



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 12:38 PM UTC

PDB ID : 5T1S / pdb_00005t1s
Title : Irak4 kinase - compound 1 co-structure
Authors : Fischmann, T.O.
Deposited on : 2016-08-22
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 : 4-5-2 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

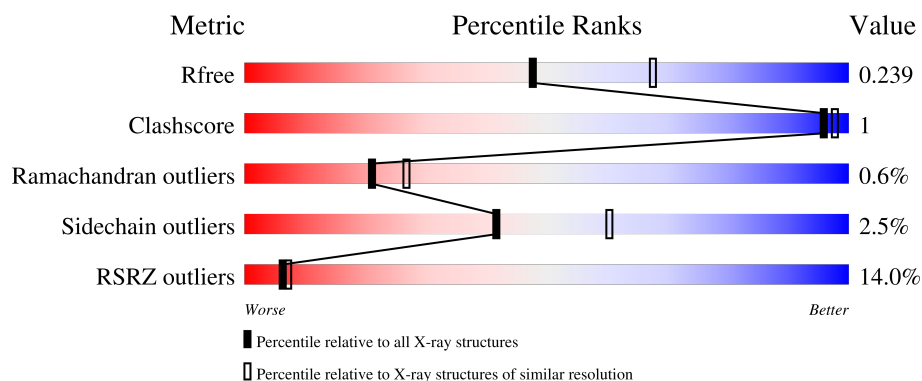
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (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	A	301	<div> <div>9%</div> <div>88% 5% • 6%</div> </div>
1	B	301	<div> <div>12%</div> <div>89% 5% • 5%</div> </div>
1	C	301	<div> <div>18%</div> <div>88% 7% 5%</div> </div>
1	D	301	<div> <div>14%</div> <div>88% 5% • 6%</div> </div>

2 Entry composition [i](#)

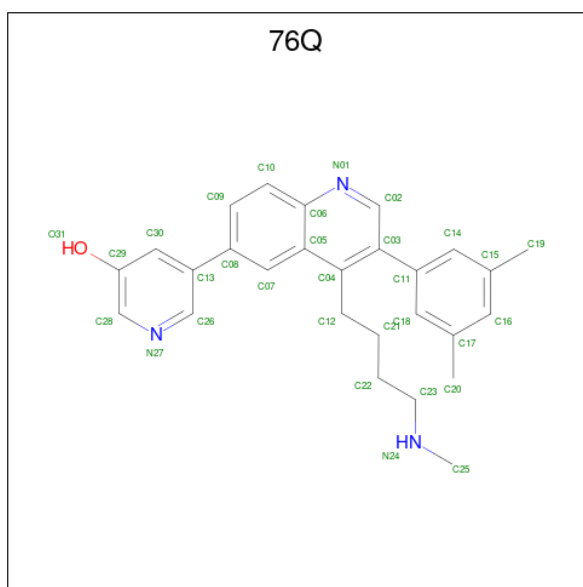
There are 3 unique types of molecules in this entry. The entry contains 9178 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Interleukin-1 receptor-associated kinase 4.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	283	Total	C	N	O	P	S	0	0	3
			2227	1395	375	440	3	14			
1	B	285	Total	C	N	O	P	S	0	0	2
			2233	1398	377	441	3	14			
1	C	287	Total	C	N	O	P	S	0	0	1
			2249	1410	376	446	3	14			
1	D	284	Total	C	N	O	P	S	0	0	0
			2236	1403	377	439	3	14			

- Molecule 2 is 5-[3-(3,5-dimethylphenyl)-4-[4-(methylamino)butyl]quinolin-6-yl]pyridin-3-ol (CCD ID: 76Q) (formula: C₂₇H₂₉N₃O).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			31	27	3	1		
2	B	1	Total	C	N	O	0	0
			31	27	3	1		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	C	1	Total	C	N	O	0	0
			31	27	3	1		
2	D	1	Total	C	N	O	0	0
			31	27	3	1		

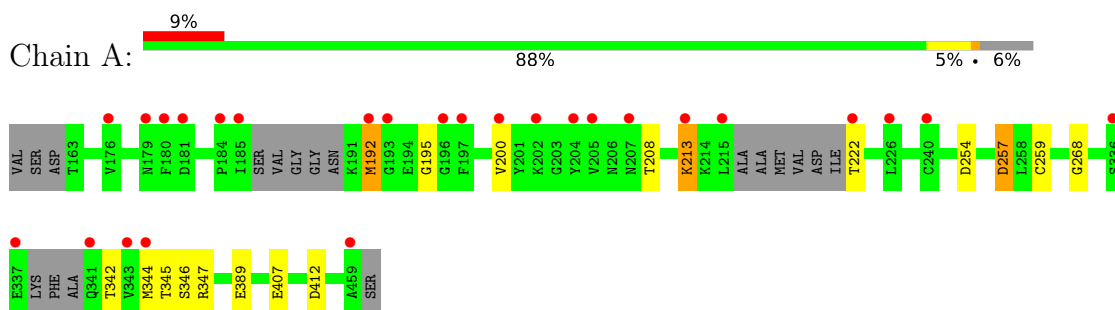
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	23	Total	O	0	0
			23	23		
3	B	24	Total	O	0	0
			24	24		
3	C	31	Total	O	0	0
			31	31		
3	D	31	Total	O	0	0
			31	31		

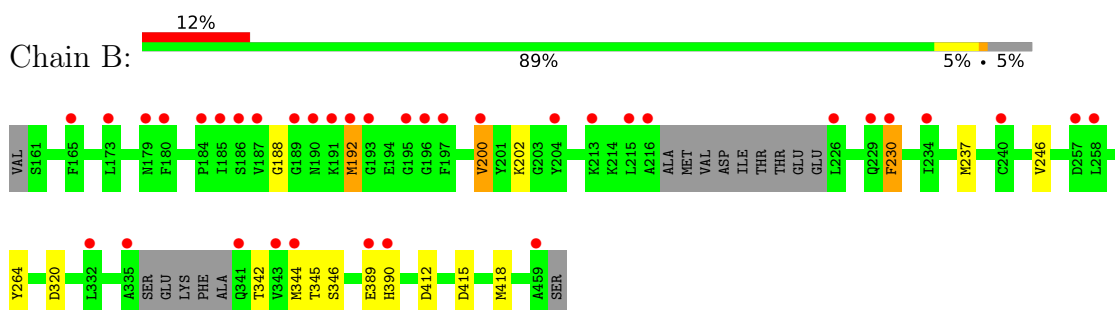
3 Residue-property plots

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.

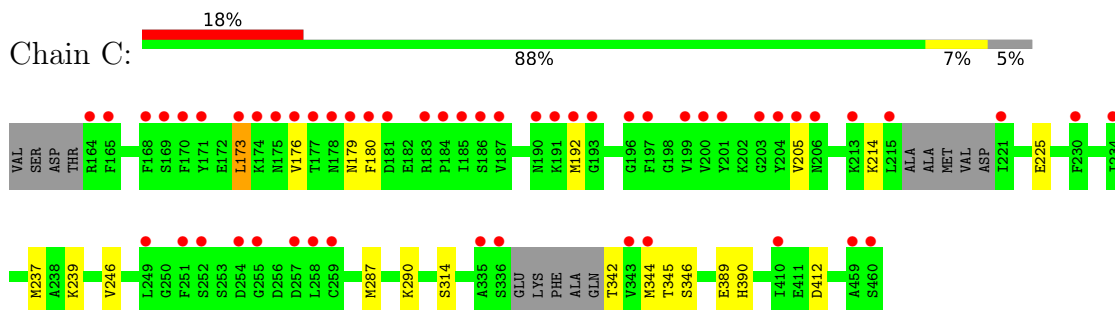
- Molecule 1: Interleukin-1 receptor-associated kinase 4



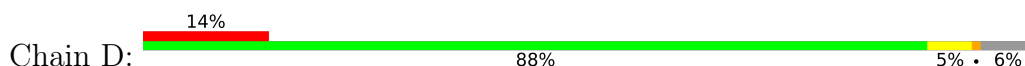
- Molecule 1: Interleukin-1 receptor-associated kinase 4

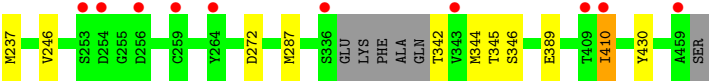
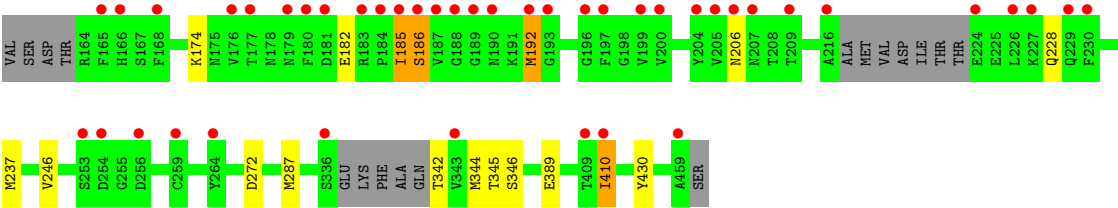


- Molecule 1: Interleukin-1 receptor-associated kinase 4



- Molecule 1: Interleukin-1 receptor-associated kinase 4





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	144.34Å 139.30Å 88.09Å 90.00° 125.05° 90.00°	Depositor
Resolution (Å)	37.20 – 2.30 37.20 – 2.30	Depositor EDS
% Data completeness (in resolution range)	97.7 (37.20-2.30) 97.7 (37.20-2.30)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.33 (at 2.29Å)	Xtriage
Refinement program	BUSTER 2.11.2	Depositor
R, R_{free}	0.207 , 0.223 0.218 , 0.239	Depositor DCC
R_{free} test set	3138 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	45.7	Xtriage
Anisotropy	0.390	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 51.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.109 for -h-2*k,l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	9178	wwPDB-VP
Average B, all atoms (Å ²)	66.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.59% 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: 76Q, TPO, SEP

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	0.85	1/2229 (0.0%)	1.10	2/3000 (0.1%)
1	B	0.86	1/2236 (0.0%)	1.09	3/3010 (0.1%)
1	C	0.89	2/2253 (0.1%)	1.11	4/3036 (0.1%)
1	D	0.87	0/2240	1.12	3/3017 (0.1%)
All	All	0.87	4/8958 (0.0%)	1.11	12/12063 (0.1%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	192	MET	SD-CE	-7.49	1.60	1.79
1	C	192	MET	SD-CE	-6.19	1.64	1.79
1	A	192	MET	SD-CE	-5.93	1.64	1.79
1	C	314	SER	CA-C	5.04	1.59	1.52

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	185	ILE	N-CA-C	7.19	124.29	109.34
1	C	179	ASN	N-CA-C	5.87	119.79	111.92
1	B	230	PHE	CA-CB-CG	5.80	119.60	113.80
1	A	407	GLU	N-CA-C	-5.47	104.96	111.69
1	D	182	GLU	N-CA-C	5.43	119.52	113.01
1	C	205	VAL	N-CA-CB	5.38	116.58	110.72
1	C	412	ASP	CA-CB-CG	5.26	117.86	112.60
1	B	320	ASP	CA-CB-CG	5.24	117.84	112.60
1	C	180	PHE	N-CA-C	5.24	117.56	111.02
1	B	412	ASP	CA-CB-CG	5.18	117.78	112.60
1	A	412	ASP	CA-CB-CG	5.13	117.73	112.60
1	D	186	SER	N-CA-C	5.07	121.61	110.80

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	2227	0	2180	3	0
1	B	2233	0	2186	7	0
1	C	2249	0	2205	4	0
1	D	2236	0	2201	5	0
2	A	31	0	0	1	0
2	B	31	0	0	0	0
2	C	31	0	0	0	0
2	D	31	0	0	3	0
3	A	23	0	0	0	0
3	B	24	0	0	0	0
3	C	31	0	0	0	0
3	D	31	0	0	0	0
All	All	9178	0	8772	19	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 1.

All (19) 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:192:MET:HE3	1:B:202:LYS:HB2	1.74	0.68
1:A:192:MET:HE3	1:A:200:VAL:HG12	1.75	0.68
1:B:192:MET:HB2	1:B:200:VAL:HG23	1.75	0.66
1:C:237:MET:HE1	1:C:246:VAL:HG23	1.84	0.59
1:B:237:MET:HE1	1:B:246:VAL:HG23	1.86	0.56
1:D:237:MET:HE1	1:D:246:VAL:HG23	1.88	0.55
1:D:192:MET:HB3	2:D:9901:76Q:C14	2.40	0.52
1:D:410:ILE:HD12	1:D:410:ILE:H	1.74	0.51
1:B:415:ASP:HB3	1:B:418:MET:HE2	1.94	0.50
1:B:390:HIS:O	1:C:390:HIS:O	2.32	0.47
1:B:192:MET:CE	1:B:264:TYR:HE1	2.30	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:192:MET:HE1	1:B:264:TYR:CE1	2.51	0.45
1:C:287:MET:HE2	1:C:290:LYS:HD3	1.99	0.44
1:D:272:ASP:OD2	2:D:9901:76Q:C23	2.65	0.44
1:A:213:LYS:O	1:A:259:CYS:HA	2.17	0.44
1:A:268:GLY:HA2	2:A:9901:76Q:C18	2.50	0.42
1:D:410:ILE:HG12	1:D:430:TYR:CD2	2.55	0.41
1:C:173:LEU:HD12	1:C:176:VAL:HB	2.02	0.41
2:D:9901:76Q:C14	2:D:9901:76Q:C21	2.98	0.41

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	272/301 (90%)	258 (95%)	11 (4%)	3 (1%)	11	13
1	B	276/301 (92%)	262 (95%)	12 (4%)	2 (1%)	18	23
1	C	279/301 (93%)	267 (96%)	12 (4%)	0	100	100
1	D	276/301 (92%)	262 (95%)	12 (4%)	2 (1%)	18	23
All	All	1103/1204 (92%)	1049 (95%)	47 (4%)	7 (1%)	21	27

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	186	SER
1	A	254	ASP
1	D	185	ILE
1	A	257	ASP
1	B	230	PHE
1	A	195	GLY
1	B	188	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	243/259 (94%)	236 (97%)	7 (3%)	37	55
1	B	243/259 (94%)	240 (99%)	3 (1%)	63	79
1	C	245/259 (95%)	239 (98%)	6 (2%)	43	62
1	D	243/259 (94%)	235 (97%)	8 (3%)	33	50
All	All	974/1036 (94%)	950 (98%)	24 (2%)	42	60

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	208	THR
1	A	213	LYS
1	A	222	THR
1	A	257	ASP
1	A	344	MET
1	A	347	ARG
1	A	389	GLU
1	B	200	VAL
1	B	344	MET
1	B	389	GLU
1	C	173	LEU
1	C	214	LYS
1	C	225	GLU
1	C	239	LYS
1	C	344	MET
1	C	389	GLU
1	D	174	LYS
1	D	192	MET
1	D	206	ASN
1	D	228	GLN
1	D	287	MET
1	D	344	MET
1	D	389	GLU
1	D	410	ILE

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	206	ASN
1	A	241	GLN
1	C	206	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

12 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	SEP	B	346	1	8,9,10	1.07	1 (12%)	7,12,14	1.37	1 (14%)
1	TPO	B	342	1	8,10,11	1.06	1 (12%)	10,14,16	1.50	1 (10%)
1	SEP	A	346	1	8,9,10	0.95	0	7,12,14	1.19	1 (14%)
1	TPO	C	342	1	8,10,11	1.12	1 (12%)	10,14,16	1.50	1 (10%)
1	TPO	D	345	1	8,10,11	1.03	0	10,14,16	1.35	2 (20%)
1	TPO	D	342	1	8,10,11	1.08	1 (12%)	10,14,16	1.48	1 (10%)
1	TPO	A	342	1	8,10,11	1.03	0	10,14,16	1.50	1 (10%)
1	TPO	B	345	1	8,10,11	1.18	0	10,14,16	1.29	2 (20%)
1	SEP	C	346	1	8,9,10	0.90	0	7,12,14	1.30	1 (14%)
1	TPO	C	345	1	8,10,11	1.31	0	10,14,16	1.19	1 (10%)
1	SEP	D	346	1	8,9,10	1.05	0	7,12,14	1.35	1 (14%)
1	TPO	A	345	1	8,10,11	1.08	0	10,14,16	1.40	2 (20%)

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
1	SEP	B	346	1	-	0/6/8/10	-
1	TPO	B	342	1	-	2/9/11/13	-
1	SEP	A	346	1	-	1/6/8/10	-
1	TPO	C	342	1	-	2/9/11/13	-
1	TPO	D	345	1	-	3/9/11/13	-
1	TPO	D	342	1	-	2/9/11/13	-
1	TPO	A	342	1	-	2/9/11/13	-
1	TPO	B	345	1	-	3/9/11/13	-
1	SEP	C	346	1	-	1/6/8/10	-
1	TPO	C	345	1	-	3/9/11/13	-
1	SEP	D	346	1	-	1/6/8/10	-
1	TPO	A	345	1	-	2/9/11/13	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	342	TPO	P-OG1	-2.39	1.55	1.59
1	B	346	SEP	P-O1P	2.32	1.57	1.50
1	C	342	TPO	P-OG1	-2.23	1.55	1.59
1	B	342	TPO	P-OG1	-2.10	1.55	1.59

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	342	TPO	P-OG1-CB	-3.76	113.12	123.33
1	A	342	TPO	P-OG1-CB	-3.74	113.16	123.33
1	B	342	TPO	P-OG1-CB	-3.65	113.40	123.33
1	D	342	TPO	P-OG1-CB	-3.63	113.45	123.33
1	D	346	SEP	OG-CB-CA	3.22	111.28	108.14
1	B	346	SEP	OG-CB-CA	3.00	111.06	108.14
1	C	346	SEP	OG-CB-CA	2.95	111.02	108.14
1	A	345	TPO	O3P-P-OG1	2.71	116.39	105.85
1	A	345	TPO	P-OG1-CB	-2.56	116.38	123.33
1	D	345	TPO	O3P-P-OG1	2.45	115.40	105.85
1	B	345	TPO	O3P-P-OG1	2.40	115.20	105.85
1	A	346	SEP	OG-CB-CA	2.30	110.39	108.14
1	C	345	TPO	P-OG1-CB	-2.18	117.42	123.33
1	D	345	TPO	P-OG1-CB	-2.16	117.45	123.33
1	B	345	TPO	P-OG1-CB	-2.15	117.48	123.33

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	342	TPO	O-C-CA-CB
1	A	345	TPO	N-CA-CB-OG1
1	B	342	TPO	O-C-CA-CB
1	B	345	TPO	N-CA-CB-OG1
1	C	342	TPO	O-C-CA-CB
1	C	345	TPO	N-CA-CB-OG1
1	D	342	TPO	O-C-CA-CB
1	D	345	TPO	N-CA-CB-OG1
1	B	345	TPO	CB-OG1-P-O1P
1	D	345	TPO	CB-OG1-P-O1P
1	C	342	TPO	C-CA-CB-CG2
1	C	345	TPO	CB-OG1-P-O3P
1	A	342	TPO	C-CA-CB-CG2
1	A	345	TPO	O-C-CA-CB
1	A	346	SEP	C-CA-CB-OG
1	B	342	TPO	C-CA-CB-CG2
1	B	345	TPO	O-C-CA-CB
1	C	345	TPO	O-C-CA-CB
1	C	346	SEP	C-CA-CB-OG
1	D	342	TPO	C-CA-CB-CG2
1	D	345	TPO	O-C-CA-CB
1	D	346	SEP	C-CA-CB-OG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 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	76Q	A	9901	-	34,34,34	1.39	1 (2%)	45,47,47	0.88	3 (6%)
2	76Q	B	9901	-	34,34,34	1.00	1 (2%)	45,47,47	0.78	1 (2%)
2	76Q	D	9901	-	34,34,34	1.67	1 (2%)	45,47,47	0.92	3 (6%)
2	76Q	C	9901	-	34,34,34	1.36	1 (2%)	45,47,47	0.77	1 (2%)

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	76Q	A	9901	-	-	4/14/14/14	0/4/4/4
2	76Q	B	9901	-	-	3/14/14/14	0/4/4/4
2	76Q	D	9901	-	-	4/14/14/14	0/4/4/4
2	76Q	C	9901	-	-	3/14/14/14	0/4/4/4

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	9901	76Q	C03-C04	8.82	1.55	1.41
2	A	9901	76Q	C03-C04	7.50	1.53	1.41
2	C	9901	76Q	C03-C04	7.13	1.53	1.41
2	B	9901	76Q	C03-C04	5.04	1.49	1.41

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	9901	76Q	C03-C04-C05	-3.45	116.20	119.28
2	A	9901	76Q	C03-C04-C05	-3.30	116.33	119.28
2	D	9901	76Q	C03-C04-C05	-3.00	116.60	119.28
2	B	9901	76Q	C03-C04-C05	-2.78	116.80	119.28
2	D	9901	76Q	C11-C03-C04	2.52	126.56	122.88
2	A	9901	76Q	C11-C03-C04	2.27	126.19	122.88
2	A	9901	76Q	C12-C04-C03	2.09	125.89	121.79
2	D	9901	76Q	C12-C04-C03	2.00	125.71	121.79

There are no chirality outliers.

All (14) torsion outliers are listed below:

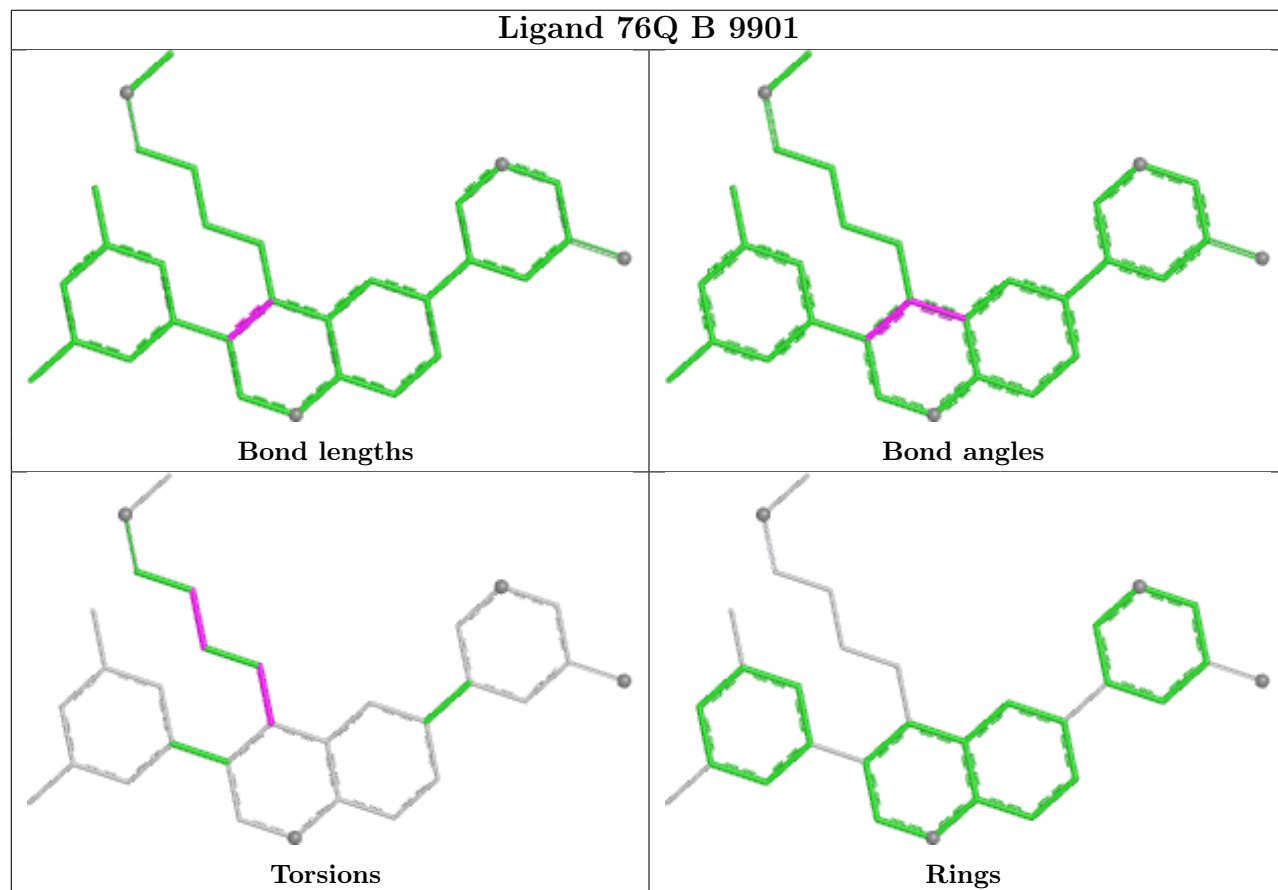
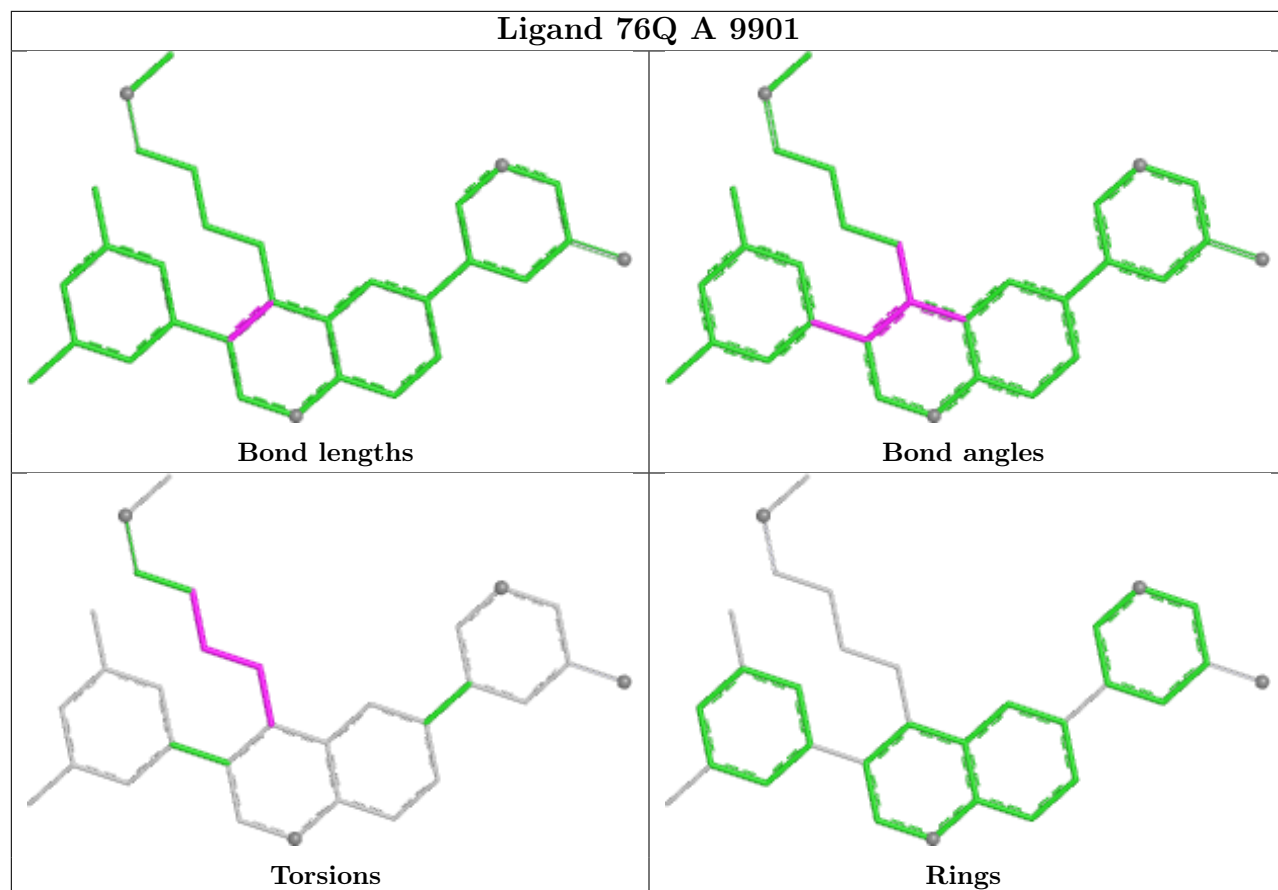
Mol	Chain	Res	Type	Atoms
2	A	9901	76Q	C03-C04-C12-C21
2	A	9901	76Q	C05-C04-C12-C21
2	B	9901	76Q	C05-C04-C12-C21
2	C	9901	76Q	C05-C04-C12-C21
2	D	9901	76Q	C03-C04-C12-C21
2	D	9901	76Q	C05-C04-C12-C21
2	C	9901	76Q	C21-C22-C23-N24
2	D	9901	76Q	C04-C12-C21-C22
2	A	9901	76Q	C04-C12-C21-C22
2	B	9901	76Q	C03-C04-C12-C21
2	C	9901	76Q	C03-C04-C12-C21
2	A	9901	76Q	C12-C21-C22-C23
2	B	9901	76Q	C12-C21-C22-C23
2	D	9901	76Q	C12-C21-C22-C23

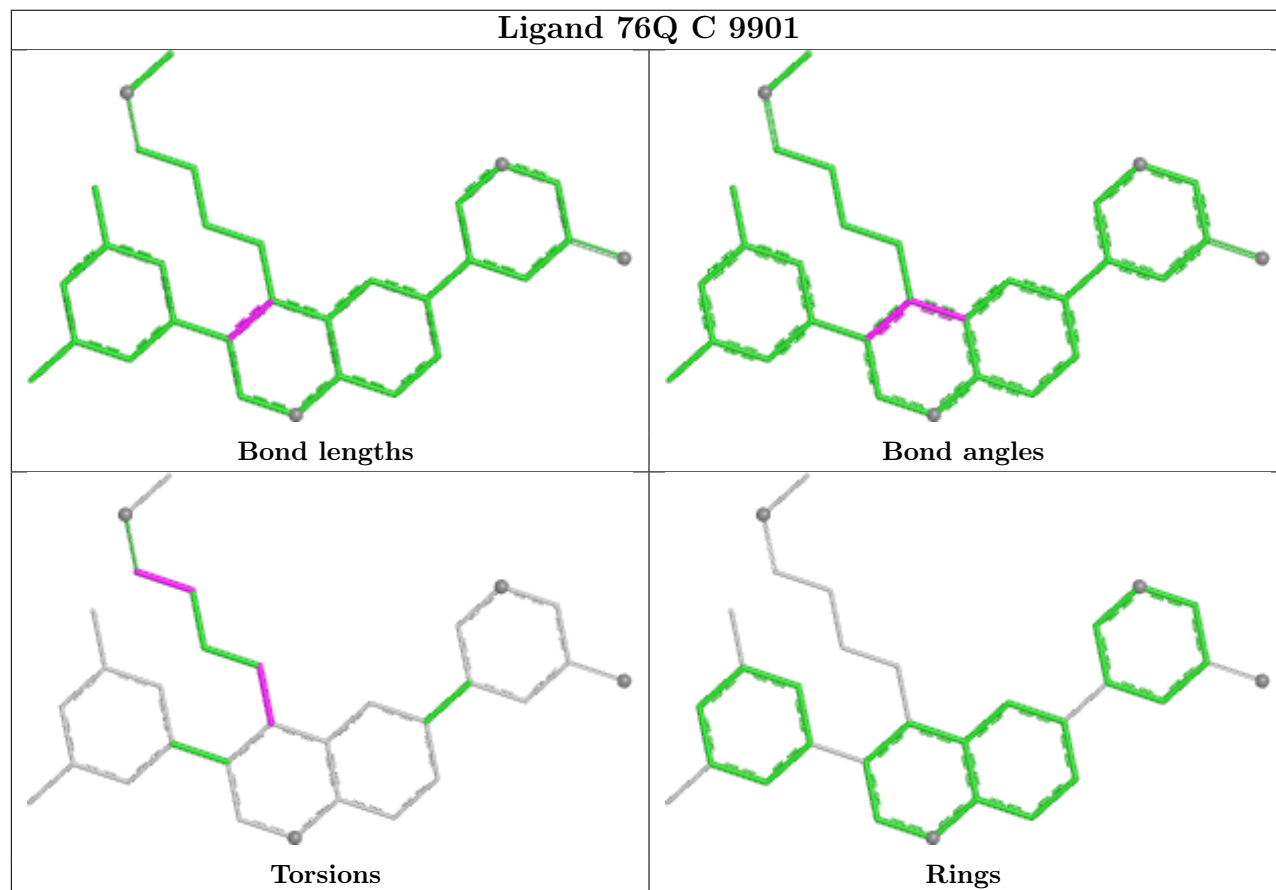
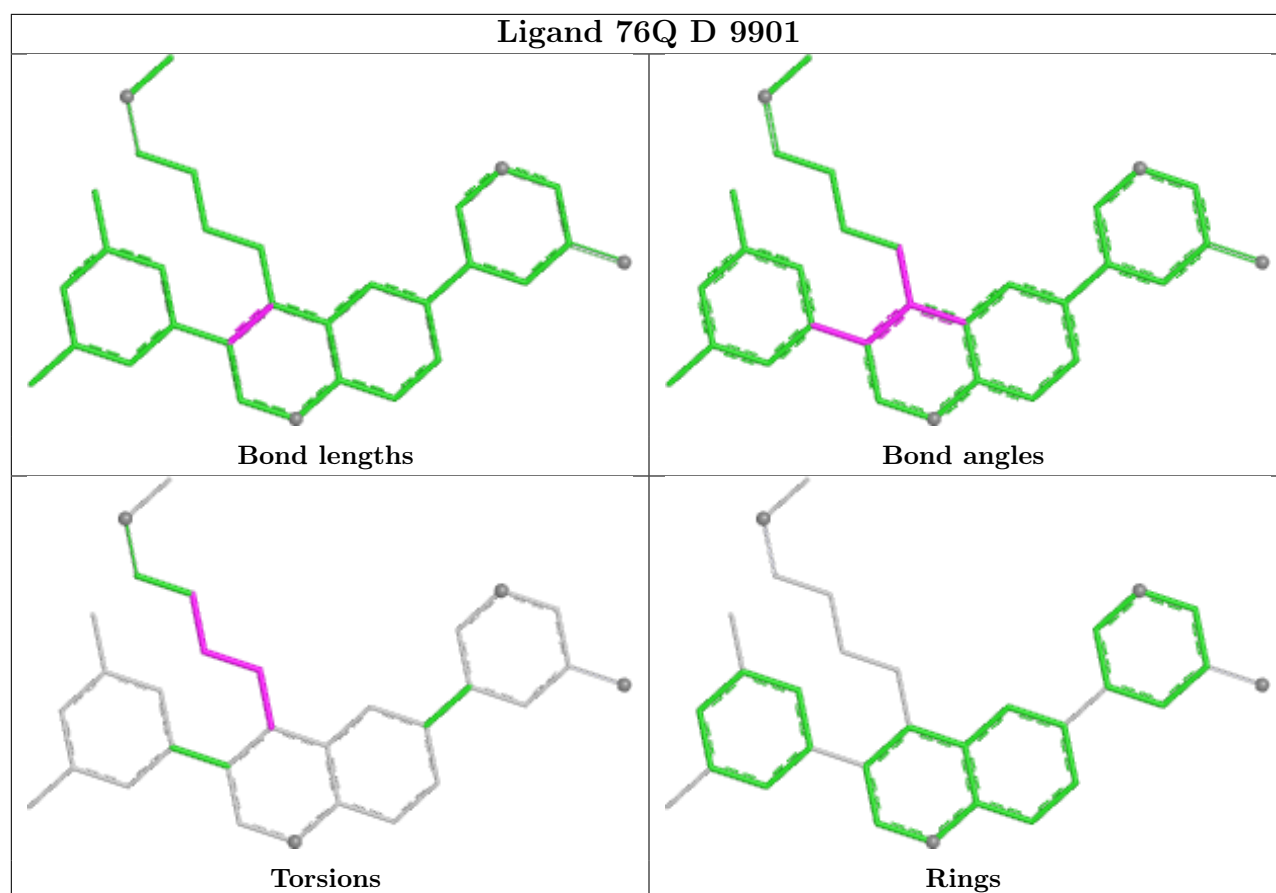
There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	9901	76Q	1	0
2	D	9901	76Q	3	0

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





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	280/301 (93%)	0.65	26 (9%) 14 16	34, 58, 122, 149	0
1	B	282/301 (93%)	0.71	36 (12%) 7 8	34, 61, 136, 156	0
1	C	284/301 (94%)	0.84	53 (18%) 3 4	29, 58, 124, 150	0
1	D	281/301 (93%)	0.79	43 (15%) 5 6	31, 55, 114, 141	0
All	All	1127/1204 (93%)	0.75	158 (14%) 6 7	29, 58, 124, 156	0

All (158) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	335	ALA	8.7
1	A	185	ILE	7.5
1	C	205	VAL	6.2
1	D	224	GLU	6.1
1	C	221	ILE	6.1
1	D	197	PHE	5.9
1	D	185	ILE	5.6
1	A	337	GLU	5.5
1	D	226	LEU	5.5
1	C	197	PHE	5.3
1	C	460	SER	5.1
1	A	341	GLN	5.1
1	D	216	ALA	5.1
1	D	187	VAL	5.0
1	A	459	ALA	4.7
1	C	180	PHE	4.6
1	A	215	LEU	4.6
1	C	336	SER	4.5
1	D	184	PRO	4.4
1	C	215	LEU	4.3
1	C	190	ASN	4.3

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Mol	Chain	Res	Type	RSRZ
1	B	240	CYS	4.2
1	C	185	ILE	4.2
1	D	188	GLY	4.0
1	C	192	MET	4.0
1	D	189	GLY	3.9
1	B	341	GLN	3.9
1	D	199	VAL	3.9
1	C	177	THR	3.8
1	C	170	PHE	3.8
1	D	205	VAL	3.8
1	C	179	ASN	3.8
1	D	459	ALA	3.8
1	B	459	ALA	3.7
1	C	168	PHE	3.7
1	B	197	PHE	3.7
1	D	230	PHE	3.7
1	C	187	VAL	3.6
1	A	184	PRO	3.6
1	C	230	PHE	3.6
1	C	165	PHE	3.6
1	C	191	LYS	3.6
1	B	185	ILE	3.5
1	B	229	GLN	3.5
1	C	335	ALA	3.5
1	D	192	MET	3.5
1	A	226	LEU	3.4
1	C	206	ASN	3.4
1	C	174	LYS	3.2
1	D	336	SER	3.1
1	B	193	GLY	3.1
1	B	190	ASN	3.1
1	C	251	PHE	3.1
1	B	187	VAL	3.0
1	B	344	MET	3.0
1	C	199	VAL	3.0
1	D	183	ARG	3.0
1	A	344	MET	3.0
1	B	230	PHE	3.0
1	A	343	VAL	3.0
1	C	176	VAL	3.0
1	B	191	LYS	3.0
1	B	204	TYR	3.0

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Mol	Chain	Res	Type	RSRZ
1	C	252	SER	3.0
1	C	249	LEU	2.9
1	C	193	GLY	2.9
1	B	165	PHE	2.9
1	B	343	VAL	2.9
1	A	204	TYR	2.9
1	D	190	ASN	2.9
1	B	226	LEU	2.9
1	C	257	ASP	2.9
1	C	259	CYS	2.9
1	D	206	ASN	2.9
1	A	193	GLY	2.8
1	D	186	SER	2.8
1	B	258	LEU	2.8
1	D	196	GLY	2.8
1	C	173	LEU	2.8
1	A	213	LYS	2.8
1	A	176	VAL	2.8
1	D	165	PHE	2.7
1	B	184	PRO	2.7
1	B	216	ALA	2.7
1	D	181	ASP	2.7
1	C	164	ARG	2.7
1	A	180	PHE	2.7
1	D	193	GLY	2.7
1	D	410	ILE	2.7
1	C	186	SER	2.7
1	B	234	ILE	2.6
1	C	183	ARG	2.6
1	A	179	ASN	2.6
1	B	180	PHE	2.6
1	C	178	ASN	2.6
1	A	200	VAL	2.6
1	C	258	LEU	2.6
1	C	254	ASP	2.6
1	C	196	GLY	2.6
1	A	205	VAL	2.6
1	C	343	VAL	2.6
1	C	201	TYR	2.6
1	B	390	HIS	2.6
1	D	227	LYS	2.6
1	C	175	ASN	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	197	PHE	2.5
1	D	343	VAL	2.5
1	C	181	ASP	2.5
1	D	179	ASN	2.5
1	D	180	PHE	2.5
1	B	200	VAL	2.5
1	C	184	PRO	2.5
1	B	389	GLU	2.5
1	D	176	VAL	2.5
1	D	204	TYR	2.5
1	A	196	GLY	2.5
1	D	229	GLN	2.5
1	A	192	MET	2.4
1	B	196	GLY	2.4
1	C	200	VAL	2.4
1	C	234	ILE	2.4
1	D	200	VAL	2.4
1	B	215	LEU	2.4
1	D	177	THR	2.4
1	C	204	TYR	2.3
1	A	222	THR	2.3
1	D	168	PHE	2.3
1	A	202	LYS	2.3
1	C	171	TYR	2.3
1	B	192	MET	2.3
1	C	203	GLY	2.3
1	D	166	HIS	2.3
1	D	409	THR	2.2
1	B	332	LEU	2.2
1	A	207	ASN	2.2
1	D	209	THR	2.2
1	B	257	ASP	2.2
1	D	256	ASP	2.2
1	A	240	CYS	2.2
1	D	259	CYS	2.2
1	D	253	SER	2.2
1	B	173	LEU	2.1
1	C	344	MET	2.1
1	B	213	LYS	2.1
1	D	264	TYR	2.1
1	D	254	ASP	2.1
1	B	189	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	179	ASN	2.1
1	D	207	ASN	2.1
1	B	195	GLY	2.1
1	A	336	SER	2.1
1	B	186	SER	2.0
1	C	459	ALA	2.0
1	A	181	ASP	2.0
1	C	410	ILE	2.0
1	C	255	GLY	2.0
1	C	213	LYS	2.0
1	C	169	SER	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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(Å ²)	Q<0.9
1	SEP	C	346	10/11	0.55	0.15	79,86,95,95	0
1	SEP	B	346	10/11	0.63	0.13	87,91,97,97	0
1	SEP	A	346	10/11	0.69	0.15	78,82,89,89	0
1	SEP	D	346	10/11	0.78	0.12	75,82,91,91	0
1	TPO	D	342	11/12	0.79	0.15	83,86,94,94	0
1	TPO	C	342	11/12	0.80	0.15	89,90,95,95	0
1	TPO	B	342	11/12	0.80	0.16	93,95,95,95	0
1	TPO	A	342	11/12	0.84	0.14	88,89,96,96	0
1	TPO	A	345	11/12	0.89	0.14	74,76,79,80	0
1	TPO	D	345	11/12	0.91	0.12	70,74,75,76	0
1	TPO	B	345	11/12	0.92	0.11	85,87,88,89	0
1	TPO	C	345	11/12	0.94	0.10	71,72,76,78	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

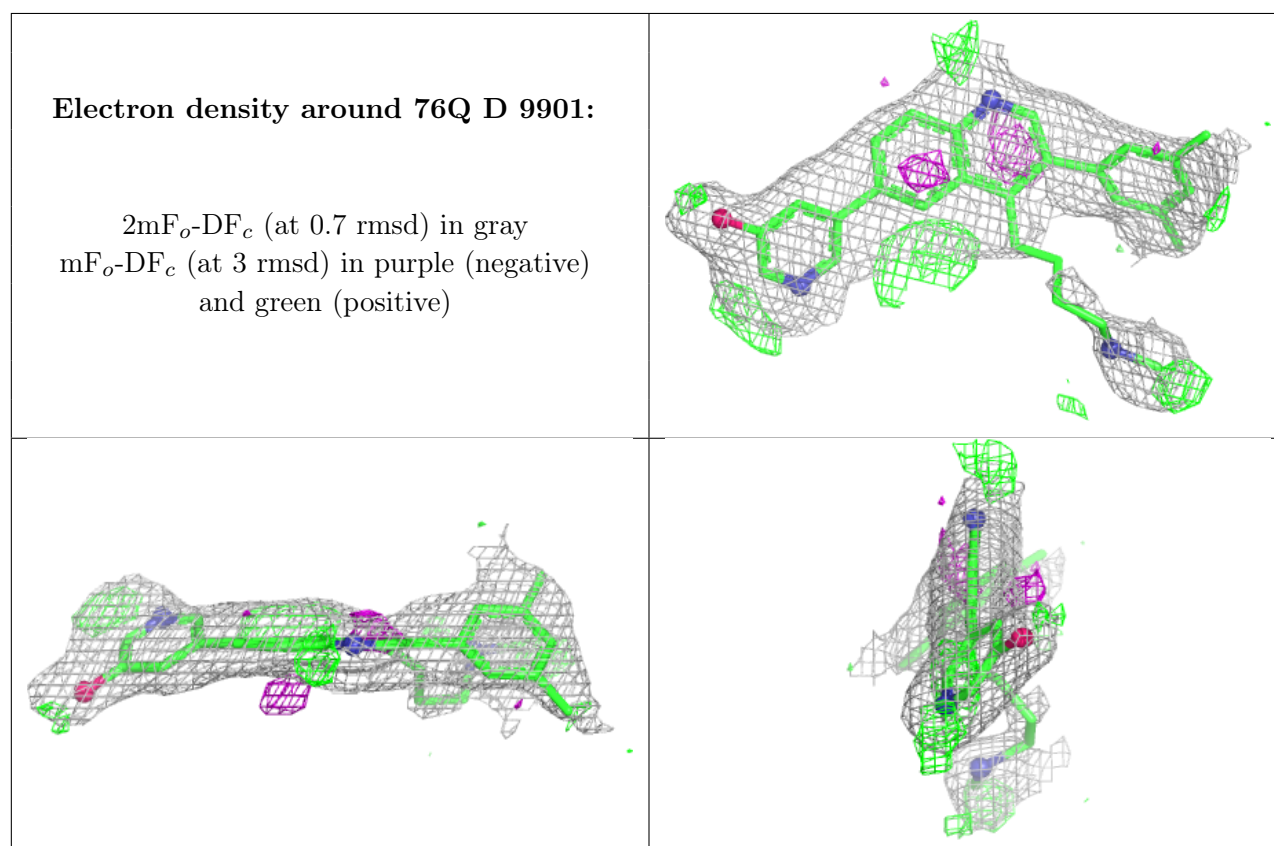
6.4 Ligands [i](#)

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

median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

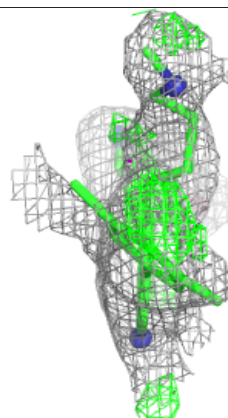
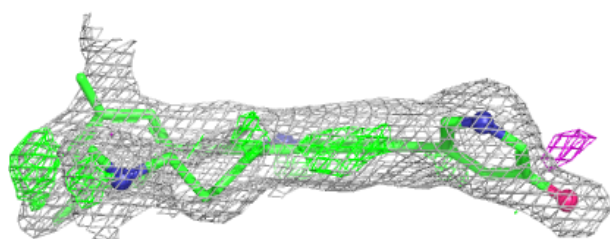
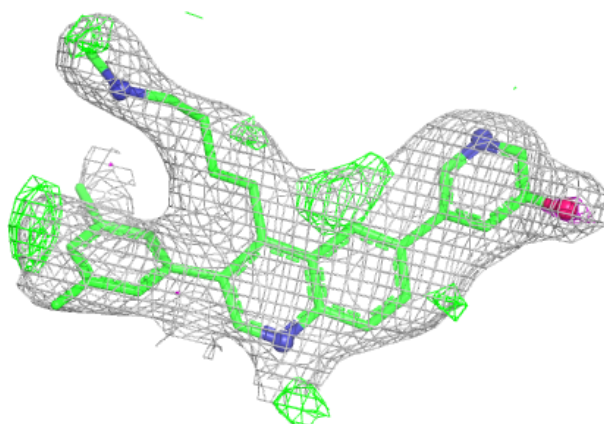
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	76Q	D	9901	31/31	0.75	0.19	66,73,78,78	0
2	76Q	C	9901	31/31	0.80	0.18	58,69,74,75	0
2	76Q	A	9901	31/31	0.81	0.16	61,71,77,78	0
2	76Q	B	9901	31/31	0.85	0.15	58,67,75,80	0

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.

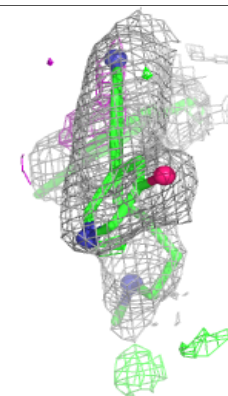
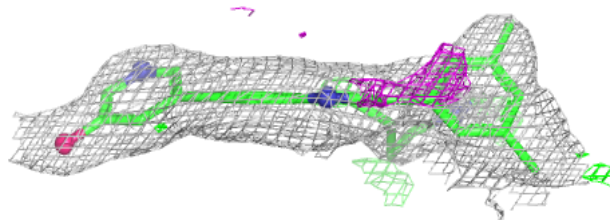
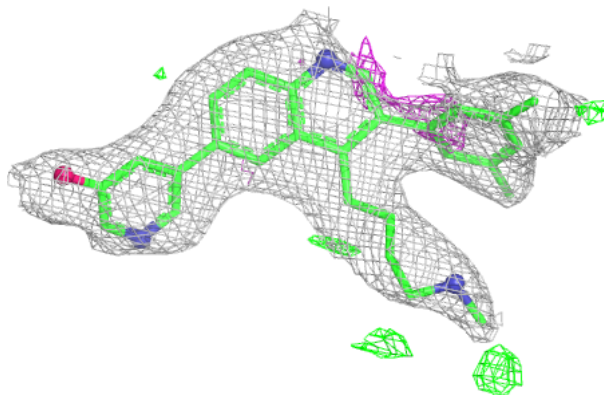


Electron density around 76Q C 9901:

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

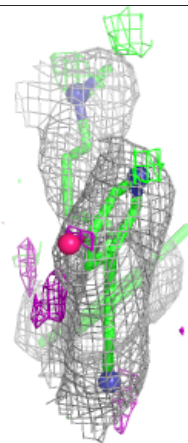
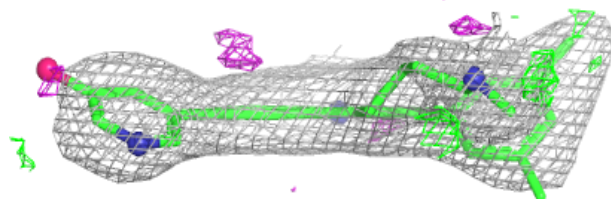
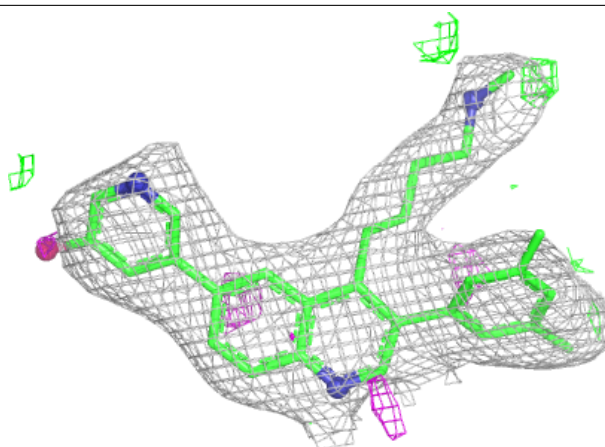
**Electron density around 76Q A 9901:**

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



Electron density around 76Q B 9901:

$2mF_o-DF_c$ (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.