



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 18, 2026 – 12:51 AM UTC

PDB ID : 6TU6 / pdb_00006tu6
Title : Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole
Authors : Bloch, J.S.; Hilvert, D.
Deposited on : 2020-01-02
Resolution : 1.05 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

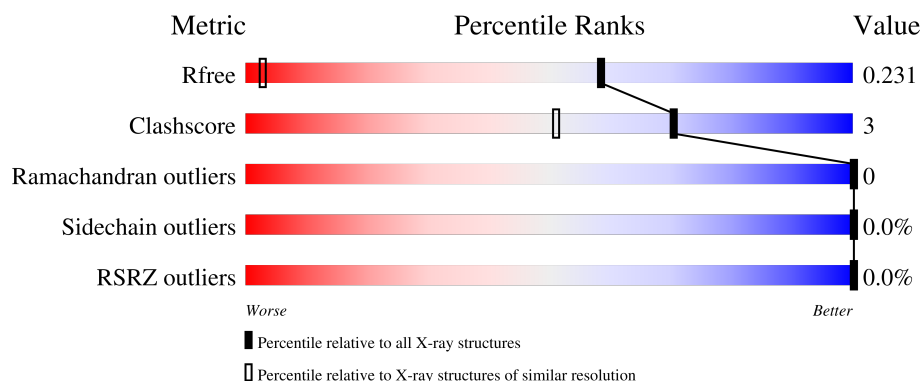
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.05 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	1182 (1.08-1.04)
Clashscore	190562	1204 (1.08-1.04)
Ramachandran outliers	187476	1175 (1.08-1.04)
Sidechain outliers	187428	1176 (1.08-1.04)
RSRZ outliers	180081	1181 (1.08-1.04)

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	317	89% 6% 5%
1	B	317	89% 6% 5%
1	C	317	90% 5% 5%
1	D	317	91% • 5%
1	E	317	91% • 5%

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Mol	Chain	Length	Quality of chain
1	F	317	 89% 6% 5%
1	G	317	 89% 6% 5%
1	H	317	 87% 7% 5%
1	I	317	 88% 7% 5%
1	J	317	 90% 5% 5%
1	K	317	 90% 5% 5%
1	L	317	 92% 5%
1	M	317	 91% 5%
1	N	317	 85% 10% 5%
1	O	317	 88% 7% 5%
1	P	317	 90% 5% 5%

2 Entry composition

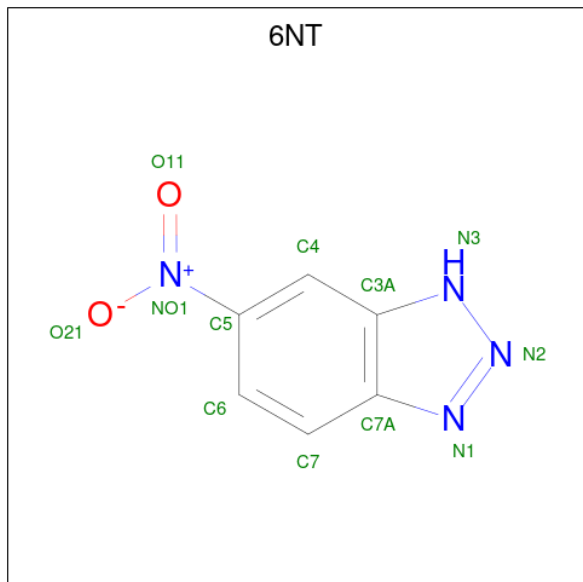
There are 4 unique types of molecules in this entry. The entry contains 84548 atoms, of which 38676 are hydrogens and 0 are deuteriums.

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 Kemp Eliminate HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	300	Total	C	H	N	O	S	0	40	0
			4859	1547	2413	420	465	14			
1	B	300	Total	C	H	N	O	S	0	40	1
			4861	1544	2416	426	461	14			
1	C	300	Total	C	H	N	O	S	0	38	1
			4847	1541	2410	423	460	13			
1	D	300	Total	C	H	N	O	S	0	35	1
			4806	1527	2390	418	458	13			
1	E	300	Total	C	H	N	O	S	0	40	1
			4833	1539	2403	417	461	13			
1	F	300	Total	C	H	N	O	S	0	39	0
			4827	1539	2395	416	462	15			
1	G	300	Total	C	H	N	O	S	0	32	1
			4772	1521	2371	411	456	13			
1	H	301	Total	C	H	N	O	S	0	42	0
			4877	1550	2426	420	466	15			
1	I	300	Total	C	H	N	O	S	0	40	0
			4856	1543	2418	418	464	13			
1	J	300	Total	C	H	N	O	S	0	38	0
			4832	1537	2405	415	460	15			
1	K	300	Total	C	H	N	O	S	0	45	0
			4884	1551	2427	423	469	14			
1	L	300	Total	C	H	N	O	S	0	36	0
			4806	1529	2388	416	459	14			
1	M	300	Total	C	H	N	O	S	0	43	1
			4864	1543	2420	423	465	13			
1	N	300	Total	C	H	N	O	S	0	43	0
			4871	1546	2423	422	466	14			
1	O	301	Total	C	H	N	O	S	0	46	0
			4908	1558	2445	422	468	15			
1	P	300	Total	C	H	N	O	S	0	50	1
			4948	1568	2462	433	472	13			

- Molecule 2 is 6-NITROBENZOTRIAZOLE (CCD ID: 6NT) (formula: $C_6H_4N_4O_2$) (labeled as "Ligand of Interest" by depositor).



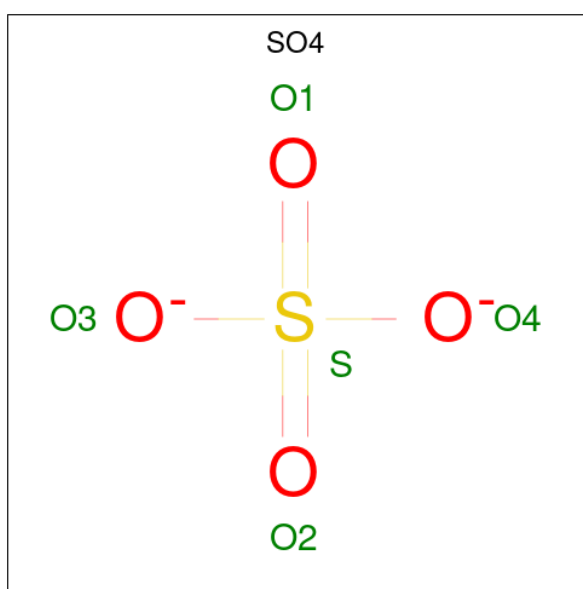
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	B	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	C	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	D	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	E	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	F	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	G	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	H	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	I	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	J	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	K	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	L	1	Total	C	H	N	O	0	1
			16	6	4	4	2		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	M	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	N	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	O	1	Total	C	H	N	O	0	1
			16	6	4	4	2		
2	P	1	Total	C	H	N	O	0	1
			16	6	4	4	2		

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	D	1	Total 5	O 4	S 1	0	0
3	E	1	Total 5	O 4	S 1	0	0
3	E	1	Total 5	O 4	S 1	0	0
3	F	1	Total 5	O 4	S 1	0	0
3	H	1	Total 5	O 4	S 1	0	0
3	H	1	Total 5	O 4	S 1	0	0
3	I	1	Total 5	O 4	S 1	0	0
3	I	1	Total 5	O 4	S 1	0	0
3	J	1	Total 5	O 4	S 1	0	0
3	L	1	Total 5	O 4	S 1	0	0
3	M	1	Total 5	O 4	S 1	0	0
3	M	1	Total 5	O 4	S 1	0	0
3	N	1	Total 5	O 4	S 1	0	0
3	N	1	Total 5	O 4	S 1	0	0
3	O	1	Total 5	O 4	S 1	0	0
3	P	1	Total 5	O 4	S 1	0	0
3	P	1	Total 5	O 4	S 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	458	Total 459	O 459	0	2
4	B	439	Total 439	O 439	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	432	Total 434	O 434	0	2
4	D	406	Total 407	O 407	0	2
4	E	443	Total 445	O 445	0	2
4	F	394	Total 394	O 394	0	0
4	G	390	Total 390	O 390	0	0
4	H	390	Total 390	O 390	0	0
4	I	378	Total 378	O 378	0	0
4	J	376	Total 376	O 376	0	0
4	K	374	Total 374	O 374	0	0
4	L	409	Total 409	O 409	0	0
4	M	463	Total 464	O 464	0	2
4	N	371	Total 372	O 372	0	1
4	O	372	Total 372	O 372	0	0
4	P	416	Total 418	O 418	0	2

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: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain A: 



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain B: 



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain C: 



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain D: 



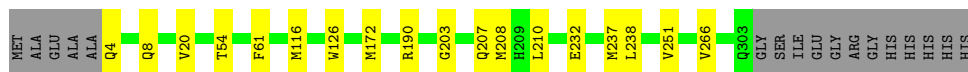
- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain E: 



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain F: 89% 6% 5%



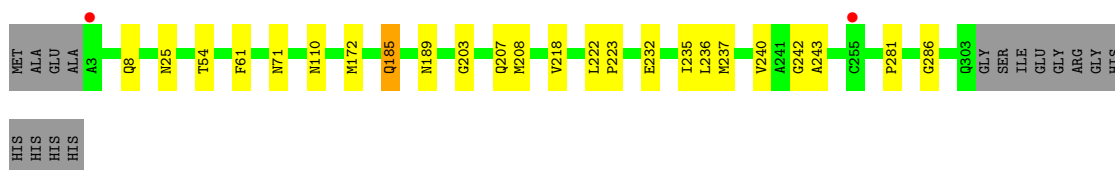
- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain G: 89% 6% 5%



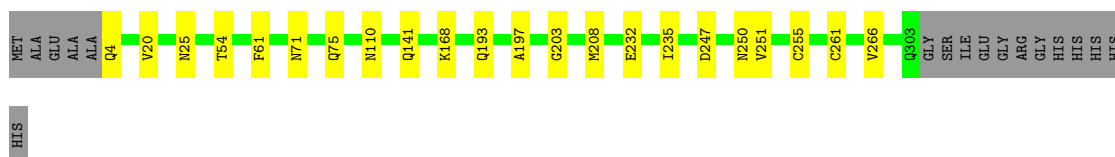
- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain H: 87% 7% 5%



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain I: 88% 7% 5%



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain J: 90% 5% 5%



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain K:  90% 5% 5%



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain L:  92% 5%



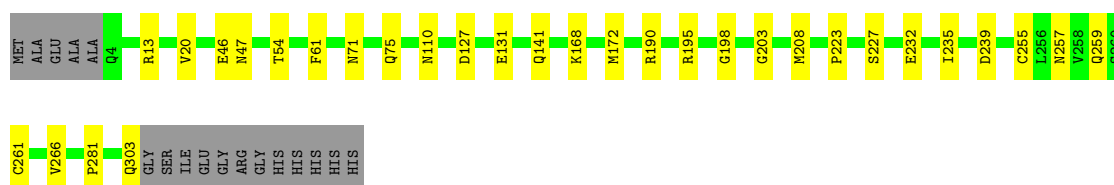
- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain M:  91% 5%



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain N:  85% 10% 5%



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain O:  88% 7% 5%



- Molecule 1: Kemp Eliminase HG3.17 mutant Q50M, E47N, N300D Complexed with Transition State Analog 6-Nitrobenzotriazole

Chain P:  90% 5% 5%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	98.37Å 108.69Å 108.72Å 88.53° 90.16° 89.82°	Depositor
Resolution (Å)	49.18 – 1.05 49.18 – 1.05	Depositor EDS
% Data completeness (in resolution range)	95.3 (49.18-1.05) 94.1 (49.18-1.05)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.66 (at 1.05Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.196 , 0.231 0.196 , 0.231	Depositor DCC
R_{free} test set	1979 reflections (0.09%)	wwPDB-VP
Wilson B-factor (Å ²)	8.6	Xtriage
Anisotropy	0.114	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.43 , 46.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	0.022 for h,-l,k 0.022 for h,l,-k 0.477 for h,-k,-l 0.022 for -h,k,-l 0.023 for -h,-k,l 0.477 for -h,-l,-k 0.479 for -h,l,k	Xtriage
F_o, F_c correlation	0.98	EDS
Total number of atoms	84548	wwPDB-VP
Average B, all atoms (Å ²)	12.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 94.85 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.1339e-09. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 6NT, SO4

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	0.32	0/2637	0.55	0/3596
1	B	0.35	0/2625	0.57	0/3578
1	C	0.32	0/2606	0.55	0/3553
1	D	0.33	0/2565	0.55	0/3495
1	E	0.33	0/2606	0.56	0/3553
1	F	0.34	0/2602	0.56	0/3547
1	G	0.34	0/2547	0.56	0/3473
1	H	0.32	0/2627	0.56	0/3583
1	I	0.32	0/2621	0.55	0/3574
1	J	0.32	0/2599	0.57	0/3543
1	K	0.33	0/2666	0.55	0/3635
1	L	0.33	0/2578	0.56	0/3514
1	M	0.35	1/2626 (0.0%)	0.55	0/3579
1	N	0.33	0/2639	0.55	0/3597
1	O	0.33	0/2658	0.57	0/3624
1	P	0.31	0/2701	0.54	0/3681
All	All	0.33	1/41903 (0.0%)	0.56	0/57125

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	M	50[A]	MET	CG-SD	7.15	1.98	1.80

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	2446	2413	2252	20	0
1	B	2445	2416	2254	18	0
1	C	2437	2410	2267	14	0
1	D	2416	2390	2260	12	0
1	E	2430	2403	2250	11	0
1	F	2432	2395	2240	15	0
1	G	2401	2371	2241	16	0
1	H	2451	2426	2266	23	0
1	I	2438	2418	2260	20	0
1	J	2427	2405	2250	14	0
1	K	2457	2427	2252	15	0
1	L	2418	2388	2251	8	0
1	M	2444	2420	2260	11	0
1	N	2448	2423	2262	24	0
1	O	2463	2445	2262	23	0
1	P	2486	2462	2271	14	0
2	A	12	4	4	0	0
2	B	12	4	4	0	0
2	C	12	4	4	0	0
2	D	12	4	4	0	0
2	E	12	4	4	0	0
2	F	12	4	4	0	0
2	G	12	4	4	0	0
2	H	12	4	4	0	0
2	I	12	4	4	0	0
2	J	12	4	4	0	0
2	K	12	4	4	0	0
2	L	12	4	4	0	0
2	M	12	4	4	0	0
2	N	12	4	4	0	0
2	O	12	4	4	1	0
2	P	12	4	4	0	0
3	A	5	0	0	1	0
3	B	5	0	0	0	0
3	C	15	0	0	1	0
3	D	15	0	0	1	0
3	E	10	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	F	5	0	0	0	0
3	H	10	0	0	0	0
3	I	10	0	0	1	0
3	J	5	0	0	0	0
3	L	5	0	0	0	0
3	M	10	0	0	1	0
3	N	10	0	0	1	0
3	O	5	0	0	0	0
3	P	10	0	0	1	0
4	A	459	0	0	13	4
4	B	439	0	0	11	3
4	C	434	0	0	10	2
4	D	407	0	0	10	5
4	E	445	0	0	8	3
4	F	394	0	0	3	5
4	G	390	0	0	12	3
4	H	390	0	0	10	1
4	I	378	0	0	14	3
4	J	376	0	0	3	3
4	K	374	0	0	9	4
4	L	409	0	0	6	6
4	M	464	0	0	10	2
4	N	372	0	0	16	1
4	O	372	0	0	5	1
4	P	418	0	0	8	2
All	All	45872	38676	36162	261	24

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 3.

The worst 5 of 261 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:I:193:GLN:O	4:I:501:HOH:O	1.52	1.20
1:H:110[A]:ASN:ND2	4:H:503:HOH:O	1.88	1.03
1:K:195:ARG:O	4:K:501:HOH:O	1.72	1.03
1:G:195:ARG:O	4:G:501:HOH:O	1.75	1.01
1:N:195:ARG:O	4:N:501:HOH:O	1.80	0.98

The worst 5 of 24 symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:K:502:HOH:O	4:P:662:HOH:O[1_665]	1.97	0.23
4:F:558:HOH:O	4:L:806:HOH:O[1_556]	2.01	0.19
4:F:658:HOH:O	4:L:690:HOH:O[1_556]	2.01	0.19
4:A:926:HOH:O	4:E:882:HOH:O[1_655]	2.02	0.18
4:B:771:HOH:O	4:M:813:HOH:O[1_655]	2.02	0.18

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	334/317 (105%)	326 (98%)	8 (2%)	0	100	100
1	B	334/317 (105%)	329 (98%)	5 (2%)	0	100	100
1	C	332/317 (105%)	327 (98%)	5 (2%)	0	100	100
1	D	329/317 (104%)	324 (98%)	5 (2%)	0	100	100
1	E	334/317 (105%)	329 (98%)	5 (2%)	0	100	100
1	F	333/317 (105%)	329 (99%)	4 (1%)	0	100	100
1	G	326/317 (103%)	321 (98%)	5 (2%)	0	100	100
1	H	337/317 (106%)	332 (98%)	5 (2%)	0	100	100
1	I	334/317 (105%)	330 (99%)	4 (1%)	0	100	100
1	J	332/317 (105%)	327 (98%)	5 (2%)	0	100	100
1	K	339/317 (107%)	334 (98%)	5 (2%)	0	100	100
1	L	330/317 (104%)	327 (99%)	3 (1%)	0	100	100
1	M	335/317 (106%)	330 (98%)	5 (2%)	0	100	100
1	N	337/317 (106%)	332 (98%)	5 (2%)	0	100	100
1	O	339/317 (107%)	334 (98%)	5 (2%)	0	100	100
1	P	344/317 (108%)	339 (98%)	5 (2%)	0	100	100
All	All	5349/5072 (106%)	5270 (98%)	79 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	275/254 (108%)	275 (100%)	0	100	100
1	B	274/254 (108%)	274 (100%)	0	100	100
1	C	271/254 (107%)	271 (100%)	0	100	100
1	D	269/254 (106%)	269 (100%)	0	100	100
1	E	273/254 (108%)	273 (100%)	0	100	100
1	F	273/254 (108%)	273 (100%)	0	100	100
1	G	266/254 (105%)	266 (100%)	0	100	100
1	H	276/254 (109%)	274 (99%)	2 (1%)	76	49
1	I	275/254 (108%)	275 (100%)	0	100	100
1	J	273/254 (108%)	273 (100%)	0	100	100
1	K	280/254 (110%)	280 (100%)	0	100	100
1	L	270/254 (106%)	270 (100%)	0	100	100
1	M	275/254 (108%)	275 (100%)	0	100	100
1	N	276/254 (109%)	276 (100%)	0	100	100
1	O	279/254 (110%)	279 (100%)	0	100	100
1	P	283/254 (111%)	283 (100%)	0	100	100
All	All	4388/4064 (108%)	4386 (100%)	2 (0%)	100	100

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	185[A]	GLN
1	H	185[B]	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 37 such sidechains are listed below:

Mol	Chain	Res	Type
1	L	75	GLN

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Mol	Chain	Res	Type
1	P	189	ASN
1	L	102	ASN
1	M	75	GLN
1	E	299	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

40 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	$\# Z > 2$
3	SO4	P	402	-	4,4,4	0.25	0	6,6,6	0.16	0
3	SO4	E	402	-	4,4,4	0.26	0	6,6,6	0.15	0
2	6NT	I	401[B]	-	13,13,13	1.32	2 (15%)	16,18,18	0.86	1 (6%)
2	6NT	N	401[B]	-	13,13,13	1.38	2 (15%)	16,18,18	0.74	0
2	6NT	K	401[B]	-	13,13,13	1.41	2 (15%)	16,18,18	0.88	0
2	6NT	E	401[B]	-	13,13,13	1.51	2 (15%)	16,18,18	0.59	0
3	SO4	D	403	-	4,4,4	0.26	0	6,6,6	0.23	0
3	SO4	F	402	-	4,4,4	0.25	0	6,6,6	0.33	0
3	SO4	M	402	-	4,4,4	0.28	0	6,6,6	0.30	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	SO4	D	404	-	4,4,4	0.23	0	6,6,6	0.14	0
2	6NT	B	401[B]	-	13,13,13	1.23	1 (7%)	16,18,18	0.63	0
3	SO4	H	402	-	4,4,4	0.26	0	6,6,6	0.34	0
3	SO4	C	404	-	4,4,4	0.24	0	6,6,6	0.15	0
3	SO4	D	402	-	4,4,4	0.28	0	6,6,6	0.37	0
2	6NT	O	401[B]	-	13,13,13	1.39	1 (7%)	16,18,18	0.99	0
3	SO4	I	403	-	4,4,4	0.24	0	6,6,6	0.08	0
2	6NT	C	401[B]	-	13,13,13	1.33	1 (7%)	16,18,18	0.68	0
3	SO4	C	403	-	4,4,4	0.23	0	6,6,6	0.10	0
2	6NT	G	401[B]	-	13,13,13	1.38	2 (15%)	16,18,18	0.63	0
3	SO4	E	403	-	4,4,4	0.26	0	6,6,6	0.13	0
3	SO4	N	403	-	4,4,4	0.22	0	6,6,6	0.11	0
2	6NT	A	401[B]	-	13,13,13	1.42	2 (15%)	16,18,18	0.58	0
3	SO4	N	402	-	4,4,4	0.24	0	6,6,6	0.14	0
3	SO4	J	402	-	4,4,4	0.23	0	6,6,6	0.14	0
3	SO4	P	403	-	4,4,4	0.25	0	6,6,6	0.15	0
3	SO4	M	403	-	4,4,4	0.26	0	6,6,6	0.27	0
3	SO4	O	402	-	4,4,4	0.25	0	6,6,6	0.10	0
3	SO4	L	402	-	4,4,4	0.25	0	6,6,6	0.12	0
2	6NT	H	401[B]	-	13,13,13	1.36	1 (7%)	16,18,18	1.18	1 (6%)
2	6NT	J	401[B]	-	13,13,13	1.37	1 (7%)	16,18,18	0.78	0
3	SO4	H	403	-	4,4,4	0.27	0	6,6,6	0.10	0
2	6NT	D	401[B]	-	13,13,13	1.32	1 (7%)	16,18,18	0.69	0
2	6NT	P	401[B]	-	13,13,13	1.30	1 (7%)	16,18,18	0.65	0
3	SO4	A	402	-	4,4,4	0.24	0	6,6,6	0.17	0
3	SO4	I	402	-	4,4,4	0.23	0	6,6,6	0.11	0
2	6NT	M	401[B]	-	13,13,13	1.32	1 (7%)	16,18,18	0.74	0
2	6NT	F	401[B]	-	13,13,13	1.36	1 (7%)	16,18,18	0.84	1 (6%)
3	SO4	C	402	-	4,4,4	0.23	0	6,6,6	0.06	0
3	SO4	B	402	-	4,4,4	0.22	0	6,6,6	0.13	0
2	6NT	L	401[B]	-	13,13,13	1.29	1 (7%)	16,18,18	0.67	0

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	6NT	L	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	G	401[B]	-	-	0/2/4/4	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	6NT	O	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	B	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	I	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	A	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	J	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	K	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	N	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	D	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	M	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	P	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	E	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	F	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	C	401[B]	-	-	0/2/4/4	0/2/2/2
2	6NT	H	401[B]	-	-	0/2/4/4	0/2/2/2

The worst 5 of 22 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	401[B]	6NT	N1-N2	3.46	1.39	1.31
2	F	401[B]	6NT	N1-N2	3.44	1.39	1.31
2	J	401[B]	6NT	N1-N2	3.41	1.39	1.31
2	O	401[B]	6NT	N1-N2	3.36	1.39	1.31
2	K	401[B]	6NT	N1-N2	3.32	1.39	1.31

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	401[B]	6NT	C4-C5-NO1	2.94	121.27	118.74
2	F	401[B]	6NT	C6-C5-NO1	2.55	121.56	119.34
2	I	401[B]	6NT	C6-C5-NO1	2.21	121.26	119.34

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

8 monomers are involved in 8 short contacts:

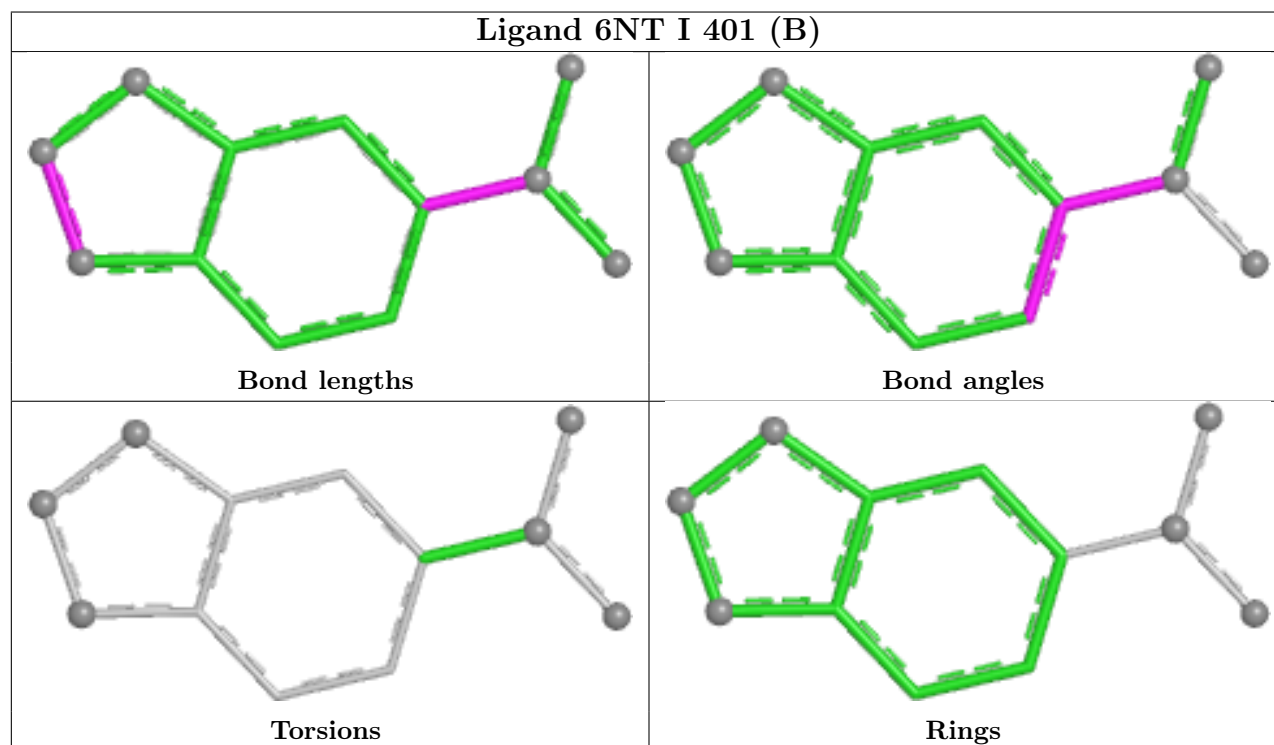
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	402	SO4	1	0
2	O	401[B]	6NT	1	0
3	N	402	SO4	1	0

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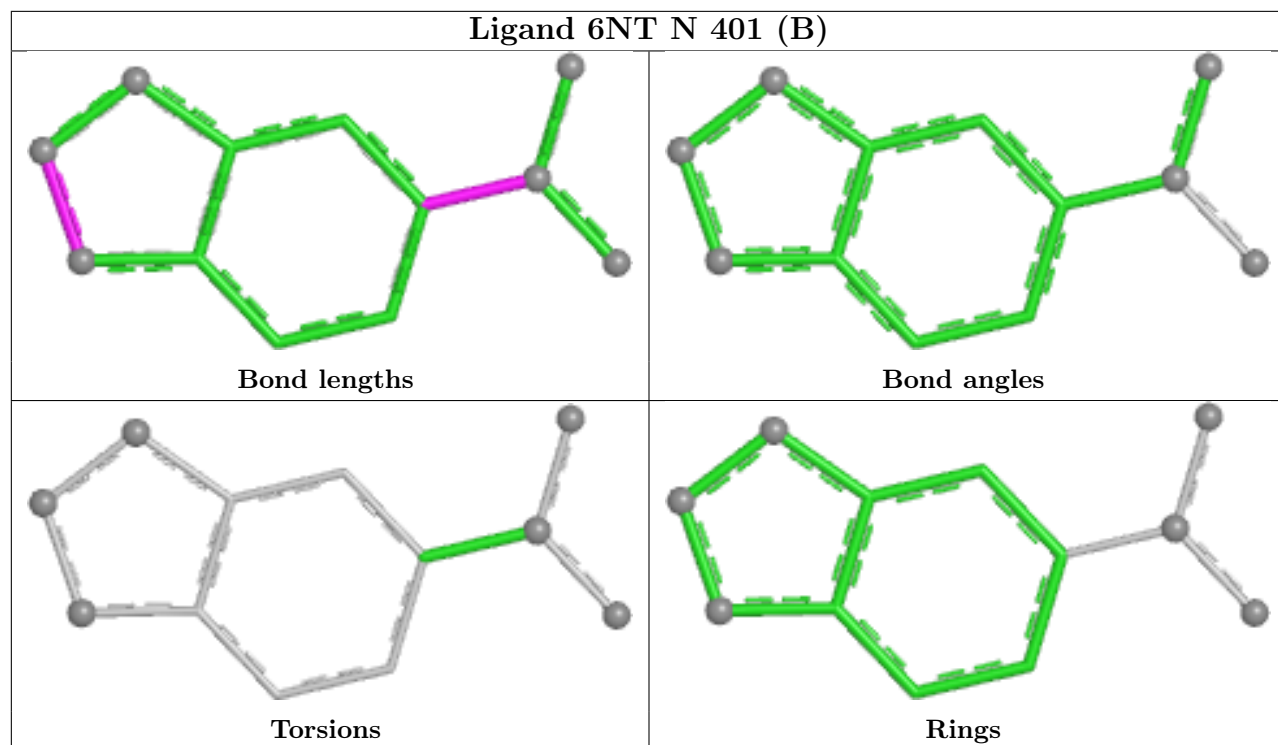
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	P	403	SO4	1	0
3	M	403	SO4	1	0
3	A	402	SO4	1	0
3	I	402	SO4	1	0
3	C	402	SO4	1	0

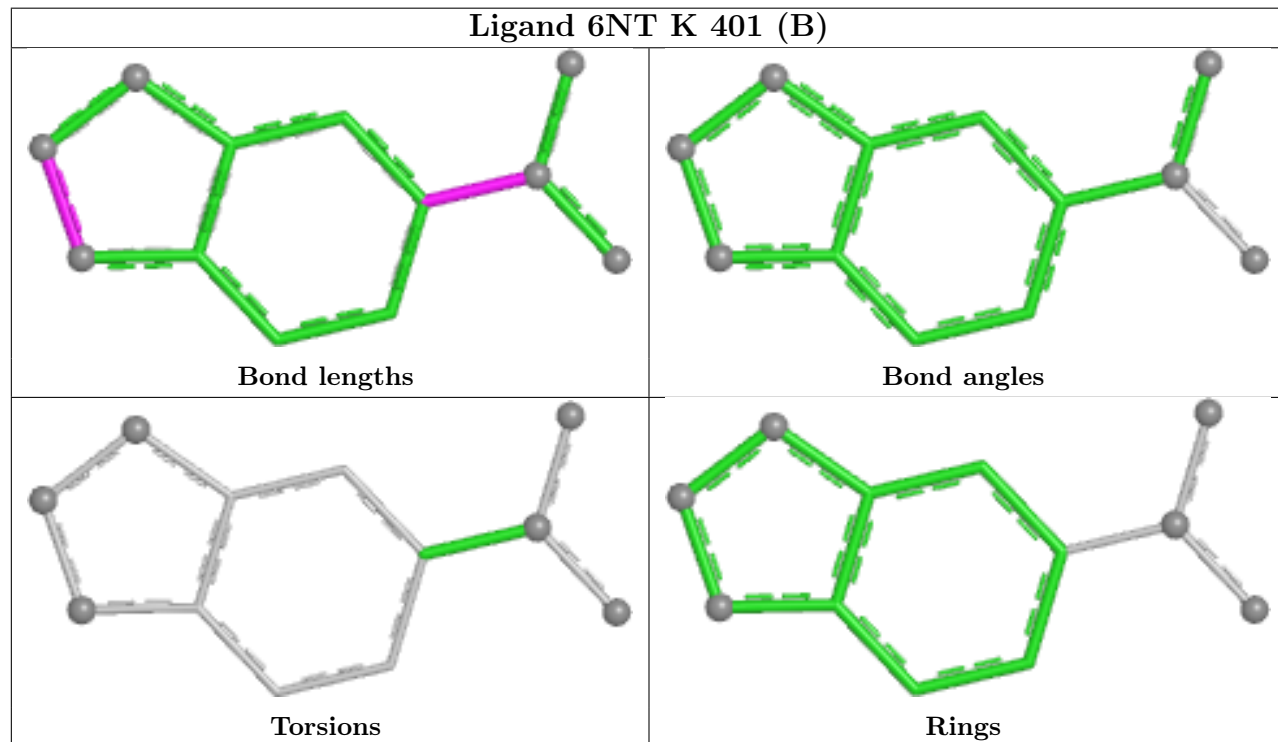
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.



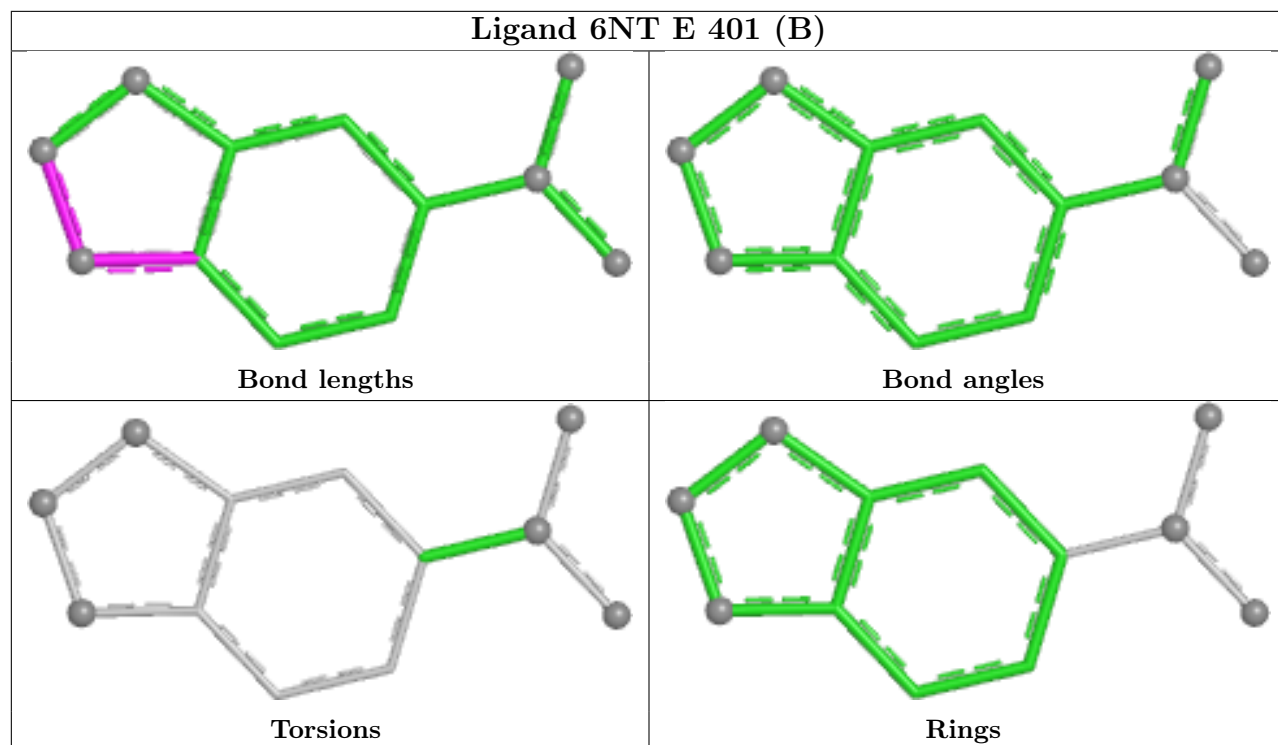
Ligand 6NT N 401 (B)



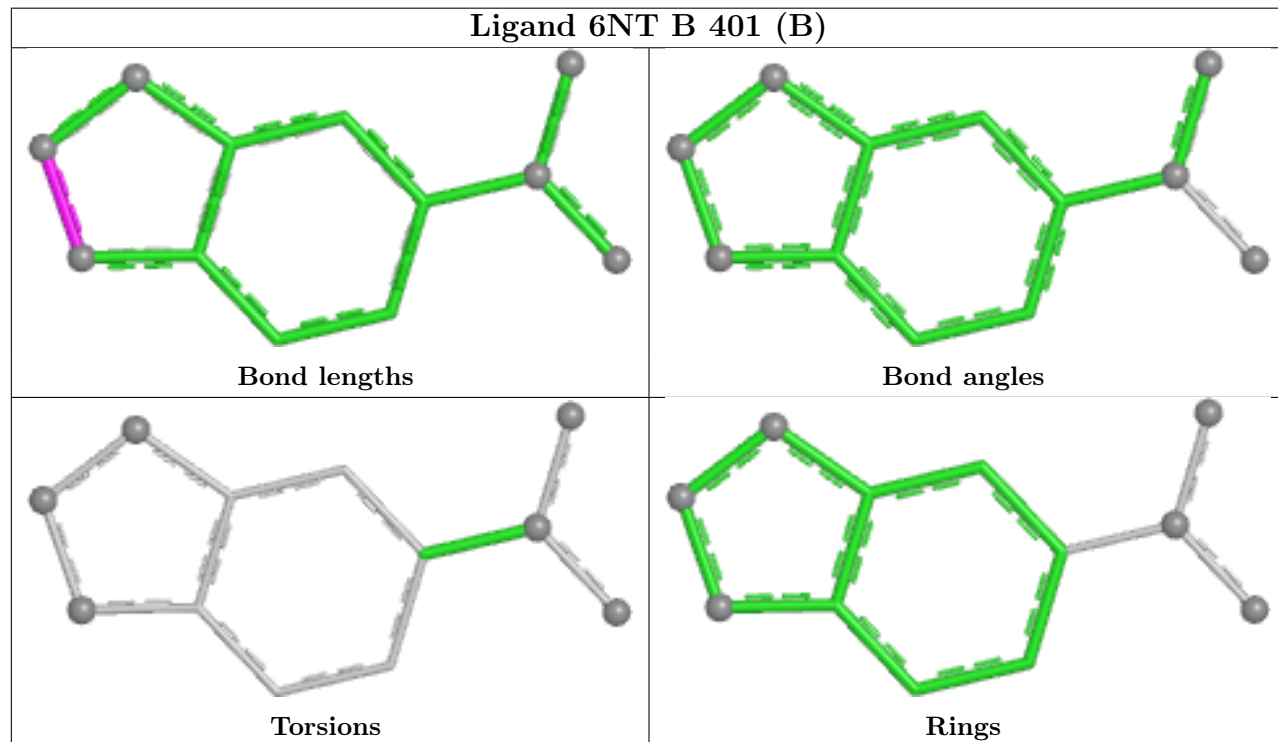
Ligand 6NT K 401 (B)



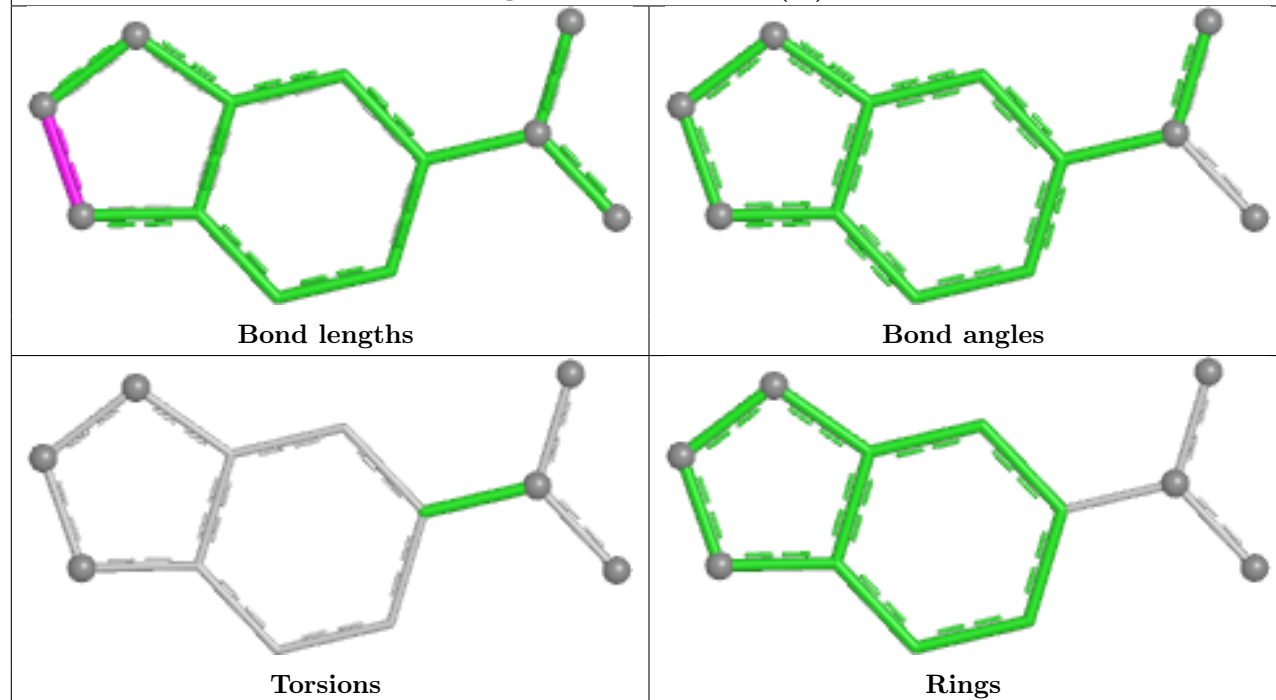
Ligand 6NT E 401 (B)



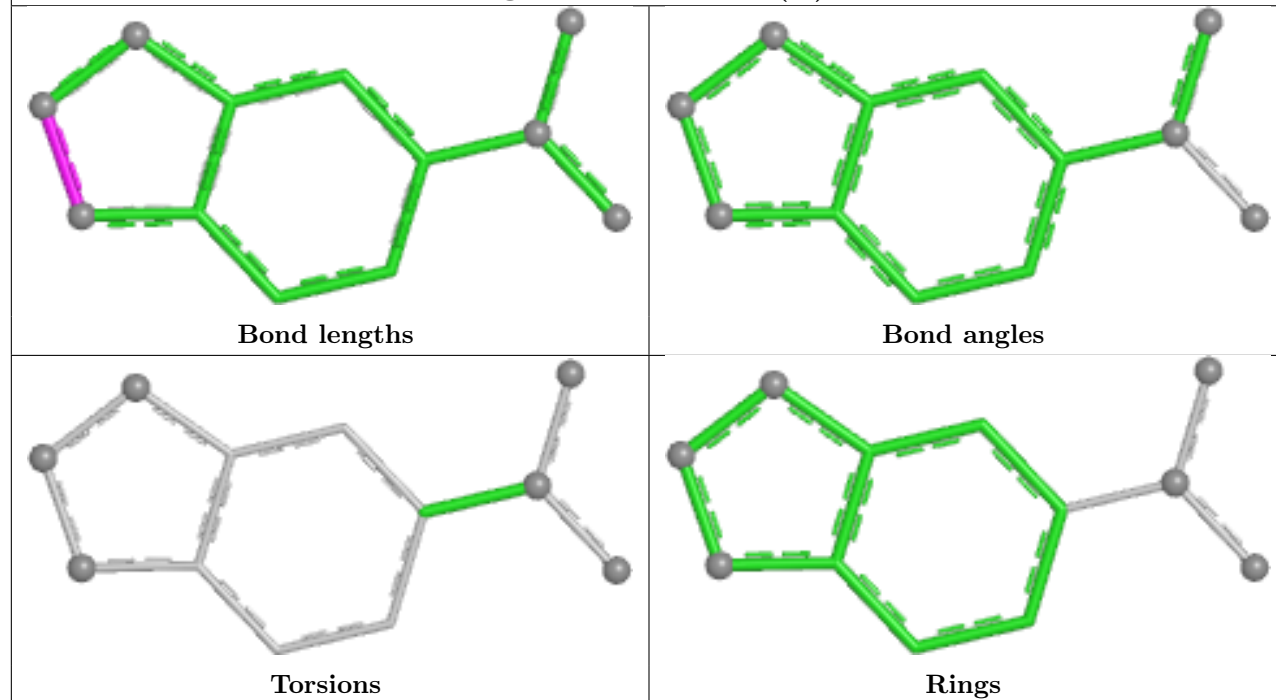
Ligand 6NT B 401 (B)



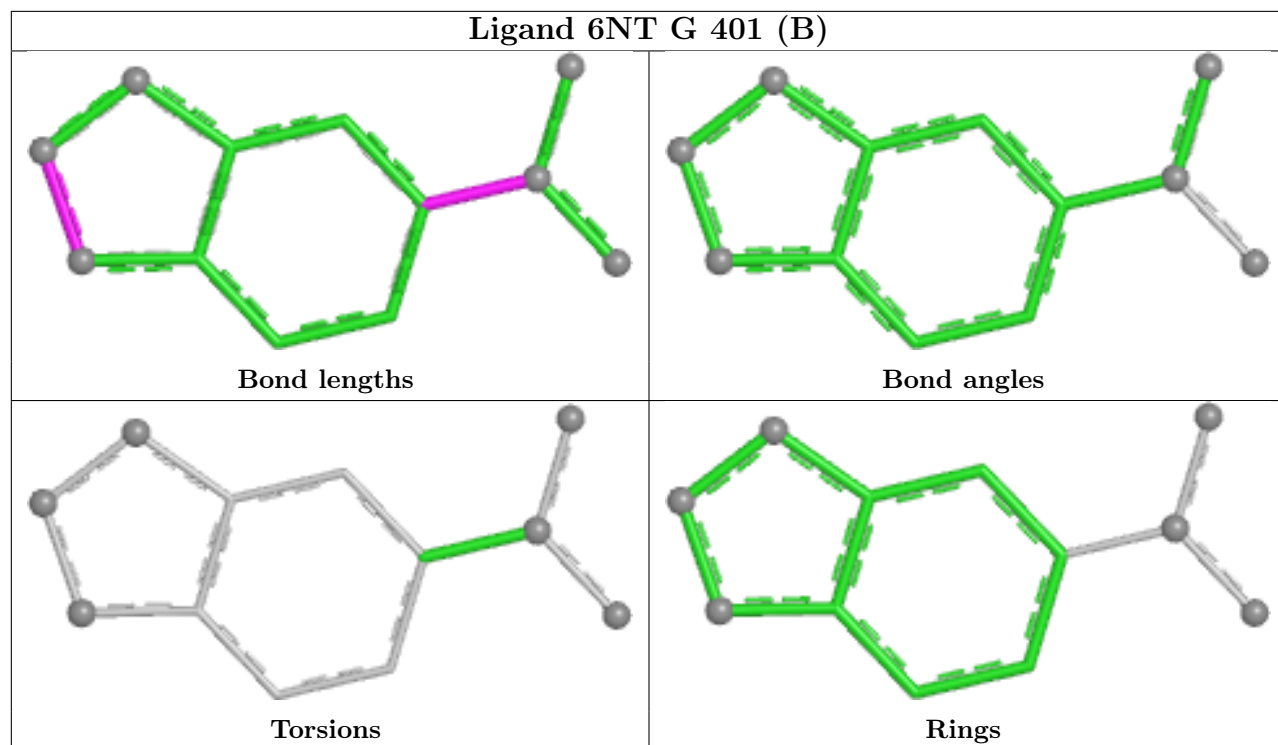
Ligand 6NT O 401 (B)



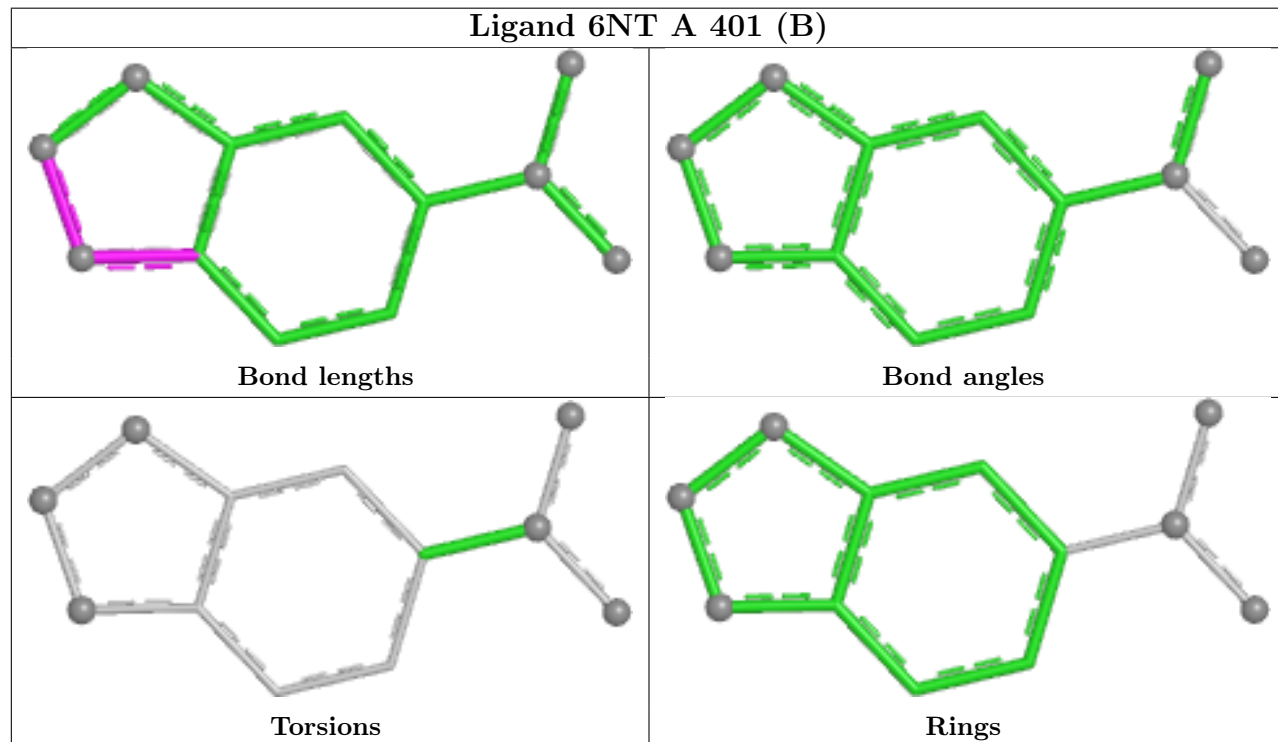
Ligand 6NT C 401 (B)



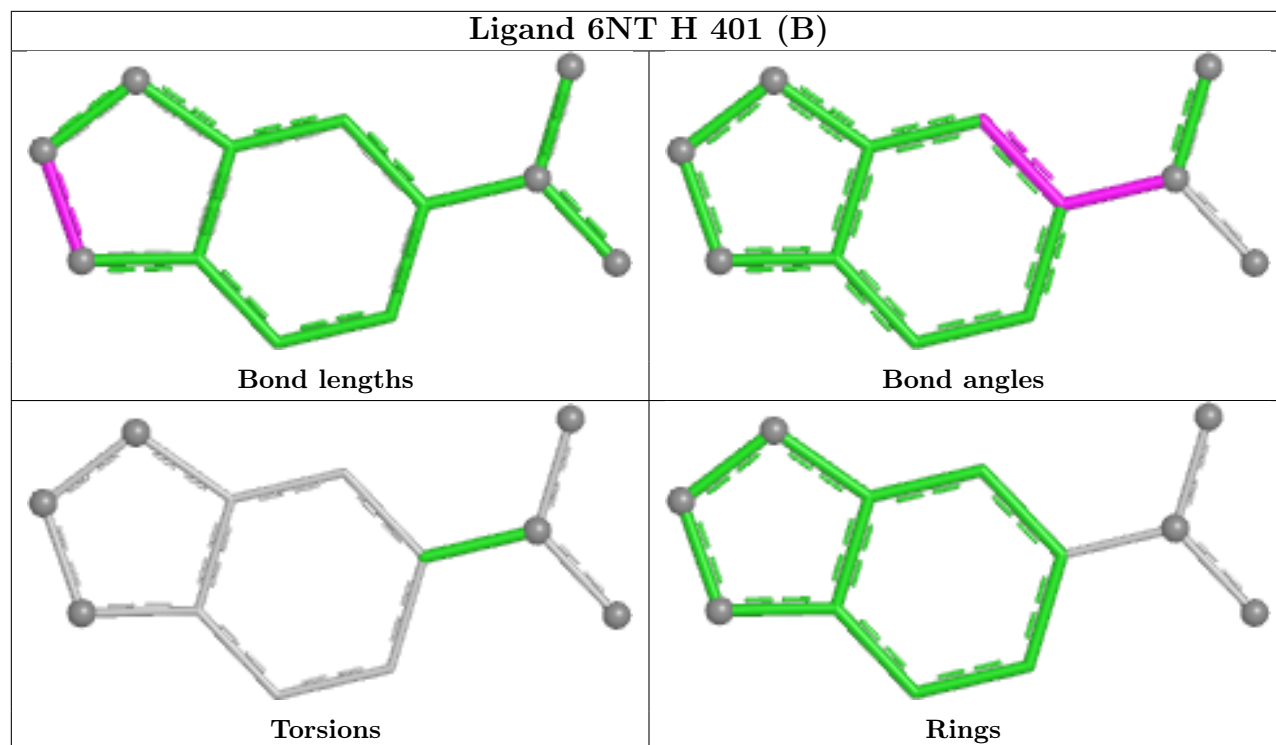
Ligand 6NT G 401 (B)



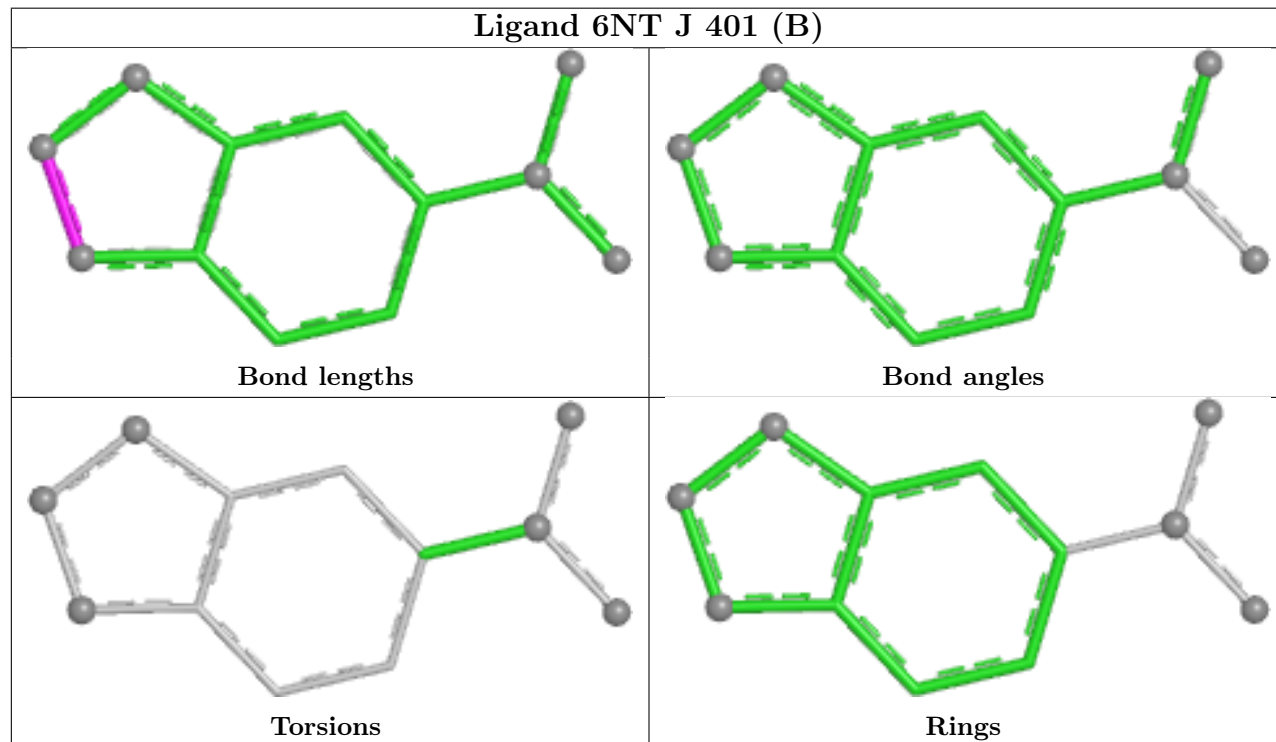
Ligand 6NT A 401 (B)



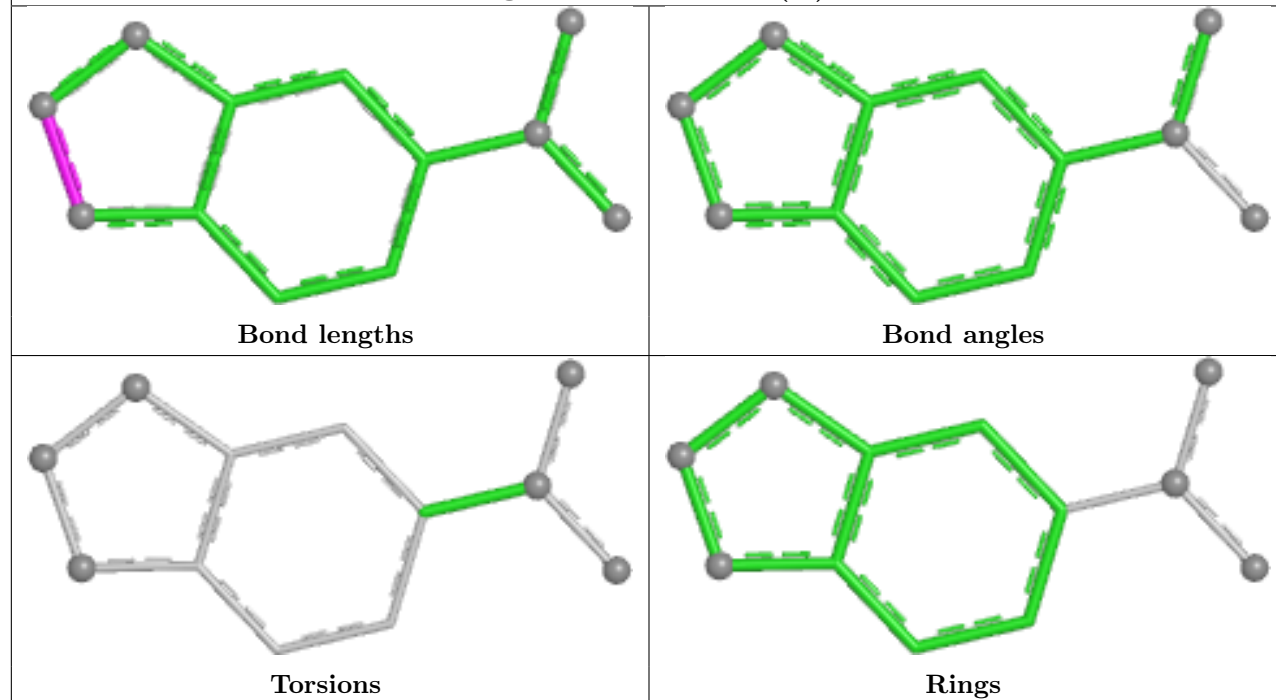
Ligand 6NT H 401 (B)



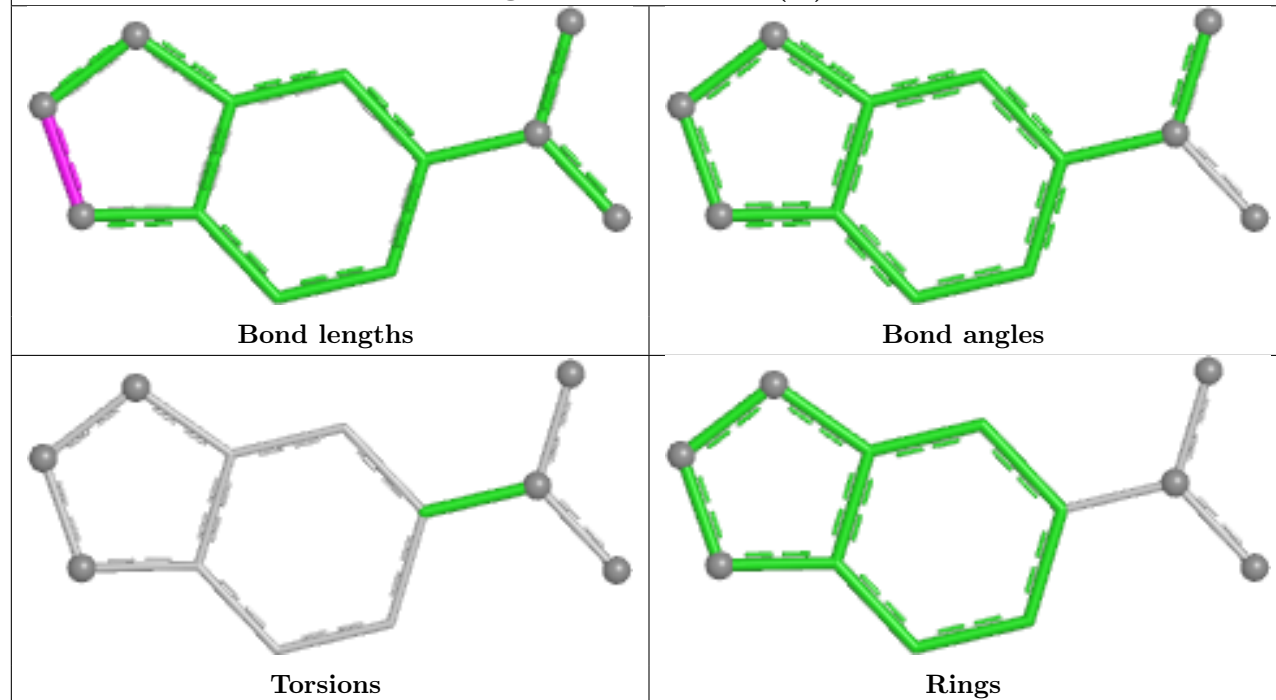
Ligand 6NT J 401 (B)



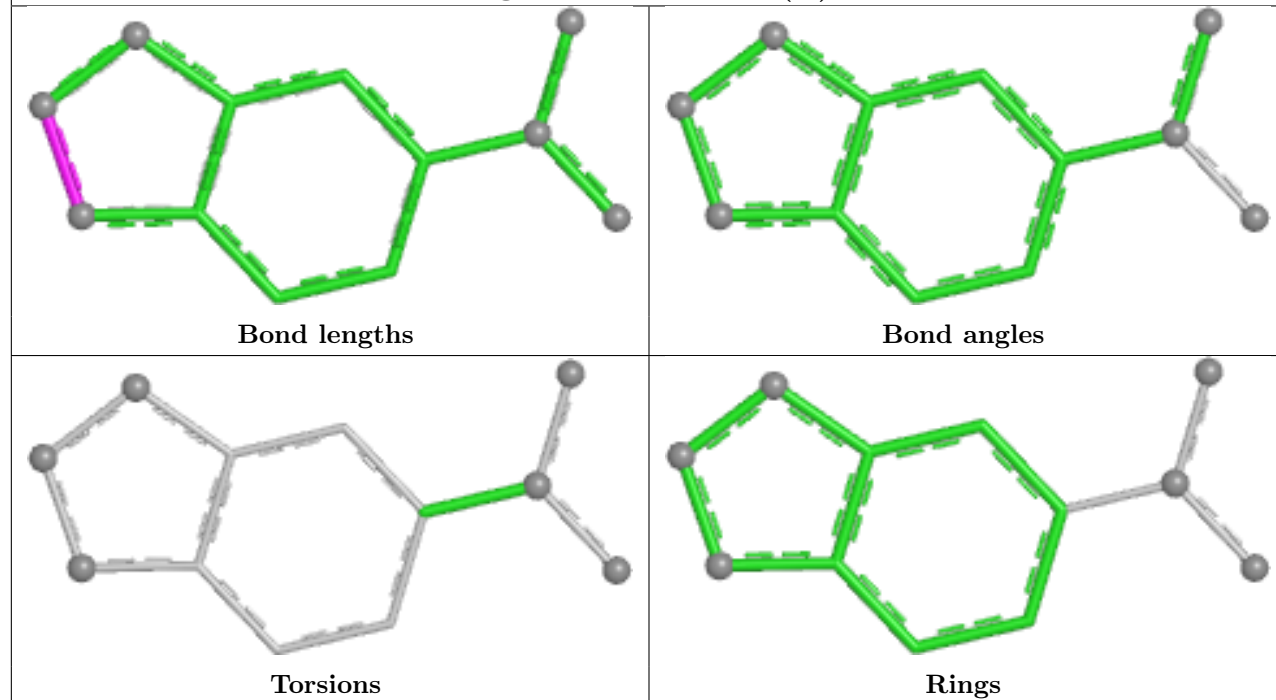
Ligand 6NT D 401 (B)



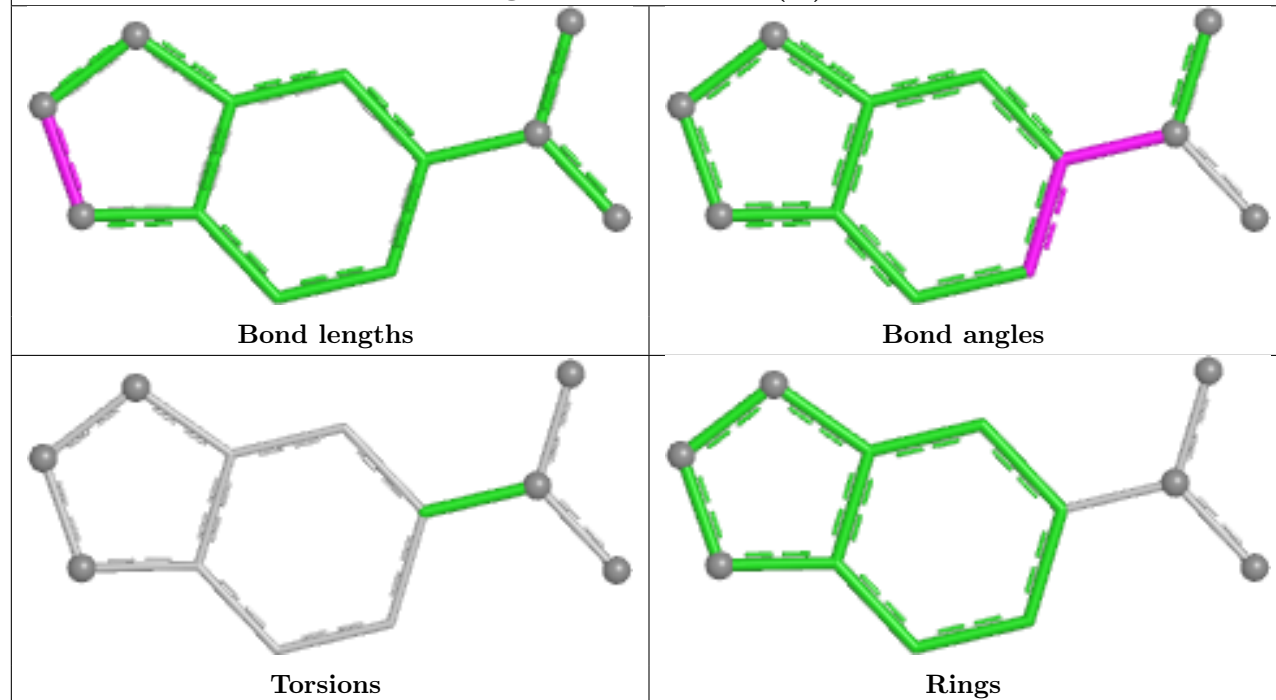
Ligand 6NT P 401 (B)

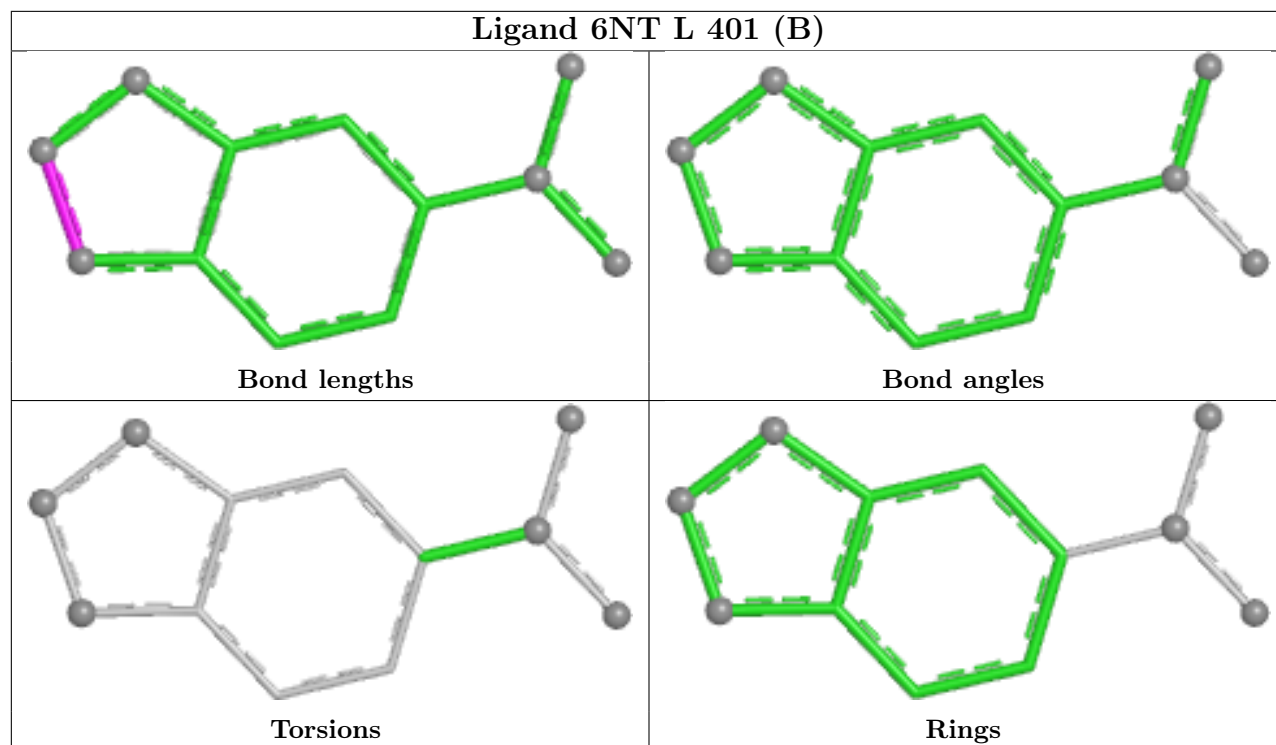


Ligand 6NT M 401 (B)



Ligand 6NT F 401 (B)





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	300/317 (94%)	-1.09	0  	3, 10, 18, 35	20 (6%)
1	B	300/317 (94%)	-1.06	0  	3, 9, 17, 32	20 (6%)
1	C	300/317 (94%)	-1.09	0  	4, 10, 18, 35	19 (6%)
1	D	300/317 (94%)	-1.04	0  	3, 10, 19, 34	18 (6%)
1	E	300/317 (94%)	-1.11	0  	3, 9, 17, 30	20 (6%)
1	F	300/317 (94%)	-0.85	0  	4, 10, 18, 36	19 (6%)
1	G	300/317 (94%)	-0.78	0  	4, 10, 20, 30	16 (5%)
1	H	301/317 (94%)	-0.83	2 (0%)  	3, 10, 18, 38	22 (7%)
1	I	300/317 (94%)	-0.81	0  	4, 10, 20, 38	21 (7%)
1	J	300/317 (94%)	-0.84	0  	3, 10, 19, 35	19 (6%)
1	K	300/317 (94%)	-0.79	0  	4, 11, 20, 40	23 (7%)
1	L	300/317 (94%)	-1.02	0  	3, 10, 19, 33	18 (6%)
1	M	300/317 (94%)	-1.07	0  	3, 9, 18, 32	22 (7%)
1	N	300/317 (94%)	-0.79	0  	4, 11, 19, 48	22 (7%)
1	O	301/317 (94%)	-0.84	0  	4, 10, 18, 38	24 (7%)
1	P	300/317 (94%)	-1.11	0  	3, 9, 17, 30	26 (8%)
All	All	4802/5072 (94%)	-0.94	2 (0%)  	3, 10, 19, 48	329 (6%)

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	255[A]	CYS	4.1
1	H	3	ALA	2.3

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($\text{\AA}^2$)	Q<0.9
3	SO4	F	402	5/5	0.90	0.13	34,34,35,35	0
3	SO4	P	403	5/5	0.91	0.12	33,52,73,80	0
3	SO4	N	402	5/5	0.94	0.11	44,44,45,45	0
3	SO4	P	402	5/5	0.94	0.12	25,30,70,87	0
3	SO4	C	404	5/5	0.94	0.10	37,39,65,76	0
3	SO4	E	403	5/5	0.95	0.09	30,42,68,69	0
3	SO4	I	402	5/5	0.96	0.09	47,47,47,47	0
3	SO4	M	402	5/5	0.96	0.08	29,30,31,31	0
3	SO4	B	402	5/5	0.96	0.09	36,46,63,84	0
3	SO4	N	403	5/5	0.96	0.08	42,60,69,94	0
3	SO4	O	402	5/5	0.96	0.08	49,59,71,96	0
3	SO4	E	402	5/5	0.96	0.09	28,38,57,61	0
3	SO4	H	403	5/5	0.96	0.07	41,42,61,89	0
3	SO4	A	402	5/5	0.97	0.10	42,42,42,42	0
3	SO4	M	403	5/5	0.97	0.09	25,43,74,76	0
3	SO4	D	403	5/5	0.97	0.10	66,69,76,78	0
3	SO4	D	404	5/5	0.97	0.09	56,57,69,76	0
3	SO4	C	402	5/5	0.97	0.10	51,51,51,51	0
3	SO4	I	403	5/5	0.97	0.12	34,44,82,85	0
3	SO4	L	402	5/5	0.97	0.10	30,41,78,79	0
3	SO4	D	402	5/5	0.98	0.07	30,30,31,31	0
3	SO4	C	403	5/5	0.98	0.07	27,35,64,79	0
3	SO4	H	402	5/5	0.98	0.08	30,31,31,31	0
3	SO4	J	402	5/5	0.98	0.07	39,49,72,84	0
2	6NT	K	401[B]	12/12	0.99	0.02	10,12,12,14	0
2	6NT	N	401[B]	12/12	0.99	0.03	10,11,12,13	0
2	6NT	O	401[B]	12/12	0.99	0.03	9,10,11,12	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	6NT	A	401[B]	12/12	0.99	0.02	6,7,8,8	0
2	6NT	F	401[B]	12/12	0.99	0.03	10,11,12,12	0
2	6NT	G	401[B]	12/12	0.99	0.03	10,11,12,13	0
2	6NT	H	401[B]	12/12	0.99	0.03	10,11,12,12	0
2	6NT	I	401[B]	12/12	0.99	0.03	11,12,13,13	0
2	6NT	J	401[B]	12/12	0.99	0.03	10,11,12,12	0
2	6NT	M	401[B]	12/12	1.00	0.02	6,7,8,9	0
2	6NT	D	401[B]	12/12	1.00	0.02	7,8,8,9	0
2	6NT	E	401[B]	12/12	1.00	0.02	6,7,8,8	0
2	6NT	P	401[B]	12/12	1.00	0.02	7,8,8,9	0
2	6NT	B	401[B]	12/12	1.00	0.02	7,7,8,9	0
2	6NT	C	401[B]	12/12	1.00	0.02	7,8,8,9	0
2	6NT	L	401[B]	12/12	1.00	0.02	7,8,9,9	0

6.5 Other polymers [i](#)

There are no such residues in this entry.