



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 19, 2026 – 03:36 AM UTC

PDB ID : 6MVV / pdb_00006mvv
Title : NavAb voltage-gated sodium channel, I217C/F203A
Authors : Lenaeus, M.J.; Catterall, W.A.
Deposited on : 2018-10-28
Resolution : 2.90 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

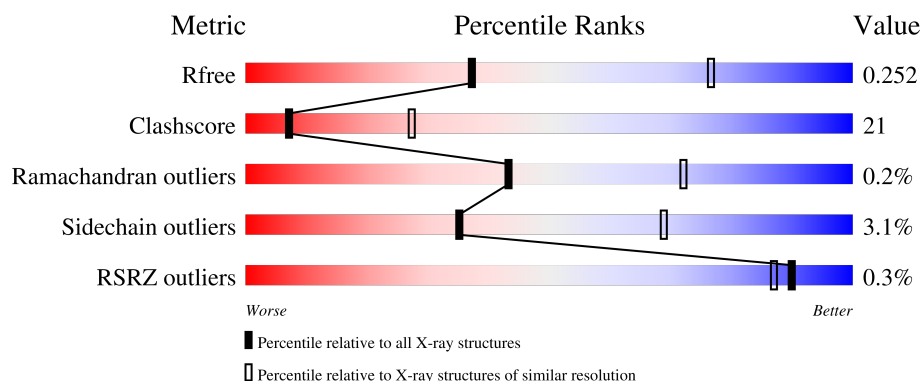
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (2.90-2.90)

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	285	49% 27% • 22%
1	B	285	51% 28% • 20%
1	C	285	41% 34% • 24%
1	D	285	47% 29% • 22%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 7195 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	222	Total	C	N	O	S	0	0	0
			1755	1191	265	287	12			
1	B	228	Total	C	N	O	S	0	0	0
			1792	1212	266	302	12			
1	C	217	Total	C	N	O	S	0	0	0
			1692	1151	251	279	11			
1	D	222	Total	C	N	O	S	0	0	0
			1744	1186	257	288	13			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	983	MET	-	initiating methionine	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	1203	ALA	PHE	engineered mutation	UNP A8EVM5
A	1217	CYS	ILE	engineered mutation	UNP A8EVM5
B	1983	MET	-	initiating methionine	UNP A8EVM5

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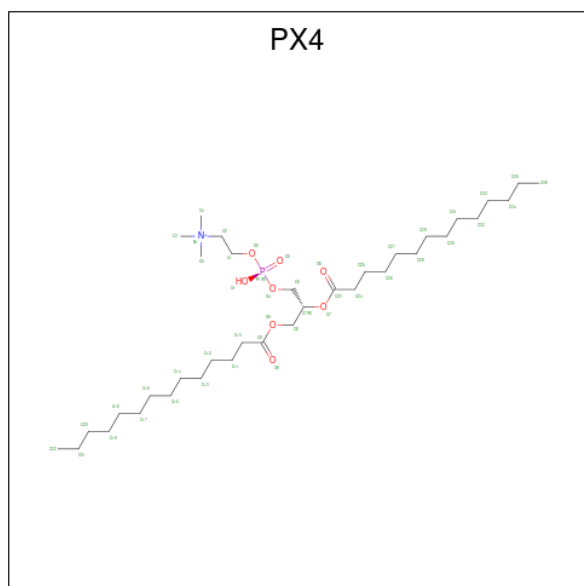
Chain	Residue	Modelled	Actual	Comment	Reference
B	1984	ASP	-	expression tag	UNP A8EVM5
B	1985	TYR	-	expression tag	UNP A8EVM5
B	1986	LYS	-	expression tag	UNP A8EVM5
B	1987	ASP	-	expression tag	UNP A8EVM5
B	1988	ASP	-	expression tag	UNP A8EVM5
B	1989	ASP	-	expression tag	UNP A8EVM5
B	1990	ASP	-	expression tag	UNP A8EVM5
B	1991	LYS	-	expression tag	UNP A8EVM5
B	1992	GLY	-	expression tag	UNP A8EVM5
B	1993	SER	-	expression tag	UNP A8EVM5
B	1994	LEU	-	expression tag	UNP A8EVM5
B	1995	VAL	-	expression tag	UNP A8EVM5
B	1996	PRO	-	expression tag	UNP A8EVM5
B	1997	ARG	-	expression tag	UNP A8EVM5
B	1998	GLY	-	expression tag	UNP A8EVM5
B	1999	SER	-	expression tag	UNP A8EVM5
B	2000	HIS	-	expression tag	UNP A8EVM5
B	2203	ALA	PHE	engineered mutation	UNP A8EVM5
B	2217	CYS	ILE	engineered mutation	UNP A8EVM5
C	983	MET	-	initiating methionine	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	1203	ALA	PHE	engineered mutation	UNP A8EVM5
C	1217	CYS	ILE	engineered mutation	UNP A8EVM5
D	1983	MET	-	initiating methionine	UNP A8EVM5
D	1984	ASP	-	expression tag	UNP A8EVM5
D	1985	TYR	-	expression tag	UNP A8EVM5

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Chain	Residue	Modelled	Actual	Comment	Reference
D	1986	LYS	-	expression tag	UNP A8EVM5
D	1987	ASP	-	expression tag	UNP A8EVM5
D	1988	ASP	-	expression tag	UNP A8EVM5
D	1989	ASP	-	expression tag	UNP A8EVM5
D	1990	ASP	-	expression tag	UNP A8EVM5
D	1991	LYS	-	expression tag	UNP A8EVM5
D	1992	GLY	-	expression tag	UNP A8EVM5
D	1993	SER	-	expression tag	UNP A8EVM5
D	1994	LEU	-	expression tag	UNP A8EVM5
D	1995	VAL	-	expression tag	UNP A8EVM5
D	1996	PRO	-	expression tag	UNP A8EVM5
D	1997	ARG	-	expression tag	UNP A8EVM5
D	1998	GLY	-	expression tag	UNP A8EVM5
D	1999	SER	-	expression tag	UNP A8EVM5
D	2000	HIS	-	expression tag	UNP A8EVM5
D	2203	ALA	PHE	engineered mutation	UNP A8EVM5
D	2217	CYS	ILE	engineered mutation	UNP A8EVM5

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



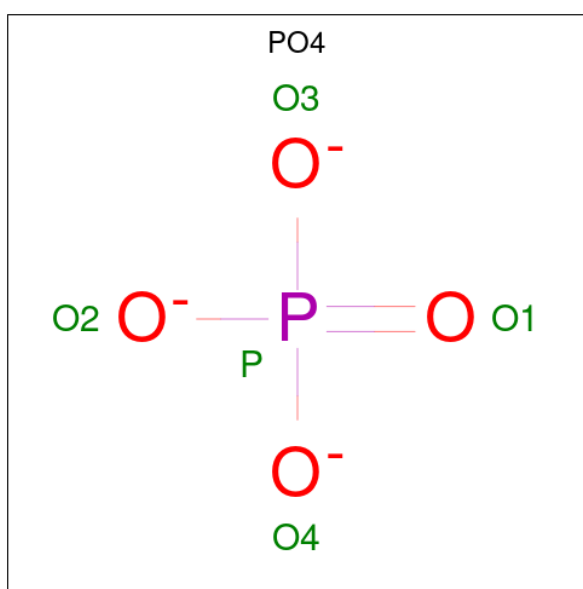
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			31	22	1	7	1		
2	B	1	Total	C	N	O	P	0	0
			30	22	1	6	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	N	O	P	0	0
			34	24	1	8	1		
2	C	1	Total	C	N	O	P	0	0
			36	26	1	8	1		
2	C	1	Total	C	N	O	P	0	0
			22	14	1	6	1		
2	D	1	Total	C	N	O	P	0	0
			31	21	1	8	1		

- Molecule 3 is PHOSPHATE ION (CCD ID: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	P	0	0
			5	4	1		
3	A	1	Total	O	P	0	0
			5	4	1		
3	B	1	Total	O	P	0	0
			5	4	1		
3	C	1	Total	O	P	0	0
			5	4	1		
3	D	1	Total	O	P	0	0
			5	4	1		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total 1	O 1	0	0
4	B	2	Total 2	O 2	0	0

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 2 21	Depositor
Cell constants a, b, c, α , β , γ	125.78Å 125.97Å 192.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.93 – 2.90 29.93 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.9 (29.93-2.90) 92.5 (29.93-2.90)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.90 (at 2.90Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.216 , 0.256 0.212 , 0.252	Depositor DCC
R_{free} test set	2005 reflections (2.94%)	wwPDB-VP
Wilson B-factor (Å ²)	63.0	Xtriage
Anisotropy	0.384	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 80.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.40$, $\langle L^2 \rangle = 0.23$	Xtriage
Estimated twinning fraction	0.468 for k,h,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7195	wwPDB-VP
Average B, all atoms (Å ²)	83.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.58% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PO4, 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	0.26	0/1803	0.49	0/2461
1	B	0.26	0/1839	0.50	0/2510
1	C	0.27	0/1739	0.51	2/2378 (0.1%)
1	D	0.25	0/1792	0.50	0/2449
All	All	0.26	0/7173	0.50	2/9798 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	1182	GLY	CA-C-N	-6.24	116.54	123.16
1	C	1182	GLY	C-N-CA	-6.24	116.54	123.16

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	1755	0	1775	67	0
1	B	1792	0	1802	85	0
1	C	1692	0	1689	93	0
1	D	1744	0	1754	75	0
2	A	31	0	45	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	64	0	88	10	0
2	C	58	0	74	18	0
2	D	31	0	36	2	0
3	A	10	0	0	0	0
3	B	5	0	0	0	0
3	C	5	0	0	0	0
3	D	5	0	0	0	0
4	A	1	0	0	0	0
4	B	2	0	0	0	0
All	All	7195	0	7263	301	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 (301) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:2029:MET:HE3	1:D:2103:VAL:HA	1.55	0.88
1:A:1029:MET:HE3	1:A:1103:VAL:HA	1.57	0.83
1:B:2038:MET:HE2	1:B:2042:GLY:HA2	1.60	0.83
1:D:2025:ASN:HB2	1:D:2052:VAL:HG11	1.61	0.81
1:D:2022:ILE:HD11	1:D:2108:ARG:HE	1.48	0.79
1:C:1162:THR:HG22	1:C:1164:GLY:H	1.48	0.78
1:A:1038:MET:HE2	1:A:1042:GLY:HA2	1.65	0.77
1:B:2137:MET:HG2	2:B:2301:PX4:H71	1.67	0.77
1:C:1033:THR:HG23	1:D:2149:THR:HG21	1.66	0.75
1:B:2022:ILE:HG21	1:B:2109:LEU:HB2	1.69	0.74
1:B:2162:THR:HG22	1:B:2164:GLY:H	1.53	0.74
1:A:1162:THR:HG22	1:A:1164:GLY:H	1.54	0.73
1:B:2137:MET:HB3	2:B:2301:PX4:H67	1.70	0.73
1:B:2087:SER:HB3	1:B:2105:ARG:HH21	1.55	0.72
1:C:1033:THR:HG21	1:D:2163:LEU:HB2	1.71	0.71
1:B:2053:ILE:HD11	1:B:2084:VAL:HA	1.73	0.70
1:D:2127:ILE:HA	1:D:2130:MET:HE2	1.74	0.69
1:B:2060:ILE:HD11	1:B:2080:ASP:HB3	1.75	0.69
1:C:1165:GLU:HA	2:C:1301:PX4:H4	1.75	0.69
1:D:2067:HIS:HB3	1:D:2070:SER:HB2	1.72	0.68
1:C:1207:PHE:HA	1:C:1210:ILE:HD12	1.76	0.68
1:D:2162:THR:HG22	1:D:2165:GLU:H	1.59	0.68
1:C:1110:VAL:HG13	1:C:1116:MET:HB3	1.76	0.67
1:C:1185:ARG:HA	1:C:1188:MET:HE2	1.75	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:2155:ARG:HD2	1:D:2190:VAL:HG11	1.76	0.67
1:C:1064:ILE:O	1:C:1068:ARG:N	2.27	0.67
1:B:2024:LEU:HB3	1:B:2048:PHE:HZ	1.60	0.66
1:A:1022:ILE:HG21	1:A:1109:LEU:HB2	1.77	0.66
1:A:1087:SER:HA	1:A:1102:ARG:HG2	1.77	0.66
1:B:2025:ASN:HA	1:B:2028:THR:HG22	1.78	0.66
1:D:2025:ASN:HA	1:D:2028:THR:HG22	1.78	0.66
1:C:1087:SER:OG	1:C:1105:ARG:NH2	2.28	0.66
1:A:1155:ARG:HD2	1:A:1190:VAL:HG11	1.77	0.65
1:B:2116:MET:HE1	1:C:1136:LEU:HB2	1.78	0.65
1:D:2018:ILE:HG13	1:D:2059:GLU:HG3	1.78	0.65
1:D:2038:MET:HA	1:D:2042:GLY:HA3	1.77	0.65
1:A:1060:ILE:HD13	1:A:1108:ARG:HH21	1.62	0.65
1:C:1111:THR:O	1:C:1117:ARG:NE	2.29	0.64
1:A:1025:ASN:HA	1:A:1028:THR:HG22	1.79	0.64
1:C:1029:MET:HE3	1:C:1103:VAL:HA	1.80	0.63
1:D:2064:ILE:O	1:D:2068:ARG:N	2.32	0.63
1:D:2087:SER:OG	1:D:2105:ARG:NH2	2.32	0.63
1:D:2072:PHE:HA	1:D:2078:LEU:HD21	1.81	0.63
1:A:1087:SER:OG	1:A:1105:ARG:NH2	2.31	0.63
1:B:2083:VAL:HG21	1:B:2105:ARG:N	2.13	0.63
1:B:2026:GLY:HA2	1:B:2106:LEU:HD13	1.81	0.62
1:A:1076:TRP:HB3	1:A:1111:THR:HG23	1.81	0.62
1:B:2022:ILE:O	1:B:2026:GLY:N	2.27	0.61
1:A:1033:THR:HG23	1:B:2149:THR:HG21	1.83	0.60
1:C:1060:ILE:HG13	1:C:1071:PHE:HZ	1.67	0.60
1:D:2162:THR:HG23	1:D:2164:GLY:H	1.65	0.60
1:C:1079:PHE:O	1:C:1083:VAL:HG23	2.01	0.60
1:C:1165:GLU:HG3	2:C:1301:PX4:H1	1.83	0.60
1:A:1111:THR:O	1:A:1117:ARG:NE	2.32	0.60
1:C:1110:VAL:HG11	1:C:1120:VAL:HG21	1.84	0.60
1:C:1137:MET:HG2	2:C:1301:PX4:H42	1.84	0.59
1:C:1038:MET:HE2	1:C:1042:GLY:HA2	1.83	0.59
1:D:2029:MET:HG2	1:D:2103:VAL:HG23	1.83	0.59
1:A:1089:VAL:O	1:A:1102:ARG:NH2	2.36	0.59
1:A:1165:GLU:HG3	2:A:1301:PX4:H11	1.85	0.59
1:A:1076:TRP:H	1:A:1076:TRP:CD1	2.21	0.58
1:B:2048:PHE:HA	1:B:2051:ILE:HD12	1.84	0.58
1:C:1083:VAL:HG11	1:C:1104:LEU:C	2.27	0.58
1:C:1005:ILE:O	1:C:1009:VAL:HG23	2.03	0.58
1:B:2053:ILE:HG12	1:B:2087:SER:HB2	1.86	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:1137:MET:HB3	2:C:1301:PX4:H38	1.84	0.58
1:A:1067:HIS:HB3	1:A:1070:SER:HB2	1.84	0.58
1:B:2043:VAL:O	1:B:2047:LEU:HG	2.04	0.58
1:B:2087:SER:HA	1:B:2102:ARG:HG2	1.87	0.57
1:D:2022:ILE:O	1:D:2026:GLY:N	2.31	0.57
1:A:1130:MET:HE2	1:A:1216:ILE:HD11	1.87	0.57
1:B:2165:GLU:HG2	2:B:2301:PX4:H10	1.86	0.57
1:B:2024:LEU:HB3	1:B:2048:PHE:CZ	2.40	0.57
1:B:2057:THR:O	1:B:2061:ILE:N	2.35	0.57
1:C:1060:ILE:O	1:C:1064:ILE:HG13	2.04	0.56
1:C:1177:GLU:OE1	1:C:1178:SER:OG	2.11	0.56
1:D:2148:ALA:HB1	1:D:2160:PHE:CD1	2.40	0.56
1:D:2017:PHE:O	1:D:2020:TYR:HB3	2.06	0.56
1:D:2209:MET:HA	1:D:2212:LEU:HD13	1.88	0.55
1:A:1167:PHE:HB3	2:A:1301:PX4:H46	1.87	0.55
1:C:1076:TRP:HB3	1:C:1111:THR:HG23	1.89	0.55
1:D:2204:VAL:O	1:D:2208:VAL:HG23	2.06	0.55
1:B:2168:TYR:C	1:B:2168:TYR:HD1	2.15	0.55
1:C:1063:ARG:HE	1:C:1071:PHE:HE2	1.54	0.55
1:B:2134:ILE:HG23	2:B:2301:PX4:H66	1.89	0.54
1:D:2054:THR:O	1:D:2058:ILE:HG12	2.07	0.54
1:D:2141:PHE:HB3	1:D:2167:PHE:CE1	2.42	0.54
1:A:1104:LEU:HD13	2:B:2302:PX4:H72	1.89	0.54
1:A:1124:ILE:HA	1:A:1127:ILE:HG13	1.89	0.54
1:A:1137:MET:HB3	2:A:1301:PX4:H67	1.90	0.54
1:B:2083:VAL:HA	1:B:2086:ILE:HB	1.88	0.54
1:B:2164:GLY:HA2	2:B:2301:PX4:H16	1.89	0.54
1:A:1091:THR:HA	1:A:1102:ARG:HH22	1.72	0.54
1:B:2168:TYR:C	1:B:2168:TYR:CD1	2.86	0.54
1:D:2080:ASP:OD1	1:D:2108:ARG:HG3	2.06	0.54
1:D:2021:LEU:HB2	1:D:2056:PHE:HE1	1.73	0.53
1:B:2137:MET:HE1	1:B:2208:VAL:HB	1.89	0.53
1:C:1009:VAL:CG2	1:C:1062:LEU:HB3	2.39	0.53
1:B:2175:THR:HB	1:C:1176:LEU:HD13	1.89	0.53
1:B:2053:ILE:HA	1:B:2056:PHE:HB2	1.91	0.53
1:C:1060:ILE:HG13	1:C:1071:PHE:CZ	2.42	0.52
1:C:1151:LEU:HD22	2:C:1302:PX4:H48	1.91	0.52
1:C:1162:THR:HG22	1:C:1164:GLY:N	2.22	0.52
1:B:2025:ASN:O	1:B:2029:MET:HG3	2.10	0.52
1:C:1059:GLU:OE2	1:C:1108:ARG:NH2	2.43	0.52
1:C:1025:ASN:C	1:C:1025:ASN:HD22	2.17	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:2076:TRP:H	1:D:2076:TRP:CD1	2.27	0.52
1:C:1098:LEU:O	1:C:1102:ARG:HG3	2.10	0.52
1:C:1149:THR:HA	1:C:1160:PHE:O	2.09	0.52
1:A:1143:ILE:O	1:A:1147:MET:HG3	2.10	0.51
1:C:1119:ILE:O	1:C:1123:LEU:HG	2.09	0.51
1:C:1155:ARG:HD2	1:C:1190:VAL:HG11	1.92	0.51
1:D:2026:GLY:HA2	1:D:2106:LEU:HD13	1.93	0.51
1:A:1072:PHE:HA	1:A:1078:LEU:HD21	1.93	0.51
1:C:1009:VAL:HG22	1:C:1062:LEU:HB3	1.93	0.51
1:D:2010:GLU:N	1:D:2010:GLU:OE1	2.44	0.51
1:C:1096:GLU:O	1:C:1100:VAL:HG23	2.11	0.51
1:C:1175:THR:HB	1:D:2176:LEU:HD13	1.92	0.50
1:D:2177:GLU:OE1	1:D:2178:SER:OG	2.24	0.50
1:A:1009:VAL:HG22	1:A:1062:LEU:HB3	1.94	0.50
1:B:2076:TRP:H	1:B:2076:TRP:CD1	2.30	0.50
1:C:1002:TYR:O	1:C:1005:ILE:HG12	2.11	0.50
1:D:2083:VAL:HA	1:D:2086:ILE:HD12	1.94	0.50
1:C:1167:PHE:CD1	2:C:1301:PX4:H22	2.47	0.50
1:D:2029:MET:HE2	1:D:2106:LEU:HD21	1.94	0.50
1:A:1037:PHE:C	1:A:1039:GLN:H	2.19	0.50
1:A:1176:LEU:HD13	1:D:2175:THR:HB	1.94	0.50
1:C:1018:ILE:O	1:C:1022:ILE:HG12	2.12	0.50
1:B:2123:LEU:HD22	1:C:1211:ASN:ND2	2.27	0.49
1:B:2083:VAL:HG21	1:B:2104:LEU:C	2.38	0.49
1:B:2185:ARG:O	1:B:2189:GLU:HG2	2.12	0.49
1:D:2122:ALA:O	1:D:2126:VAL:HG23	2.12	0.49
1:D:2124:ILE:HA	1:D:2127:ILE:HG12	1.94	0.49
1:B:2051:ILE:O	1:B:2054:THR:HG22	2.13	0.49
1:C:1076:TRP:H	1:C:1076:TRP:CD1	2.30	0.49
1:A:1165:GLU:HA	2:A:1301:PX4:H5	1.95	0.49
1:C:1194:ALA:HA	2:C:1302:PX4:H52	1.95	0.49
1:B:2054:THR:O	1:B:2058:ILE:HG12	2.12	0.49
1:D:2130:MET:O	1:D:2133:VAL:HG12	2.12	0.49
1:A:1167:PHE:HE1	2:A:1301:PX4:H57	1.77	0.48
1:A:1048:PHE:HA	1:A:1051:ILE:HD12	1.95	0.48
1:D:2071:PHE:CE1	1:D:2077:SER:HB3	2.48	0.48
1:A:1059:GLU:OE2	1:A:1108:ARG:NH2	2.47	0.48
1:D:2162:THR:HG23	1:D:2164:GLY:N	2.29	0.48
1:D:2185:ARG:HA	1:D:2188:MET:HE2	1.95	0.48
1:C:1118:LYS:O	1:C:1122:ALA:N	2.29	0.48
1:A:1199:ILE:HB	1:A:1200:PRO:HD3	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2057:THR:HG23	1:B:2088:LEU:HD11	1.96	0.48
1:A:1136:LEU:HB2	1:D:2116:MET:HE2	1.95	0.48
1:B:2083:VAL:HG11	1:B:2105:ARG:HA	1.96	0.48
1:C:1169:THR:OG1	1:D:2185:ARG:NH2	2.40	0.48
1:C:1140:PHE:HE2	1:C:1205:VAL:HG23	1.79	0.47
1:C:1202:ILE:O	1:C:1206:THR:OG1	2.26	0.47
1:B:2028:THR:HG21	1:B:2048:PHE:HD2	1.79	0.47
1:C:1171:PHE:O	1:C:1175:THR:HG23	2.15	0.47
1:D:2139:LEU:O	1:D:2143:ILE:HG13	2.15	0.47
1:C:1025:ASN:HB2	1:C:1052:VAL:HG11	1.95	0.47
1:C:1120:VAL:O	1:C:1124:ILE:HG13	2.14	0.47
1:B:2053:ILE:HD12	1:B:2056:PHE:HB2	1.97	0.47
1:A:1029:MET:HG2	1:A:1103:VAL:HG23	1.97	0.47
1:A:1143:ILE:HD12	1:D:2107:PHE:CE1	2.50	0.47
1:B:2056:PHE:O	1:B:2060:ILE:N	2.37	0.47
1:B:2199:ILE:HB	1:B:2200:PRO:HD3	1.97	0.47
1:C:1191:TYR:HB3	2:C:1302:PX4:H46	1.95	0.47
1:A:1037:PHE:HZ	1:A:1045:THR:HG1	1.60	0.47
1:A:1063:ARG:NH2	1:A:1077:SER:OG	2.45	0.47
1:B:2022:ILE:CG2	1:B:2109:LEU:HB2	2.43	0.47
1:B:2130:MET:HE2	1:B:2212:LEU:HD22	1.97	0.47
1:C:1084:VAL:O	1:C:1088:LEU:N	2.47	0.47
1:C:1143:ILE:O	1:C:1147:MET:HG3	2.15	0.47
1:C:1177:GLU:OE1	1:D:2178:SER:HA	2.15	0.46
1:B:2097:ILE:H	1:B:2097:ILE:HG13	1.55	0.46
1:B:2155:ARG:NH2	2:B:2302:PX4:H8	2.31	0.46
1:B:2177:GLU:OE1	1:C:1178:SER:HA	2.15	0.46
2:C:1301:PX4:H5	1:D:2188:MET:HE1	1.97	0.46
1:A:1147:MET:HE2	1:D:2100:VAL:HG12	1.97	0.46
1:B:2025:ASN:OD1	1:B:2105:ARG:NH1	2.49	0.46
1:B:2050:GLN:HA	1:B:2053:ILE:HG22	1.98	0.46
1:B:2087:SER:CB	1:B:2105:ARG:HH21	2.24	0.46
1:A:1131:LEU:HD23	1:A:1131:LEU:HA	1.76	0.46
1:A:1177:GLU:OE1	1:B:2178:SER:HA	2.16	0.46
1:B:2026:GLY:HA2	1:B:2106:LEU:CD1	2.44	0.46
1:B:2101:LEU:HD22	1:B:2104:LEU:HD11	1.96	0.46
2:D:2301:PX4:H46	2:D:2301:PX4:H16	1.71	0.46
1:A:1090:PRO:C	1:A:1102:ARG:HH22	2.24	0.46
1:B:2019:ILE:HG23	1:B:2109:LEU:HD11	1.98	0.46
1:C:1134:ILE:HA	2:C:1301:PX4:H40	1.96	0.45
1:C:1177:GLU:CD	1:D:2178:SER:HA	2.41	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1060:ILE:O	1:A:1064:ILE:HG13	2.16	0.45
1:C:1022:ILE:HD12	1:C:1108:ARG:HB3	1.98	0.45
1:A:1165:GLU:CG	2:A:1301:PX4:H11	2.47	0.45
1:D:2080:ASP:CG	1:D:2108:ARG:HG3	2.40	0.45
1:A:1102:ARG:HB3	1:A:1105:ARG:NH2	2.31	0.45
1:B:2025:ASN:HB2	1:B:2052:VAL:HG11	1.97	0.45
1:B:2029:MET:SD	1:B:2103:VAL:HA	2.57	0.45
1:C:1003:LEU:HA	1:C:1006:THR:HB	1.98	0.45
1:C:1004:ARG:O	1:C:1008:ILE:HG13	2.16	0.45
1:C:1184:VAL:O	1:C:1188:MET:HG3	2.15	0.45
1:C:1205:VAL:O	1:C:1209:MET:HG2	2.16	0.45
1:D:2137:MET:CE	1:D:2209:MET:HG2	2.46	0.45
2:C:1301:PX4:H8	1:D:2188:MET:SD	2.57	0.45
1:D:2022:ILE:HD11	1:D:2108:ARG:NE	2.25	0.45
1:A:1084:VAL:O	1:A:1088:LEU:N	2.50	0.45
1:B:2148:ALA:HB1	1:B:2160:PHE:CD1	2.51	0.45
1:C:1048:PHE:HA	1:C:1051:ILE:HD12	1.97	0.45
1:C:1139:LEU:O	1:C:1143:ILE:HG13	2.17	0.45
1:A:1009:VAL:CG2	1:A:1062:LEU:HB3	2.47	0.45
1:C:1025:ASN:O	1:C:1028:THR:HG22	2.16	0.45
1:C:1099:ARG:HA	1:C:1102:ARG:NE	2.32	0.45
1:C:1171:PHE:HD2	2:C:1301:PX4:H23	1.82	0.45
1:C:1167:PHE:HD1	2:C:1301:PX4:H22	1.83	0.44
1:D:2199:ILE:HB	1:D:2200:PRO:HD3	1.99	0.44
1:C:1165:GLU:HG2	2:C:1301:PX4:H7	2.00	0.44
1:C:1071:PHE:CE2	1:C:1077:SER:HB3	2.52	0.44
1:D:2143:ILE:O	1:D:2147:MET:HG3	2.17	0.44
1:B:2205:VAL:O	1:B:2209:MET:HG2	2.18	0.44
1:C:1006:THR:HG23	1:C:1066:VAL:HG13	2.00	0.44
1:A:1080:ASP:HA	1:A:1083:VAL:HG12	2.00	0.44
1:C:1080:ASP:OD2	1:C:1111:THR:HG21	2.18	0.44
1:C:1177:GLU:OE2	1:D:2180:SER:HB3	2.18	0.44
1:C:1185:ARG:HB2	1:C:1186:PRO:HD3	1.99	0.44
1:B:2043:VAL:O	1:B:2046:THR:HG22	2.18	0.44
2:B:2302:PX4:H10	2:B:2302:PX4:H1	1.68	0.44
1:A:1162:THR:HG22	1:A:1164:GLY:N	2.28	0.43
1:C:1137:MET:HE1	1:C:1208:VAL:HB	2.01	0.43
1:D:2204:VAL:O	1:D:2207:PHE:HB2	2.18	0.43
1:B:2187:LEU:HD12	1:B:2187:LEU:HA	1.84	0.43
1:C:1131:LEU:HA	1:C:1131:LEU:HD23	1.68	0.43
1:D:2089:VAL:HG13	1:D:2090:PRO:HD2	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:2133:VAL:HG11	1:D:2212:LEU:HG	2.00	0.43
2:B:2301:PX4:H13	2:B:2301:PX4:H1	1.76	0.43
1:C:1206:THR:O	1:C:1210:ILE:HG13	2.18	0.43
1:A:1132:SER:HB2	1:D:2119:ILE:HG13	2.00	0.43
1:B:2053:ILE:HG12	1:B:2087:SER:CB	2.48	0.43
1:B:2131:LEU:HA	1:B:2131:LEU:HD23	1.68	0.43
1:A:1081:PHE:O	1:A:1085:ALA:N	2.32	0.43
1:B:2185:ARG:HB2	1:B:2186:PRO:HD3	2.00	0.43
1:C:1171:PHE:CD2	2:C:1301:PX4:H23	2.53	0.43
1:D:2041:PHE:O	1:D:2044:TYR:HB2	2.19	0.43
2:D:2301:PX4:H7	2:D:2301:PX4:H2	1.66	0.43
1:B:2149:THR:HA	1:B:2160:PHE:O	2.19	0.43
1:C:1167:PHE:C	2:C:1301:PX4:H19	2.44	0.43
1:A:1018:ILE:HD13	1:A:1018:ILE:HA	1.82	0.42
1:B:2180:SER:HA	1:B:2184:VAL:HB	2.01	0.42
1:A:1041:PHE:O	1:A:1044:TYR:HB2	2.19	0.42
1:A:1171:PHE:O	1:A:1175:THR:HG23	2.20	0.42
1:D:2041:PHE:HA	1:D:2044:TYR:CD1	2.55	0.42
1:B:2028:THR:HG21	1:B:2048:PHE:CD2	2.53	0.42
1:A:1063:ARG:NH1	1:A:1080:ASP:OD2	2.53	0.42
1:B:2034:SER:HB3	1:B:2037:PHE:HB2	1.99	0.42
1:C:1047:LEU:O	1:C:1051:ILE:HG13	2.19	0.42
1:A:1167:PHE:HD1	2:A:1301:PX4:H52	1.84	0.42
1:B:2022:ILE:HB	1:B:2109:LEU:HD13	2.02	0.42
1:C:1025:ASN:OD1	1:C:1105:ARG:NH1	2.52	0.42
1:C:1167:PHE:HE1	2:C:1301:PX4:H30	1.84	0.42
1:D:2137:MET:HE1	1:D:2209:MET:HG2	2.00	0.42
1:B:2191:TYR:C	1:B:2193:TYR:H	2.27	0.42
1:C:1191:TYR:CD1	2:C:1302:PX4:H46	2.54	0.42
1:D:2173:VAL:O	1:D:2176:LEU:HD23	2.19	0.42
1:C:1199:ILE:HB	1:C:1200:PRO:HD3	2.00	0.42
1:D:2060:ILE:HD12	1:D:2060:ILE:HA	1.83	0.42
1:D:2183:ILE:O	1:D:2187:LEU:HD13	2.19	0.42
1:C:1025:ASN:HA	1:C:1028:THR:HG22	2.00	0.42
1:C:1100:VAL:HG13	1:D:2150:GLN:OE1	2.20	0.42
1:D:2089:VAL:HG11	1:D:2098:LEU:HD13	2.00	0.42
1:A:1170:LEU:HD23	1:A:1170:LEU:HA	1.78	0.42
1:B:2168:TYR:HD1	1:B:2168:TYR:O	2.02	0.42
2:A:1301:PX4:H54	2:A:1301:PX4:H60	1.82	0.42
1:B:2110:VAL:HG13	1:B:2116:MET:HB3	2.01	0.42
1:B:2143:ILE:O	1:B:2147:MET:HG3	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2030:GLY:HA3	1:C:1142:TYR:OH	2.19	0.41
1:D:2021:LEU:HA	1:D:2024:LEU:HB2	2.01	0.41
1:A:1139:LEU:O	1:A:1143:ILE:HG13	2.20	0.41
1:A:1049:ASN:O	1:A:1053:ILE:HG23	2.19	0.41
1:A:1080:ASP:OD2	1:A:1111:THR:HG21	2.20	0.41
1:B:2165:GLU:HG3	2:B:2301:PX4:H12	2.02	0.41
1:A:1141:PHE:O	1:A:1145:ALA:N	2.32	0.41
1:A:1143:ILE:HG21	1:D:2107:PHE:CE2	2.55	0.41
1:B:2053:ILE:HA	1:B:2053:ILE:HD12	1.89	0.41
1:B:2183:ILE:O	1:B:2187:LEU:HB2	2.19	0.41
1:A:1031:LEU:C	1:A:1033:THR:N	2.78	0.41
1:B:2005:ILE:O	1:B:2009:VAL:HG23	2.21	0.41
1:B:2130:MET:HB2	1:B:2130:MET:HE3	1.70	0.41
1:D:2149:THR:HA	1:D:2160:PHE:O	2.21	0.41
1:A:1005:ILE:HG13	1:A:1066:VAL:HG22	2.03	0.41
1:A:1021:LEU:HD11	1:A:1055:ILE:HG21	2.03	0.41
1:D:2018:ILE:HD13	1:D:2018:ILE:HA	1.78	0.41
1:D:2185:ARG:HH11	1:D:2185:ARG:HD3	1.68	0.41
1:A:1119:ILE:O	1:A:1123:LEU:HG	2.21	0.41
1:A:1091:THR:CA	1:A:1102:ARG:HH22	2.33	0.41
1:B:2056:PHE:O	1:B:2060:ILE:HB	2.20	0.41
1:B:2067:HIS:HB3	1:B:2070:SER:HB2	2.02	0.41
1:C:1065:TYR:HD1	1:C:1065:TYR:HA	1.74	0.41
1:D:2037:PHE:O	1:D:2039:GLN:N	2.55	0.40
1:D:2103:VAL:O	1:D:2106:LEU:HG	2.22	0.40
1:B:2107:PHE:CE1	1:C:1143:ILE:HD12	2.56	0.40
1:B:2177:GLU:HG3	1:C:1176:LEU:O	2.21	0.40
1:A:1101:LEU:HD23	1:B:2147:MET:HE1	2.04	0.40
1:B:2028:THR:O	1:B:2032:GLU:HG3	2.22	0.40
1:C:1097:ILE:HG22	1:C:1101:LEU:HG	2.03	0.40
1:D:2021:LEU:HB2	1:D:2056:PHE:CE1	2.55	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	220/285 (77%)	206 (94%)	14 (6%)	0	100	100
1	B	226/285 (79%)	214 (95%)	11 (5%)	1 (0%)	30	59
1	C	215/285 (75%)	208 (97%)	7 (3%)	0	100	100
1	D	220/285 (77%)	209 (95%)	10 (4%)	1 (0%)	24	54
All	All	881/1140 (77%)	837 (95%)	42 (5%)	2 (0%)	43	72

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	2038	MET
1	B	2228	GLU

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	187/263 (71%)	182 (97%)	5 (3%)	39	73
1	B	192/263 (73%)	187 (97%)	5 (3%)	40	73
1	C	178/263 (68%)	170 (96%)	8 (4%)	24	58
1	D	186/263 (71%)	181 (97%)	5 (3%)	39	73
All	All	743/1052 (71%)	720 (97%)	23 (3%)	35	69

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1005	ILE
1	A	1029	MET
1	A	1060	ILE
1	A	1083	VAL
1	A	1167	PHE
1	B	2047	LEU

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Mol	Chain	Res	Type
1	B	2060	ILE
1	B	2167	PHE
1	B	2187	LEU
1	B	2228	GLU
1	C	1029	MET
1	C	1043	VAL
1	C	1054	THR
1	C	1060	ILE
1	C	1083	VAL
1	C	1108	ARG
1	C	1133	VAL
1	C	1167	PHE
1	D	2053	ILE
1	D	2060	ILE
1	D	2083	VAL
1	D	2162	THR
1	D	2167	PHE

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	1049	ASN
1	B	2211	ASN
1	C	1049	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

11 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	PO4	A	1302	-	4,4,4	0.95	0	6,6,6	0.48	0
2	PX4	A	1301	-	30,30,45	1.12	2 (6%)	35,37,53	1.11	1 (2%)
3	PO4	D	2302	-	4,4,4	0.99	0	6,6,6	0.50	0
3	PO4	A	1303	-	4,4,4	0.91	0	6,6,6	0.47	0
2	PX4	C	1302	-	21,21,45	1.24	2 (9%)	26,27,53	0.82	1 (3%)
2	PX4	D	2301	-	30,30,45	1.40	3 (10%)	36,38,53	1.20	3 (8%)
2	PX4	C	1301	-	35,35,45	1.30	3 (8%)	41,43,53	1.15	3 (7%)
3	PO4	B	2303	-	4,4,4	0.94	0	6,6,6	0.44	0
2	PX4	B	2301	-	29,29,45	1.19	3 (10%)	34,36,53	1.30	2 (5%)
2	PX4	B	2302	-	33,33,45	1.21	3 (9%)	39,41,53	1.11	2 (5%)
3	PO4	C	1303	-	4,4,4	0.98	0	6,6,6	0.39	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
2	PX4	A	1301	-	-	19/33/33/49	-
2	PX4	C	1302	-	-	10/22/22/49	-
2	PX4	D	2301	-	-	16/34/34/49	-
2	PX4	C	1301	-	-	25/39/39/49	-
2	PX4	B	2301	-	-	16/31/31/49	-
2	PX4	B	2302	-	-	15/36/36/49	-

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	2301	PX4	O5-C9	3.96	1.44	1.33
2	C	1301	PX4	O5-C9	3.66	1.44	1.33
2	C	1301	PX4	O7-C23	3.60	1.44	1.34
2	C	1302	PX4	O7-C23	3.41	1.43	1.33
2	D	2301	PX4	O7-C23	3.33	1.43	1.34
2	B	2301	PX4	O7-C23	3.32	1.43	1.34
2	A	1301	PX4	O7-C23	3.25	1.43	1.34
2	B	2302	PX4	O7-C23	3.18	1.43	1.34
2	A	1301	PX4	C4-N1	-2.95	1.41	1.50
2	C	1301	PX4	C4-N1	-2.91	1.41	1.50
2	C	1302	PX4	C4-N1	-2.79	1.41	1.50
2	D	2301	PX4	C4-N1	-2.78	1.41	1.50
2	B	2302	PX4	C4-N1	-2.76	1.42	1.50
2	B	2301	PX4	C4-N1	-2.65	1.42	1.50
2	B	2302	PX4	O5-C9	2.38	1.44	1.33
2	B	2301	PX4	O7-C7	-2.16	1.43	1.47

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2301	PX4	O7-C23-C24	4.49	121.20	111.48
2	B	2302	PX4	O7-C23-C24	4.47	121.15	111.48
2	A	1301	PX4	O7-C23-C24	4.29	120.76	111.48
2	D	2301	PX4	O7-C23-C24	4.15	120.45	111.48
2	C	1301	PX4	O7-C23-C24	3.79	119.67	111.48
2	B	2301	PX4	C7-O7-C23	-3.35	112.95	117.78
2	D	2301	PX4	O5-C9-C10	3.30	121.89	111.83
2	C	1301	PX4	O5-C9-C10	2.86	120.56	111.83
2	C	1302	PX4	O7-C23-C24	2.48	119.41	111.83
2	C	1301	PX4	C11-C10-C9	-2.25	105.45	113.69
2	B	2302	PX4	C7-O7-C23	-2.16	112.62	117.80
2	D	2301	PX4	O7-C23-O8	-2.02	118.99	123.70

There are no chirality outliers.

All (101) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1301	PX4	C1-O3-P1-O2
2	A	1301	PX4	C6-O4-P1-O1
2	A	1301	PX4	C6-C7-C8-O5
2	A	1301	PX4	O7-C7-C8-O5
2	A	1301	PX4	C24-C23-O7-C7

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Mol	Chain	Res	Type	Atoms
2	B	2301	PX4	C1-O3-P1-O1
2	B	2301	PX4	C1-O3-P1-O2
2	B	2301	PX4	C1-O3-P1-O4
2	B	2301	PX4	C6-O4-P1-O1
2	B	2301	PX4	C6-O4-P1-O2
2	B	2301	PX4	C6-O4-P1-O3
2	B	2301	PX4	O3-C1-C2-N1
2	B	2301	PX4	O4-C6-C7-O7
2	B	2302	PX4	C1-O3-P1-O2
2	B	2302	PX4	O3-C1-C2-N1
2	C	1301	PX4	O3-C1-C2-N1
2	C	1301	PX4	O7-C7-C8-O5
2	C	1302	PX4	C1-O3-P1-O1
2	C	1302	PX4	C1-O3-P1-O2
2	C	1302	PX4	C1-O3-P1-O4
2	C	1302	PX4	C6-O4-P1-O1
2	C	1302	PX4	C6-O4-P1-O2
2	C	1302	PX4	C6-O4-P1-O3
2	C	1302	PX4	O3-C1-C2-N1
2	C	1302	PX4	O4-C6-C7-O7
2	D	2301	PX4	C1-O3-P1-O2
2	D	2301	PX4	C6-O4-P1-O1
2	D	2301	PX4	O4-C6-C7-O7
2	D	2301	PX4	O8-C23-O7-C7
2	D	2301	PX4	C24-C23-O7-C7
2	A	1301	PX4	O8-C23-O7-C7
2	B	2302	PX4	O6-C9-O5-C8
2	B	2302	PX4	C10-C9-O5-C8
2	B	2302	PX4	C24-C23-O7-C7
2	A	1301	PX4	C23-C24-C25-C26
2	B	2301	PX4	C23-C24-C25-C26
2	D	2301	PX4	C23-C24-C25-C26
2	B	2302	PX4	O8-C23-O7-C7
2	A	1301	PX4	C28-C29-C30-C31
2	C	1301	PX4	C1-C2-N1-C5
2	C	1302	PX4	C23-C24-C25-C26
2	C	1301	PX4	C9-C10-C11-C12
2	B	2302	PX4	C7-C6-O4-P1
2	C	1301	PX4	C1-C2-N1-C3
2	C	1301	PX4	C1-C2-N1-C4
2	C	1301	PX4	C14-C15-C16-C17
2	B	2302	PX4	C31-C32-C33-C34

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Mol	Chain	Res	Type	Atoms
2	B	2302	PX4	C30-C31-C32-C33
2	C	1301	PX4	C16-C17-C18-C19
2	C	1301	PX4	C17-C18-C19-C20
2	C	1301	PX4	C18-C19-C20-C21
2	B	2301	PX4	C30-C31-C32-C33
2	A	1301	PX4	C24-C25-C26-C27
2	C	1301	PX4	C11-C12-C13-C14
2	C	1301	PX4	C24-C23-O7-C7
2	B	2302	PX4	C23-C24-C25-C26
2	C	1301	PX4	O8-C23-O7-C7
2	D	2301	PX4	C24-C25-C26-C27
2	B	2302	PX4	C24-C25-C26-C27
2	D	2301	PX4	C25-C26-C27-C28
2	B	2301	PX4	C33-C34-C35-C36
2	A	1301	PX4	C25-C26-C27-C28
2	C	1301	PX4	C10-C11-C12-C13
2	D	2301	PX4	C10-C11-C12-C13
2	B	2301	PX4	C28-C29-C30-C31
2	C	1301	PX4	C19-C20-C21-C22
2	B	2301	PX4	C27-C28-C29-C30
2	C	1301	PX4	C6-C7-C8-O5
2	B	2301	PX4	C25-C26-C27-C28
2	B	2302	PX4	O7-C7-C8-O5
2	D	2301	PX4	O4-C6-C7-C8
2	C	1301	PX4	C2-C1-O3-P1
2	B	2301	PX4	C26-C27-C28-C29
2	A	1301	PX4	C32-C33-C34-C35
2	B	2302	PX4	C26-C27-C28-C29
2	A	1301	PX4	C6-O4-P1-O2
2	A	1301	PX4	C6-O4-P1-O3
2	B	2302	PX4	C6-O4-P1-O2
2	C	1301	PX4	C1-O3-P1-O2
2	D	2301	PX4	C1-O3-P1-O4
2	D	2301	PX4	C6-O4-P1-O2
2	D	2301	PX4	C6-O4-P1-O3
2	C	1302	PX4	C25-C26-C27-C28
2	C	1301	PX4	O4-C6-C7-O7
2	C	1301	PX4	O7-C23-C24-C25
2	C	1301	PX4	O4-C6-C7-C8
2	A	1301	PX4	C1-C2-N1-C4
2	D	2301	PX4	O7-C23-C24-C25
2	A	1301	PX4	C1-C2-N1-C5

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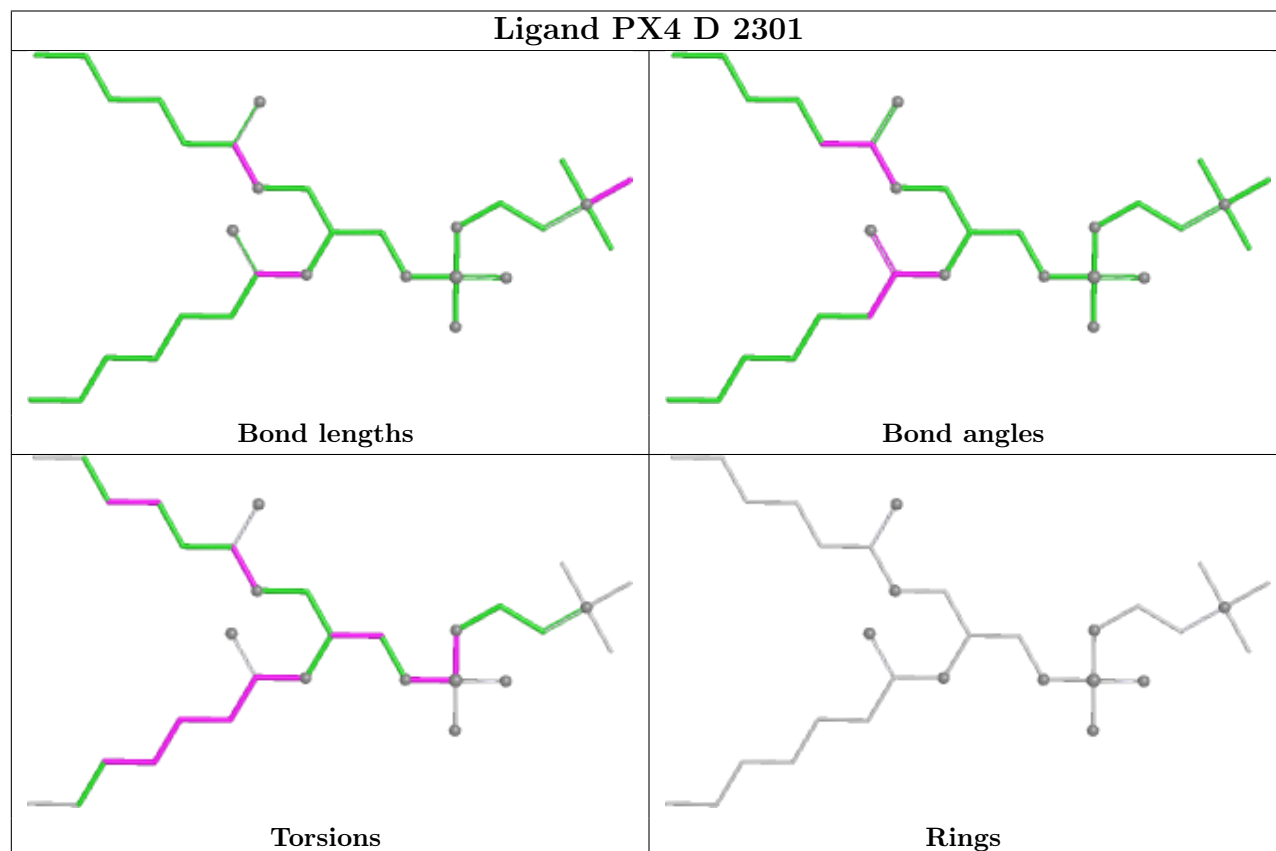
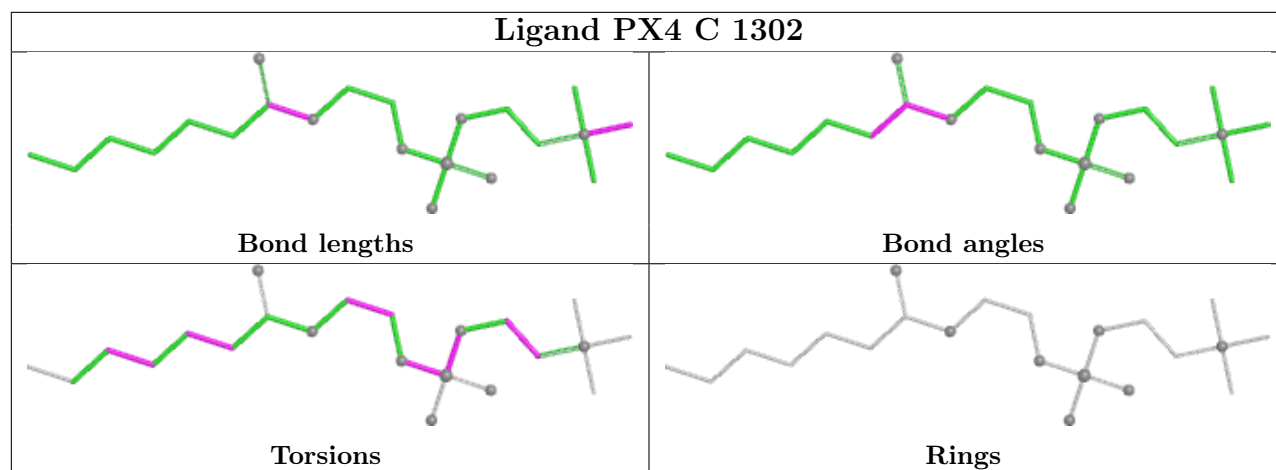
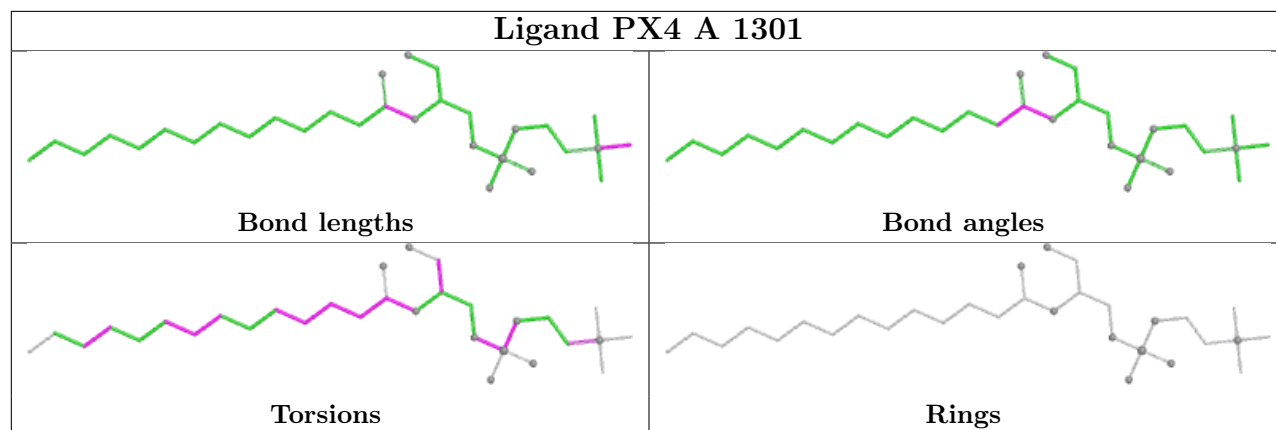
Mol	Chain	Res	Type	Atoms
2	A	1301	PX4	O7-C23-C24-C25
2	C	1301	PX4	C11-C10-C9-O5
2	B	2302	PX4	C6-C7-C8-O5
2	A	1301	PX4	C1-C2-N1-C3
2	C	1301	PX4	C12-C13-C14-C15
2	A	1301	PX4	O8-C23-C24-C25
2	C	1301	PX4	O8-C23-C24-C25
2	C	1301	PX4	C11-C10-C9-O6
2	A	1301	PX4	C29-C30-C31-C32
2	B	2301	PX4	C24-C25-C26-C27
2	D	2301	PX4	O8-C23-C24-C25
2	D	2301	PX4	C10-C9-O5-C8

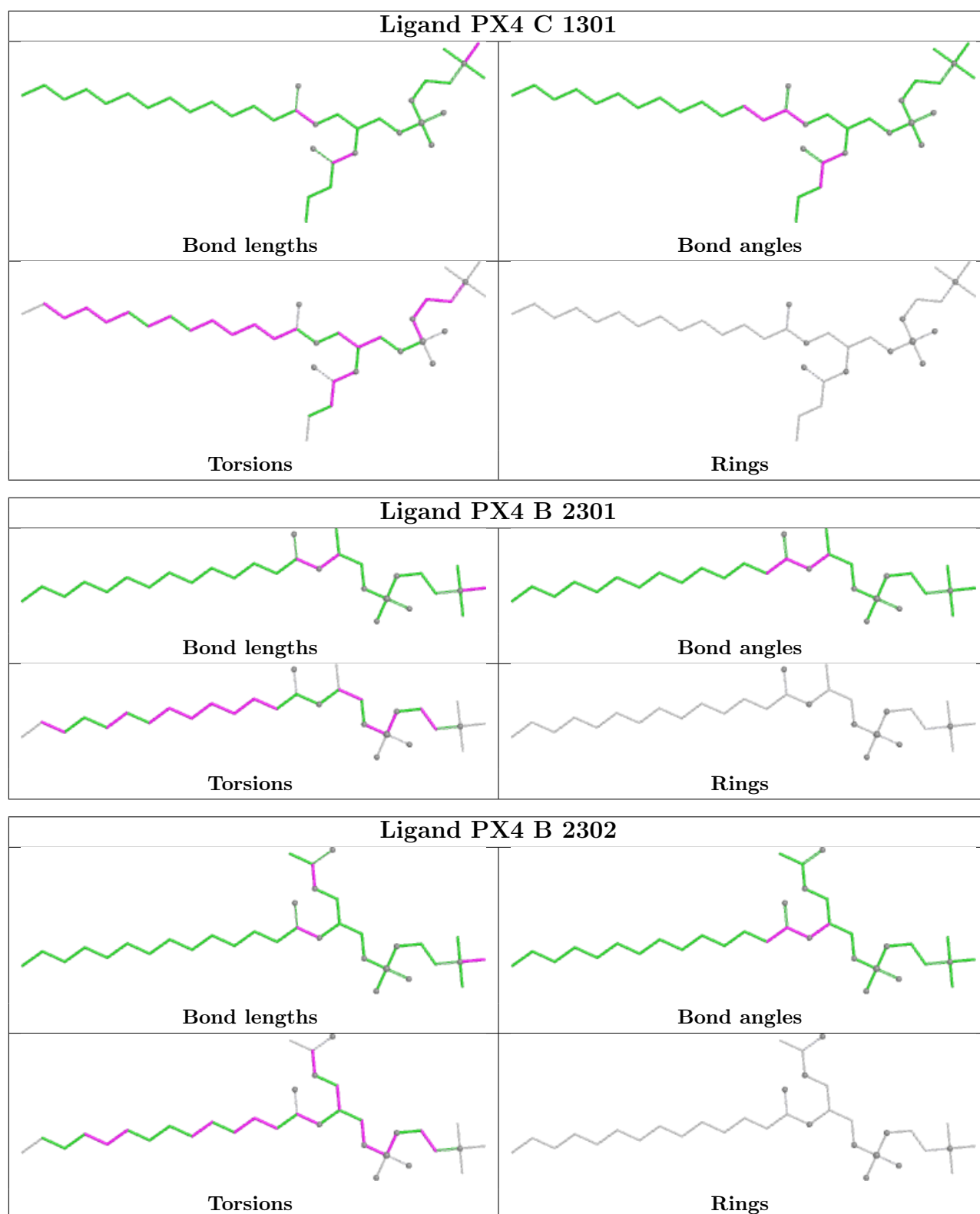
There are no ring outliers.

6 monomers are involved in 38 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1301	PX4	8	0
2	C	1302	PX4	4	0
2	D	2301	PX4	2	0
2	C	1301	PX4	14	0
2	B	2301	PX4	7	0
2	B	2302	PX4	3	0

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





5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

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

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	222/285 (77%)	-1.25	1 (0%) 87 83	37, 86, 137, 222	0
1	B	228/285 (80%)	-1.13	1 (0%) 88 85	39, 86, 147, 246	0
1	C	217/285 (76%)	-1.26	1 (0%) 87 83	35, 83, 142, 231	0
1	D	222/285 (77%)	-1.28	0 100 100	35, 82, 134, 171	0
All	All	889/1140 (77%)	-1.23	3 (0%) 90 87	35, 85, 142, 246	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	1091	THR	2.7
1	B	2007	ASN	2.6
1	A	1091	THR	2.2

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](#)

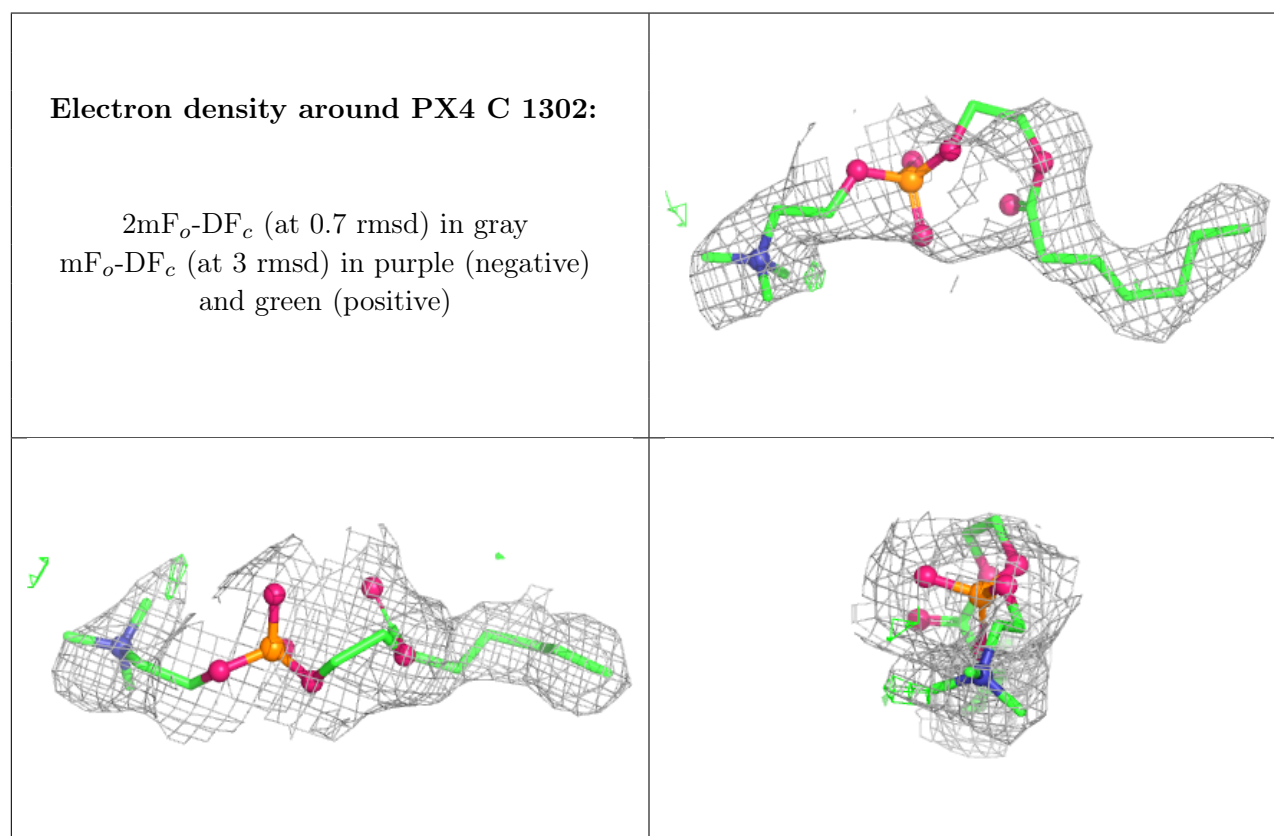
There are no oligosaccharides in this entry.

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.

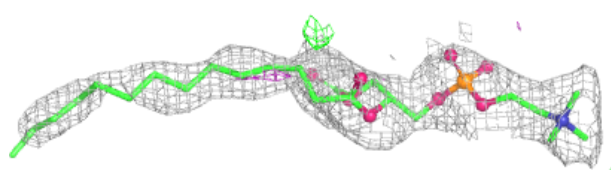
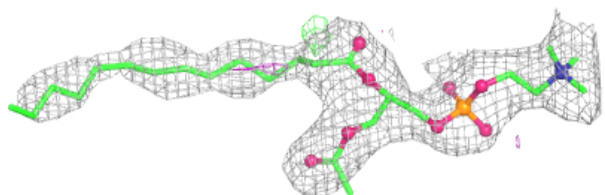
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	PO4	B	2303	5/5	0.97	0.07	126,128,137,143	0
2	PX4	C	1302	22/46	0.98	0.07	27,106,128,133	0
3	PO4	A	1302	5/5	0.98	0.05	101,109,112,112	0
2	PX4	B	2302	34/46	0.98	0.08	32,90,119,123	0
3	PO4	D	2302	5/5	0.98	0.06	142,142,143,147	0
2	PX4	D	2301	31/46	0.99	0.06	48,65,76,87	0
2	PX4	A	1301	31/46	0.99	0.04	31,54,73,83	0
3	PO4	A	1303	5/5	0.99	0.04	123,129,131,135	0
2	PX4	C	1301	36/46	0.99	0.05	19,67,92,96	0
3	PO4	C	1303	5/5	0.99	0.05	69,85,87,92	0
2	PX4	B	2301	30/46	0.99	0.06	26,57,76,95	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.

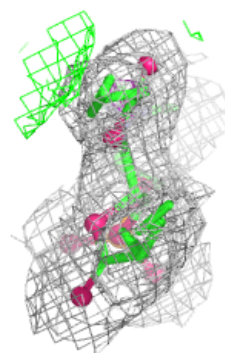
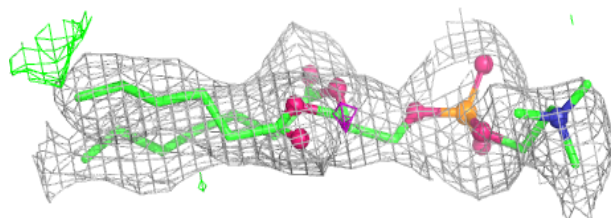
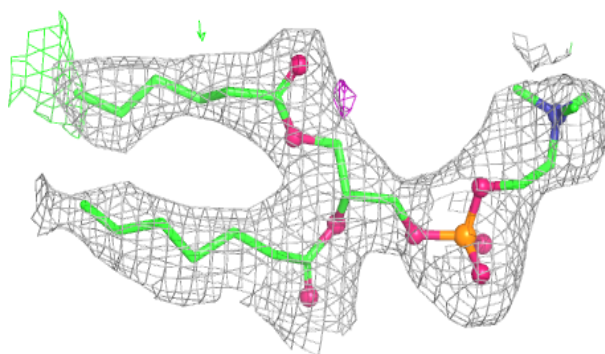


Electron density around PX4 B 2302:

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

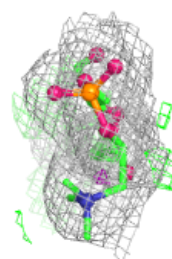
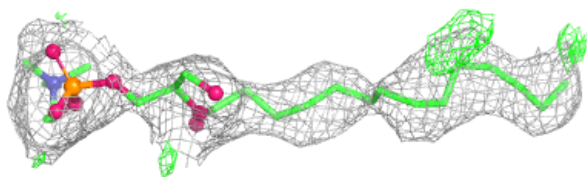
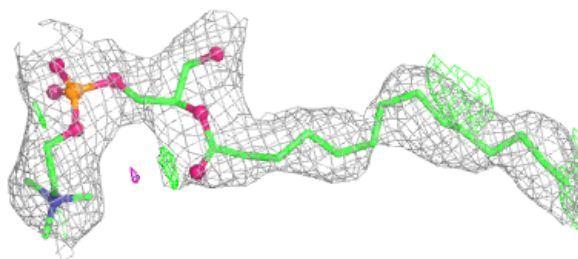
**Electron density around PX4 D 2301:**

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

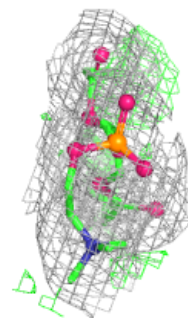
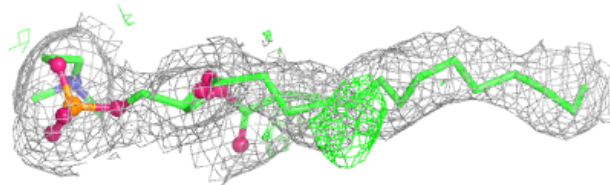
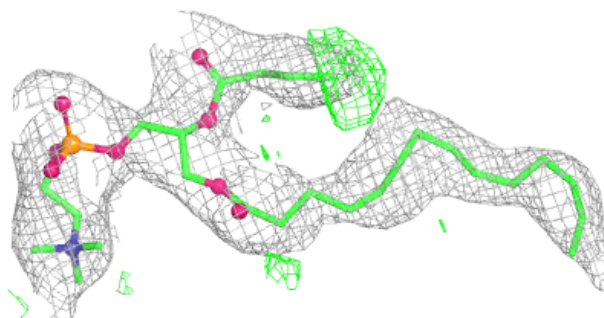


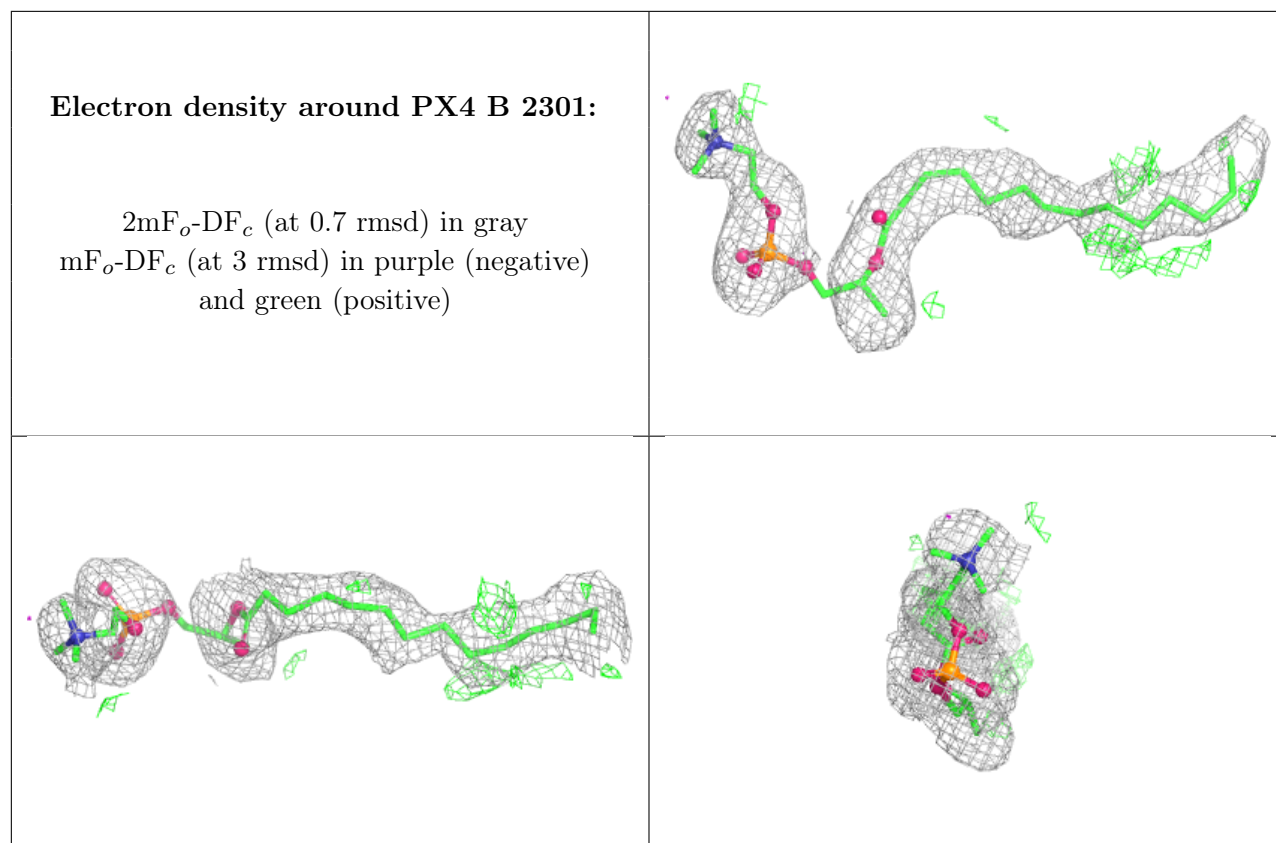
Electron density around PX4 A 1301:

$2mF_o-DF_c$ (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)





6.5 Other polymers [i](#)

There are no such residues in this entry.