



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:59 AM UTC

PDB ID : 3FQ7 / pdb_00003fq7
Title : Gabaculine complex of GSAM
Authors : Stetefeld, J.
Deposited on : 2009-01-07
Resolution : 2.15 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

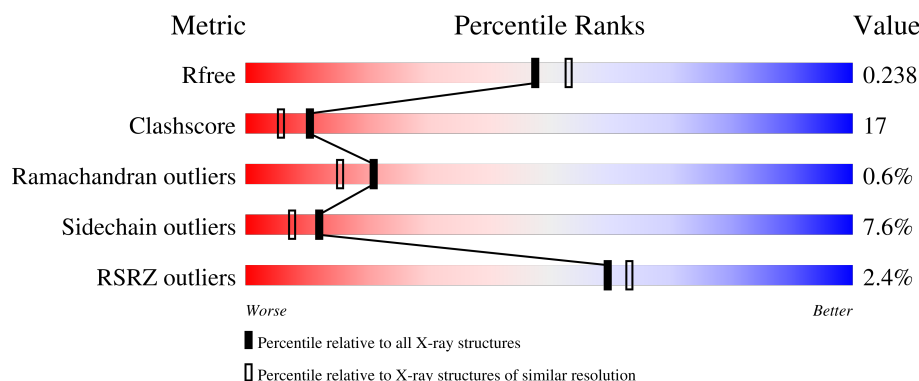
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.15 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	2057 (2.16-2.16)
Clashscore	190562	2159 (2.16-2.16)
Ramachandran outliers	187476	2134 (2.16-2.16)
Sidechain outliers	187428	2133 (2.16-2.16)
RSRZ outliers	180081	2059 (2.16-2.16)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 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	427	3% 67% 29% .
1	B	427	2% 70% 26% .

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6771 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.

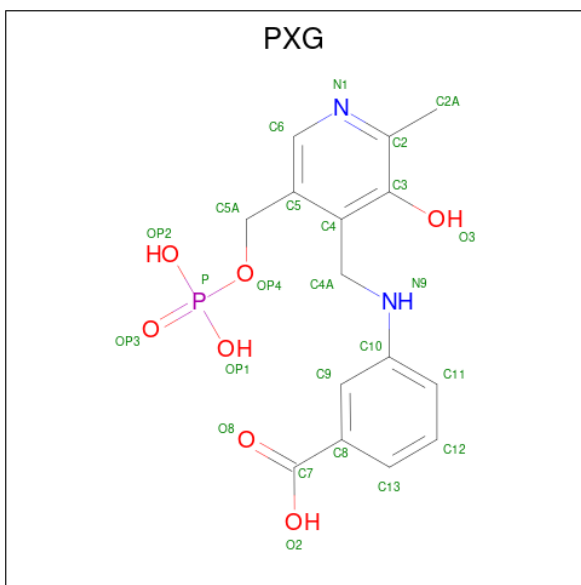
- Molecule 1 is a protein called Glutamate-1-semialdehyde 2,1-aminomutase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	427	Total	C	N	O	S	0	0	0
			3202	2043	535	605	19			
1	B	427	Total	C	N	O	S	195	0	0
			3202	2043	535	605	19			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1108	ASN	ILE	conflict	UNP P24630
A	1133	ILE	LEU	conflict	UNP P24630
A	1172	SER	ASP	conflict	UNP P24630
A	1179	LYS	SER	conflict	UNP P24630
A	1187	THR	ALA	conflict	UNP P24630
A	1327	GLY	ALA	conflict	UNP P24630
B	2108	ASN	ILE	conflict	UNP P24630
B	2133	ILE	LEU	conflict	UNP P24630
B	2172	SER	ASP	conflict	UNP P24630
B	2179	LYS	SER	conflict	UNP P24630
B	2187	THR	ALA	conflict	UNP P24630
B	2327	GLY	ALA	conflict	UNP P24630

- Molecule 2 is 3-[O-PHOSPHONOPYRIDOXYL]--AMINO-BENZOIC ACID (CCD ID: PXG) (formula: C₁₅H₁₇N₂O₇P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			25	15	2	7	1		
2	B	1	Total	C	N	O	P	0	0
			25	15	2	7	1		

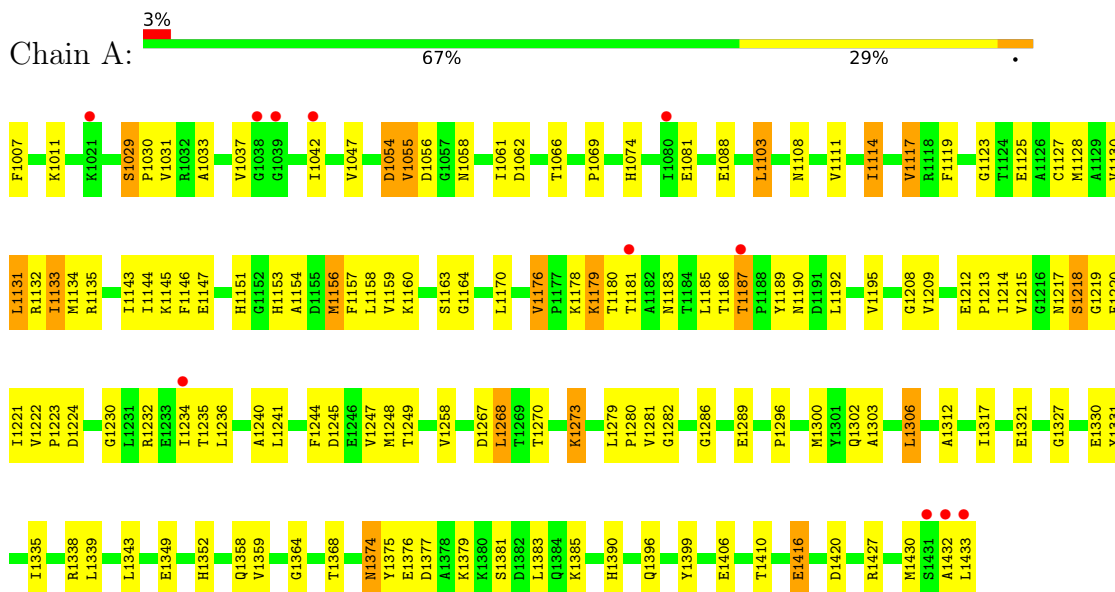
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	171	Total	O	0	0
			171	171		
3	B	146	Total	O	0	0
			146	146		

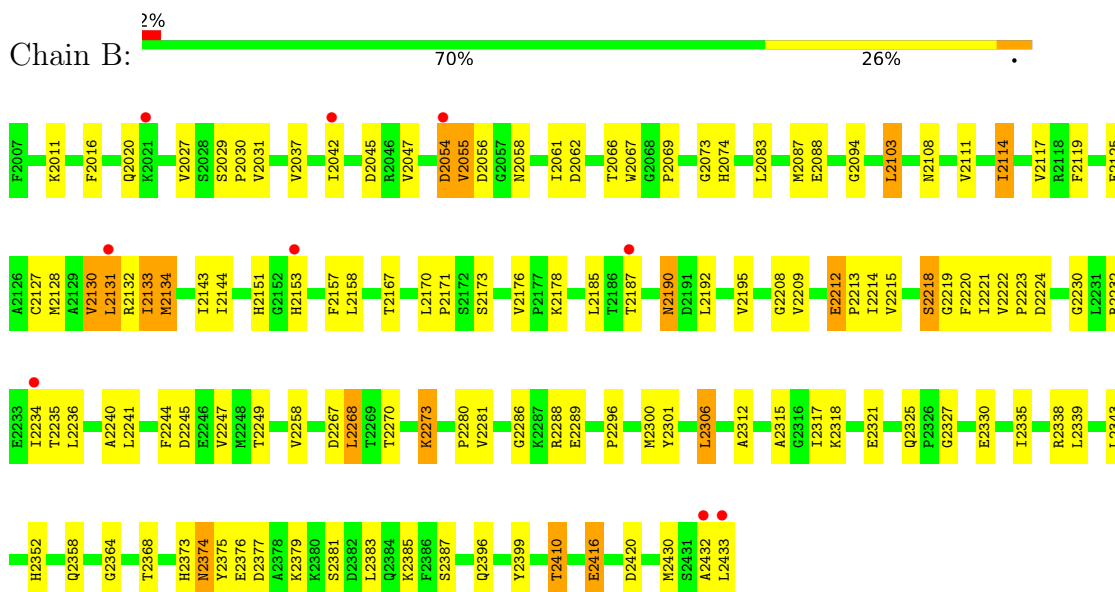
3 Residue-property plots

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: Glutamate-1-semialdehyde 2,1-aminomutase



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4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	66.37Å 107.03Å 121.75Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.41 – 2.15 20.41 – 2.15	Depositor EDS
% Data completeness (in resolution range)	86.1 (20.41-2.15) 86.0 (20.41-2.15)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.31 (at 2.15Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.214 , 0.240 0.213 , 0.238	Depositor DCC
R_{free} test set	4153 reflections (10.06%)	wwPDB-VP
Wilson B-factor (Å ²)	24.3	Xtriage
Anisotropy	0.442	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 40.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6771	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.65% 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 ⓘ

5.1 Standard geometry ⓘ

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

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	0.44	0/3271	0.96	14/4430 (0.3%)
1	B	0.42	0/3271	0.95	14/4430 (0.3%)
All	All	0.43	0/6542	0.96	28/8860 (0.3%)

There are no bond length outliers.

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1218	SER	N-CA-C	-8.39	100.12	110.61
1	B	2218	SER	N-CA-C	-7.91	100.73	110.61
1	A	1061	ILE	N-CA-C	-7.59	96.61	108.23
1	B	2061	ILE	N-CA-C	-7.53	96.71	108.23
1	B	2055	VAL	N-CA-C	-7.37	103.77	112.98
1	A	1055	VAL	N-CA-C	-6.92	104.34	112.98
1	B	2029	SER	CA-C-N	6.35	127.78	119.84
1	B	2029	SER	C-N-CA	6.35	127.78	119.84
1	A	1029	SER	CA-C-N	6.28	127.69	119.84
1	A	1029	SER	C-N-CA	6.28	127.69	119.84
1	A	1111	VAL	N-CA-C	5.96	113.44	107.55
1	B	2111	VAL	N-CA-C	5.93	113.42	107.55
1	B	2219	GLY	N-CA-C	-5.88	102.83	112.83
1	A	1212	GLU	N-CA-C	-5.88	101.06	109.24
1	B	2114	ILE	N-CA-C	5.79	116.77	107.73
1	A	1219	GLY	N-CA-C	-5.70	103.14	112.83
1	A	1214	ILE	N-CA-C	-5.57	99.52	107.77
1	A	1154	ALA	N-CA-C	-5.41	102.39	110.23
1	A	1114	ILE	N-CA-C	5.27	116.35	108.54
1	A	1359	VAL	N-CA-C	-5.27	99.92	107.78
1	B	2045	ASP	N-CA-C	-5.26	106.92	113.55
1	B	2214	ILE	N-CA-C	-5.23	99.99	107.78

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1117	VAL	CB-CA-C	-5.21	102.79	110.82
1	B	2094	GLY	N-CA-C	-5.20	108.07	115.30
1	B	2134	MET	N-CA-C	-5.19	105.52	111.07
1	B	2073	GLY	N-CA-C	-5.09	105.36	112.18
1	B	2212	GLU	N-CA-C	-5.08	101.90	109.42
1	A	1282	GLY	N-CA-C	-5.08	103.69	111.10

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	3202	0	3182	125	0
1	B	3202	0	3182	101	0
2	A	25	0	13	5	0
2	B	25	0	13	3	0
3	A	171	0	0	5	0
3	B	146	0	0	4	0
All	All	6771	0	6390	209	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 17.

All (209) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1147:GLU:HG2	1:A:1160:LYS:HG2	1.50	0.91
1:A:1156:MET:HE1	1:A:1183:ASN:HB2	1.53	0.90
1:A:1131:LEU:HG	1:A:1157:PHE:CZ	2.06	0.90
1:A:1190:ASN:HD21	1:A:1224:ASP:H	1.21	0.88
1:A:1190:ASN:ND2	1:A:1224:ASP:H	1.74	0.86
1:A:1153:HIS:CD2	1:B:2132:ARG:HH12	1.94	0.84
1:A:1131:LEU:HA	1:A:1134:MET:HE3	1.60	0.84
1:A:1338:ARG:HH22	1:A:1416:GLU:HG3	1.45	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2131:LEU:HA	1:B:2134:MET:HE3	1.63	0.79
1:B:2133:ILE:HG23	1:B:2300:MET:SD	2.21	0.79
1:A:1153:HIS:HD2	1:B:2132:ARG:HH12	1.29	0.77
1:B:2190:ASN:HD21	1:B:2224:ASP:H	1.30	0.77
1:B:2338:ARG:HH22	1:B:2416:GLU:HG3	1.48	0.77
1:B:2232:ARG:O	1:B:2232:ARG:HD3	1.86	0.74
1:B:2325:GLN:HG3	3:B:7228:HOH:O	1.87	0.74
1:B:2190:ASN:ND2	1:B:2224:ASP:H	1.86	0.73
1:A:1192:LEU:HD11	1:A:1230:GLY:HA3	1.71	0.72
1:B:2281:VAL:HG22	1:B:2312:ALA:HB1	1.71	0.72
1:A:1281:VAL:HG22	1:A:1312:ALA:HB1	1.71	0.72
1:B:2281:VAL:CG2	1:B:2312:ALA:HB1	2.20	0.71
1:A:1232:ARG:O	1:A:1232:ARG:HD3	1.91	0.71
1:B:2317:ILE:O	1:B:2321:GLU:HG3	1.91	0.71
1:B:2037:VAL:HG23	1:B:2387:SER:HA	1.73	0.71
1:A:1132:ARG:HH12	1:B:2153:HIS:HD2	1.35	0.70
1:A:1156:MET:HE2	1:A:1180:THR:O	1.91	0.70
1:A:1133:ILE:HG23	1:A:1300:MET:SD	2.32	0.69
1:B:2192:LEU:HD11	1:B:2230:GLY:HA3	1.74	0.69
1:B:2125:GLU:HA	1:B:2128:MET:HE2	1.75	0.68
1:A:1281:VAL:CG2	1:A:1312:ALA:HB1	2.23	0.68
1:A:1135:ARG:HH12	1:A:1156:MET:CG	2.06	0.68
1:B:2232:ARG:HD3	1:B:2232:ARG:C	2.19	0.68
1:A:1132:ARG:HH12	1:B:2153:HIS:CD2	2.13	0.66
1:A:1135:ARG:NH1	1:A:1156:MET:SD	2.68	0.66
1:B:2220:PHE:HB3	1:B:2364:GLY:HA3	1.80	0.64
1:A:1232:ARG:HD3	1:A:1232:ARG:C	2.23	0.63
1:A:1222:VAL:HG13	1:A:1223:PRO:HD2	1.80	0.62
1:B:2222:VAL:HG13	1:B:2223:PRO:HD2	1.80	0.62
1:A:1135:ARG:HH12	1:A:1156:MET:HG3	1.63	0.62
1:A:1317:ILE:O	1:A:1321:GLU:HG3	1.98	0.62
1:A:1190:ASN:HD21	1:A:1224:ASP:N	1.95	0.61
1:B:2338:ARG:NH1	1:B:2420:ASP:OD1	2.34	0.61
1:A:1030:PRO:HA	1:B:2296:PRO:HD3	1.83	0.61
1:B:2268:LEU:HD12	1:B:2286:GLY:HA3	1.82	0.60
1:A:1268:LEU:HD12	1:A:1286:GLY:HA3	1.84	0.60
1:A:1135:ARG:NH2	1:A:1156:MET:SD	2.71	0.60
1:A:1066:THR:HG23	1:A:1069:PRO:HD2	1.84	0.59
1:A:1220:PHE:HB3	1:A:1364:GLY:HA3	1.84	0.58
1:A:1042:ILE:HD11	1:A:1399:TYR:CD1	2.39	0.58
1:B:2054:ASP:HB3	1:B:2056:ASP:H	1.68	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1296:PRO:HD3	1:B:2030:PRO:HA	1.85	0.58
1:B:2338:ARG:HG2	1:B:2338:ARG:HH21	1.69	0.58
1:A:1144:ILE:HB	1:A:1209:VAL:HG22	1.85	0.58
1:A:1042:ILE:HD11	1:A:1399:TYR:CE1	2.39	0.58
1:B:2144:ILE:HB	1:B:2209:VAL:HG22	1.86	0.58
1:A:1338:ARG:HG2	1:A:1338:ARG:HH21	1.68	0.57
1:A:1289:GLU:CD	1:A:1289:GLU:H	2.12	0.57
3:A:7036:HOH:O	1:B:2074:HIS:HD2	1.86	0.57
1:B:2232:ARG:HH12	1:B:2267:ASP:CG	2.13	0.57
1:B:2289:GLU:H	1:B:2289:GLU:CD	2.13	0.57
1:A:1327:GLY:HA2	1:A:1330:GLU:OE1	2.06	0.56
1:A:1176:VAL:HG11	3:A:7197:HOH:O	2.06	0.56
1:B:2245:ASP:HA	1:B:2270:THR:OG1	2.06	0.56
1:B:2338:ARG:HG2	1:B:2338:ARG:NH2	2.20	0.56
1:A:1245:ASP:HA	1:A:1270:THR:OG1	2.05	0.56
1:A:1338:ARG:HG2	1:A:1338:ARG:NH2	2.21	0.56
1:B:2042:ILE:HD11	1:B:2399:TYR:CE1	2.42	0.55
1:A:1054:ASP:HB3	1:A:1056:ASP:H	1.72	0.55
1:A:1128:MET:SD	1:B:2128:MET:SD	3.05	0.55
1:B:2066:THR:HG23	1:B:2069:PRO:HD2	1.88	0.55
1:B:2042:ILE:HD11	1:B:2399:TYR:CD1	2.42	0.54
1:B:2374:ASN:ND2	1:B:2377:ASP:H	2.06	0.54
1:B:2245:ASP:OD2	2:B:2434:PXG:N1	2.41	0.54
1:A:1374:ASN:HD22	1:A:1376:GLU:N	2.05	0.53
1:A:1338:ARG:NH1	1:A:1420:ASP:OD1	2.41	0.53
1:A:1147:GLU:HA	1:A:1160:LYS:HB3	1.89	0.53
1:B:2131:LEU:HD23	1:B:2134:MET:HE3	1.91	0.53
1:A:1245:ASP:OD2	2:A:1434:PXG:N1	2.42	0.52
1:A:1011:LYS:HB3	1:A:1055:VAL:HG13	1.91	0.52
1:A:1215:VAL:HG11	1:A:1218:SER:OG	2.09	0.52
1:A:1232:ARG:HH12	1:A:1267:ASP:CG	2.18	0.52
1:B:2232:ARG:HD2	1:B:2236:LEU:HD11	1.92	0.52
1:A:1062:ASP:OD1	1:A:1074:HIS:HE1	1.94	0.51
1:A:1178:LYS:HA	1:A:1181:THR:HG22	1.93	0.51
1:A:1132:ARG:NH1	1:B:2153:HIS:HD2	2.07	0.51
1:A:1033:ALA:HB2	1:B:2296:PRO:HG3	1.92	0.51
1:A:1131:LEU:CD2	1:A:1143:ILE:HG13	2.39	0.51
1:A:1279:LEU:C	1:B:2306:LEU:HD22	2.34	0.51
1:A:1011:LYS:CB	1:A:1055:VAL:HG13	2.41	0.51
1:A:1127:CYS:O	1:A:1130:VAL:HG12	2.11	0.50
1:B:2195:VAL:HG11	1:B:2234:ILE:HD11	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2374:ASN:HD22	1:B:2376:GLU:N	2.08	0.50
1:A:1033:ALA:HB3	3:A:7276:HOH:O	2.11	0.50
1:A:1215:VAL:HB	1:A:1221:ILE:HB	1.93	0.50
1:A:1232:ARG:HD2	1:A:1236:LEU:HD11	1.92	0.50
1:A:1164:GLY:HA3	1:B:2301:TYR:OH	2.12	0.50
1:A:1146:PHE:CD1	1:A:1187:THR:HG23	2.46	0.49
1:A:1190:ASN:HD21	1:A:1223:PRO:HA	1.76	0.49
1:A:1280:PRO:N	1:B:2306:LEU:HD22	2.28	0.49
1:B:2215:VAL:HG11	1:B:2218:SER:OG	2.12	0.49
1:A:1029:SER:HG	2:A:1434:PXG:C7	2.25	0.49
1:B:2220:PHE:CB	1:B:2364:GLY:HA3	2.42	0.49
1:A:1187:THR:HG21	1:A:1195:VAL:HG22	1.93	0.49
1:B:2190:ASN:HD21	1:B:2224:ASP:N	2.03	0.49
1:A:1220:PHE:CB	1:A:1364:GLY:HA3	2.42	0.49
1:A:1163:SER:HA	1:A:1406:GLU:OE2	2.14	0.48
1:A:1374:ASN:HD22	1:A:1376:GLU:H	1.60	0.48
1:A:1374:ASN:ND2	1:A:1377:ASP:H	2.11	0.48
1:A:1103:LEU:HD13	1:A:1119:PHE:CE2	2.47	0.48
1:A:1125:GLU:HA	1:A:1128:MET:HE2	1.94	0.48
1:A:1074:HIS:HD2	3:B:7181:HOH:O	1.96	0.48
1:B:2368:THR:HB	1:B:2381:SER:HA	1.96	0.48
1:B:2208:GLY:HA2	1:B:2240:ALA:HB1	1.96	0.47
1:B:2031:VAL:HG11	2:B:2434:PXG:H13	1.95	0.47
1:B:2327:GLY:HA2	1:B:2330:GLU:OE1	2.14	0.47
1:B:2234:ILE:HG13	1:B:2235:THR:N	2.28	0.47
1:A:1151:HIS:HD2	1:A:1245:ASP:OD2	1.97	0.46
1:B:2108:ASN:OD1	1:B:2114:ILE:HG22	2.15	0.46
1:A:1135:ARG:NH1	1:A:1156:MET:HG3	2.30	0.46
1:B:2103:LEU:HD13	1:B:2119:PHE:CE2	2.51	0.46
1:B:2352:HIS:HE1	1:B:2430:MET:O	1.98	0.46
1:A:1195:VAL:HG11	1:A:1234:ILE:HD11	1.96	0.46
1:B:2215:VAL:HB	1:B:2221:ILE:HB	1.97	0.46
1:A:1234:ILE:HG13	1:A:1235:THR:N	2.30	0.46
1:A:1352:HIS:HD2	1:A:1385:LYS:NZ	2.14	0.46
1:A:1108:ASN:OD1	1:A:1114:ILE:HG22	2.16	0.46
1:B:2011:LYS:CB	1:B:2055:VAL:HG13	2.45	0.46
1:B:2054:ASP:HB2	1:B:2058:ASN:HB2	1.97	0.46
1:B:2374:ASN:HD22	1:B:2376:GLU:H	1.64	0.46
1:A:1368:THR:HB	1:A:1381:SER:HA	1.97	0.45
1:A:1144:ILE:HA	1:A:1185:LEU:O	2.17	0.45
1:B:2127:CYS:SG	1:B:2151:HIS:HB3	2.57	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1054:ASP:HB2	1:A:1058:ASN:HB2	1.97	0.45
1:A:1306:LEU:HD22	1:B:2280:PRO:N	2.32	0.45
1:B:2131:LEU:HA	1:B:2131:LEU:HD23	1.88	0.45
1:B:2190:ASN:HD21	1:B:2223:PRO:HA	1.82	0.45
1:B:2352:HIS:HD2	1:B:2385:LYS:NZ	2.15	0.45
1:A:1349:GLU:OE2	1:A:1427:ARG:NH1	2.50	0.45
1:B:2016:PHE:O	1:B:2020:GLN:HG3	2.17	0.45
1:A:1195:VAL:CG1	1:A:1234:ILE:CD1	2.95	0.44
1:A:1303:ALA:O	1:B:2153:HIS:CE1	2.70	0.44
1:A:1352:HIS:HE1	1:A:1430:MET:O	2.00	0.44
1:A:1131:LEU:HD23	1:A:1134:MET:HE3	1.99	0.44
1:B:2062:ASP:OD1	1:B:2074:HIS:HE1	1.99	0.44
1:A:1037:VAL:HG21	1:A:1390:HIS:CG	2.53	0.44
1:A:1066:THR:O	1:A:1069:PRO:HD2	2.17	0.44
1:A:1132:ARG:NH1	1:B:2153:HIS:CD2	2.83	0.44
1:A:1195:VAL:HG11	1:A:1234:ILE:CD1	2.48	0.44
1:A:1195:VAL:HG12	1:A:1234:ILE:HD12	2.00	0.44
1:A:1007:PHE:N	3:A:7002:HOH:O	2.50	0.43
1:A:1131:LEU:HA	1:A:1131:LEU:HD23	1.88	0.43
1:A:1208:GLY:HA2	1:A:1240:ALA:HB1	2.00	0.43
1:B:2195:VAL:HG11	1:B:2234:ILE:CD1	2.47	0.43
1:B:2249:THR:HB	1:B:2258:VAL:HG23	1.99	0.43
1:B:2087:MET:HE2	1:B:2087:MET:HB3	1.83	0.43
1:B:2224:ASP:OD1	1:B:2373:HIS:CD2	2.72	0.43
1:B:2432:ALA:O	1:B:2433:LEU:OXT	2.36	0.43
1:A:1145:LYS:O	1:A:1186:THR:HA	2.17	0.43
1:A:1375:TYR:CZ	1:A:1379:LYS:HD3	2.54	0.43
1:B:2213:PRO:HG3	1:B:2244:PHE:CG	2.54	0.43
1:A:1432:ALA:O	1:A:1433:LEU:OXT	2.36	0.43
1:B:2195:VAL:CG1	1:B:2234:ILE:CD1	2.97	0.43
1:A:1331:TYR:CE2	1:A:1335:ILE:HD13	2.54	0.43
1:B:2083:LEU:HD21	1:B:2315:ALA:HB2	2.01	0.43
1:A:1146:PHE:CE1	1:A:1187:THR:HG23	2.54	0.42
1:A:1179:LYS:HB2	1:A:1179:LYS:NZ	2.34	0.42
1:B:2131:LEU:HD22	1:B:2143:ILE:HG13	2.00	0.42
1:A:1047:VAL:HG23	1:A:1074:HIS:HB3	2.00	0.42
1:A:1159:VAL:HG13	3:A:7285:HOH:O	2.19	0.42
1:A:1189:TYR:O	1:A:1190:ASN:HB2	2.19	0.42
1:A:1302:GLN:HG2	1:B:2153:HIS:CD2	2.54	0.42
1:B:2153:HIS:ND1	1:B:2153:HIS:N	2.67	0.42
1:A:1159:VAL:HG12	1:A:1186:THR:HG21	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1135:ARG:HH22	1:A:1156:MET:CE	2.32	0.42
1:A:1302:GLN:HG2	1:B:2153:HIS:NE2	2.34	0.42
1:B:2011:LYS:HB3	1:B:2055:VAL:HG13	2.02	0.42
1:B:2127:CYS:O	1:B:2130:VAL:HG12	2.20	0.42
1:B:2306:LEU:HA	3:B:7142:HOH:O	2.19	0.42
1:A:1062:ASP:OD1	1:A:1074:HIS:CE1	2.72	0.42
1:A:1248:MET:HE3	2:A:1434:PXG:O3	2.20	0.42
1:B:2027:VAL:HA	3:B:7045:HOH:O	2.20	0.42
1:B:2131:LEU:CD2	1:B:2143:ILE:HG13	2.48	0.42
1:B:2247:VAL:HG12	1:B:2273:LYS:HE2	2.01	0.42
1:B:2037:VAL:O	1:B:2037:VAL:HG22	2.19	0.42
1:B:2047:VAL:HB	1:B:2074:HIS:CG	2.55	0.42
1:B:2335:ILE:HD11	1:B:2410:THR:CG2	2.50	0.42
1:A:1375:TYR:O	1:A:1379:LYS:HG3	2.20	0.41
1:B:2318:LYS:HD2	1:B:2318:LYS:HA	1.83	0.41
1:B:2375:TYR:O	1:B:2379:LYS:HG3	2.19	0.41
1:A:1131:LEU:HG	1:A:1157:PHE:HZ	1.76	0.41
1:B:2131:LEU:HD23	1:B:2134:MET:CE	2.49	0.41
1:B:2232:ARG:HD2	1:B:2236:LEU:CD1	2.50	0.41
1:B:2288:ARG:HE	1:B:2288:ARG:HB2	1.59	0.41
1:A:1123:GLY:HA3	2:A:1434:PXG:OP4	2.21	0.41
1:A:1230:GLY:O	1:A:1234:ILE:HG23	2.21	0.41
1:B:2067:TRP:O	1:B:2273:LYS:HD3	2.21	0.41
1:A:1047:VAL:HB	1:A:1074:HIS:CG	2.56	0.41
1:B:2338:ARG:NH2	1:B:2416:GLU:HG3	2.27	0.41
1:A:1247:VAL:HG12	1:A:1273:LYS:HE2	2.02	0.41
1:B:2151:HIS:HD2	1:B:2245:ASP:OD2	2.04	0.41
1:A:1232:ARG:HD2	1:A:1236:LEU:CD1	2.51	0.41
1:A:1031:VAL:HG11	2:A:1434:PXG:H13	2.02	0.40
1:A:1213:PRO:HG3	1:A:1244:PHE:CG	2.56	0.40
1:A:1249:THR:HB	1:A:1258:VAL:HG23	2.02	0.40
1:A:1163:SER:H	1:A:1217:ASN:HB3	1.86	0.40
1:A:1213:PRO:HB2	1:A:1258:VAL:HG21	2.04	0.40
1:A:1135:ARG:CZ	1:A:1156:MET:SD	3.10	0.40
1:A:1135:ARG:NH2	1:A:1156:MET:CE	2.85	0.40
1:A:1232:ARG:C	1:A:1232:ARG:CD	2.94	0.40
1:B:2212:GLU:HG2	2:B:2434:PXG:H2A3	2.03	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	425/427 (100%)	404 (95%)	20 (5%)	1 (0%)	43	44
1	B	425/427 (100%)	395 (93%)	26 (6%)	4 (1%)	14	9
All	All	850/854 (100%)	799 (94%)	46 (5%)	5 (1%)	21	15

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	2171	PRO
1	B	2157	PHE
1	B	2173	SER
1	A	1273	LYS
1	B	2273	LYS

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	330/330 (100%)	306 (93%)	24 (7%)	13	8
1	B	330/330 (100%)	304 (92%)	26 (8%)	11	7
All	All	660/660 (100%)	610 (92%)	50 (8%)	12	8

All (50) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1054	ASP

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Mol	Chain	Res	Type
1	A	1081	GLU
1	A	1088	GLU
1	A	1103	LEU
1	A	1117	VAL
1	A	1131	LEU
1	A	1133	ILE
1	A	1156	MET
1	A	1158	LEU
1	A	1170	LEU
1	A	1176	VAL
1	A	1179	LYS
1	A	1187	THR
1	A	1241	LEU
1	A	1268	LEU
1	A	1306	LEU
1	A	1339	LEU
1	A	1343	LEU
1	A	1358	GLN
1	A	1374	ASN
1	A	1383	LEU
1	A	1396	GLN
1	A	1410	THR
1	A	1416	GLU
1	B	2054	ASP
1	B	2088	GLU
1	B	2103	LEU
1	B	2117	VAL
1	B	2130	VAL
1	B	2131	LEU
1	B	2133	ILE
1	B	2158	LEU
1	B	2167	THR
1	B	2170	LEU
1	B	2176	VAL
1	B	2178	LYS
1	B	2185	LEU
1	B	2187	THR
1	B	2190	ASN
1	B	2241	LEU
1	B	2268	LEU
1	B	2306	LEU
1	B	2339	LEU

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Mol	Chain	Res	Type
1	B	2343	LEU
1	B	2358	GLN
1	B	2374	ASN
1	B	2383	LEU
1	B	2396	GLN
1	B	2410	THR
1	B	2416	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1058	ASN
1	A	1074	HIS
1	A	1151	HIS
1	A	1153	HIS
1	A	1190	ASN
1	A	1217	ASN
1	A	1292	GLN
1	A	1352	HIS
1	A	1373	HIS
1	A	1374	ASN
1	A	1396	GLN
1	A	1404	GLN
1	B	2058	ASN
1	B	2074	HIS
1	B	2151	HIS
1	B	2190	ASN
1	B	2217	ASN
1	B	2292	GLN
1	B	2352	HIS
1	B	2373	HIS
1	B	2374	ASN
1	B	2396	GLN
1	B	2404	GLN

5.3.3 RNA ⓘ

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](#)

2 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
2	PXG	A	1434	-	26,26,26	3.12	14 (53%)	36,37,37	2.95	14 (38%)
2	PXG	B	2434	-	26,26,26	3.01	14 (53%)	36,37,37	2.96	11 (30%)

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	PXG	A	1434	-	-	2/15/15/15	0/2/2/2
2	PXG	B	2434	-	-	6/15/15/15	0/2/2/2

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	2434	PXG	C12-C11	7.18	1.51	1.38
2	A	1434	PXG	C4A-C4	6.62	1.61	1.52
2	A	1434	PXG	C12-C11	6.55	1.50	1.38
2	B	2434	PXG	C4A-C4	6.09	1.60	1.52
2	A	1434	PXG	C9-C10	5.23	1.48	1.39
2	B	2434	PXG	C9-C10	5.06	1.47	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1434	PXG	C9-C8	4.74	1.46	1.39
2	B	2434	PXG	C9-C8	4.60	1.46	1.39
2	A	1434	PXG	C3-C2	4.44	1.45	1.41
2	A	1434	PXG	C2-N1	4.17	1.41	1.33
2	B	2434	PXG	C2-N1	4.05	1.41	1.33
2	A	1434	PXG	P-OP2	3.70	1.68	1.54
2	B	2434	PXG	C6-N1	3.55	1.41	1.34
2	B	2434	PXG	P-OP2	3.50	1.67	1.54
2	A	1434	PXG	C5-C4	3.41	1.45	1.40
2	A	1434	PXG	C6-N1	3.22	1.41	1.34
2	B	2434	PXG	C12-C13	3.15	1.44	1.38
2	B	2434	PXG	C3-C2	2.96	1.44	1.41
2	B	2434	PXG	C5-C4	2.87	1.44	1.40
2	B	2434	PXG	C6-C5	2.84	1.43	1.37
2	A	1434	PXG	C6-C5	2.82	1.43	1.37
2	B	2434	PXG	OP4-C5A	2.73	1.54	1.44
2	A	1434	PXG	C12-C13	2.72	1.43	1.38
2	A	1434	PXG	C8-C7	2.60	1.55	1.49
2	A	1434	PXG	OP4-C5A	2.55	1.54	1.44
2	A	1434	PXG	C11-C10	-2.18	1.35	1.39
2	B	2434	PXG	O2-C7	-2.13	1.24	1.30
2	B	2434	PXG	C11-C10	-2.07	1.35	1.39

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2434	PXG	OP4-C5A-C5	10.46	128.97	109.36
2	A	1434	PXG	OP4-C5A-C5	10.08	128.24	109.36
2	B	2434	PXG	C4-C4A-N9	8.94	130.09	110.70
2	A	1434	PXG	C4-C4A-N9	8.31	128.72	110.70
2	A	1434	PXG	C4A-C4-C5	5.41	125.64	119.75
2	B	2434	PXG	C4A-C4-C5	4.84	125.02	119.75
2	B	2434	PXG	O2-C7-O8	-4.81	113.02	123.35
2	A	1434	PXG	O2-C7-O8	-4.79	113.05	123.35
2	B	2434	PXG	O2-C7-C8	3.52	123.87	114.84
2	A	1434	PXG	O2-C7-C8	3.45	123.70	114.84
2	B	2434	PXG	C4A-N9-C10	-2.91	112.55	121.87
2	A	1434	PXG	OP1-P-OP4	-2.79	99.40	106.67
2	A	1434	PXG	OP1-P-OP3	2.69	121.31	110.83
2	B	2434	PXG	OP1-P-OP3	2.54	120.72	110.83
2	A	1434	PXG	C4A-N9-C10	-2.46	113.99	121.87
2	A	1434	PXG	C4A-C4-C3	-2.40	116.79	119.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1434	PXG	C11-C10-N9	-2.38	115.59	120.96
2	B	2434	PXG	OP1-P-OP4	-2.28	100.73	106.67
2	B	2434	PXG	C4A-C4-C3	-2.22	117.03	119.98
2	A	1434	PXG	C9-C10-N9	2.21	126.73	120.78
2	A	1434	PXG	OP4-P-OP3	2.17	112.31	106.44
2	B	2434	PXG	C11-C10-N9	-2.16	116.07	120.96
2	A	1434	PXG	C9-C8-C7	2.12	123.75	119.96
2	A	1434	PXG	C5A-C5-C6	-2.11	115.92	119.36
2	B	2434	PXG	C9-C10-N9	2.03	126.25	120.78

There are no chirality outliers.

All (8) torsion outliers are listed below:

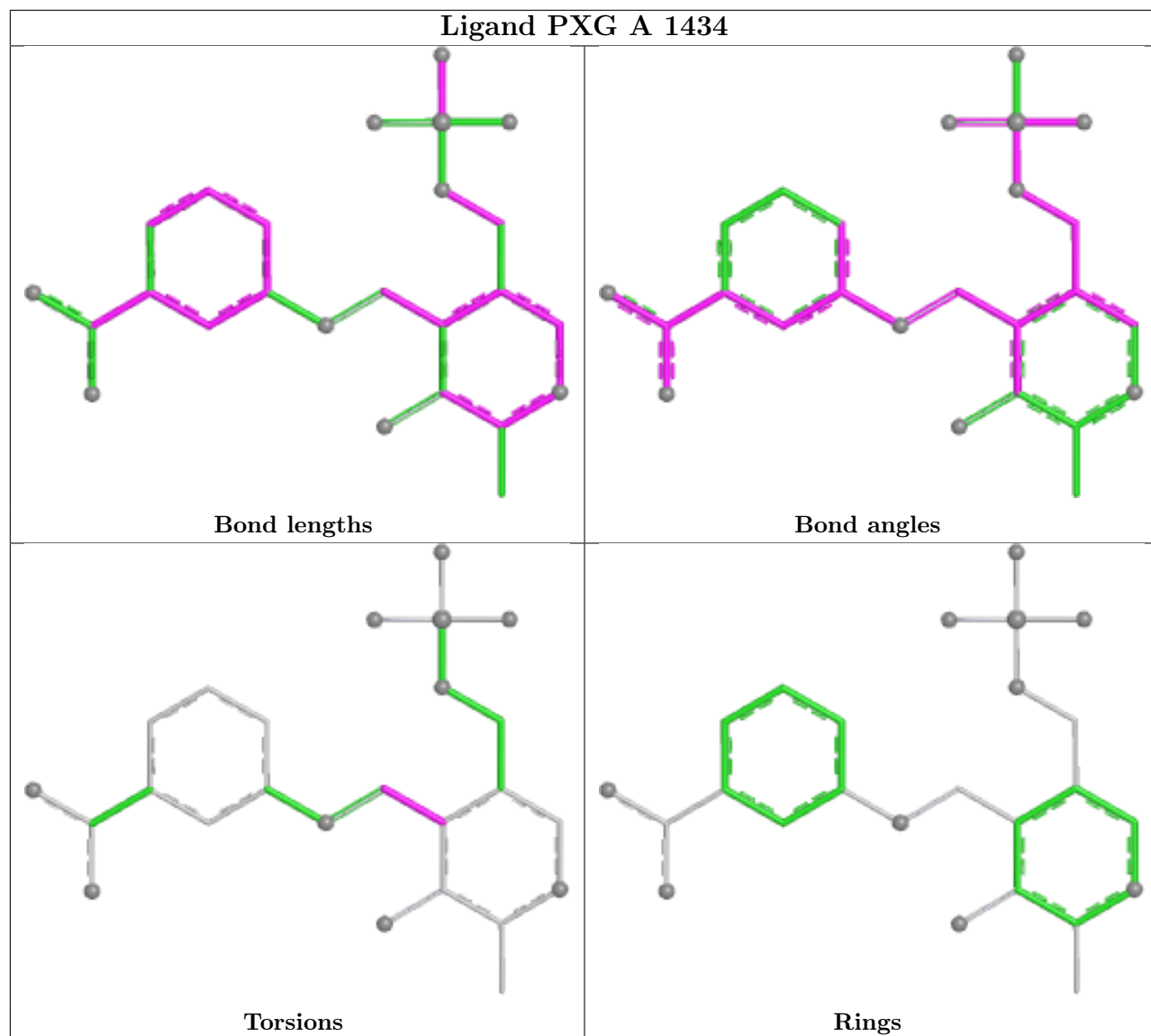
Mol	Chain	Res	Type	Atoms
2	A	1434	PXG	C5-C4-C4A-N9
2	B	2434	PXG	C3-C4-C4A-N9
2	B	2434	PXG	C5-C4-C4A-N9
2	A	1434	PXG	C3-C4-C4A-N9
2	B	2434	PXG	O2-C7-C8-C9
2	B	2434	PXG	O2-C7-C8-C13
2	B	2434	PXG	O8-C7-C8-C9
2	B	2434	PXG	O8-C7-C8-C13

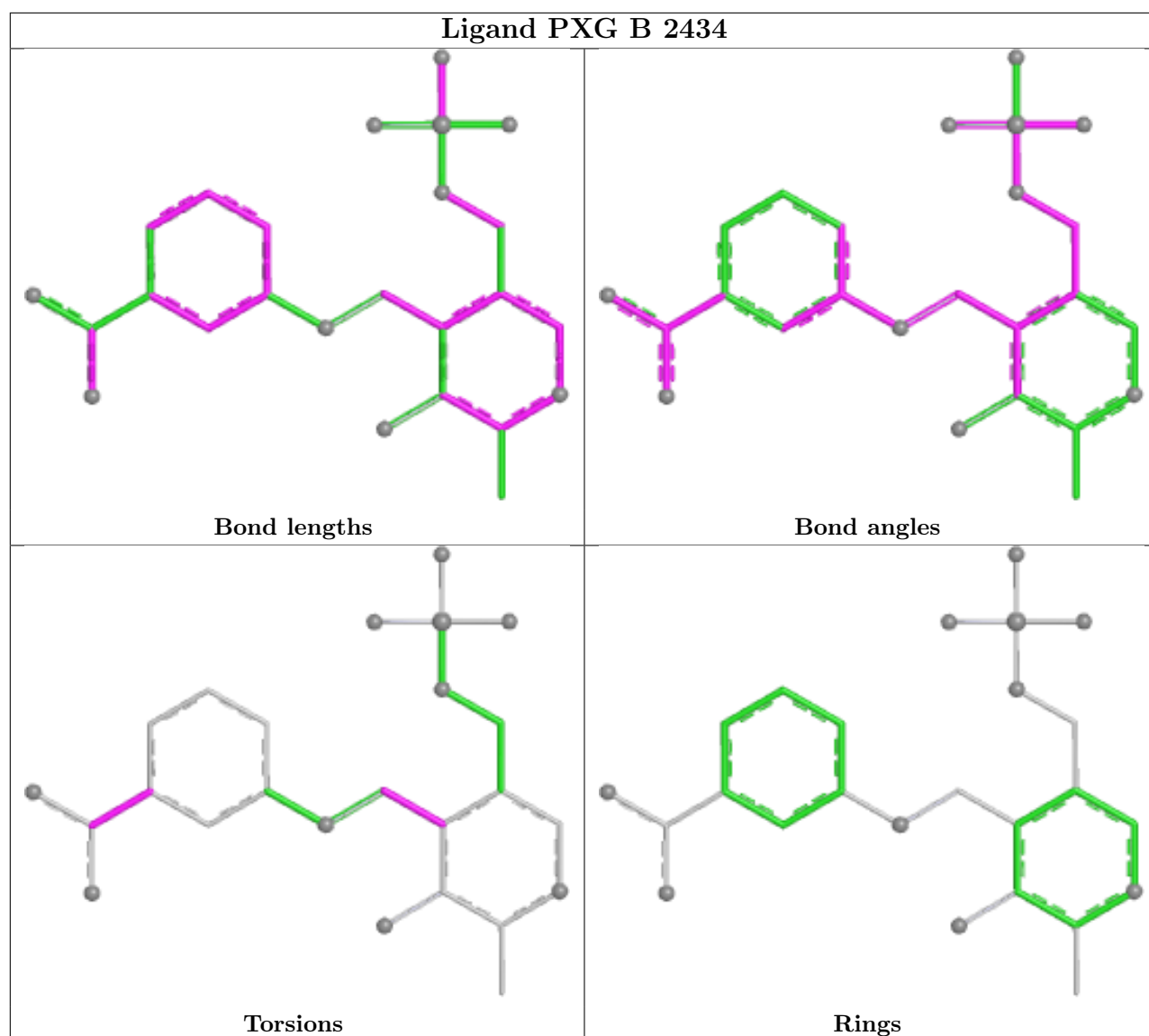
There are no ring outliers.

2 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1434	PXG	5	0
2	B	2434	PXG	3	0

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





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [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	427/427 (100%)	0.19	11 (2%) 57 61	12, 24, 39, 50	0
1	B	398/427 (93%)	0.19	9 (2%) 61 64	11, 23, 39, 65	0
All	All	825/854 (96%)	0.19	20 (2%) 59 63	11, 24, 39, 65	0

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	2153	HIS	7.8
1	B	2054	ASP	3.5
1	B	2433	LEU	3.1
1	B	2234	ILE	3.1
1	B	2432	ALA	3.1
1	A	1038	GLY	2.9
1	A	1234	ILE	2.8
1	A	1432	ALA	2.8
1	A	1080	ILE	2.6
1	B	2187	THR	2.5
1	A	1042	ILE	2.5
1	A	1181	THR	2.5
1	A	1431	SER	2.5
1	B	2021	LYS	2.4
1	A	1187	THR	2.3
1	B	2131	LEU	2.3
1	A	1039	GLY	2.2
1	B	2042	ILE	2.1
1	A	1021	LYS	2.1
1	A	1433	LEU	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](#)

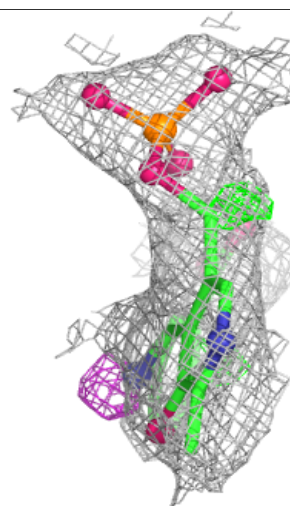
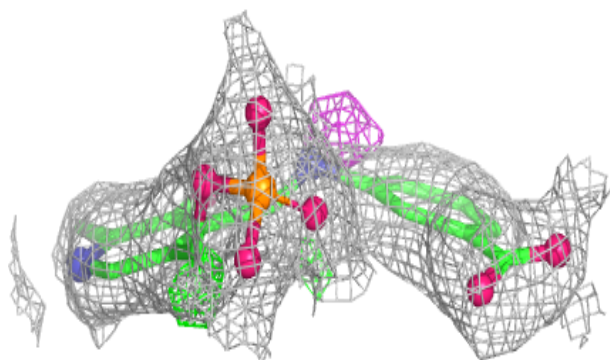
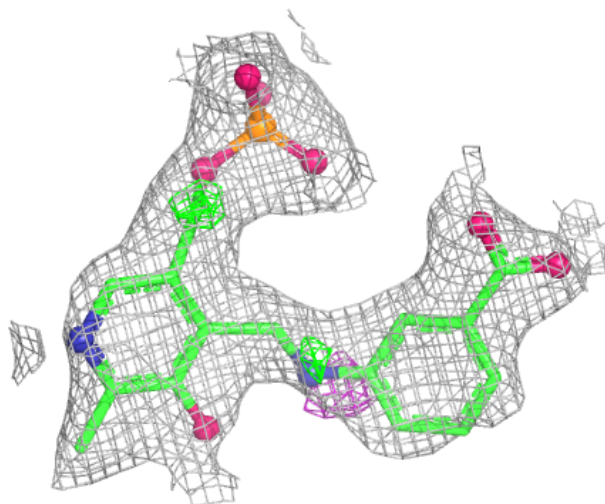
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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
2	PXG	B	2434	25/25	0.93	0.10	17,24,31,31	0
2	PXG	A	1434	25/25	0.95	0.08	13,18,28,29	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.

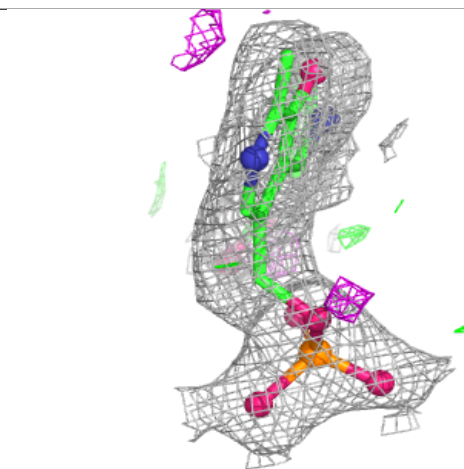
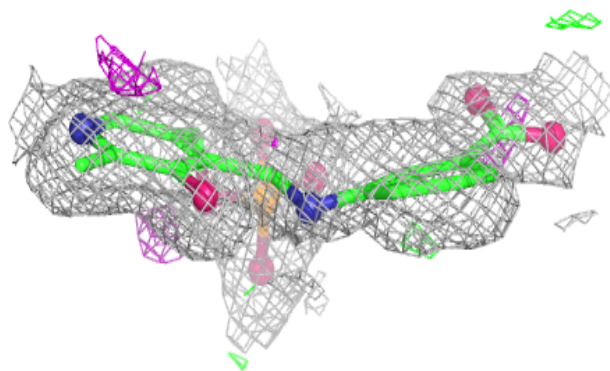
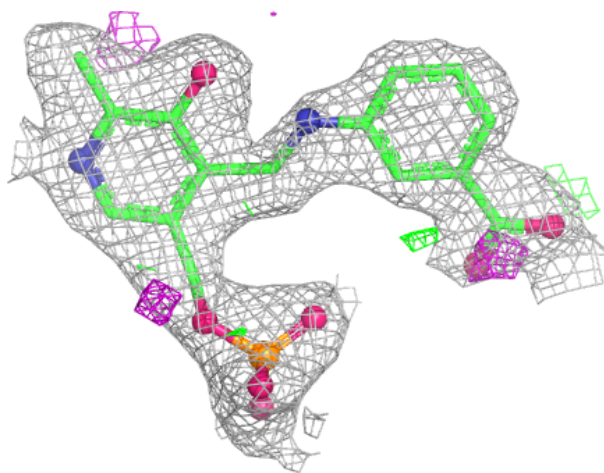
Electron density around PXG B 2434:

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



Electron density around PXG A 1434:

$2mF_o-DF_c$ (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.