

Full wwPDB X-ray Structure Validation Report (i)

Jan 4, 2024 – 03:44 pm GMT

PDB ID	:	5 G0 V
Title	:	InhA in complex with a DNA encoded library hit
Authors	:	Read, J.A.; Breed, J.
Deposited on		
Resolution	:	1.79 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 (i) 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 (1)) were used in the production of this report:

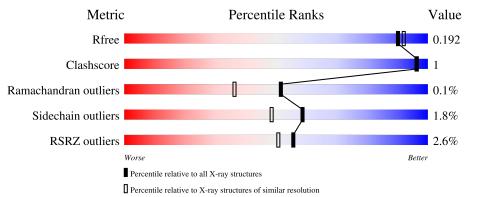
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure: $X\text{-}RAY\;DIFFRACTION$

The reported resolution of this entry is 1.79 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	$egin{array}{c} { m Whole \ archive} \ (\#{ m Entries}) \end{array}$	${f Similar\ resolution}\ (\#{ m Entries,\ resolution\ range}({ m \AA}))$
R_{free}	130704	5950(1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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 <=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	А	269	93%	• •
1	В	269	3% 90%	6% •
1	С	269	87%	• 9%
1	D	269	4% 95%	• •



2 Entry composition (i)

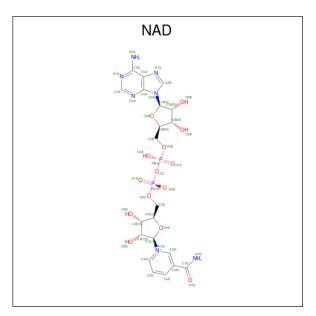
There are 5 unique types of molecules in this entry. The entry contains 8546 atoms, of which 0 are hydrogens and 0 are deuteriums.

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.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	Δ	260	Total	С	Ν	0	\mathbf{S}	0	1	0
	А	200	1887	1199	327	351	10	0		0
1	В	258	Total	С	Ν	0	S	0	1	0
	D	200	1902	1206	329	357	10	0	I	0
1	С	244	Total	С	Ν	0	S	0	0	0
	U	244	1799	1145	311	335	8	0	0	0
1	Л	263	Total	С	Ν	0	S	0	1	0
	D	203	1913	1216	329	358	10	0		0

• Molecule 1 is a protein called ENOYL-ACYL CARRIER PROTEIN REDUCTASE.

• Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$).



Mol	Chain	Residues		Ate	oms			ZeroOcc	AltConf
0	٨	1	Total	С	Ν	Ο	Р	0	0
	A	1	44	21	7	14	2	0	0
0	р	1	Total	С	Ν	Ο	Р	0	0
	D	1	44	21	7	14	2	0	U



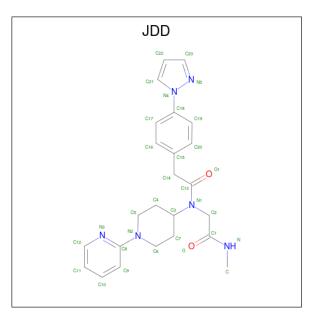
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Mol	Chain	Residues		Ate	oms			ZeroOcc	AltConf
0	С	1	Total	С	Ν	Ο	Р	0	0
	C	1	44	21	7	14	2	0	0
0	Л	1	Total	С	Ν	Ο	Р	0	0
	D	1	44	21	7	14	2	0	0

• Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

[Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
	3	А	1	Total Mg 1 1	0	0

• Molecule 4 is N-[2-(methylamino)-2-oxidanylidene-ethyl]-2-(4-pyrazol-1-ylphenyl)-N-(1-pyridin-2-ylpiperidin-4-yl)ethanamide (three-letter code: JDD) (formula: $C_{24}H_{28}N_6O_2$).



Mol	Chain	Residues	A	Aton	ıs		ZeroOcc	AltConf
4	В	1	Total 32	C 24	N 6	O 2	0	0

• Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	А	229	Total O 229 229	0	0
5	В	230	Total O 230 230	0	0



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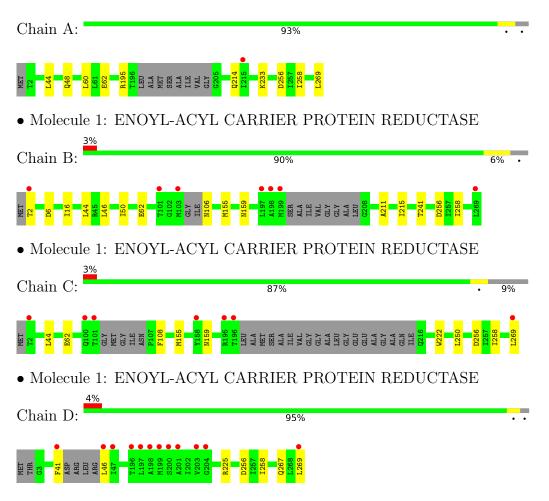
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	С	197	Total O 197 197	0	0
5	D	180	Total O 180 180	0	0



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: ENOYL-ACYL CARRIER PROTEIN REDUCTASE





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants	65.15Å 111.73Å 67.81Å	Depositor
a, b, c, α , β , γ	90.00° 98.30° 90.00°	Depositor
Resolution (Å)	57.53 - 1.79	Depositor
Resolution (A)	57.52 - 1.79	EDS
% Data completeness	97.9(57.53-1.79)	Depositor
(in resolution range)	97.9(57.52 - 1.79)	EDS
R _{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) > 1$	$2.19 (at 1.80 \text{\AA})$	Xtriage
Refinement program	BUSTER 2.11.5	Depositor
R, R_{free}	0.159 , 0.188	Depositor
$\mathbf{n}, \mathbf{n}_{free}$	0.164 , 0.192	DCC
R_{free} test set	4356 reflections $(4.93%)$	wwPDB-VP
Wilson B-factor $(Å^2)$	21.8	Xtriage
Anisotropy	0.361	Xtriage
Bulk solvent $k_{sol}(e/Å^3)$, $B_{sol}(Å^2)$	0.32 , 52.5	EDS
L-test for $twinning^2$	$< L > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.024 for l,-k,h	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	8546	wwPDB-VP
Average B, all atoms $(Å^2)$	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: The largest off-origin peak in the Patterson function is 4.28% of the height of the origin peak. No significant pseudotranslation is detected.

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.



¹Intensities estimated from amplitudes.

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: NAD, MG, JDD

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		
	Unam	RMSZ	# Z > 5	RMSZ	# Z > 5	
1	А	0.51	0/1924	0.60	0/2617	
1	В	0.51	0/1938	0.60	0/2633	
1	С	0.52	0/1835	0.61	0/2496	
1	D	0.52	0/1950	0.59	0/2652	
All	All	0.52	0/7647	0.60	0/10398	

There are no bond length outliers.

There are no bond angle outliers.

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	А	1887	0	1848	4	0
1	В	1902	0	1873	7	0
1	С	1799	0	1774	4	0
1	D	1913	0	1893	3	0
2	А	44	0	26	0	0
2	В	44	0	26	0	0
2	С	44	0	26	0	0
2	D	44	0	26	0	0
3	А	1	0	0	0	0



Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	В	32	0	0	0	0
5	А	229	0	0	0	0
5	В	230	0	0	0	0
5	С	197	0	0	0	0
5	D	180	0	0	1	0
All	All	8546	0	7492	15	0

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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 1.

All (15) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:108:PHE:HB2	1:C:159:ASN:HD22	1.59	0.67
1:A:44:LEU:HD21	1:A:62:GLU:HB2	1.80	0.63
1:B:44:LEU:HD21	1:B:62:GLU:HB2	1.82	0.62
1:A:48:GLN:HG2	1:A:60:LEU:HD23	1.91	0.52
1:B:46:LEU:O	1:B:50:ILE:HD12	2.11	0.51
1:B:16:ILE:O	1:B:50:ILE:HD13	2.10	0.51
1:A:258:ILE:HD12	1:D:258:ILE:HD12	1.93	0.51
1:B:258:ILE:HD12	1:C:258:ILE:HD12	1.94	0.49
1:D:225:ARG:HD2	1:D:267:GLN:O	2.13	0.48
1:C:44:LEU:HD21	1:C:62:GLU:HG3	1.98	0.46
1:D:41:PHE:HD2	5:D:2178:HOH:O	1.99	0.45
1:A:195:ARG:CG	1:A:233:LYS:HA	2.47	0.45
1:B:241:THR:HG23	1:C:250:LEU:HD23	2.00	0.43
1:B:2:THR:HA	1:B:6:ASP:OD2	2.19	0.42
1:B:211:ALA:O	1:B:215:ILE:HG12	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	Perce	entiles
1	А	257/269~(96%)	247 (96%)	10 (4%)	0	100	100
1	В	253/269~(94%)	242 (96%)	10 (4%)	1 (0%)	34	21
1	С	238/269~(88%)	229 (96%)	9~(4%)	0	100	100
1	D	260/269~(97%)	250 (96%)	10 (4%)	0	100	100
All	All	1008/1076~(94%)	968 (96%)	39~(4%)	1 (0%)	51	36

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	В	159	ASN

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent side chain 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	А	183/205~(89%)	180~(98%)	3~(2%)	62	54	
1	В	189/205~(92%)	186~(98%)	3~(2%)	62	54	
1	С	180/205~(88%)	176 (98%)	4 (2%)	52	39	
1	D	189/205~(92%)	186 (98%)	3(2%)	62	54	
All	All	741/820~(90%)	728~(98%)	13~(2%)	59	48	

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	А	214	GLN
1	А	256	ASP
1	А	269	LEU
1	В	106	ASN
1	В	155	MET
1	В	256	ASP
1	С	155	MET
1	С	222	TRP
1	С	256	ASP
1	С	269	LEU



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Mol	Chain	Res	Type
1	D	46	LEU
1	D	256	ASP
1	D	269	LEU

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

Mol	Chain	Res	Type
1	А	139	ASN
1	С	159	ASN

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 6 ligands modelled in this entry, 1 is monoatomic - leaving 5 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	Iol Type Chain Res		Link	Bond lengths			Bond angles			
IVI0I	туре	Chain	nes	LIIIK	Counts	RMSZ	# Z >2	Counts	RMSZ	# Z >2
2	NAD	D	1270	-	42,48,48	0.68	0	50,73,73	0.78	1 (2%)
2	NAD	В	1270	-	42,48,48	0.63	0	50,73,73	0.77	2 (4%)
4	JDD	В	1271	-	34,35,35	0.42	0	44,47,47	0.54	0



Mol	Trune	Chain	Dec	Link	Bo	ond leng	\mathbf{ths}	В	ond ang	les
IVIOI	Type	Chain	Res	LIIIK	Counts	RMSZ	# Z >2	Counts	RMSZ	# Z > 2
2	NAD	А	1270	-	42,48,48	0.64	1 (2%)	50,73,73	0.71	2 (4%)
2	NAD	С	1270	-	42,48,48	0.63	0	50,73,73	0.76	2 (4%)

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	D	1270	-	-	7/26/62/62	0/5/5/5
2	NAD	В	1270	-	-	5/26/62/62	0/5/5/5
4	JDD	В	1271	-	-	2/26/36/36	0/4/4/4
2	NAD	А	1270	-	-	7/26/62/62	0/5/5/5
2	NAD	С	1270	-	-	6/26/62/62	0/5/5/5

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Ζ	Observed(Å)	Ideal(Å)
2	А	1270	NAD	C2N-N1N	2.14	1.37	1.35

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
2	В	1270	NAD	C5A-C6A-N6A	2.38	123.96	120.35
2	С	1270	NAD	O4B-C1B-C2B	-2.33	103.53	106.93
2	А	1270	NAD	O4B-C1B-C2B	-2.32	103.53	106.93
2	D	1270	NAD	C5A-C6A-N6A	2.17	123.65	120.35
2	А	1270	NAD	C5A-C6A-N6A	2.15	123.62	120.35
2	С	1270	NAD	C5A-C6A-N6A	2.15	123.61	120.35
2	В	1270	NAD	O4B-C1B-C2B	-2.13	103.81	106.93

All (7) bond angle outliers are listed below:

There are no chirality outliers.

All (27) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	А	1270	NAD	PN-O3-PA-O5B
2	А	1270	NAD	C5D-O5D-PN-O1N
2	А	1270	NAD	C5D-O5D-PN-O2N
2	А	1270	NAD	O4D-C1D-N1N-C2N
2	А	1270	NAD	O4D-C1D-N1N-C6N



Mol	Chain	\mathbf{Res}	Type	Atoms
2	В	1270	NAD	C5D-O5D-PN-O1N
2	В	1270	NAD	O4D-C1D-N1N-C2N
2	С	1270	NAD	C5D-O5D-PN-O1N
2	С	1270	NAD	C5D-O5D-PN-O2N
2	С	1270	NAD	O4D-C1D-N1N-C2N
2	D	1270	NAD	PN-O3-PA-O5B
2	D	1270	NAD	C5D-O5D-PN-O1N
2	D	1270	NAD	O4D-C1D-N1N-C2N
4	В	1271	JDD	C2-C1-N-C
4	В	1271	JDD	O-C1-N-C
2	С	1270	NAD	PN-O3-PA-O5B
2	В	1270	NAD	C5D-O5D-PN-O3
2	В	1270	NAD	C5D-O5D-PN-O2N
2	D	1270	NAD	C5D-O5D-PN-O2N
2	В	1270	NAD	O4B-C4B-C5B-O5B
2	А	1270	NAD	C5D-O5D-PN-O3
2	С	1270	NAD	C5D-O5D-PN-O3
2	D	1270	NAD	C5B-O5B-PA-O3
2	D	1270	NAD	C5D-O5D-PN-O3
2	А	1270	NAD	O4B-C4B-C5B-O5B
2	С	1270	NAD	O4B-C4B-C5B-O5B
2	D	1270	NAD	O4B-C4B-C5B-O5B

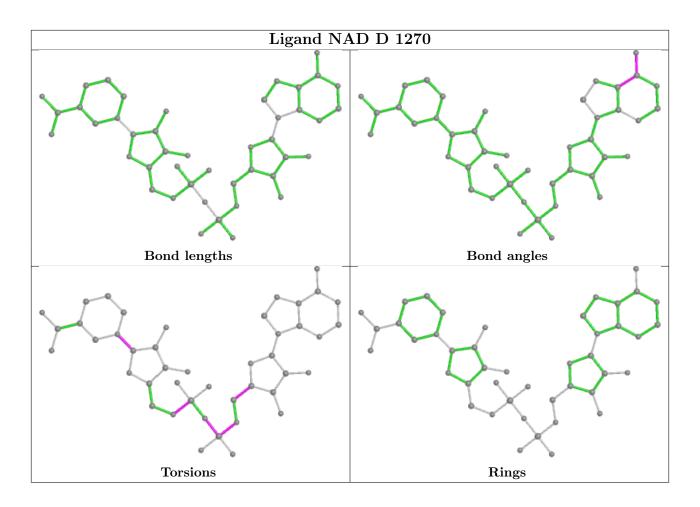
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There are no ring outliers.

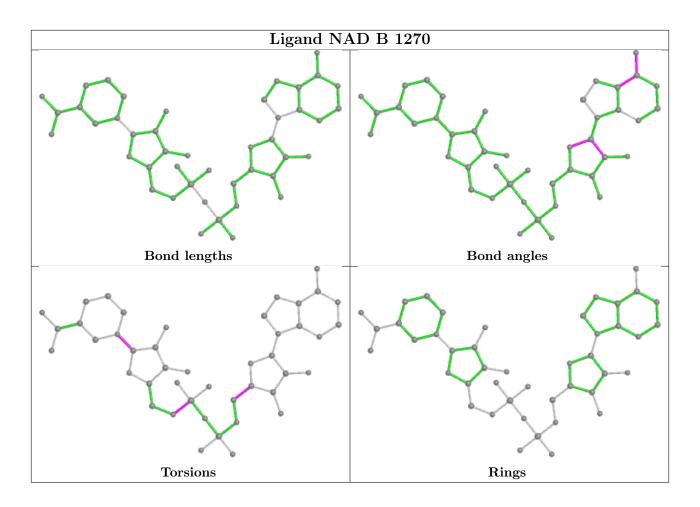
No monomer is involved in short contacts.

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 then 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.

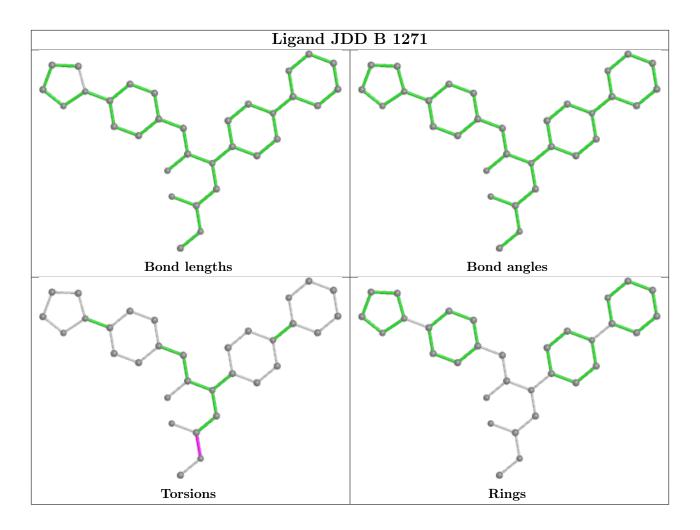




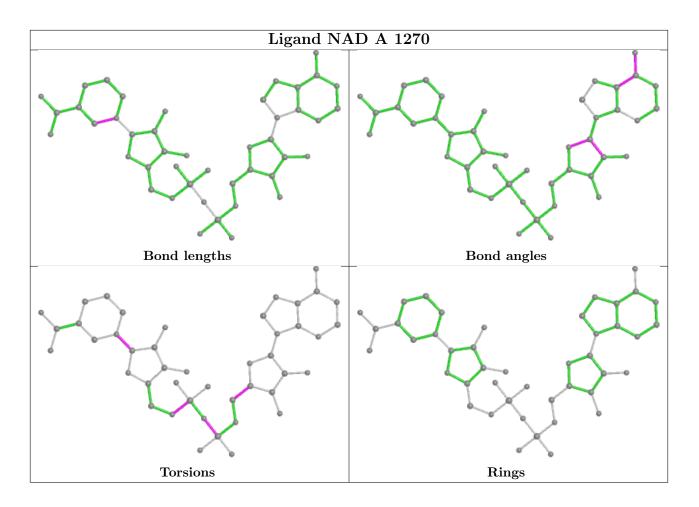




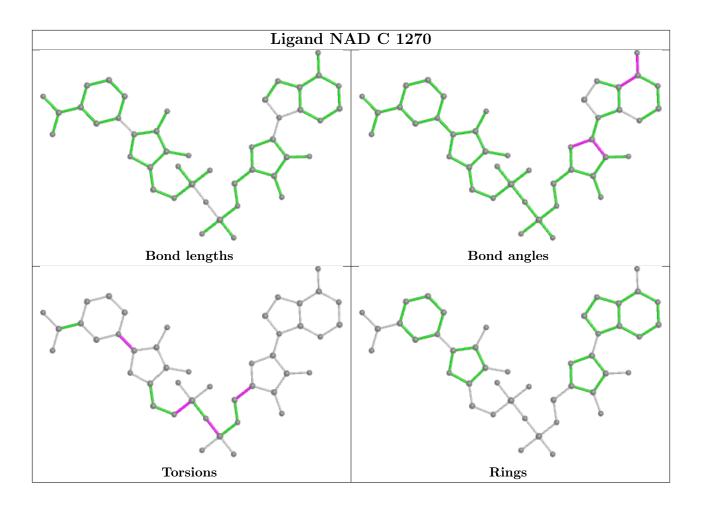












5.7 Other polymers (i)

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, 95^{th} 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	$\langle RSRZ \rangle$	#RSRZ>2	$OWAB(Å^2)$	Q<0.9
1	А	260/269~(96%)	-0.22	1 (0%) 92 90	15, 23, 42, 56	0
1	В	258/269~(95%)	-0.11	7 (2%) 54 49	16, 25, 47, 79	0
1	С	244/269~(90%)	-0.21	7 (2%) 51 46	14, 24, 40, 70	0
1	D	263/269~(97%)	-0.05	12 (4%) 32 26	15, 24, 50, 65	0
All	All	1025/1076~(95%)	-0.15	27 (2%) 56 51	14, 24, 45, 79	0

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	204	GLY	7.1
1	D	197	LEU	5.1
1	D	199	MET	5.0
1	С	101	THR	5.0
1	В	199	MET	4.6
1	В	197	LEU	4.2
1	D	203	VAL	4.2
1	D	198	ALA	4.1
1	С	196	THR	3.7
1	В	198	ALA	3.5
1	С	100	GLN	3.3
1	В	101	THR	3.3
1	D	41	PHE	3.3
1	В	103	MET	3.2
1	D	269	LEU	3.1
1	D	46	LEU	3.0
1	С	2	THR	2.8
1	С	158	TYR	2.7
1	А	215	ILE	2.7
1	D	47	ILE	2.5
1	В	269	LEU	2.5



Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	В	2	THR	2.4
1	С	269	LEU	2.4
1	D	200	SER	2.2
1	D	196	THR	2.2
1	D	201	ALA	2.1
1	С	195	ARG	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 monosaccharides in this entry.

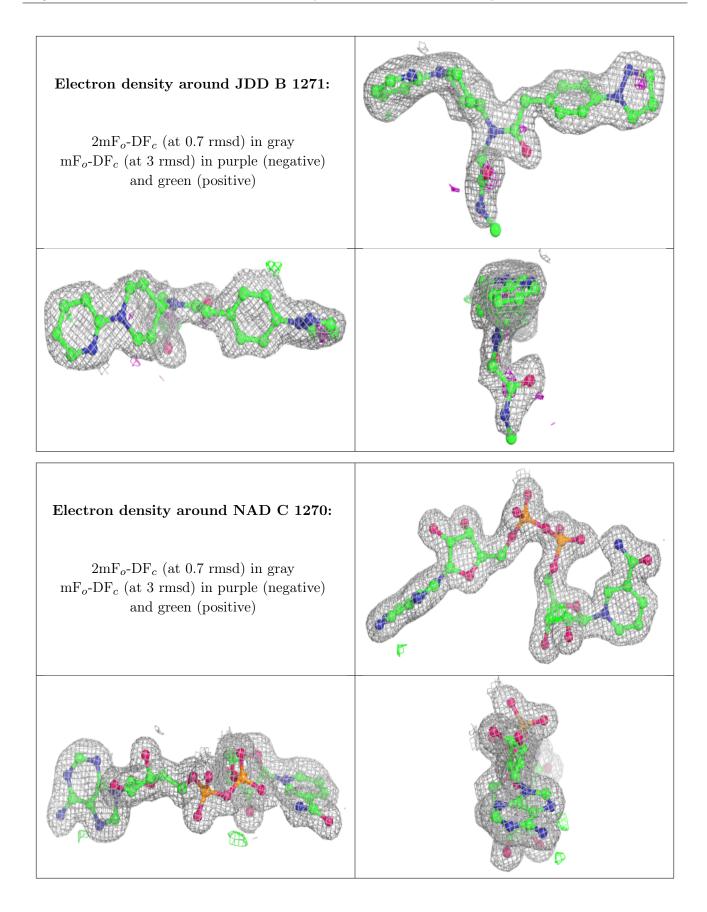
6.4 Ligands (i)

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, 95^{th} 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.

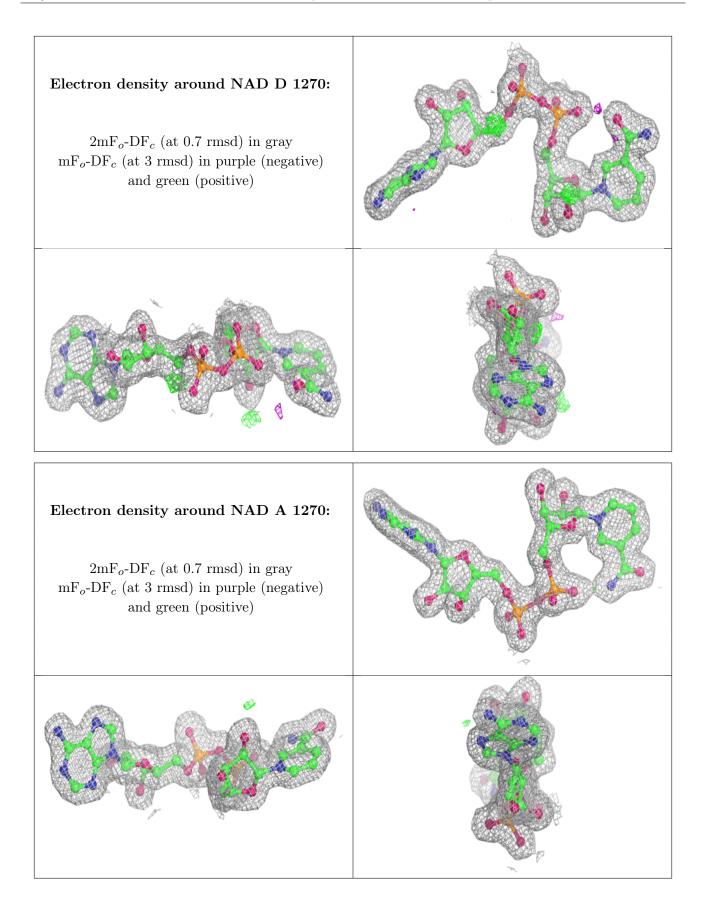
Mol	Type	Chain	Res	Atoms	RSCC	RSR	$B-factors(Å^2)$	Q<0.9
4	JDD	В	1271	32/32	0.88	0.15	$29,\!33,\!45,\!52$	0
3	MG	А	1271	1/1	0.93	0.13	33,33,33,33	0
2	NAD	С	1270	44/44	0.97	0.07	17,20,22,24	0
2	NAD	D	1270	44/44	0.97	0.07	17,21,24,27	0
2	NAD	А	1270	44/44	0.98	0.07	15,18,21,22	0
2	NAD	В	1270	44/44	0.98	0.07	17,20,22,24	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.

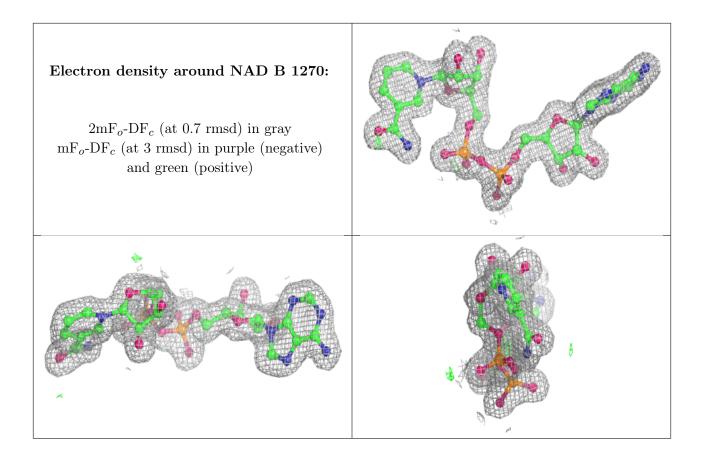












6.5 Other polymers (i)

There are no such residues in this entry.

