



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 28, 2023 – 12:23 pm GMT

PDB ID : 8BC9
Title : Human Brr2 Helicase Region in complex with C-tail deleted Jab1 and compound 24
Authors : Vester, K.; Loll, B.; Wahl, M.C.
Deposited on : 2022-10-15
Resolution : 2.30 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 : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.32.1
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.32.1

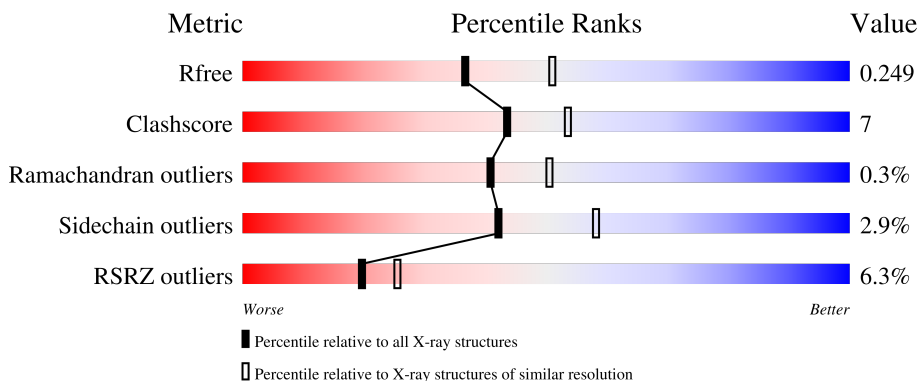
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	B	1747	 6% (red), 79% (green), 18% (yellow), .. (grey)
2	J	263	 5% (red), 83% (green), 16% (yellow), . (grey)

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 16458 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 U5 small nuclear ribonucleoprotein 200 kDa helicase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	1724	13862	8859	2372	2559	72	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	390	GLY	-	expression tag	UNP O75643
B	391	ALA	-	expression tag	UNP O75643
B	392	GLU	-	expression tag	UNP O75643
B	393	PHE	-	expression tag	UNP O75643

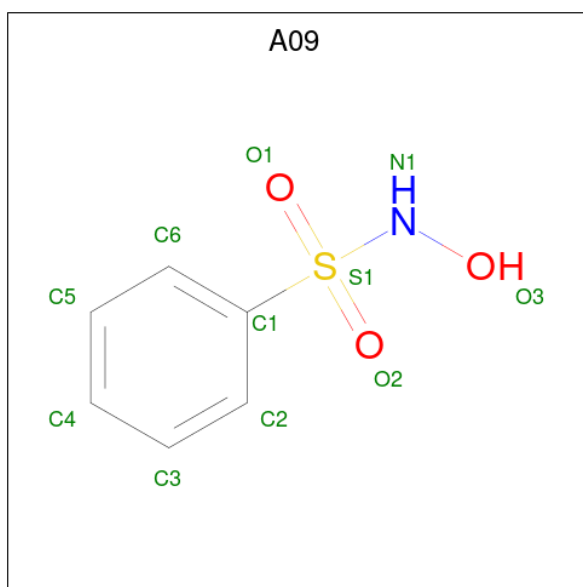
- Molecule 2 is a protein called Pre-mRNA-processing-splicing factor 8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	J	263	2123	1358	365	388	12	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	2058	GLY	-	expression tag	UNP Q6P2Q9
J	2059	PRO	-	expression tag	UNP Q6P2Q9
J	2060	LEU	-	expression tag	UNP Q6P2Q9
J	2061	GLY	-	expression tag	UNP Q6P2Q9
J	2062	SER	-	expression tag	UNP Q6P2Q9
J	2063	MET	-	expression tag	UNP Q6P2Q9

- Molecule 3 is N-hydroxybenzenesulfonamide (three-letter code: A09) (formula: C₆H₇NO₃S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
3	B	1	11	6	1	3	1	0	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



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

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

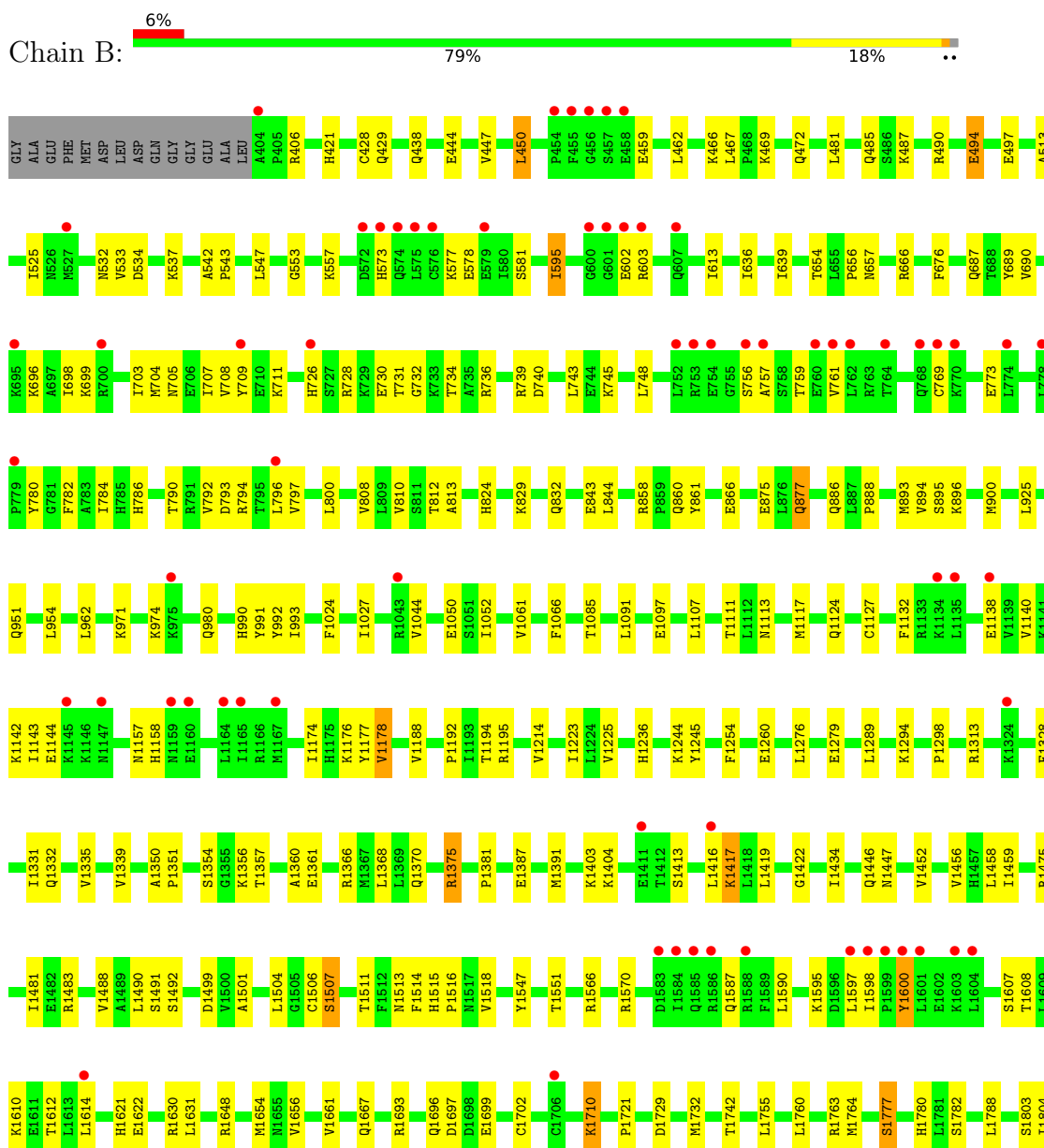
- Molecule 5 is water.

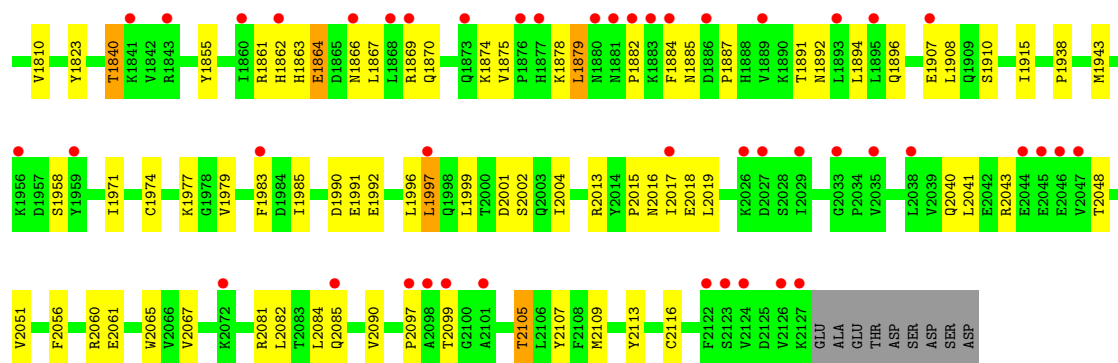
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	360	Total O 360 360	0	13
5	J	58	Total O 58 58	0	1

3 Residue-property plots [i](#)

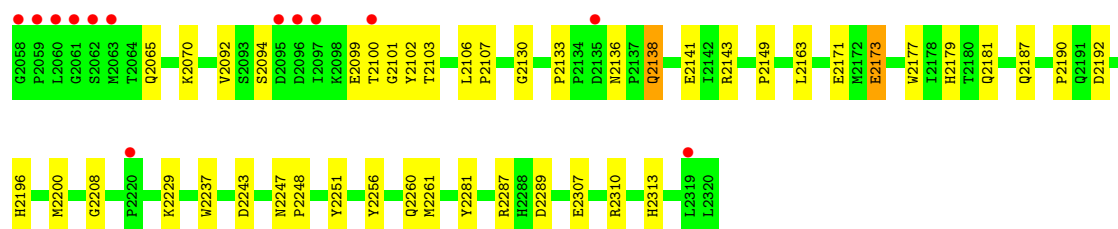
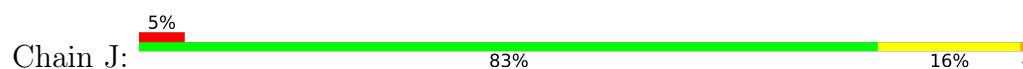
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: U5 small nuclear ribonucleoprotein 200 kDa helicase





- Molecule 2: Pre-mRNA-processing-splicing factor 8



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	99.83Å 119.22Å 188.27Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.04 – 2.30 46.04 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.6 (46.04-2.30) 99.6 (46.04-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.29 (at 2.29Å)	Xtrriage
Refinement program	PHENIX 1.20_4459	Depositor
R, R_{free}	0.198 , 0.249 0.198 , 0.249	Depositor DCC
R_{free} test set	2101 reflections (2.09%)	wwPDB-VP
Wilson B-factor (Å ²)	48.8	Xtrriage
Anisotropy	0.103	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 42.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	16458	wwPDB-VP
Average B, all atoms (Å ²)	67.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.96% 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: EDO, A09

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	B	0.41	0/14156	0.60	0/19180
2	J	0.43	0/2190	0.60	0/2981
All	All	0.42	0/16346	0.60	0/22161

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	B	13862	0	14007	191	1
2	J	2123	0	2063	23	1
3	B	11	0	7	0	0
4	B	40	0	60	5	0
4	J	4	0	6	0	0
5	B	360	0	0	10	0
5	J	58	0	0	0	0
All	All	16458	0	16143	215	1

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 7.

All (215) 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)
2:J:2200:MET:HE1	2:J:2208:GLY:HA2	1.38	1.06
1:B:406:ARG:NH2	1:B:951:GLN:OE1	2.07	0.88
1:B:1595:LYS:HA	1:B:1598:ILE:HD12	1.65	0.76
1:B:1404:LYS:HB3	1:B:1422:GLY:HA2	1.70	0.73
1:B:1977:LYS:HD3	1:B:1996:LEU:HD13	1.70	0.72
1:B:1475:ARG:HD2	1:B:1504:LEU:HA	1.71	0.72
1:B:462:LEU:HD11	1:B:466:LYS:HG2	1.70	0.72
2:J:2100:THR:HG21	2:J:2229:LYS:HD3	1.72	0.71
1:B:1696:GLN:OE1	5:B:5901:HOH:O	2.10	0.68
1:B:1600:TYR:HB3	1:B:1631:LEU:HD11	1.77	0.66
1:B:573:HIS:HB3	1:B:577:LYS:HG3	1.78	0.65
1:B:2001:ASP:O	1:B:2004:ILE:HG13	1.98	0.63
1:B:467:LEU:HD21	1:B:481:LEU:HD11	1.80	0.63
1:B:1024:PHE:HB3	1:B:1027:ILE:HD12	1.82	0.62
1:B:993:ILE:HD12	1:B:1091:LEU:HD23	1.81	0.61
1:B:1351:PRO:HG3	1:B:1516:PRO:HA	1.82	0.61
2:J:2177:TRP:HE1	2:J:2196:HIS:HD1	1.48	0.61
1:B:1456:VAL:HG12	1:B:1491:SER:HB2	1.83	0.61
2:J:2133:PRO:HG2	2:J:2136:ASN:HB2	1.83	0.61
1:B:2015:PRO:HG2	1:B:2116:CYS:SG	2.42	0.60
1:B:1174:ILE:O	1:B:1178:VAL:HG13	2.02	0.60
1:B:1514:PHE:HB3	1:B:1518:VAL:HG21	1.82	0.60
1:B:1194:THR:HB	4:B:5806:EDO:H11	1.83	0.60
1:B:1107:LEU:O	1:B:1111:THR:HG23	2.01	0.59
1:B:893:MET:HG2	1:B:925:LEU:HB2	1.85	0.59
1:B:860:GLN:N	1:B:860:GLN:OE1	2.36	0.58
1:B:2082:LEU:HD22	1:B:2090:VAL:HG21	1.84	0.58
1:B:1507:SER:O	1:B:1511:THR:HG23	2.02	0.58
1:B:1693:ARG:HD3	1:B:1697:ASP:OD2	2.02	0.57
2:J:2187:GLN:HB2	2:J:2256:TYR:OH	2.02	0.57
1:B:1879:LEU:HD23	1:B:1879:LEU:H	1.69	0.56
1:B:1298:PRO:HB3	1:B:1515:HIS:CG	2.40	0.56
1:B:1335:VAL:O	1:B:1339:VAL:HG23	2.05	0.56
1:B:1551:THR:HG22	1:B:1587:GLN:OE1	2.05	0.55
1:B:1866:ASN:HA	1:B:1869:ARG:HB2	1.88	0.55
1:B:1192:PRO:HG3	1:B:1289:LEU:HD11	1.87	0.55
1:B:731:THR:HG21	1:B:786:HIS:HD2	1.72	0.55
1:B:1974:CYS:HA	1:B:1996:LEU:HD21	1.88	0.55
1:B:421:HIS:NE2	1:B:875:GLU:OE1	2.28	0.55
1:B:1413:SER:HA	1:B:1416:LEU:HD12	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1943:MET:HG2	1:B:2065:TRP:CE3	2.42	0.54
2:J:2141:GLU:OE1	2:J:2143:ARG:NH2	2.40	0.54
1:B:894:VAL:HG22	5:B:6041:HOH:O	2.08	0.54
1:B:2013:ARG:HE	1:B:2048:THR:HG23	1.73	0.54
1:B:1368:LEU:HD22	1:B:1403:LYS:HE2	1.89	0.53
1:B:602:GLU:HG3	1:B:603:ARG:H	1.74	0.53
1:B:1875:VAL:HG22	1:B:1896:GLN:HB3	1.91	0.53
1:B:1298:PRO:HB3	1:B:1515:HIS:CD2	2.44	0.53
1:B:1654:MET:HG2	1:B:1656:VAL:HG22	1.92	0.52
1:B:1127:CYS:HB2	1:B:1144:GLU:HG3	1.89	0.52
1:B:1157:ASN:OD1	1:B:1158:HIS:N	2.36	0.52
1:B:1331:ILE:HD12	1:B:1354:SER:HB3	1.91	0.52
1:B:1066:PHE:CG	1:B:1085:THR:HG21	2.45	0.51
1:B:2067:VAL:HB	1:B:2107:TYR:HB2	1.91	0.51
1:B:1515:HIS:HB3	1:B:1516:PRO:HD2	1.92	0.51
1:B:490:ARG:HA	1:B:494:GLU:HG3	1.92	0.51
1:B:1050:GLU:CD	1:B:1050:GLU:H	2.14	0.51
1:B:1195:ARG:HD3	1:B:1260:GLU:OE2	2.10	0.51
1:B:962:LEU:HD21	1:B:974:LYS:HE2	1.93	0.51
1:B:687:GLN:OE1	1:B:689:TYR:OH	2.12	0.51
1:B:734:THR:HG21	1:B:829:LYS:HE2	1.93	0.51
1:B:1879:LEU:HG	1:B:1882:PRO:HB3	1.93	0.51
1:B:1974:CYS:HB3	1:B:1979:VAL:HB	1.93	0.51
1:B:726:HIS:CE1	1:B:844:LEU:HD11	2.46	0.51
1:B:1566:ARG:HG3	1:B:1621:HIS:CG	2.46	0.50
1:B:542:ALA:HB1	1:B:547:LEU:HD23	1.93	0.50
1:B:1481:ILE:HG13	1:B:1483:ARG:H	1.75	0.50
1:B:602:GLU:HB3	5:B:6211:HOH:O	2.11	0.50
1:B:971:LYS:HB2	1:B:980:GLN:HB3	1.93	0.50
1:B:1357:THR:O	1:B:1361:GLU:HG3	2.12	0.50
1:B:728:ARG:O	1:B:731:THR:HG22	2.11	0.50
1:B:980:GLN:NE2	5:B:5912:HOH:O	2.43	0.49
1:B:1570:ARG:NH2	1:B:1608:THR:OG1	2.45	0.49
1:B:1879:LEU:H	1:B:1879:LEU:CD2	2.25	0.49
1:B:1360:ALA:HB2	1:B:1490:LEU:HD11	1.93	0.49
1:B:748:LEU:HD21	1:B:780:TYR:HB3	1.94	0.49
1:B:1132:PHE:HE1	1:B:1214:VAL:HG11	1.77	0.49
1:B:699:LYS:O	1:B:703:ILE:HG13	2.12	0.49
1:B:900:MET:HG2	5:B:6207:HOH:O	2.13	0.49
1:B:1894:LEU:HD21	1:B:1908:LEU:HD22	1.93	0.49
1:B:532:ASN:C	1:B:534:ASP:H	2.17	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1113:ASN:O	1:B:1117:MET:HG3	2.12	0.48
1:B:812:THR:OG1	1:B:813:ALA:N	2.46	0.48
1:B:654:THR:HG21	1:B:676:PHE:O	2.13	0.48
1:B:1434:ILE:HD12	1:B:1823:TYR:HB2	1.94	0.48
2:J:2103:THR:HG23	2:J:2260:GLN:HG2	1.94	0.48
1:B:1777:SER:HB3	1:B:1780:HIS:ND1	2.29	0.48
1:B:1861:ARG:HH12	1:B:1907:GLU:HB3	1.78	0.48
1:B:739:ARG:NE	1:B:740:ASP:OD1	2.38	0.48
4:B:5806:EDO:H22	5:B:6078[B]:HOH:O	2.12	0.48
2:J:2092:VAL:HG13	2:J:2261:MET:HE3	1.96	0.48
1:B:462:LEU:HD11	1:B:466:LYS:CG	2.42	0.48
1:B:578:GLU:O	1:B:581:SER:OG	2.25	0.47
1:B:1729:ASP:OD1	1:B:1729:ASP:N	2.47	0.47
1:B:1977:LYS:NZ	1:B:1992:GLU:HG2	2.29	0.47
4:B:5802:EDO:H12	5:B:6199:HOH:O	2.14	0.47
2:J:2179:HIS:CE1	2:J:2181:GLN:HG3	2.49	0.47
1:B:1366:ARG:O	1:B:1370:GLN:HG2	2.15	0.47
2:J:2100:THR:O	2:J:2102:TYR:N	2.41	0.47
1:B:1661:VAL:O	1:B:1702:CYS:HA	2.14	0.47
1:B:1864:GLU:O	1:B:1867:LEU:HB3	2.14	0.47
1:B:991:TYR:OH	1:B:1097:GLU:OE1	2.17	0.47
1:B:1840:THR:O	1:B:1938:PRO:HB3	2.15	0.47
1:B:790:THR:HG22	1:B:792:VAL:H	1.79	0.47
1:B:1506:CYS:HB3	1:B:1511:THR:HG22	1.97	0.47
1:B:1943:MET:HG2	1:B:2065:TRP:CZ3	2.50	0.47
1:B:1729:ASP:HA	1:B:1732:MET:HE2	1.97	0.46
2:J:2243:ASP:HB3	2:J:2248:PRO:HB3	1.98	0.46
1:B:513:ALA:HB1	1:B:613:ILE:HD13	1.97	0.46
1:B:1501:ALA:HB1	1:B:1506:CYS:HB2	1.98	0.46
1:B:1225:VAL:HG21	1:B:1254:PHE:CE2	2.50	0.46
1:B:1882:PRO:HB2	1:B:1884:PHE:CZ	2.51	0.46
1:B:1990:ASP:OD1	1:B:1991:GLU:N	2.48	0.46
1:B:790:THR:HG22	1:B:792:VAL:N	2.30	0.46
1:B:1356:LYS:HB2	4:B:5802:EDO:H21	1.98	0.46
1:B:1887:PRO:O	1:B:1891:THR:HG23	2.15	0.46
1:B:406:ARG:NE	1:B:954:LEU:HG	2.31	0.46
1:B:707:ILE:O	1:B:711:LYS:HG2	2.15	0.46
1:B:497:GLU:HG3	5:B:5918:HOH:O	2.15	0.45
1:B:1375:ARG:HD3	1:B:1419:LEU:O	2.16	0.45
1:B:1710:LYS:HG2	5:B:5990:HOH:O	2.15	0.45
1:B:636:ILE:O	1:B:639:ILE:HB	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1294:LYS:HG3	4:B:5806:EDO:O2	2.16	0.45
1:B:1958:SER:HB3	1:B:1971:ILE:HD13	1.99	0.45
2:J:2106:LEU:HD12	2:J:2107:PRO:HD2	1.98	0.45
1:B:1381:PRO:HG2	1:B:1458:LEU:HD12	1.97	0.45
1:B:2056:PHE:CE2	1:B:2060:ARG:HD3	2.51	0.45
1:B:756:SER:HB2	1:B:759:THR:HG23	1.98	0.45
1:B:1138:GLU:O	1:B:1142:LYS:HG3	2.16	0.45
1:B:2017:ILE:HD12	1:B:2084:LEU:HD23	1.98	0.45
1:B:543:PRO:HD2	1:B:547:LEU:HD23	1.98	0.45
1:B:1124:GLN:HB2	2:J:2307:GLU:OE1	2.16	0.45
1:B:1350:ALA:O	1:B:1492:SER:HA	2.16	0.45
1:B:1760:LEU:HD11	1:B:1764:MET:HE3	1.98	0.45
1:B:1590:LEU:HD22	1:B:1614:LEU:O	2.17	0.45
1:B:1804:ILE:HG12	1:B:1810:VAL:HG12	1.98	0.45
1:B:636:ILE:HD13	1:B:666:ARG:HG2	1.98	0.44
1:B:447:VAL:HB	1:B:687:GLN:HB2	1.98	0.44
1:B:709:TYR:OH	1:B:745:LYS:HE2	2.18	0.44
2:J:2070:LYS:HB3	2:J:2070:LYS:HE3	1.64	0.44
1:B:469:LYS:HA	1:B:472:GLN:HG3	1.99	0.44
1:B:2051:VAL:HG13	1:B:2113:TYR:CZ	2.52	0.44
1:B:704:MET:O	1:B:708:VAL:HG12	2.17	0.44
1:B:1693:ARG:HB3	1:B:1696:GLN:HB2	2.00	0.44
1:B:2065:TRP:CD1	1:B:2081:ARG:HG2	2.53	0.44
1:B:1622:GLU:OE1	1:B:1622:GLU:N	2.43	0.44
2:J:2149:PRO:HB3	2:J:2281:TYR:CE1	2.53	0.44
1:B:824:HIS:HE1	1:B:866:GLU:OE2	2.00	0.43
1:B:1452:VAL:HG22	1:B:1488:VAL:HB	1.99	0.43
1:B:1943:MET:HE3	1:B:2065:TRP:HB2	2.00	0.43
1:B:1943:MET:HE2	1:B:2109:MET:HB2	2.00	0.43
1:B:481:LEU:HB3	1:B:485:GLN:HB2	2.00	0.43
1:B:690:VAL:HG11	1:B:707:ILE:HD13	1.99	0.43
1:B:769:CYS:SG	1:B:796:LEU:HD22	2.58	0.43
1:B:2017:ILE:HD13	1:B:2043:ARG:HG3	2.01	0.43
2:J:2100:THR:CG2	2:J:2229:LYS:HD3	2.44	0.43
1:B:450:LEU:HA	1:B:450:LEU:HD13	1.77	0.43
1:B:1375:ARG:NH1	1:B:1447:ASN:OD1	2.51	0.43
1:B:1515:HIS:CE1	1:B:1721:PRO:HG3	2.53	0.43
1:B:444:GLU:HG2	1:B:690:VAL:HG22	1.99	0.43
1:B:790:THR:O	1:B:794:ARG:HG3	2.19	0.43
1:B:2043:ARG:NH2	1:B:2084:LEU:O	2.35	0.43
1:B:553:GLY:O	1:B:557:LYS:HG3	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1176:LYS:HG3	1:B:1177:TYR:N	2.33	0.43
1:B:1862:HIS:HE2	1:B:1885:ASN:HB3	1.83	0.43
2:J:2190:PRO:HB3	2:J:2251:TYR:CD1	2.54	0.43
1:B:1223:ILE:O	1:B:1236:HIS:HA	2.18	0.42
1:B:1608:THR:O	1:B:1612:THR:HG23	2.19	0.42
1:B:743:LEU:HB3	1:B:748:LEU:HD12	2.00	0.42
1:B:1597:LEU:HD23	1:B:1614:LEU:HA	2.00	0.42
1:B:1630:ARG:HD2	1:B:1630:ARG:N	2.33	0.42
1:B:736:ARG:NH1	1:B:773:GLU:OE2	2.42	0.42
1:B:784:ILE:HA	1:B:810:VAL:O	2.19	0.42
1:B:796:LEU:HG	1:B:800:LEU:HD13	2.01	0.42
2:J:2163:LEU:HA	2:J:2163:LEU:HD23	1.66	0.42
1:B:428:CYS:HB3	1:B:877:GLN:OE1	2.20	0.42
1:B:1244:LYS:HE3	1:B:1245:TYR:CE2	2.55	0.42
1:B:2105:THR:OG1	1:B:2107:TYR:CZ	2.71	0.42
2:J:2136:ASN:HB3	2:J:2138:GLN:OE1	2.19	0.42
1:B:1140:VAL:HA	1:B:1143:ILE:HD12	2.01	0.42
1:B:1755:LEU:HD23	1:B:1755:LEU:HA	1.90	0.42
1:B:1547:TYR:O	1:B:1551:THR:HG23	2.20	0.42
1:B:459:GLU:OE2	1:B:487:LYS:HE2	2.20	0.42
1:B:705:ASN:OD1	1:B:829:LYS:NZ	2.52	0.42
2:J:2179:HIS:NE2	2:J:2192:ASP:OD2	2.45	0.42
1:B:1456:VAL:O	1:B:1459:ILE:HG12	2.20	0.41
1:B:730:GLU:O	1:B:734:THR:HG23	2.20	0.41
1:B:1044:VAL:HG11	1:B:1061:VAL:HG22	2.00	0.41
1:B:656:PRO:O	1:B:657:ASN:HB2	2.21	0.41
1:B:886:GLN:O	1:B:888:PRO:HD3	2.20	0.41
1:B:1983:PHE:HE1	1:B:2016:ASN:HD22	1.67	0.41
1:B:2019:LEU:HD12	1:B:2041:LEU:HD11	2.01	0.41
1:B:1417:LYS:HA	1:B:1417:LYS:HD3	1.58	0.41
1:B:731:THR:HG23	1:B:732:GLY:N	2.35	0.41
1:B:1997:LEU:HD21	1:B:1999:LEU:HB2	2.02	0.41
1:B:782:PHE:HA	1:B:808:VAL:O	2.20	0.41
1:B:1943:MET:HE3	1:B:2065:TRP:CB	2.50	0.41
2:J:2310:ARG:HD2	2:J:2313:HIS:ND1	2.35	0.41
1:B:1499:ASP:OD2	1:B:1763:ARG:NH1	2.51	0.41
1:B:793:ASP:O	1:B:797:VAL:HG23	2.21	0.41
1:B:1328:PHE:HB3	1:B:1332:GLN:HB2	2.03	0.41
1:B:1870:GLN:O	1:B:1874:LYS:HG2	2.20	0.41
1:B:757:ALA:O	1:B:761:VAL:HG23	2.21	0.41
1:B:832:GLN:NE2	1:B:843:GLU:OE2	2.46	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1878:LYS:HA	1:B:1878:LYS:HD3	1.76	0.41
1:B:858:ARG:HE	1:B:861:TYR:HB2	1.86	0.40
1:B:1387:GLU:O	1:B:1391:MET:HG2	2.21	0.40
1:B:595:ILE:HD11	1:B:990:HIS:O	2.21	0.40
1:B:896:LYS:HE3	5:B:6114:HOH:O	2.21	0.40
1:B:1132:PHE:CE1	1:B:1214:VAL:HG11	2.56	0.40
1:B:1855:TYR:CE1	1:B:1915:ILE:HA	2.56	0.40
1:B:1607:SER:O	1:B:1610:LYS:HB2	2.22	0.40
1:B:1803:SER:O	1:B:1810:VAL:HA	2.21	0.40
2:J:2130:GLY:O	2:J:2173:GLU:HG3	2.21	0.40
2:J:2237:TRP:CZ2	2:J:2251:TYR:HB2	2.56	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1782:SER:OG	2:J:2065:GLN:OE1[4_555]	2.16	0.04

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	B	1722/1747 (99%)	1668 (97%)	50 (3%)	4 (0%)	47 58
2	J	261/263 (99%)	249 (95%)	11 (4%)	1 (0%)	34 42
All	All	1983/2010 (99%)	1917 (97%)	61 (3%)	5 (0%)	41 50

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	2099	THR
2	J	2101	GLY

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Mol	Chain	Res	Type
1	B	2085	GLN
1	B	533	VAL
1	B	2097	PRO

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	B	1543/1560 (99%)	1499 (97%)	44 (3%)	42 58
2	J	236/236 (100%)	228 (97%)	8 (3%)	37 51
All	All	1779/1796 (99%)	1727 (97%)	52 (3%)	42 58

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	429	GLN
1	B	438	GLN
1	B	450	LEU
1	B	494	GLU
1	B	525	ILE
1	B	537	LYS
1	B	595	ILE
1	B	696	LYS
1	B	698	ILE
1	B	877	GLN
1	B	895	SER
1	B	992	TYR
1	B	1052	ILE
1	B	1178	VAL
1	B	1188	VAL
1	B	1276	LEU
1	B	1279	GLU
1	B	1313	ARG
1	B	1375	ARG
1	B	1417	LYS

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Mol	Chain	Res	Type
1	B	1446	GLN
1	B	1507	SER
1	B	1513	ASN
1	B	1600	TYR
1	B	1648	ARG
1	B	1667	GLN
1	B	1699	GLU
1	B	1710	LYS
1	B	1742	THR
1	B	1777	SER
1	B	1788	LEU
1	B	1840	THR
1	B	1863	HIS
1	B	1864	GLU
1	B	1879	LEU
1	B	1892	ASN
1	B	1910	SER
1	B	1985	ILE
1	B	1997	LEU
1	B	2002	SER
1	B	2018	GLU
1	B	2040	GLN
1	B	2061	GLU
1	B	2105	THR
2	J	2094	SER
2	J	2099	GLU
2	J	2138	GLN
2	J	2171	GLU
2	J	2173	GLU
2	J	2247	ASN
2	J	2287	ARG
2	J	2289	ASP

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

Mol	Chain	Res	Type
1	B	768	GLN
1	B	1892	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

12 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
4	EDO	B	5806	-	3,3,3	0.39	0	2,2,2	0.33	0
4	EDO	B	5803	-	3,3,3	0.51	0	2,2,2	0.38	0
4	EDO	B	5804	-	3,3,3	0.45	0	2,2,2	0.60	0
4	EDO	B	5811	-	3,3,3	0.83	0	2,2,2	0.11	0
4	EDO	B	5802	-	3,3,3	0.47	0	2,2,2	0.23	0
4	EDO	B	5805	-	3,3,3	0.51	0	2,2,2	0.25	0
4	EDO	J	2401	-	3,3,3	0.54	0	2,2,2	0.37	0
4	EDO	B	5808	-	3,3,3	0.56	0	2,2,2	0.39	0
3	A09	B	5801	-	10,11,11	2.60	3 (30%)	12,15,15	4.69	3 (25%)
4	EDO	B	5810	-	3,3,3	0.57	0	2,2,2	0.62	0
4	EDO	B	5807	-	3,3,3	0.79	0	2,2,2	0.44	0
4	EDO	B	5809	-	3,3,3	0.47	0	2,2,2	0.74	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
4	EDO	B	5806	-	-	1/1/1/1	-
4	EDO	B	5803	-	-	0/1/1/1	-
4	EDO	B	5804	-	-	0/1/1/1	-
4	EDO	B	5811	-	-	1/1/1/1	-
4	EDO	B	5802	-	-	1/1/1/1	-
4	EDO	B	5805	-	-	0/1/1/1	-
4	EDO	J	2401	-	-	1/1/1/1	-
4	EDO	B	5808	-	-	0/1/1/1	-
3	A09	B	5801	-	-	4/6/9/9	0/1/1/1
4	EDO	B	5810	-	-	1/1/1/1	-
4	EDO	B	5807	-	-	1/1/1/1	-
4	EDO	B	5809	-	-	1/1/1/1	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	5801	A09	O2-S1	6.22	1.50	1.43
3	B	5801	A09	O1-S1	4.45	1.48	1.43
3	B	5801	A09	C1-S1	2.89	1.80	1.76

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	5801	A09	O2-S1-O1	-14.75	101.42	119.55
3	B	5801	A09	O1-S1-C1	5.68	114.96	107.97
3	B	5801	A09	O2-S1-C1	-3.14	104.10	107.97

There are no chirality outliers.

All (11) torsion outliers are listed below:

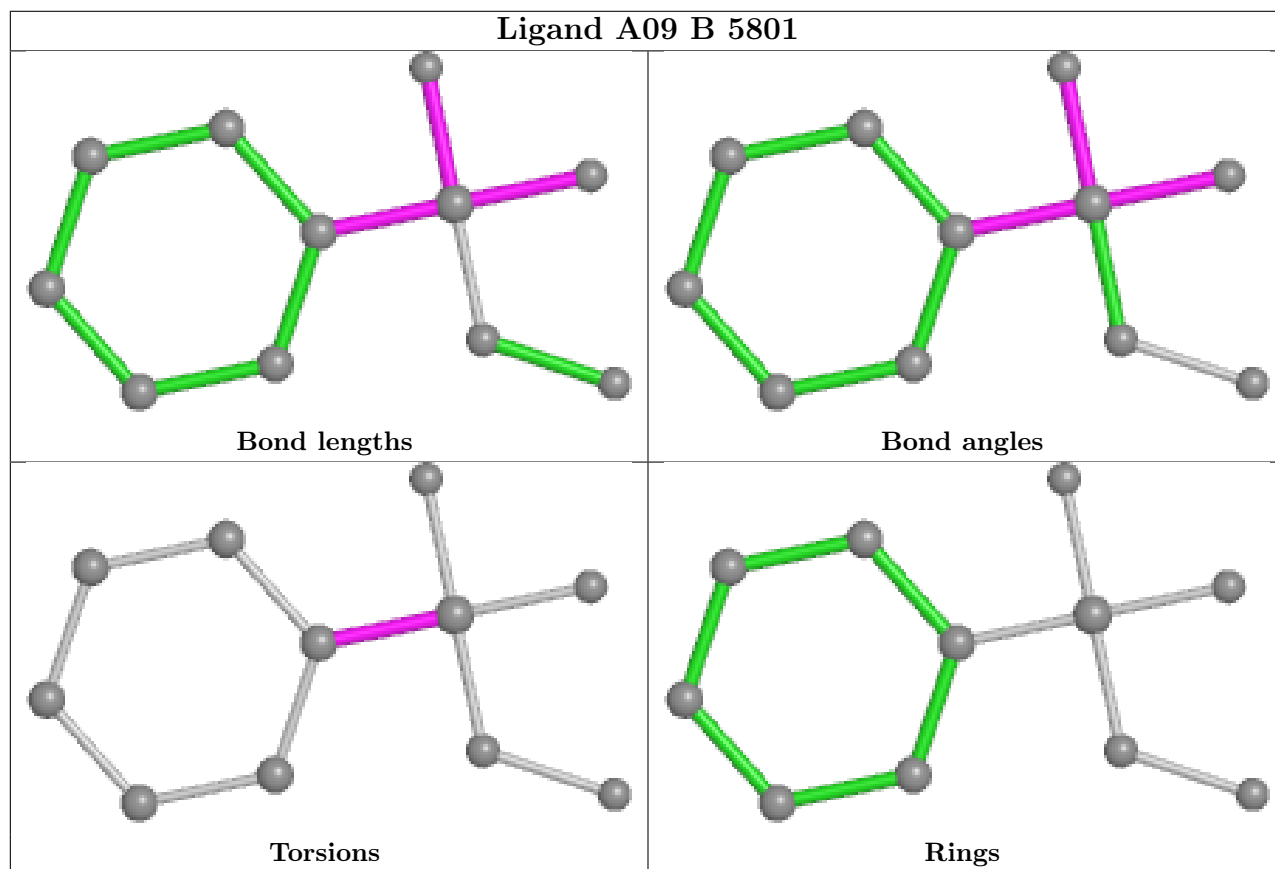
Mol	Chain	Res	Type	Atoms
3	B	5801	A09	C2-C1-S1-N1
3	B	5801	A09	C6-C1-S1-N1
3	B	5801	A09	C6-C1-S1-O2
3	B	5801	A09	C2-C1-S1-O2
4	B	5802	EDO	O1-C1-C2-O2
4	B	5806	EDO	O1-C1-C2-O2
4	B	5810	EDO	O1-C1-C2-O2
4	J	2401	EDO	O1-C1-C2-O2
4	B	5811	EDO	O1-C1-C2-O2
4	B	5807	EDO	O1-C1-C2-O2
4	B	5809	EDO	O1-C1-C2-O2

There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	5806	EDO	3	0
4	B	5802	EDO	2	0

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



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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	B	1724/1747 (98%)	0.24	113 (6%) 18 23	32, 61, 122, 189	0
2	J	263/263 (100%)	0.09	13 (4%) 29 36	39, 57, 121, 205	0
All	All	1987/2010 (98%)	0.22	126 (6%) 20 25	32, 60, 122, 205	0

All (126) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	575	LEU	13.2
2	J	2062	SER	12.0
1	B	1584	ILE	8.8
2	J	2061	GLY	7.8
2	J	2060	LEU	7.6
1	B	1601	LEU	7.4
2	J	2063	MET	7.2
1	B	404	ALA	7.2
1	B	1597	LEU	7.1
1	B	1889	VAL	7.1
1	B	458	GLU	7.0
1	B	603	ARG	6.8
1	B	2098	ALA	6.3
1	B	1586	ARG	6.0
2	J	2097	ILE	6.0
1	B	1880	ASN	6.0
1	B	573	HIS	6.0
1	B	779	PRO	5.8
1	B	2127	LYS	5.7
1	B	1600	TYR	5.7
1	B	2045	GLU	5.2
1	B	576	CYS	5.2
1	B	1860	ILE	4.9
2	J	2058	GLY	4.8

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Mol	Chain	Res	Type	RSRZ
1	B	753	ARG	4.6
1	B	457	SER	4.4
1	B	1585	GLN	4.4
1	B	769	CYS	4.3
1	B	764	THR	4.2
1	B	2047	VAL	4.2
1	B	1866	ASN	4.1
1	B	754	GLU	4.0
1	B	2038	LEU	4.0
1	B	2046	GLU	3.9
1	B	1881	ASN	3.9
1	B	601	GLY	3.7
1	B	2124	VAL	3.7
1	B	2017	ILE	3.7
1	B	1983	PHE	3.6
1	B	1598	ILE	3.6
2	J	2100	THR	3.6
2	J	2096	ASP	3.6
1	B	1873	GLN	3.6
1	B	1868	LEU	3.6
1	B	760	GLU	3.5
2	J	2095	ASP	3.5
1	B	762	LEU	3.5
1	B	456	GLY	3.4
1	B	761	VAL	3.4
1	B	579	GLU	3.4
1	B	752	LEU	3.3
1	B	1614	LEU	3.3
1	B	1862	HIS	3.3
2	J	2319	LEU	3.2
1	B	1884	PHE	3.2
1	B	1603	LYS	3.2
1	B	2122	PHE	3.1
1	B	1895	LEU	3.1
1	B	1167	MET	3.1
1	B	2123	SER	3.1
1	B	602	GLU	3.1
1	B	1997	LEU	3.1
1	B	2097	PRO	3.1
1	B	1841	LYS	3.1
1	B	574	GLN	3.0
1	B	2101	ALA	3.0

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Mol	Chain	Res	Type	RSRZ
1	B	1145	LYS	3.0
1	B	1138	GLU	2.9
1	B	778	LEU	2.9
1	B	1135	LEU	2.9
1	B	1883	LYS	2.9
1	B	572	ASP	2.8
1	B	1165	ILE	2.8
1	B	1416	LEU	2.8
1	B	1893	LEU	2.8
1	B	1324	LYS	2.8
1	B	774	LEU	2.8
1	B	796	LEU	2.7
1	B	1886	ASP	2.7
1	B	2027	ASP	2.7
1	B	1164	LEU	2.7
1	B	1588	ARG	2.6
1	B	1583	ASP	2.6
1	B	695	LYS	2.6
1	B	454	PRO	2.5
1	B	1599	PRO	2.5
1	B	768	GLN	2.5
1	B	975	LYS	2.5
1	B	757	ALA	2.5
1	B	527	MET	2.5
1	B	1959	TYR	2.5
2	J	2059	PRO	2.5
1	B	2035	VAL	2.4
1	B	2044	GLU	2.4
1	B	1956	LYS	2.4
1	B	2026	LYS	2.4
1	B	1159	ASN	2.4
1	B	770	LYS	2.4
1	B	1604	LEU	2.3
1	B	607	GLN	2.3
1	B	1877	HIS	2.3
1	B	1134	LYS	2.3
1	B	1876	PRO	2.3
1	B	2033	GLY	2.3
1	B	1147	ASN	2.3
1	B	756	SER	2.3
1	B	2029	ILE	2.3
1	B	1869	ARG	2.2

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Mol	Chain	Res	Type	RSRZ
2	J	2135	ASP	2.2
1	B	709	TYR	2.1
1	B	700	ARG	2.1
1	B	1882	PRO	2.1
1	B	1160	GLU	2.1
1	B	2126	VAL	2.1
1	B	600	GLY	2.1
1	B	2085	GLN	2.1
1	B	1907	GLU	2.1
1	B	1843	ARG	2.1
1	B	2099	THR	2.1
1	B	1706	CYS	2.1
1	B	1043	ARG	2.0
1	B	1411	GLU	2.0
2	J	2220	PRO	2.0
1	B	726	HIS	2.0
1	B	455	PHE	2.0
1	B	2072	LYS	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 monosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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.

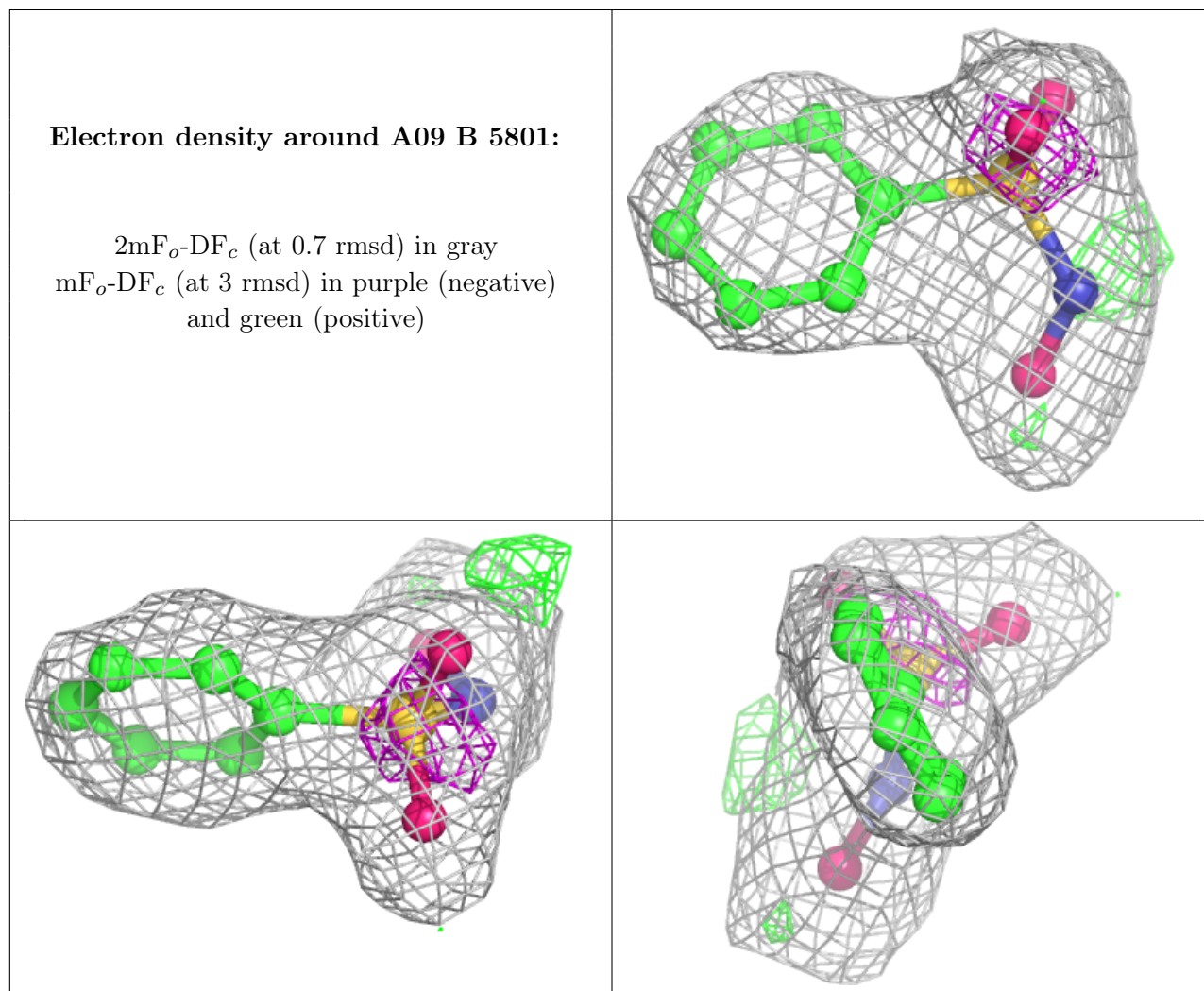
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	EDO	B	5808	4/4	0.68	0.36	69,76,78,89	0
4	EDO	B	5804	4/4	0.78	0.27	58,60,61,69	0
4	EDO	B	5803	4/4	0.85	0.12	56,63,68,71	0
4	EDO	B	5810	4/4	0.85	0.29	60,63,65,68	0
4	EDO	B	5806	4/4	0.87	0.19	50,53,59,64	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	EDO	B	5811	4/4	0.87	0.13	48,56,57,57	0
4	EDO	B	5802	4/4	0.88	0.27	36,51,61,64	0
3	A09	B	5801	11/11	0.89	0.13	44,50,61,67	0
4	EDO	J	2401	4/4	0.89	0.19	57,64,67,73	0
4	EDO	B	5807	4/4	0.91	0.18	41,42,43,45	0
4	EDO	B	5809	4/4	0.92	0.20	43,49,60,74	0
4	EDO	B	5805	4/4	0.92	0.22	56,56,59,65	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.



6.5 Other polymers [i](#)

There are no such residues in this entry.