



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 1, 2026 – 10:53 PM UTC

PDB ID : 3F3V / pdb_00003f3v
Title : Kinase domain of cSrc in complex with inhibitor RL45 (Type II)
Authors : Grutter, C.; Kluter, S.; Getlik, M.; Rauh, D.
Deposited on : 2008-10-31
Resolution : 2.60 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

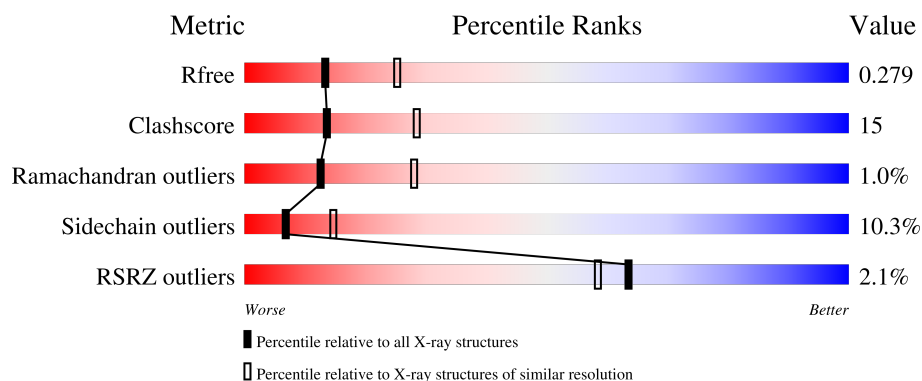
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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	286	61% 25% 5% 9%
1	B	286	3% 57% 30% 8%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4286 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.

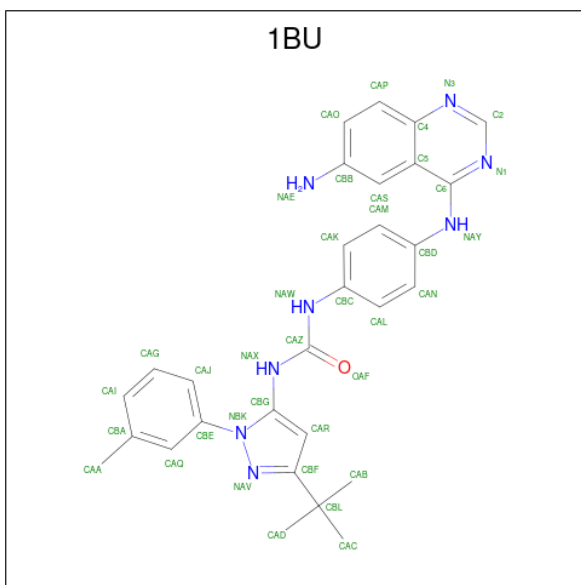
- Molecule 1 is a protein called Proto-oncogene tyrosine-protein kinase Src.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	261	Total	C	N	O	S	0	1	0
			2076	1332	348	378	18			
1	B	262	Total	C	N	O	S	0	1	0
			2081	1341	349	373	18			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	248	GLY	-	expression tag	UNP P00523
A	249	HIS	-	expression tag	UNP P00523
A	250	MET	-	expression tag	UNP P00523
A	345	CYS	SER	engineered mutation	UNP P00523
B	248	GLY	-	expression tag	UNP P00523
B	249	HIS	-	expression tag	UNP P00523
B	250	MET	-	expression tag	UNP P00523
B	345	CYS	SER	engineered mutation	UNP P00523

- Molecule 2 is 1-{4-[(6-aminoquinazolin-4-yl)amino]phenyl}-3-[3-tert-butyl-1-(3-methylphenyl)-1H-pyrazol-5-yl]urea (CCD ID: 1BU) (formula: C₂₉H₃₀N₈O).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total 38	C 29	N 8	O 1	0	0
2	B	1	Total 38	C 29	N 8	O 1	0	0

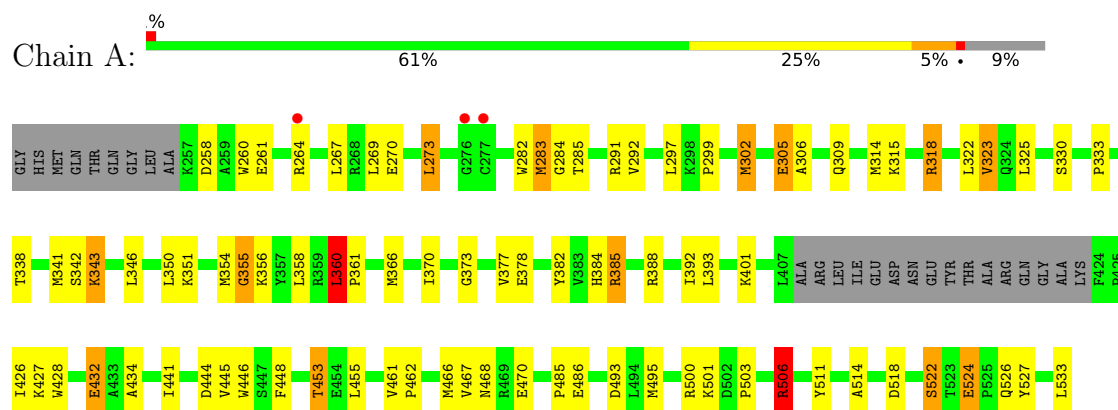
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	26	Total O 26 26	0	0
3	B	27	Total O 27 27	0	0

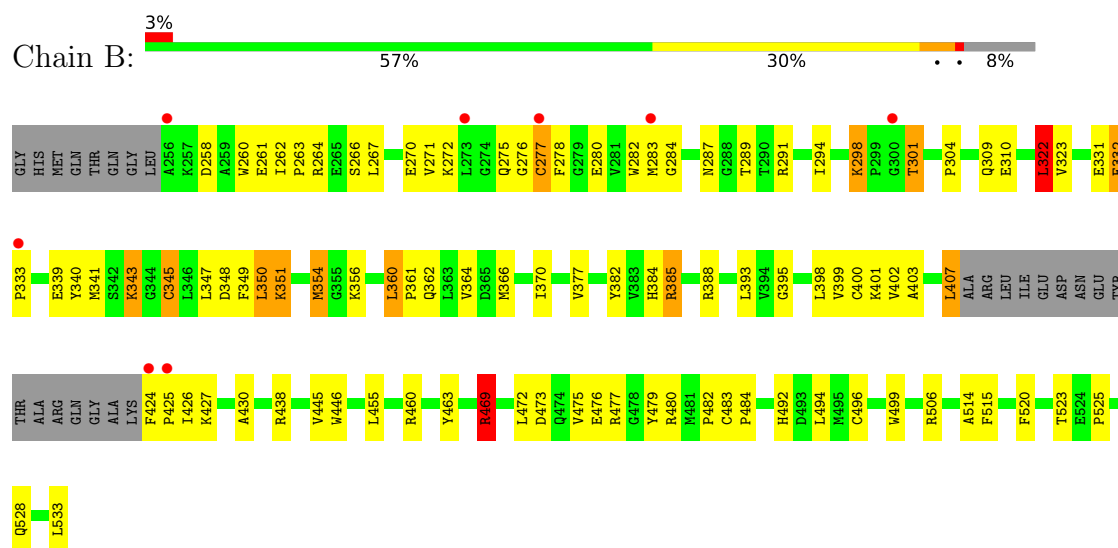
3 Residue-property plots

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

- Molecule 1: Proto-oncogene tyrosine-protein kinase Src



- Molecule 1: Proto-oncogene tyrosine-protein kinase Src



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	42.05Å 63.40Å 74.95Å 79.06° 87.72° 90.08°	Depositor
Resolution (Å)	40.00 – 2.60 40.00 – 2.60	Depositor EDS
% Data completeness (in resolution range)	100.0 (40.00-2.60) 94.0 (40.00-2.60)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.85 (at 2.61Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.210 , 0.284 0.210 , 0.279	Depositor DCC
R_{free} test set	880 reflections (4.00%)	wwPDB-VP
Wilson B-factor (Å ²)	32.4	Xtriage
Anisotropy	0.060	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 41.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.038 for h,-k,-l	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	4286	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.98% 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: 1BU

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	1.11	3/2130 (0.1%)	1.18	8/2887 (0.3%)
1	B	1.03	1/2136 (0.0%)	1.20	15/2896 (0.5%)
All	All	1.07	4/4266 (0.1%)	1.19	23/5783 (0.4%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	322	LEU	CA-C	-5.46	1.46	1.52
1	A	511	TYR	CA-C	5.42	1.59	1.52
1	A	360	LEU	C-O	-5.06	1.19	1.24
1	A	323	VAL	C-O	-5.04	1.18	1.24

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	469	ARG	N-CA-C	8.03	123.12	113.16
1	A	461	VAL	CA-C-N	-7.71	112.39	120.03
1	A	461	VAL	C-N-CA	-7.71	112.39	120.03
1	B	399	VAL	N-CA-C	-6.52	100.29	108.89
1	B	430	ALA	CA-C-N	6.35	125.85	119.24
1	B	430	ALA	C-N-CA	6.35	125.85	119.24
1	B	514	ALA	N-CA-C	-6.25	104.58	111.82
1	A	522	SER	N-CA-C	6.03	119.83	112.23
1	B	276	GLY	N-CA-C	-5.93	104.31	112.25
1	A	373	GLY	N-CA-C	-5.87	105.70	112.50
1	B	463	TYR	CA-C-N	-5.76	113.84	119.78
1	B	463	TYR	C-N-CA	-5.76	113.84	119.78
1	B	370	ILE	N-CA-C	-5.63	105.02	110.42
1	B	506	ARG	CA-C-N	5.45	125.42	120.03
1	B	506	ARG	C-N-CA	5.45	125.42	120.03

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	448	PHE	N-CA-C	-5.25	105.56	111.28
1	A	506	ARG	CA-C-N	5.14	125.12	120.03
1	A	506	ARG	C-N-CA	5.14	125.12	120.03
1	B	340	TYR	CA-C-N	-5.12	116.18	122.84
1	B	340	TYR	C-N-CA	-5.12	116.18	122.84
1	B	354	MET	N-CA-C	5.09	117.72	111.82
1	A	514	ALA	N-CA-C	-5.05	105.86	111.36
1	B	356	LYS	N-CA-C	-5.04	106.39	112.54

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	2076	0	2038	59	0
1	B	2081	0	2056	65	0
2	A	38	0	30	0	0
2	B	38	0	30	2	0
3	A	26	0	0	4	0
3	B	27	0	0	2	0
All	All	4286	0	4154	122	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 15.

All (122) 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:318:ARG:HH11	1:A:318:ARG:HG2	1.10	1.13
1:A:485:PRO:O	1:A:486:GLU:HB2	1.61	0.99
1:A:318:ARG:HH11	1:A:318:ARG:CG	1.75	0.97
1:B:343:LYS:HZ2	1:B:398:LEU:H	1.17	0.92
1:A:318:ARG:HG2	1:A:318:ARG:NH1	1.72	0.91
1:A:346:LEU:HD11	1:A:366:MET:HE2	1.54	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:272:LYS:HZ2	1:B:275:GLN:HG3	1.39	0.87
1:B:272:LYS:NZ	1:B:275:GLN:HG3	1.89	0.87
1:B:264:ARG:NH2	1:B:331:GLU:O	2.09	0.86
1:A:524:GLU:HG3	1:A:526:GLN:HE22	1.47	0.80
1:A:346:LEU:HD11	1:A:366:MET:CE	2.12	0.78
1:A:264[C]:ARG:HD2	1:A:264[C]:ARG:H	1.51	0.74
1:B:345:CYS:SG	1:B:348:ASP:OD1	2.44	0.74
1:B:343:LYS:NZ	1:B:398:LEU:H	1.86	0.73
1:A:485:PRO:O	3:A:57:HOH:O	2.05	0.73
1:B:287:ASN:O	1:B:289:THR:HG23	1.89	0.73
1:A:343:LYS:O	3:A:40:HOH:O	2.09	0.71
1:B:384:HIS:O	1:B:385:ARG:HB2	1.89	0.70
1:B:271:VAL:O	1:B:282:TRP:CE3	2.45	0.69
1:A:260:TRP:CD1	1:A:315:LYS:HE2	2.26	0.69
1:A:524:GLU:HG3	1:A:526:GLN:NE2	2.08	0.68
1:A:354:MET:O	1:A:355:GLY:C	2.37	0.66
1:A:270:GLU:HG3	1:A:284:GLY:HA2	1.80	0.64
1:A:302:MET:HE2	1:A:306:ALA:HB3	1.79	0.64
1:B:298:LYS:O	1:B:301:THR:OG1	2.18	0.62
1:B:323:VAL:HG21	1:B:403:ALA:HB2	1.82	0.62
1:B:271:VAL:HG12	1:B:272:LYS:N	2.15	0.61
1:B:424:PHE:CD1	1:B:425:PRO:HD2	2.36	0.61
1:B:322:LEU:HD22	1:B:402:VAL:HB	1.83	0.61
1:B:347:LEU:O	1:B:351:LYS:HG2	2.00	0.61
1:A:305:GLU:OE1	1:A:309:GLN:NE2	2.33	0.61
1:A:297:LEU:O	1:A:299:PRO:HD3	2.01	0.60
1:A:302:MET:HE2	1:A:306:ALA:CB	2.32	0.60
1:A:264[A]:ARG:HH12	1:A:333:PRO:HG2	1.67	0.59
1:A:366:MET:O	1:A:370:ILE:HG13	2.03	0.59
1:B:483:CYS:HA	1:B:492:HIS:CD2	2.38	0.58
1:A:273:LEU:HD22	1:A:283:MET:HB2	1.86	0.58
1:B:360:LEU:HB2	1:B:533:LEU:OXT	2.04	0.58
1:B:366:MET:HE3	1:B:398:LEU:HD22	1.84	0.58
1:B:469:ARG:HB2	1:B:472:LEU:HD12	1.87	0.57
1:A:346:LEU:CD1	1:A:366:MET:CE	2.82	0.56
1:B:332:GLU:OE1	1:B:333:PRO:HA	2.05	0.56
1:A:341:MET:HG3	1:A:393:LEU:HB3	1.87	0.56
1:A:360:LEU:HB2	1:A:533:LEU:OXT	2.06	0.56
1:B:310:GLU:HG3	2:B:1:1BU:CAQ	2.36	0.56
1:B:323:VAL:HG21	1:B:393:LEU:HD12	1.88	0.55
1:B:262:ILE:HB	1:B:263:PRO:HD2	1.87	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:377:VAL:HG13	1:B:382:TYR:HB3	1.89	0.55
1:B:343:LYS:CD	1:B:395:GLY:O	2.54	0.55
1:A:346:LEU:CD1	1:A:366:MET:HE2	2.31	0.54
1:A:527:TYR:HE1	3:A:3:HOH:O	1.91	0.54
1:B:271:VAL:O	1:B:282:TRP:HE3	1.89	0.53
1:B:280:GLU:CB	1:B:282:TRP:HE1	2.22	0.53
1:B:272:LYS:HZ1	1:B:275:GLN:HG3	1.73	0.52
1:B:482:PRO:O	1:B:484:PRO:HD3	2.09	0.52
1:B:362:GLN:O	1:B:366:MET:HG3	2.11	0.51
1:A:384:HIS:O	1:A:385:ARG:HB2	2.11	0.51
1:B:343:LYS:HD2	1:B:395:GLY:O	2.11	0.51
1:B:424:PHE:CG	1:B:425:PRO:HD2	2.46	0.51
1:A:378:GLU:HB3	3:A:20:HOH:O	2.10	0.51
1:A:388:ARG:HB3	1:A:428:TRP:CD1	2.46	0.51
1:A:269:LEU:HD23	1:A:282:TRP:CG	2.45	0.50
1:A:314:MET:HE2	1:A:325:LEU:HB2	1.92	0.50
1:B:277:CYS:SG	1:B:278:PHE:CD2	3.04	0.50
1:A:377:VAL:HG13	1:A:382:TYR:HB3	1.94	0.50
1:A:426:ILE:HG21	1:A:468:ASN:CG	2.36	0.50
1:B:270:GLU:HG3	1:B:284:GLY:HA2	1.93	0.49
1:A:527:TYR:OH	1:A:533:LEU:OXT	2.29	0.49
1:B:310:GLU:HG3	2:B:1:1BU:CBE	2.42	0.49
1:A:318:ARG:CG	1:A:318:ARG:NH1	2.45	0.49
1:A:485:PRO:O	1:A:486:GLU:CB	2.41	0.49
1:A:446:TRP:C	1:A:446:TRP:CD1	2.90	0.49
1:B:427:LYS:HE2	3:B:52:HOH:O	2.12	0.48
1:A:258:ASP:OD1	1:A:260:TRP:HD1	1.96	0.48
1:A:467:VAL:H	1:A:470:GLU:HG2	1.78	0.48
1:B:323:VAL:CG2	1:B:403:ALA:HB2	2.43	0.48
1:B:267:LEU:O	1:B:267:LEU:HD12	2.15	0.47
1:B:350:LEU:HD21	1:B:455:LEU:HA	1.97	0.47
1:A:261:GLU:OE2	1:A:330:SER:OG	2.26	0.47
1:A:453:THR:HG22	1:A:495:MET:SD	2.55	0.46
1:A:360:LEU:N	1:A:361:PRO:CD	2.78	0.46
1:B:280:GLU:HB2	1:B:282:TRP:HE1	1.81	0.46
1:A:524:GLU:CG	1:A:526:GLN:HE22	2.22	0.46
1:B:277:CYS:HG	1:B:278:PHE:HD2	1.60	0.46
1:B:427:LYS:CE	3:B:52:HOH:O	2.63	0.46
1:B:473:ASP:O	1:B:477:ARG:HG3	2.16	0.46
1:B:480:ARG:NH2	1:B:499:TRP:O	2.48	0.46
1:B:262:ILE:HD12	1:B:266:SER:OG	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:271:VAL:HG12	1:B:272:LYS:H	1.80	0.45
1:A:267:LEU:HA	1:A:285:THR:O	2.16	0.45
1:A:526:GLN:H	1:A:526:GLN:CD	2.24	0.45
1:B:494:LEU:HD13	1:B:515:PHE:CE1	2.51	0.45
1:B:479:TYR:O	1:B:480:ARG:HD3	2.16	0.45
1:A:314:MET:HE1	1:A:338:THR:CG2	2.47	0.45
1:B:523:THR:O	1:B:525:PRO:HD2	2.17	0.45
1:B:349:PHE:CE1	1:B:354:MET:HG3	2.51	0.44
1:B:360:LEU:HB3	1:B:361:PRO:HD3	1.98	0.44
1:B:341:MET:HG3	1:B:393:LEU:HB3	1.99	0.44
1:A:378:GLU:HG3	1:A:441:ILE:HG12	2.00	0.44
1:A:426:ILE:CD1	1:A:434:ALA:HB1	2.48	0.44
1:A:500:ARG:O	1:A:506:ARG:NH1	2.37	0.44
1:B:523:THR:C	1:B:525:PRO:HD2	2.42	0.44
1:A:346:LEU:HD21	1:A:455:LEU:HD21	2.00	0.43
1:B:339:GLU:OE1	1:B:401:LYS:NZ	2.44	0.43
1:A:426:ILE:CD1	1:A:434:ALA:CB	2.97	0.43
1:B:322:LEU:CD2	1:B:402:VAL:HB	2.46	0.43
1:B:258:ASP:OD2	1:B:260:TRP:HB2	2.19	0.42
1:A:522:SER:HB3	1:B:351:LYS:HE2	2.01	0.42
1:B:445:VAL:O	1:B:446:TRP:C	2.62	0.42
1:B:520:PHE:O	1:B:525:PRO:HA	2.20	0.42
1:B:271:VAL:CG1	1:B:272:LYS:N	2.82	0.41
1:A:269:LEU:HD23	1:A:282:TRP:CD2	2.55	0.41
1:A:444:ASP:O	1:A:445:VAL:C	2.64	0.41
1:A:358:LEU:HD23	1:A:358:LEU:HA	1.87	0.41
1:B:492:HIS:CE1	1:B:496:CYS:SG	3.14	0.41
1:B:280:GLU:HB3	1:B:282:TRP:NE1	2.37	0.41
1:B:366:MET:HE2	1:B:400:CYS:SG	2.61	0.41
1:A:370:ILE:HD13	1:A:392:ILE:HG13	2.02	0.40
1:A:518:ASP:CG	1:B:460:ARG:HH11	2.30	0.40
1:A:427:LYS:HD3	1:A:462:PRO:O	2.22	0.40
1:A:432:GLU:HG2	1:A:503:PRO:HG3	2.03	0.40
1:B:388:ARG:NH2	1:B:407:LEU:HD13	2.36	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	258/286 (90%)	238 (92%)	17 (7%)	3 (1%)	10	23
1	B	259/286 (91%)	237 (92%)	20 (8%)	2 (1%)	16	34
All	All	517/572 (90%)	475 (92%)	37 (7%)	5 (1%)	12	28

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	355	GLY
1	A	385	ARG
1	A	305	GLU
1	B	385	ARG
1	B	304	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	A	219/245 (89%)	197 (90%)	22 (10%)	7	16
1	B	219/245 (89%)	196 (90%)	23 (10%)	6	14
All	All	438/490 (89%)	393 (90%)	45 (10%)	7	15

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	273	LEU

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Mol	Chain	Res	Type
1	A	283	MET
1	A	291	ARG
1	A	292	VAL
1	A	302	MET
1	A	318	ARG
1	A	322	LEU
1	A	323	VAL
1	A	342	SER
1	A	343	LYS
1	A	350	LEU
1	A	351	LYS
1	A	356	LYS
1	A	360	LEU
1	A	401	LYS
1	A	432	GLU
1	A	453	THR
1	A	466	MET
1	A	493	ASP
1	A	501	LYS
1	A	506	ARG
1	A	524	GLU
1	B	261	GLU
1	B	277	CYS
1	B	283	MET
1	B	291	ARG
1	B	294	ILE
1	B	298	LYS
1	B	301	THR
1	B	309	GLN
1	B	322	LEU
1	B	332	GLU
1	B	343	LYS
1	B	345	CYS
1	B	350	LEU
1	B	351	LYS
1	B	360	LEU
1	B	364	VAL
1	B	407	LEU
1	B	426	ILE
1	B	438	ARG
1	B	469	ARG
1	B	475	VAL

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Mol	Chain	Res	Type
1	B	476	GLU
1	B	528	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	397	ASN
1	B	309	GLN
1	B	324	GLN
1	B	397	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

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	1BU	B	1	-	42,42,42	3.42	22 (52%)	59,61,61	2.62	20 (33%)
2	1BU	A	1	-	42,42,42	3.39	21 (50%)	59,61,61	2.40	18 (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	1BU	B	1	-	-	2/22/22/22	0/5/5/5
2	1BU	A	1	-	-	2/22/22/22	0/5/5/5

All (43) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1	1BU	NBK-NAV	-9.02	1.19	1.39
2	A	1	1BU	CBG-NBK	-8.35	1.28	1.36
2	A	1	1BU	NBK-NAV	-8.28	1.21	1.39
2	A	1	1BU	CBE-NBK	-7.64	1.29	1.43
2	B	1	1BU	CBE-NBK	-7.38	1.29	1.43
2	B	1	1BU	C6-C5	-6.80	1.36	1.44
2	B	1	1BU	CBG-NBK	-6.66	1.30	1.36
2	B	1	1BU	CBG-NAX	-6.10	1.30	1.39
2	A	1	1BU	C6-C5	-5.98	1.37	1.44
2	A	1	1BU	CAR-CBG	-5.63	1.30	1.37
2	B	1	1BU	CAR-CBF	-5.62	1.30	1.39
2	B	1	1BU	CAR-CBG	-5.47	1.30	1.37
2	A	1	1BU	CBG-NAX	-5.42	1.31	1.39
2	A	1	1BU	CAR-CBF	-5.21	1.31	1.39
2	B	1	1BU	CAZ-NAX	-4.62	1.29	1.39
2	A	1	1BU	CAZ-NAX	-4.49	1.29	1.39
2	B	1	1BU	C4-N3	-4.11	1.30	1.37
2	B	1	1BU	CBD-NAY	-3.89	1.32	1.40
2	A	1	1BU	C4-N3	-3.80	1.31	1.37
2	A	1	1BU	CBF-NAV	-3.65	1.28	1.34
2	A	1	1BU	CBC-NAW	-3.56	1.34	1.41
2	B	1	1BU	CAP-C4	-3.43	1.36	1.41
2	B	1	1BU	CBF-NAV	-3.34	1.29	1.34
2	A	1	1BU	C6-NAY	-3.21	1.31	1.36
2	B	1	1BU	C6-NAY	-3.16	1.31	1.36
2	B	1	1BU	C5-C4	-3.14	1.37	1.42
2	A	1	1BU	CAZ-NAW	-3.05	1.30	1.37
2	A	1	1BU	C5-C4	-3.00	1.37	1.42
2	A	1	1BU	CBD-NAY	-2.87	1.34	1.40
2	A	1	1BU	CAP-C4	-2.87	1.37	1.41
2	B	1	1BU	C2-N3	-2.78	1.27	1.32
2	B	1	1BU	CAS-C5	-2.75	1.36	1.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1	1BU	CBC-NAW	-2.73	1.36	1.41
2	A	1	1BU	C6-N1	-2.54	1.30	1.34
2	B	1	1BU	CAZ-NAW	-2.52	1.31	1.37
2	A	1	1BU	CAS-C5	-2.49	1.37	1.42
2	A	1	1BU	C2-N3	-2.49	1.28	1.32
2	A	1	1BU	C2-N1	-2.49	1.29	1.33
2	B	1	1BU	C2-N1	-2.43	1.29	1.33
2	B	1	1BU	OAF-CAZ	-2.35	1.18	1.23
2	A	1	1BU	CAQ-CBE	-2.17	1.35	1.39
2	B	1	1BU	CAQ-CBE	-2.13	1.35	1.39
2	B	1	1BU	C6-N1	-2.05	1.31	1.34

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1	1BU	C2-N1-C6	9.41	123.91	116.60
2	A	1	1BU	C2-N1-C6	9.07	123.64	116.60
2	B	1	1BU	C5-C6-N1	-7.07	116.12	121.35
2	A	1	1BU	C5-C6-N1	-6.25	116.72	121.35
2	B	1	1BU	N3-C2-N1	-5.53	121.16	128.67
2	A	1	1BU	N3-C2-N1	-5.31	121.46	128.67
2	A	1	1BU	C5-C6-NAY	4.61	124.43	119.77
2	B	1	1BU	NAX-CBG-NBK	4.59	127.85	120.11
2	B	1	1BU	CAS-C5-C6	-4.48	121.20	124.84
2	B	1	1BU	C6-C5-C4	4.41	118.47	115.86
2	A	1	1BU	CBF-NAV-NBK	4.32	107.89	104.27
2	B	1	1BU	CAR-CBG-NAX	-4.18	125.77	132.60
2	B	1	1BU	CBF-NAV-NBK	4.02	107.63	104.27
2	B	1	1BU	C2-N3-C4	3.89	119.86	115.43
2	A	1	1BU	NAX-CBG-NBK	3.88	126.66	120.11
2	B	1	1BU	CAD-CBL-CBF	3.83	116.14	109.63
2	A	1	1BU	C2-N3-C4	3.81	119.76	115.43
2	B	1	1BU	CAC-CBL-CBF	-3.65	103.41	109.63
2	A	1	1BU	C6-C5-C4	3.60	117.98	115.86
2	B	1	1BU	C5-C6-NAY	3.48	123.29	119.77
2	A	1	1BU	CAR-CBF-NAV	-3.38	107.87	111.86
2	A	1	1BU	CAR-CBG-NAX	-3.12	127.50	132.60
2	A	1	1BU	CAD-CBL-CBF	3.07	114.86	109.63
2	B	1	1BU	CAP-C4-C5	2.72	122.06	119.13
2	A	1	1BU	CAP-C4-C5	2.65	121.99	119.13
2	A	1	1BU	CAI-CBA-CAQ	2.61	121.80	117.96
2	A	1	1BU	CBE-CAQ-CBA	-2.60	117.34	120.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1	1BU	CAO-CAP-C4	-2.52	117.78	120.80
2	B	1	1BU	NAW-CAZ-NAX	2.44	119.51	114.22
2	B	1	1BU	CAK-CBC-CAL	-2.41	115.84	119.04
2	A	1	1BU	C5-C4-N3	-2.27	120.42	122.82
2	A	1	1BU	CBL-CBF-NAV	2.22	123.36	120.42
2	B	1	1BU	C5-C4-N3	-2.21	120.48	122.82
2	B	1	1BU	CAR-CBF-NAV	-2.16	109.31	111.86
2	B	1	1BU	CAA-CBA-CAQ	-2.13	118.03	120.92
2	A	1	1BU	CAR-CBG-NBK	-2.10	105.61	107.01
2	B	1	1BU	CAQ-CBE-NBK	2.04	122.22	119.27
2	A	1	1BU	CAK-CBC-CAL	-2.02	116.36	119.04

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1	1BU	CAM-CBD-NAY-C6
2	A	1	1BU	CAM-CBD-NAY-C6
2	A	1	1BU	CAN-CBD-NAY-C6
2	B	1	1BU	CAN-CBD-NAY-C6

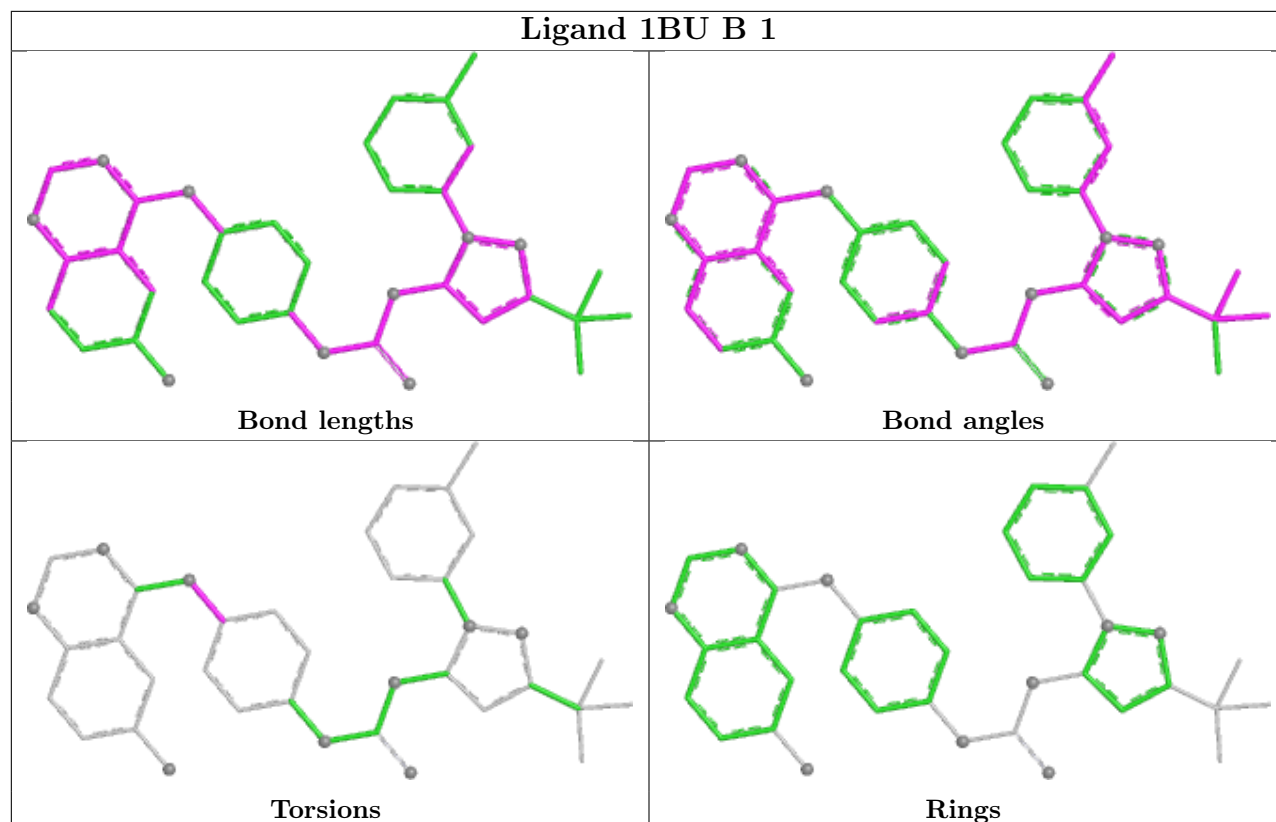
There are no ring outliers.

1 monomer is involved in 2 short contacts:

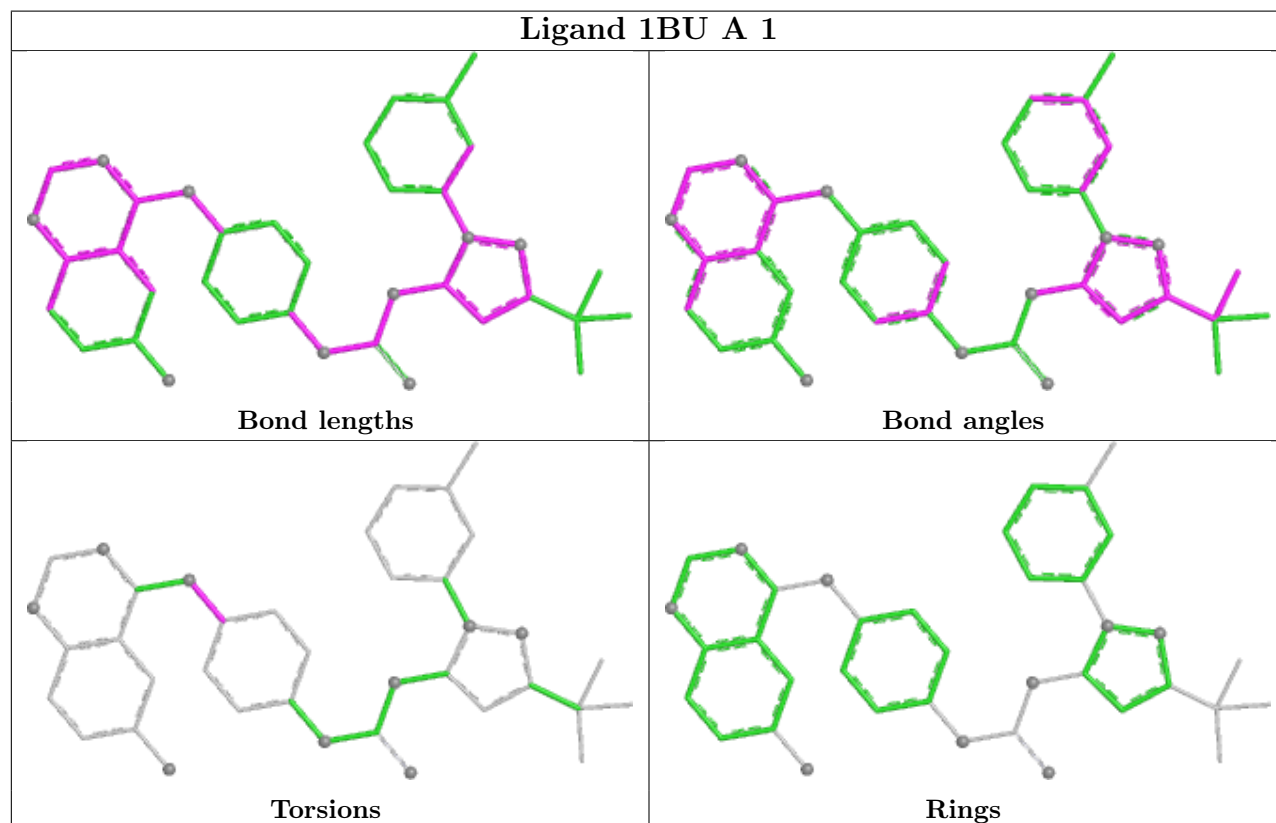
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1	1BU	2	0

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.

Ligand 1BU B 1



Ligand 1BU A 1



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

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

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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	261/286 (91%)	-0.14	3 (1%) 78 74	7, 21, 41, 55	1 (0%)
1	B	262/286 (91%)	-0.08	8 (3%) 51 45	4, 21, 53, 62	1 (0%)
All	All	523/572 (91%)	-0.11	11 (2%) 63 58	4, 21, 50, 62	2 (0%)

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	264[A]	ARG	3.5
1	B	277	CYS	2.7
1	B	256	ALA	2.4
1	A	277	CYS	2.4
1	B	273	LEU	2.3
1	B	333	PRO	2.2
1	A	276	GLY	2.2
1	B	424	PHE	2.1
1	B	425	PRO	2.1
1	B	300	GLY	2.0
1	B	283	MET	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](#)

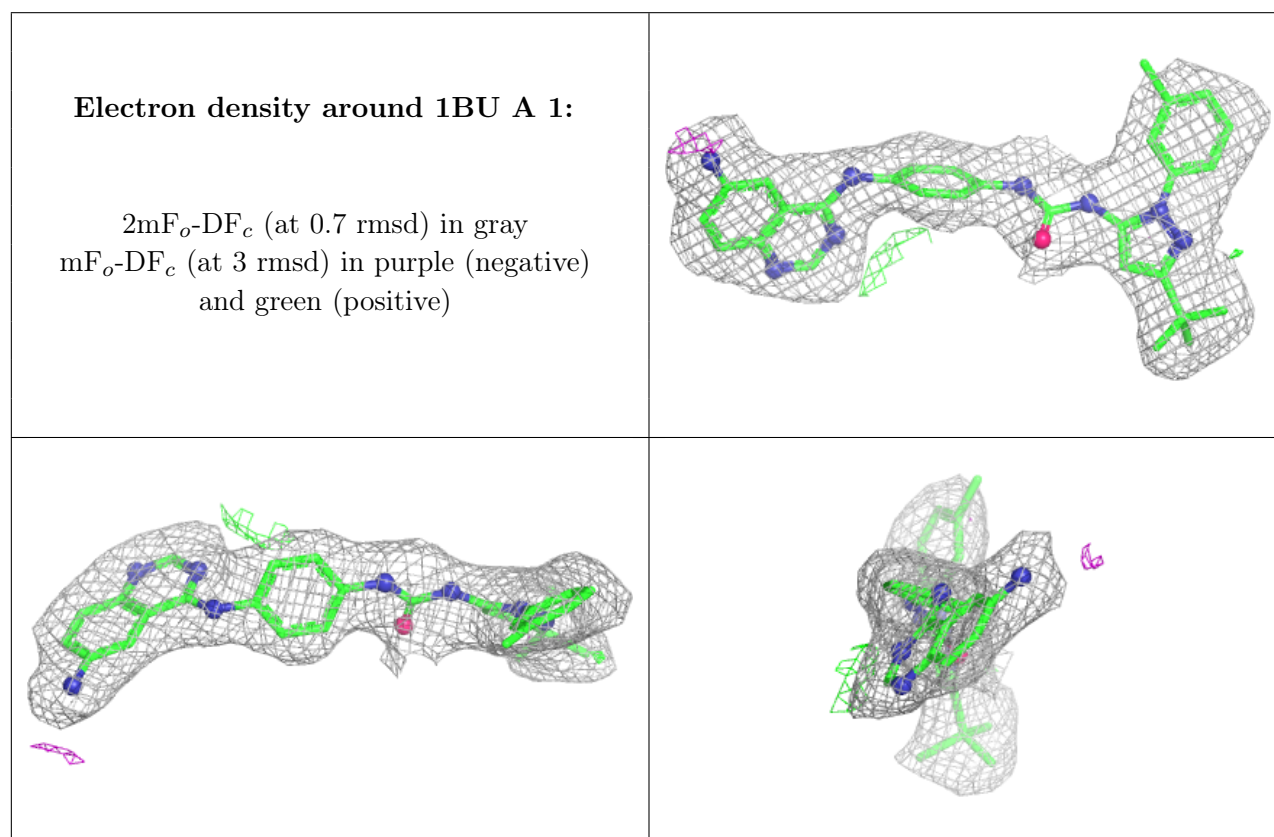
There are no oligosaccharides in this entry.

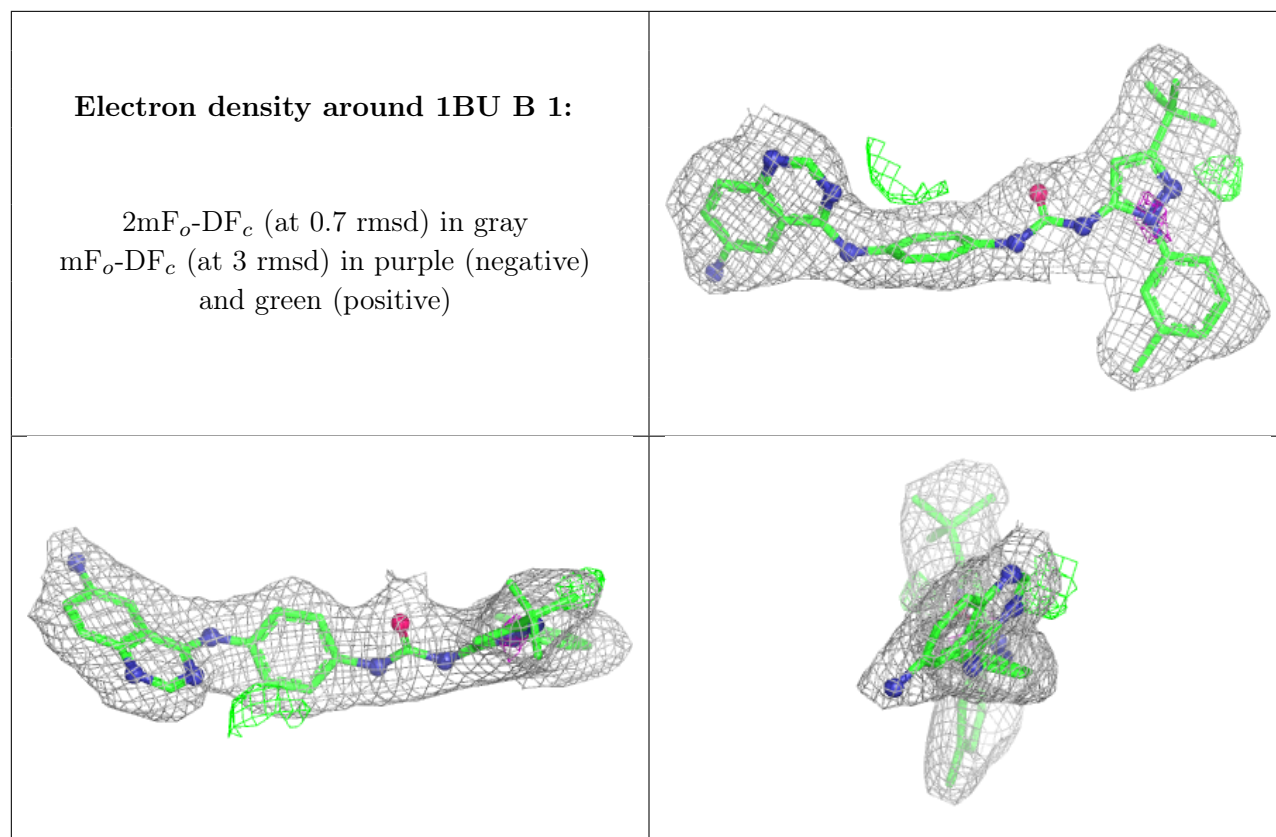
6.4 Ligands ⓘ

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(Å ²)	Q<0.9
2	1BU	A	1	38/38	0.91	0.09	19,24,27,29	0
2	1BU	B	1	38/38	0.93	0.08	18,21,23,25	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.