



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 16, 2023 – 02:38 PM JST

PDB ID : 7VB8
Title : SbSOMT in complex with resveratrol and nicotinamide adenine dinucleotide(NAD+)
Authors : Pow, K.C.; Hao, Q.
Deposited on : 2021-08-30
Resolution : 1.72 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 : 2.31.3
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) : 2.31.3

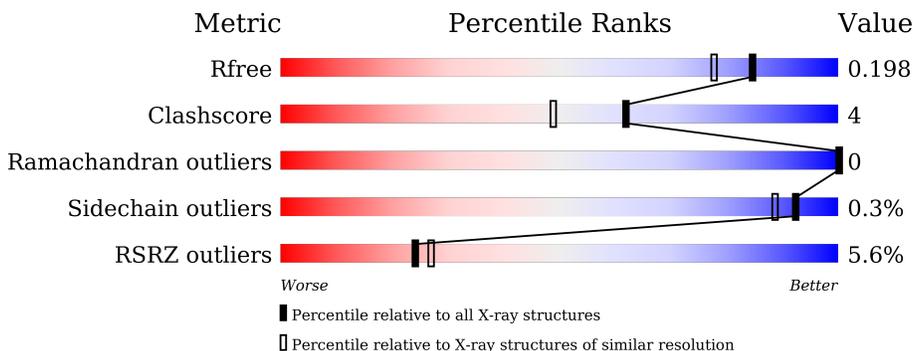
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.72 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	5722 (1.74-1.70)
Clashscore	141614	6152 (1.74-1.70)
Ramachandran outliers	138981	6051 (1.74-1.70)
Sidechain outliers	138945	6051 (1.74-1.70)
RSRZ outliers	127900	5629 (1.74-1.70)

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	377	 7% 88% 8% . .
1	B	377	 4% 87% 9% .

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	ACT	A	408	-	-	X	-
6	GOL	A	410	-	-	-	X

2 Entry composition [i](#)

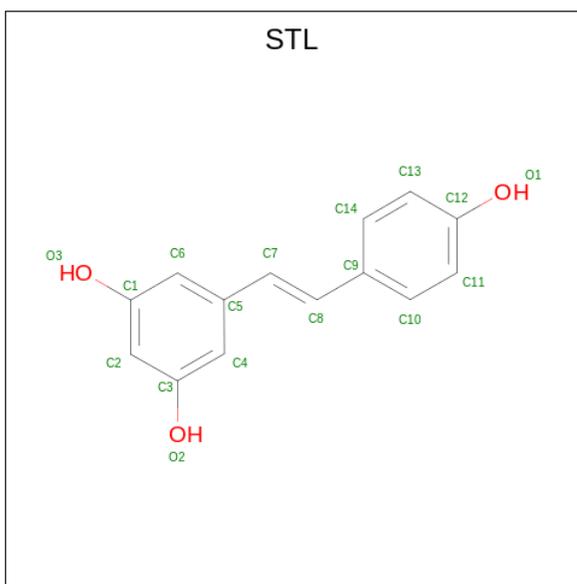
There are 8 unique types of molecules in this entry. The entry contains 6638 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 stilbene O-methyltransferase.

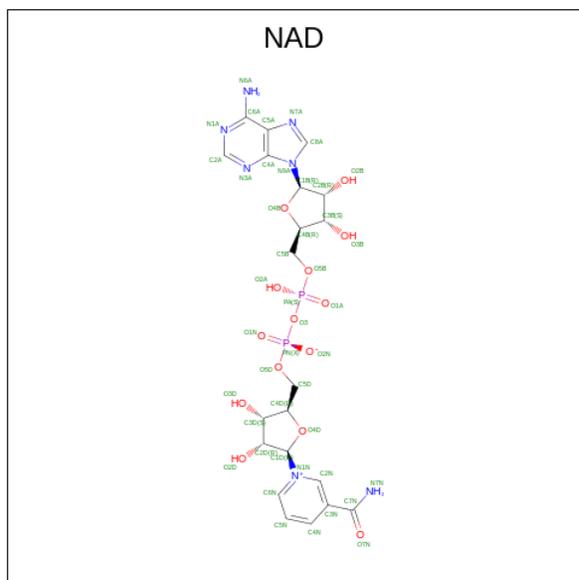
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	363	Total 2889	C 1842	N 481	O 543	S 23	0	9	0
1	A	363	Total 2952	C 1880	N 497	O 548	S 27	0	16	0

- Molecule 2 is RESVERATROL (three-letter code: STL) (formula: $C_{14}H_{12}O_3$) (labeled as "Ligand of Interest" by depositor).



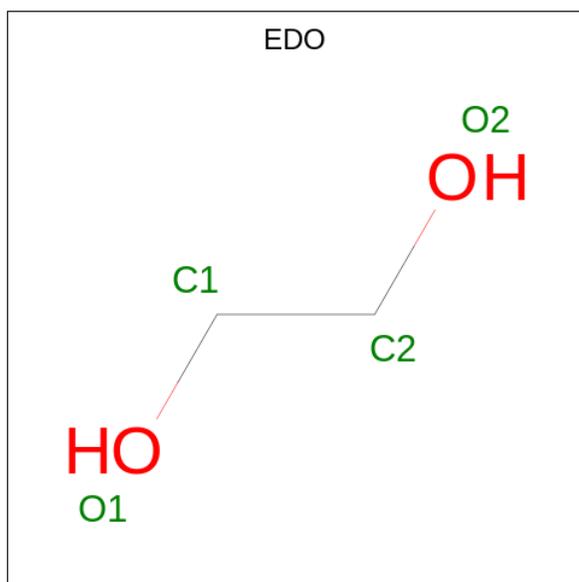
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	B	1	Total 17	C 14	O 3	0	0
2	A	1	Total 17	C 14	O 3	0	0

- Molecule 3 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
3	B	1	44	21	7	14	2	0	0
3	A	1	44	21	7	14	2	0	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



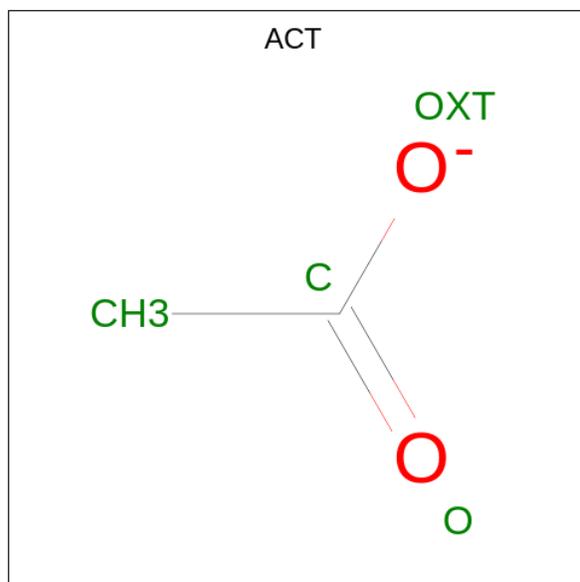
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	C O		
4	B	1	4	2 2	0	0
4	B	1	4	2 2	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0

- Molecule 5 is ACETATE ION (three-letter code: ACT) (formula: C₂H₃O₂).



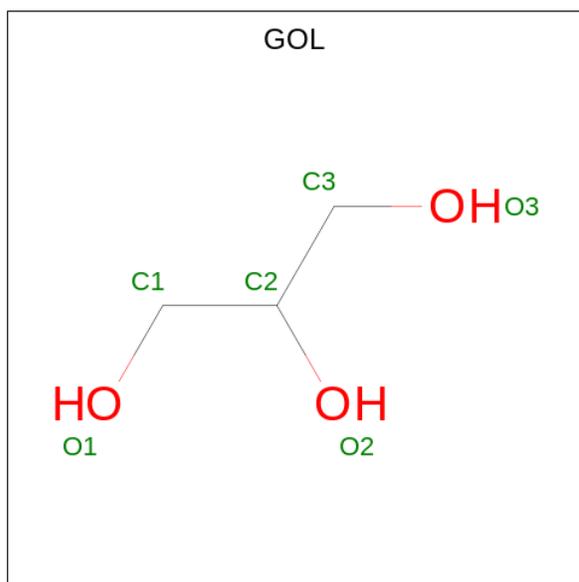
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			4	2	2		

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 7 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	2	Total Cl 2 2	0	0
7	A	1	Total Cl 1 1	0	0

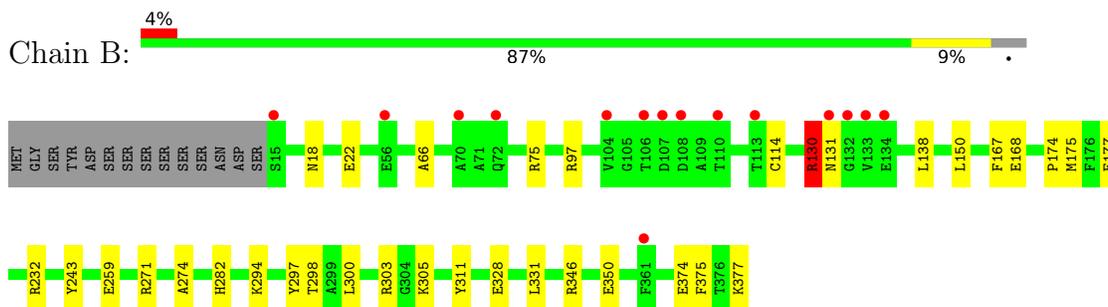
- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	B	282	Total O 282 282	0	0
8	A	286	Total O 286 286	0	0

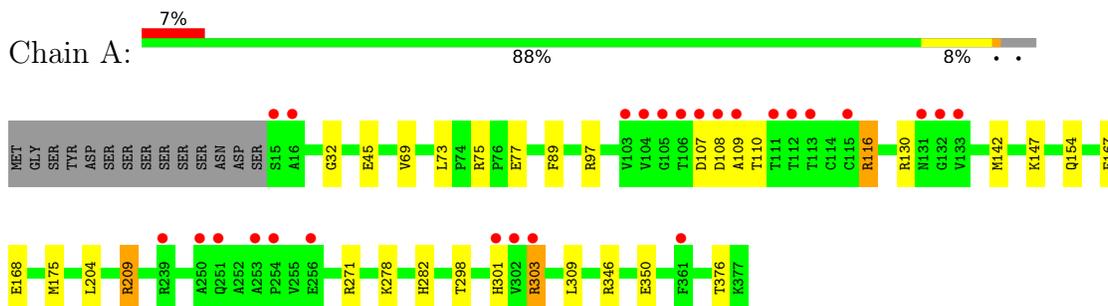
3 Residue-property plots [i](#)

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: stilbene O-methyltransferase



- Molecule 1: stilbene O-methyltransferase



4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	96.83Å 96.83Å 168.04Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.46 – 1.72 48.42 – 1.72	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.46-1.72) 99.8 (48.42-1.72)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.90 (at 1.72Å)	Xtrriage
Refinement program	REFMAC 5.8.0352	Depositor
R, R_{free}	0.163 , 0.189 0.176 , 0.198	Depositor DCC
R_{free} test set	4899 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	25.0	Xtrriage
Anisotropy	0.042	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 42.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.016 for -h,-k,l	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	6638	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.64% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: EDO, STL, GOL, NAD, ACT, CL

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	0.57	1/3011 (0.0%)	0.79	0/4075
1	B	0.57	0/2948	0.84	3/3996 (0.1%)
All	All	0.57	1/5959 (0.0%)	0.82	3/8071 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	7
1	B	0	6
All	All	0	13

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	168	GLU	CD-OE1	5.40	1.31	1.25

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	130	ARG	NE-CZ-NH2	-5.40	117.60	120.30
1	B	311	TYR	CB-CG-CD1	5.21	124.13	121.00
1	B	243	TYR	CB-CG-CD2	5.14	124.08	121.00

There are no chirality outliers.

All (13) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	116[A]	ARG	Sidechain
1	A	130	ARG	Sidechain
1	A	209[A]	ARG	Sidechain
1	A	271	ARG	Sidechain
1	A	303	ARG	Sidechain
1	A	346	ARG	Sidechain
1	A	75	ARG	Sidechain
1	B	114	CYS	Peptide
1	B	130	ARG	Sidechain
1	B	271	ARG	Sidechain
1	B	303	ARG	Sidechain
1	B	75	ARG	Sidechain
1	B	97	ARG	Sidechain

5.2 Too-close contacts [i](#)

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	2952	0	2929	28	0
1	B	2889	0	2855	24	0
2	A	17	0	12	0	0
2	B	17	0	12	0	0
3	A	44	0	26	0	0
3	B	44	0	26	0	0
4	A	28	0	42	2	0
4	B	16	0	24	3	0
5	A	4	0	3	2	0
5	B	8	0	6	0	0
6	A	42	0	56	4	0
6	B	6	0	8	2	0
7	A	1	0	0	0	0
7	B	2	0	0	0	0
8	A	286	0	0	6	0
8	B	282	0	0	4	0
All	All	6638	0	5999	51	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 4.

All (51) 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:350[A]:GLU:HG3	8:A:683:HOH:O	1.78	0.82
1:B:177[B]:GLU:OE2	8:B:501:HOH:O	2.03	0.76
1:B:300:LEU:O	1:B:377:LYS:NZ	2.19	0.76
1:A:142[B]:MET:SD	4:A:407:EDO:O2	2.43	0.75
1:A:204:LEU:HD11	1:A:309[A]:LEU:HD11	1.69	0.73
1:B:130:ARG:HG2	1:B:138:LEU:CD2	2.20	0.72
4:B:404:EDO:H11	8:B:654:HOH:O	1.95	0.67
6:A:416:GOL:H11	8:A:696:HOH:O	1.95	0.65
1:B:259:GLU:HG3	6:B:409:GOL:H12	1.81	0.63
1:B:297:TYR:CE1	1:B:377:LYS:HG3	2.35	0.61
1:A:107:ASP:CG	1:A:116[A]:ARG:NH2	2.54	0.61
1:B:294:LYS:O	1:B:298:THR:HG23	2.00	0.61
1:A:107:ASP:OD2	1:A:116[A]:ARG:CZ	2.48	0.60
1:B:18:ASN:ND2	1:B:22:GLU:OE2	2.37	0.57
1:B:232:ARG:HH11	1:B:232:ARG:HG2	1.70	0.57
8:B:663:HOH:O	1:A:147:LYS:HE3	2.04	0.56
1:B:150:LEU:HD12	1:A:154[A]:GLN:NE2	2.20	0.56
1:B:374:GLU:HB2	4:B:406:EDO:H21	1.88	0.55
1:A:278[B]:LYS:HE3	8:A:508:HOH:O	2.05	0.55
1:A:298:THR:HG21	8:A:607:HOH:O	2.08	0.53
1:B:232:ARG:HG2	1:B:232:ARG:NH1	2.24	0.53
1:B:346:ARG:O	1:B:350:GLU:HG2	2.10	0.51
1:B:168[B]:GLU:HG2	1:B:174:PRO:HA	1.93	0.50
1:A:77:GLU:HG3	6:A:410:GOL:H32	1.95	0.49
1:B:259:GLU:HB2	6:B:409:GOL:H31	1.96	0.48
1:A:109:ALA:HB2	6:A:410:GOL:O3	2.14	0.47
1:A:167:PHE:CE1	1:A:175[B]:MET:HA	2.49	0.47
1:A:209[B]:ARG:CG	1:A:209[B]:ARG:HH11	2.28	0.47
1:B:328[B]:GLU:OE1	1:A:32:GLY:O	2.32	0.46
1:A:45[A]:GLU:OE1	8:A:501:HOH:O	2.20	0.46
1:A:107:ASP:OD2	1:A:110:THR:HG22	2.15	0.46
8:B:679:HOH:O	4:A:403:EDO:H11	2.16	0.46
1:A:303:ARG:HH21	1:A:376:THR:HG21	1.79	0.46
1:A:142[A]:MET:SD	5:A:408:ACT:C	3.05	0.45
1:A:69:VAL:HG11	1:A:73:LEU:HD21	2.00	0.44
1:B:274:ALA:HA	1:B:305:LYS:O	2.18	0.44
1:B:131:ASN:HD22	1:B:131:ASN:H	1.66	0.43
1:B:297:TYR:CZ	1:B:377:LYS:HG3	2.53	0.43
1:A:301:HIS:CD2	8:A:507:HOH:O	2.71	0.43
1:A:97:ARG:HG3	1:A:97:ARG:HH11	1.83	0.43
1:B:131:ASN:H	1:B:131:ASN:ND2	2.17	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:45[B]:GLU:OE2	5:A:408:ACT:OXT	2.36	0.43
1:A:167:PHE:CE1	1:A:175[A]:MET:HA	2.53	0.43
1:B:331[A]:LEU:HD12	1:A:89:PHE:CD2	2.54	0.42
1:A:303:ARG:HA	1:A:303:ARG:HD3	1.74	0.42
1:B:167:PHE:CE1	1:B:175:MET:HA	2.54	0.42
1:B:305:LYS:HA	1:B:375:PHE:O	2.20	0.42
1:A:77:GLU:HG2	1:A:108:ASP:O	2.20	0.42
1:A:77:GLU:HG3	6:A:410:GOL:C3	2.50	0.42
1:B:150:LEU:HD12	1:A:154[A]:GLN:HE22	1.84	0.42
1:B:66:ALA:HB3	4:B:405:EDO:H11	2.03	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	377/377 (100%)	372 (99%)	5 (1%)	0	100	100
1	B	370/377 (98%)	367 (99%)	3 (1%)	0	100	100
All	All	747/754 (99%)	739 (99%)	8 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	316/313 (101%)	315 (100%)	1 (0%)	92	89
1	B	309/313 (99%)	308 (100%)	1 (0%)	92	89
All	All	625/626 (100%)	623 (100%)	2 (0%)	92	89

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

Mol	Chain	Res	Type
1	B	282	HIS
1	A	282	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	131	ASN
1	B	345	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](#)

Of 29 ligands modelled in this entry, 3 are monoatomic - leaving 26 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAD	B	402	-	42,48,48	0.77	2 (4%)	50,73,73	0.95	2 (4%)
6	GOL	A	410	-	5,5,5	0.12	0	5,5,5	0.33	0
4	EDO	A	405	-	3,3,3	0.22	0	2,2,2	0.26	0
6	GOL	A	416	-	5,5,5	0.25	0	5,5,5	0.48	0
5	ACT	B	408	-	3,3,3	1.09	0	3,3,3	0.85	0
6	GOL	A	406	-	5,5,5	0.20	0	5,5,5	0.45	0
6	GOL	A	409	-	5,5,5	0.27	0	5,5,5	0.89	0
4	EDO	B	405	-	3,3,3	0.51	0	2,2,2	0.73	0
3	NAD	A	402	-	42,48,48	0.84	2 (4%)	50,73,73	1.11	6 (12%)
4	EDO	B	403	-	3,3,3	0.27	0	2,2,2	0.31	0
6	GOL	A	417	-	5,5,5	0.20	0	5,5,5	0.37	0
4	EDO	A	403	-	3,3,3	0.57	0	2,2,2	0.76	0
4	EDO	A	407	-	3,3,3	0.44	0	2,2,2	0.27	0
4	EDO	A	415	-	3,3,3	0.11	0	2,2,2	0.44	0
4	EDO	A	414	-	3,3,3	0.10	0	2,2,2	0.60	0
6	GOL	B	409	-	5,5,5	0.18	0	5,5,5	0.56	0
6	GOL	A	412	-	5,5,5	0.21	0	5,5,5	0.40	0
5	ACT	A	408	-	3,3,3	1.02	0	3,3,3	0.52	0
4	EDO	A	404	-	3,3,3	0.33	0	2,2,2	0.30	0
5	ACT	B	407	-	3,3,3	0.92	0	3,3,3	0.93	0
2	STL	B	401	-	18,18,18	0.42	0	24,24,24	0.59	0
4	EDO	A	413	-	3,3,3	0.05	0	2,2,2	0.13	0
6	GOL	A	411	-	5,5,5	0.07	0	5,5,5	0.33	0
2	STL	A	401	-	18,18,18	0.58	0	24,24,24	0.67	0
4	EDO	B	404	-	3,3,3	0.44	0	2,2,2	0.62	0
4	EDO	B	406	-	3,3,3	0.22	0	2,2,2	0.54	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
3	NAD	B	402	-	-	8/26/62/62	0/5/5/5
6	GOL	A	410	-	-	1/4/4/4	-
4	EDO	A	405	-	-	1/1/1/1	-
6	GOL	A	416	-	-	2/4/4/4	-
6	GOL	A	406	-	-	2/4/4/4	-
6	GOL	A	409	-	-	0/4/4/4	-
4	EDO	B	405	-	-	1/1/1/1	-
3	NAD	A	402	-	-	1/26/62/62	0/5/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	B	403	-	-	1/1/1/1	-
6	GOL	A	417	-	-	2/4/4/4	-
4	EDO	A	403	-	-	1/1/1/1	-
4	EDO	A	407	-	-	1/1/1/1	-
4	EDO	A	415	-	-	1/1/1/1	-
4	EDO	A	414	-	-	1/1/1/1	-
6	GOL	B	409	-	-	2/4/4/4	-
6	GOL	A	412	-	-	2/4/4/4	-
4	EDO	A	404	-	-	0/1/1/1	-
2	STL	B	401	-	-	0/5/5/5	0/2/2/2
4	EDO	A	413	-	-	1/1/1/1	-
6	GOL	A	411	-	-	2/4/4/4	-
2	STL	A	401	-	-	0/5/5/5	0/2/2/2
4	EDO	B	404	-	-	0/1/1/1	-
4	EDO	B	406	-	-	0/1/1/1	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	402	NAD	C2N-N1N	2.92	1.38	1.35
3	B	402	NAD	O4D-C1D	2.36	1.44	1.41
3	A	402	NAD	C8A-N7A	-2.27	1.30	1.34
3	A	402	NAD	C2N-N1N	2.04	1.37	1.35

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	402	NAD	C2N-C3N-C4N	3.32	122.02	118.26
3	A	402	NAD	C6N-N1N-C2N	-2.73	119.48	121.97
3	A	402	NAD	C5A-C6A-N6A	2.73	124.50	120.35
3	B	402	NAD	C6N-N1N-C2N	-2.68	119.53	121.97
3	A	402	NAD	PN-O3-PA	-2.34	124.78	132.83
3	B	402	NAD	C5A-C6A-N6A	2.14	123.61	120.35
3	A	402	NAD	O4D-C1D-C2D	-2.09	103.88	106.93
3	A	402	NAD	O2A-PA-O1A	2.04	122.35	112.24

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	402	NAD	O4B-C4B-C5B-O5B
3	B	402	NAD	C5D-O5D-PN-O3
3	B	402	NAD	C3D-C4D-C5D-O5D
6	A	406	GOL	C1-C2-C3-O3
6	A	411	GOL	C1-C2-C3-O3
6	A	412	GOL	C1-C2-C3-O3
6	A	412	GOL	O2-C2-C3-O3
6	A	416	GOL	C1-C2-C3-O3
6	A	417	GOL	C1-C2-C3-O3
3	B	402	NAD	C3B-C4B-C5B-O5B
6	A	417	GOL	O2-C2-C3-O3
3	B	402	NAD	O4D-C4D-C5D-O5D
6	B	409	GOL	O1-C1-C2-C3
6	A	410	GOL	O1-C1-C2-C3
6	A	406	GOL	O2-C2-C3-O3
4	B	403	EDO	O1-C1-C2-O2
4	A	403	EDO	O1-C1-C2-O2
4	A	405	EDO	O1-C1-C2-O2
4	A	407	EDO	O1-C1-C2-O2
4	A	414	EDO	O1-C1-C2-O2
6	A	416	GOL	O2-C2-C3-O3
4	B	405	EDO	O1-C1-C2-O2
4	A	413	EDO	O1-C1-C2-O2
3	B	402	NAD	C4D-C5D-O5D-PN
3	B	402	NAD	PN-O3-PA-O5B
6	A	411	GOL	O2-C2-C3-O3
3	B	402	NAD	C5D-O5D-PN-O1N
6	B	409	GOL	O1-C1-C2-O2
4	A	415	EDO	O1-C1-C2-O2
3	A	402	NAD	PA-O3-PN-O1N

There are no ring outliers.

9 monomers are involved in 13 short contacts:

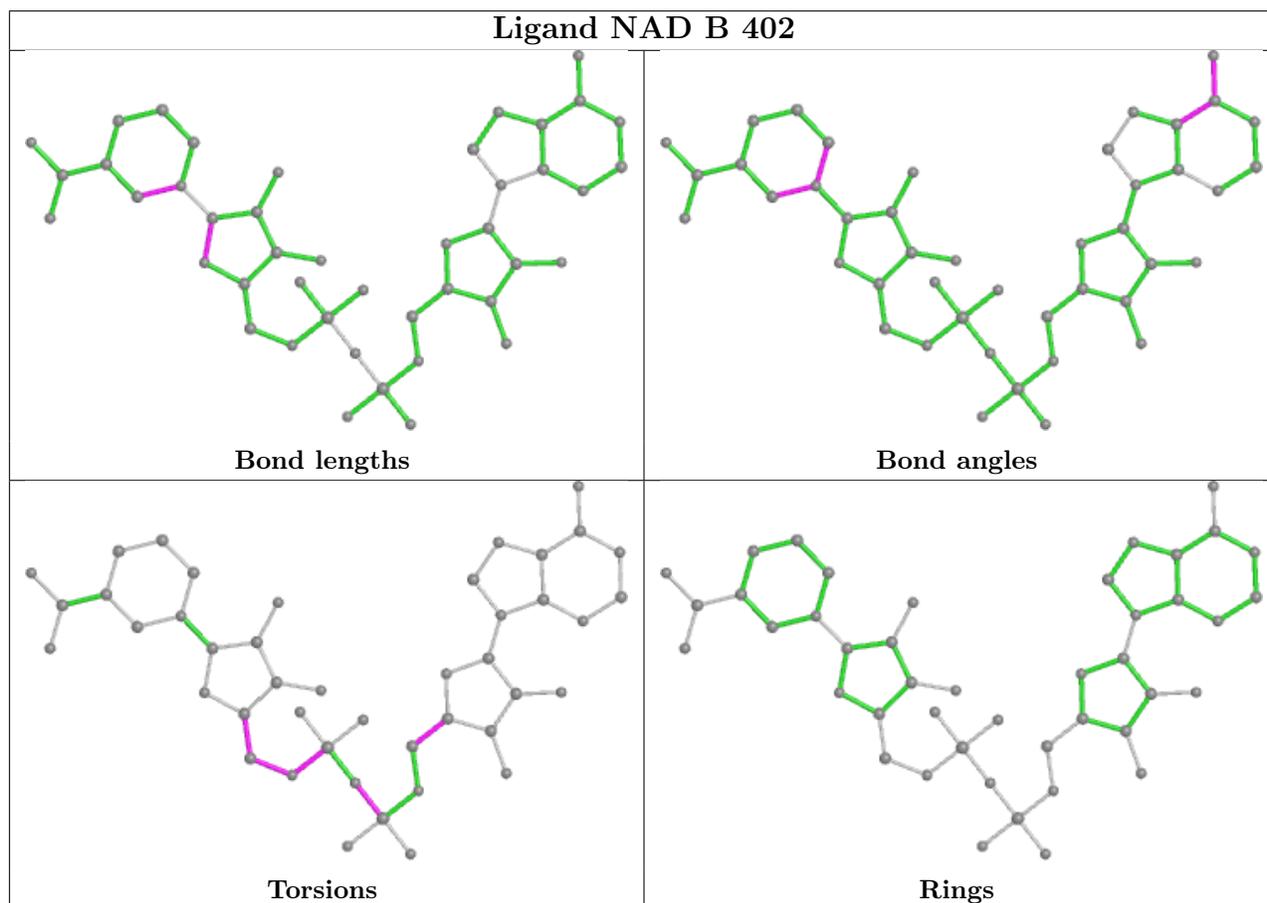
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	410	GOL	3	0
6	A	416	GOL	1	0
4	B	405	EDO	1	0
4	A	403	EDO	1	0
4	A	407	EDO	1	0
6	B	409	GOL	2	0
5	A	408	ACT	2	0
4	B	404	EDO	1	0

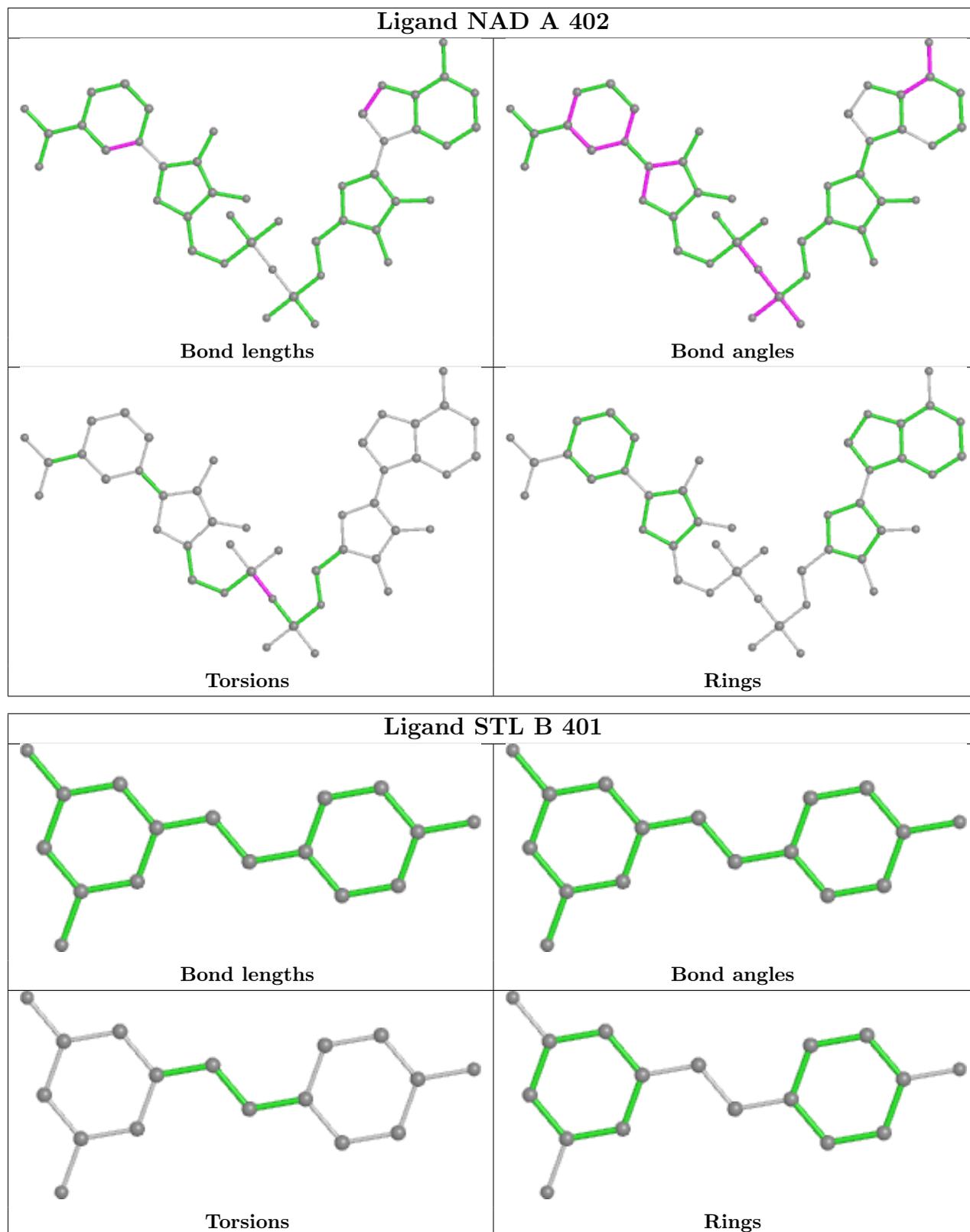
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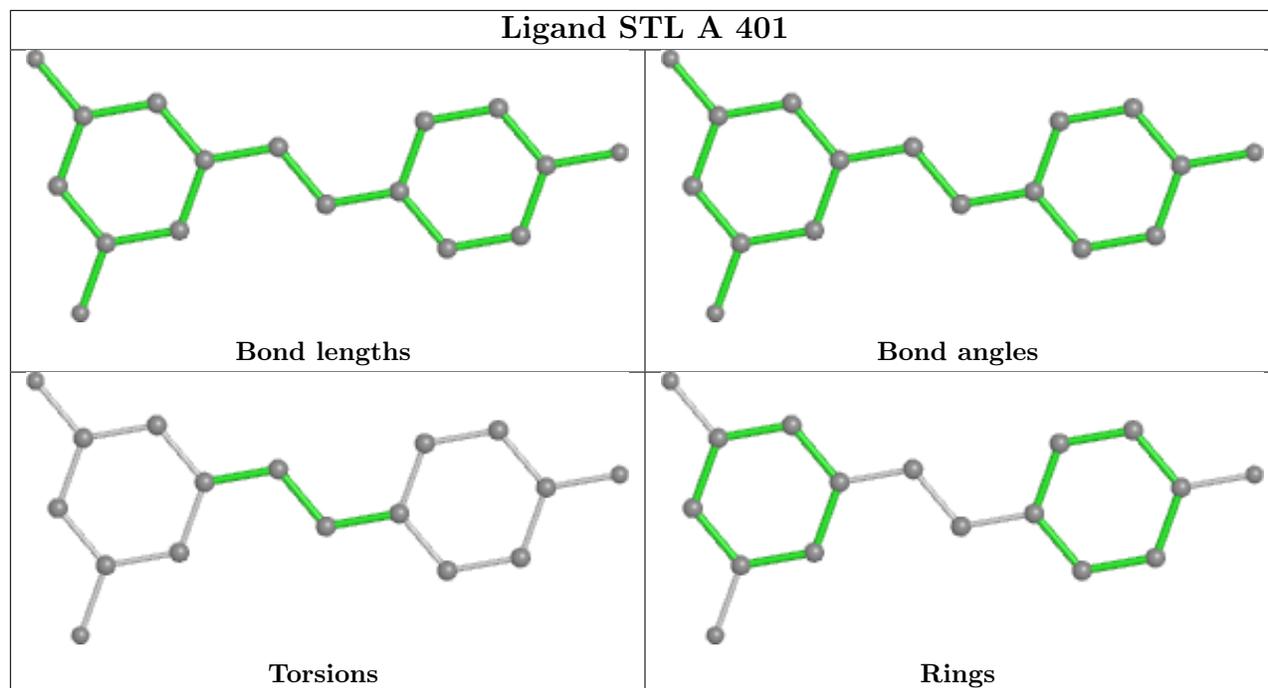
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	406	EDO	1	0

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







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [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	363/377 (96%)	0.10	26 (7%) 15 17	16, 25, 53, 86	0
1	B	363/377 (96%)	-0.05	15 (4%) 37 41	16, 26, 49, 107	0
All	All	726/754 (96%)	0.02	41 (5%) 24 27	16, 25, 51, 107	0

All (41) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	133	VAL	7.8
1	B	132	GLY	7.1
1	A	106	THR	6.6
1	A	131	ASN	6.3
1	B	106	THR	5.0
1	A	133	VAL	4.8
1	B	70	ALA	4.5
1	A	113	THR	4.4
1	A	108	ASP	4.4
1	A	103	VAL	4.2
1	B	131	ASN	4.2
1	A	112	THR	3.5
1	B	72	GLN	3.5
1	A	107	ASP	3.3
1	B	134	GLU	3.2
1	A	111	THR	3.0
1	B	108	ASP	2.9
1	A	302	VAL	2.9
1	A	256	GLU	2.9
1	A	132	GLY	2.9
1	B	361[A]	PHE	2.9
1	B	56	GLU	2.9
1	A	109	ALA	2.8
1	B	104	VAL	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	16	ALA	2.7
1	A	239	ARG	2.7
1	B	15	SER	2.6
1	B	113	THR	2.5
1	A	253	ALA	2.5
1	A	361[A]	PHE	2.4
1	A	303	ARG	2.4
1	A	301	HIS	2.4
1	A	254	PRO	2.3
1	A	115	CYS	2.3
1	A	250	ALA	2.3
1	A	104	VAL	2.2
1	B	107	ASP	2.2
1	A	15	SER	2.2
1	A	251	GLN	2.2
1	A	105	GLY	2.2
1	B	110	THR	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 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, 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
6	GOL	A	412	6/6	0.16	0.35	76,79,88,90	0
6	GOL	A	410	6/6	0.32	0.55	70,87,90,90	0
6	GOL	A	417	6/6	0.45	0.37	57,76,78,79	0
4	EDO	A	413	4/4	0.49	0.28	59,69,71,72	0
4	EDO	A	407	4/4	0.52	0.22	53,55,55,56	0
6	GOL	A	416	6/6	0.56	0.39	50,63,67,68	0

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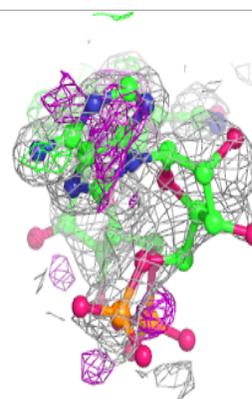
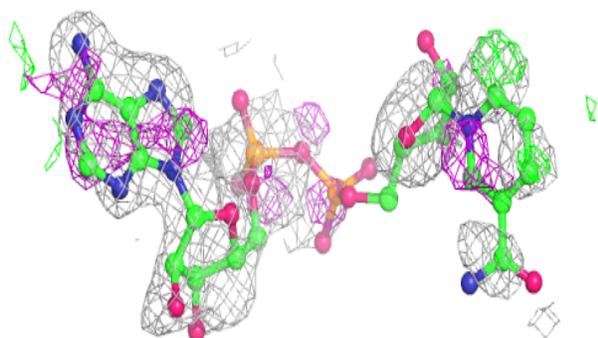
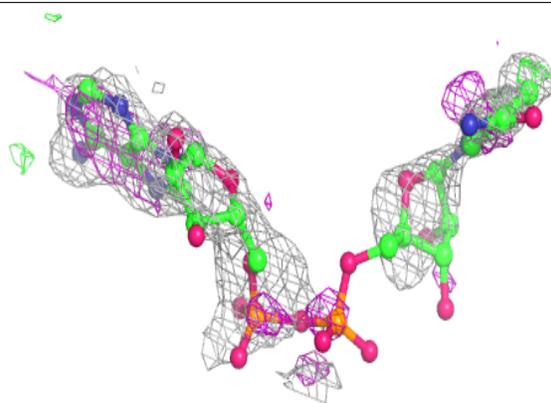
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	EDO	A	405	4/4	0.71	0.24	62,66,68,74	0
3	NAD	B	402	44/44	0.74	0.35	33,91,141,152	0
5	ACT	B	408	4/4	0.74	0.22	57,58,59,61	0
6	GOL	B	409	6/6	0.76	0.23	54,58,63,73	0
6	GOL	A	409	6/6	0.78	0.16	30,41,44,46	0
4	EDO	A	415	4/4	0.80	0.27	58,63,64,66	0
6	GOL	A	411	6/6	0.83	0.31	63,65,66,67	0
5	ACT	A	408	4/4	0.84	0.15	33,34,39,41	0
4	EDO	A	404	4/4	0.84	0.30	42,43,48,53	0
4	EDO	B	403	4/4	0.88	0.30	40,48,56,56	0
4	EDO	B	404	4/4	0.90	0.24	42,46,52,67	0
6	GOL	A	406	6/6	0.90	0.10	40,51,57,60	0
4	EDO	A	403	4/4	0.91	0.13	32,39,44,45	0
4	EDO	B	405	4/4	0.91	0.31	31,43,52,57	0
5	ACT	B	407	4/4	0.93	0.09	31,35,37,38	0
7	CL	B	411	1/1	0.93	0.05	49,49,49,49	0
4	EDO	A	414	4/4	0.95	0.13	36,44,47,48	0
4	EDO	B	406	4/4	0.96	0.17	31,42,45,46	0
3	NAD	A	402	44/44	0.96	0.08	20,33,41,43	0
7	CL	B	410	1/1	0.97	0.05	35,35,35,35	0
2	STL	A	401	17/17	0.97	0.09	16,18,21,23	0
7	CL	A	418	1/1	0.97	0.05	38,38,38,38	0
2	STL	B	401	17/17	0.98	0.07	16,19,21,21	0

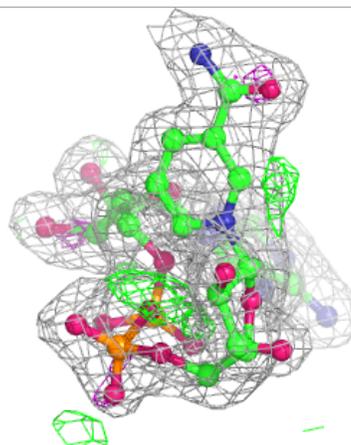
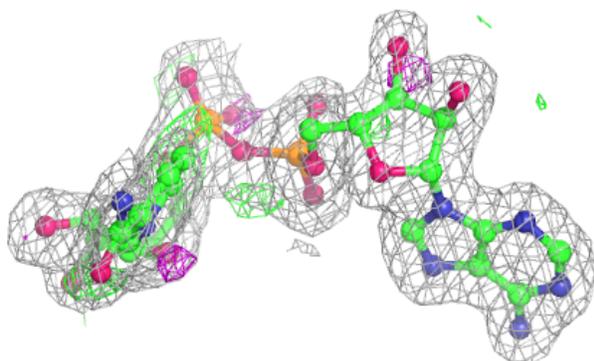
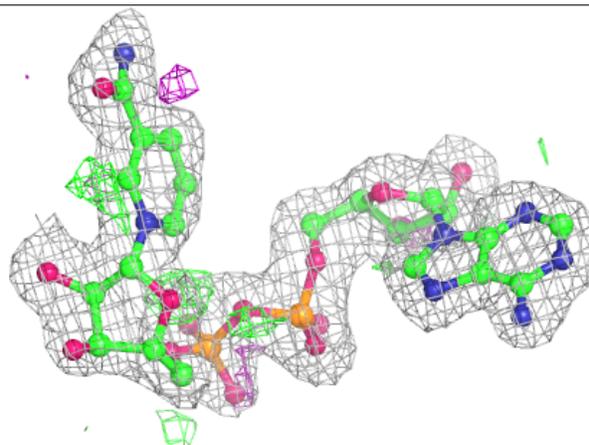
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around NAD B 402:

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

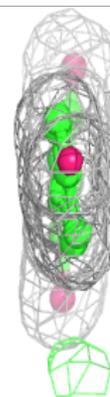
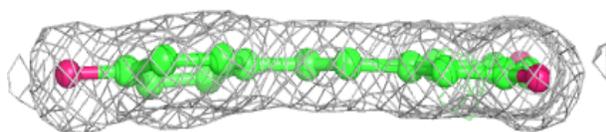
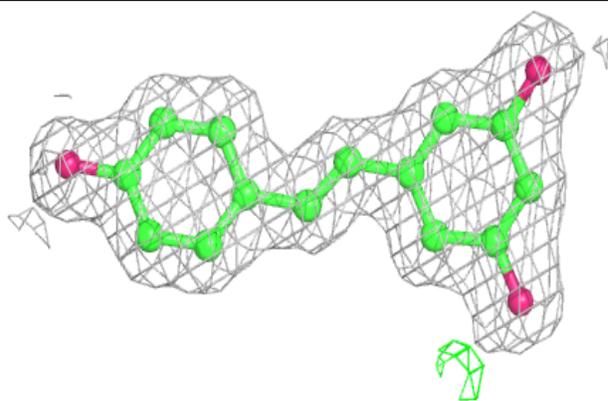
**Electron density around NAD A 402:**

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

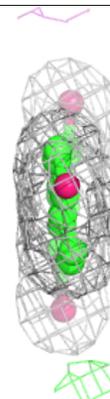
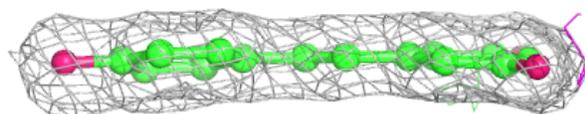
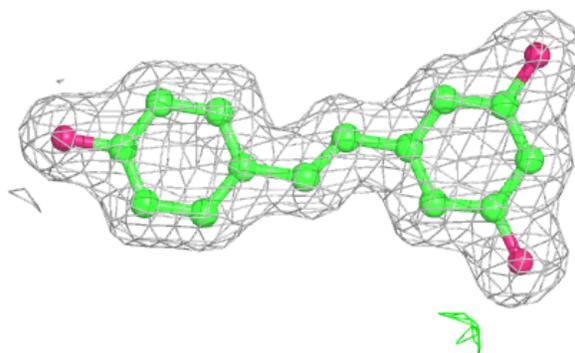


Electron density around STL A 401:

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

**Electron density around STL 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.