



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 20, 2026 – 10:29 AM UTC

PDB ID : 6TRY / pdb\_00006try  
Title : Crystal structure of human Aldehyde dehydrogenase 1A3 in complex with MF13 inhibitor compound  
Authors : Gelardi, E.L.M.; Garavaglia, S.  
Deposited on : 2019-12-19  
Resolution : 2.90 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](mailto: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>.

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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)  
Xtrriage (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

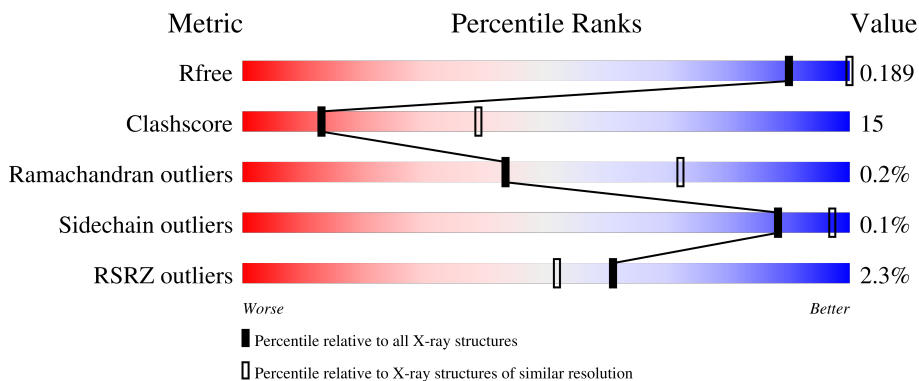
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.90 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	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (2.90-2.90)

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  $\geq 3$ , 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	512	 3% 64% 28% • 7%
1	B	512	 % 71% 22% • 6%

## 2 Entry composition [i](#)

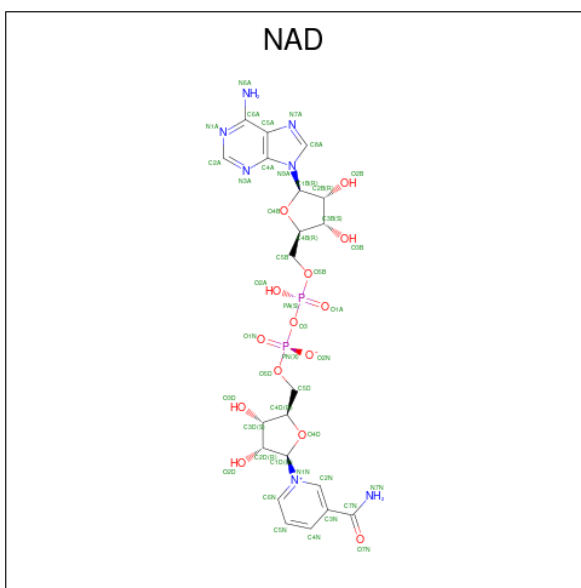
There are 5 unique types of molecules in this entry. The entry contains 7557 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Aldehyde dehydrogenase family 1 member A3.

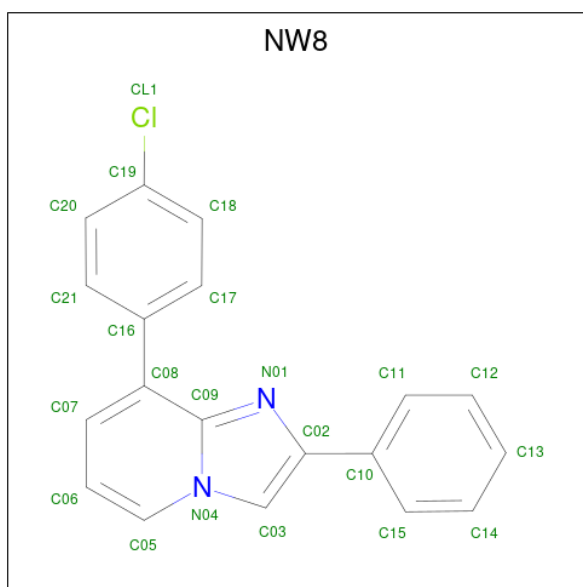
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	478	Total 3689	C 2352	N 628	O 689	S 20	0	0	0
1	B	482	Total 3719	C 2371	N 632	O 696	S 20	0	0	0

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (CCD ID: NAD) (formula:  $C_{21}H_{27}N_7O_{14}P_2$ ).



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

- Molecule 3 is 8-(4-chlorophenyl)-2-phenyl-imidazo[1,2-a]pyridine (CCD ID: NW8) (formula:  $C_{19}H_{13}ClN_2$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	Cl			N
3	A	1	22	19	1	2	0	0
3	B	1	22	19	1	2	0	0

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula:  $C_3H_8O_3$ ).



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

- Molecule 5 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
5	A	5	Total O 5 5	0	0
5	B	6	Total O 6 6	0	0



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	81.30Å 89.18Å 159.24Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.96 – 2.90 47.96 – 2.90	Depositor EDS
% Data completeness (in resolution range)	97.1 (47.96-2.90) 98.5 (47.96-2.90)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.11 (at 2.91Å)	Xtrriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, $R_{free}$	0.191 , 0.273 0.202 , 0.189	Depositor DCC
$R_{free}$ test set	1347 reflections (5.11%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	60.4	Xtrriage
Anisotropy	0.448	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 51.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	7557	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	61.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.92% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: GOL, NW8, 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	1.33	2/3763 (0.1%)	1.28	18/5089 (0.4%)
1	B	0.55	2/3795 (0.1%)	0.92	24/5134 (0.5%)
All	All	1.01	4/7558 (0.1%)	1.11	42/10223 (0.4%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	59	GLN	C-N	-76.04	0.41	1.33
1	B	238	PRO	N-CA	15.44	1.68	1.47
1	B	237	GLY	C-N	7.36	1.44	1.33
1	A	87	PRO	C-O	-5.32	1.17	1.24

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	59	GLN	CA-C-N	-43.67	67.45	120.72
1	A	59	GLN	C-N-CA	-43.67	67.45	120.72
1	A	59	GLN	O-C-N	35.09	163.22	123.22
1	B	237	GLY	CA-C-N	14.67	136.49	119.47
1	B	237	GLY	C-N-CA	14.67	136.49	119.47
1	A	489	LEU	N-CA-C	13.50	129.70	113.23
1	B	489	LEU	N-CA-C	12.97	131.59	113.56
1	B	294	ASP	N-CA-C	-12.24	91.72	109.96
1	B	111	ARG	N-CA-C	-9.83	100.84	113.12
1	B	386	MET	N-CA-C	9.67	121.77	111.03
1	B	238	PRO	N-CA-C	-8.91	100.88	113.81
1	A	490	GLY	N-CA-C	-8.66	96.80	111.27
1	A	489	LEU	CA-C-O	-8.52	110.32	120.12
1	B	294	ASP	CB-CA-C	8.00	121.68	110.16
1	B	350	LYS	N-CA-C	7.93	122.53	113.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	294	ASP	N-CA-C	-7.90	98.18	109.96
1	B	489	LEU	CB-CA-C	-7.83	96.27	111.06
1	A	489	LEU	CB-CA-C	-7.55	98.66	111.26
1	B	159	ASP	N-CA-C	-7.51	97.76	108.96
1	A	350	LYS	N-CA-C	7.19	121.65	113.02
1	B	327	TYR	N-CA-C	7.15	119.69	111.11
1	B	490	GLY	N-CA-C	-7.03	97.30	110.66
1	A	348	ASP	N-CA-C	7.02	120.56	110.24
1	B	238	PRO	CA-N-CD	-7.02	102.17	112.00
1	B	349	VAL	CB-CA-C	6.98	122.98	112.16
1	B	295	LEU	N-CA-C	-6.81	102.98	112.45
1	B	159	ASP	N-CA-CB	6.64	122.05	111.56
1	A	158	THR	N-CA-C	6.59	124.83	110.80
1	B	237	GLY	O-C-N	-6.54	115.23	121.77
1	B	158	THR	N-CA-C	6.16	123.91	110.80
1	A	57	ARG	CB-CA-C	6.13	117.34	109.80
1	A	158	THR	CB-CA-C	-6.07	98.34	110.42
1	B	413	PHE	CA-CB-CG	5.92	119.72	113.80
1	B	110	ASP	N-CA-C	-5.69	101.09	109.62
1	A	272	SER	N-CA-C	5.62	121.47	110.56
1	B	158	THR	CB-CA-C	-5.62	99.24	110.42
1	A	159	ASP	N-CA-C	-5.50	100.94	109.14
1	A	294	ASP	CB-CA-C	5.47	118.04	110.16
1	B	489	LEU	CA-C-O	-5.46	112.44	119.59
1	A	57	ARG	N-CA-C	-5.31	102.78	110.64
1	B	386	MET	CB-CA-C	-5.16	102.96	110.95
1	A	98	ARG	N-CA-C	-5.07	105.45	110.97

There are no chirality outliers.

There are no planarity outliers.

## 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	3689	0	3708	133	4
1	B	3719	0	3743	90	4

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	44	0	24	3	0
2	B	44	0	24	5	0
3	A	22	0	0	0	0
3	B	22	0	0	0	0
4	A	6	0	8	1	0
5	A	5	0	0	0	0
5	B	6	0	0	2	0
All	All	7557	0	7507	225	4

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 15.

All (225) 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:361:GLN:NE2	1:A:413:PHE:CE2	1.81	1.40
1:B:238:PRO:N	1:B:238:PRO:CA	1.67	1.39
1:B:386:MET:SD	1:B:394:LYS:HB2	1.72	1.30
1:A:180:TRP:CH2	1:A:413:PHE:HZ	1.53	1.26
1:A:180:TRP:CH2	1:A:413:PHE:CZ	2.22	1.25
1:A:180:TRP:HH2	1:A:413:PHE:CZ	1.55	1.24
2:B:801:NAD:O4D	2:B:801:NAD:C1D	1.64	1.20
2:A:701:NAD:C1D	2:A:701:NAD:O4D	1.63	1.16
1:A:58:GLU:C	1:A:59:GLN:N	2.10	1.09
1:B:473:ALA:O	1:B:489:LEU:O	1.77	1.01
1:A:473:ALA:O	1:A:489:LEU:O	1.80	1.00
1:A:180:TRP:CZ2	1:A:413:PHE:CZ	2.51	0.98
1:A:361:GLN:NE2	1:A:413:PHE:HE2	1.32	0.96
1:A:180:TRP:CH2	1:A:413:PHE:CE1	2.56	0.93
1:B:377:ALA:HB2	1:B:405:MET:HE1	1.52	0.92
1:A:295:LEU:HD23	1:A:333:ARG:NH1	1.85	0.90
1:A:435:THR:HG22	1:A:437:TYR:H	1.38	0.89
1:B:386:MET:SD	1:B:394:LYS:CB	2.63	0.86
1:A:180:TRP:CZ2	1:A:413:PHE:HZ	1.90	0.85
1:A:361:GLN:NE2	1:A:413:PHE:CZ	2.45	0.84
1:B:87:PRO:O	1:B:91:LEU:HD13	1.75	0.84
1:A:180:TRP:HH2	1:A:413:PHE:CE1	1.95	0.83
1:A:348:ASP:HB2	1:A:351:THR:OG1	1.78	0.82
1:B:327:TYR:O	1:B:331:VAL:HG23	1.81	0.80
1:B:51:THR:HG21	1:B:211:LEU:HD21	1.64	0.79
1:A:377:ALA:HB2	1:A:405:MET:HE1	1.63	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:291:ALA:CB	1:A:325:GLN:OE1	2.32	0.77
1:A:361:GLN:HG3	1:A:413:PHE:CD2	2.19	0.77
1:A:245:SER:HA	1:A:253:ILE:HD11	1.68	0.76
1:B:236:PHE:HB2	1:B:239:THR:HG22	1.69	0.75
1:A:295:LEU:HD23	1:A:333:ARG:HH12	1.49	0.75
1:B:121:ASP:OD1	5:B:901:HOH:O	2.05	0.74
1:B:144:PHE:O	1:B:196:CYS:SG	2.42	0.73
1:A:405:MET:HE2	1:A:407:ILE:HD11	1.71	0.72
1:B:238:PRO:N	1:B:238:PRO:C	2.47	0.72
1:A:86:SER:O	1:A:90:ARG:HG3	1.88	0.72
1:A:119:THR:HG21	1:A:126:PHE:HA	1.72	0.71
1:B:124:LYS:NZ	1:B:181:ASN:O	2.23	0.71
1:A:280:GLU:OE1	1:A:488:GLU:HG3	1.90	0.71
1:B:447:ASN:OD1	1:B:450:LYS:HG3	1.91	0.71
1:A:187:LEU:HD21	1:A:203:LEU:HD13	1.73	0.71
1:B:331:VAL:O	1:B:335:VAL:HG23	1.91	0.70
1:A:335:VAL:HG12	1:A:339:LYS:HE3	1.73	0.70
1:A:103:LEU:HD23	1:A:103:LEU:O	1.92	0.70
1:B:180:TRP:CH2	1:B:413:PHE:HE2	2.10	0.70
1:A:426:GLU:OE2	1:B:84:ARG:NH1	2.25	0.69
1:A:331:VAL:O	1:A:335:VAL:HG23	1.92	0.69
1:A:370:GLU:HA	1:A:373:LYS:HD3	1.74	0.67
1:B:36:ILE:HA	1:B:231:ASN:OD1	1.95	0.66
1:B:35:PHE:CZ	1:B:38:ASN:HA	2.31	0.66
1:B:312:GLN:HB3	1:B:413:PHE:CE2	2.31	0.66
1:B:327:TYR:OH	1:B:399:SER:O	2.14	0.65
1:B:336:GLU:O	1:B:340:LYS:HG2	1.97	0.65
1:B:302:ALA:O	1:B:306:VAL:HG23	1.97	0.65
1:A:378:LYS:HE3	1:A:380:GLU:HB2	1.79	0.65
1:B:119:THR:HG21	1:B:126:PHE:HA	1.78	0.64
1:B:378:LYS:HB3	1:B:399:SER:HB3	1.79	0.64
1:A:366:LEU:HD12	1:A:384:SER:HA	1.80	0.64
1:A:109:ARG:HH22	1:A:222:GLU:CD	2.07	0.63
1:B:115:ALA:O	1:B:119:THR:HG23	1.99	0.62
1:A:57:ARG:O	1:A:58:GLU:HG2	1.99	0.62
1:A:447:ASN:HB3	1:A:450:LYS:HB2	1.82	0.62
1:B:335:VAL:HG13	1:B:381:CYS:HB2	1.82	0.62
1:A:368:LEU:O	1:A:371:SER:OG	2.18	0.61
1:A:361:GLN:HG3	1:A:413:PHE:HD2	1.65	0.61
1:A:103:LEU:HD23	1:A:103:LEU:C	2.26	0.60
1:A:103:LEU:HD22	1:A:141:LEU:HD13	1.82	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:416:VAL:O	1:B:418:PRO:HD3	2.01	0.60
1:A:413:PHE:CD2	1:A:413:PHE:O	2.55	0.60
1:A:361:GLN:HB2	1:A:364:LYS:HE2	1.84	0.60
1:A:291:ALA:HB1	1:A:325:GLN:OE1	2.02	0.59
1:A:35:PHE:CZ	1:A:38:ASN:HA	2.37	0.59
1:B:386:MET:SD	1:B:394:LYS:HD2	2.43	0.59
1:A:180:TRP:CZ2	1:A:413:PHE:CE1	2.85	0.59
1:A:361:GLN:HE21	1:A:413:PHE:HE2	0.59	0.59
1:B:378:LYS:HB3	1:B:399:SER:CB	2.33	0.59
1:B:394:LYS:HG3	1:B:395:PRO:HD2	1.85	0.59
1:B:110:ASP:O	1:B:114:LEU:HD12	2.03	0.58
2:A:701:NAD:H52A	2:A:701:NAD:O1N	2.03	0.58
1:B:386:MET:SD	1:B:394:LYS:CD	2.92	0.58
1:B:125:PRO:HD3	1:B:310:GLN:NE2	2.18	0.57
1:A:449:ASP:O	1:A:453:LYS:HG3	2.03	0.57
1:A:122:THR:HG22	1:A:209:THR:HG21	1.86	0.57
1:B:121:ASP:OD2	1:B:209:THR:HA	2.03	0.57
1:A:380:GLU:OE1	1:A:380:GLU:HA	2.03	0.57
1:B:180:TRP:CH2	1:B:413:PHE:CE2	2.93	0.57
1:A:103:LEU:HD23	1:A:107:VAL:HG23	1.85	0.57
1:A:180:TRP:HZ2	1:A:413:PHE:CZ	2.19	0.56
1:B:129:ALA:O	1:B:134:LEU:HD12	2.05	0.56
1:B:87:PRO:O	1:B:91:LEU:CD1	2.49	0.56
1:A:56:THR:O	1:A:57:ARG:C	2.48	0.56
1:A:244:ILE:HG23	1:A:250:ILE:HD13	1.87	0.56
1:B:111:ARG:HG2	1:B:130:PHE:CE1	2.41	0.55
1:B:67:ASP:HB3	1:B:69:PRO:HD2	1.87	0.55
1:A:366:LEU:HA	1:A:369:ILE:HG13	1.87	0.55
1:B:203:LEU:HD12	1:B:232:ILE:HG12	1.87	0.55
1:A:204:LYS:NZ	1:A:205:PRO:O	2.38	0.55
1:A:413:PHE:O	1:A:413:PHE:CG	2.60	0.54
1:A:435:THR:HG22	1:A:437:TYR:N	2.14	0.54
1:A:356:GLN:CD	1:A:356:GLN:H	2.16	0.54
1:A:412:ILE:HG22	1:A:414:GLY:N	2.23	0.54
1:B:335:VAL:HG12	1:B:339:LYS:HD2	1.89	0.54
1:B:181:ASN:OD1	1:B:182:PHE:N	2.41	0.53
1:A:117:LEU:HD23	1:A:120:MET:HE2	1.88	0.53
1:A:476:PRO:HG3	1:A:492:TYR:CD1	2.43	0.53
1:A:245:SER:HA	1:A:253:ILE:CD1	2.38	0.53
1:A:412:ILE:HG12	1:A:416:VAL:CG2	2.37	0.53
1:B:122:THR:OG1	1:B:124:LYS:HB2	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:379:LEU:HD11	1:A:398:PHE:CE2	2.43	0.53
1:A:359:GLN:HA	1:A:362:PHE:HB3	1.90	0.53
1:A:253:ILE:HG13	1:A:275:LYS:HD3	1.92	0.52
1:A:71:VAL:HG21	1:A:243:ALA:HB1	1.91	0.52
1:A:412:ILE:HG21	1:A:416:VAL:HG22	1.92	0.52
1:B:252:LYS:HE3	1:B:496:GLU:O	2.10	0.52
1:B:327:TYR:CE2	1:B:421:LYS:HB2	2.44	0.52
1:B:258:SER:HB3	2:B:801:NAD:O1A	2.09	0.52
1:A:412:ILE:HG12	1:A:416:VAL:HG21	1.92	0.52
1:B:324:GLU:HB3	1:B:421:LYS:HE3	1.91	0.51
1:A:180:TRP:CH2	1:A:413:PHE:HE1	2.25	0.51
1:B:92:ASP:HB2	1:B:95:SER:OG	2.10	0.51
1:A:68:LYS:O	1:A:71:VAL:HG22	2.10	0.51
1:A:106:LEU:HD12	1:A:223:ALA:HB2	1.93	0.51
1:B:269:ALA:HB1	1:B:275:LYS:HG3	1.92	0.51
1:A:116:ALA:O	1:A:120:MET:HG3	2.12	0.50
1:A:180:TRP:CE3	1:A:357:ILE:HG12	2.46	0.50
1:A:357:ILE:HD12	1:A:358:ASP:N	2.26	0.50
1:A:365:ILE:O	1:A:369:ILE:HG13	2.12	0.50
1:B:32:THR:C	1:B:63:VAL:HG23	2.37	0.50
1:B:119:THR:CG2	1:B:126:PHE:HA	2.42	0.50
1:B:115:ALA:HB2	1:B:134:LEU:HD13	1.94	0.50
1:A:103:LEU:C	1:A:103:LEU:CD2	2.84	0.50
1:A:365:ILE:HD12	1:A:414:GLY:HA3	1.93	0.49
4:A:703:GOL:H12	1:B:276:ARG:HA	1.93	0.49
1:B:306:VAL:HB	1:B:307:PHE:CD1	2.47	0.49
1:A:302:ALA:O	1:A:306:VAL:HG12	2.12	0.49
1:A:368:LEU:HA	1:A:371:SER:HB3	1.94	0.49
1:B:295:LEU:HD13	1:B:326:VAL:HG11	1.94	0.49
1:A:103:LEU:CD2	1:A:107:VAL:HG23	2.42	0.49
1:A:33:LYS:HB3	1:A:41:HIS:O	2.13	0.48
1:A:85:GLY:O	1:A:90:ARG:HD2	2.13	0.48
1:A:329:GLU:O	1:A:333:ARG:HG2	2.14	0.48
1:A:56:THR:O	1:A:56:THR:OG1	2.27	0.48
1:A:44:LYS:HA	1:A:44:LYS:HD3	1.61	0.48
1:B:43:SER:HB3	1:B:64:GLU:HB3	1.96	0.48
1:A:359:GLN:HA	1:A:362:PHE:CB	2.44	0.47
1:A:366:LEU:CD1	1:A:384:SER:HA	2.42	0.47
1:A:361:GLN:HB2	1:A:364:LYS:CE	2.44	0.47
1:B:237:GLY:HA3	2:B:801:NAD:C8A	2.44	0.47
1:A:423:LYS:N	1:A:427:GLU:OE1	2.37	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:147:TRP:CZ2	1:B:491:GLU:HB2	2.49	0.47
1:A:172:GLY:O	1:A:199:ASN:HB3	2.15	0.47
1:A:301:CYS:O	1:A:305:GLY:N	2.45	0.47
1:B:191:LEU:HA	1:B:201:MET:SD	2.55	0.47
1:A:103:LEU:HD22	1:A:141:LEU:CD1	2.45	0.47
1:B:312:GLN:HA	1:B:413:PHE:CD2	2.50	0.46
1:B:364:LYS:HB2	1:B:364:LYS:HE2	1.54	0.46
1:B:474:GLN:CD	1:B:474:GLN:H	2.23	0.46
1:A:200:THR:HG22	1:A:229:VAL:HA	1.98	0.46
1:A:348:ASP:HB2	1:A:351:THR:HG1	1.79	0.46
1:B:238:PRO:N	1:B:239:THR:N	2.63	0.46
1:A:137:CYS:HA	1:A:188:VAL:HG21	1.98	0.46
1:A:299:VAL:HG11	1:A:333:ARG:HB2	1.97	0.46
1:A:412:ILE:HG22	1:A:414:GLY:H	1.81	0.46
1:A:358:ASP:CG	1:A:360:LYS:HG3	2.41	0.45
1:B:125:PRO:HD3	1:B:310:GLN:HE21	1.81	0.45
1:B:207:GLU:HG2	1:B:208:GLN:OE1	2.16	0.45
1:A:335:VAL:CG1	1:A:339:LYS:HE3	2.46	0.45
1:A:50:ALA:CB	1:A:59:GLN:NE2	2.80	0.45
1:B:187:LEU:HD11	1:B:203:LEU:HB3	1.99	0.45
1:B:420:LEU:HD23	1:B:431:ARG:HH21	1.81	0.45
1:A:110:ASP:OD2	1:A:215:TYR:OH	2.30	0.44
1:B:45:SER:HB3	5:B:904:HOH:O	2.16	0.44
1:A:361:GLN:CD	1:A:413:PHE:CE2	2.82	0.44
1:A:375:GLU:H	1:A:375:GLU:HG3	1.58	0.44
1:B:461:GLY:HA3	1:B:478:GLY:O	2.18	0.44
1:A:33:LYS:HA	1:A:64:GLU:CG	2.48	0.44
1:A:284:LYS:NZ	1:A:318:SER:HB3	2.33	0.44
1:A:35:PHE:HZ	1:A:38:ASN:HD22	1.64	0.44
1:A:191:LEU:HA	1:A:201:MET:SD	2.58	0.44
1:A:312:GLN:HE22	1:A:356:GLN:HA	1.83	0.44
2:B:801:NAD:H6N	2:B:801:NAD:H2D	1.78	0.43
1:A:306:VAL:O	1:A:311:GLY:HA2	2.18	0.43
1:B:371:SER:O	1:B:375:GLU:HG3	2.18	0.43
1:A:237:GLY:HA3	2:A:701:NAD:C8A	2.49	0.43
1:A:271:ARG:O	1:B:263:LYS:HE2	2.18	0.43
1:B:447:ASN:HB3	1:B:450:LYS:HD2	1.99	0.43
2:B:801:NAD:H8A	2:B:801:NAD:H2B	1.84	0.43
1:B:295:LEU:HD23	1:B:333:ARG:CZ	2.49	0.43
1:A:180:TRP:CZ2	1:A:357:ILE:HD11	2.53	0.43
1:A:343:VAL:HB	1:A:353:GLN:HE21	1.84	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:250:ILE:O	1:B:275:LYS:HE3	2.19	0.43
1:A:135:GLU:HG3	1:A:139:ARG:HD2	2.00	0.43
1:B:121:ASP:OD2	1:B:211:LEU:HD23	2.19	0.42
1:A:412:ILE:O	1:A:413:PHE:HB3	2.19	0.42
1:B:180:TRP:CZ2	1:B:357:ILE:HG21	2.54	0.42
1:A:170:PRO:HB3	1:A:197:CYS:O	2.19	0.42
1:B:295:LEU:HD12	1:B:295:LEU:HA	1.73	0.42
1:A:39:GLU:HB2	1:A:41:HIS:HE1	1.84	0.42
1:A:95:SER:HA	1:A:98:ARG:HB2	2.01	0.42
1:B:420:LEU:HD23	1:B:431:ARG:NH2	2.34	0.42
1:B:88:TRP:CH2	1:B:96:ARG:HG2	2.53	0.42
1:B:204:LYS:NZ	1:B:235:GLY:O	2.50	0.42
1:A:174:CYS:O	1:A:201:MET:HA	2.19	0.42
1:A:492:TYR:OH	1:B:154:LYS:HD2	2.20	0.42
1:B:31:PHE:CZ	1:B:218:SER:HB3	2.55	0.42
1:B:303:HIS:O	1:B:307:PHE:HD1	2.03	0.41
1:B:325:GLN:OE1	1:B:325:GLN:N	2.52	0.41
1:A:123:GLY:O	1:A:355:PRO:HD2	2.21	0.41
1:A:118:GLU:OE1	1:A:118:GLU:HA	2.20	0.41
1:A:436:ASP:HB3	1:A:482:MET:HE2	2.01	0.41
1:B:195:LEU:HD23	1:B:195:LEU:HA	1.74	0.41
1:A:73:LYS:NZ	1:A:73:LYS:HB3	2.35	0.41
1:B:442:ALA:HB2	1:B:468:TYR:CD2	2.56	0.41
1:A:368:LEU:HD23	1:A:371:SER:CB	2.51	0.41
1:A:27:LEU:HD12	1:A:28:GLU:H	1.85	0.41
1:A:33:LYS:HD2	1:A:40:TRP:HB3	2.03	0.41
1:A:114:LEU:HB2	1:A:134:LEU:HD21	2.03	0.41
1:A:207:GLU:HG2	1:A:208:GLN:OE1	2.21	0.41
1:A:263:LYS:O	1:A:267:GLU:HG3	2.21	0.41
1:A:312:GLN:HB3	1:A:413:PHE:CE1	2.55	0.41
1:B:253:ILE:HG22	1:B:277:VAL:HG22	2.02	0.41
1:B:339:LYS:HG3	1:B:381:CYS:SG	2.61	0.41
1:A:356:GLN:HE22	1:A:392:PHE:C	2.30	0.40
1:B:124:LYS:HE3	1:B:309:ASN:OD1	2.21	0.40
1:A:368:LEU:HD23	1:A:371:SER:HB3	2.02	0.40

All (4) 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)
1:A:332:ARG:NH1	1:B:423:LYS:NZ[1_565]	0.53	1.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:332:ARG:NH1	1:B:423:LYS:CE[1_565]	1.41	0.79
1:A:332:ARG:CZ	1:B:423:LYS:NZ[1_565]	1.76	0.44
1:A:332:ARG:NH2	1:B:423:LYS:CD[1_565]	1.89	0.31

## 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	472/512 (92%)	449 (95%)	22 (5%)	1 (0%)	43	72
1	B	480/512 (94%)	455 (95%)	24 (5%)	1 (0%)	43	72
All	All	952/1024 (93%)	904 (95%)	46 (5%)	2 (0%)	43	72

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	438	GLY
1	B	438	GLY

### 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	395/422 (94%)	395 (100%)	0	100	100
1	B	398/422 (94%)	397 (100%)	1 (0%)	86	96
All	All	793/844 (94%)	792 (100%)	1 (0%)	88	97

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	195	LEU

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

Mol	Chain	Res	Type
1	A	26	ASN
1	A	38	ASN
1	A	41	HIS
1	A	59	GLN
1	A	304	GLN
1	A	353	GLN
1	A	356	GLN
1	A	485	ASN
1	B	102	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](#)

5 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	NW8	B	802	-	25,25,25	2.21	9 (36%)	33,35,35	3.25	15 (45%)
3	NW8	A	702	-	25,25,25	2.45	9 (36%)	33,35,35	3.04	18 (54%)
2	NAD	A	701	-	46,48,48	4.12	20 (43%)	64,73,73	2.01	18 (28%)
4	GOL	A	703	-	5,5,5	1.58	2 (40%)	5,5,5	0.56	0
2	NAD	B	801	-	46,48,48	4.13	19 (41%)	64,73,73	2.05	18 (28%)

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	NW8	B	802	-	-	0/8/8/8	0/4/4/4
3	NW8	A	702	-	-	0/8/8/8	0/4/4/4
2	NAD	A	701	-	-	10/30/62/62	0/5/5/5
4	GOL	A	703	-	-	1/4/4/4	-
2	NAD	B	801	-	-	11/30/62/62	0/5/5/5

All (59) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	801	NAD	O4D-C1D	17.69	1.64	1.40
2	A	701	NAD	O4D-C1D	17.31	1.63	1.40
2	A	701	NAD	O4B-C1B	8.60	1.61	1.42
2	B	801	NAD	O4B-C1B	7.95	1.60	1.42
3	A	702	NW8	C10-C02	-7.87	1.35	1.47
2	B	801	NAD	C2B-C1B	-7.75	1.29	1.53
2	A	701	NAD	C2B-C1B	-7.72	1.29	1.53
2	A	701	NAD	C7N-N7N	7.63	1.47	1.33
2	B	801	NAD	C7N-N7N	7.39	1.46	1.33
2	B	801	NAD	PA-O3	6.75	1.66	1.59
2	A	701	NAD	PA-O3	6.13	1.66	1.59
2	A	701	NAD	O4D-C4D	-6.08	1.31	1.45
2	A	701	NAD	C6A-N6A	6.06	1.49	1.34
3	B	802	NW8	C10-C02	-6.05	1.38	1.47
2	B	801	NAD	C6A-N6A	6.03	1.49	1.34
2	B	801	NAD	O4B-C4B	-6.01	1.31	1.45
2	B	801	NAD	O4D-C4D	-5.82	1.32	1.45
2	A	701	NAD	O4B-C4B	-5.55	1.32	1.45
3	A	702	NW8	C16-C08	-4.48	1.41	1.48
3	B	802	NW8	C16-C08	-4.39	1.41	1.48

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	NAD	O3D-C3D	-4.20	1.32	1.43
2	A	701	NAD	O2D-C2D	4.05	1.53	1.43
2	B	801	NAD	O3D-C3D	-4.00	1.33	1.43
2	A	701	NAD	O2B-C2B	3.95	1.52	1.43
2	B	801	NAD	PN-O3	3.83	1.63	1.59
2	B	801	NAD	O2B-C2B	3.72	1.52	1.43
2	B	801	NAD	O2D-C2D	3.71	1.52	1.43
3	A	702	NW8	C02-N01	-3.47	1.33	1.39
2	B	801	NAD	C2N-N1N	3.37	1.38	1.35
3	B	802	NW8	C09-N04	-3.31	1.32	1.38
2	A	701	NAD	PA-O1A	3.25	1.62	1.50
3	A	702	NW8	C09-N04	-3.22	1.32	1.38
2	B	801	NAD	C5D-C4D	3.13	1.61	1.51
2	A	701	NAD	C5D-C4D	3.06	1.60	1.51
3	B	802	NW8	C02-N01	-3.00	1.34	1.39
3	B	802	NW8	C19-CL1	3.00	1.81	1.74
3	A	702	NW8	C19-CL1	2.86	1.81	1.74
2	A	701	NAD	C5A-N7A	-2.83	1.33	1.39
2	A	701	NAD	C2N-N1N	2.79	1.38	1.35
2	A	701	NAD	PA-O5B	2.78	1.70	1.59
2	B	801	NAD	O3B-C3B	-2.78	1.36	1.43
2	A	701	NAD	O3B-C3B	-2.68	1.36	1.43
2	B	801	NAD	C5A-N7A	-2.63	1.34	1.39
2	B	801	NAD	C2A-N3A	2.56	1.38	1.33
3	B	802	NW8	C05-C06	2.49	1.40	1.35
4	A	703	GOL	C3-C2	2.41	1.61	1.51
3	A	702	NW8	C15-C10	-2.41	1.35	1.39
3	B	802	NW8	C08-C09	2.39	1.46	1.43
3	A	702	NW8	C12-C11	-2.31	1.35	1.38
2	A	701	NAD	C5A-C4A	-2.25	1.35	1.39
4	A	703	GOL	C1-C2	2.22	1.60	1.51
2	B	801	NAD	C4N-C3N	-2.20	1.36	1.39
2	B	801	NAD	C5A-C4A	-2.12	1.35	1.39
2	A	701	NAD	PN-O3	2.11	1.61	1.59
3	A	702	NW8	C05-C06	2.10	1.39	1.35
3	A	702	NW8	C11-C10	-2.07	1.36	1.39
3	B	802	NW8	C07-C08	2.07	1.41	1.37
3	B	802	NW8	C09-N01	2.06	1.37	1.33
2	A	701	NAD	C3N-C7N	2.02	1.53	1.50

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	702	NW8	C03-N04-C09	9.29	110.35	106.87
3	B	802	NW8	C03-N04-C09	8.68	110.12	106.87
3	B	802	NW8	N04-C09-N01	-7.04	106.16	111.05
3	B	802	NW8	C20-C19-C18	-6.64	113.01	121.24
3	B	802	NW8	C21-C20-C19	5.80	125.08	119.24
2	A	701	NAD	N3A-C2A-N1A	-5.70	119.95	128.58
2	B	801	NAD	N3A-C2A-N1A	-5.62	120.07	128.58
3	A	702	NW8	N04-C09-N01	-5.58	107.17	111.05
3	A	702	NW8	C20-C19-C18	-5.58	114.33	121.24
2	B	801	NAD	C5A-C4A-N3A	-5.55	119.08	126.72
2	A	701	NAD	C4D-O4D-C1D	-5.31	105.06	109.92
3	A	702	NW8	C21-C20-C19	4.94	124.21	119.24
3	B	802	NW8	C03-C02-N01	-4.66	106.29	110.75
2	B	801	NAD	N9A-C8A-N7A	-4.64	107.35	113.94
2	A	701	NAD	C5A-C4A-N3A	-4.60	120.38	126.72
2	A	701	NAD	N9A-C8A-N7A	-4.52	107.53	113.94
2	B	801	NAD	N6A-C6A-N1A	-4.52	108.31	118.38
2	A	701	NAD	O3-PA-O1A	-4.40	97.46	110.70
3	A	702	NW8	C15-C10-C11	4.04	123.71	118.57
3	B	802	NW8	C20-C19-CL1	3.87	125.07	119.36
3	A	702	NW8	C15-C10-C02	-3.77	116.65	120.87
2	A	701	NAD	N6A-C6A-N1A	-3.76	110.00	118.38
3	B	802	NW8	C02-N01-C09	3.75	110.70	105.66
2	B	801	NAD	C6N-N1N-C2N	-3.74	118.69	121.88
3	B	802	NW8	C05-N04-C09	-3.72	119.73	122.21
3	B	802	NW8	C21-C16-C17	-3.66	113.91	118.57
3	A	702	NW8	C10-C02-N01	3.55	125.38	119.95
2	B	801	NAD	C2A-N3A-C4A	3.52	120.44	111.83
2	B	801	NAD	N3A-C4A-N9A	3.48	133.09	127.17
3	B	802	NW8	C10-C02-N01	3.43	125.20	119.95
2	B	801	NAD	C5A-N7A-C8A	3.42	108.83	103.45
2	A	701	NAD	C2A-N3A-C4A	3.27	119.83	111.83
2	B	801	NAD	C5A-C6A-N6A	3.21	131.22	123.29
3	A	702	NW8	C14-C15-C10	-3.19	117.23	120.36
3	B	802	NW8	C18-C17-C16	3.13	124.14	120.80
2	A	701	NAD	C5A-N7A-C8A	3.06	108.25	103.45
2	A	701	NAD	C5D-C4D-C3D	-3.02	104.34	115.21
3	B	802	NW8	C17-C18-C19	2.99	122.26	119.24
2	B	801	NAD	C5B-C4B-C3B	-2.96	104.55	115.21
2	B	801	NAD	C5D-C4D-C3D	-2.96	104.57	115.21
2	B	801	NAD	C4D-O4D-C1D	-2.91	107.26	109.92
3	A	702	NW8	C20-C19-CL1	2.89	123.63	119.36
3	A	702	NW8	C17-C18-C19	2.79	122.05	119.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	701	NAD	C5A-C6A-N6A	2.75	130.10	123.29
3	B	802	NW8	C15-C10-C02	-2.73	117.81	120.87
3	A	702	NW8	C21-C16-C17	-2.72	115.11	118.57
2	A	701	NAD	O7N-C7N-N7N	-2.67	118.75	122.62
2	B	801	NAD	O7N-C7N-N7N	-2.62	118.83	122.62
3	B	802	NW8	C21-C16-C08	2.45	124.50	120.98
2	A	701	NAD	O5B-PA-O1A	2.45	118.63	108.94
3	A	702	NW8	C10-C02-C03	-2.43	125.94	129.65
2	B	801	NAD	C4A-C5A-N7A	-2.43	107.81	110.58
2	A	701	NAD	N3A-C4A-N9A	2.43	131.29	127.17
2	A	701	NAD	C4A-C5A-N7A	-2.35	107.89	110.58
3	A	702	NW8	C14-C13-C12	2.35	123.09	119.87
2	B	801	NAD	C4A-N9A-C8A	2.32	108.18	105.74
2	A	701	NAD	C5A-C4A-N9A	2.31	108.32	105.81
3	A	702	NW8	C13-C12-C11	-2.30	117.40	120.24
2	B	801	NAD	C6A-C5A-C4A	2.27	120.28	117.18
2	B	801	NAD	PA-O5B-C5B	-2.25	108.48	121.35
3	A	702	NW8	C03-C02-N01	-2.18	108.66	110.75
2	A	701	NAD	C4A-N9A-C8A	2.16	108.00	105.74
2	A	701	NAD	C3N-C7N-N7N	2.15	120.39	117.74
3	A	702	NW8	C02-N01-C09	2.13	108.52	105.66
3	A	702	NW8	C18-C17-C16	2.10	123.04	120.80
3	A	702	NW8	C05-N04-C09	-2.08	120.82	122.21
3	B	802	NW8	C06-C05-N04	2.08	121.54	118.80
2	B	801	NAD	O2N-PN-O3	2.05	112.80	107.27
2	A	701	NAD	O4B-C1B-N9A	2.02	111.97	108.09

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	701	NAD	C5B-O5B-PA-O1A
2	A	701	NAD	C5D-O5D-PN-O3
2	B	801	NAD	O4D-C1D-N1N-C2N
2	B	801	NAD	O4D-C1D-N1N-C6N
2	B	801	NAD	C2D-C1D-N1N-C2N
2	B	801	NAD	C2D-C1D-N1N-C6N
2	A	701	NAD	O4B-C4B-C5B-O5B
2	B	801	NAD	O4B-C4B-C5B-O5B
2	A	701	NAD	C3B-C4B-C5B-O5B
2	B	801	NAD	PA-O3-PN-O5D
4	A	703	GOL	O2-C2-C3-O3

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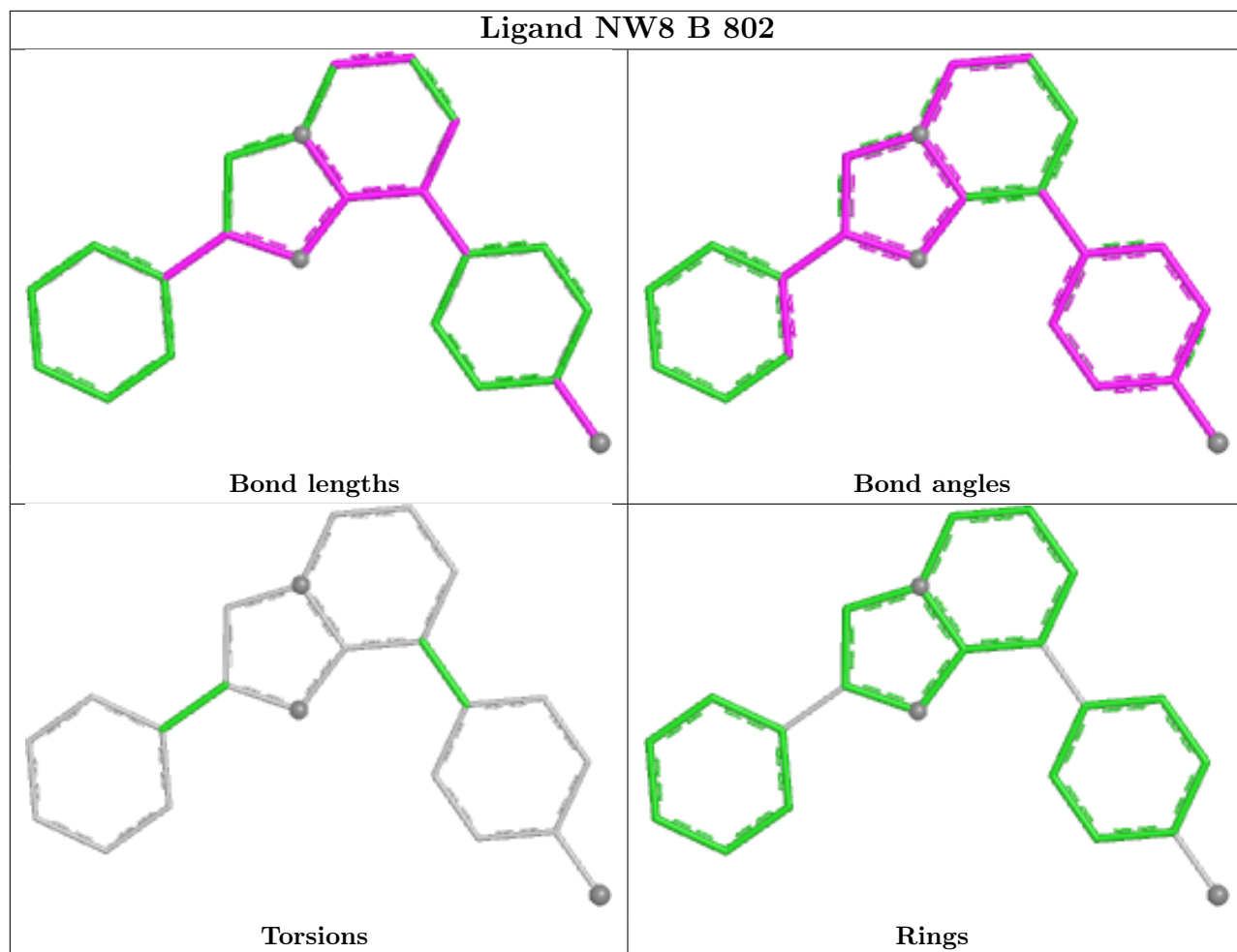
Mol	Chain	Res	Type	Atoms
2	A	701	NAD	C3D-C4D-C5D-O5D
2	A	701	NAD	C2B-C1B-N9A-C8A
2	B	801	NAD	C2B-C1B-N9A-C8A
2	A	701	NAD	C5B-O5B-PA-O2A
2	A	701	NAD	C5B-O5B-PA-O3
2	B	801	NAD	C5B-O5B-PA-O1A
2	B	801	NAD	C5B-O5B-PA-O2A
2	B	801	NAD	C5B-O5B-PA-O3
2	A	701	NAD	O4D-C4D-C5D-O5D
2	B	801	NAD	O4B-C1B-N9A-C8A
2	A	701	NAD	O4B-C1B-N9A-C8A

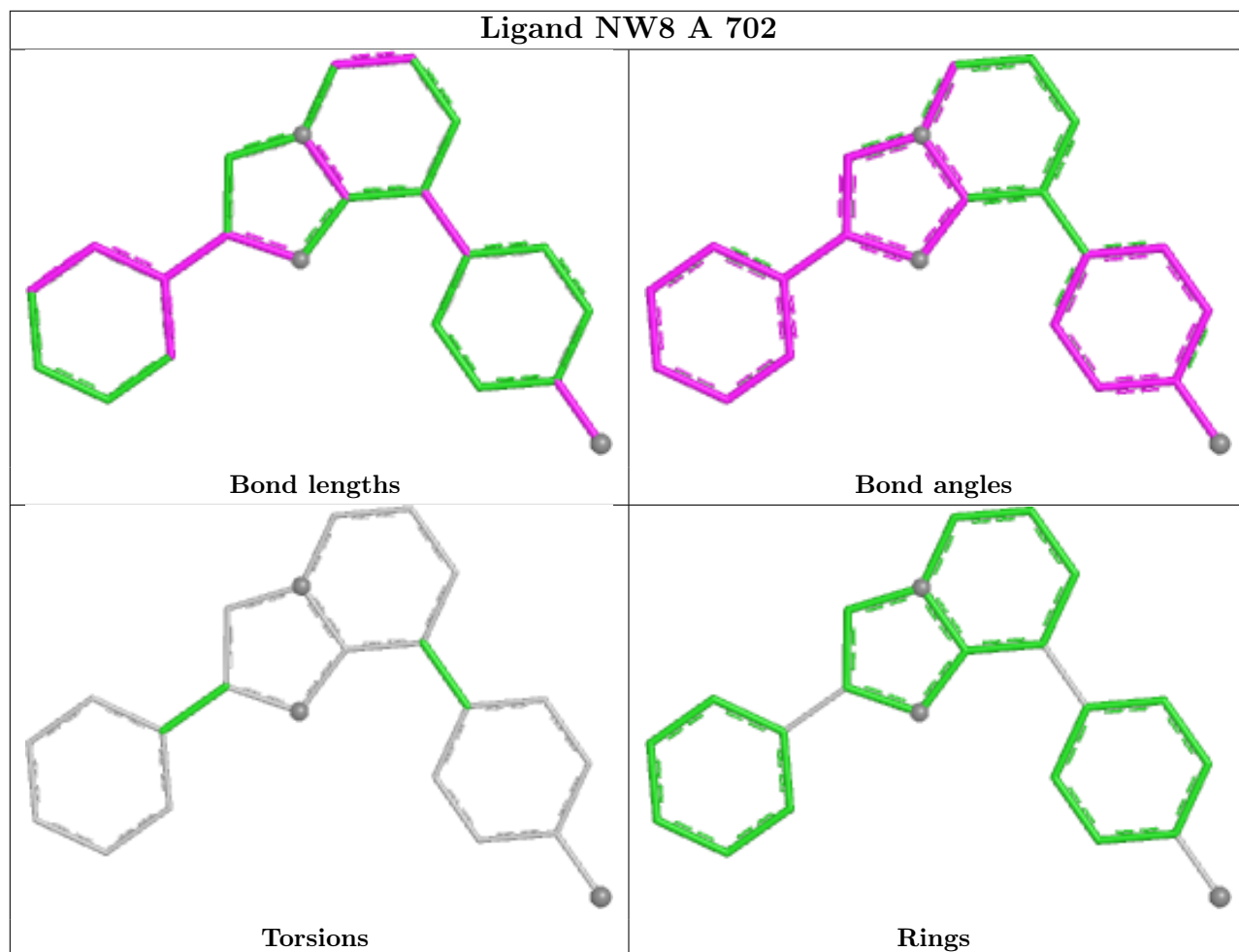
There are no ring outliers.

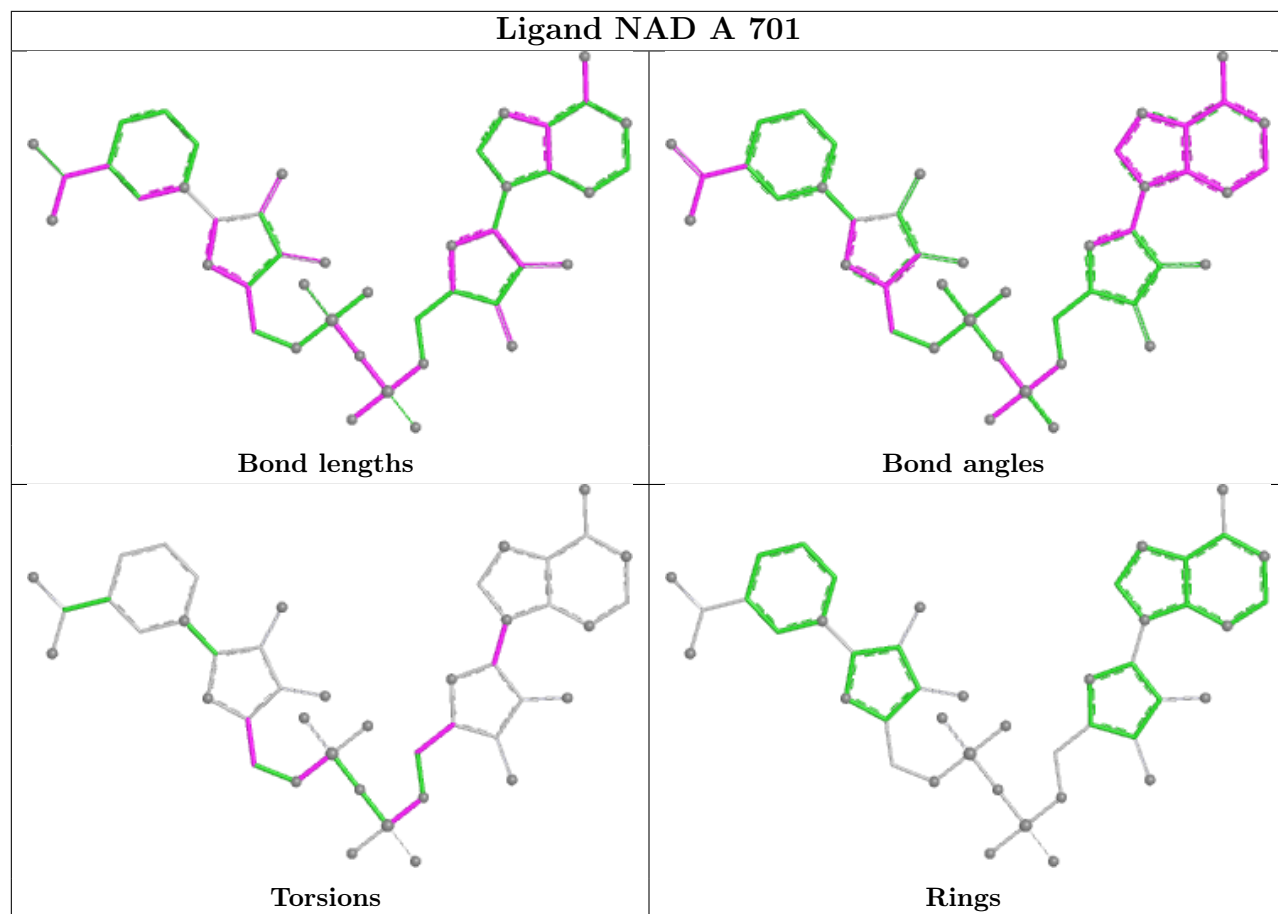
3 monomers are involved in 9 short contacts:

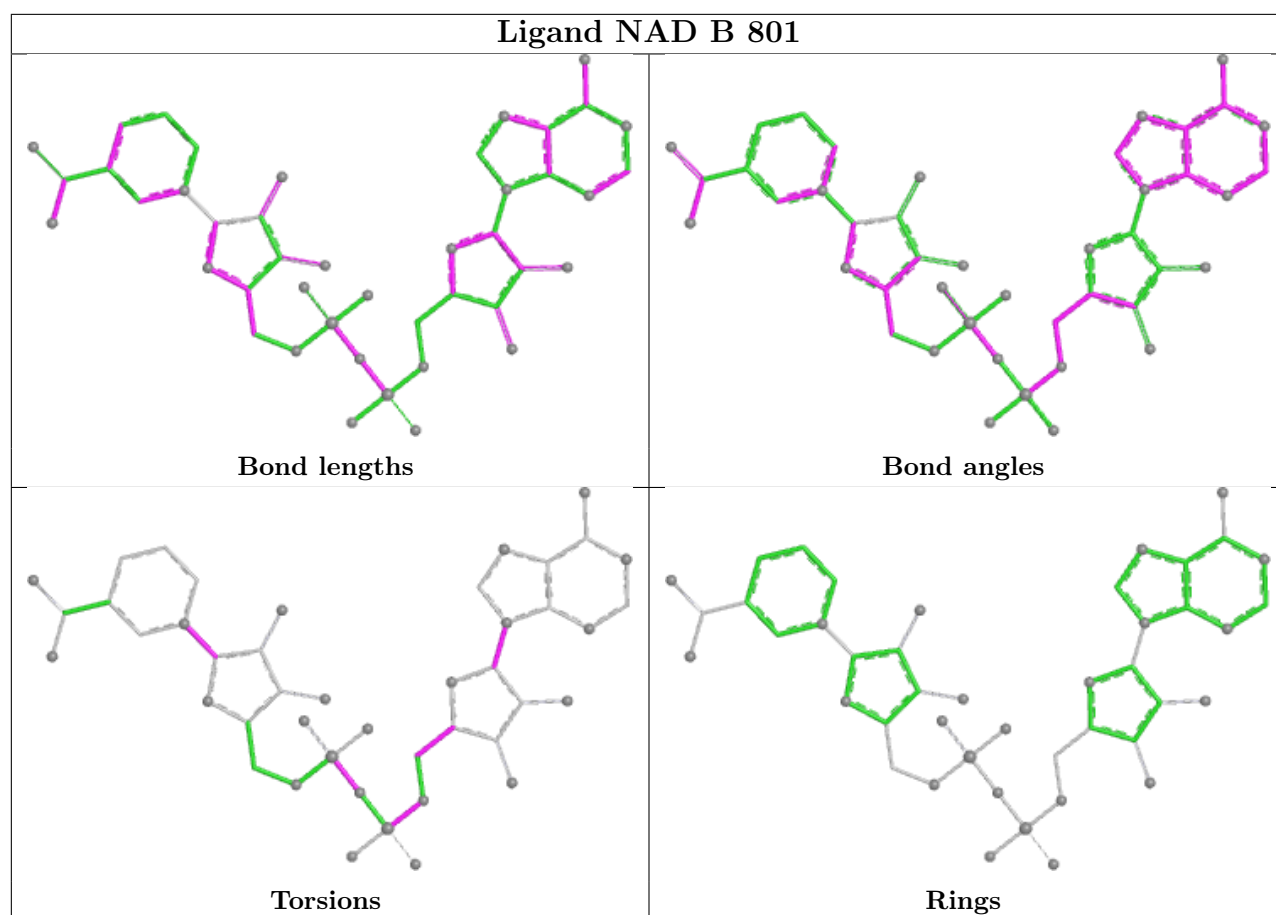
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	701	NAD	3	0
4	A	703	GOL	1	0
2	B	801	NAD	5	0

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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	2

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	58:GLU	C	59:GLN	N	2.10
1	A	59:GLN	C	60:ILE	N	0.41

## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	478/512 (93%)	0.06	16 (3%) 49 40	31, 53, 114, 134	0
1	B	482/512 (94%)	-0.01	6 (1%) 76 69	30, 54, 91, 135	0
All	All	960/1024 (93%)	0.02	22 (2%) 61 52	30, 54, 103, 135	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	413	PHE	4.5
1	A	386	MET	3.4
1	B	413	PHE	2.9
1	A	380	GLU	2.9
1	A	346	PRO	2.8
1	A	337	TYR	2.6
1	A	393	ILE	2.4
1	A	349	VAL	2.4
1	B	318	SER	2.4
1	A	416	VAL	2.2
1	B	390	GLY	2.2
1	B	423	LYS	2.2
1	A	57	ARG	2.2
1	A	332	ARG	2.2
1	A	362	PHE	2.2
1	B	307	PHE	2.2
1	A	379	LEU	2.2
1	B	27	LEU	2.1
1	A	314	CYS	2.1
1	A	398	PHE	2.1
1	A	396	THR	2.1
1	A	356	GLN	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](#)

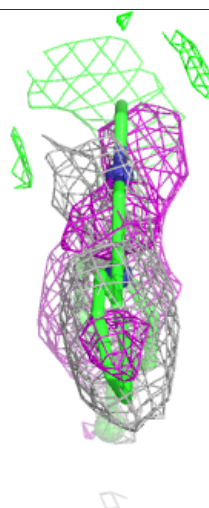
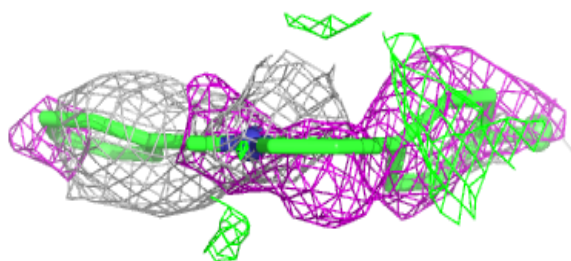
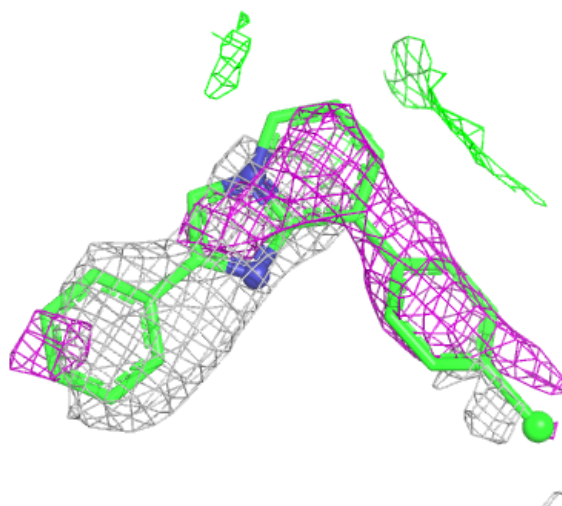
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	NW8	A	702	22/22	0.63	0.23	55,86,96,111	0
3	NW8	B	802	22/22	0.78	0.19	55,73,86,94	0
2	NAD	A	701	44/44	0.87	0.14	37,65,127,130	0
4	GOL	A	703	6/6	0.88	0.14	47,54,56,59	0
2	NAD	B	801	44/44	0.89	0.13	46,63,150,154	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.

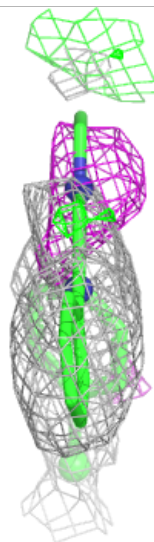
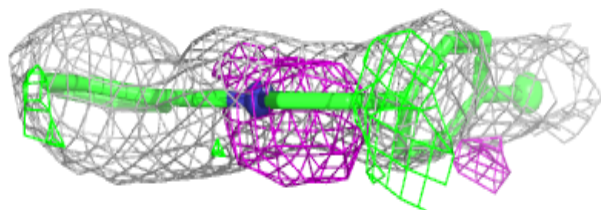
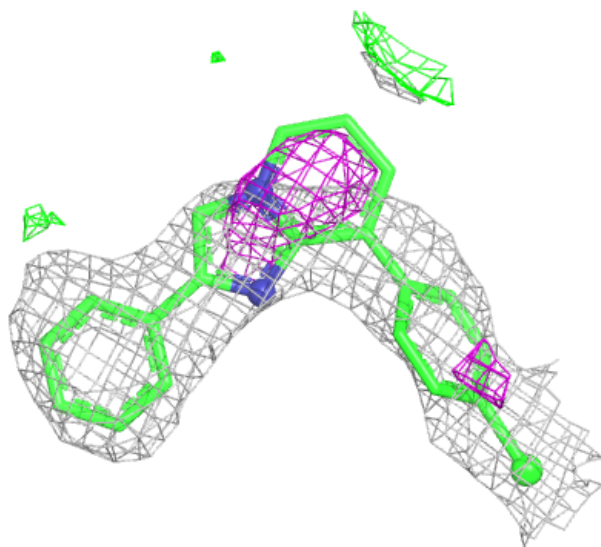
**Electron density around NW8 A 702:**

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



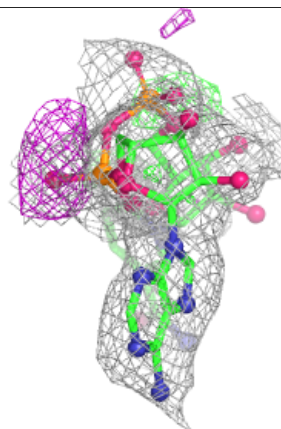
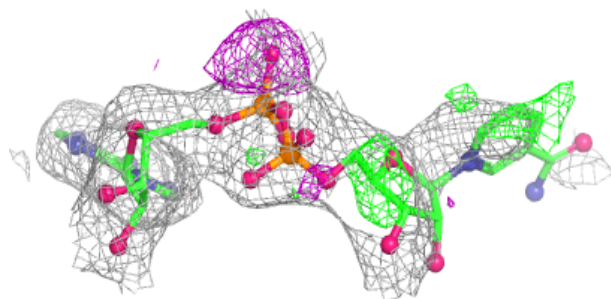
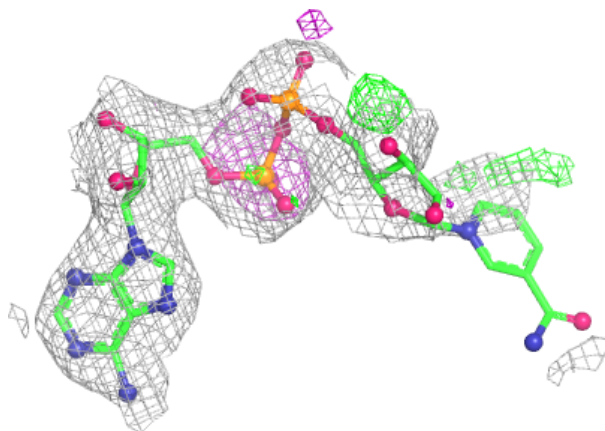
**Electron density around NW8 B 802:**

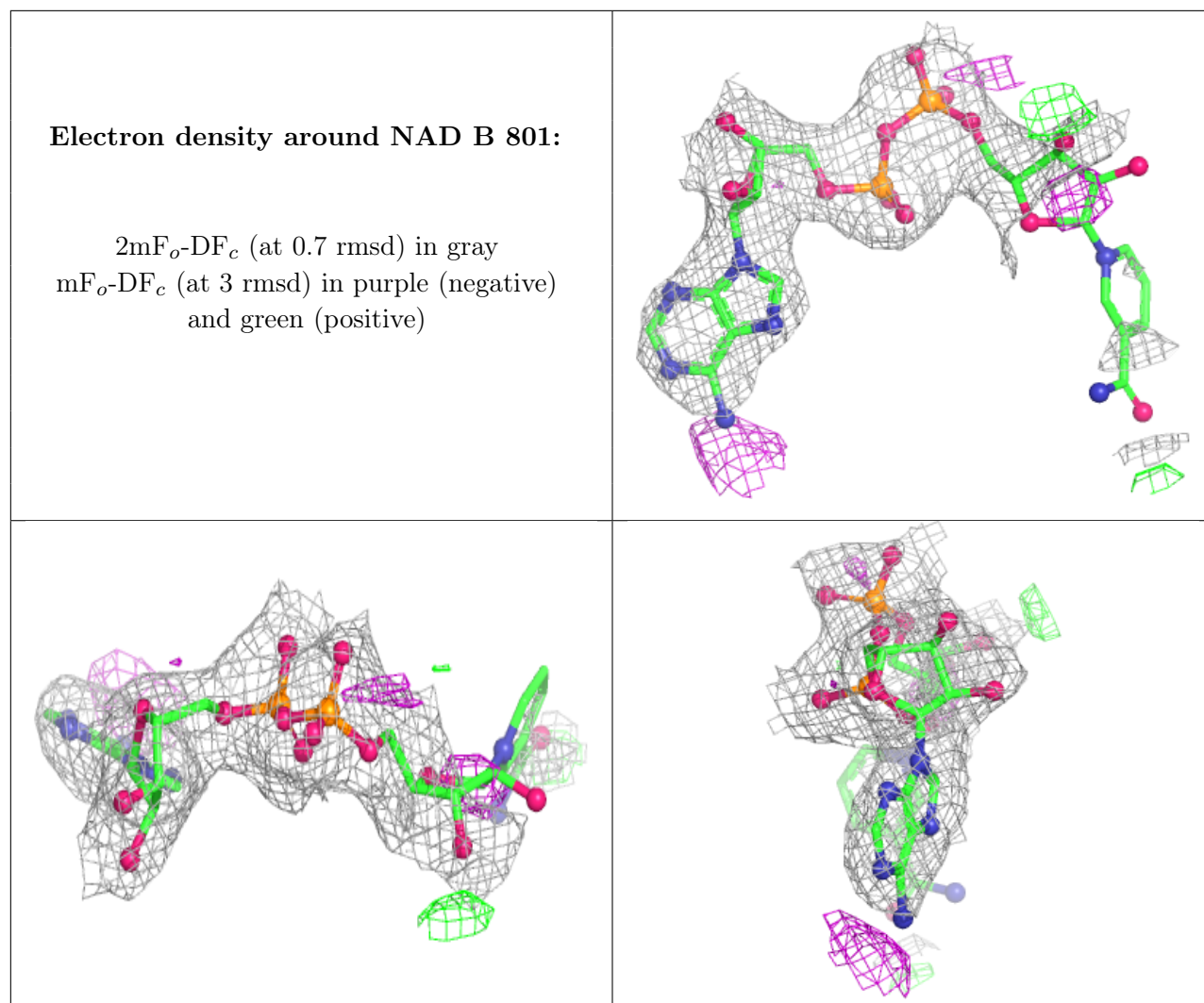
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around NAD A 701:**

$2mF_o-DF_c$  (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.