



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:00 PM UTC

PDB ID : 4K9D / pdb_00004k9d
Title : X-ray crystal structure of a Glyceraldehyde 3-phosphate dehydrogenase from *Brugia malayi* bound to the co-factor NAD
Authors : Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on : 2013-04-19
Resolution : 2.10 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

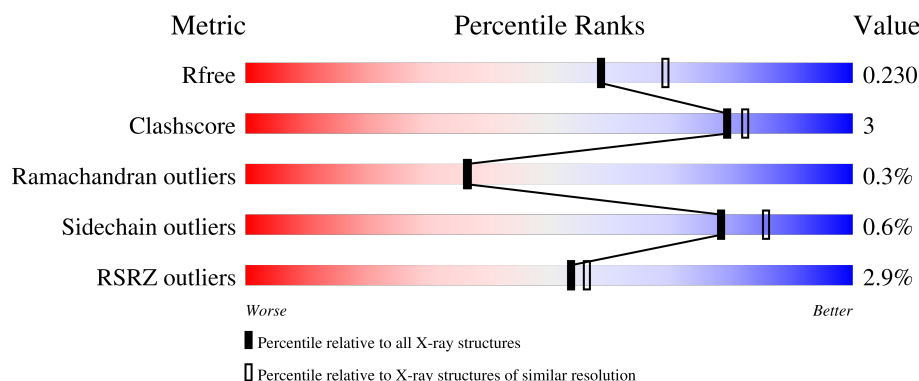
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

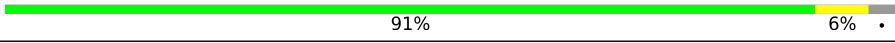
The reported resolution of this entry is 2.10 Å.

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	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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	347	
1	B	347	
1	C	347	
1	D	347	
1	E	347	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	347	% 90% 7%
1	G	347	91% 6%
1	H	347	15% 88% 5% 6%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 20811 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 Glyceraldehyde-3-phosphate dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	338	Total	C	N	O	S	0	3	0
			2496	1569	427	488	12			
1	B	338	Total	C	N	O	S	0	6	0
			2536	1601	434	487	14			
1	C	337	Total	C	N	O	S	0	3	0
			2506	1580	427	486	13			
1	D	337	Total	C	N	O	S	0	0	0
			2463	1548	422	481	12			
1	E	335	Total	C	N	O	S	0	1	0
			2345	1469	402	462	12			
1	F	337	Total	C	N	O	S	0	1	0
			2499	1574	429	484	12			
1	G	337	Total	C	N	O	S	0	6	0
			2511	1583	429	486	13			
1	H	325	Total	C	N	O	S	0	0	0
			2170	1346	387	428	9			

There are 64 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	MET	-	expression tag	UNP A8Q3K8
A	-6	ALA	-	expression tag	UNP A8Q3K8
A	-5	HIS	-	expression tag	UNP A8Q3K8
A	-4	HIS	-	expression tag	UNP A8Q3K8
A	-3	HIS	-	expression tag	UNP A8Q3K8
A	-2	HIS	-	expression tag	UNP A8Q3K8
A	-1	HIS	-	expression tag	UNP A8Q3K8
A	0	HIS	-	expression tag	UNP A8Q3K8
B	-7	MET	-	expression tag	UNP A8Q3K8
B	-6	ALA	-	expression tag	UNP A8Q3K8
B	-5	HIS	-	expression tag	UNP A8Q3K8
B	-4	HIS	-	expression tag	UNP A8Q3K8
B	-3	HIS	-	expression tag	UNP A8Q3K8

Continued on next page...

Continued from previous page...

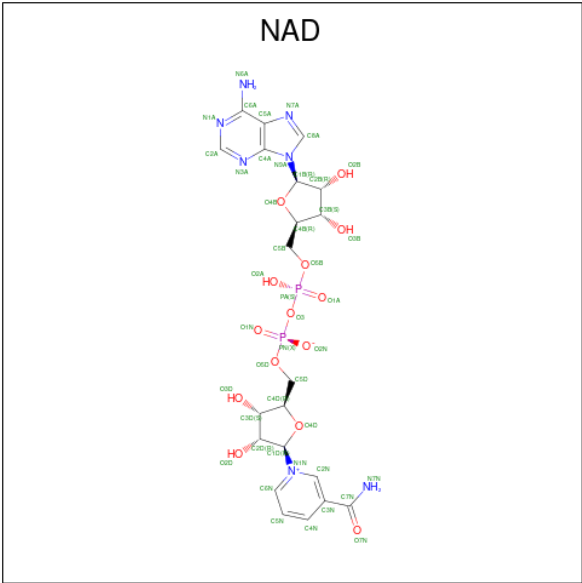
Chain	Residue	Modelled	Actual	Comment	Reference
B	-2	HIS	-	expression tag	UNP A8Q3K8
B	-1	HIS	-	expression tag	UNP A8Q3K8
B	0	HIS	-	expression tag	UNP A8Q3K8
C	-7	MET	-	expression tag	UNP A8Q3K8
C	-6	ALA	-	expression tag	UNP A8Q3K8
C	-5	HIS	-	expression tag	UNP A8Q3K8
C	-4	HIS	-	expression tag	UNP A8Q3K8
C	-3	HIS	-	expression tag	UNP A8Q3K8
C	-2	HIS	-	expression tag	UNP A8Q3K8
C	-1	HIS	-	expression tag	UNP A8Q3K8
C	0	HIS	-	expression tag	UNP A8Q3K8
D	-7	MET	-	expression tag	UNP A8Q3K8
D	-6	ALA	-	expression tag	UNP A8Q3K8
D	-5	HIS	-	expression tag	UNP A8Q3K8
D	-4	HIS	-	expression tag	UNP A8Q3K8
D	-3	HIS	-	expression tag	UNP A8Q3K8
D	-2	HIS	-	expression tag	UNP A8Q3K8
D	-1	HIS	-	expression tag	UNP A8Q3K8
D	0	HIS	-	expression tag	UNP A8Q3K8
E	-7	MET	-	expression tag	UNP A8Q3K8
E	-6	ALA	-	expression tag	UNP A8Q3K8
E	-5	HIS	-	expression tag	UNP A8Q3K8
E	-4	HIS	-	expression tag	UNP A8Q3K8
E	-3	HIS	-	expression tag	UNP A8Q3K8
E	-2	HIS	-	expression tag	UNP A8Q3K8
E	-1	HIS	-	expression tag	UNP A8Q3K8
E	0	HIS	-	expression tag	UNP A8Q3K8
F	-7	MET	-	expression tag	UNP A8Q3K8
F	-6	ALA	-	expression tag	UNP A8Q3K8
F	-5	HIS	-	expression tag	UNP A8Q3K8
F	-4	HIS	-	expression tag	UNP A8Q3K8
F	-3	HIS	-	expression tag	UNP A8Q3K8
F	-2	HIS	-	expression tag	UNP A8Q3K8
F	-1	HIS	-	expression tag	UNP A8Q3K8
F	0	HIS	-	expression tag	UNP A8Q3K8
G	-7	MET	-	expression tag	UNP A8Q3K8
G	-6	ALA	-	expression tag	UNP A8Q3K8
G	-5	HIS	-	expression tag	UNP A8Q3K8
G	-4	HIS	-	expression tag	UNP A8Q3K8
G	-3	HIS	-	expression tag	UNP A8Q3K8
G	-2	HIS	-	expression tag	UNP A8Q3K8
G	-1	HIS	-	expression tag	UNP A8Q3K8

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
G	0	HIS	-	expression tag	UNP A8Q3K8
H	-7	MET	-	expression tag	UNP A8Q3K8
H	-6	ALA	-	expression tag	UNP A8Q3K8
H	-5	HIS	-	expression tag	UNP A8Q3K8
H	-4	HIS	-	expression tag	UNP A8Q3K8
H	-3	HIS	-	expression tag	UNP A8Q3K8
H	-2	HIS	-	expression tag	UNP A8Q3K8
H	-1	HIS	-	expression tag	UNP A8Q3K8
H	0	HIS	-	expression tag	UNP A8Q3K8

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (CCD ID: NAD) (formula: C₂₁H₂₇N₇O₁₄P₂).



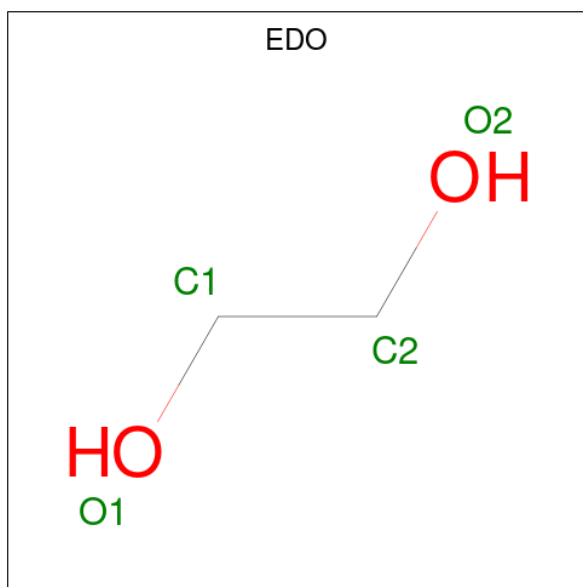
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	B	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	C	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	D	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	E	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	F	1	Total	C	N	O	P	0	0
			44	21	7	14	2		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	G	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	H	1	Total	C	N	O	P	0	0
			44	21	7	14	2		

- Molecule 3 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



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

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	128	Total	O	0	0
			128	128		

Continued on next page...

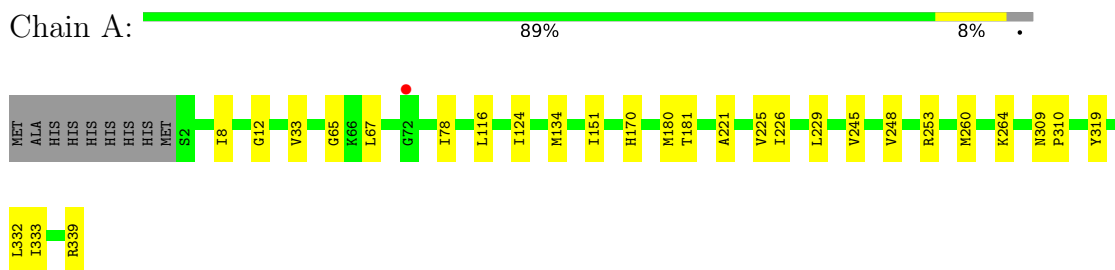
Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	170	Total 170	O 170	0	0
4	C	130	Total 130	O 130	0	0
4	D	87	Total 87	O 87	0	0
4	E	58	Total 58	O 58	0	0
4	F	144	Total 144	O 144	0	0
4	G	170	Total 170	O 170	0	0
4	H	22	Total 22	O 22	0	0

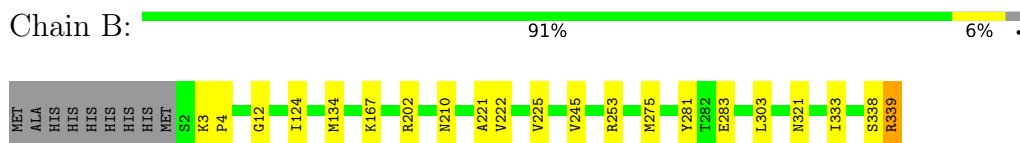
3 Residue-property plots

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.

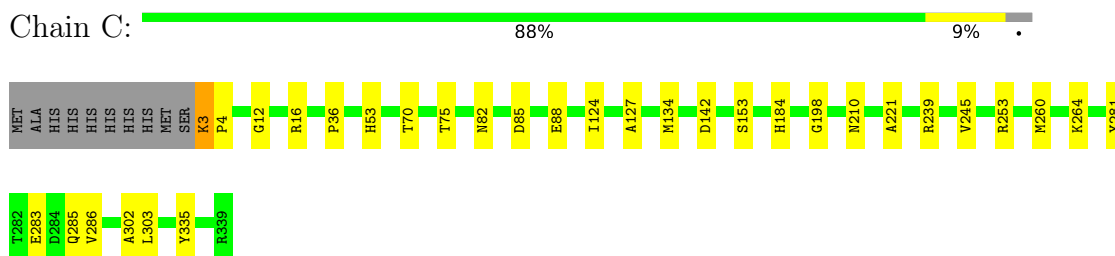
- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase



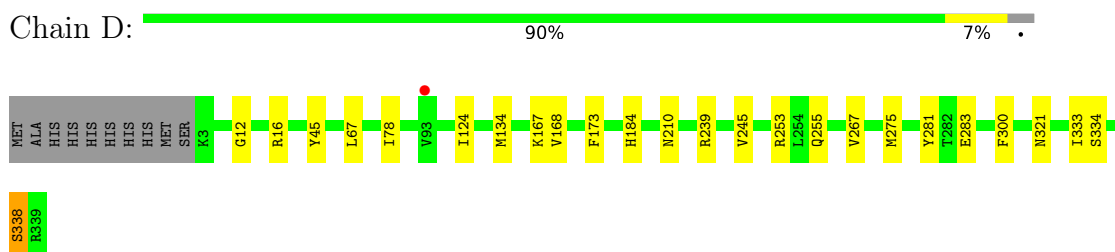
- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase



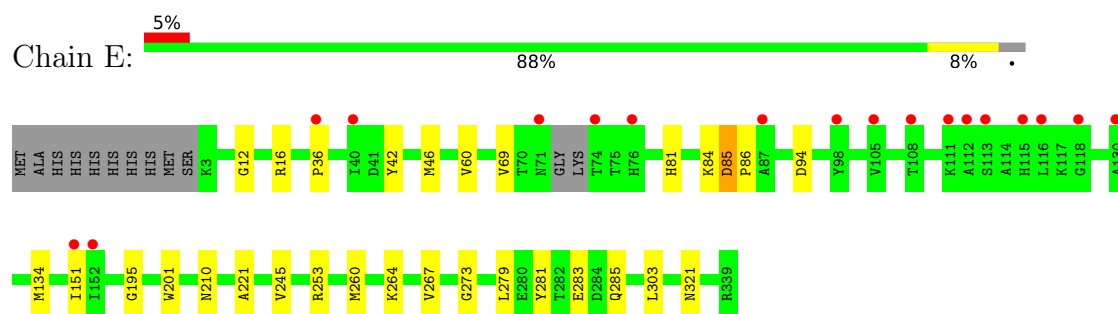
- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase



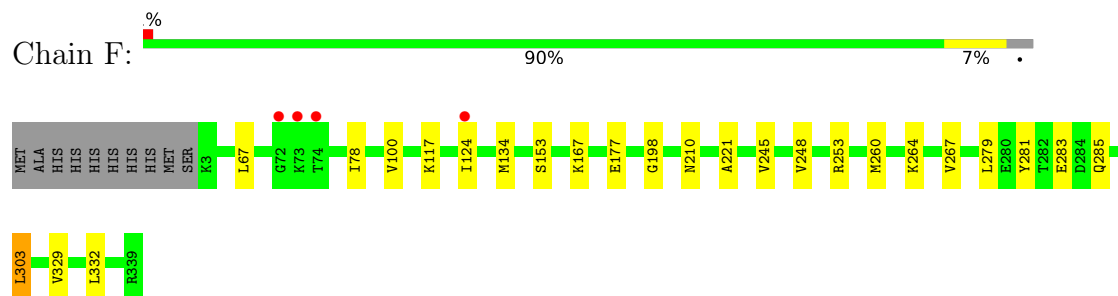
- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase



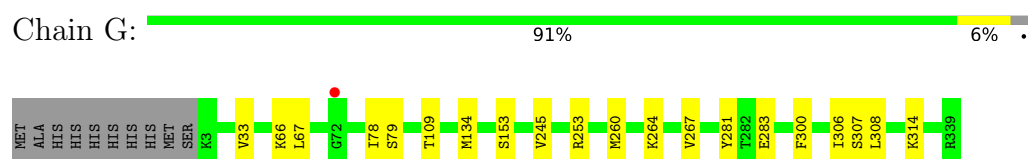
- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase



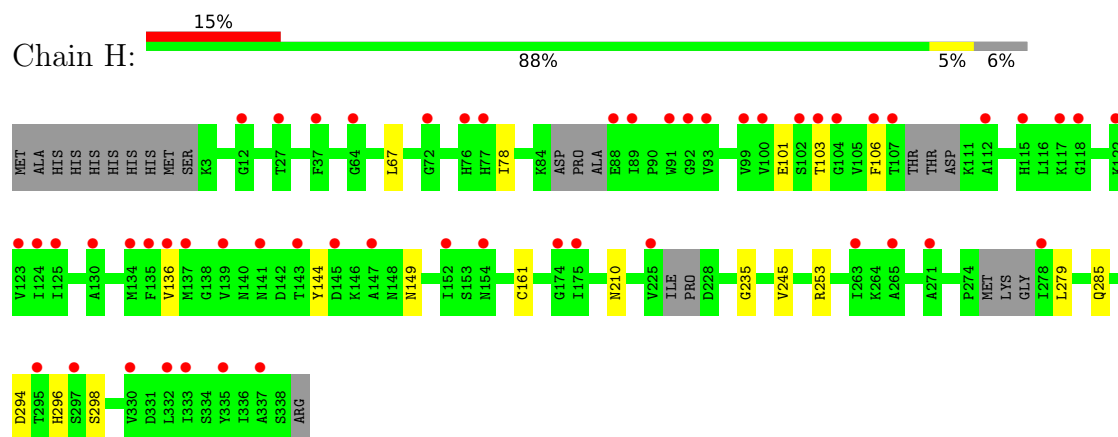
- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase



- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase



- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	87.76Å 176.99Å 94.25Å 90.00° 101.12° 90.00°	Depositor
Resolution (Å)	19.87 – 2.10 19.87 – 2.10	Depositor EDS
% Data completeness (in resolution range)	97.4 (19.87-2.10) 97.3 (19.87-2.10)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.17 (at 2.09Å)	Xtriage
Refinement program	PHENIX dev_1255	Depositor
R, R_{free}	0.184 , 0.230 0.185 , 0.230	Depositor DCC
R_{free} test set	8004 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å ²)	28.9	Xtriage
Anisotropy	0.525	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 50.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	20811	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.80% 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: EDO, NAD

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	0.49	0/2554	0.81	0/3484
1	B	0.54	0/2603	0.84	1/3539 (0.0%)
1	C	0.52	0/2564	0.84	2/3491 (0.1%)
1	D	0.45	0/2512	0.85	1/3429 (0.0%)
1	E	0.45	0/2394	0.89	8/3280 (0.2%)
1	F	0.53	0/2551	0.86	2/3472 (0.1%)
1	G	0.53	0/2578	0.82	0/3512
1	H	0.43	0/2206	0.90	3/3024 (0.1%)
All	All	0.49	0/19962	0.85	17/27231 (0.1%)

There are no bond length outliers.

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	273	GLY	CA-C-N	6.15	125.77	119.56
1	E	273	GLY	C-N-CA	6.15	125.77	119.56
1	H	235	GLY	N-CA-C	6.05	119.33	110.80
1	E	85	ASP	CA-C-N	5.93	125.61	119.56
1	E	85	ASP	C-N-CA	5.93	125.61	119.56
1	H	210	ASN	N-CA-C	5.88	119.14	109.72
1	E	210	ASN	N-CA-C	5.55	118.60	109.72
1	D	210	ASN	N-CA-C	5.53	118.57	109.72
1	F	210	ASN	N-CA-C	5.38	118.32	109.72
1	C	198	GLY	N-CA-C	5.32	119.32	112.83
1	H	103	THR	N-CA-C	-5.29	105.57	112.23
1	E	195	GLY	CA-C-N	5.27	125.44	119.90
1	E	195	GLY	C-N-CA	5.27	125.44	119.90
1	F	198	GLY	N-CA-C	5.23	119.21	112.83
1	C	210	ASN	N-CA-C	5.22	117.75	109.50
1	B	210	ASN	N-CA-C	5.17	118.00	109.72

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	201	TRP	N-CA-C	5.13	116.87	111.28

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	2496	0	2419	15	0
1	B	2536	0	2524	15	0
1	C	2506	0	2460	19	0
1	D	2463	0	2365	15	0
1	E	2345	0	2112	13	0
1	F	2499	0	2456	16	0
1	G	2511	0	2466	12	0
1	H	2170	0	1844	8	0
2	A	44	0	26	1	0
2	B	44	0	26	2	0
2	C	44	0	26	1	0
2	D	44	0	26	2	0
2	E	44	0	26	1	0
2	F	44	0	26	0	0
2	G	44	0	26	0	0
2	H	44	0	26	0	0
3	A	8	0	12	0	0
3	B	4	0	6	0	0
3	C	4	0	6	1	0
3	F	4	0	6	0	0
3	G	4	0	6	0	0
4	A	128	0	0	0	0
4	B	170	0	0	0	0
4	C	130	0	0	2	0
4	D	87	0	0	1	0
4	E	58	0	0	0	0
4	F	144	0	0	1	0
4	G	170	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	H	22	0	0	0	0
All	All	20811	0	18890	104	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 3.

All (104) 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:339:ARG:HG2	1:B:339:ARG:HH11	1.41	0.85
1:D:67:LEU:HB3	1:D:78:ILE:HB	1.65	0.79
1:B:253:ARG:HD2	1:C:253:ARG:HD2	1.73	0.70
1:F:253:ARG:HD2	1:G:253:ARG:HD2	1.74	0.68
1:D:253:ARG:HD2	1:E:253:ARG:HD2	1.74	0.68
1:E:81:HIS:NE2	1:E:94:ASP:OD2	2.21	0.65
1:G:260:MET:HE2	1:G:307[A]:SER:OG	1.95	0.65
1:E:134:MET:HE1	1:E:221:ALA:HB1	1.78	0.64
1:B:339:ARG:HG2	1:B:339:ARG:NH1	2.13	0.63
1:A:253:ARG:HD2	1:H:253:ARG:HD2	1.82	0.61
1:H:67:LEU:HB3	1:H:78:ILE:HB	1.81	0.61
1:F:124:ILE:HD13	1:F:329:VAL:HG13	1.83	0.60
1:B:338:SER:OG	1:B:339:ARG:NH1	2.30	0.60
1:E:42:TYR:CZ	1:E:46:MET:HE3	2.38	0.59
1:A:260:MET:HG3	1:A:264:LYS:HE3	1.86	0.58
1:C:3:LYS:HD2	1:C:4:PRO:HD2	1.85	0.58
1:G:66:LYS:HD2	1:G:79:SER:HA	1.86	0.57
1:C:281:TYR:OH	1:C:283:GLU:OE2	2.19	0.57
1:A:65:GLY:HA3	1:F:117:LYS:HA	1.87	0.57
1:C:85:ASP:HB3	1:C:88:GLU:HG2	1.86	0.56
1:D:167:LYS:NZ	4:D:635:HOH:O	2.38	0.56
1:A:309:ASN:HB2	1:A:310:PRO:HD2	1.89	0.55
1:G:260:MET:HG3	1:G:264:LYS:HE3	1.89	0.55
1:E:260:MET:HG3	1:E:264:LYS:HE3	1.89	0.54
1:E:36:PRO:HG3	1:E:84:LYS:HA	1.88	0.54
1:F:134:MET:HE1	1:F:221:ALA:HB1	1.90	0.54
1:G:134[A]:MET:HG2	1:G:153:SER:HB3	1.89	0.53
1:E:285:GLN:NE2	1:E:303:LEU:HD23	2.24	0.53
1:F:253:ARG:CD	1:G:253:ARG:HD2	2.39	0.53
1:H:161:CYS:HA	1:H:298:SER:HB2	1.91	0.53
1:F:167:LYS:NZ	4:F:626:HOH:O	2.41	0.52
1:A:67:LEU:HB3	1:A:78:ILE:HB	1.92	0.52

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:134[A]:MET:HE1	1:C:221:ALA:HB1	1.91	0.51
1:E:60:VAL:HG23	1:E:69:VAL:HG22	1.92	0.51
1:D:334:SER:O	1:D:338:SER:OG	2.28	0.51
1:C:281:TYR:CE1	1:C:283:GLU:HG3	2.46	0.50
1:D:321:ASN:O	2:D:500:NAD:H4N	2.10	0.50
1:F:281:TYR:CE1	1:F:283:GLU:HG3	2.46	0.50
1:B:134:MET:HE1	1:B:221:ALA:HB1	1.94	0.50
1:A:124:ILE:HD13	1:A:332:LEU:HD23	1.94	0.49
1:B:12:GLY:HA3	2:B:401:NAD:O5B	2.12	0.49
1:C:36:PRO:HA	1:C:82:ASN:HB3	1.94	0.49
1:B:222:VAL:HA	1:B:225[A]:VAL:HG22	1.95	0.49
1:G:267:VAL:HG11	1:G:300:PHE:CG	2.48	0.49
1:F:285:GLN:NE2	1:F:303:LEU:HD23	2.29	0.47
1:H:294:ASP:OD1	1:H:296:HIS:ND1	2.34	0.47
1:D:124:ILE:HD12	1:D:333:ILE:HG13	1.96	0.47
1:C:184:HIS:HB3	1:C:239[A]:ARG:HD3	1.96	0.47
1:G:67:LEU:HB3	1:G:78:ILE:HB	1.96	0.47
1:D:281:TYR:CE1	1:D:283:GLU:HG3	2.50	0.47
1:F:260:MET:HG3	1:F:264:LYS:HE3	1.98	0.46
1:B:339:ARG:HH11	1:B:339:ARG:CG	2.22	0.46
1:C:70:THR:HG22	1:C:75:THR:HG23	1.98	0.46
1:D:45:TYR:CE1	1:H:285:GLN:HB2	2.51	0.45
1:C:142:ASP:HA	1:C:335:TYR:OH	2.16	0.45
1:A:134:MET:HE1	1:A:221:ALA:HB1	1.99	0.45
1:A:124:ILE:HD12	1:A:333:ILE:HG13	1.99	0.44
1:C:239[B]:ARG:NH2	4:C:625:HOH:O	2.50	0.44
1:B:253:ARG:HD2	1:C:253:ARG:CD	2.45	0.44
1:F:100:VAL:HA	1:F:124:ILE:HG23	1.99	0.44
1:H:101:GLU:CD	1:H:106:PHE:HB2	2.43	0.44
1:B:202:ARG:HD3	1:C:286:VAL:O	2.18	0.44
1:E:267:VAL:HG13	1:E:279:LEU:HD21	1.98	0.44
1:G:281:TYR:CE1	1:G:283:GLU:HG3	2.53	0.44
1:F:177:GLU:HB2	1:G:308:LEU:CD2	2.47	0.44
1:C:285:GLN:NE2	1:C:303:LEU:HD23	2.33	0.44
1:D:173:PHE:O	1:D:255:GLN:HB3	2.18	0.44
1:F:267:VAL:HG13	1:F:279:LEU:HD21	1.99	0.44
1:G:33[A]:VAL:HG23	1:G:78:ILE:HG21	1.99	0.43
1:E:281:TYR:CE1	1:E:283:GLU:HG3	2.53	0.43
1:A:225:VAL:HG23	1:A:226:ILE:HG13	2.01	0.43
2:C:401:NAD:N1A	4:C:587:HOH:O	2.37	0.43
1:D:267:VAL:HG11	1:D:300:PHE:CG	2.54	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:67:LEU:HB3	1:F:78:ILE:HB	2.01	0.43
1:C:127:ALA:O	1:C:153:SER:OG	2.37	0.42
1:E:12:GLY:O	1:E:16:ARG:HG3	2.18	0.42
1:E:321:ASN:O	2:E:500:NAD:H4N	2.18	0.42
1:F:134:MET:HG2	1:F:153:SER:HB3	2.02	0.42
1:B:167:LYS:HD3	1:B:275[A]:MET:HE3	2.02	0.42
1:C:260:MET:HG3	1:C:264:LYS:HE3	2.00	0.42
1:A:116:LEU:HD11	1:A:151:ILE:HD11	2.01	0.42
1:B:281:TYR:CE1	1:B:283:GLU:HG3	2.55	0.42
1:C:53:HIS:HB3	3:C:402:EDO:H22	2.01	0.42
1:H:279:LEU:HA	1:H:298:SER:O	2.19	0.42
1:A:180:MET:HG2	1:A:181:THR:N	2.35	0.41
1:B:124:ILE:HD12	1:B:333:ILE:HG13	2.01	0.41
1:A:12:GLY:HA3	2:A:401:NAD:O5B	2.20	0.41
1:G:306:ILE:HG13	1:G:314:LYS:HB3	2.02	0.41
1:H:144:TYR:CE1	1:H:149:ASN:HB2	2.55	0.41
1:C:264:LYS:HE2	1:C:302:ALA:HB1	2.03	0.41
1:D:12:GLY:HA3	2:D:500:NAD:O5B	2.21	0.41
1:F:124:ILE:CD1	1:F:332:LEU:HD23	2.50	0.41
1:F:124:ILE:HD12	1:F:332:LEU:HD23	2.02	0.41
1:D:168:VAL:HG23	1:D:275:MET:HE2	2.03	0.41
1:A:8:ILE:HB	1:A:33[B]:VAL:HG12	2.03	0.41
1:A:170:HIS:ND1	1:A:229:LEU:HD21	2.35	0.41
1:D:184:HIS:HB3	1:D:239:ARG:HD3	2.02	0.40
1:B:321:ASN:O	2:B:401:NAD:H4N	2.21	0.40
1:B:3:LYS:HA	1:B:4:PRO:HD3	1.96	0.40
1:D:12:GLY:O	1:D:16:ARG:HG3	2.22	0.40
1:D:134:MET:HB3	1:D:134:MET:HE3	1.80	0.40
1:E:85:ASP:HA	1:E:86:PRO:HD2	1.87	0.40
1:A:248:VAL:HG23	1:A:319:TYR:CE1	2.56	0.40
1:C:12:GLY:O	1:C:16:ARG:HG3	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	339/347 (98%)	326 (96%)	12 (4%)	1 (0%)	36	36
1	B	342/347 (99%)	331 (97%)	10 (3%)	1 (0%)	36	36
1	C	338/347 (97%)	326 (96%)	11 (3%)	1 (0%)	36	36
1	D	335/347 (96%)	323 (96%)	11 (3%)	1 (0%)	36	36
1	E	332/347 (96%)	320 (96%)	11 (3%)	1 (0%)	36	36
1	F	336/347 (97%)	323 (96%)	12 (4%)	1 (0%)	36	36
1	G	341/347 (98%)	329 (96%)	11 (3%)	1 (0%)	36	36
1	H	315/347 (91%)	302 (96%)	12 (4%)	1 (0%)	36	36
All	All	2678/2776 (96%)	2580 (96%)	90 (3%)	8 (0%)	36	36

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	245	VAL
1	B	245	VAL
1	C	245	VAL
1	D	245	VAL
1	F	245	VAL
1	G	245	VAL
1	H	245	VAL
1	E	245	VAL

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	263/282 (93%)	262 (100%)	1 (0%)	84	89
1	B	273/282 (97%)	271 (99%)	2 (1%)	76	83
1	C	266/282 (94%)	263 (99%)	3 (1%)	65	74
1	D	255/282 (90%)	254 (100%)	1 (0%)	84	89

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	220/282 (78%)	219 (100%)	1 (0%)	81	88
1	F	265/282 (94%)	263 (99%)	2 (1%)	73	81
1	G	267/282 (95%)	266 (100%)	1 (0%)	84	89
1	H	182/282 (64%)	181 (100%)	1 (0%)	81	88
All	All	1991/2256 (88%)	1979 (99%)	12 (1%)	78	86

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	339	ARG
1	B	303	LEU
1	B	339	ARG
1	C	3	LYS
1	C	124[A]	ILE
1	C	124[B]	ILE
1	D	338	SER
1	E	151	ILE
1	F	248	VAL
1	F	303	LEU
1	G	109	THR
1	H	136	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	255	GLN
1	C	82	ASN
1	D	82	ASN
1	D	311	ASN
1	F	76	HIS
1	F	209	GLN
1	G	148	ASN
1	H	170	HIS
1	H	230	ASN

5.3.3 RNA ⓘ

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](#)

14 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	NAD	F	401	-	46,48,48	1.30	6 (13%)	64,73,73	1.62	8 (12%)
2	NAD	E	500	-	46,48,48	1.21	5 (10%)	64,73,73	1.59	10 (15%)
3	EDO	C	402	-	3,3,3	0.43	0	2,2,2	0.41	0
2	NAD	B	401	-	46,48,48	1.20	6 (13%)	64,73,73	1.62	11 (17%)
2	NAD	G	401	-	46,48,48	1.19	4 (8%)	64,73,73	1.61	12 (18%)
3	EDO	A	402	-	3,3,3	0.52	0	2,2,2	0.35	0
2	NAD	H	500	-	46,48,48	1.19	5 (10%)	64,73,73	1.59	9 (14%)
3	EDO	A	403	-	3,3,3	0.50	0	2,2,2	0.24	0
2	NAD	D	500	-	46,48,48	1.20	5 (10%)	64,73,73	1.60	10 (15%)
3	EDO	F	402	-	3,3,3	0.64	0	2,2,2	0.16	0
2	NAD	C	401	-	46,48,48	1.19	5 (10%)	64,73,73	1.55	9 (14%)
2	NAD	A	401	-	46,48,48	1.11	4 (8%)	64,73,73	1.64	11 (17%)
3	EDO	G	402	-	3,3,3	0.50	0	2,2,2	0.21	0
3	EDO	B	402	-	3,3,3	0.49	0	2,2,2	0.41	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	NAD	F	401	-	-	8/30/62/62	0/5/5/5
2	NAD	E	500	-	-	15/30/62/62	0/5/5/5
3	EDO	C	402	-	-	0/1/1/1	-
2	NAD	B	401	-	-	7/30/62/62	0/5/5/5
2	NAD	G	401	-	-	10/30/62/62	0/5/5/5
3	EDO	A	402	-	-	0/1/1/1	-
2	NAD	H	500	-	-	14/30/62/62	0/5/5/5
3	EDO	A	403	-	-	0/1/1/1	-
2	NAD	D	500	-	-	8/30/62/62	0/5/5/5
3	EDO	F	402	-	-	1/1/1/1	-
2	NAD	C	401	-	-	8/30/62/62	0/5/5/5
2	NAD	A	401	-	-	8/30/62/62	0/5/5/5
3	EDO	G	402	-	-	0/1/1/1	-
3	EDO	B	402	-	-	0/1/1/1	-

All (40) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	500	NAD	C5A-C4A	4.94	1.47	1.39
2	D	500	NAD	C5A-C4A	4.87	1.47	1.39
2	E	500	NAD	C5A-C4A	4.82	1.47	1.39
2	F	401	NAD	C5A-C4A	4.77	1.47	1.39
2	B	401	NAD	C5A-C4A	4.74	1.47	1.39
2	C	401	NAD	C5A-C4A	4.74	1.47	1.39
2	G	401	NAD	C5A-C4A	4.58	1.47	1.39
2	A	401	NAD	C5A-C4A	4.31	1.46	1.39
2	E	500	NAD	C5A-C6A	2.97	1.49	1.41
2	D	500	NAD	C5A-C6A	2.88	1.49	1.41
2	G	401	NAD	C5A-C6A	2.85	1.48	1.41
2	F	401	NAD	C5A-C6A	2.85	1.48	1.41
2	H	500	NAD	C5A-C6A	2.84	1.48	1.41
2	A	401	NAD	C5A-C6A	2.78	1.48	1.41
2	F	401	NAD	PA-O3	2.76	1.62	1.59
2	B	401	NAD	O4D-C1D	2.70	1.44	1.40
2	C	401	NAD	C5A-C6A	2.65	1.48	1.41
2	F	401	NAD	O4D-C1D	2.62	1.44	1.40
2	G	401	NAD	O4D-C1D	2.58	1.44	1.40
2	D	500	NAD	C8A-N7A	2.51	1.36	1.31
2	B	401	NAD	PA-O3	2.46	1.62	1.59
2	A	401	NAD	O4D-C1D	2.44	1.44	1.40
2	E	500	NAD	C8A-N7A	2.43	1.36	1.31

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	500	NAD	C8A-N7A	2.40	1.36	1.31
2	C	401	NAD	C8A-N7A	2.37	1.36	1.31
2	G	401	NAD	C8A-N7A	2.34	1.36	1.31
2	F	401	NAD	C8A-N7A	2.29	1.36	1.31
2	D	500	NAD	C5A-N7A	-2.27	1.34	1.39
2	E	500	NAD	C5A-N7A	-2.25	1.35	1.39
2	C	401	NAD	PA-O3	2.22	1.61	1.59
2	H	500	NAD	C5A-N7A	-2.19	1.35	1.39
2	B	401	NAD	C5A-C6A	2.19	1.47	1.41
2	A	401	NAD	C8A-N7A	2.19	1.35	1.31
2	H	500	NAD	O4D-C1D	2.14	1.43	1.40
2	E	500	NAD	O4D-C1D	2.12	1.43	1.40
2	F	401	NAD	C5A-N7A	-2.12	1.35	1.39
2	B	401	NAD	C8A-N7A	2.11	1.35	1.31
2	C	401	NAD	C5A-N7A	-2.07	1.35	1.39
2	D	500	NAD	O4D-C1D	2.02	1.43	1.40
2	B	401	NAD	C4A-N9A	-2.01	1.33	1.37

All (80) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	401	NAD	C5A-C4A-N3A	-6.27	118.09	126.72
2	H	500	NAD	C5A-C4A-N3A	-5.83	118.69	126.72
2	C	401	NAD	C5A-C4A-N3A	-5.69	118.89	126.72
2	E	500	NAD	C5A-C4A-N3A	-5.61	119.00	126.72
2	D	500	NAD	C5A-C4A-N3A	-5.55	119.08	126.72
2	B	401	NAD	C5A-C4A-N3A	-5.32	119.39	126.72
2	F	401	NAD	N3A-C4A-N9A	5.13	135.90	127.17
2	G	401	NAD	C5A-C4A-N3A	-5.04	119.78	126.72
2	B	401	NAD	N3A-C4A-N9A	4.95	135.59	127.17
2	A	401	NAD	C5A-C4A-N3A	-4.94	119.91	126.72
2	H	500	NAD	N3A-C4A-N9A	4.54	134.89	127.17
2	C	401	NAD	N3A-C4A-N9A	4.50	134.82	127.17
2	E	500	NAD	N3A-C4A-N9A	4.48	134.78	127.17
2	A	401	NAD	N3A-C4A-N9A	4.25	134.40	127.17
2	A	401	NAD	N3A-C2A-N1A	-4.24	122.16	128.58
2	D	500	NAD	N3A-C4A-N9A	4.07	134.08	127.17
2	D	500	NAD	C4A-C5A-N7A	-3.87	106.16	110.58
2	G	401	NAD	C4A-C5A-N7A	-3.86	106.17	110.58
2	G	401	NAD	N3A-C4A-N9A	3.84	133.69	127.17
2	A	401	NAD	C2A-N3A-C4A	3.79	121.08	111.83
2	B	401	NAD	C4A-N9A-C8A	3.76	109.69	105.74

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	401	NAD	C2A-N3A-C4A	3.70	120.87	111.83
2	B	401	NAD	N3A-C2A-N1A	-3.64	123.08	128.58
2	A	401	NAD	C4A-N9A-C8A	3.64	109.56	105.74
2	H	500	NAD	C2A-N3A-C4A	3.63	120.69	111.83
2	F	401	NAD	C2A-N3A-C4A	3.61	120.65	111.83
2	H	500	NAD	C4A-C5A-N7A	-3.54	106.53	110.58
2	E	500	NAD	C2A-N3A-C4A	3.54	120.47	111.83
2	D	500	NAD	C2A-N3A-C4A	3.49	120.34	111.83
2	E	500	NAD	C4A-C5A-N7A	-3.48	106.61	110.58
2	C	401	NAD	C4A-C5A-N7A	-3.44	106.65	110.58
2	B	401	NAD	C2A-N3A-C4A	3.41	120.17	111.83
2	G	401	NAD	N3A-C2A-N1A	-3.40	123.44	128.58
2	G	401	NAD	C2A-N3A-C4A	3.35	120.02	111.83
2	F	401	NAD	C4A-C5A-N7A	-3.31	106.80	110.58
2	C	401	NAD	N3A-C2A-N1A	-3.29	123.60	128.58
2	A	401	NAD	C4A-C5A-N7A	-3.20	106.92	110.58
2	H	500	NAD	N3A-C2A-N1A	-3.16	123.79	128.58
2	G	401	NAD	C5A-N7A-C8A	2.99	108.15	103.45
2	G	401	NAD	C4A-N9A-C8A	2.98	108.86	105.74
2	H	500	NAD	O4B-C1B-N9A	2.98	113.81	108.09
2	E	500	NAD	N3A-C2A-N1A	-2.97	124.08	128.58
2	D	500	NAD	N3A-C2A-N1A	-2.94	124.14	128.58
2	E	500	NAD	C4A-N9A-C8A	2.85	108.73	105.74
2	D	500	NAD	C5A-N7A-C8A	2.83	107.89	103.45
2	F	401	NAD	N3A-C2A-N1A	-2.82	124.31	128.58
2	F	401	NAD	C4A-N9A-C8A	2.78	108.65	105.74
2	C	401	NAD	C5A-N7A-C8A	2.74	107.75	103.45
2	E	500	NAD	O4B-C1B-N9A	2.73	113.33	108.09
2	A	401	NAD	C5A-N7A-C8A	2.69	107.68	103.45
2	C	401	NAD	C4A-N9A-C8A	2.68	108.55	105.74
2	A	401	NAD	N9A-C8A-N7A	-2.66	110.16	113.94
2	F	401	NAD	C5A-N7A-C8A	2.65	107.61	103.45
2	E	500	NAD	C5A-N7A-C8A	2.63	107.58	103.45
2	B	401	NAD	C4A-C5A-N7A	-2.57	107.65	110.58
2	G	401	NAD	N9A-C8A-N7A	-2.56	110.30	113.94
2	H	500	NAD	C5A-N7A-C8A	2.52	107.41	103.45
2	G	401	NAD	C6A-C5A-N7A	2.42	136.75	132.09
2	H	500	NAD	C4A-N9A-C8A	2.42	108.27	105.74
2	B	401	NAD	O3-PA-O1A	-2.41	103.44	110.70
2	A	401	NAD	C6A-C5A-N7A	2.41	136.74	132.09
2	A	401	NAD	C2A-N1A-C6A	2.38	122.65	118.73
2	D	500	NAD	C4A-N9A-C8A	2.35	108.21	105.74

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	401	NAD	N9A-C8A-N7A	-2.32	110.65	113.94
2	G	401	NAD	C2A-N1A-C6A	2.31	122.52	118.73
2	A	401	NAD	O2A-PA-O1A	2.27	123.02	112.44
2	D	500	NAD	C6A-C5A-N7A	2.27	136.46	132.09
2	G	401	NAD	C3N-C7N-N7N	2.26	120.53	117.74
2	G	401	NAD	O2A-PA-O1A	2.26	122.94	112.44
2	B	401	NAD	C5A-N7A-C8A	2.25	106.99	103.45
2	C	401	NAD	N9A-C8A-N7A	-2.24	110.76	113.94
2	B	401	NAD	C2A-N1A-C6A	2.23	122.39	118.73
2	E	500	NAD	N9A-C8A-N7A	-2.18	110.85	113.94
2	D	500	NAD	N9A-C8A-N7A	-2.14	110.90	113.94
2	F	401	NAD	N9A-C8A-N7A	-2.12	110.92	113.94
2	B	401	NAD	O2A-PA-O1A	2.12	122.30	112.44
2	E	500	NAD	C6A-C5A-N7A	2.10	136.14	132.09
2	C	401	NAD	C6A-C5A-N7A	2.06	136.06	132.09
2	D	500	NAD	O2N-PN-O1N	2.05	121.98	112.44
2	H	500	NAD	C6A-C5A-N7A	2.03	136.01	132.09

There are no chirality outliers.

All (79) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	NAD	C5B-O5B-PA-O1A
2	A	401	NAD	O4D-C1D-N1N-C2N
2	A	401	NAD	O4D-C1D-N1N-C6N
2	A	401	NAD	C2D-C1D-N1N-C2N
2	A	401	NAD	C2D-C1D-N1N-C6N
2	B	401	NAD	O4D-C1D-N1N-C2N
2	B	401	NAD	O4D-C1D-N1N-C6N
2	B	401	NAD	C2D-C1D-N1N-C2N
2	B	401	NAD	C2D-C1D-N1N-C6N
2	C	401	NAD	C5D-O5D-PN-O1N
2	C	401	NAD	O4D-C1D-N1N-C2N
2	C	401	NAD	O4D-C1D-N1N-C6N
2	C	401	NAD	C2D-C1D-N1N-C2N
2	C	401	NAD	C2D-C1D-N1N-C6N
2	D	500	NAD	O4D-C1D-N1N-C2N
2	D	500	NAD	O4D-C1D-N1N-C6N
2	D	500	NAD	C2D-C1D-N1N-C2N
2	D	500	NAD	C2D-C1D-N1N-C6N
2	E	500	NAD	C5B-O5B-PA-O1A
2	E	500	NAD	C5D-O5D-PN-O2N

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
2	E	500	NAD	O4D-C1D-N1N-C2N
2	E	500	NAD	O4D-C1D-N1N-C6N
2	E	500	NAD	C2D-C1D-N1N-C2N
2	E	500	NAD	C2D-C1D-N1N-C6N
2	F	401	NAD	C5B-O5B-PA-O1A
2	F	401	NAD	O4D-C1D-N1N-C2N
2	F	401	NAD	O4D-C1D-N1N-C6N
2	F	401	NAD	C2D-C1D-N1N-C2N
2	F	401	NAD	C2D-C1D-N1N-C6N
2	G	401	NAD	C5B-O5B-PA-O1A
2	G	401	NAD	C5D-O5D-PN-O1N
2	G	401	NAD	O4D-C1D-N1N-C2N
2	G	401	NAD	O4D-C1D-N1N-C6N
2	G	401	NAD	C2D-C1D-N1N-C2N
2	G	401	NAD	C2D-C1D-N1N-C6N
2	H	500	NAD	C5B-O5B-PA-O1A
2	H	500	NAD	C5B-O5B-PA-O3
2	H	500	NAD	C5D-O5D-PN-O3
2	H	500	NAD	C5D-O5D-PN-O2N
2	H	500	NAD	O4D-C1D-N1N-C2N
2	H	500	NAD	O4D-C1D-N1N-C6N
2	H	500	NAD	C2D-C1D-N1N-C2N
2	H	500	NAD	C2D-C1D-N1N-C6N
2	E	500	NAD	O4B-C4B-C5B-O5B
2	E	500	NAD	C3B-C4B-C5B-O5B
2	H	500	NAD	O4B-C4B-C5B-O5B
2	C	401	NAD	O4B-C4B-C5B-O5B
2	C	401	NAD	C3B-C4B-C5B-O5B
2	F	401	NAD	O4B-C4B-C5B-O5B
2	G	401	NAD	O4B-C4B-C5B-O5B
2	H	500	NAD	C3B-C4B-C5B-O5B
2	A	401	NAD	O4B-C4B-C5B-O5B
2	F	401	NAD	C3B-C4B-C5B-O5B
2	G	401	NAD	C3B-C4B-C5B-O5B
2	B	401	NAD	O4B-C4B-C5B-O5B
2	D	500	NAD	O4B-C4B-C5B-O5B
2	A	401	NAD	C3B-C4B-C5B-O5B
2	D	500	NAD	C3B-C4B-C5B-O5B
2	E	500	NAD	O4D-C4D-C5D-O5D
2	E	500	NAD	C3D-C4D-C5D-O5D
2	H	500	NAD	C2B-C1B-N9A-C8A
2	C	401	NAD	C5D-O5D-PN-O3

Continued on next page...

Continued from previous page...

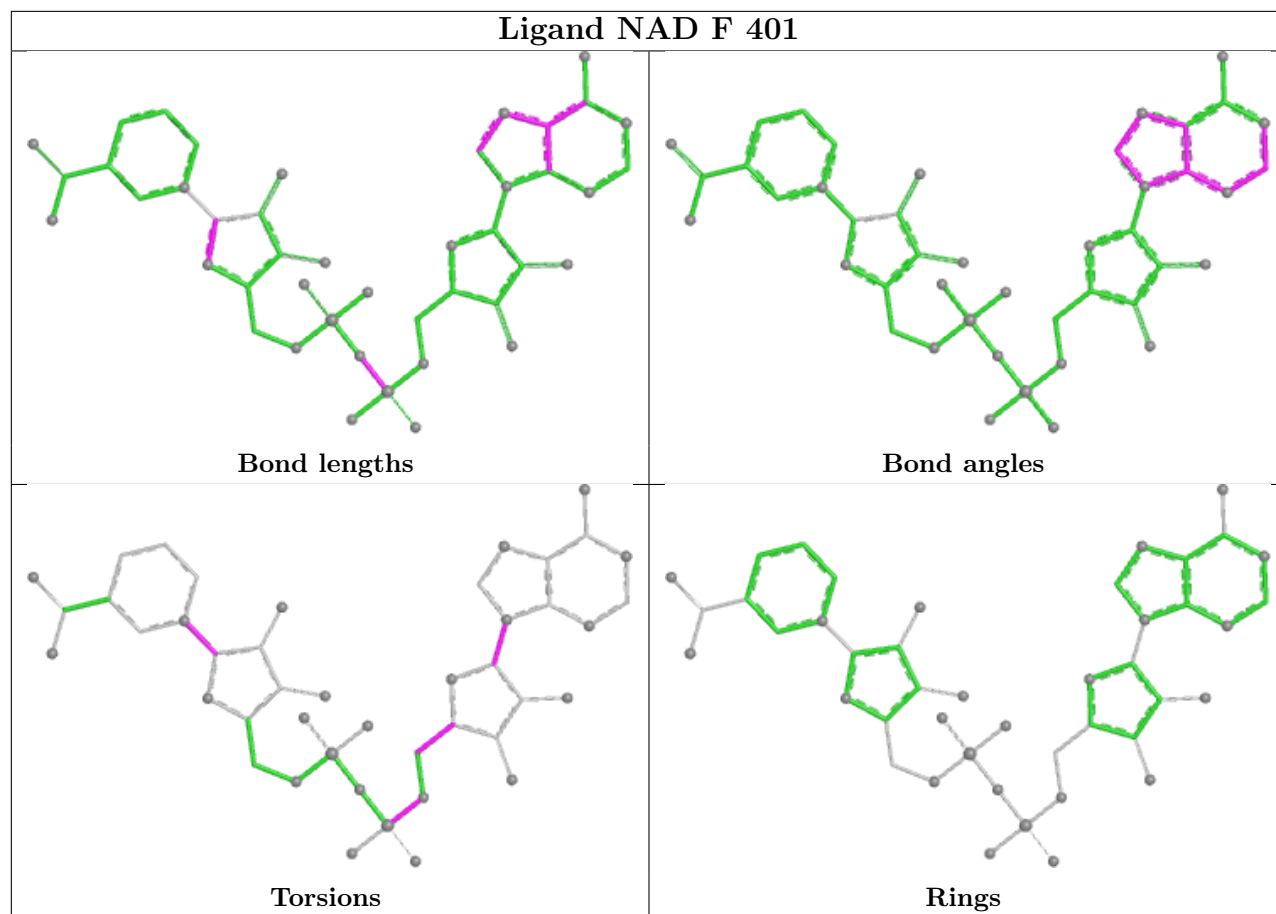
Mol	Chain	Res	Type	Atoms
2	E	500	NAD	C5B-O5B-PA-O2A
2	E	500	NAD	C5B-O5B-PA-O3
2	E	500	NAD	C5D-O5D-PN-O3
2	G	401	NAD	C5B-O5B-PA-O2A
2	G	401	NAD	C5B-O5B-PA-O3
2	H	500	NAD	C5B-O5B-PA-O2A
2	H	500	NAD	C5D-O5D-PN-O1N
3	F	402	EDO	O1-C1-C2-O2
2	A	401	NAD	C2B-C1B-N9A-C8A
2	E	500	NAD	PN-O3-PA-O2A
2	B	401	NAD	C3B-C4B-C5B-O5B
2	H	500	NAD	O4B-C1B-N9A-C8A
2	B	401	NAD	C2B-C1B-N9A-C8A
2	D	500	NAD	C2B-C1B-N9A-C8A
2	E	500	NAD	C2B-C1B-N9A-C8A
2	F	401	NAD	C2B-C1B-N9A-C8A
2	D	500	NAD	PA-O3-PN-O1N

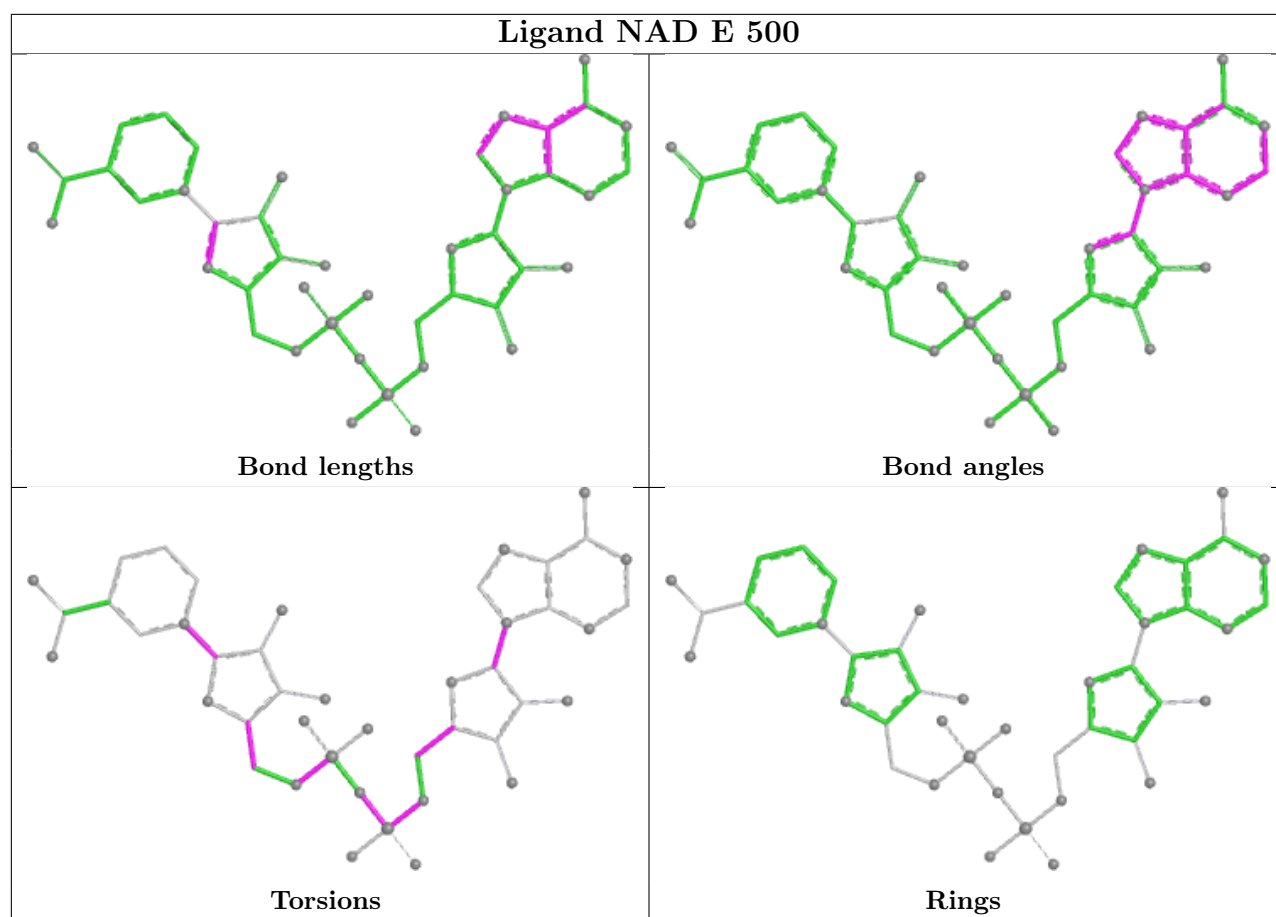
There are no ring outliers.

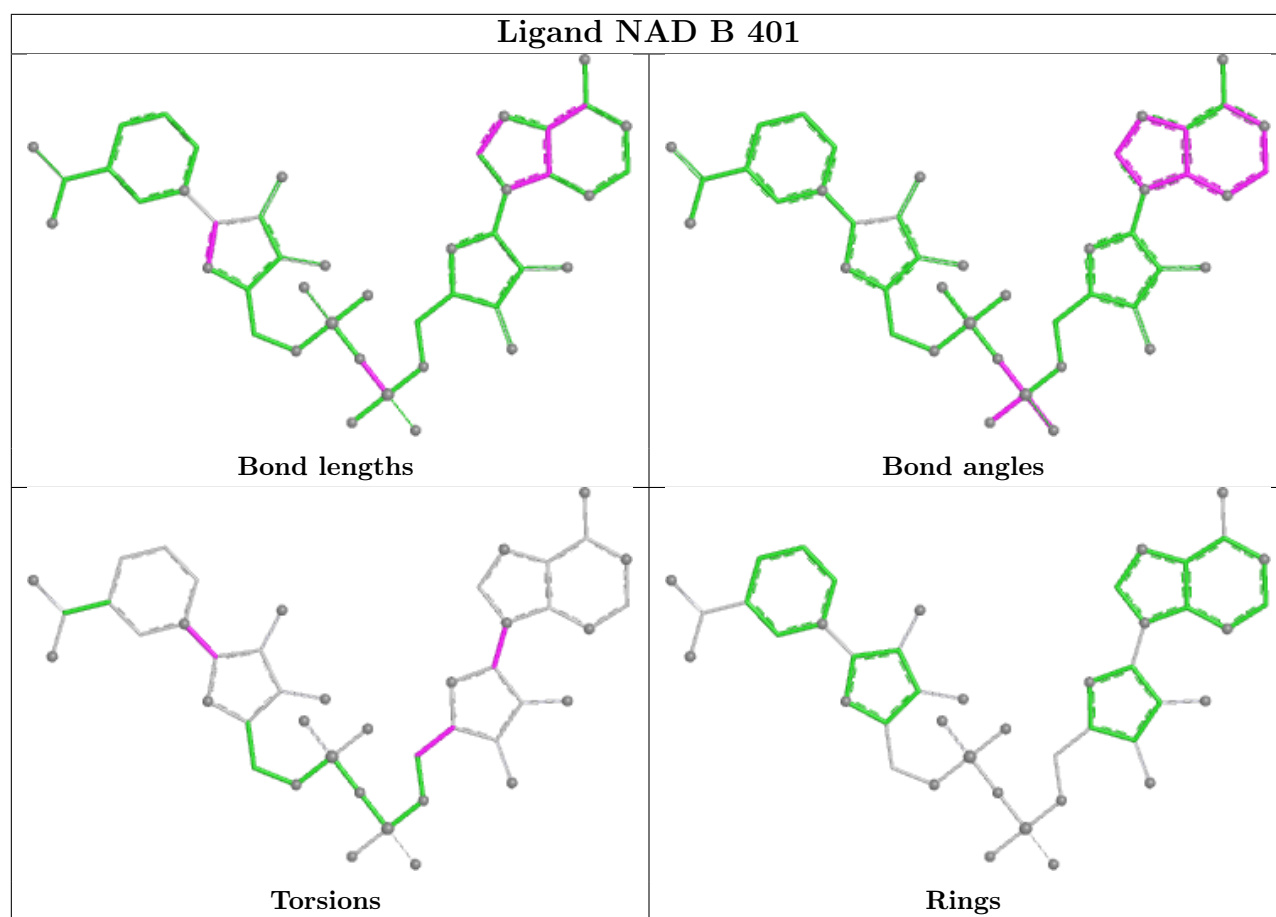
6 monomers are involved in 8 short contacts:

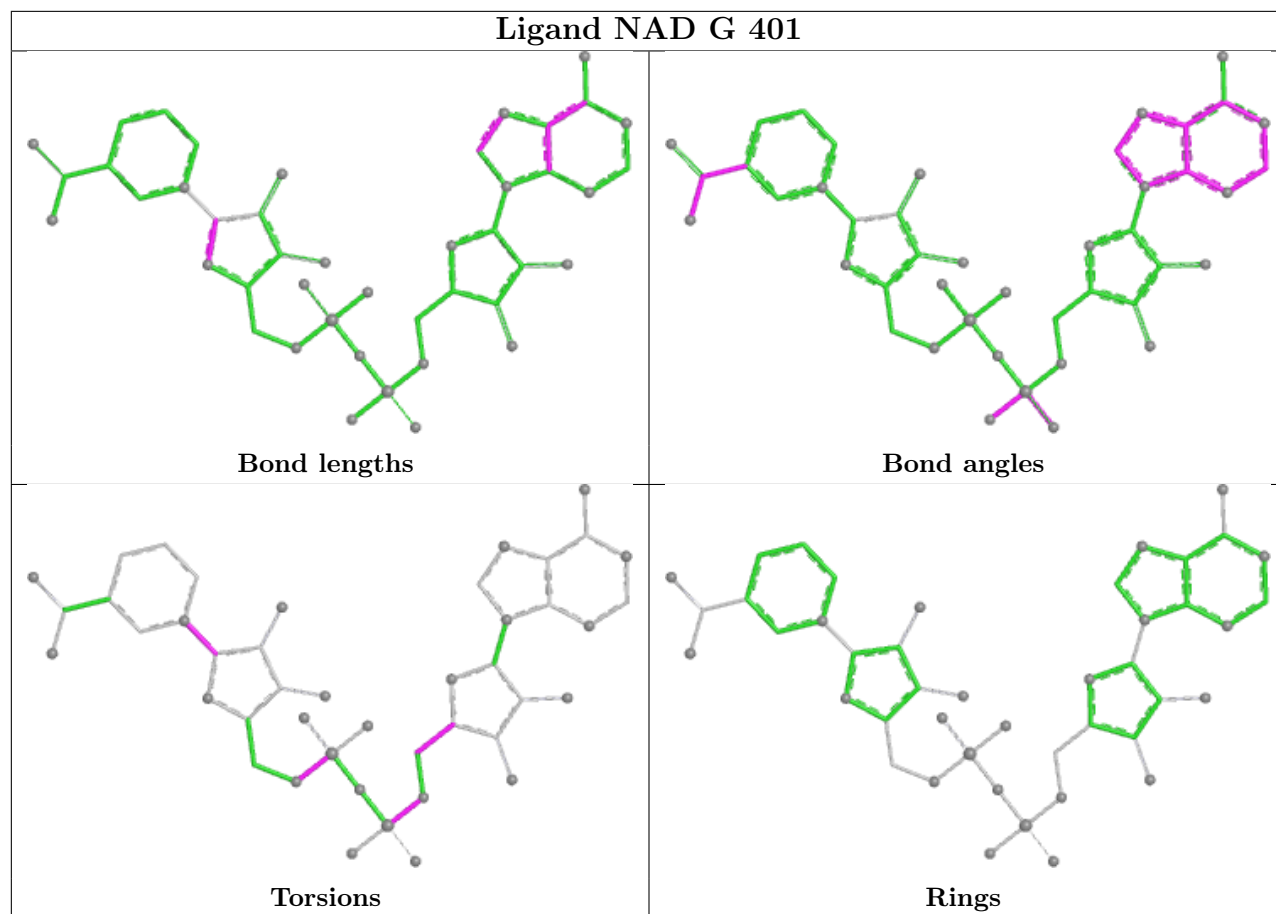
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	500	NAD	1	0
3	C	402	EDO	1	0
2	B	401	NAD	2	0
2	D	500	NAD	2	0
2	C	401	NAD	1	0
2	A	401	NAD	1	0

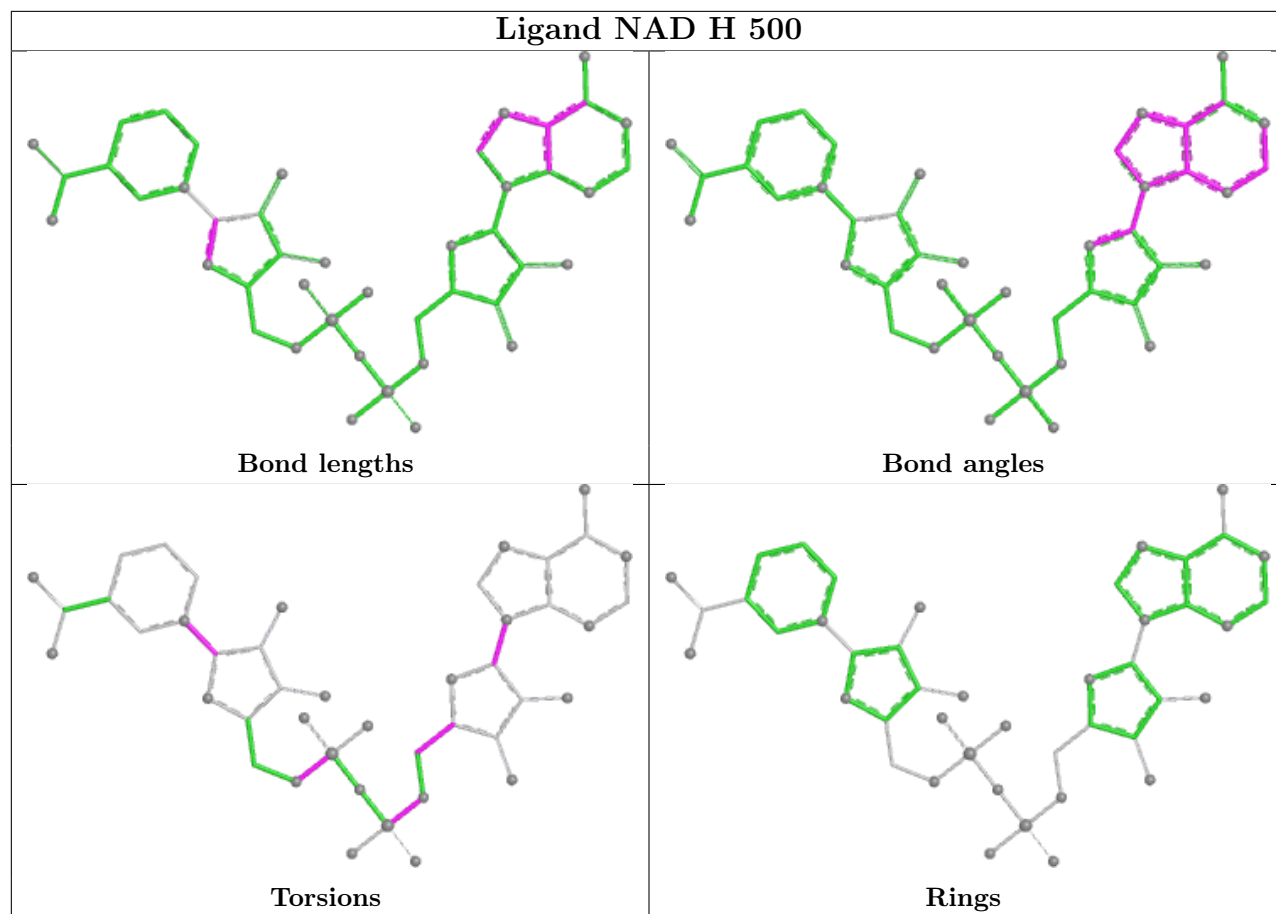
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

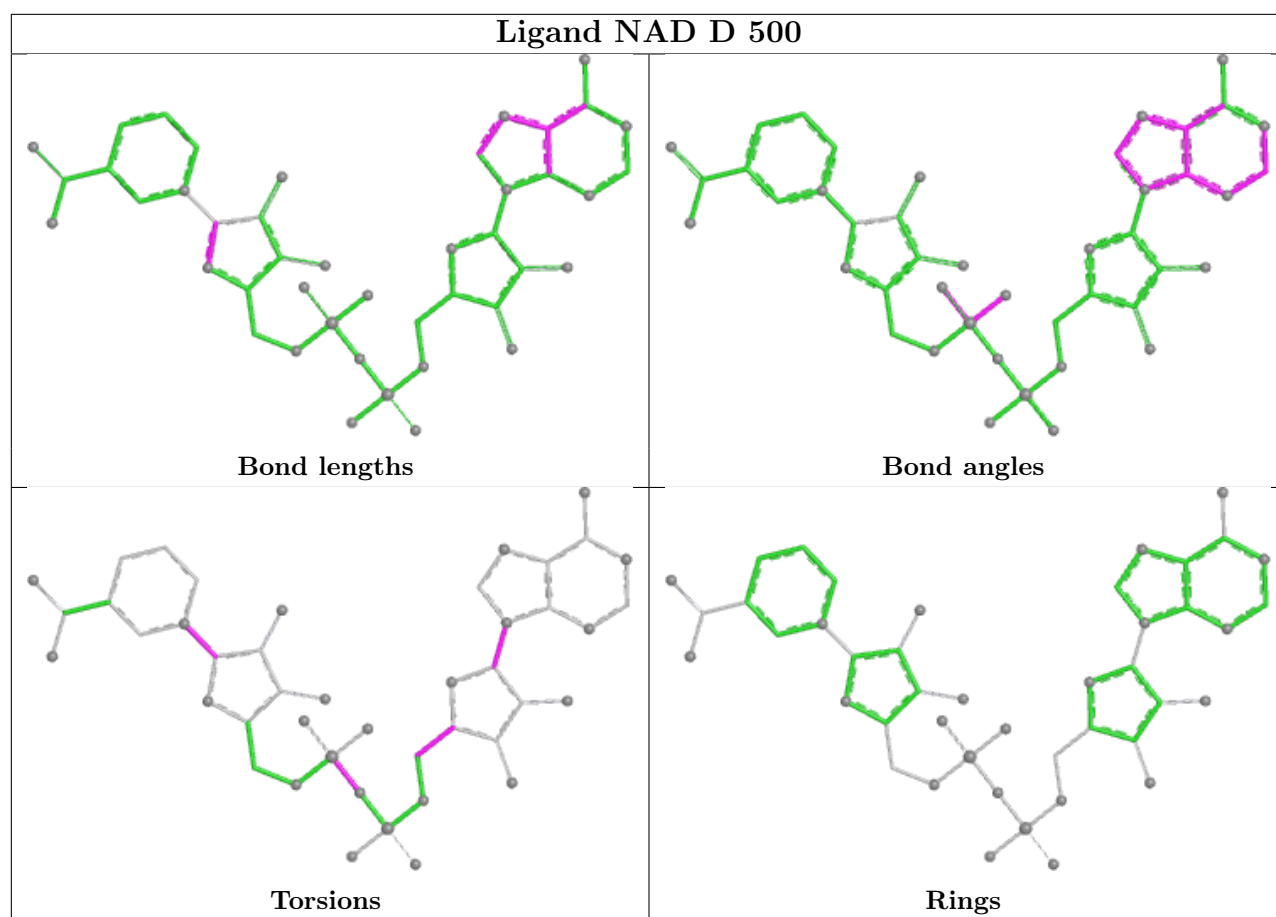


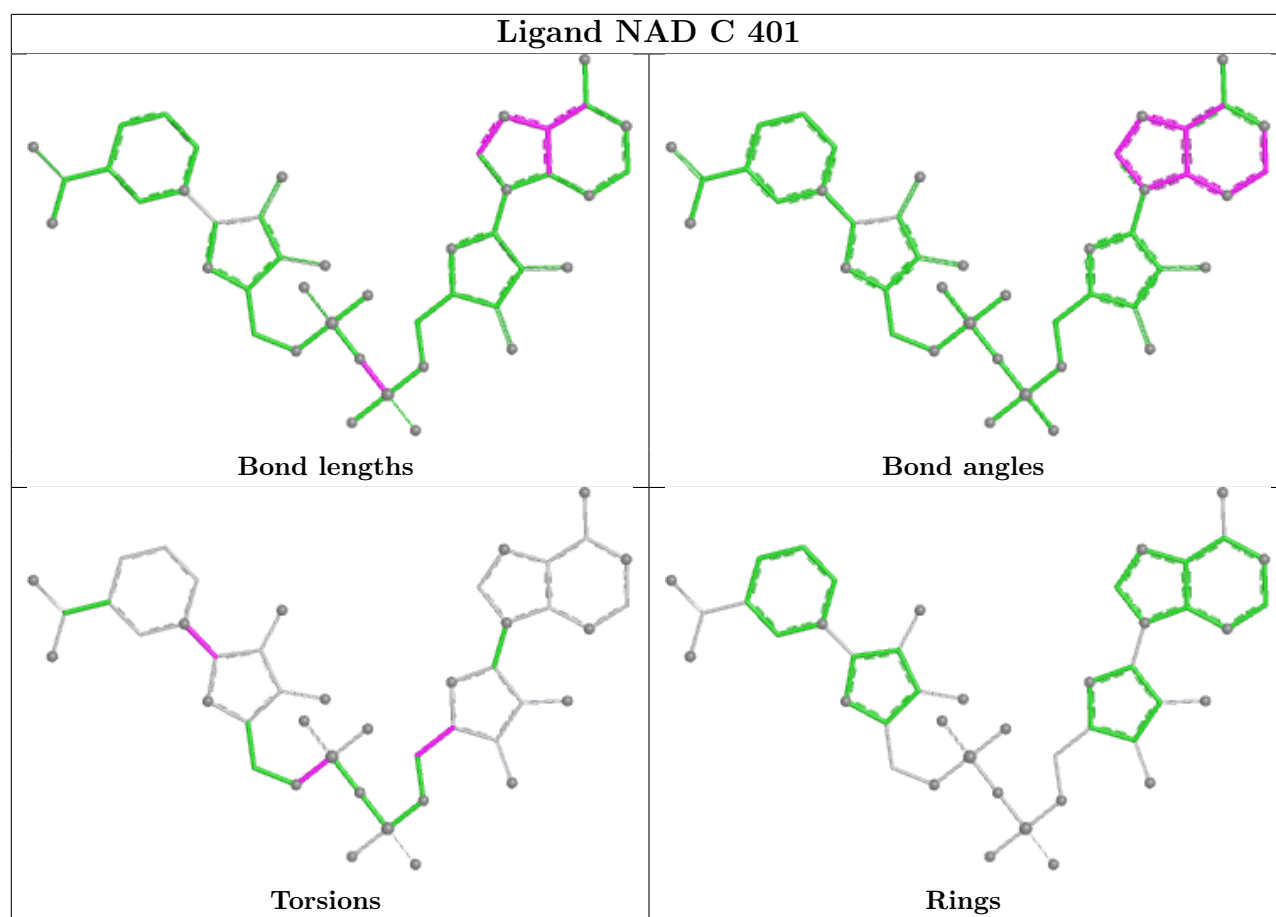


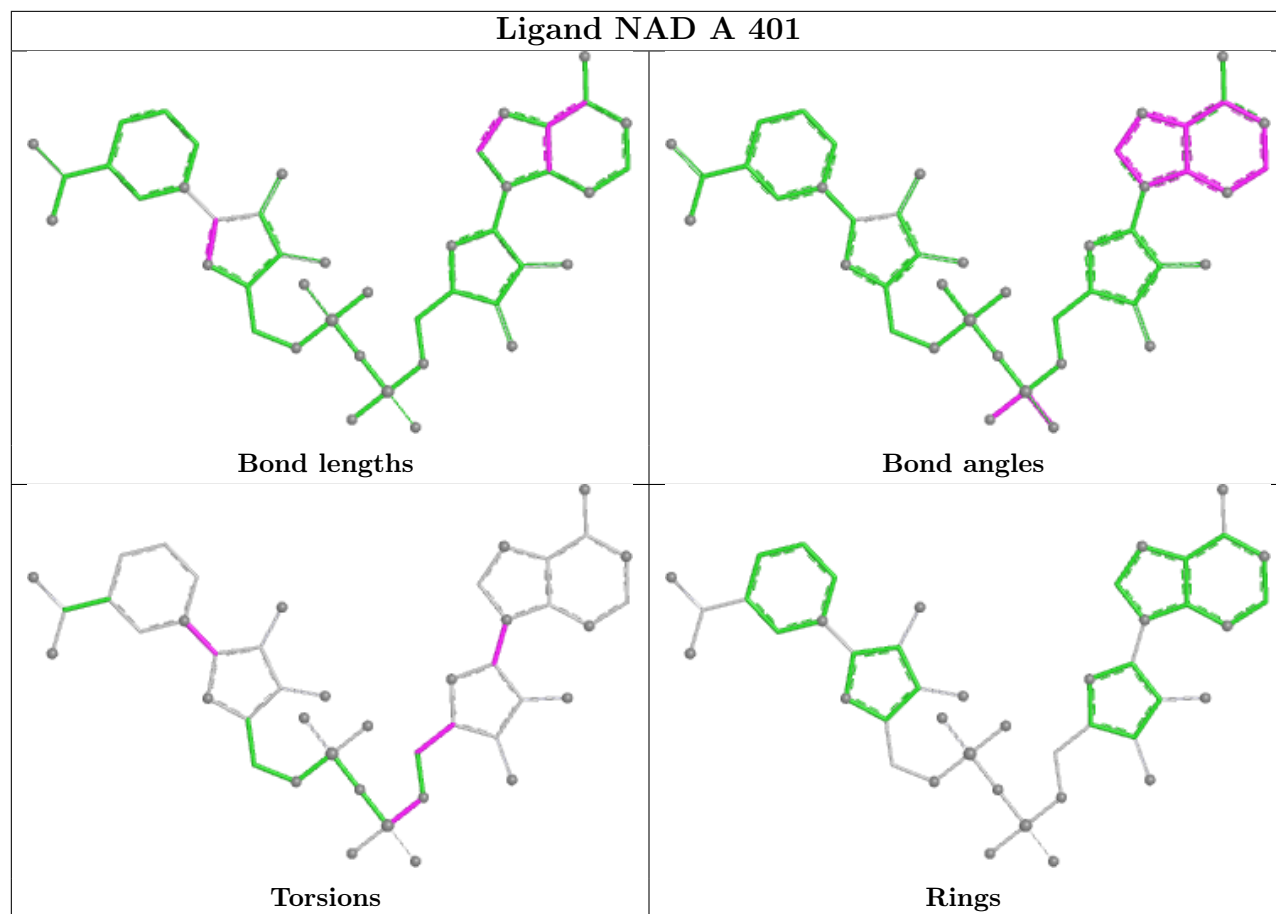












5.7 Other polymers [i](#)

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 ⓘ

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	338/347 (97%)	-0.23	1 (0%) 90 91	17, 35, 57, 73	3 (0%)
1	B	338/347 (97%)	-0.55	0 100 100	11, 26, 47, 73	6 (1%)
1	C	337/347 (97%)	-0.27	0 100 100	12, 32, 60, 71	3 (0%)
1	D	337/347 (97%)	-0.09	1 (0%) 90 91	19, 39, 68, 84	0
1	E	335/347 (96%)	0.41	18 (5%) 31 33	18, 51, 85, 97	1 (0%)
1	F	337/347 (97%)	-0.36	4 (1%) 76 78	13, 31, 55, 85	1 (0%)
1	G	337/347 (97%)	-0.42	1 (0%) 90 91	12, 30, 51, 69	6 (1%)
1	H	325/347 (93%)	1.03	53 (16%) 4 4	26, 65, 91, 113	0
All	All	2684/2776 (96%)	-0.07	78 (2%) 53 56	11, 37, 78, 113	20 (0%)

All (78) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	332	LEU	4.7
1	H	124	ILE	4.6
1	H	225	VAL	4.2
1	E	71	ASN	3.7
1	H	152	ILE	3.7
1	G	72	GLY	3.7
1	H	93	VAL	3.5
1	E	115	HIS	3.4
1	H	112	ALA	3.4
1	E	118	GLY	3.3
1	H	139	VAL	3.3
1	H	106	PHE	3.3
1	H	100	VAL	3.3
1	H	89	ILE	3.2
1	H	135	PHE	3.2
1	H	278	ILE	3.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	H	107	THR	3.1
1	H	265	ALA	3.1
1	F	74	THR	3.0
1	H	122	LYS	3.0
1	H	175	ILE	3.0
1	E	87	ALA	2.9
1	F	73	LYS	2.9
1	H	37	PHE	2.9
1	H	64	GLY	2.9
1	H	104	GLY	2.8
1	E	108	THR	2.8
1	H	92	GLY	2.8
1	E	105	VAL	2.8
1	H	118	GLY	2.7
1	H	130	ALA	2.7
1	H	295	THR	2.7
1	H	91	TRP	2.7
1	E	116	LEU	2.7
1	H	263	ILE	2.7
1	E	130	ALA	2.6
1	H	134	MET	2.6
1	H	115	HIS	2.6
1	H	337	ALA	2.6
1	H	12	GLY	2.6
1	E	112	ALA	2.6
1	E	36	PRO	2.6
1	H	76	HIS	2.5
1	F	72	GLY	2.5
1	H	147	ALA	2.5
1	E	98	TYR	2.4
1	E	113	SER	2.4
1	H	297	SER	2.4
1	E	40	ILE	2.4
1	H	99	VAL	2.4
1	E	74	THR	2.4
1	H	117	LYS	2.4
1	H	271	ALA	2.4
1	H	125	ILE	2.4
1	H	88	GLU	2.3
1	H	123	VAL	2.3
1	H	102	SER	2.3
1	H	333	ILE	2.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	H	77	HIS	2.3
1	D	93	VAL	2.3
1	H	141	ASN	2.3
1	H	335	TYR	2.2
1	H	143	THR	2.2
1	H	154	ASN	2.2
1	F	124	ILE	2.2
1	H	103	THR	2.2
1	H	137	MET	2.2
1	E	76	HIS	2.2
1	E	111	LYS	2.2
1	H	330	VAL	2.1
1	E	151	ILE	2.1
1	H	72	GLY	2.1
1	H	145	ASP	2.1
1	E	152	ILE	2.1
1	H	174	GLY	2.1
1	H	136	VAL	2.1
1	H	27	THR	2.0
1	A	72	GLY	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no 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
3	EDO	F	402	4/4	0.84	0.12	37,40,40,41	0
3	EDO	A	403	4/4	0.86	0.12	41,44,44,50	0
3	EDO	B	402	4/4	0.87	0.12	36,37,39,40	0

Continued on next page...

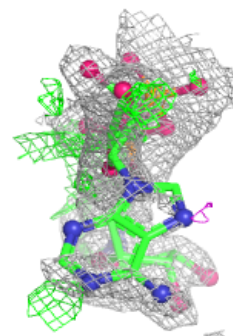
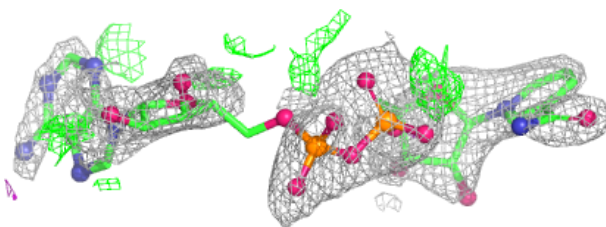
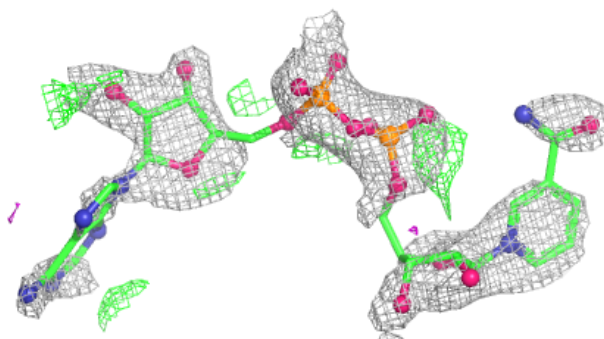
Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	NAD	H	500	44/44	0.88	0.14	21,47,68,71	44
2	NAD	E	500	44/44	0.90	0.09	30,49,62,66	0
3	EDO	A	402	4/4	0.93	0.08	35,36,37,39	0
3	EDO	G	402	4/4	0.93	0.08	36,44,46,48	0
2	NAD	D	500	44/44	0.94	0.08	29,41,52,55	0
3	EDO	C	402	4/4	0.94	0.07	38,38,39,42	0
2	NAD	B	401	44/44	0.95	0.07	22,29,34,36	0
2	NAD	C	401	44/44	0.96	0.06	22,31,39,46	0
2	NAD	A	401	44/44	0.96	0.06	19,31,35,39	0
2	NAD	G	401	44/44	0.97	0.06	18,29,38,43	0
2	NAD	F	401	44/44	0.97	0.06	18,33,39,47	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.

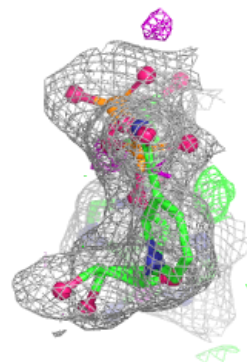
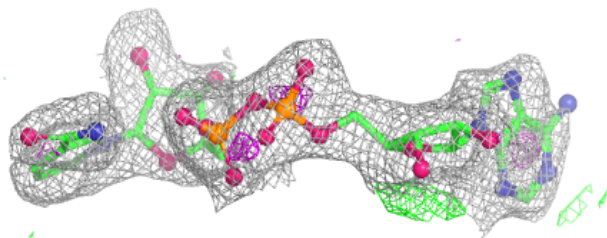
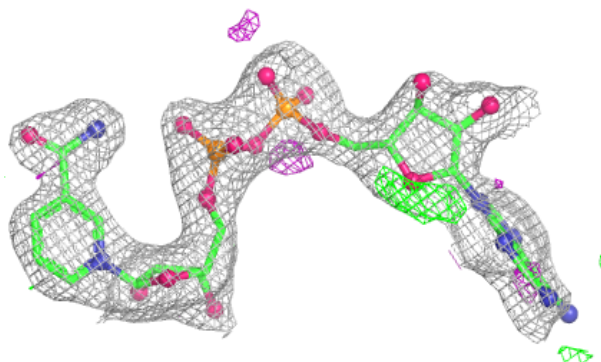
Electron density around NAD H 500:

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

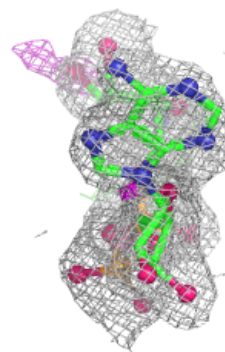
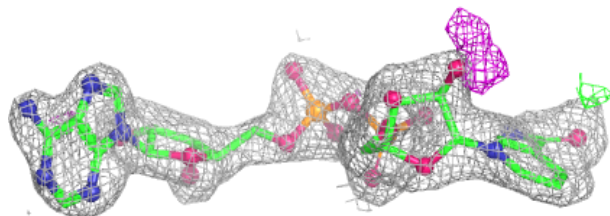
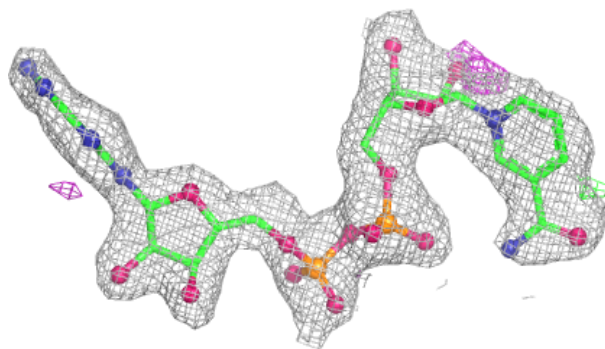


Electron density around NAD E 500:

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

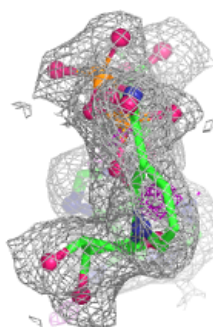
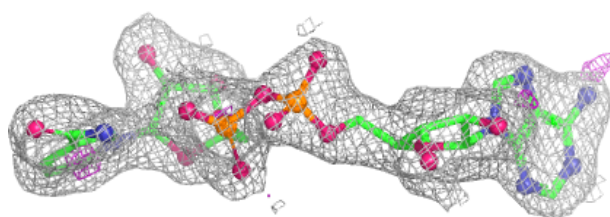
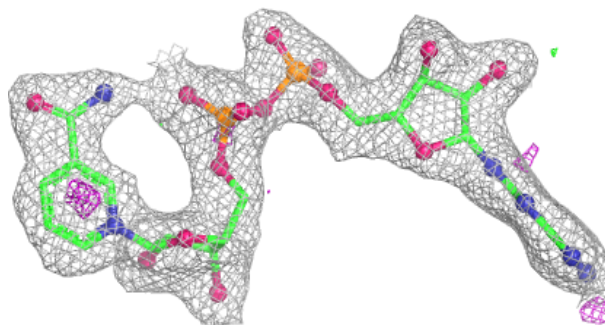
**Electron density around NAD D 500:**

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

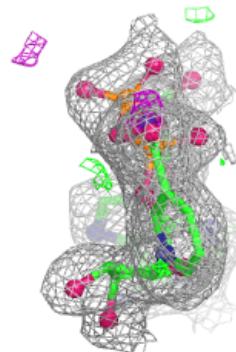
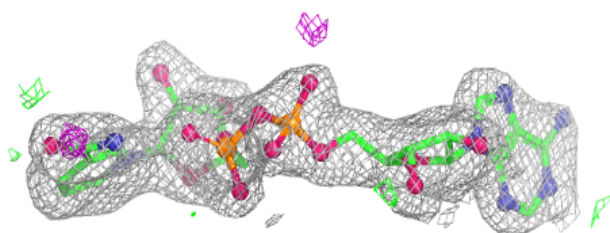
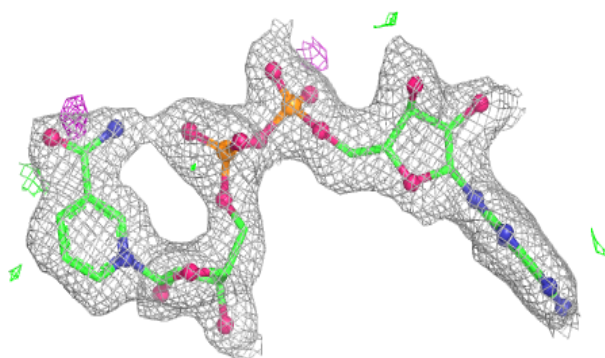


Electron density around NAD B 401:

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

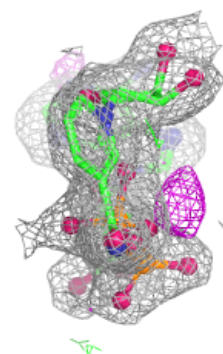
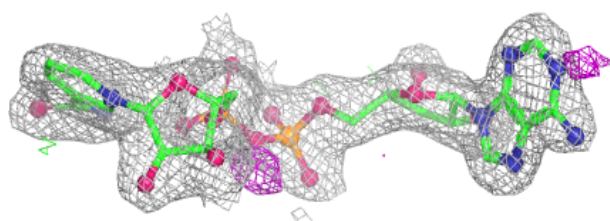
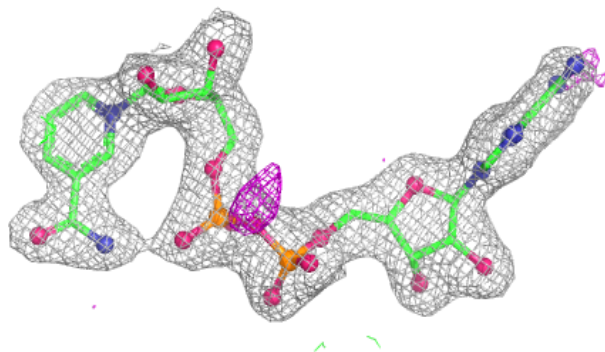
**Electron density around NAD C 401:**

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

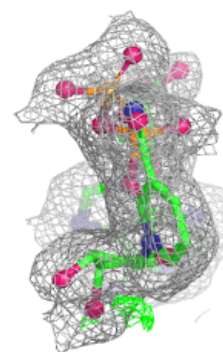
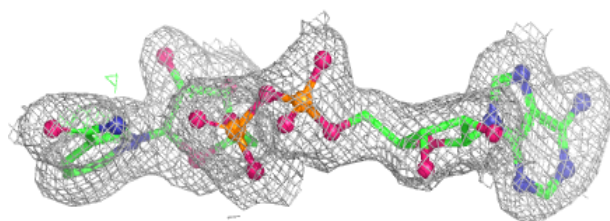
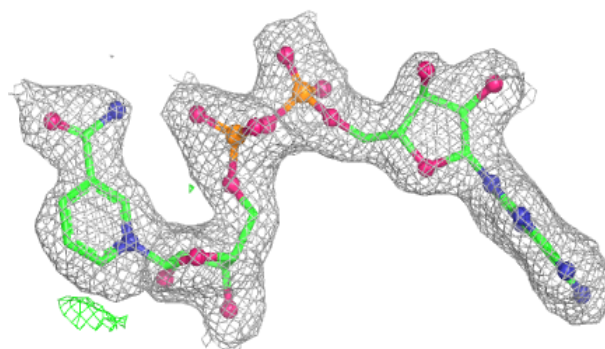


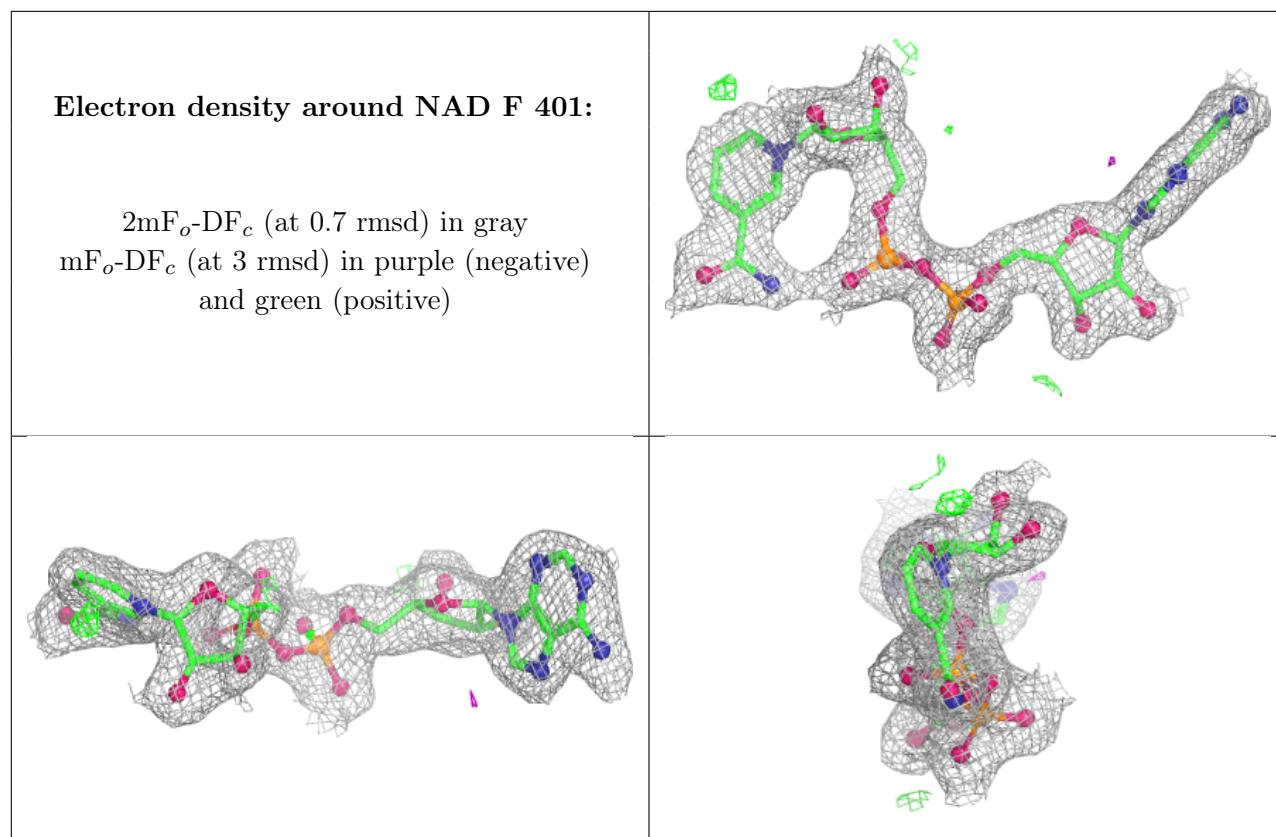
Electron density around NAD A 401:

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

**Electron density around NAD G 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.