



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 12:33 PM UTC

PDB ID : 8PTA / pdb_00008pta
Title : JNK1 covalently bound to BD837 cyclohexenone based inhibitor
Authors : Sok, P.; Poti, A.; Remenyi, A.
Deposited on : 2023-07-13
Resolution : 2.41 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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

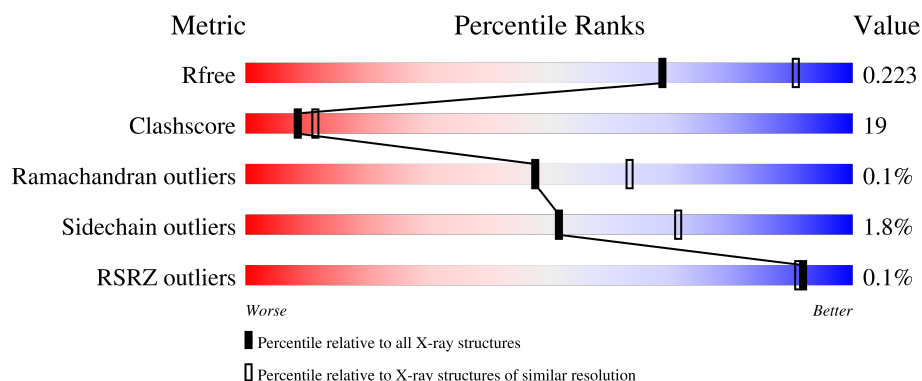
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION




The reported resolution of this entry is 2.41 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	6062 (2.44-2.40)
Clashscore	190562	6562 (2.44-2.40)
Ramachandran outliers	187476	6481 (2.44-2.40)
Sidechain outliers	187428	6482 (2.44-2.40)
RSRZ outliers	180081	6066 (2.44-2.40)

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	366	 66% 30% ..
1	B	366	 64% 32% ..
1	C	366	 50% 44% . .

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 8442 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.

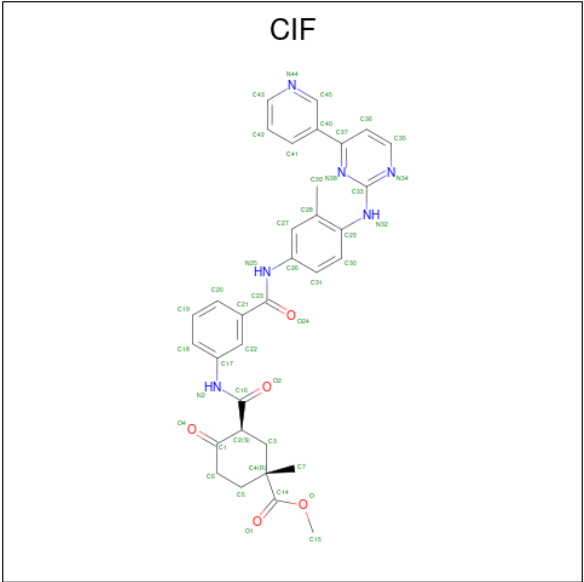
- Molecule 1 is a protein called Mitogen-activated protein kinase 8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	354	Total	C	N	O	S	0	0	0
			2765	1781	456	507	21			
1	B	352	Total	C	N	O	S	0	0	0
			2777	1790	460	507	20			
1	C	351	Total	C	N	O	S	0	0	0
			2735	1758	456	502	19			

There are 9 discrepancies between the modelled and reference sequences:

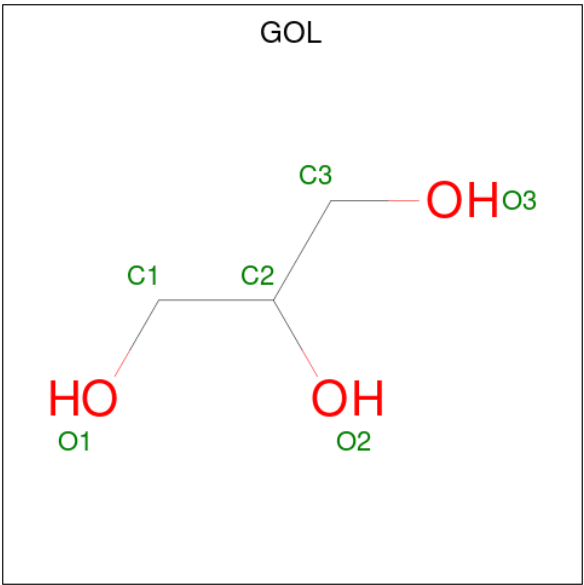
Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP P45983
A	0	SER	-	expression tag	UNP P45983
A	208	ILE	LEU	variant	UNP P45983
B	-1	GLY	-	expression tag	UNP P45983
B	0	SER	-	expression tag	UNP P45983
B	208	ILE	LEU	variant	UNP P45983
C	-1	GLY	-	expression tag	UNP P45983
C	0	SER	-	expression tag	UNP P45983
C	208	ILE	LEU	variant	UNP P45983

- Molecule 2 is methyl (1R,3S)-1-methyl-3-[[3-[[3-methyl-4-[(4-pyridin-3-yl)pyrimidin-2-yl)amino]phenyl]carbamoyl]phenyl]carbamoyl]-4-oxidanylidene-cyclohexane-1-carboxylate (CCD ID: CIF) (formula: C₃₃H₃₂N₆O₅) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			44	33	6	5		
2	B	1	Total	C	N	O	0	0
			44	33	6	5		
2	C	1	Total	C	N	O	0	0
			44	33	6	5		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			6	3	3		

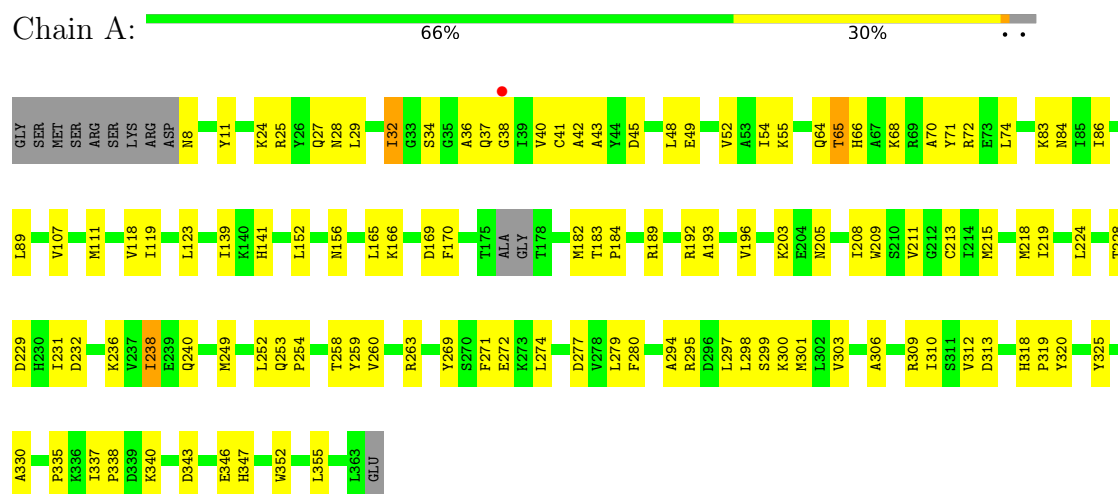
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	8	Total 8	O 8	0	0
4	B	12	Total 12	O 12	0	0
4	C	7	Total 7	O 7	0	0

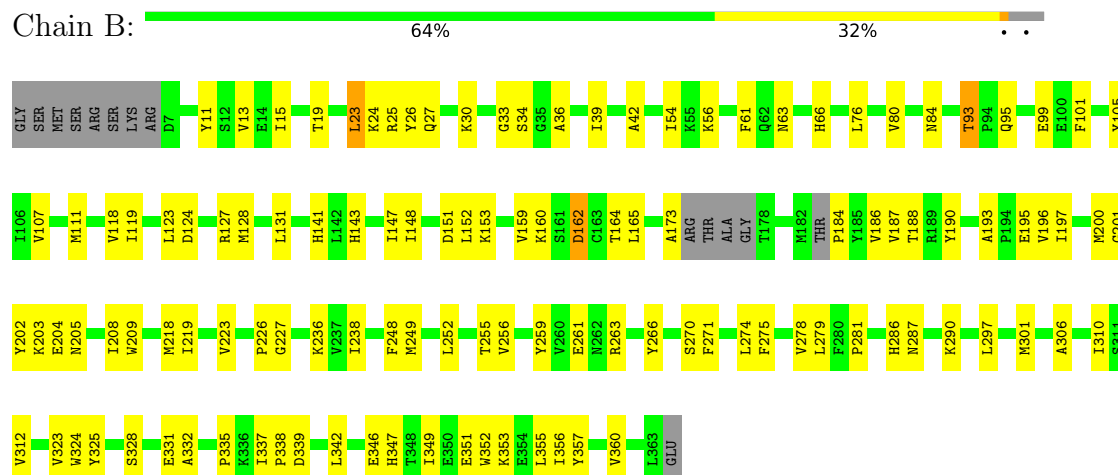
3 Residue-property plots [i](#)

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: Mitogen-activated protein kinase 8



• Molecule 1: Mitogen-activated protein kinase 8



• Molecule 1: Mitogen-activated protein kinase 8



GLY	L98	T178	V256	E344
SER	E99	S179	R257	R345
MET	F100	F180	Y258	E346
SER	F101	M181	Y259	H347
ARG	Q102	M182		
SER	D103	THR	R263	E350
LYS	V104	PRO		E351
ARG	Y105	TYR	Y266	W352
ASP	I106	V186		K353
N8	V107	V187	F271	E354
N9		T188	E272	L355
F10	M111	R189	K273	I356
		Y190	L274	Y357
G16	M114	Y191	F275	K358
D17		R192	P276	E359
L23	V118	A193	D277	V360
K24		P194	V278	N361
K25	L123	E195	L279	ASP
R26	D124	V196	F280	LEU
	H125	I197	P281	GLU
	E126			
L29	R127	M200	E285	
	M128	G201		
V40	S129	Y202	K288	
C41		K203	L289	
A42		E204	K290	
A43	L132	N205	A291	
Y44	Y133	V206		
	M135	D207	R295	
I54		I208	D296	
K55	I139	W209	L297	
K56	K140	S210	L298	
L57	H141	V211	S299	
	L142		K300	
P60	H143	I214	M301	
F61	S144	M215		
	A145		I304	
Y71	G146	I219	D305	
R72	I147	K220	A306	
E73	I148			
L74	H149	P226	R309	
V75	R150		I310	
L76		D229	A315	
M77	V158	H230		
	V159	I231		
	K160	D232	H318	
H82		Q233	P319	
K83	L165		Y320	
N84	K166	V237	I321	
I85	I167	I238	W324	
I86	L168	E239		
G87	D169	Q240	E329	
L89	F170	L241		
	G171	P244	P335	
V91	L172		K336	
F92	A173	F248	I337	
T93	R174			
P94	T175	L252	L342	
Q95	A176		D343	
K96	G177			
S97				

4 Data and refinement statistics

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, α , β , γ	106.26Å 106.26Å 99.72Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	46.89 – 2.41 46.89 – 2.41	Depositor EDS
% Data completeness (in resolution range)	99.8 (46.89-2.41) 99.7 (46.89-2.41)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.14 (at 2.42Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.210 , 0.226 0.211 , 0.223	Depositor DCC
R_{free} test set	1979 reflections (4.07%)	wwPDB-VP
Wilson B-factor (Å ²)	71.9	Xtriage
Anisotropy	0.407	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 76.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.39$, $\langle L^2 \rangle = 0.22$	Xtriage
Estimated twinning fraction	0.458 for -h,-k,l 0.130 for h,-h-k,-l 0.129 for -k,-h,-l	Xtriage
Reported twinning fraction	0.459 for -h,-k,l	Depositor
Outliers	0 of 48500 reflections	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	8442	wwPDB-VP
Average B, all atoms (Å ²)	84.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.48% 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: GOL, CIF

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	0.34	1/2829 (0.0%)	0.58	1/3844 (0.0%)
1	B	0.41	1/2840 (0.0%)	0.65	1/3851 (0.0%)
1	C	0.48	2/2797 (0.1%)	0.73	1/3799 (0.0%)
All	All	0.41	4/8466 (0.0%)	0.66	3/11494 (0.0%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	227	GLY	CA-C	9.01	1.59	1.52
1	C	226	PRO	C-N	-8.06	1.29	1.33
1	C	201	GLY	C-O	5.44	1.27	1.23
1	A	34	SER	CA-CB	-5.30	1.49	1.53

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	360	VAL	N-CA-C	-6.18	104.91	112.76
1	B	201	GLY	CA-C-O	-6.09	117.92	122.37
1	A	37	GLN	N-CA-C	-5.36	106.43	112.87

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	2765	0	2697	79	0
1	B	2777	0	2737	86	0
1	C	2735	0	2668	143	0
2	A	44	0	0	2	0
2	B	44	0	0	6	0
2	C	44	0	0	3	0
3	A	6	0	8	0	0
4	A	8	0	0	0	0
4	B	12	0	0	0	0
4	C	7	0	0	0	0
All	All	8442	0	8110	313	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 19.

The worst 5 of 313 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:C:72:ARG:HH22	1:C:172:LEU:HA	1.39	0.88
1:C:129:SER:HB2	1:C:324:TRP:HE1	1.41	0.85
1:B:111:MET:H	2:B:401:CIF:C35	1.95	0.78
1:C:178:THR:HG23	1:C:180:PHE:H	1.49	0.77
1:C:189:ARG:HA	1:C:192:ARG:HG3	1.65	0.76

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	350/366 (96%)	340 (97%)	10 (3%)	0	100	100
1	B	346/366 (94%)	336 (97%)	10 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	347/366 (95%)	336 (97%)	10 (3%)	1 (0%)	36	49
All	All	1043/1098 (95%)	1012 (97%)	30 (3%)	1 (0%)	48	63

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	178	THR

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	295/327 (90%)	291 (99%)	4 (1%)	59	77
1	B	299/327 (91%)	294 (98%)	5 (2%)	53	73
1	C	290/327 (89%)	283 (98%)	7 (2%)	43	63
All	All	884/981 (90%)	868 (98%)	16 (2%)	51	71

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	337	ILE
1	C	277	ASP
1	B	278	VAL
1	C	271	PHE
1	B	255	THR

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	8	ASN
1	A	233	GLN
1	A	318	HIS
1	C	120	GLN

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 ⓘ

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	CIF	C	401	1	47,48,48	2.12	17 (36%)	64,68,68	2.18	18 (28%)
3	GOL	A	402	-	5,5,5	0.94	0	5,5,5	1.15	1 (20%)
2	CIF	A	401	1	47,48,48	1.98	12 (25%)	64,68,68	2.27	19 (29%)
2	CIF	B	401	1	47,48,48	2.07	16 (34%)	64,68,68	2.34	22 (34%)

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	CIF	C	401	1	-	14/32/47/47	0/5/5/5
3	GOL	A	402	-	-	2/4/4/4	-
2	CIF	A	401	1	-	11/32/47/47	0/5/5/5
2	CIF	B	401	1	-	11/32/47/47	0/5/5/5

The worst 5 of 45 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	401	CIF	O-C14	6.36	1.45	1.33
2	B	401	CIF	C26-N25	-4.91	1.31	1.41
2	B	401	CIF	O-C14	4.46	1.41	1.33
2	C	401	CIF	O-C14	4.37	1.41	1.33
2	A	401	CIF	C17-N2	-4.31	1.32	1.41

The worst 5 of 60 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	401	CIF	C37-N38-C33	7.16	122.32	116.81
2	C	401	CIF	C35-N34-C33	7.03	121.29	115.42
2	A	401	CIF	C37-N38-C33	7.01	122.20	116.81
2	C	401	CIF	N34-C33-N38	-6.58	120.06	126.42
2	A	401	CIF	N34-C33-N38	-6.43	120.20	126.42

There are no chirality outliers.

5 of 38 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	CIF	O1-C14-C4-C3
2	A	401	CIF	C28-C29-N32-C33
2	A	401	CIF	C30-C29-N32-C33
2	B	401	CIF	N2-C16-C2-C1
2	B	401	CIF	O2-C16-C2-C1

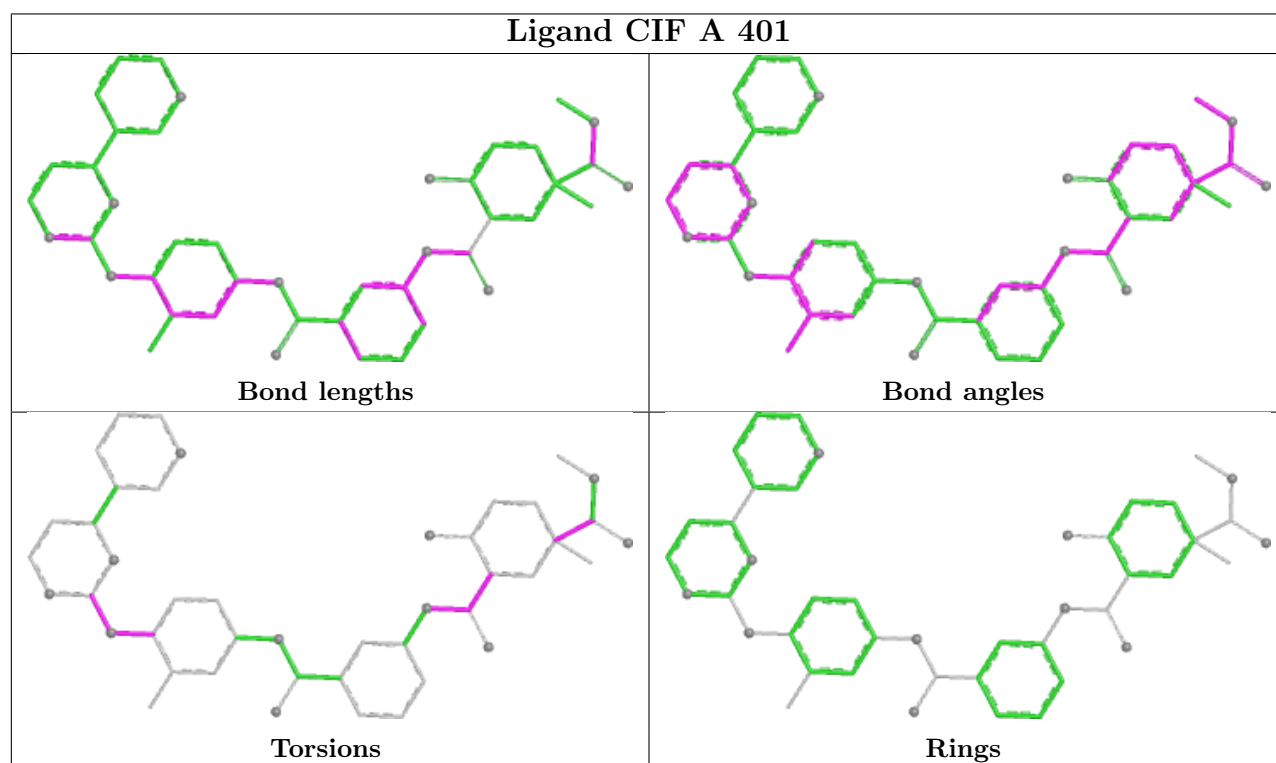
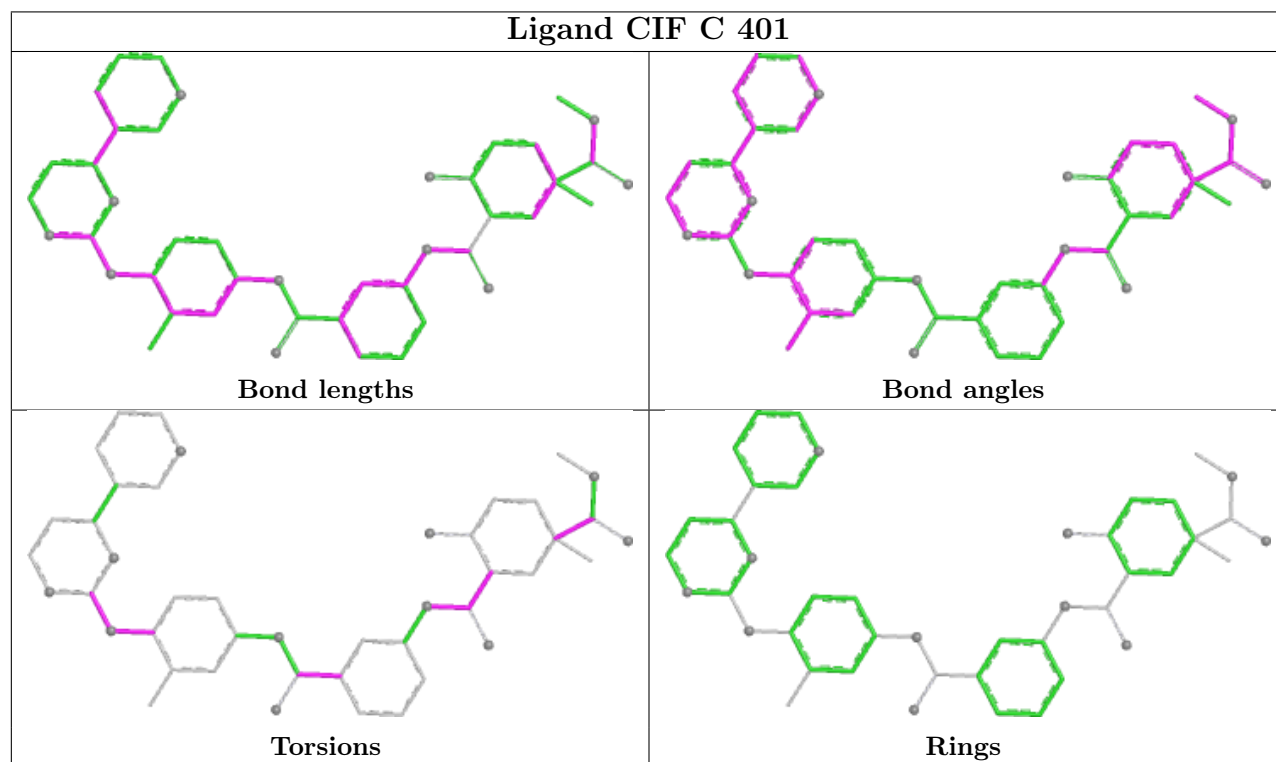
There are no ring outliers.

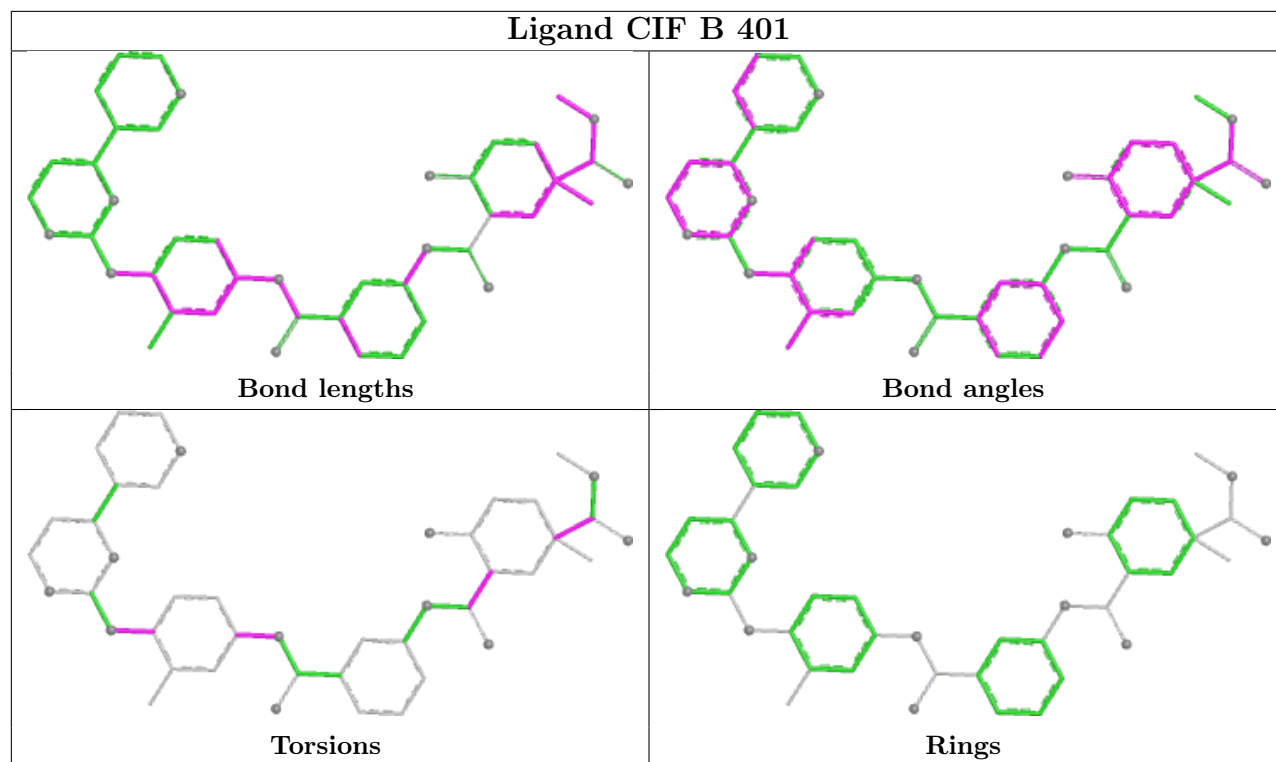
3 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	401	CIF	3	0
2	A	401	CIF	2	0
2	B	401	CIF	6	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 [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	354/366 (96%)	-0.46	1 (0%) 90 88	55, 76, 104, 159	0
1	B	352/366 (96%)	-0.50	0 100 100	51, 74, 107, 129	0
1	C	351/366 (95%)	-0.28	0 100 100	71, 96, 129, 183	0
All	All	1057/1098 (96%)	-0.41	1 (0%) 92 91	51, 83, 117, 183	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	38	GLY	2.2

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 [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
2	CIF	C	401	44/44	0.97	0.08	72,81,86,87	0
3	GOL	A	402	6/6	0.97	0.06	61,62,66,69	0

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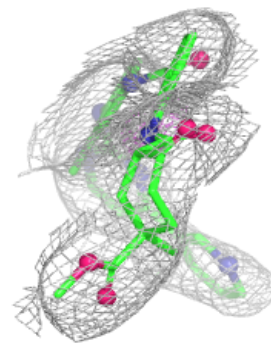
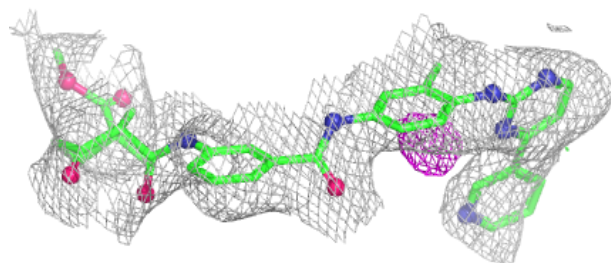
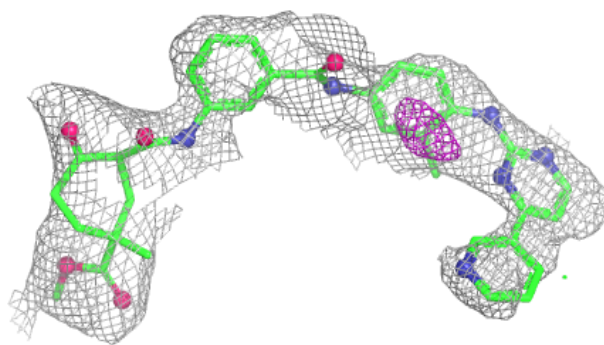
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	CIF	A	401	44/44	0.98	0.07	63,77,92,110	0
2	CIF	B	401	44/44	0.98	0.07	71,78,92,110	0

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.

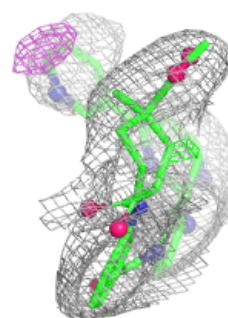
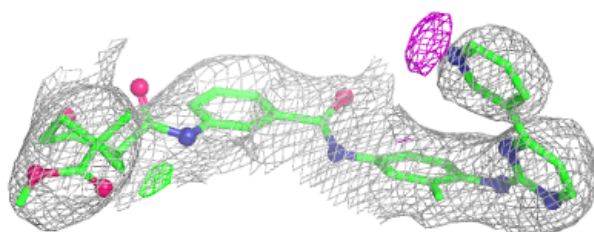
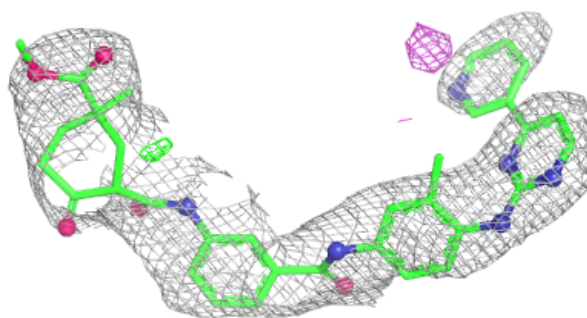
Electron density around CIF C 401:

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

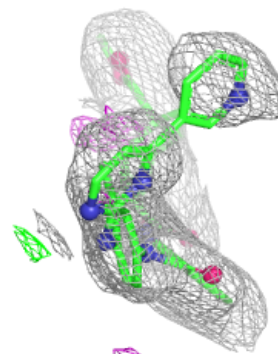
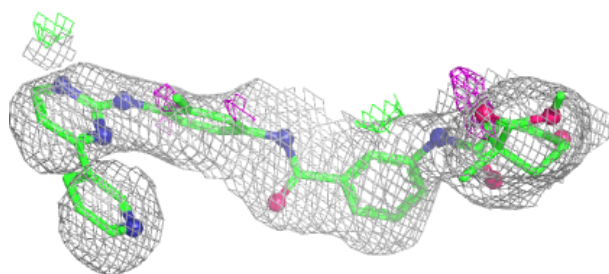
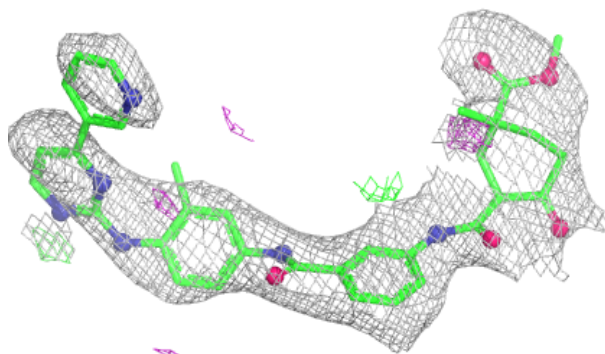


Electron density around CIF A 401:

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

**Electron density around CIF B 401:**

$2mF_o-DF_c$ (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.