



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 29, 2023 – 01:43 AM EDT

PDB ID : 3O4R  
Title : Crystal Structure of Human Dehydrogenase/Reductase (SDR family) member 4 (DHRS4)  
Authors : Ugochukwu, E.; Bhatia, C.; Krojer, T.; Vollmar, M.; Yue, W.W.; Bountra, C.; Arrowsmith, C.H.; Weigelt, J.; Edwards, A.; von Delft, F.; Oppermann, U.; Structural Genomics Consortium (SGC)  
Deposited on : 2010-07-27  
Resolution : 1.70 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](#) ①) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : 1.13  
EDS : 2.35  
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) : 2.35

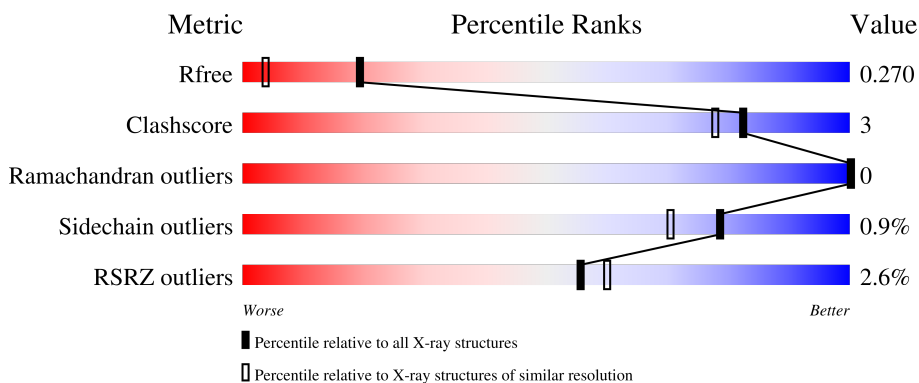
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.70 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	4298 (1.70-1.70)
Clashscore	141614	4695 (1.70-1.70)
Ramachandran outliers	138981	4610 (1.70-1.70)
Sidechain outliers	138945	4610 (1.70-1.70)
RSRZ outliers	127900	4222 (1.70-1.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	261	4% 92% 6% .
1	B	261	% 92% . .
1	C	261	4% 92% 5% .
1	D	261	% 90% 6% .

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 8296 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.

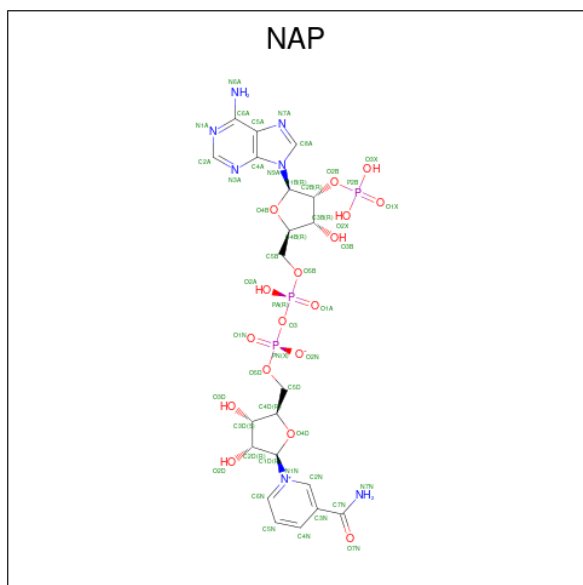
- Molecule 1 is a protein called Dehydrogenase/reductase SDR family member 4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	254	1871	1173	324	363	11	0	2	0
1	B	252	1878	1181	322	364	11	0	5	0
1	C	253	1850	1163	319	358	10	0	0	0
1	D	251	1856	1168	321	356	11	0	1	0

There are 4 discrepancies between the modelled and reference sequences:

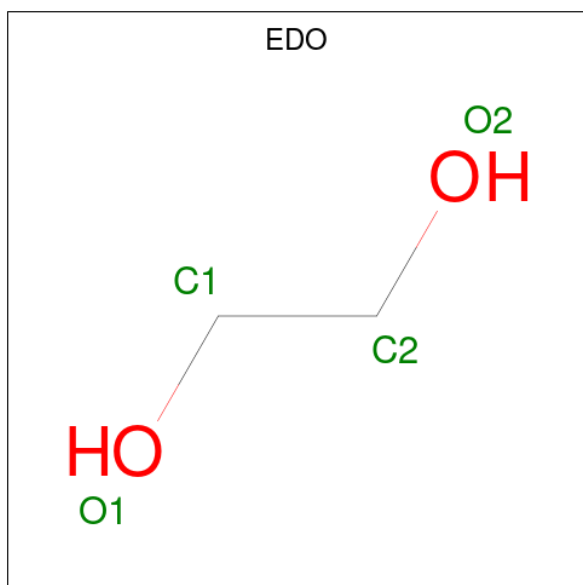
Chain	Residue	Modelled	Actual	Comment	Reference
A	18	SER	-	expression tag	UNP Q9BTZ2
B	18	SER	-	expression tag	UNP Q9BTZ2
C	18	SER	-	expression tag	UNP Q9BTZ2
D	18	SER	-	expression tag	UNP Q9BTZ2

- Molecule 2 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: C<sub>21</sub>H<sub>28</sub>N<sub>7</sub>O<sub>17</sub>P<sub>3</sub>).



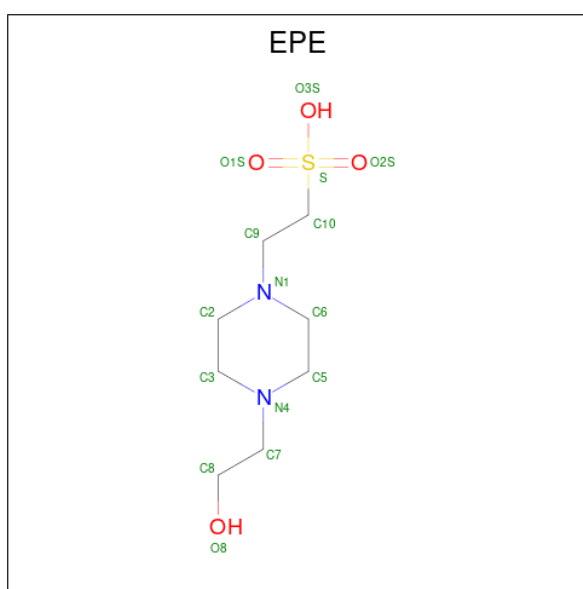
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	48	21	7	17	3	0	0
2	B	1	48	21	7	17	3	0	0
2	C	1	48	21	7	17	3	0	0
2	D	1	48	21	7	17	3	0	0

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



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

- Molecule 4 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: C<sub>8</sub>H<sub>18</sub>N<sub>2</sub>O<sub>4</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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

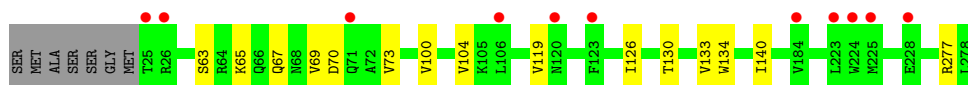
- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	152	Total O 152 152	0	0
6	B	177	Total O 177 177	0	0
6	C	123	Total O 123 123	0	0
6	D	154	Total O 154 154	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.

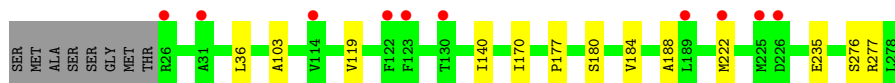
- Molecule 1: Dehydrogenase/reductase SDR family member 4



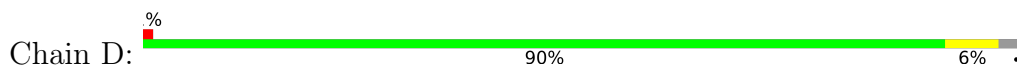
- Molecule 1: Dehydrogenase/reductase SDR family member 4



- Molecule 1: Dehydrogenase/reductase SDR family member 4



- Molecule 1: Dehydrogenase/reductase SDR family member 4





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	60.07Å 132.20Å 133.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.29 – 1.70 29.29 – 1.70	Depositor EDS
% Data completeness (in resolution range)	98.6 (29.29-1.70) 98.6 (29.29-1.70)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	0.07	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.16 (at 1.70Å)	Xtrriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.210 , 0.250 0.230 , 0.270	Depositor DCC
$R_{free}$ test set	5823 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	23.6	Xtrriage
Anisotropy	0.483	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 39.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.001 for -h,l,k	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8296	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	33.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.40% 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: NAP, EDO, EPE, GOL

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	0.52	0/1902	0.61	0/2580
1	B	0.49	0/1919	0.60	0/2603
1	C	0.48	0/1876	0.58	0/2547
1	D	0.51	0/1885	0.61	0/2555
All	All	0.50	0/7582	0.60	0/10285

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	A	1871	0	1895	14	0
1	B	1878	0	1911	8	0
1	C	1850	0	1865	8	0
1	D	1856	0	1894	12	0
2	A	48	0	25	1	0
2	B	48	0	25	0	0
2	C	48	0	25	0	0
2	D	48	0	25	0	0
3	A	4	0	6	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	8	0	12	0	0
3	D	4	0	6	0	0
4	A	15	0	17	0	0
5	B	6	0	8	0	0
5	C	6	0	8	0	0
6	A	152	0	0	7	0
6	B	177	0	0	2	0
6	C	123	0	0	2	0
6	D	154	0	0	2	0
All	All	8296	0	7722	39	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 (39) 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:119:VAL:HG23	6:B:303:HOH:O	1.60	1.02
1:B:119:VAL:CG2	6:B:303:HOH:O	2.12	0.97
1:A:67:GLN:O	6:A:593:HOH:O	1.92	0.87
1:A:119:VAL:HG23	6:A:373:HOH:O	1.80	0.80
1:A:119:VAL:O	6:A:373:HOH:O	2.12	0.68
1:C:119:VAL:HG23	6:C:425:HOH:O	1.93	0.67
1:A:70:ASP:N	6:A:593:HOH:O	2.31	0.63
1:A:119:VAL:CG2	6:A:373:HOH:O	2.43	0.62
1:D:100:VAL:HG13	1:D:110:ILE:CD1	2.31	0.60
1:A:126:ILE:HD11	1:A:134:TRP:HZ2	1.68	0.57
1:A:100:VAL:O	1:A:104:VAL:HG23	2.05	0.57
1:C:188:ALA:HB2	1:D:188:ALA:HB2	1.86	0.56
1:C:177:PRO:HD3	1:D:198:ILE:HG21	1.95	0.49
1:A:69:VAL:O	1:A:73:VAL:HG23	2.14	0.48
1:A:63:SER:OG	2:A:601:NAP:O2X	2.25	0.48
1:C:119:VAL:HG13	1:C:140:ILE:HB	1.96	0.48
1:D:100:VAL:HG13	1:D:110:ILE:HD11	1.97	0.47
1:A:119:VAL:HG13	1:A:140:ILE:HB	1.97	0.47
1:B:180[B]:SER:OG	1:B:181:PRO:HD3	2.15	0.46
1:B:100:VAL:HG13	1:B:110:ILE:CD1	2.46	0.46
1:C:119:VAL:CG2	6:C:425:HOH:O	2.58	0.46
1:C:170:ILE:HD11	1:C:276:SER:HB3	1.98	0.46
1:D:119:VAL:HG13	1:D:140:ILE:HB	1.97	0.46
1:B:194:LYS:NZ	1:D:277:ARG:O	2.47	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:100:VAL:HG13	1:B:110:ILE:HD12	1.99	0.45
1:C:180:SER:O	1:C:184:VAL:HG23	2.17	0.44
1:D:149:THR:O	1:D:152:VAL:HG22	2.18	0.43
1:D:216:LYS:HG2	1:D:242:LEU:HD23	2.00	0.43
1:D:139:ASP:HB2	6:D:319:HOH:O	2.19	0.42
1:D:210:LEU:HD21	1:D:248:CYS:HB3	2.01	0.42
1:A:70:ASP:HB2	6:A:593:HOH:O	2.20	0.42
1:B:144:ALA:HB3	1:B:145:PRO:HD3	2.02	0.42
1:A:126:ILE:HD11	1:A:134:TRP:CZ2	2.53	0.42
1:D:222[B]:MET:HE3	6:D:611:HOH:O	2.19	0.42
1:A:130:THR:OG1	1:A:133:VAL:HG23	2.21	0.41
1:B:76:LEU:HD12	1:B:83:VAL:HG11	2.03	0.40
1:D:141:ASN:O	1:D:189:LEU:HD21	2.21	0.40
1:A:67:GLN:C	6:A:593:HOH:O	2.49	0.40
1:C:36:LEU:HD21	1:C:103:ALA:HB2	2.04	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	254/261 (97%)	248 (98%)	6 (2%)	0	100	100
1	B	255/261 (98%)	250 (98%)	5 (2%)	0	100	100
1	C	251/261 (96%)	247 (98%)	4 (2%)	0	100	100
1	D	250/261 (96%)	246 (98%)	4 (2%)	0	100	100
All	All	1010/1044 (97%)	991 (98%)	19 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	200/212 (94%)	198 (99%)	2 (1%)	76	67
1	B	203/212 (96%)	202 (100%)	1 (0%)	88	83
1	C	196/212 (92%)	193 (98%)	3 (2%)	65	51
1	D	199/212 (94%)	198 (100%)	1 (0%)	88	83
All	All	798/848 (94%)	791 (99%)	7 (1%)	78	70

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	65	LYS
1	A	277	ARG
1	B	277	ARG
1	C	222	MET
1	C	235	GLU
1	C	277	ARG
1	D	277	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	71	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

11 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	NAP	B	602	-	45,52,52	1.09	2 (4%)	56,80,80	1.29	4 (7%)
4	EPE	A	705	-	15,15,15	0.87	1 (6%)	18,20,20	2.08	7 (38%)
5	GOL	C	706	-	5,5,5	0.35	0	5,5,5	0.26	0
3	EDO	A	703	-	3,3,3	0.43	0	2,2,2	0.37	0
3	EDO	B	704	-	3,3,3	0.48	0	2,2,2	0.28	0
5	GOL	B	707	-	5,5,5	0.39	0	5,5,5	0.36	0
2	NAP	C	604	-	45,52,52	1.00	2 (4%)	56,80,80	1.37	7 (12%)
3	EDO	D	701	-	3,3,3	0.46	0	2,2,2	0.27	0
2	NAP	D	603	-	45,52,52	1.20	2 (4%)	56,80,80	1.33	7 (12%)
2	NAP	A	601	-	45,52,52	1.11	1 (2%)	56,80,80	1.24	6 (10%)
3	EDO	B	702	-	3,3,3	0.49	0	2,2,2	0.15	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	NAP	B	602	-	-	1/31/67/67	0/5/5/5
4	EPE	A	705	-	-	5/9/19/19	0/1/1/1
5	GOL	C	706	-	-	3/4/4/4	-
3	EDO	A	703	-	-	0/1/1/1	-
3	EDO	B	704	-	-	0/1/1/1	-
5	GOL	B	707	-	-	2/4/4/4	-
2	NAP	C	604	-	-	4/31/67/67	0/5/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	D	701	-	-	0/1/1/1	-
2	NAP	D	603	-	-	4/31/67/67	0/5/5/5
2	NAP	A	601	-	-	1/31/67/67	0/5/5/5
3	EDO	B	702	-	-	1/1/1/1	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	603	NAP	O7N-C7N	5.73	1.35	1.24
2	A	601	NAP	O7N-C7N	5.37	1.34	1.24
2	B	602	NAP	O7N-C7N	5.04	1.33	1.24
2	C	604	NAP	O7N-C7N	4.45	1.32	1.24
4	A	705	EPE	C10-S	3.00	1.81	1.77
2	D	603	NAP	C8A-N7A	2.70	1.39	1.34
2	B	602	NAP	O4B-C1B	2.19	1.44	1.41
2	C	604	NAP	O4D-C1D	2.03	1.43	1.41

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	603	NAP	N3A-C2A-N1A	-5.45	120.16	128.68
2	C	604	NAP	N3A-C2A-N1A	-5.24	120.49	128.68
4	A	705	EPE	C6-C5-N4	4.67	120.23	110.64
2	A	601	NAP	N3A-C2A-N1A	-4.05	122.34	128.68
2	B	602	NAP	N3A-C2A-N1A	-3.94	122.51	128.68
4	A	705	EPE	C5-N4-C3	3.56	116.84	108.83
4	A	705	EPE	O3S-S-C10	3.11	110.81	105.77
2	C	604	NAP	C3N-C7N-N7N	3.09	121.45	117.75
2	A	601	NAP	C4A-C5A-N7A	-3.02	106.25	109.40
2	B	602	NAP	C5D-C4D-C3D	-2.98	104.00	115.18
2	C	604	NAP	O3X-P2B-O2X	2.75	118.16	107.64
2	A	601	NAP	O3X-P2B-O2X	2.62	117.63	107.64
4	A	705	EPE	C5-C6-N1	2.49	115.76	110.64
4	A	705	EPE	C9-N1-C6	2.48	117.57	111.23
2	D	603	NAP	O7N-C7N-C3N	2.40	122.51	119.63
4	A	705	EPE	C2-C3-N4	2.40	115.57	110.64
2	A	601	NAP	O5D-PN-O1N	-2.38	99.76	109.07
2	B	602	NAP	O7N-C7N-C3N	2.27	122.34	119.63
2	D	603	NAP	O4D-C1D-C2D	-2.25	103.64	106.93
2	C	604	NAP	O7N-C7N-N7N	-2.22	119.42	122.58
2	D	603	NAP	C3B-C2B-C1B	-2.21	98.73	102.89
2	D	603	NAP	O2N-PN-O5D	2.19	117.89	107.75

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	603	NAP	O5D-PN-O1N	-2.17	100.60	109.07
4	A	705	EPE	O2S-S-C10	2.16	109.52	106.92
2	D	603	NAP	C1B-N9A-C4A	-2.14	122.89	126.64
2	C	604	NAP	O4B-C1B-C2B	-2.14	102.88	106.59
2	A	601	NAP	O2N-PN-O1N	2.09	122.57	112.24
2	B	602	NAP	C2D-C3D-C4D	-2.07	98.62	102.64
2	C	604	NAP	PN-O3-PA	-2.04	125.83	132.83
2	C	604	NAP	C4A-C5A-N7A	-2.03	107.28	109.40
2	A	601	NAP	C5D-C4D-C3D	-2.01	107.65	115.18

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	603	NAP	C5D-O5D-PN-O2N
4	A	705	EPE	C10-C9-N1-C6
5	C	706	GOL	O1-C1-C2-O2
5	B	707	GOL	C1-C2-C3-O3
5	C	706	GOL	O1-C1-C2-C3
4	A	705	EPE	C9-C10-S-O3S
5	B	707	GOL	O2-C2-C3-O3
2	C	604	NAP	C5D-O5D-PN-O3
2	D	603	NAP	C5D-O5D-PN-O1N
5	C	706	GOL	C1-C2-C3-O3
2	A	601	NAP	O4B-C4B-C5B-O5B
4	A	705	EPE	C10-C9-N1-C2
3	B	702	EDO	O1-C1-C2-O2
2	C	604	NAP	O4D-C4D-C5D-O5D
2	C	604	NAP	C3D-C4D-C5D-O5D
2	D	603	NAP	C5D-O5D-PN-O3
2	D	603	NAP	O4B-C4B-C5B-O5B
2	B	602	NAP	O4B-C4B-C5B-O5B
2	C	604	NAP	O4B-C4B-C5B-O5B
4	A	705	EPE	S-C10-C9-N1
4	A	705	EPE	C9-C10-S-O1S

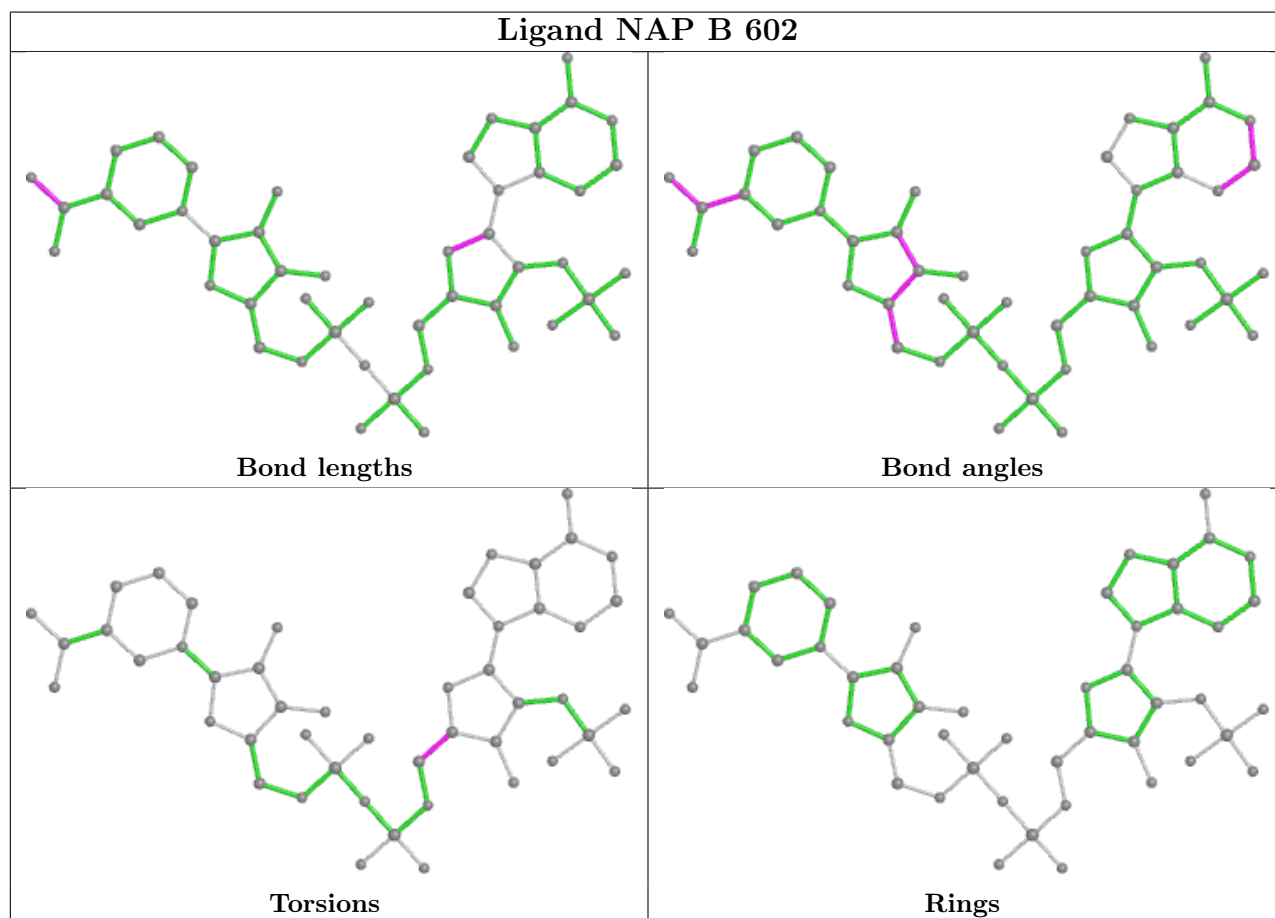
There are no ring outliers.

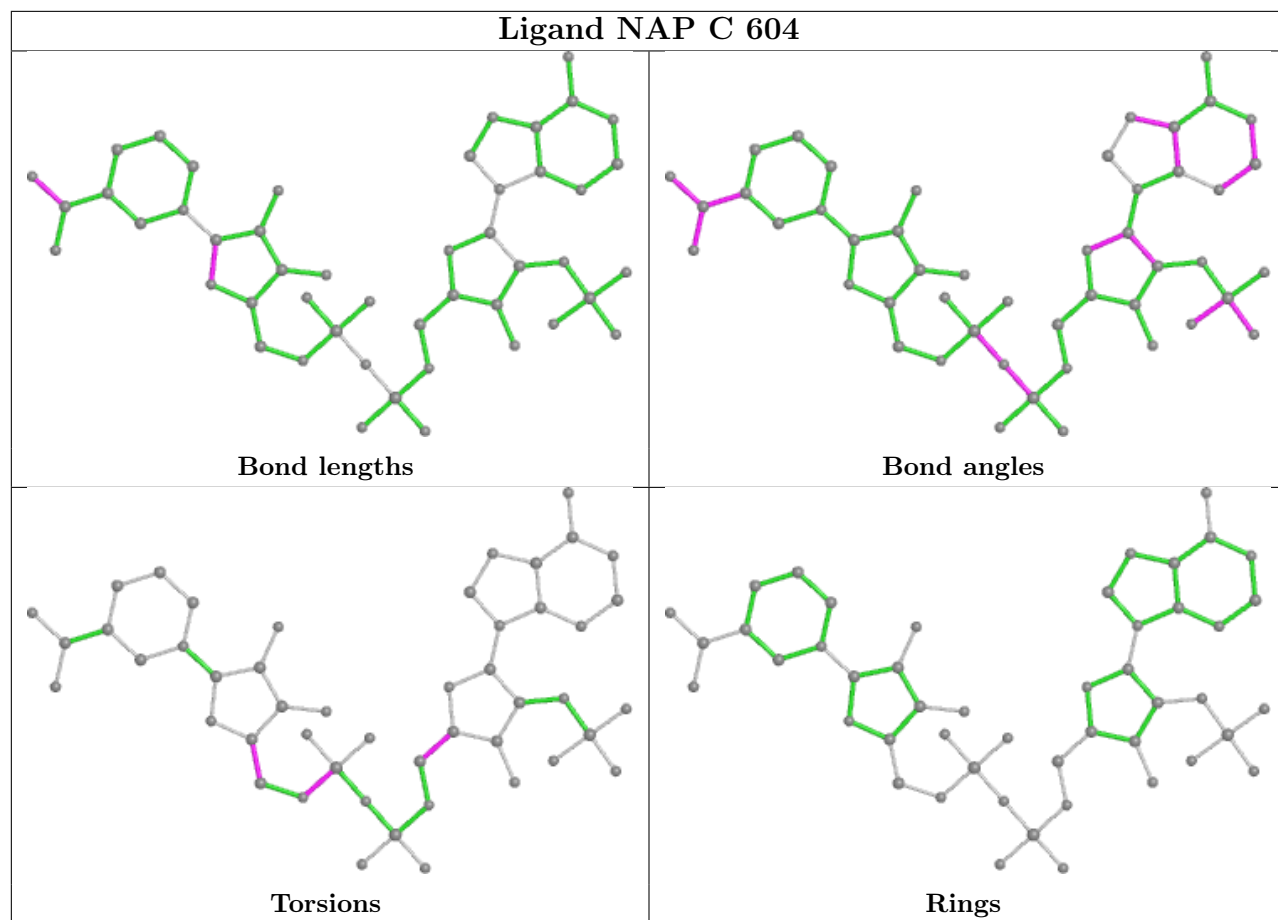
1 monomer is involved in 1 short contact:

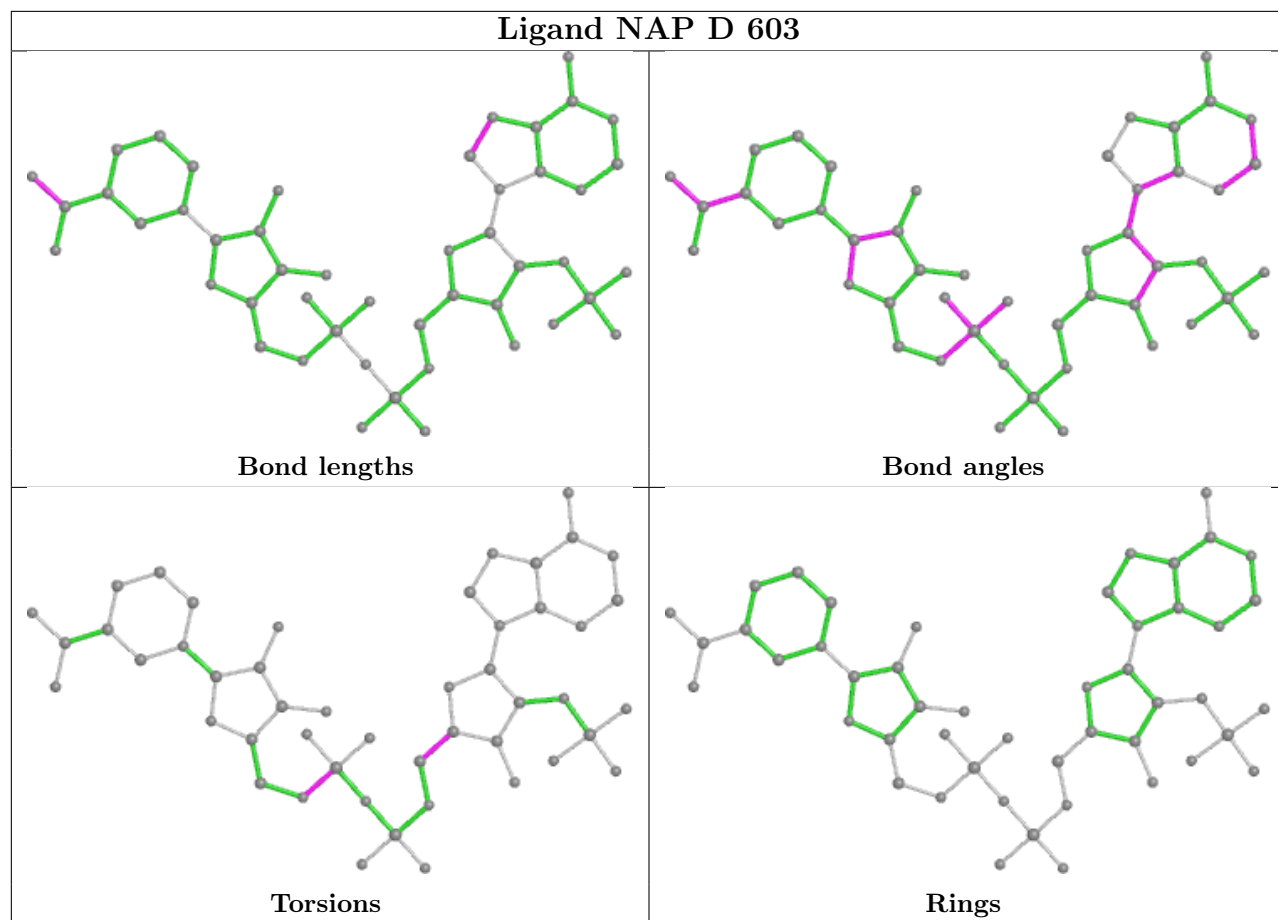
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	NAP	1	0

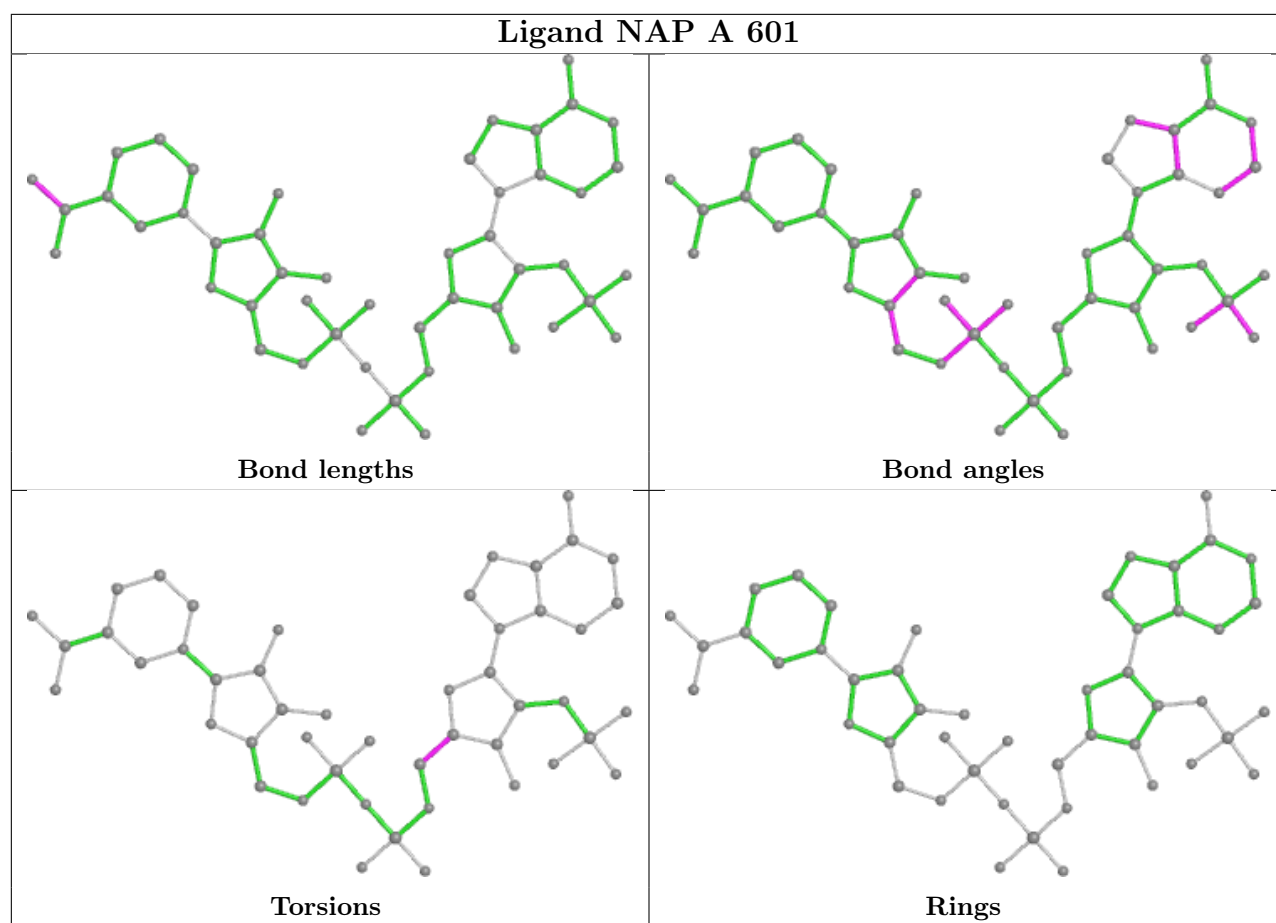


The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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, 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	254/261 (97%)	0.20	11 (4%) 35 39	20, 31, 47, 66	0
1	B	252/261 (96%)	0.03	3 (1%) 79 82	19, 31, 45, 63	0
1	C	253/261 (96%)	0.28	10 (3%) 38 42	21, 32, 49, 70	0
1	D	251/261 (96%)	0.02	2 (0%) 86 88	21, 31, 44, 52	0
All	All	1010/1044 (96%)	0.13	26 (2%) 56 60	19, 31, 46, 70	0

All (26) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	25	THR	5.0
1	C	225	MET	4.9
1	C	122	PHE	3.9
1	A	225	MET	3.5
1	C	123	PHE	3.5
1	C	226	ASP	3.4
1	A	26	ARG	3.3
1	C	222	MET	2.9
1	C	26	ARG	2.7
1	C	130	THR	2.7
1	B	166	ILE	2.6
1	A	123	PHE	2.6
1	C	114	VAL	2.4
1	A	120	ASN	2.4
1	B	38	THR	2.3
1	A	71[A]	GLN	2.3
1	A	184	VAL	2.3
1	D	80	GLY	2.3
1	A	224	TRP	2.2
1	B	27	ARG	2.2
1	A	106	LEU	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	31	ALA	2.0
1	C	189	LEU	2.0
1	A	228	GLU	2.0
1	A	223	LEU	2.0
1	D	123	PHE	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](#)

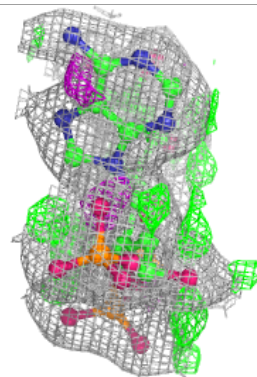
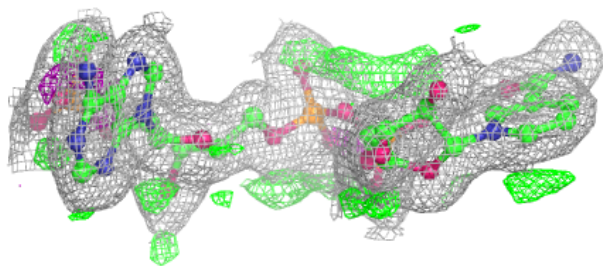
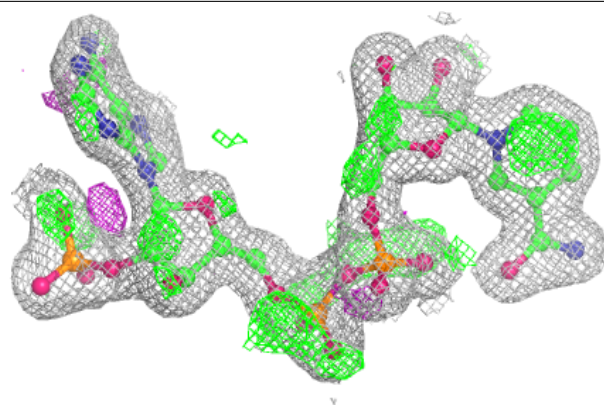
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 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	EDO	B	702	4/4	0.67	0.19	52,56,56,56	0
5	GOL	C	706	6/6	0.73	0.16	49,63,66,67	0
5	GOL	B	707	6/6	0.80	0.13	57,61,62,62	0
3	EDO	A	703	4/4	0.83	0.14	49,51,54,58	0
4	EPE	A	705	15/15	0.85	0.30	70,90,95,95	0
3	EDO	B	704	4/4	0.85	0.12	52,54,54,57	0
3	EDO	D	701	4/4	0.85	0.11	48,48,49,50	0
2	NAP	A	601	48/48	0.95	0.08	18,28,36,37	0
2	NAP	C	604	48/48	0.96	0.09	26,33,37,40	0
2	NAP	D	603	48/48	0.97	0.08	15,27,32,35	0
2	NAP	B	602	48/48	0.97	0.08	18,26,30,37	0

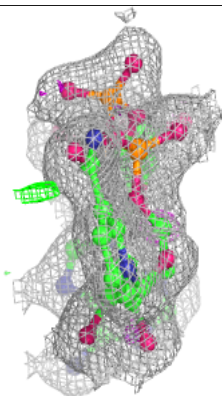
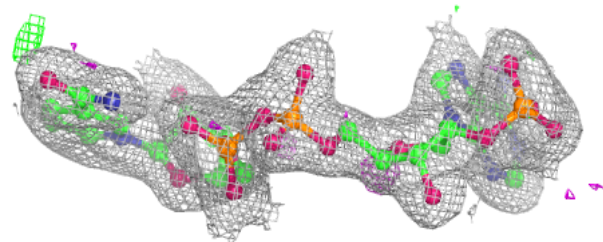
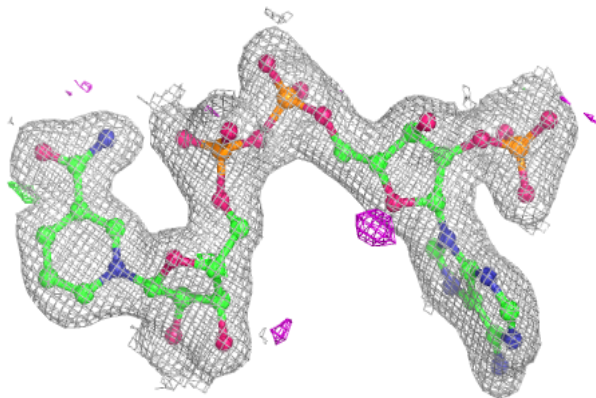
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around NAP A 601:**

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

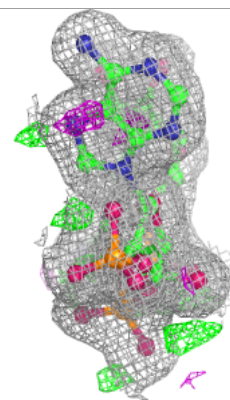
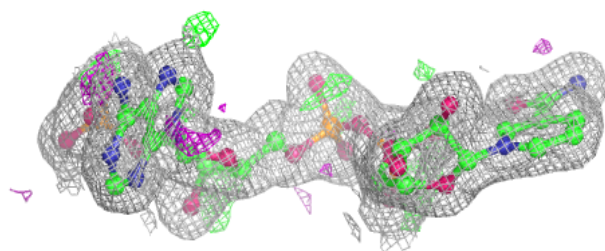
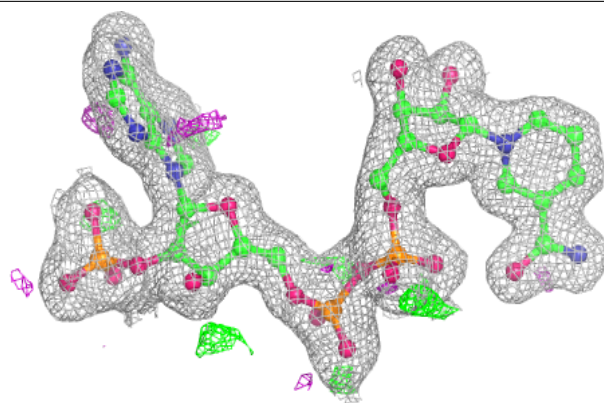
**Electron density around NAP C 604:**

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

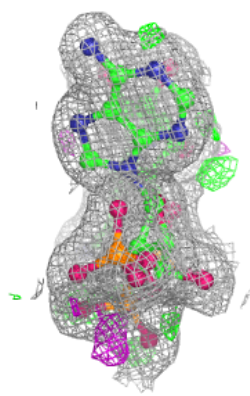
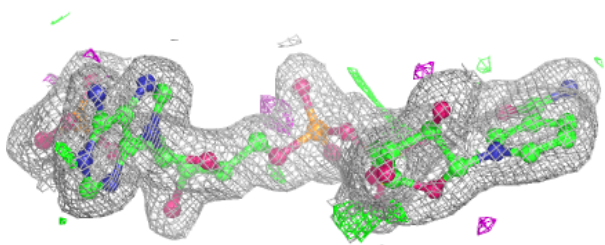
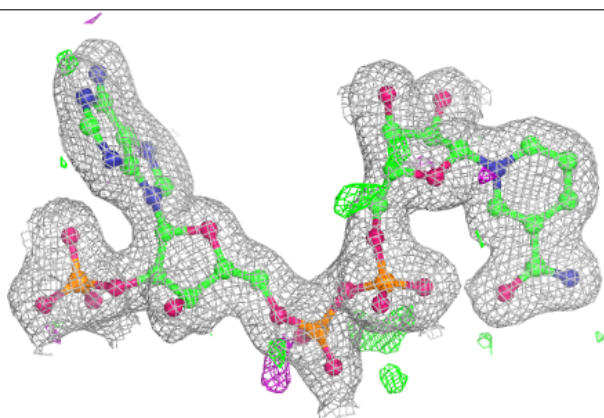


**Electron density around NAP D 603:**

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

**Electron density around NAP B 602:**

$2mF_o-DF_c$  (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.