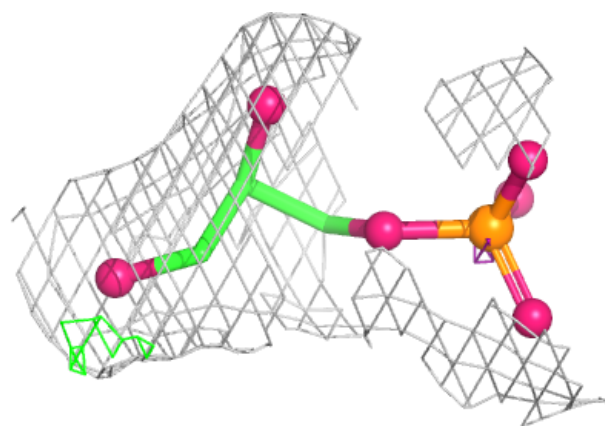


Electron density around PX4 D 1301:

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

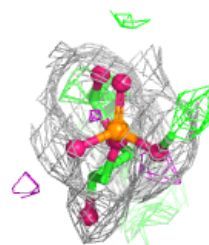
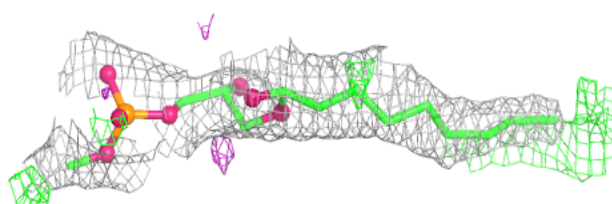
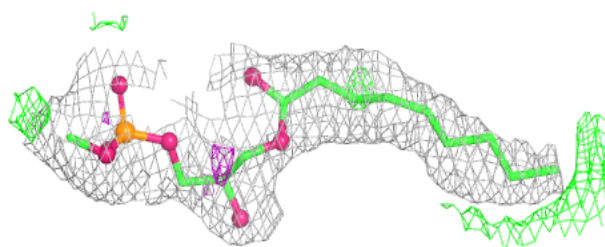
**Electron density around PX4 C 1301:**

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

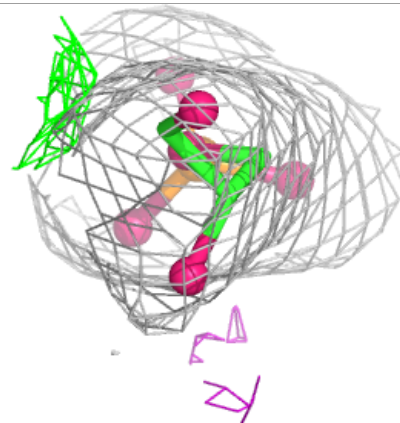
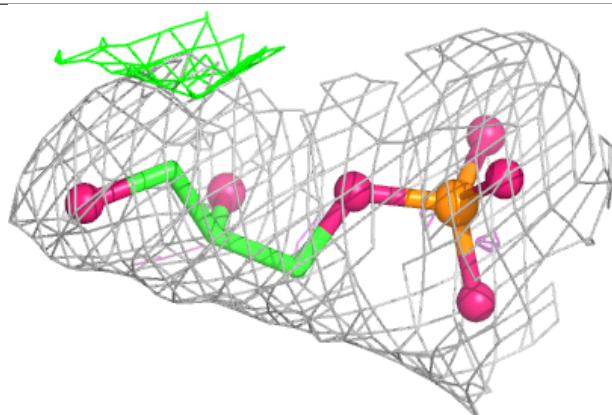
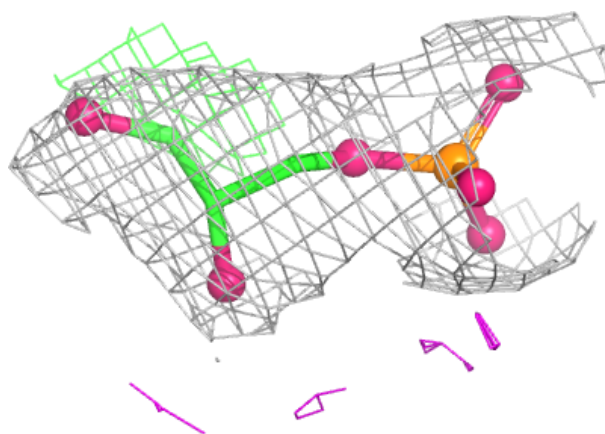


Electron density around PX4 C 1305:

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

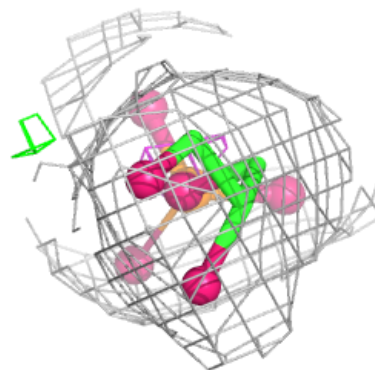
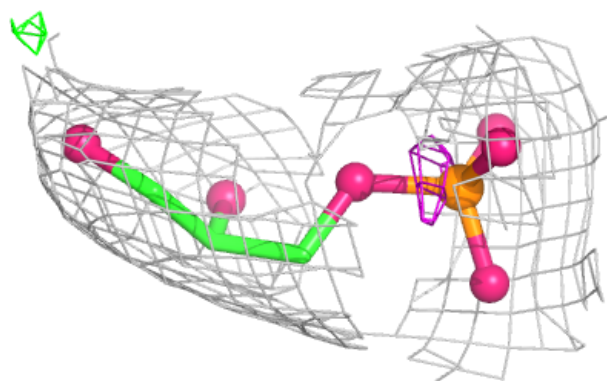
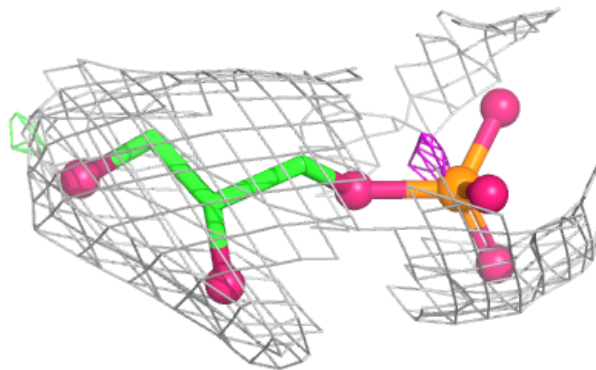
**Electron density around PX4 A 1303:**

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

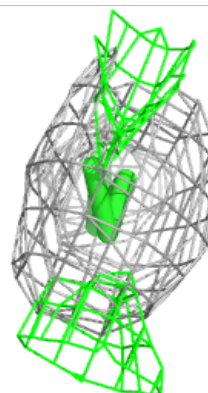
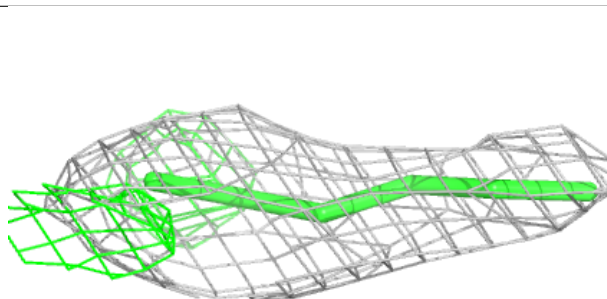
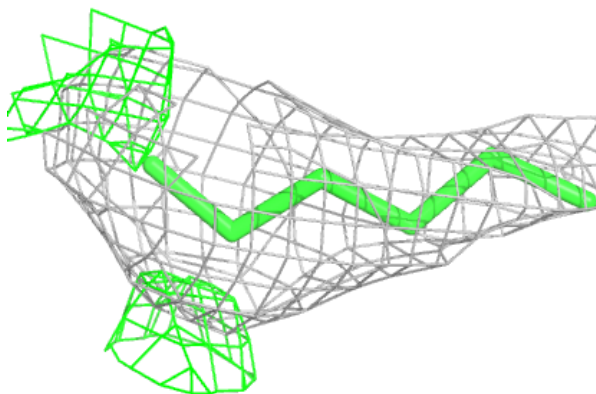


Electron density around PX4 B 1301:

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

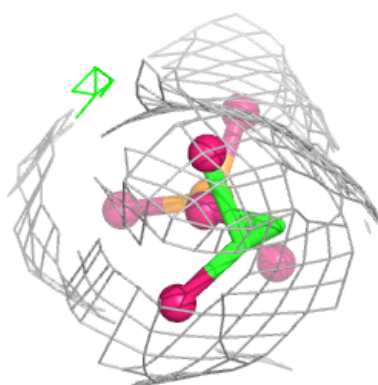
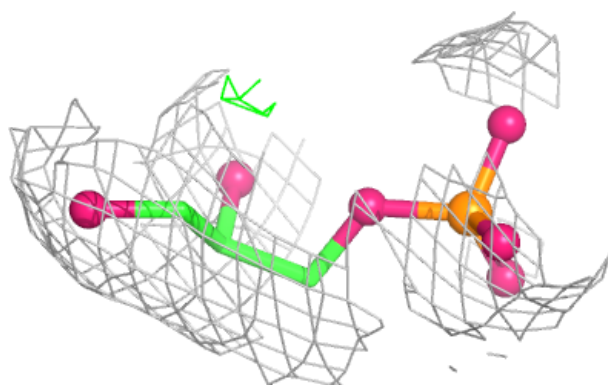
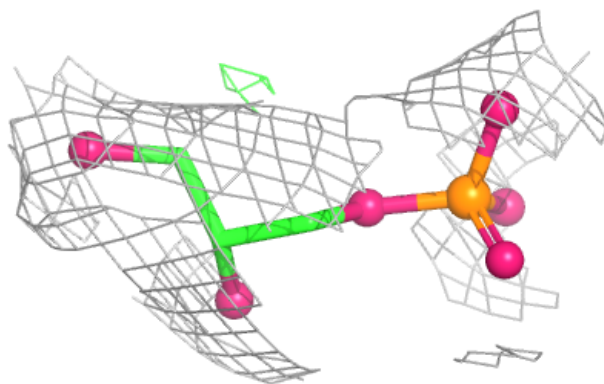
**Electron density around PX4 A 1304:**

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

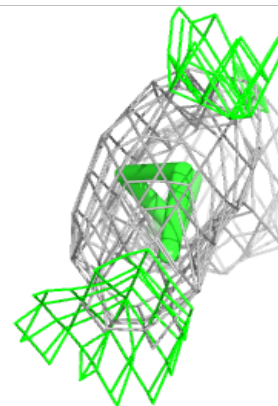
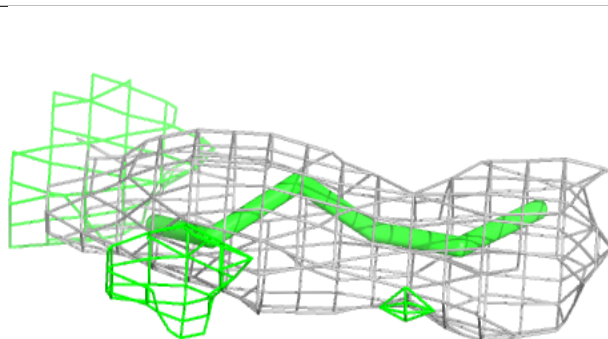
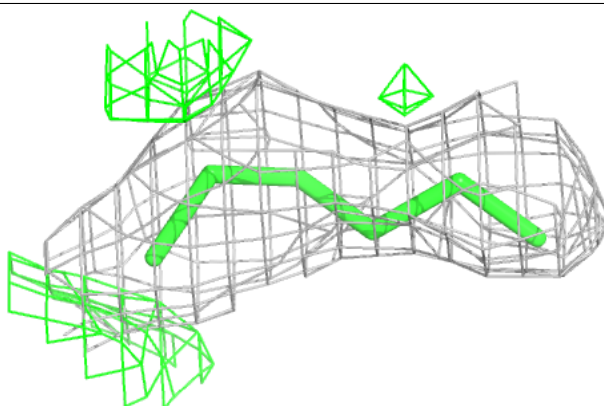


Electron density around PX4 C 1304:

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

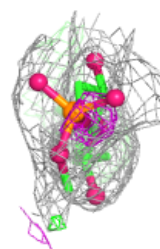
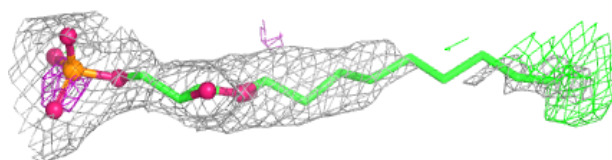
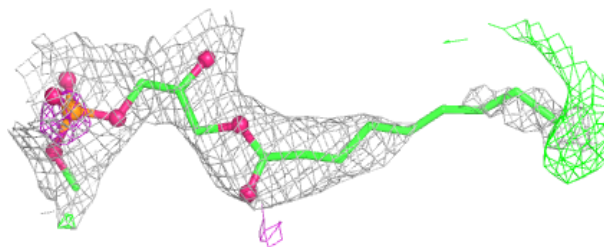
**Electron density around PX4 C 1303:**

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

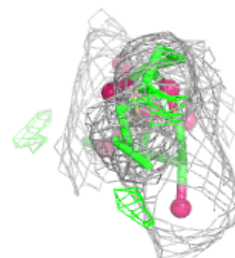
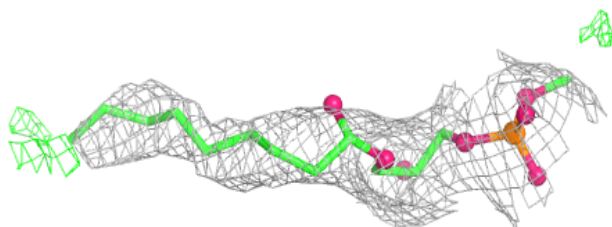
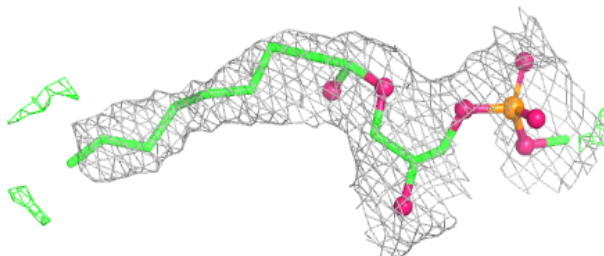


Electron density around PX4 C 1302:

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

**Electron density around PX4 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)



6.5 Other polymers [i](#)

There are no such residues in this entry.