Full wwPDB X-ray Structure Validation Report ⓘ

Oct 30, 2023 – 05:20 PM EDT

PDB ID	:	8U6N
Title	:	Crystal Structure of HIV-1 Reverse Transcriptase in Complex with 3-(2-((6-cyanonaphthalen-1-yl)oxy)phenoxy)-N,N-dimethylpropanamide (JLJ752), a non-nucleoside inhibitor
Authors	:	Prucha, G.; Henry, S.; Jorgensen, W.L.; Anderson, K.S.
Deposited on	:	2023-09-13
Resolution	:	2.74 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:

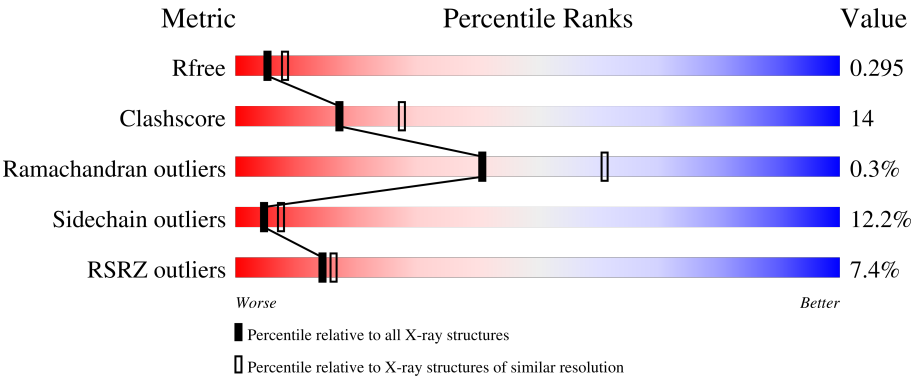
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.74 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	1271 (2.76-2.72)
Clashscore	141614	1322 (2.76-2.72)
Ramachandran outliers	138981	1297 (2.76-2.72)
Sidechain outliers	138945	1298 (2.76-2.72)
RSRZ outliers	127900	1243 (2.76-2.72)

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 <=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	539	8% 63% 30%
2	B	428	5% 69% 23% 6%

2 Entry composition (i)

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 Gag-Pol polyprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	521	Total	C	N	O	S	0	0	0
			3724	2390	636	691	7			

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	expression tag	UNP P03366
A	0	VAL	-	expression tag	UNP P03366
A	172	ALA	LYS	engineered mutation	UNP P03366
A	173	ALA	LYS	engineered mutation	UNP P03366
A	280	SER	CYS	engineered mutation	UNP P03366

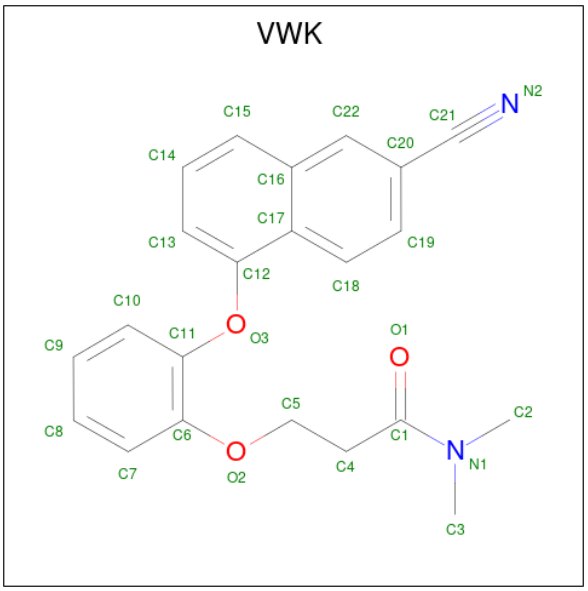
- Molecule 2 is a protein called p51 RT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	401	Total	C	N	O	S	0	0	0
			2998	1940	494	559	5			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	280	SER	CYS	engineered mutation	UNP P03366

- Molecule 3 is 3-{2-[(6-cyanonaphthalen-1-yl)oxy]phenoxy}-N,N-dimethylpropanamide (three-letter code: VWK) (formula: $C_{22}H_{20}N_2O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 27 22 2 3	0	0

- Molecule 4 is water.

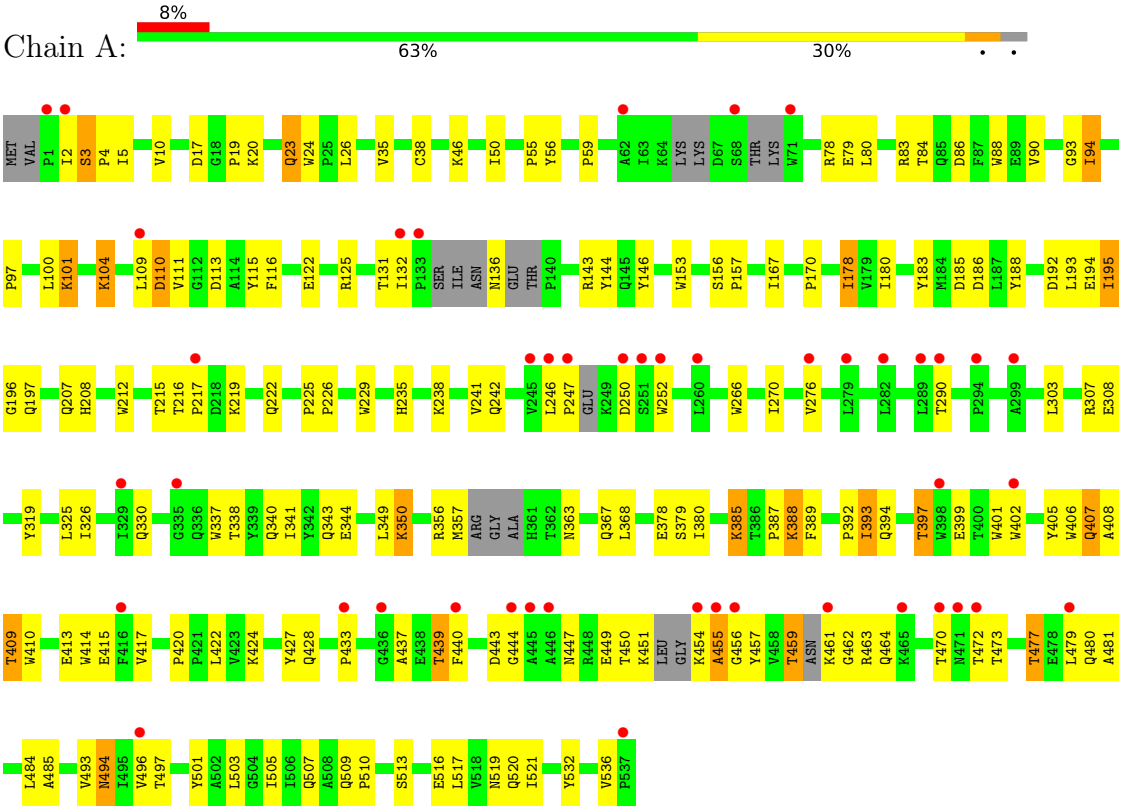
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	4	Total O 4 4	0	0
4	B	4	Total O 4 4	0	0

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.

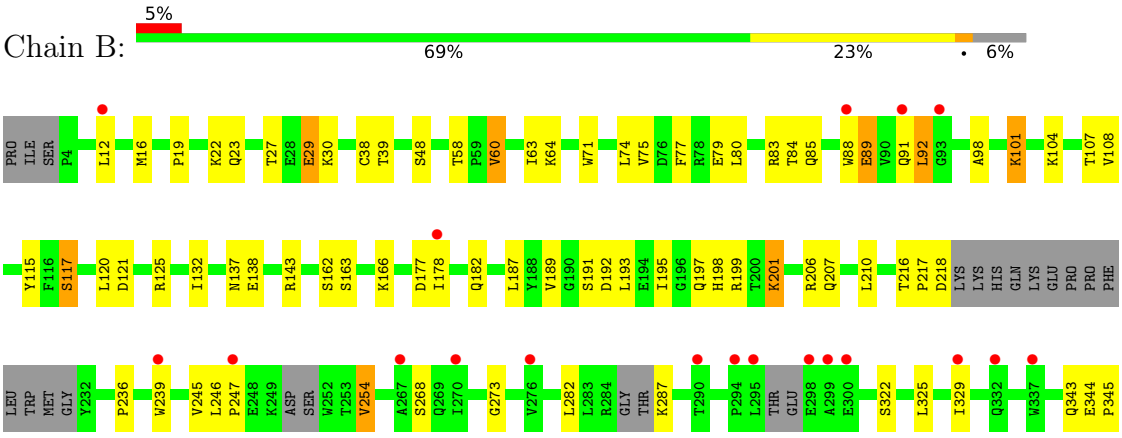
• Molecule 1: Gag-Pol polyprotein

Chain A:



• Molecule 2: p51 RT

Chain B:




N348
M357
ARG
GLY
A360
H361
T362
N363
D364
V365
K366
T369
Q373
K374
I375
E378
S379
I382
P387
P392
K395
E399
T400
W401
E404
Y405
W406
Q407
W414
V417
N418
T419
P420
P421
L422
V423
K424
L425
TRP
TYR
GLN

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	209.57Å 65.65Å 100.57Å 90.00° 114.67° 90.00°	Depositor
Resolution (Å)	36.45 – 2.74 36.45 – 2.74	Depositor EDS
% Data completeness (in resolution range)	99.7 (36.45-2.74) 99.7 (36.45-2.74)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.25 (at 2.72Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.253 , 0.291 0.266 , 0.295	Depositor DCC
R_{free} test set	1653 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	90.0	Xtriage
Anisotropy	0.147	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.26 , 77.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	6757	wwPDB-VP
Average B, all atoms (Å^2)	103.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.55% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: VWK

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	0.47	0/3822	0.60	0/5252
2	B	0.52	0/3079	0.66	0/4225
All	All	0.49	0/6901	0.63	0/9477

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	A	3724	0	3214	123	0
2	B	2998	0	2732	64	0
3	A	27	0	0	1	0
4	A	4	0	0	0	0
4	B	4	0	0	0	0
All	All	6757	0	5946	177	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 14.

All (177) 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:84:THR:HG21	1:A:153:TRP:HE1	1.45	0.81
1:A:122:GLU:HA	1:A:125:ARG:HD2	1.62	0.80
2:B:401:TRP:HE3	2:B:404:GLU:HG3	1.47	0.78
1:A:5:ILE:CD1	1:A:167:ILE:HD11	2.15	0.77
1:A:303:LEU:HD21	1:A:307:ARG:HH21	1.53	0.73
2:B:329:ILE:HD11	2:B:375:ILE:HD13	1.72	0.71
1:A:5:ILE:HD11	1:A:167:ILE:HD11	1.72	0.70
2:B:163:SER:HA	2:B:166:LYS:HE2	1.71	0.70
1:A:104:LYS:HB2	1:A:192:ASP:HA	1.72	0.70
1:A:380:ILE:HD13	2:B:27:THR:HG22	1.73	0.70
1:A:109:LEU:HD22	1:A:216:THR:HB	1.73	0.70
2:B:120:LEU:HD23	2:B:125:ARG:HG2	1.73	0.69
1:A:459:THR:C	2:B:287:LYS:HA	2.12	0.68
1:A:406:TRP:CD2	2:B:420:PRO:HG3	2.29	0.68
2:B:79:GLU:OE2	2:B:83:ARG:NH1	2.27	0.67
1:A:88:TRP:NE1	2:B:143:ARG:HD2	2.11	0.66
1:A:241:VAL:HG12	1:A:242:GLN:O	1.96	0.66
2:B:369:THR:HG21	2:B:405:TYR:HB2	1.79	0.64
1:A:459:THR:O	2:B:287:LYS:HA	1.99	0.63
1:A:437:ALA:CB	1:A:493:VAL:HA	2.30	0.62
2:B:329:ILE:HD11	2:B:375:ILE:CD1	2.30	0.62
1:A:80:LEU:O	1:A:84:THR:HG23	2.00	0.61
1:A:408:ALA:HA	2:B:364:ASP:OD2	2.00	0.61
1:A:363:ASN:HD21	1:A:401:TRP:HE1	1.48	0.61
1:A:17:ASP:O	1:A:83:ARG:HD3	2.00	0.60
2:B:29:GLU:HG2	2:B:30:LYS:N	2.15	0.60
2:B:63:ILE:HD13	2:B:74:LEU:HD22	1.83	0.60
2:B:85:GLN:HG2	2:B:89:GLU:HB3	1.83	0.60
2:B:392:PRO:HA	2:B:417:VAL:HG22	1.83	0.59
1:A:19:PRO:HG3	1:A:80:LEU:HB2	1.83	0.59
1:A:84:THR:HG21	1:A:153:TRP:NE1	2.18	0.58
1:A:451:LYS:CB	1:A:470:THR:HA	2.34	0.58
1:A:401:TRP:HZ3	1:A:409:THR:HG21	1.69	0.58
1:A:101:LYS:NZ	1:A:101:LYS:HB2	2.18	0.57
2:B:423:VAL:HG23	2:B:425:LEU:H	1.68	0.57
2:B:193:LEU:HD23	2:B:197:GLN:HB3	1.85	0.56
1:A:456:GLY:HA2	1:A:464:GLN:CB	2.35	0.56
1:A:393:ILE:HD11	1:A:397:THR:HB	1.86	0.56
2:B:91:GLN:HG2	2:B:92:LEU:HG	1.87	0.56
1:A:23:GLN:HE21	1:A:59:PRO:HB3	1.70	0.56
1:A:93:GLY:O	1:A:94:ILE:HD12	2.06	0.56
1:A:356:ARG:HG2	1:A:367:GLN:HE21	1.71	0.56

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:363:ASN:ND2	2:B:366:LYS:H	2.04	0.55
1:A:94:ILE:HD11	1:A:183:TYR:CZ	2.42	0.55
1:A:516:GLU:HA	1:A:519:ASN:HD22	1.72	0.55
2:B:85:GLN:HA	2:B:88:TRP:HB3	1.88	0.55
1:A:241:VAL:HG13	1:A:266:TRP:HE1	1.71	0.55
1:A:5:ILE:HG13	1:A:212:TRP:CE3	2.42	0.54
2:B:325:LEU:HD23	2:B:343:GLN:HG2	1.87	0.54
2:B:239:TRP:CH2	2:B:378:GLU:HG2	2.43	0.54
1:A:5:ILE:CG1	1:A:167:ILE:HD11	2.38	0.54
1:A:406:TRP:CE2	2:B:420:PRO:HG3	2.43	0.54
1:A:5:ILE:HG12	1:A:167:ILE:HD11	1.89	0.53
1:A:23:GLN:HG2	1:A:59:PRO:HA	1.91	0.53
1:A:343:GLN:HG3	1:A:349:LEU:HD11	1.92	0.52
1:A:450:THR:O	1:A:451:LYS:C	2.47	0.52
1:A:517:LEU:O	1:A:521:ILE:HG13	2.10	0.52
2:B:85:GLN:NE2	2:B:89:GLU:HG2	2.23	0.52
1:A:178:ILE:HD11	1:A:180:ILE:HD11	1.91	0.52
1:A:440:PHE:HA	1:A:457:TYR:HB2	1.92	0.51
1:A:90:VAL:HG21	1:A:157:PRO:HB2	1.92	0.51
2:B:419:THR:O	2:B:421:PRO:HD3	2.10	0.51
1:A:325:LEU:HB2	1:A:385:LYS:HD3	1.93	0.50
1:A:19:PRO:O	1:A:56:TYR:HB3	2.12	0.50
2:B:191:SER:HG	2:B:198:HIS:HD1	1.52	0.50
2:B:401:TRP:CE3	2:B:404:GLU:HG3	2.38	0.50
1:A:337:TRP:CZ3	1:A:368:LEU:HD13	2.47	0.50
1:A:241:VAL:HG13	1:A:266:TRP:NE1	2.27	0.49
1:A:94:ILE:HD11	1:A:183:TYR:CE1	2.47	0.49
1:A:480:GLN:O	1:A:484:LEU:N	2.44	0.49
2:B:379:SER:OG	2:B:387:PRO:HD3	2.11	0.49
1:A:88:TRP:CD1	2:B:143:ARG:HD2	2.46	0.49
2:B:369:THR:HG22	2:B:373:GLN:NE2	2.27	0.49
1:A:10:VAL:HG21	1:A:153:TRP:HH2	1.77	0.49
1:A:397:THR:HG21	1:A:424:LYS:HA	1.95	0.49
2:B:12:LEU:CD2	2:B:84:THR:HG22	2.43	0.49
2:B:107:THR:HG22	2:B:108:VAL:H	1.78	0.49
2:B:182:GLN:HG3	2:B:187:LEU:HD12	1.95	0.49
1:A:4:PRO:HG2	1:A:212:TRP:CE3	2.47	0.48
2:B:254:VAL:HG22	2:B:282:LEU:HD21	1.94	0.48
1:A:167:ILE:HG23	1:A:212:TRP:CD1	2.48	0.48
1:A:229:TRP:HB2	3:A:601:VWK:N2	2.28	0.48
1:A:392:PRO:HA	1:A:417:VAL:O	2.13	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:84:THR:OG1	2:B:85:GLN:N	2.47	0.48
1:A:379:SER:CB	1:A:387:PRO:HD3	2.44	0.48
1:A:319:TYR:OH	1:A:385:LYS:HD2	2.14	0.48
1:A:479:LEU:HD22	1:A:501:TYR:HE1	1.79	0.48
1:A:428:GLN:HA	1:A:509:GLN:HE22	1.79	0.48
1:A:125:ARG:HG2	1:A:146:TYR:O	2.14	0.47
1:A:406:TRP:CG	2:B:420:PRO:HG3	2.49	0.47
2:B:12:LEU:HD23	2:B:84:THR:HG22	1.94	0.47
1:A:481:ALA:O	1:A:485:ALA:N	2.47	0.47
2:B:395:LYS:O	2:B:399:GLU:HG3	2.14	0.47
1:A:444:GLY:HA3	1:A:477:THR:HB	1.96	0.47
1:A:447:ASN:C	1:A:449:GLU:N	2.68	0.47
2:B:344:GLU:OE1	2:B:345:PRO:HD2	2.15	0.47
1:A:439:THR:OG1	1:A:440:PHE:N	2.48	0.47
2:B:98:ALA:O	2:B:101:LYS:HD3	2.15	0.47
1:A:454:LYS:O	1:A:455:ALA:HB3	2.16	0.46
2:B:191:SER:OG	2:B:198:HIS:ND1	2.28	0.46
2:B:206:ARG:O	2:B:210:LEU:HG	2.14	0.46
1:A:94:ILE:HD11	1:A:183:TYR:OH	2.15	0.46
1:A:303:LEU:HG	1:A:307:ARG:HE	1.79	0.46
2:B:363:ASN:HD21	2:B:365:VAL:HB	1.80	0.46
1:A:186:ASP:HB3	1:A:188:TYR:CE1	2.50	0.46
1:A:437:ALA:HB1	1:A:493:VAL:HA	1.97	0.46
1:A:394:GLN:HA	1:A:414:TRP:HH2	1.80	0.46
1:A:104:LYS:NZ	1:A:194:GLU:HA	2.29	0.46
2:B:85:GLN:O	2:B:89:GLU:HG3	2.15	0.46
1:A:50:ILE:O	1:A:143:ARG:HB2	2.16	0.46
2:B:246:LEU:HD12	2:B:247:PRO:HD2	1.98	0.45
1:A:111:VAL:HG13	1:A:185:ASP:O	2.15	0.45
1:A:357:MET:HE3	1:A:357:MET:HB3	1.86	0.45
1:A:516:GLU:HA	1:A:519:ASN:ND2	2.31	0.45
2:B:104:LYS:HG3	2:B:192:ASP:HA	1.97	0.45
1:A:447:ASN:C	1:A:449:GLU:H	2.19	0.45
1:A:459:THR:HG23	1:A:462:GLY:H	1.81	0.45
1:A:46:LYS:HD2	1:A:116:PHE:HB3	1.98	0.45
1:A:247:PRO:HG2	1:A:252:TRP:CH2	2.52	0.45
1:A:503:LEU:O	1:A:507:GLN:HB2	2.16	0.45
1:A:2:ILE:O	1:A:3:SER:CB	2.65	0.45
1:A:235:HIS:HB2	1:A:238:LYS:O	2.17	0.44
1:A:387:PRO:HG2	1:A:389:PHE:CZ	2.52	0.44
2:B:19:PRO:HG3	2:B:80:LEU:HB2	1.98	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:219:LYS:HA	1:A:222:GLN:HG2	1.99	0.44
1:A:444:GLY:CA	1:A:477:THR:HB	2.47	0.44
2:B:115:TYR:C	2:B:117:SER:H	2.21	0.44
1:A:97:PRO:HA	1:A:100:LEU:HG	1.98	0.44
2:B:101:LYS:HG2	2:B:382:ILE:HA	1.98	0.44
2:B:88:TRP:CE2	2:B:92:LEU:HD11	2.52	0.44
2:B:236:PRO:HA	2:B:239:TRP:CD2	2.53	0.44
2:B:195:ILE:HG22	2:B:199:ARG:HE	1.82	0.44
1:A:55:PRO:HG2	1:A:143:ARG:NH1	2.32	0.44
2:B:64:LYS:HE2	2:B:71:TRP:CZ2	2.53	0.44
2:B:405:TYR:O	2:B:407:GLN:HG3	2.18	0.43
1:A:399:GLU:HA	1:A:402:TRP:NE1	2.33	0.43
1:A:110:ASP:O	1:A:217:PRO:HD3	2.18	0.43
1:A:270:ILE:HD12	1:A:270:ILE:HA	1.79	0.43
1:A:56:TYR:CD1	1:A:56:TYR:N	2.87	0.43
1:A:459:THR:HG23	1:A:461:LYS:N	2.34	0.43
1:A:516:GLU:O	1:A:520:GLN:N	2.47	0.43
2:B:75:VAL:HG11	2:B:77:PHE:CZ	2.54	0.42
1:A:505:ILE:O	1:A:510:PRO:HD3	2.20	0.42
1:A:195:ILE:HD12	1:A:196:GLY:H	1.83	0.42
1:A:408:ALA:HB1	2:B:364:ASP:HB3	2.02	0.42
1:A:79:GLU:HG3	1:A:83:ARG:HE	1.85	0.42
1:A:80:LEU:HG	1:A:84:THR:CG2	2.50	0.42
1:A:115:TYR:CD2	1:A:156:SER:HB3	2.54	0.42
1:A:131:THR:HG23	1:A:143:ARG:HD2	2.02	0.42
1:A:325:LEU:HD22	1:A:385:LYS:HD3	2.02	0.42
1:A:433:PRO:HD3	1:A:532:TYR:CZ	2.55	0.42
1:A:35:VAL:HG23	1:A:132:ILE:HD11	2.02	0.42
1:A:405:TYR:CE2	1:A:407:GLN:HB3	2.55	0.42
1:A:437:ALA:HB3	1:A:494:ASN:OD1	2.19	0.42
1:A:38:CYS:HB3	1:A:144:TYR:CE2	2.55	0.41
1:A:401:TRP:CE3	1:A:402:TRP:HB3	2.55	0.41
1:A:225:PRO:HA	1:A:226:PRO:C	2.41	0.41
1:A:325:LEU:O	1:A:388:LYS:HD3	2.21	0.41
1:A:420:PRO:HA	1:A:422:LEU:N	2.34	0.41
1:A:193:LEU:HD13	1:A:197:GLN:NE2	2.36	0.41
1:A:379:SER:HB3	1:A:385:LYS:O	2.21	0.41
1:A:109:LEU:HD23	1:A:217:PRO:HG2	2.03	0.41
1:A:5:ILE:HD11	1:A:167:ILE:CD1	2.44	0.41
1:A:24:TRP:O	1:A:26:LEU:N	2.53	0.41
1:A:427:TYR:OH	1:A:509:GLN:HA	2.21	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:162:SER:O	2:B:166:LYS:HG3	2.21	0.41
1:A:170:PRO:HB2	1:A:208:HIS:HE1	1.86	0.41
1:A:477:THR:O	1:A:481:ALA:N	2.46	0.41
2:B:38:CYS:SG	2:B:132:ILE:HD11	2.61	0.41
2:B:363:ASN:CG	2:B:365:VAL:H	2.24	0.41
1:A:387:PRO:HG2	1:A:389:PHE:CE1	2.56	0.40
2:B:178:ILE:HD11	2:B:201:LYS:HG2	2.03	0.40
1:A:350:LYS:NZ	1:A:378:GLU:OE2	2.37	0.40
2:B:216:THR:HB	2:B:217:PRO:HD2	2.02	0.40
1:A:457:TYR:CZ	1:A:463:ARG:O	2.74	0.40
1:A:461:LYS:O	1:A:463:ARG:N	2.54	0.40
2:B:23:GLN:OE1	2:B:60:VAL:HG13	2.21	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	504/539 (94%)	454 (90%)	48 (10%)	2 (0%)	34	55
2	B	389/428 (91%)	354 (91%)	34 (9%)	1 (0%)	41	61
All	All	893/967 (92%)	808 (90%)	82 (9%)	3 (0%)	41	61

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	455	ALA
1	A	3	SER
2	B	273	GLY

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	321/483 (66%)	275 (86%)	46 (14%)	3 4
2	B	287/390 (74%)	259 (90%)	28 (10%)	8 14
All	All	608/873 (70%)	534 (88%)	74 (12%)	5 7

All (74) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	20	LYS
1	A	23	GLN
1	A	78	ARG
1	A	86	ASP
1	A	94	ILE
1	A	101	LYS
1	A	104	LYS
1	A	110	ASP
1	A	113	ASP
1	A	136	ASN
1	A	178	ILE
1	A	195	ILE
1	A	207	GLN
1	A	215	THR
1	A	246	LEU
1	A	250	ASP
1	A	276	VAL
1	A	290	THR
1	A	308	GLU
1	A	326	ILE
1	A	330	GLN
1	A	338	THR
1	A	340	GLN
1	A	341	ILE
1	A	344	GLU
1	A	350	LYS
1	A	385	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	388	LYS
1	A	393	ILE
1	A	397	THR
1	A	407	GLN
1	A	409	THR
1	A	410	TRP
1	A	413	GLU
1	A	415	GLU
1	A	439	THR
1	A	443	ASP
1	A	459	THR
1	A	472	THR
1	A	473	THR
1	A	477	THR
1	A	494	ASN
1	A	496	VAL
1	A	497	THR
1	A	513	SER
1	A	536	VAL
2	B	16	MET
2	B	22	LYS
2	B	29	GLU
2	B	39	THR
2	B	48	SER
2	B	58	THR
2	B	60	VAL
2	B	89	GLU
2	B	92	LEU
2	B	101	LYS
2	B	117	SER
2	B	121	ASP
2	B	137	ASN
2	B	138	GLU
2	B	177	ASP
2	B	189	VAL
2	B	201	LYS
2	B	207	GLN
2	B	218	ASP
2	B	245	VAL
2	B	254	VAL
2	B	268	SER
2	B	322	SER

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	B	348	ASN
2	B	362	THR
2	B	363	ASN
2	B	395	LYS
2	B	414	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	23	GLN
1	A	330	GLN
2	B	207	GLN

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)

1 ligand is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	VWK	A	601	-	29,29,29	2.13	3 (10%)	37,39,39	1.11	3 (8%)

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	VWK	A	601	-	-	3/16/16/16	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	601	VWK	C1-N1	9.67	1.46	1.34
3	A	601	VWK	C20-C21	2.84	1.50	1.44
3	A	601	VWK	C22-C16	-2.15	1.37	1.42

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	601	VWK	C18-C17-C16	2.49	121.11	117.89
3	A	601	VWK	C4-C1-N1	2.35	121.63	118.11
3	A	601	VWK	C22-C20-C21	-2.02	117.91	119.65

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	601	VWK	C11-C6-O2-C5
3	A	601	VWK	C7-C6-O2-C5
3	A	601	VWK	O1-C1-C4-C5

There are no ring outliers.

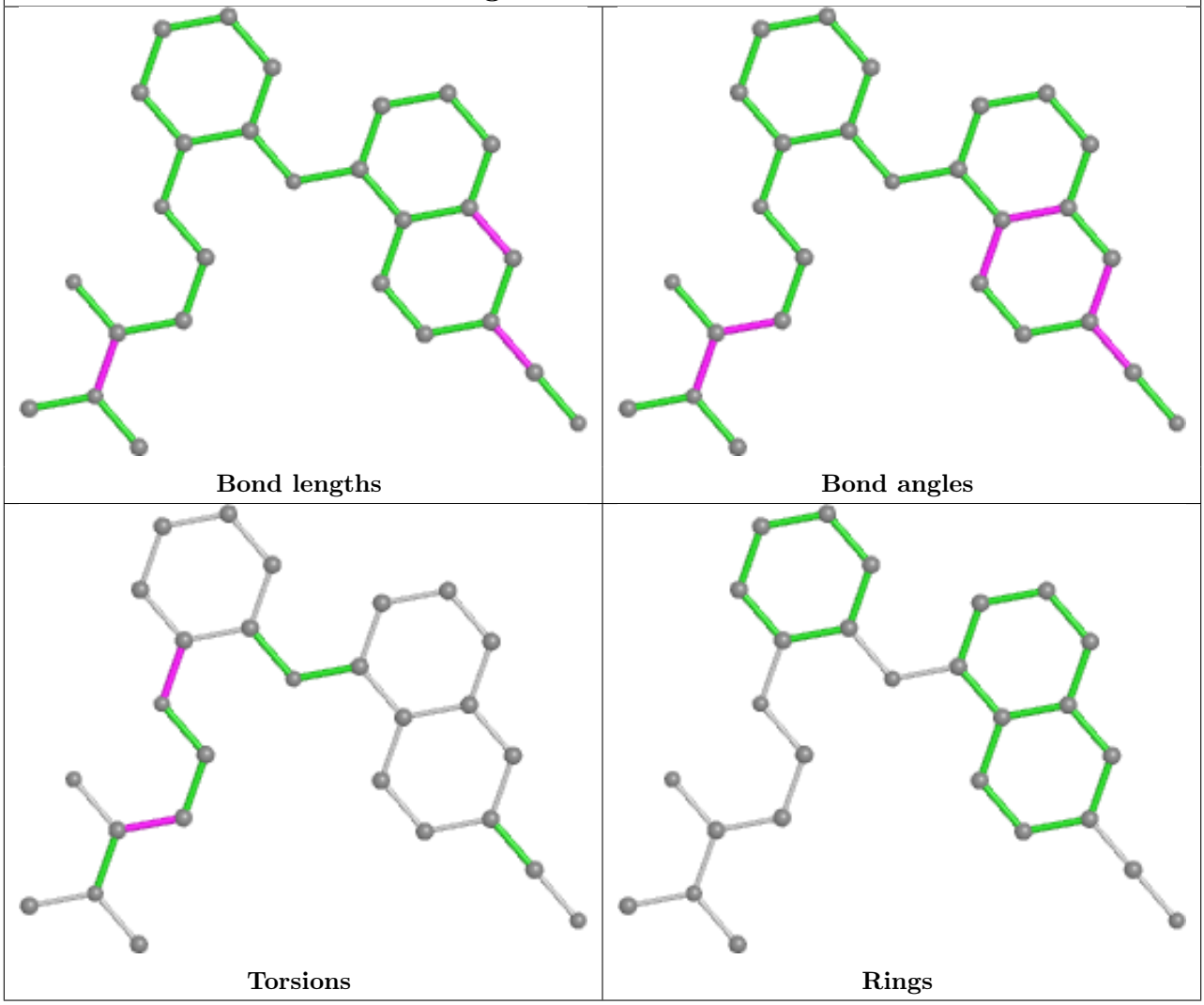
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	601	VWK	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 then 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 VWK A 601



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, 95^{th} 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	521/539 (96%)	0.24	45 (8%)	10	12	30, 107, 158, 450	1 (0%)
2	B	401/428 (93%)	0.21	23 (5%)	23	26	54, 90, 186, 491	0
All	All	922/967 (95%)	0.23	68 (7%)	14	16	30, 100, 166, 491	1 (0%)

All (68) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	246	LEU	6.5
1	A	537	PRO	6.1
1	A	247	PRO	5.7
2	B	276	VAL	5.6
1	A	445	ALA	5.6
2	B	270	ILE	5.5
1	A	1	PRO	5.1
1	A	276	VAL	4.9
1	A	446	ALA	4.9
1	A	455	ALA	4.7
1	A	471	ASN	4.3
1	A	289	LEU	4.1
1	A	454	LYS	4.0
2	B	298	GLU	3.7
1	A	456	GLY	3.7
1	A	251	SER	3.7
1	A	71	TRP	3.5
2	B	290	THR	3.4
1	A	68	SER	3.4
1	A	245	VAL	3.3
1	A	252	TRP	3.3
2	B	12	LEU	3.3
1	A	133	PRO	3.3
1	A	299	ALA	3.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	260	LEU	3.2
1	A	217	PRO	3.1
2	B	357	MET	3.1
2	B	267	ALA	3.0
1	A	472	THR	2.9
1	A	402	TRP	2.9
1	A	132	ILE	2.9
2	B	178	ILE	2.8
1	A	109	LEU	2.8
2	B	337	TRP	2.8
1	A	461	LYS	2.8
2	B	348	ASN	2.8
2	B	329	ILE	2.7
1	A	416	PHE	2.7
1	A	433	PRO	2.6
1	A	444	GLY	2.6
1	A	279	LEU	2.5
1	A	62	ALA	2.5
2	B	93	GLY	2.4
1	A	282	LEU	2.4
1	A	436	GLY	2.4
1	A	294	PRO	2.4
1	A	250	ASP	2.3
1	A	290	THR	2.3
1	A	398	TRP	2.3
2	B	91	GLN	2.3
2	B	88	TRP	2.3
1	A	2	ILE	2.3
2	B	300	GLU	2.3
2	B	239	TRP	2.3
2	B	364	ASP	2.3
2	B	332	GLN	2.2
1	A	329	ILE	2.2
2	B	375	ILE	2.2
2	B	299	ALA	2.2
1	A	479	LEU	2.2
2	B	295	LEU	2.2
1	A	465	LYS	2.2
1	A	470	THR	2.2
2	B	294	PRO	2.1
1	A	496	VAL	2.1
1	A	335	GLY	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	440	PHE	2.1
2	B	247	PRO	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)

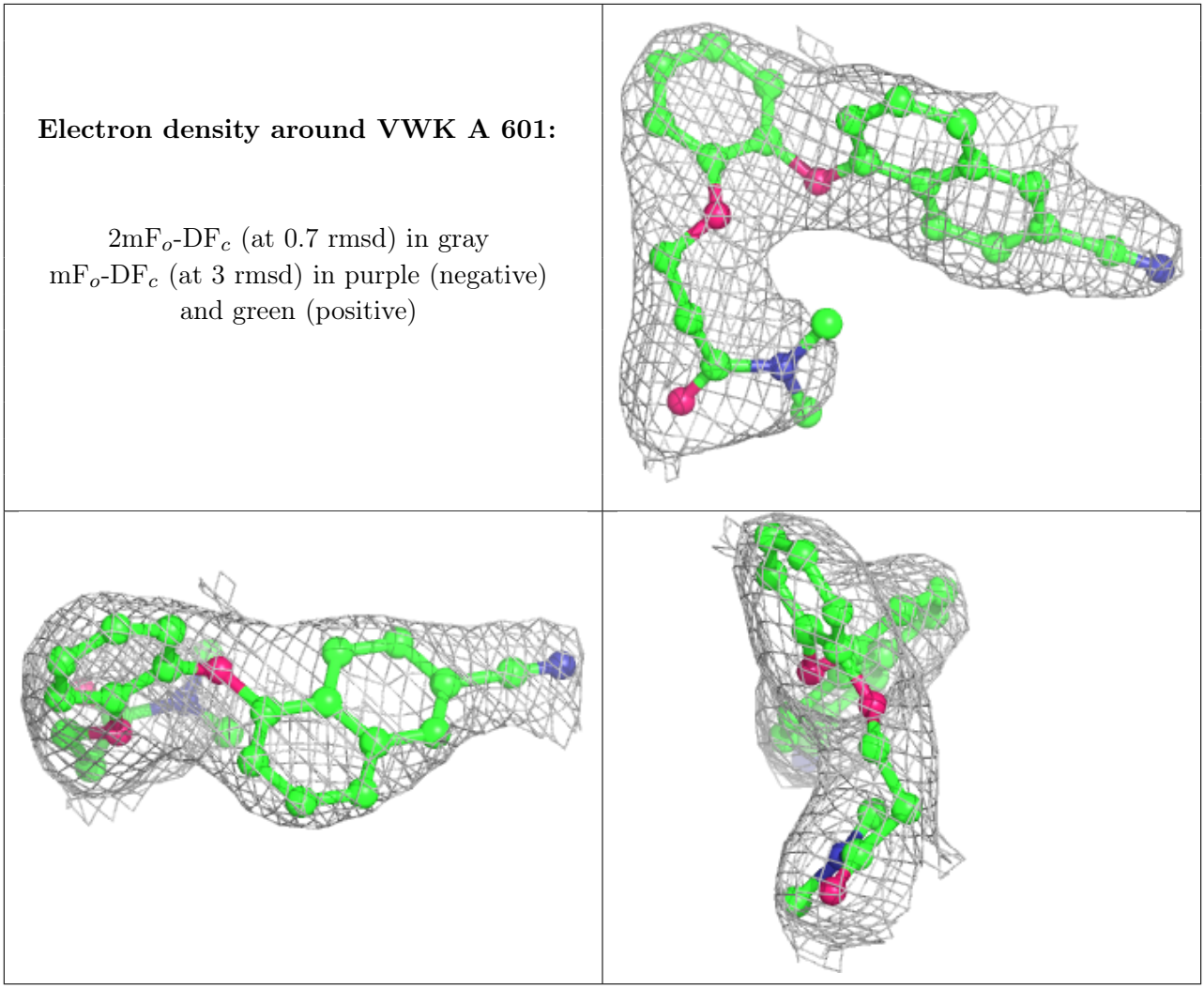
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
3	VWK	A	601	27/27	0.96	0.20	63,70,74,75	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 VWK A 601:

$2mF_o$-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.