



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 11:46 AM UTC

PDB ID : 4OK5 / pdb_00004ok5
Title : Crystal Structure of Hepatitis C Virus NS3 Helicase Inhibitor Co-complex with Compound 9 [1-(3-ethynylbenzyl)-1H-indol-3-yl]acetic acid]
Authors : Padyana, A.K.
Deposited on : 2014-01-21
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

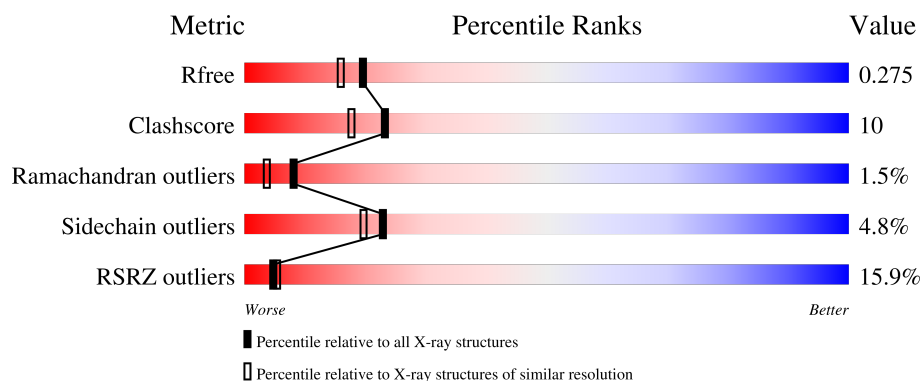
1 Overall quality at a glance

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	464	19% 72% 19% • • 5%
1	B	464	11% 76% 13% • 9%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6757 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 Serine protease NS3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	441	Total	C	N	O	S	0	3	0
			3340	2115	563	638	24			
1	B	420	Total	C	N	O	S	0	2	0
			3178	2017	533	604	24			

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	167	MET	-	expression tag	UNP K4KA16
A	168	GLY	-	expression tag	UNP K4KA16
A	169	SER	-	expression tag	UNP K4KA16
A	170	SER	-	expression tag	UNP K4KA16
A	171	HIS	-	expression tag	UNP K4KA16
A	172	HIS	-	expression tag	UNP K4KA16
A	173	HIS	-	expression tag	UNP K4KA16
A	174	HIS	-	expression tag	UNP K4KA16
A	175	HIS	-	expression tag	UNP K4KA16
A	176	HIS	-	expression tag	UNP K4KA16
A	177	SER	-	expression tag	UNP K4KA16
A	178	SER	-	expression tag	UNP K4KA16
A	179	GLY	-	expression tag	UNP K4KA16
A	403	ASN	SER	conflict	UNP K4KA16
A	505	MET	THR	conflict	UNP K4KA16
B	167	MET	-	expression tag	UNP K4KA16
B	168	GLY	-	expression tag	UNP K4KA16
B	169	SER	-	expression tag	UNP K4KA16
B	170	SER	-	expression tag	UNP K4KA16
B	171	HIS	-	expression tag	UNP K4KA16
B	172	HIS	-	expression tag	UNP K4KA16
B	173	HIS	-	expression tag	UNP K4KA16
B	174	HIS	-	expression tag	UNP K4KA16
B	175	HIS	-	expression tag	UNP K4KA16
B	176	HIS	-	expression tag	UNP K4KA16

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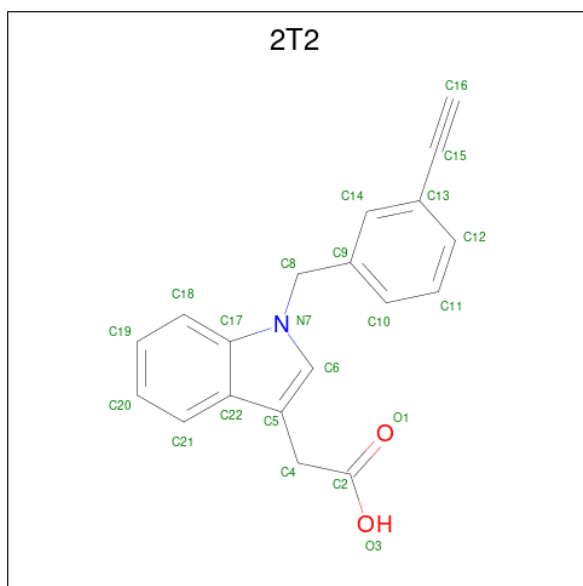
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Chain	Residue	Modelled	Actual	Comment	Reference
B	177	SER	-	expression tag	UNP K4KA16
B	178	SER	-	expression tag	UNP K4KA16
B	179	GLY	-	expression tag	UNP K4KA16
B	403	ASN	SER	conflict	UNP K4KA16
B	505	MET	THR	conflict	UNP K4KA16

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

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

- Molecule 3 is [1-(3-ethynylbenzyl)-1H-indol-3-yl]acetic acid (CCD ID: 2T2) (formula: C₁₉H₁₅NO₂).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 22 19 1 2	0	0

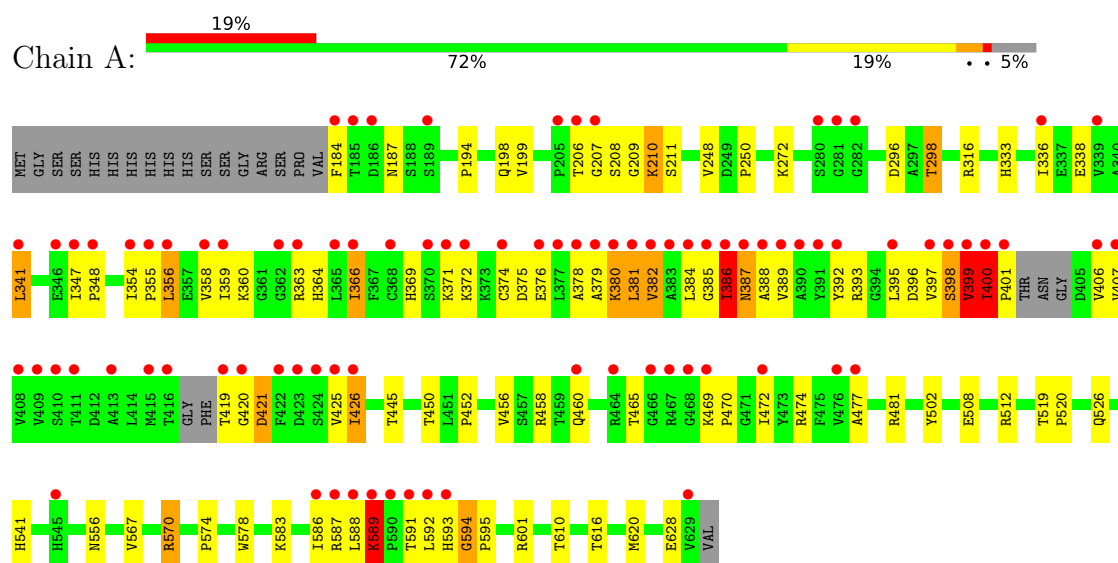
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	103	Total O 103 103	0	0
4	B	112	Total O 112 112	0	0

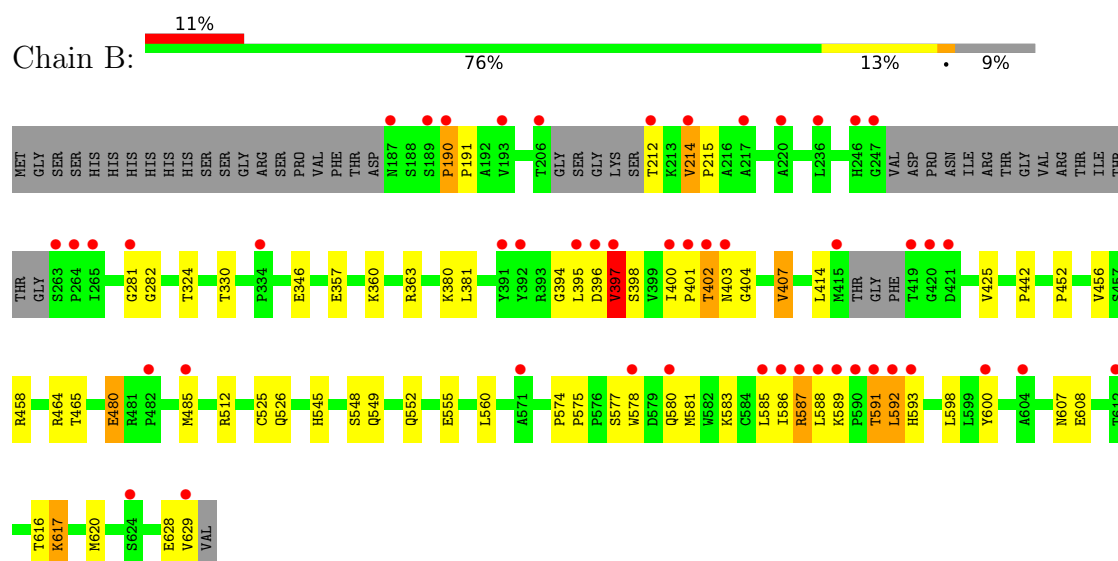
3 Residue-property plots

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: Serine protease NS3



• Molecule 1: Serine protease NS3



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	81.80Å 103.89Å 118.47Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	41.12 – 2.15 41.12 – 2.15	Depositor EDS
% Data completeness (in resolution range)	99.4 (41.12-2.15) 96.2 (41.12-2.15)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.21 (at 2.16Å)	Xtriage
Refinement program	PHENIX 1.8.4_1496	Depositor
R, R_{free}	0.210 , 0.272 0.219 , 0.275	Depositor DCC
R_{free} test set	2806 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	46.5	Xtriage
Anisotropy	0.234	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 40.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6757	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.05% 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: CA, 2T2

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	0.64	2/3419 (0.1%)	0.97	12/4670 (0.3%)
1	B	0.58	0/3254	0.91	3/4443 (0.1%)
All	All	0.61	2/6673 (0.0%)	0.94	15/9113 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	4

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	386	ILE	CA-CB	10.30	1.68	1.54
1	A	399	VAL	CA-CB	5.54	1.61	1.54

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	386	ILE	N-CA-C	7.44	124.82	109.34
1	A	400	ILE	N-CA-C	7.43	124.93	108.88
1	A	386	ILE	CA-CB-CG2	6.45	121.47	110.50
1	B	397	VAL	N-CA-C	6.16	122.14	109.34
1	A	460	GLN	CA-CB-CG	5.90	125.90	114.10
1	A	594	GLY	CA-C-N	5.86	125.82	119.78
1	A	594	GLY	C-N-CA	5.86	125.82	119.78
1	A	589	LYS	CA-C-N	-5.79	112.60	119.84
1	A	589	LYS	C-N-CA	-5.79	112.60	119.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	190	PRO	CA-C-N	5.50	125.43	119.76
1	B	190	PRO	C-N-CA	5.50	125.43	119.76
1	A	628	GLU	N-CA-C	5.45	118.29	109.79
1	A	381	LEU	CA-C-N	-5.08	112.83	121.97
1	A	381	LEU	C-N-CA	-5.08	112.83	121.97
1	A	556	ASN	N-CA-C	5.06	116.88	111.36

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	382	VAL	Peptide
1	A	386	ILE	Peptide
1	A	399	VAL	Peptide
1	A	400	ILE	Peptide

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	3340	0	3295	94	0
1	B	3178	0	3131	47	0
2	A	2	0	0	0	0
3	A	22	0	14	1	0
4	A	103	0	0	3	0
4	B	112	0	0	1	0
All	All	6757	0	6440	134	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 10.

All (134) 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:B:560:LEU:O	1:B:600:TYR:OH	1.85	0.94

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:616:THR:HG22	1:B:620:MET:HE2	1.55	0.88
1:A:382:VAL:HB	1:A:386:ILE:HD12	1.56	0.87
1:A:363:ARG:NH2	1:A:421:ASP:O	2.13	0.81
1:A:396:ASP:OD1	1:A:397:VAL:N	2.14	0.81
1:A:386:ILE:HG12	1:A:388:ALA:HB3	1.67	0.77
1:A:381:LEU:HD22	1:A:384:LEU:HD22	1.66	0.77
1:B:585:LEU:O	1:B:587:ARG:N	2.17	0.77
1:B:591:THR:O	1:B:593:HIS:N	2.19	0.75
1:B:363:ARG:NH2	1:B:400:ILE:O	2.23	0.72
1:A:616:THR:HG22	1:A:620:MET:HE2	1.77	0.67
1:A:363:ARG:NH2	1:A:420:GLY:O	2.28	0.66
1:A:400:ILE:HG12	1:A:400:ILE:O	1.96	0.66
1:B:607:ASN:OD1	1:B:608:GLU:N	2.29	0.66
1:A:387:ASN:HD22	1:A:400:ILE:HD12	1.60	0.65
1:B:396:ASP:O	1:B:398:SER:N	2.26	0.65
1:A:387:ASN:ND2	1:A:400:ILE:HD12	2.12	0.65
1:A:372:LYS:HE3	1:A:376:GLU:HG3	1.80	0.64
1:B:574:PRO:HG2	1:B:607:ASN:HD21	1.64	0.63
1:B:401:PRO:C	1:B:403:ASN:H	2.06	0.62
1:A:379:ALA:C	1:A:381:LEU:H	2.09	0.61
1:A:347:ILE:HB	1:A:354:ILE:HB	1.81	0.61
1:A:382:VAL:HB	1:A:386:ILE:CD1	2.28	0.61
1:A:363:ARG:HH11	1:A:401:PRO:HA	1.67	0.60
1:B:575:PRO:HG3	1:B:585:LEU:HD12	1.83	0.59
1:A:371:LYS:HD3	1:A:392:TYR:CD2	2.38	0.59
1:A:591:THR:O	1:A:591:THR:OG1	2.15	0.58
1:A:363:ARG:NH1	1:A:400:ILE:HG23	2.19	0.58
1:B:617:LYS:HA	1:B:620:MET:HE3	1.86	0.58
1:A:386:ILE:HG23	1:A:387:ASN:N	2.18	0.58
1:A:400:ILE:HG21	1:A:406:VAL:HB	1.86	0.58
1:B:574:PRO:HG2	1:B:607:ASN:ND2	2.18	0.57
1:A:379:ALA:O	1:A:381:LEU:N	2.37	0.56
1:B:403:ASN:OD1	1:B:404:GLY:N	2.38	0.56
1:A:363:ARG:NH1	1:A:401:PRO:HA	2.21	0.55
1:B:578:TRP:CZ2	1:B:588:LEU:HG	2.41	0.55
1:A:356:LEU:HD11	1:A:384:LEU:HD11	1.87	0.55
1:B:589:LYS:HA	1:B:592:LEU:HD23	1.89	0.55
1:A:296:ASP:OD2	1:A:298:THR:HG22	2.06	0.55
1:A:541:HIS:O	1:A:570:ARG:NH2	2.39	0.54
1:A:206:THR:HA	1:A:210:LYS:HD3	1.89	0.54
1:A:356:LEU:HD21	1:A:384:LEU:HD12	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:330:THR:HG21	1:B:458:ARG:HB3	1.90	0.54
1:A:450:THR:O	1:B:526:GLN:NE2	2.41	0.53
1:A:469:LYS:HD2	1:A:469:LYS:C	2.33	0.53
1:A:616:THR:O	1:A:620:MET:HG3	2.08	0.53
1:B:425:VAL:HG23	1:B:465:THR:HB	1.90	0.53
1:B:396:ASP:CG	1:B:397:VAL:HG23	2.35	0.52
1:B:401:PRO:O	1:B:403:ASN:N	2.38	0.52
1:A:395:LEU:HD23	1:A:396:ASP:N	2.25	0.51
1:A:187:ASN:OD1	4:A:1201:HOH:O	2.18	0.51
1:A:272:LYS:NZ	4:A:1173:HOH:O	2.33	0.51
1:B:575:PRO:HB2	1:B:577:SER:O	2.10	0.51
1:A:381:LEU:O	1:A:384:LEU:HB3	2.11	0.51
1:A:588:LEU:HD12	1:A:589:LYS:N	2.25	0.51
1:B:363:ARG:HD2	1:B:403:ASN:CG	2.35	0.51
1:A:341:LEU:HD13	1:A:474:ARG:HB3	1.92	0.51
1:A:360:LYS:NZ	1:A:384:LEU:O	2.43	0.51
1:A:382:VAL:CB	1:A:386:ILE:HD12	2.37	0.51
1:A:358:VAL:HG23	1:A:359:ILE:HG23	1.93	0.50
1:A:386:ILE:CG1	1:A:388:ALA:HB3	2.39	0.50
1:B:212:THR:C	1:B:215:PRO:HD2	2.36	0.50
1:A:502:TYR:OH	3:A:1003:2T2:H11	2.12	0.50
1:A:369:HIS:HE1	1:B:629:VAL:CG2	2.25	0.50
1:A:372:LYS:NZ	1:A:375:ASP:HB2	2.27	0.49
1:A:386:ILE:CG2	1:A:387:ASN:N	2.75	0.49
1:A:371:LYS:HD2	1:A:371:LYS:C	2.38	0.49
1:A:363:ARG:HH11	1:A:400:ILE:HG23	1.76	0.48
1:A:248:VAL:O	1:A:250:PRO:HD3	2.13	0.48
1:B:616:THR:O	1:B:620:MET:HG3	2.14	0.48
1:A:382:VAL:HA	1:A:384:LEU:HB3	1.96	0.48
1:A:348:PRO:HG2	1:A:380:LYS:NZ	2.29	0.48
1:A:333:HIS:HB3	1:A:336:ILE:HB	1.96	0.48
1:B:545:HIS:O	1:B:549:GLN:HG3	2.14	0.47
1:A:356:LEU:HG	1:A:360:LYS:HE2	1.95	0.47
1:A:382:VAL:C	1:A:384:LEU:N	2.72	0.47
1:A:616:THR:HG22	1:A:620:MET:CE	2.44	0.47
1:A:372:LYS:HE3	1:A:376:GLU:CG	2.44	0.47
1:A:379:ALA:C	1:A:381:LEU:N	2.73	0.47
1:A:481:ARG:HD3	1:B:485:MET:SD	2.55	0.47
1:A:356:LEU:HD12	1:A:356:LEU:HA	1.54	0.46
1:B:360:LYS:O	1:B:360:LYS:HG3	2.14	0.46
1:A:592:LEU:O	1:A:594:GLY:N	2.49	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:330:THR:HG23	1:B:480:GLU:OE1	2.15	0.46
1:B:442:PRO:HD3	1:B:598:LEU:HD23	1.98	0.46
1:A:194:PRO:HG3	1:A:198:GLN:HB3	1.98	0.46
1:A:578:TRP:CH2	1:A:588:LEU:HB3	2.51	0.46
1:A:384:LEU:HG	1:A:385:GLY:N	2.32	0.45
1:A:469:LYS:HD2	1:A:470:PRO:N	2.31	0.45
1:B:394:GLY:C	1:B:395:LEU:HD22	2.41	0.45
1:A:376:GLU:O	1:A:380:LYS:HB2	2.17	0.45
1:B:214:VAL:HG22	1:B:215:PRO:HD3	1.99	0.45
1:B:381:LEU:HD13	1:B:407:VAL:HG21	1.99	0.44
1:A:369:HIS:NE2	1:B:628:GLU:HG3	2.33	0.44
1:A:356:LEU:HD11	1:A:384:LEU:CD1	2.48	0.44
1:A:371:LYS:HD3	1:A:392:TYR:CE2	2.52	0.44
1:B:324:THR:HG21	1:B:456:VAL:HG12	1.99	0.44
1:A:355:PRO:O	1:A:358:VAL:HG22	2.18	0.44
1:A:356:LEU:HD21	1:A:384:LEU:CD1	2.46	0.44
1:A:458:ARG:NH2	1:A:477:ALA:O	2.51	0.43
1:A:366:ILE:HG23	1:A:426:ILE:HG23	1.99	0.43
1:B:357:GLU:H	1:B:357:GLU:HG3	1.50	0.43
1:A:583:LYS:O	1:A:586:ILE:HB	2.18	0.43
1:A:369:HIS:HE1	1:B:629:VAL:HG21	1.82	0.43
1:B:587:ARG:HD3	1:B:587:ARG:HA	1.86	0.43
1:A:364:HIS:HB2	1:A:407:VAL:HG22	2.00	0.43
1:B:401:PRO:C	1:B:403:ASN:N	2.72	0.43
1:A:399:VAL:CG1	1:A:399:VAL:O	2.66	0.42
1:A:445:THR:HG23	1:A:601:ARG:HB2	2.01	0.42
1:B:525[A]:CYS:SG	1:B:526:GLN:N	2.92	0.42
1:A:395:LEU:HD23	1:A:396:ASP:C	2.45	0.42
1:A:371:LYS:O	1:A:374:CYS:HB2	2.19	0.42
1:A:588:LEU:HD13	1:A:592:LEU:HD21	2.01	0.42
1:A:207:GLY:C	1:A:209:GLY:H	2.28	0.42
1:A:184:PHE:HA	1:A:199:VAL:O	2.19	0.42
1:A:395:LEU:HD21	1:A:398:SER:OG	2.20	0.42
1:A:526:GLN:HG2	1:B:452:PRO:HD3	2.02	0.42
1:A:519:THR:HA	1:A:520:PRO:HD3	1.86	0.41
1:A:375:ASP:O	1:A:378:ALA:N	2.53	0.41
1:B:555:GLU:OE2	1:B:581:MET:HA	2.20	0.41
1:A:425:VAL:HG23	1:A:465:THR:HB	2.02	0.41
1:A:452:PRO:HD3	1:B:526:GLN:HG2	2.03	0.41
1:A:372:LYS:HZ2	1:A:375:ASP:HB2	1.85	0.41
1:A:512:ARG:HD2	4:A:1164:HOH:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:414:LEU:O	1:B:464:ARG:NH1	2.48	0.41
1:A:574:PRO:HG3	1:A:592:LEU:HA	2.03	0.41
1:B:548:SER:O	1:B:552:GLN:HB2	2.21	0.41
1:A:386:ILE:HG23	1:A:387:ASN:CA	2.51	0.41
1:A:426:ILE:HD12	1:A:474:ARG:O	2.20	0.41
1:B:512:ARG:HD2	4:B:786:HOH:O	2.20	0.41
1:B:190:PRO:HA	1:B:191:PRO:HD3	1.75	0.41
1:A:400:ILE:HG21	1:A:406:VAL:CB	2.49	0.40
1:A:594:GLY:HA3	1:A:595:PRO:HD3	1.85	0.40
1:A:381:LEU:C	1:A:384:LEU:HB3	2.47	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	438/464 (94%)	406 (93%)	25 (6%)	7 (2%)	7	3
1	B	414/464 (89%)	391 (94%)	17 (4%)	6 (1%)	9	4
All	All	852/928 (92%)	797 (94%)	42 (5%)	13 (2%)	8	4

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	380	LYS
1	A	386	ILE
1	A	400	ILE
1	B	397	VAL
1	B	592	LEU
1	A	387	ASN
1	A	421	ASP
1	B	281	GLY

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Mol	Chain	Res	Type
1	B	402	THR
1	B	586	ILE
1	A	593	HIS
1	A	208	SER
1	B	282	GLY

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	366/382 (96%)	343 (94%)	23 (6%)	16	11
1	B	347/382 (91%)	336 (97%)	11 (3%)	34	36
All	All	713/764 (93%)	679 (95%)	34 (5%)	23	20

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	210	LYS
1	A	211	SER
1	A	298	THR
1	A	316	ARG
1	A	338	GLU
1	A	341	LEU
1	A	356	LEU
1	A	366	ILE
1	A	386	ILE
1	A	389	VAL
1	A	393	ARG
1	A	398	SER
1	A	399	VAL
1	A	419	THR
1	A	426	ILE
1	A	456	VAL
1	A	472	ILE
1	A	508	GLU

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Mol	Chain	Res	Type
1	A	567	VAL
1	A	570	ARG
1	A	587	ARG
1	A	589	LYS
1	A	610	THR
1	B	214	VAL
1	B	346	GLU
1	B	380	LYS
1	B	402	THR
1	B	407	VAL
1	B	480	GLU
1	B	580	GLN
1	B	583	LYS
1	B	587	ARG
1	B	591	THR
1	B	617	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	246	HIS
1	A	369	HIS
1	A	526	GLN
1	A	607	ASN
1	B	229	ASN
1	B	246	HIS
1	B	593	HIS

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

Of 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	2T2	A	1003	-	24,24,24	1.18	3 (12%)	33,33,33	1.39	5 (15%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	2T2	A	1003	-	-	2/10/10/10	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1003	2T2	O1-C2	3.48	1.33	1.22
3	A	1003	2T2	O3-C2	-2.95	1.21	1.30
3	A	1003	2T2	C22-C5	2.14	1.47	1.44

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1003	2T2	C2-C4-C5	-4.26	108.39	114.93
3	A	1003	2T2	C9-C8-N7	2.72	116.92	112.78
3	A	1003	2T2	C8-N7-C17	-2.48	122.56	126.13
3	A	1003	2T2	C17-N7-C6	2.17	109.78	108.49
3	A	1003	2T2	O3-C2-C4	2.13	121.11	114.51

There are no chirality outliers.

All (2) torsion outliers are listed below:

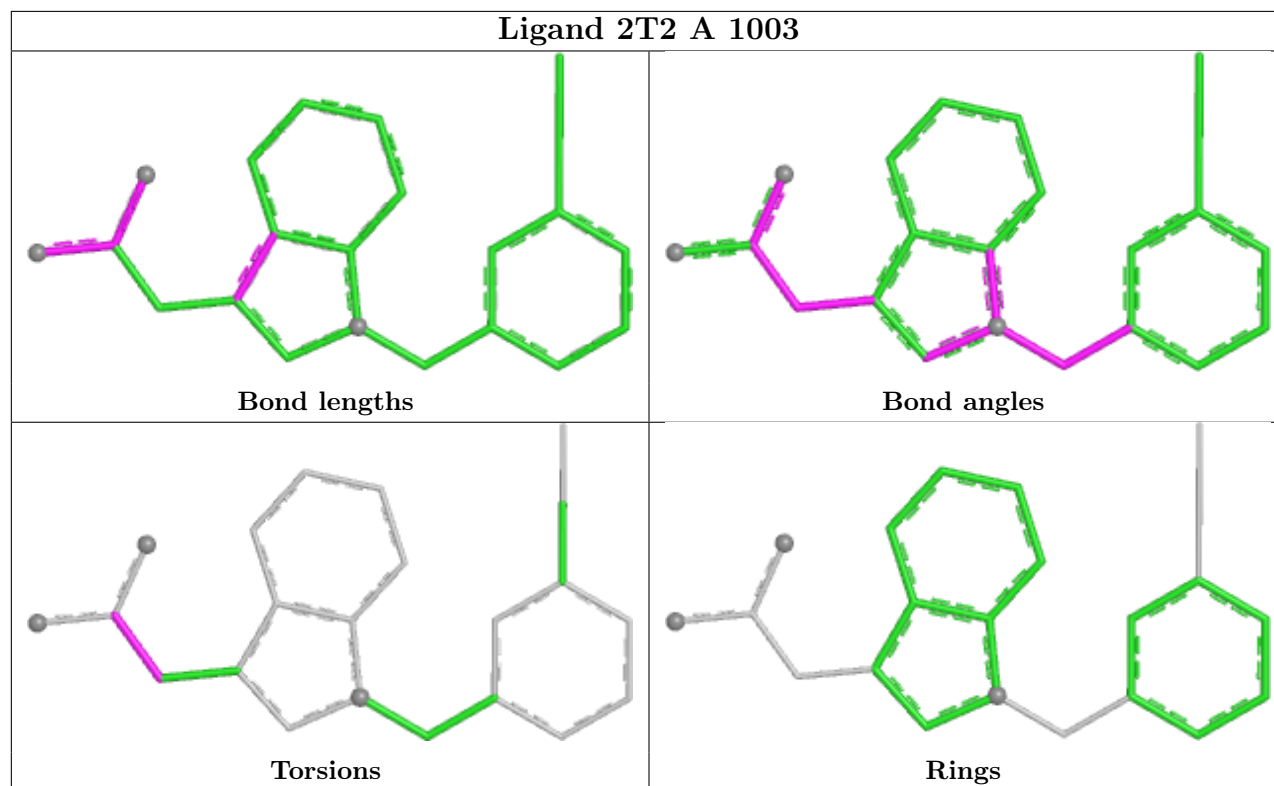
Mol	Chain	Res	Type	Atoms
3	A	1003	2T2	O3-C2-C4-C5
3	A	1003	2T2	O1-C2-C4-C5

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1003	2T2	1	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	441/464 (95%)	0.97	88 (19%) 3 3	21, 53, 97, 111	3 (0%)
1	B	420/464 (90%)	0.69	49 (11%) 9 10	23, 52, 85, 100	2 (0%)
All	All	861/928 (92%)	0.83	137 (15%) 5 5	21, 53, 93, 111	5 (0%)

All (137) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	384	LEU	5.8
1	A	592	LEU	5.5
1	A	392	TYR	5.4
1	A	389	VAL	5.0
1	A	629	VAL	4.9
1	B	592	LEU	4.9
1	B	247	GLY	4.9
1	A	381	LEU	4.8
1	A	184	PHE	4.5
1	A	206	THR	4.5
1	A	591	THR	4.5
1	A	399	VAL	4.5
1	A	382	VAL	4.4
1	A	377	LEU	4.4
1	A	390	ALA	4.3
1	A	419	THR	4.3
1	A	593	HIS	4.3
1	B	629	VAL	4.2
1	A	397	VAL	4.2
1	A	407	VAL	4.1
1	A	385	GLY	4.1
1	A	386	ILE	4.1
1	A	282	GLY	4.0
1	B	397	VAL	3.9

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Mol	Chain	Res	Type	RSRZ
1	A	401	PRO	3.9
1	A	406	VAL	3.8
1	A	383	ALA	3.8
1	A	588	LEU	3.7
1	B	403	ASN	3.7
1	A	359	ILE	3.7
1	A	378	ALA	3.6
1	B	264	PRO	3.5
1	A	365	LEU	3.5
1	B	400	ILE	3.5
1	A	408	VAL	3.5
1	A	185	THR	3.5
1	A	391	TYR	3.4
1	B	246	HIS	3.4
1	A	356	LEU	3.4
1	A	363	ARG	3.3
1	A	425	VAL	3.3
1	A	426	ILE	3.3
1	B	220	ALA	3.3
1	A	395	LEU	3.2
1	B	586	ILE	3.2
1	B	578	TRP	3.1
1	A	336	ILE	3.1
1	A	400	ILE	3.1
1	B	206	THR	3.1
1	B	591	THR	3.1
1	A	388	ALA	3.1
1	A	387	ASN	3.0
1	B	588	LEU	3.0
1	B	590	PRO	3.0
1	A	409	VAL	3.0
1	B	214	VAL	3.0
1	A	423	ASP	2.9
1	B	401	PRO	2.9
1	B	419	THR	2.9
1	B	415	MET	2.8
1	B	402	THR	2.8
1	A	207	GLY	2.8
1	A	476	VAL	2.8
1	A	422	PHE	2.8
1	A	379	ALA	2.8
1	A	477	ALA	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	416	THR	2.8
1	A	469	LYS	2.8
1	A	368	CYS	2.8
1	A	371	LYS	2.7
1	A	354	ILE	2.7
1	A	366	ILE	2.7
1	A	472	ILE	2.7
1	B	189	SER	2.7
1	A	586	ILE	2.6
1	A	410	SER	2.6
1	A	374	CYS	2.6
1	A	589	LYS	2.6
1	A	587	ARG	2.6
1	A	346	GLU	2.5
1	A	347	ILE	2.5
1	A	466	GLY	2.5
1	B	571	ALA	2.5
1	B	193	VAL	2.5
1	A	189	SER	2.5
1	A	362	GLY	2.5
1	A	372	LYS	2.5
1	A	280	SER	2.5
1	A	341	LEU	2.5
1	B	212	THR	2.4
1	A	413	ALA	2.4
1	B	236	LEU	2.4
1	A	420	GLY	2.4
1	B	187	ASN	2.4
1	A	358	VAL	2.4
1	A	370	SER	2.4
1	B	395	LEU	2.3
1	A	468	GLY	2.3
1	B	281	GLY	2.3
1	B	396	ASP	2.3
1	B	421	ASP	2.3
1	A	590	PRO	2.3
1	B	334	PRO	2.3
1	B	593	HIS	2.3
1	A	186	ASP	2.3
1	A	464	ARG	2.3
1	B	612	THR	2.3
1	A	424	SER	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	604	ALA	2.2
1	B	585	LEU	2.2
1	B	391	TYR	2.2
1	A	411	THR	2.2
1	A	376	GLU	2.2
1	A	348	PRO	2.2
1	A	415	MET	2.2
1	B	190	PRO	2.2
1	B	265	ILE	2.2
1	A	339	VAL	2.1
1	A	281	GLY	2.1
1	A	545	HIS	2.1
1	A	467	ARG	2.1
1	B	624	SER	2.1
1	A	380	LYS	2.1
1	B	589	LYS	2.1
1	B	392	TYR	2.1
1	B	485	MET	2.1
1	B	482	PRO	2.1
1	A	398	SER	2.1
1	B	263	SER	2.1
1	A	205	PRO	2.1
1	A	460	GLN	2.1
1	A	355	PRO	2.1
1	B	217	ALA	2.1
1	B	587	ARG	2.0
1	B	580	GLN	2.0
1	B	420	GLY	2.0
1	B	600	TYR	2.0

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

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

6.3 Carbohydrates ⓘ

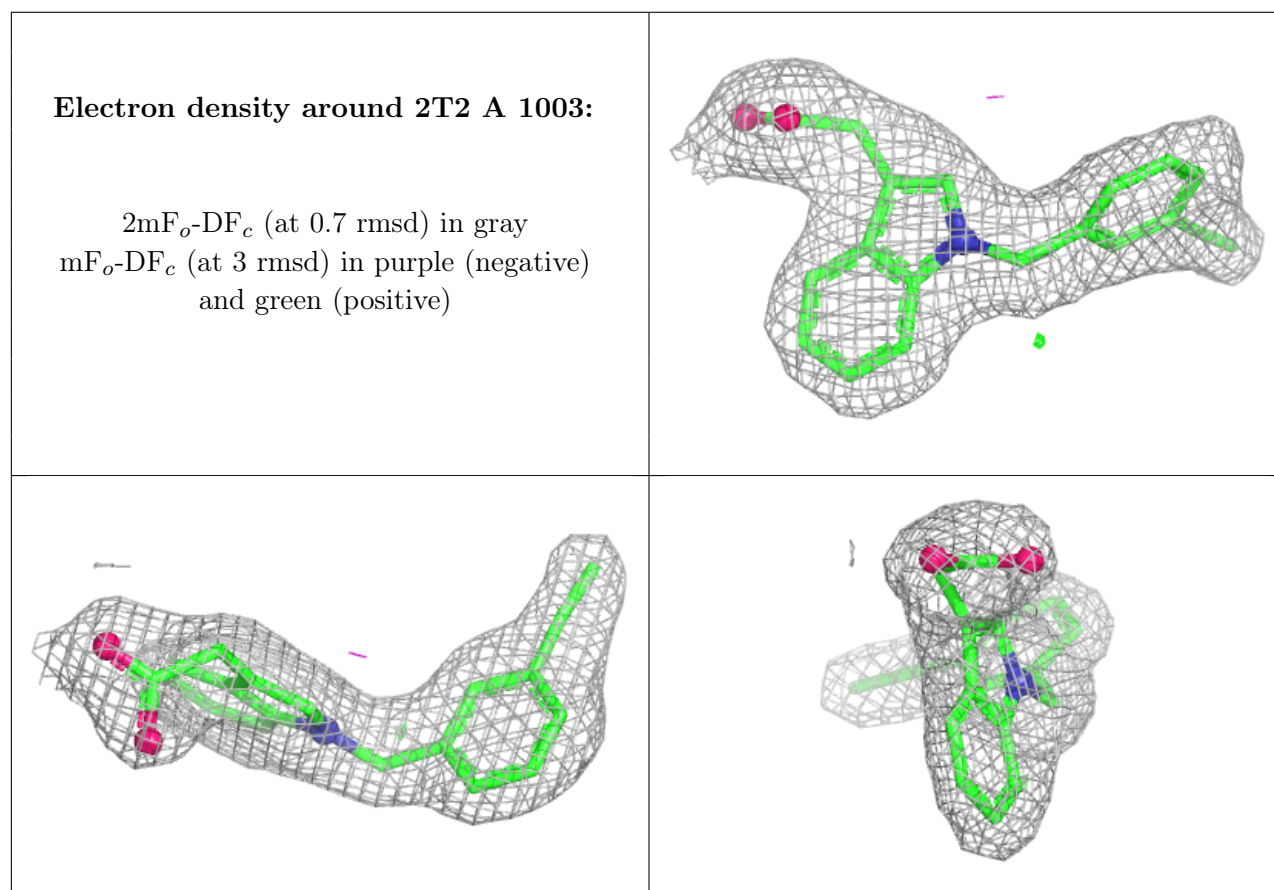
There are no oligosaccharides in this entry.

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	2T2	A	1003	22/22	0.94	0.09	31,42,48,54	0
2	CA	A	1002	1/1	0.96	0.06	64,64,64,64	0
2	CA	A	1001	1/1	0.99	0.04	64,64,64,64	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.