



wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 15, 2020 – 10:26 am BST

PDB ID : 2VOT
Title : Structural and biochemical evidence for a boat-like transition state in beta-mannosidases
Authors : Tailford, L.N.; Offen, W.A.; Smith, N.; Dumon, C.; Moreland, C.; Gratien, J.; Heck, M.-P.; Stick, R.V.; Bleriot, Y.; Vasella, A.; Gilbert, H.J.; Davies, G.J.
Deposited on : 2008-02-20
Resolution : 1.95 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
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) : 2.11

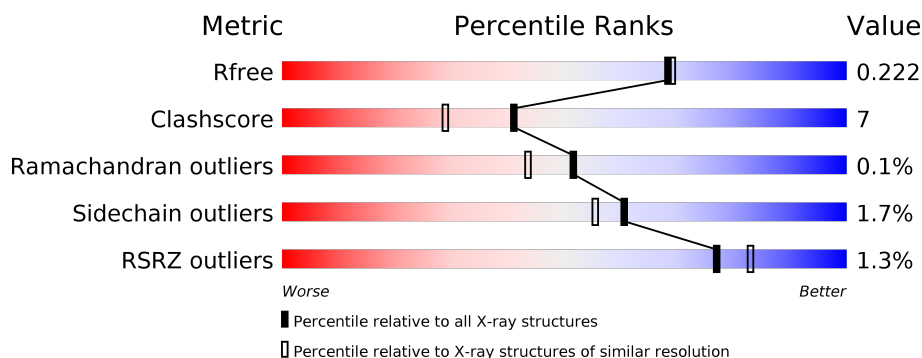
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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 on 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	846	<div> <div></div> <div>85%</div> <div>13%</div> <div>..</div> </div>
1	B	846	<div> <div></div> <div>87%</div> <div>12%</div> <div>.</div> </div>

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	EDO	A	1867	-	-	X	-
3	EDO	B	1879	-	-	X	-
3	EDO	B	1898	-	-	X	-

2 Entry composition [i](#)

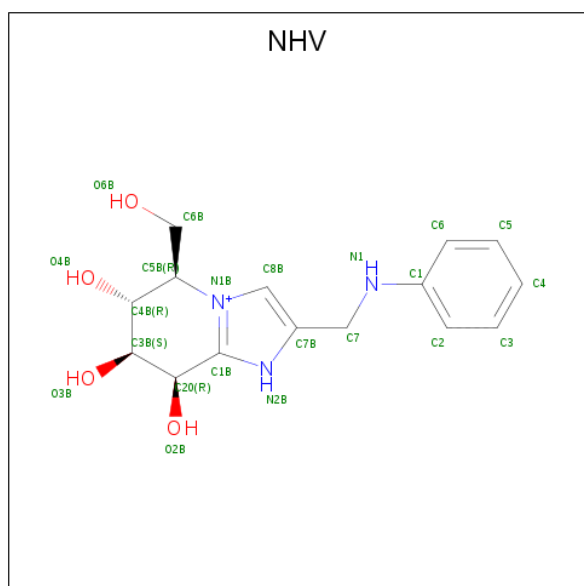
There are 6 unique types of molecules in this entry. The entry contains 15345 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 BETA-MANNOSIDASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	837	Total	C	N	O	S	3	52	0
			7015	4502	1171	1308	34			
1	B	839	Total	C	N	O	S	0	37	0
			6916	4440	1149	1292	35			

- Molecule 2 is (5R,6R,7S,8R)-6,7,8-trihydroxy-5-(hydroxymethyl)-2-[(phenylamino)methyl]-5,6,7,8-tetrahydro-1H-imidazo[1,2-a]pyridin-4-ium (three-letter code: NHV) (formula: C₁₅H₂₀N₃O₄).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			22	15	3	4		
2	B	1	Total	C	N	O	0	0
			22	15	3	4		

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		

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

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

- Molecule 4 is BROMIDE ION (three-letter code: BR) (formula: Br).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	3	Total Br 3 3	0	0
4	A	5	Total Br 5 5	0	0

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	5	Total 5	Cl 5	0	0

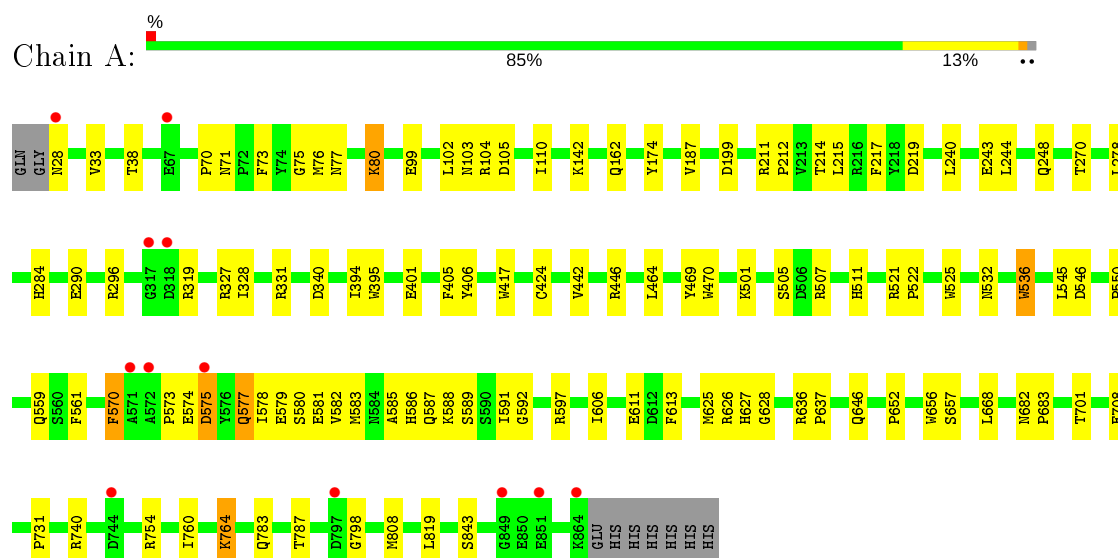
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	545	Total 545	O 545	0	0
6	B	604	Total 604	O 604	0	0

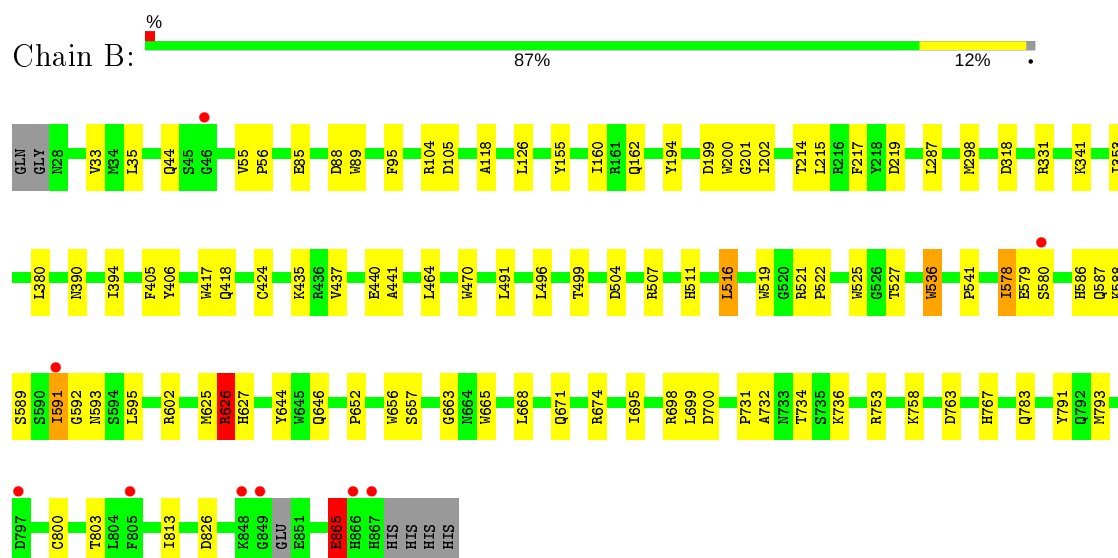
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: BETA-MANNOSIDASE



• Molecule 1: BETA-MANNOSIDASE



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	91.31Å 115.29Å 99.40Å 90.00° 113.14° 90.00°	Depositor
Resolution (Å)	20.03 – 1.95 19.93 – 1.95	Depositor EDS
% Data completeness (in resolution range)	99.9 (20.03-1.95) 99.9 (19.93-1.95)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.76 (at 1.94Å)	Xtriage
Refinement program	REFMAC 5.4.0065	Depositor
R, R_{free}	0.166 , 0.221 0.166 , 0.222	Depositor DCC
R_{free} test set	6781 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	25.0	Xtriage
Anisotropy	0.035	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 52.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	15345	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 3.71% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NHV, EDO, BR, CL

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	A	0.89	1/7247 (0.0%)	0.85	7/9852 (0.1%)
1	B	0.96	3/7161 (0.0%)	0.86	8/9734 (0.1%)
All	All	0.93	4/14408 (0.0%)	0.85	15/19586 (0.1%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	865	GLU	CB-CG	-7.53	1.37	1.52
1	B	865	GLU	CG-CD	-6.35	1.42	1.51
1	A	611[A]	GLU	CG-CD	5.14	1.59	1.51
1	B	644	TYR	CD1-CE1	5.07	1.47	1.39

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	626[A]	ARG	NE-CZ-NH2	-7.97	116.31	120.30
1	B	626[B]	ARG	NE-CZ-NH2	-7.97	116.31	120.30
1	A	507	ARG	NE-CZ-NH1	-7.65	116.48	120.30
1	A	521	ARG	NE-CZ-NH1	6.22	123.41	120.30
1	B	626[A]	ARG	NE-CZ-NH1	5.82	123.21	120.30

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	7015	0	6678	100	0
1	B	6916	0	6610	86	0
2	A	22	0	20	2	0
2	B	22	0	20	4	0
3	A	100	0	150	24	0
3	B	108	0	162	28	0
4	A	5	0	0	0	0
4	B	3	0	0	0	0
5	B	5	0	0	2	0
6	A	545	0	0	15	0
6	B	604	0	0	6	0
All	All	15345	0	13640	197	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 7.

The worst 5 of 197 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:626[A]:ARG:HH22	1:B:674:ARG:HB2	1.04	1.14
1:A:575[A]:ASP:OD2	1:A:582[A]:VAL:HB	1.48	1.13
1:B:587:GLN:OE1	1:B:589[A]:SER:HB3	1.50	1.10
5:B:1896:CL:CL	6:B:2185:HOH:O	2.06	1.09
1:A:577[A]:GLN:HA	6:A:2389:HOH:O	0.89	1.05

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	874/846 (103%)	852 (98%)	21 (2%)	1 (0%)	51 43

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	862/846 (102%)	833 (97%)	28 (3%)	1 (0%)	51	43
All	All	1736/1692 (103%)	1685 (97%)	49 (3%)	2 (0%)	51	43

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	536	TRP
1	A	536	TRP

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	757/754 (100%)	742 (98%)	15 (2%)	55	48
1	B	752/754 (100%)	737 (98%)	15 (2%)	55	48
All	All	1509/1508 (100%)	1479 (98%)	30 (2%)	60	48

5 of 30 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	764	LYS
1	B	417	TRP
1	B	758	LYS
1	B	331	ARG
1	B	435	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	28	ASN
1	B	284	HIS
1	B	867	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

Of 67 ligands modelled in this entry, 13 are monoatomic - leaving 54 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	EDO	B	1882	-	3,3,3	0.53	0	2,2,2	0.14	0
3	EDO	B	1871	-	3,3,3	0.41	0	2,2,2	0.49	0
3	EDO	A	1881	-	3,3,3	1.13	0	2,2,2	0.59	0
3	EDO	A	1893	-	3,3,3	0.59	0	2,2,2	0.15	0
3	EDO	A	1885	-	3,3,3	0.64	0	2,2,2	0.12	0
3	EDO	A	1877	-	3,3,3	0.53	0	2,2,2	0.56	0
3	EDO	B	1876	-	3,3,3	0.71	0	2,2,2	0.16	0
3	EDO	A	1869	-	3,3,3	0.86	0	2,2,2	0.23	0
3	EDO	B	1889	-	3,3,3	0.67	0	2,2,2	0.15	0
2	NHV	A	1865	-	21,24,24	1.09	1 (4%)	23,34,34	1.39	3 (13%)
3	EDO	B	1880	-	3,3,3	0.74	0	2,2,2	0.39	0
3	EDO	A	1873	-	3,3,3	0.45	0	2,2,2	0.42	0
3	EDO	B	1872	-	3,3,3	0.35	0	2,2,2	0.52	0
3	EDO	A	1876	-	3,3,3	0.44	0	2,2,2	0.86	0
3	EDO	B	1900	-	3,3,3	0.43	0	2,2,2	0.71	0
3	EDO	B	1883	-	3,3,3	0.46	0	2,2,2	1.38	0
3	EDO	A	1868	-	3,3,3	0.57	0	2,2,2	0.47	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	EDO	B	1881	-	3,3,3	0.79	0	2,2,2	0.35	0
3	EDO	A	1879	-	3,3,3	0.66	0	2,2,2	0.33	0
3	EDO	A	1867	-	3,3,3	0.49	0	2,2,2	1.37	0
3	EDO	A	1871	-	3,3,3	0.34	0	2,2,2	0.49	0
3	EDO	A	1874	-	3,3,3	0.56	0	2,2,2	0.13	0
3	EDO	A	1890	-	3,3,3	0.60	0	2,2,2	0.45	0
3	EDO	B	1887	-	3,3,3	0.29	0	2,2,2	0.55	0
3	EDO	B	1898	-	3,3,3	0.34	0	2,2,2	0.79	0
2	NHV	B	1868	-	21,24,24	1.22	1 (4%)	23,34,34	1.51	3 (13%)
3	EDO	A	1878	-	3,3,3	0.41	0	2,2,2	0.75	0
3	EDO	B	1870	-	3,3,3	0.51	0	2,2,2	0.38	0
3	EDO	B	1888	-	3,3,3	0.90	0	2,2,2	0.68	0
3	EDO	B	1877	-	3,3,3	0.52	0	2,2,2	0.41	0
3	EDO	B	1885	-	3,3,3	0.46	0	2,2,2	0.45	0
3	EDO	B	1869	-	3,3,3	0.47	0	2,2,2	1.02	0
3	EDO	A	1884	-	3,3,3	0.67	0	2,2,2	0.53	0
3	EDO	A	1892	-	3,3,3	0.26	0	2,2,2	0.96	0
3	EDO	B	1875	-	3,3,3	0.74	0	2,2,2	0.32	0
3	EDO	B	1902	-	3,3,3	0.33	0	2,2,2	1.01	0
3	EDO	B	1901	-	3,3,3	0.52	0	2,2,2	0.19	0
3	EDO	B	1879	-	3,3,3	0.63	0	2,2,2	0.38	0
3	EDO	B	1895	-	3,3,3	0.57	0	2,2,2	0.48	0
3	EDO	B	1873	-	3,3,3	0.43	0	2,2,2	0.53	0
3	EDO	A	1882	-	3,3,3	0.50	0	2,2,2	0.81	0
3	EDO	B	1884	-	3,3,3	0.61	0	2,2,2	0.58	0
3	EDO	B	1874	-	3,3,3	0.38	0	2,2,2	0.30	0
3	EDO	B	1878	-	3,3,3	0.53	0	2,2,2	0.40	0
3	EDO	A	1880	-	3,3,3	0.43	0	2,2,2	0.67	0
3	EDO	A	1894	-	3,3,3	0.53	0	2,2,2	0.29	0
3	EDO	A	1891	-	3,3,3	0.44	0	2,2,2	0.67	0
3	EDO	A	1870	-	3,3,3	0.96	0	2,2,2	0.43	0
3	EDO	A	1872	-	3,3,3	0.52	0	2,2,2	0.80	0
3	EDO	A	1866	-	3,3,3	0.68	0	2,2,2	0.23	0
3	EDO	B	1886	-	3,3,3	0.58	0	2,2,2	0.20	0
3	EDO	B	1897	-	3,3,3	0.34	0	2,2,2	0.46	0
3	EDO	A	1883	-	3,3,3	0.55	0	2,2,2	0.42	0
3	EDO	A	1875	-	3,3,3	0.63	0	2,2,2	0.03	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	B	1882	-	-	0/1/1/1	-
3	EDO	B	1871	-	-	1/1/1/1	-
3	EDO	A	1881	-	-	0/1/1/1	-
3	EDO	A	1893	-	-	1/1/1/1	-
3	EDO	A	1885	-	-	1/1/1/1	-
3	EDO	A	1877	-	-	0/1/1/1	-
3	EDO	B	1876	-	-	0/1/1/1	-
3	EDO	A	1869	-	-	0/1/1/1	-
3	EDO	B	1889	-	-	1/1/1/1	-
2	NHV	A	1865	-	-	0/5/27/27	0/2/3/3
3	EDO	B	1880	-	-	0/1/1/1	-
3	EDO	A	1873	-	-	0/1/1/1	-
3	EDO	B	1872	-	-	1/1/1/1	-
3	EDO	A	1876	-	-	0/1/1/1	-
3	EDO	B	1900	-	-	1/1/1/1	-
3	EDO	B	1883	-	-	1/1/1/1	-
3	EDO	A	1868	-	-	0/1/1/1	-
3	EDO	B	1881	-	-	0/1/1/1	-
3	EDO	A	1879	-	-	1/1/1/1	-
3	EDO	A	1867	-	-	0/1/1/1	-
3	EDO	A	1871	-	-	0/1/1/1	-
3	EDO	A	1874	-	-	0/1/1/1	-
3	EDO	A	1890	-	-	1/1/1/1	-
3	EDO	B	1887	-	-	1/1/1/1	-
3	EDO	B	1898	-	-	0/1/1/1	-
2	NHV	B	1868	-	-	0/5/27/27	0/2/3/3
3	EDO	A	1878	-	-	0/1/1/1	-
3	EDO	B	1870	-	-	0/1/1/1	-
3	EDO	B	1888	-	-	0/1/1/1	-
3	EDO	B	1877	-	-	0/1/1/1	-
3	EDO	B	1885	-	-	0/1/1/1	-
3	EDO	B	1869	-	-	0/1/1/1	-
3	EDO	A	1884	-	-	0/1/1/1	-
3	EDO	A	1892	-	-	0/1/1/1	-
3	EDO	B	1875	-	-	0/1/1/1	-
3	EDO	B	1902	-	-	0/1/1/1	-
3	EDO	B	1901	-	-	0/1/1/1	-
3	EDO	B	1879	-	-	0/1/1/1	-
3	EDO	B	1895	-	-	0/1/1/1	-
3	EDO	B	1873	-	-	0/1/1/1	-
3	EDO	A	1882	-	-	0/1/1/1	-
3	EDO	B	1884	-	-	1/1/1/1	-
3	EDO	B	1874	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	B	1878	-	-	1/1/1/1	-
3	EDO	A	1880	-	-	0/1/1/1	-
3	EDO	A	1894	-	-	1/1/1/1	-
3	EDO	A	1891	-	-	0/1/1/1	-
3	EDO	A	1870	-	-	1/1/1/1	-
3	EDO	A	1872	-	-	0/1/1/1	-
3	EDO	A	1866	-	-	1/1/1/1	-
3	EDO	B	1886	-	-	1/1/1/1	-
3	EDO	B	1897	-	-	1/1/1/1	-
3	EDO	A	1883	-	-	0/1/1/1	-
3	EDO	A	1875	-	-	0/1/1/1	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1868	NHV	C8B-N1B	-2.95	1.33	1.38
2	A	1865	NHV	C8B-N1B	-2.08	1.35	1.38

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1868	NHV	O2B-C20-C3B	5.02	119.10	108.55
2	A	1865	NHV	O2B-C20-C3B	4.79	118.61	108.55
2	B	1868	NHV	C4B-C3B-C20	2.46	113.98	110.24
2	A	1865	NHV	C3-C2-C1	2.37	122.56	119.72
2	A	1865	NHV	C7B-C8B-N1B	-2.32	105.56	107.96

There are no chirality outliers.

5 of 17 torsion outliers are listed below:

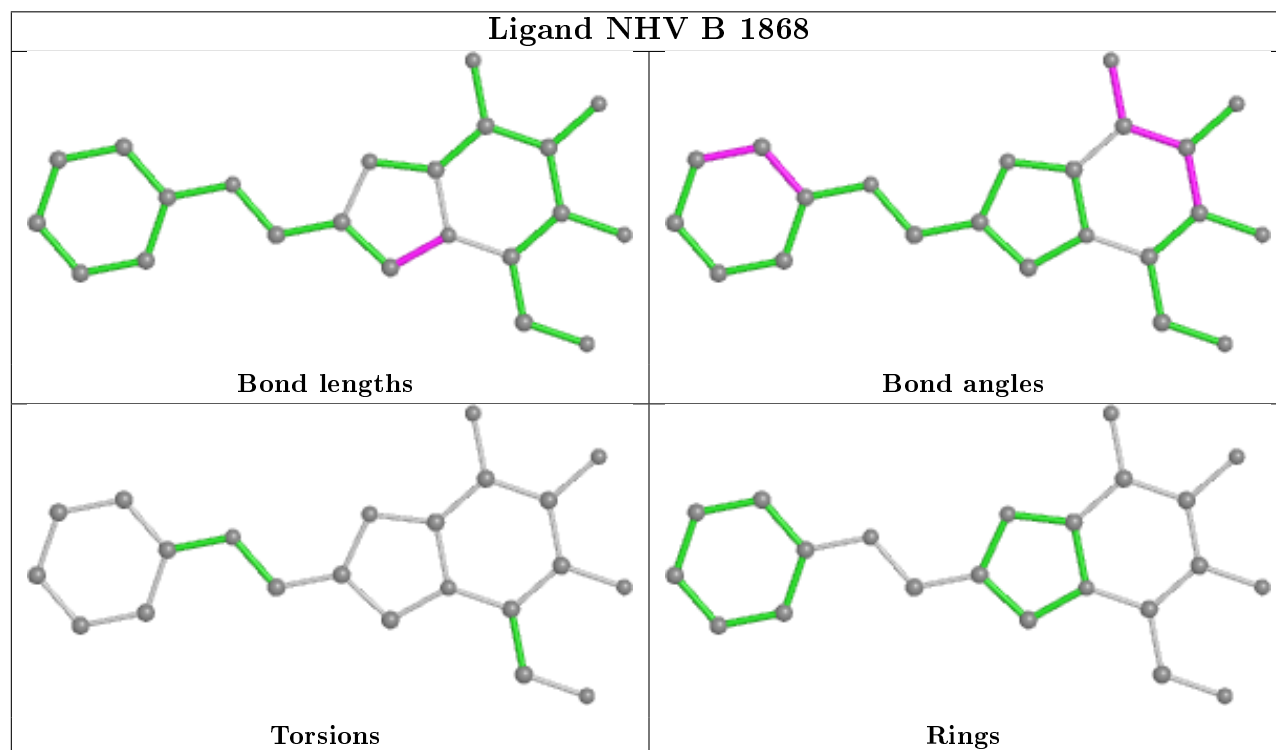
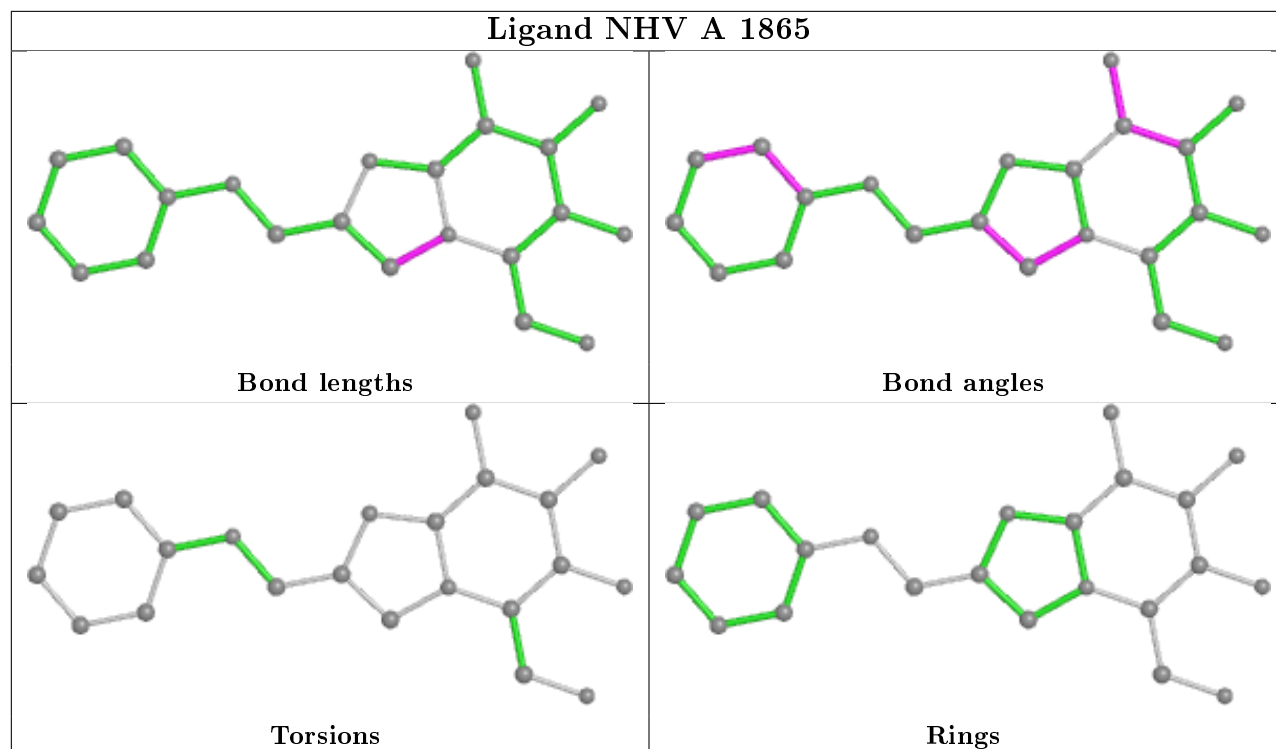
Mol	Chain	Res	Type	Atoms
3	B	1887	EDO	O1-C1-C2-O2
3	B	1889	EDO	O1-C1-C2-O2
3	B	1878	EDO	O1-C1-C2-O2
3	B	1900	EDO	O1-C1-C2-O2
3	B	1883	EDO	O1-C1-C2-O2

There are no ring outliers.

26 monomers are involved in 56 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1881	EDO	1	0
3	A	1893	EDO	3	0
3	B	1889	EDO	1	0
2	A	1865	NHV	2	0
3	B	1880	EDO	3	0
3	B	1872	EDO	1	0
3	B	1900	EDO	1	0
3	A	1868	EDO	3	0
3	A	1867	EDO	6	0
3	A	1871	EDO	1	0
3	A	1890	EDO	2	0
3	B	1887	EDO	1	0
3	B	1898	EDO	9	0
2	B	1868	NHV	4	0
3	A	1878	EDO	1	0
3	B	1877	EDO	1	0
3	B	1869	EDO	2	0
3	A	1884	EDO	1	0
3	B	1901	EDO	2	0
3	B	1879	EDO	5	0
3	B	1884	EDO	1	0
3	A	1894	EDO	2	0
3	A	1870	EDO	1	0
3	A	1866	EDO	1	0
3	B	1897	EDO	1	0
3	A	1875	EDO	2	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 ⓘ

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	837/846 (98%)	-0.26	12 (1%) 75 82	15, 26, 44, 57	14 (1%)
1	B	839/846 (99%)	-0.34	9 (1%) 80 85	12, 24, 42, 52	8 (0%)
All	All	1676/1692 (99%)	-0.30	21 (1%) 77 83	12, 25, 43, 57	22 (1%)

The worst 5 of 21 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	866	HIS	3.7
1	B	848	LYS	3.5
1	A	849	GLY	3.4
1	B	867	HIS	3.3
1	A	28	ASN	3.2

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates 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(\AA^2)	Q<0.9
3	EDO	B	1882	4/4	0.75	0.23	54,55,55,59	0
3	EDO	B	1900	4/4	0.78	0.23	55,55,55,56	0
3	EDO	A	1879	4/4	0.80	0.17	47,50,50,51	0
3	EDO	A	1870	4/4	0.80	0.22	34,36,40,40	0
3	EDO	A	1881	4/4	0.82	0.19	25,30,32,33	0
3	EDO	A	1885	4/4	0.82	0.14	45,47,48,50	0
3	EDO	A	1884	4/4	0.84	0.23	35,39,41,47	0
3	EDO	B	1889	4/4	0.84	0.23	38,41,42,44	0
3	EDO	A	1892	4/4	0.86	0.17	44,45,45,48	0
3	EDO	B	1883	4/4	0.86	0.18	38,39,41,42	0
3	EDO	A	1891	4/4	0.86	0.18	54,55,56,56	0
3	EDO	B	1886	4/4	0.86	0.13	48,50,50,51	0
3	EDO	A	1893	4/4	0.87	0.40	45,46,47,48	0
3	EDO	B	1884	4/4	0.87	0.19	36,37,37,37	0
3	EDO	A	1883	4/4	0.87	0.15	42,43,44,48	0
3	EDO	A	1876	4/4	0.88	0.09	40,44,45,47	0
3	EDO	A	1875	4/4	0.88	0.28	30,31,35,44	0
3	EDO	B	1879	4/4	0.89	0.25	40,44,45,48	0
3	EDO	B	1872	4/4	0.89	0.14	46,47,47,49	0
3	EDO	A	1867	4/4	0.89	0.19	34,36,36,37	0
3	EDO	B	1871	4/4	0.90	0.14	45,46,47,51	0
5	CL	B	1903	1/1	0.90	0.09	48,48,48,48	1
3	EDO	B	1885	4/4	0.90	0.10	53,54,55,57	0
3	EDO	A	1894	4/4	0.90	0.14	48,49,50,51	0
3	EDO	A	1880	4/4	0.90	0.11	47,48,48,49	0
3	EDO	B	1888	4/4	0.91	0.13	27,29,29,34	0
3	EDO	A	1890	4/4	0.91	0.15	33,33,35,38	0
3	EDO	B	1878	4/4	0.91	0.14	29,40,45,49	0
3	EDO	A	1873	4/4	0.91	0.11	41,48,48,51	0
3	EDO	A	1874	4/4	0.92	0.17	36,39,41,42	0
5	CL	B	1896	1/1	0.92	0.10	34,34,34,34	1
3	EDO	A	1878	4/4	0.92	0.14	31,33,36,40	0
3	EDO	B	1880	4/4	0.92	0.15	31,32,33,35	0
3	EDO	B	1874	4/4	0.93	0.11	47,48,50,51	0
3	EDO	A	1877	4/4	0.93	0.22	43,44,47,49	0
3	EDO	A	1868	4/4	0.93	0.14	22,31,34,42	0
3	EDO	B	1887	4/4	0.94	0.28	37,43,44,48	0
3	EDO	A	1882	4/4	0.94	0.17	12,32,37,45	0
3	EDO	B	1873	4/4	0.95	0.14	32,34,37,39	0
3	EDO	B	1902	4/4	0.95	0.17	43,44,45,46	0
2	NHV	A	1865	22/22	0.95	0.10	19,22,39,39	0
2	NHV	B	1868	22/22	0.95	0.10	17,20,41,42	0
3	EDO	B	1901	4/4	0.96	0.12	35,41,44,44	0

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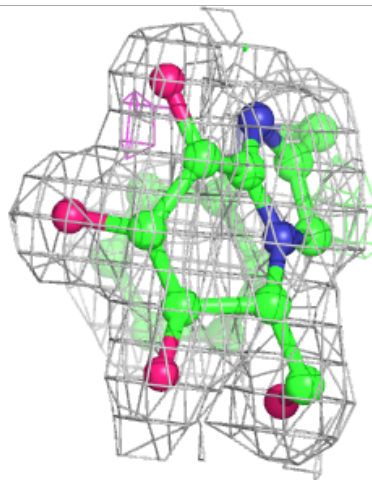
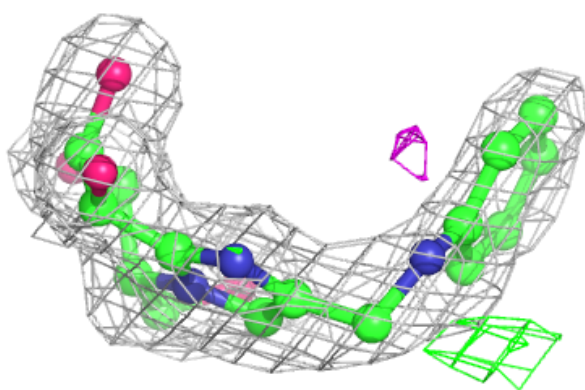
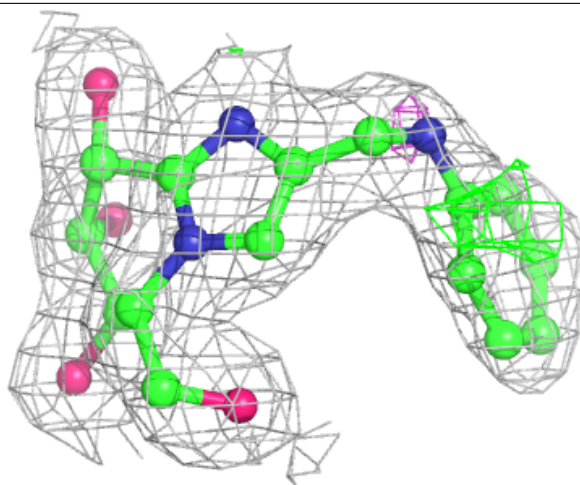
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	EDO	A	1871	4/4	0.96	0.10	38,39,41,43	0
3	EDO	B	1881	4/4	0.96	0.12	17,28,30,33	0
3	EDO	A	1866	4/4	0.96	0.08	26,28,30,31	0
3	EDO	B	1877	4/4	0.96	0.09	28,30,32,34	0
3	EDO	B	1897	4/4	0.96	0.08	27,33,33,35	0
5	CL	B	1899	1/1	0.96	0.09	30,30,30,30	1
3	EDO	B	1875	4/4	0.96	0.08	25,27,30,32	0
3	EDO	A	1869	4/4	0.97	0.08	23,26,29,33	0
3	EDO	A	1872	4/4	0.97	0.08	24,24,24,29	0
4	BR	A	1887	1/1	0.97	0.09	22,22,22,22	1
3	EDO	B	1876	4/4	0.97	0.10	18,20,21,22	0
3	EDO	B	1870	4/4	0.97	0.09	23,26,26,28	0
3	EDO	B	1869	4/4	0.97	0.11	27,28,31,37	0
5	CL	B	1893	1/1	0.98	0.06	31,31,31,31	0
3	EDO	B	1898	4/4	0.98	0.09	25,26,26,26	0
3	EDO	B	1895	4/4	0.98	0.05	28,28,29,31	0
4	BR	A	1888	1/1	0.98	0.05	28,28,28,28	1
4	BR	B	1891	1/1	0.99	0.10	23,23,23,23	1
4	BR	A	1886	1/1	0.99	0.06	26,26,26,26	1
4	BR	B	1892	1/1	0.99	0.09	20,20,20,20	1
4	BR	B	1890	1/1	0.99	0.04	28,28,28,28	1
4	BR	A	1900	1/1	0.99	0.08	21,21,21,21	1
5	CL	B	1894	1/1	0.99	0.03	33,33,33,33	1
4	BR	A	1889	1/1	0.99	0.04	28,28,28,28	1

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.

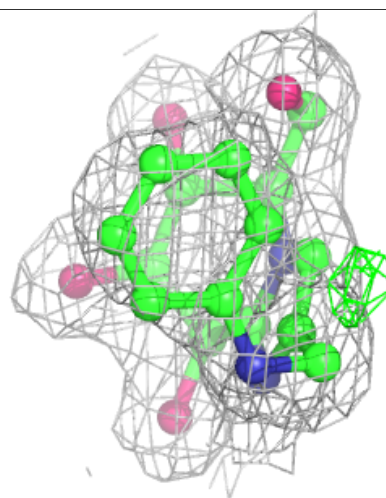
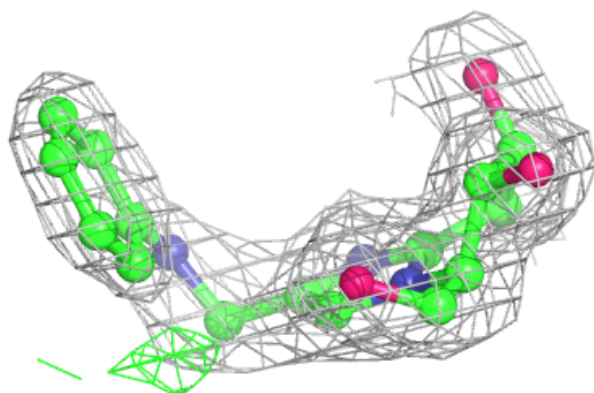
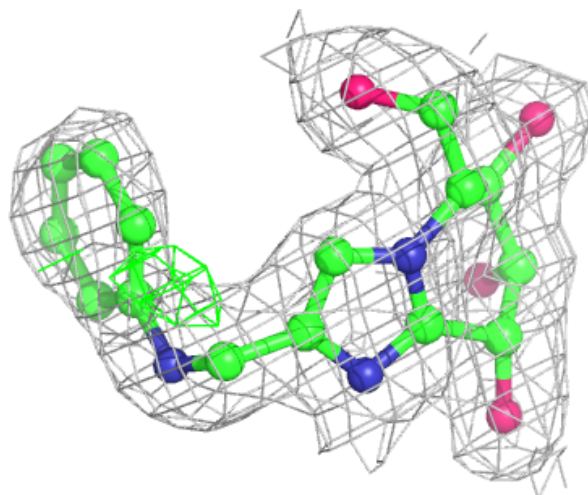
Electron density around NHV A 1865:

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



Electron density around NHV B 1868:

$2mF_o-DF_c$ (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.