



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 22, 2024 – 07:07 pm GMT

PDB ID : 7PO6  
Title : Xist (m6A)UCG tetraloop RNA bound to the YTH domain of YTHDC1  
Authors : Jones, A.N.; Mourao, A.; Sattler, M.  
Deposited on : 2021-09-08  
Resolution : 1.77 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 : 4.02b-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

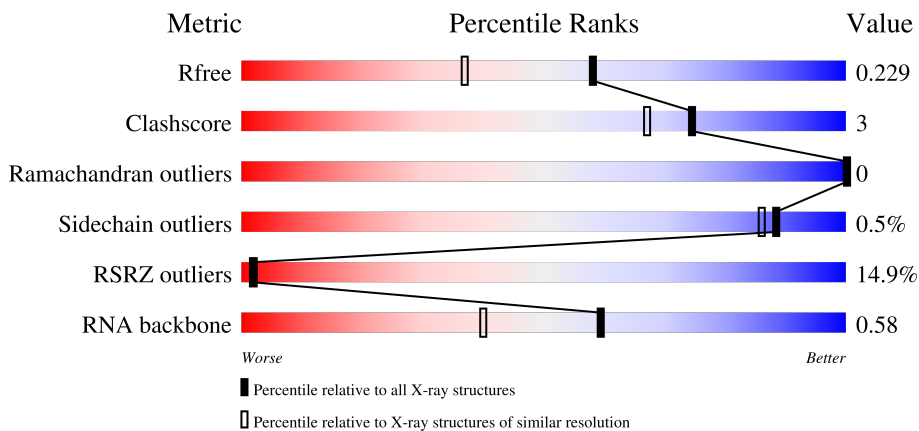
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.77 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.



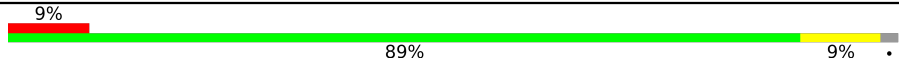
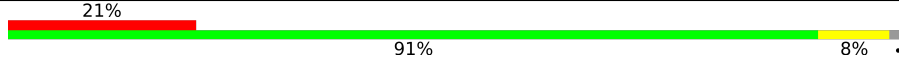
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	9185 (1.80-1.76)
Clashscore	141614	10184 (1.80-1.76)
Ramachandran outliers	138981	10051 (1.80-1.76)
Sidechain outliers	138945	10050 (1.80-1.76)
RSRZ outliers	127900	9032 (1.80-1.76)
RNA backbone	3102	1069 (2.40-1.16)

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	D	14	
1	E	14	
1	F	14	
2	A	169	

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Mol	Chain	Length	Quality of chain
2	B	169	 <p>9% 89% 9%</p>
2	C	169	 <p>21% 91% 8%</p>

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 8526 atoms, of which 4139 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 RNA chain called RNA (5'-R(\*(6MZ)P\*UP\*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				P
1	D	3	Total 93	C 29	H 33	N 10	O 19	P 2	0	0	0
1	E	3	Total 98	C 29	H 35	N 10	O 21	P 3	0	0	0
1	F	4	Total 125	C 39	H 43	N 15	O 25	P 3	0	0	0

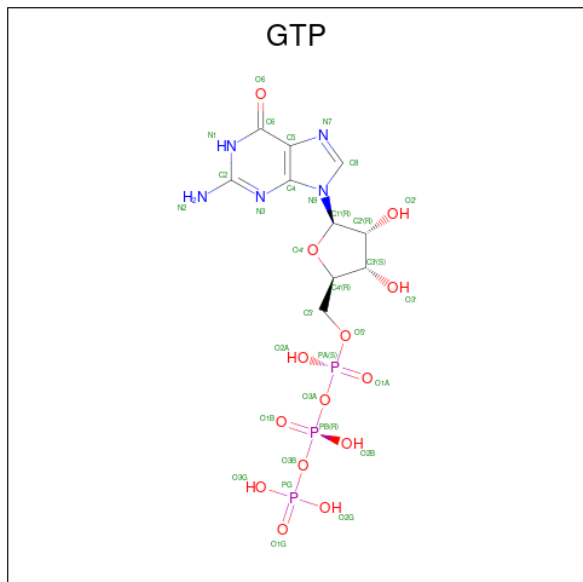
- Molecule 2 is a protein called Isoform 2 of YTH domain-containing protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
2	B	166	Total 2623	C 840	H 1316	N 232	O 230	S 5	0	3	0
2	A	163	Total 2566	C 824	H 1286	N 225	O 225	S 6	7	3	0
2	C	166	Total 2646	C 846	H 1330	N 235	O 229	S 6	0	3	0

There are 12 discrepancies between the modelled and reference sequences:

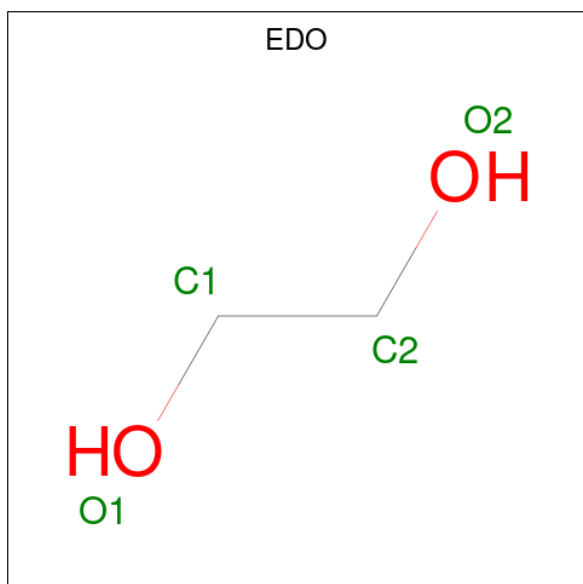
Chain	Residue	Modelled	Actual	Comment	Reference
B	341	GLY	-	expression tag	UNP Q96MU7
B	342	GLY	-	expression tag	UNP Q96MU7
B	343	GLY	-	expression tag	UNP Q96MU7
B	344	GLY	-	expression tag	UNP Q96MU7
A	341	GLY	-	expression tag	UNP Q96MU7
A	342	GLY	-	expression tag	UNP Q96MU7
A	343	GLY	-	expression tag	UNP Q96MU7
A	344	GLY	-	expression tag	UNP Q96MU7
C	341	GLY	-	expression tag	UNP Q96MU7
C	342	GLY	-	expression tag	UNP Q96MU7
C	343	GLY	-	expression tag	UNP Q96MU7
C	344	GLY	-	expression tag	UNP Q96MU7

- Molecule 3 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula:  $C_{10}H_{16}N_5O_{14}P_3$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
3	D	1	35	10	12	5	7	1	0	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



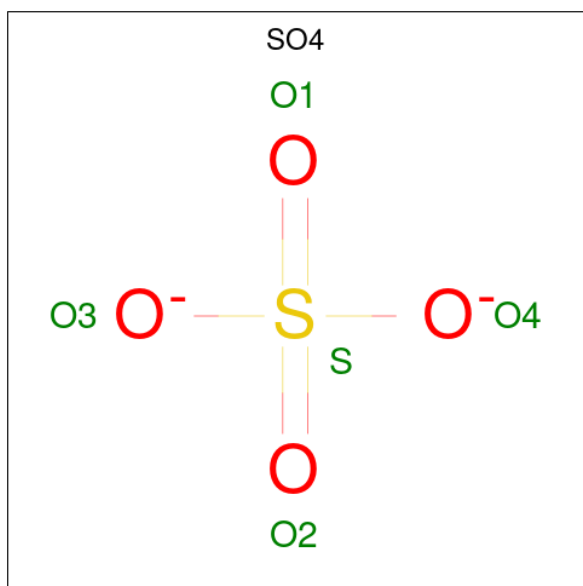
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	H			O
4	B	1	10	2	6	2	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	B	1	Total	C	H	O	0	0
			10	2	6	2		
4	B	1	Total	C	H	O	0	0
			10	2	6	2		
4	B	1	Total	C	H	O	0	0
			10	2	6	2		
4	A	1	Total	C	H	O	0	0
			10	2	6	2		
4	A	1	Total	C	H	O	0	0
			10	2	6	2		
4	C	1	Total	C	H	O	0	0
			10	2	6	2		

- Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	O	S	0	0
			5	4	1		
5	B	1	Total	O	S	0	0
			5	4	1		
5	B	1	Total	O	S	0	0
			5	4	1		
5	A	1	Total	O	S	0	0
			5	4	1		
5	C	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	C	1	Total O S 5 4 1	0	0
5	C	1	Total O S 5 4 1	0	0

- Molecule 6 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	1	Total Na 1 1	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	D	5	Total H O 11 6 5	0	0
7	B	70	Total H O 84 14 70	0	0
7	A	64	Total H O 76 12 64	0	0
7	C	45	Total H O 55 10 45	0	0
7	E	5	Total O 5 5	0	0
7	F	3	Total O 3 3	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: RNA (5'-R\*(6MZ)P\*UP\*C)-3')



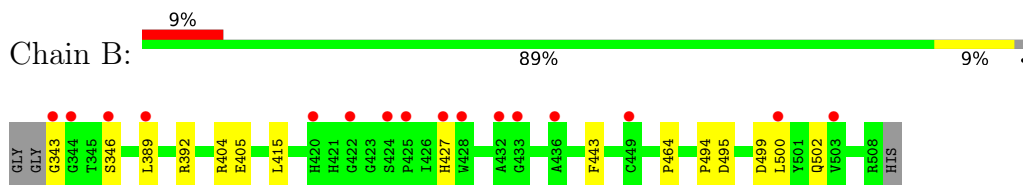
- Molecule 1: RNA (5'-R\*(6MZ)P\*UP\*C)-3')



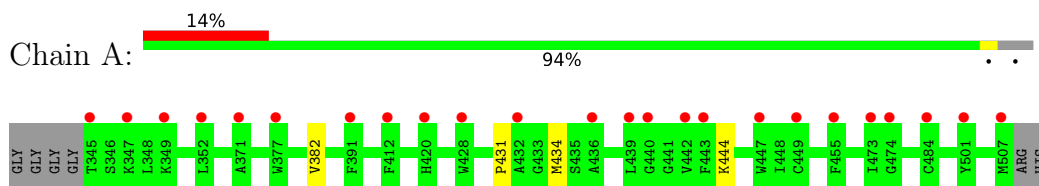
- Molecule 1: RNA (5'-R\*(6MZ)P\*UP\*C)-3')



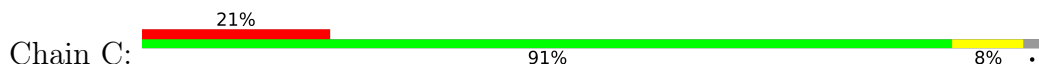
- Molecule 2: Isoform 2 of YTH domain-containing protein 1



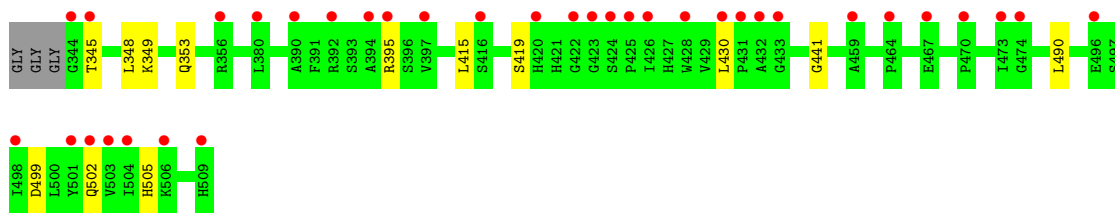
- Molecule 2: Isoform 2 of YTH domain-containing protein 1



- Molecule 2: Isoform 2 of YTH domain-containing protein 1







## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	78.44Å 85.12Å 88.62Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.34 – 1.77 48.34 – 1.77	Depositor EDS
% Data completeness (in resolution range)	98.4 (48.34-1.77) 98.4 (48.34-1.77)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.00 (at 1.76Å)	Xtrriage
Refinement program	PHENIX 1.19.2_4158, PHENIX 1.19.2_4158	Depositor
R, $R_{free}$	0.200 , 0.232 0.196 , 0.229	Depositor DCC
$R_{free}$ test set	2894 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	29.2	Xtrriage
Anisotropy	0.514	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.43 , 88.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.016 for -h,l,k	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8526	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	71.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.49% 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: GTP, 6MZ, NA, EDO, SO4

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	D	1.03	0/43	4.21	2/64 (3.1%)
1	E	0.67	0/43	1.09	0/64
1	F	0.78	0/69	1.06	0/105
2	A	0.55	0/1331	0.69	0/1798
2	B	0.59	0/1357	0.67	0/1833
2	C	0.51	0/1367	0.68	0/1846
All	All	0.56	0/4210	0.82	2/5710 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	4	U	O5'-P-OP1	-29.86	74.87	110.70
1	D	4	U	O5'-P-OP2	9.21	121.75	110.70

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	D	60	33	35	4	0
1	E	63	35	35	0	0
1	F	82	43	44	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	1280	1286	1261	3	0
2	B	1307	1316	1299	9	0
2	C	1316	1330	1297	10	0
3	D	23	12	12	3	0
4	A	8	12	12	0	0
4	B	16	24	24	2	0
4	C	4	6	6	0	0
5	A	5	0	0	1	0
5	B	15	0	0	0	0
5	C	15	0	0	0	0
6	C	1	0	0	0	0
7	A	64	12	0	1	0
7	B	70	14	0	1	0
7	C	45	10	0	0	0
7	D	5	6	0	0	0
7	E	5	0	0	0	0
7	F	3	0	0	0	0
All	All	4387	4139	4025	26	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 (26) 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:D:5:C:O3'	3:D:101:GTP:PA	2.31	0.88
1:D:5:C:C3'	3:D:101:GTP:PA	2.92	0.57
2:A:382:VAL:HG12	7:A:760:HOH:O	2.03	0.57
2:C:345:THR:HG22	2:C:349:LYS:HD2	1.88	0.54
2:B:389:LEU:HD23	2:B:392:ARG:HH21	1.73	0.53
2:C:348:LEU:HD23	2:C:490:LEU:HD23	1.94	0.50
2:C:499:ASP:OD1	2:C:502:GLN:NE2	2.45	0.49
2:C:499:ASP:HB3	2:C:502:GLN:OE1	2.13	0.49
2:C:419:SER:HB2	2:C:441:GLY:HA3	1.96	0.48
2:B:495:ASP:H	4:B:607:EDO:H21	1.78	0.48
2:C:430:LEU:HD12	2:C:430:LEU:H	1.77	0.48
1:D:5:C:H3'	3:D:101:GTP:PA	2.55	0.47
2:C:505:HIS:O	2:C:505:HIS:ND1	2.47	0.47
2:B:494:PRO:HA	4:B:607:EDO:H21	1.96	0.47
2:C:353:GLN:O	2:C:395:ARG:HD3	2.15	0.46
2:C:499:ASP:CB	2:C:502:GLN:OE1	2.65	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:444:LYS:HE2	5:A:603:SO4:O4	2.17	0.45
1:D:4:U:O2'	1:D:5:C:H5'	2.18	0.44
2:C:430:LEU:HD12	2:C:430:LEU:N	2.33	0.43
2:B:404:ARG:HG2	2:B:405:GLU:HG3	2.00	0.42
2:B:343:GLY:N	2:B:346:SER:HG	2.18	0.42
2:A:431:PRO:HG2	2:A:434:MET:CE	2.51	0.41
2:B:427:HIS:HB3	7:B:769:HOH:O	2.20	0.40
2:B:499:ASP:HB3	2:B:502:GLN:HB2	2.04	0.40
2:B:415:LEU:HD11	2:B:443:PHE:CD2	2.56	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	
2	A	164/169 (97%)	160 (98%)	4 (2%)	0	100	100
2	B	167/169 (99%)	165 (99%)	2 (1%)	0	100	100
2	C	167/169 (99%)	164 (98%)	3 (2%)	0	100	100
All	All	498/507 (98%)	489 (98%)	9 (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	
2	A	140/145 (97%)	140 (100%)	0	100	100
2	B	142/145 (98%)	141 (99%)	1 (1%)	84	79
2	C	143/145 (99%)	142 (99%)	1 (1%)	84	79
All	All	425/435 (98%)	423 (100%)	2 (0%)	88	86

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	464	PRO
2	C	415	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	D	1/14 (7%)	0	0
1	E	1/14 (7%)	0	0
1	F	2/14 (14%)	0	0
All	All	4/42 (9%)	0	0

There are no RNA backbone outliers to report.

There are no RNA pucker outliers to report.

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

3 non-standard protein/DNA/RNA residues 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
1	6MZ	F	3	1	17,21,26	4.27	7 (41%)	13,31,39	2.94	5 (38%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
1	6MZ	D	3	1	18,22,26	1.86	2 (11%)	16,32,39	2.81	5 (31%)
1	6MZ	E	3	1	18,25,26	1.83	4 (22%)	16,36,39	2.94	3 (18%)

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
1	6MZ	F	3	1	-	0/2/22/28	0/3/3/3
1	6MZ	D	3	1	-	0/4/24/28	0/3/3/3
1	6MZ	E	3	1	-	1/5/27/28	0/3/3/3

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	3	6MZ	C3'-C4'	-14.12	1.32	1.52
1	D	3	6MZ	C6-N6	6.16	1.45	1.35
1	F	3	6MZ	C6-N6	5.92	1.44	1.35
1	E	3	6MZ	C6-N6	5.64	1.44	1.35
1	F	3	6MZ	O4'-C4'	5.37	1.60	1.44
1	F	3	6MZ	O4'-C1'	-3.37	1.36	1.41
1	E	3	6MZ	C2-N3	3.33	1.37	1.32
1	F	3	6MZ	O3'-C3'	2.83	1.49	1.43
1	D	3	6MZ	C5-C4	-2.46	1.34	1.40
1	E	3	6MZ	C5-C4	-2.39	1.34	1.40
1	F	3	6MZ	C2-N3	2.39	1.35	1.32
1	F	3	6MZ	C5-C4	-2.31	1.34	1.40
1	E	3	6MZ	C2-N1	2.22	1.38	1.33

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	3	6MZ	C1'-N9-C4	-10.11	108.87	126.64
1	F	3	6MZ	C1'-N9-C4	-8.43	111.83	126.64
1	D	3	6MZ	C1'-N9-C4	-8.03	112.54	126.64
1	D	3	6MZ	N3-C2-N1	-5.47	120.13	128.68
1	E	3	6MZ	N3-C2-N1	-5.02	120.83	128.68
1	D	3	6MZ	C2-N1-C6	3.80	119.85	116.59
1	F	3	6MZ	N3-C2-N1	-3.69	122.92	128.68
1	F	3	6MZ	C3'-C2'-C1'	3.36	106.04	100.98
1	F	3	6MZ	C9-N6-C6	2.49	125.02	122.87

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	3	6MZ	C4-C5-N7	2.38	111.88	109.40
1	D	3	6MZ	C9-N6-C6	2.28	124.84	122.87
1	E	3	6MZ	C3'-C2'-C1'	2.20	104.29	100.98
1	F	3	6MZ	O4'-C1'-C2'	-2.12	103.82	106.93

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	E	3	6MZ	C4'-C5'-O5'-P

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 16 ligands modelled in this entry, 1 is monoatomic - leaving 15 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
5	SO4	B	602	-	4,4,4	0.11	0	6,6,6	0.15	0
3	GTP	D	101	-	19,25,34	1.05	2 (10%)	18,37,54	0.71	0
4	EDO	B	601	-	3,3,3	0.56	0	2,2,2	0.60	0
4	EDO	B	607	-	3,3,3	0.61	0	2,2,2	0.65	0
4	EDO	B	603	-	3,3,3	0.60	0	2,2,2	0.40	0
5	SO4	B	604	-	4,4,4	0.14	0	6,6,6	0.21	0
4	EDO	B	605	-	3,3,3	0.45	0	2,2,2	0.36	0
5	SO4	C	604	-	4,4,4	0.13	0	6,6,6	0.22	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	EDO	C	602	-	3,3,3	0.47	0	2,2,2	0.54	0
5	SO4	A	603	-	4,4,4	0.10	0	6,6,6	0.20	0
4	EDO	A	601	-	3,3,3	0.50	0	2,2,2	0.36	0
4	EDO	A	602	-	3,3,3	0.49	0	2,2,2	0.62	0
5	SO4	B	606	-	4,4,4	0.12	0	6,6,6	0.25	0
5	SO4	C	603	-	4,4,4	0.20	0	6,6,6	0.28	0
5	SO4	C	601	-	4,4,4	0.16	0	6,6,6	0.12	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	GTP	D	101	-	-	0/3/25/38	0/3/3/3
4	EDO	B	601	-	-	0/1/1/1	-
4	EDO	B	607	-	-	1/1/1/1	-
4	EDO	B	603	-	-	0/1/1/1	-
4	EDO	B	605	-	-	0/1/1/1	-
4	EDO	C	602	-	-	1/1/1/1	-
4	EDO	A	601	-	-	0/1/1/1	-
4	EDO	A	602	-	-	1/1/1/1	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	101	GTP	C5-C6	-2.31	1.42	1.47
3	D	101	GTP	C8-N7	-2.29	1.31	1.35

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

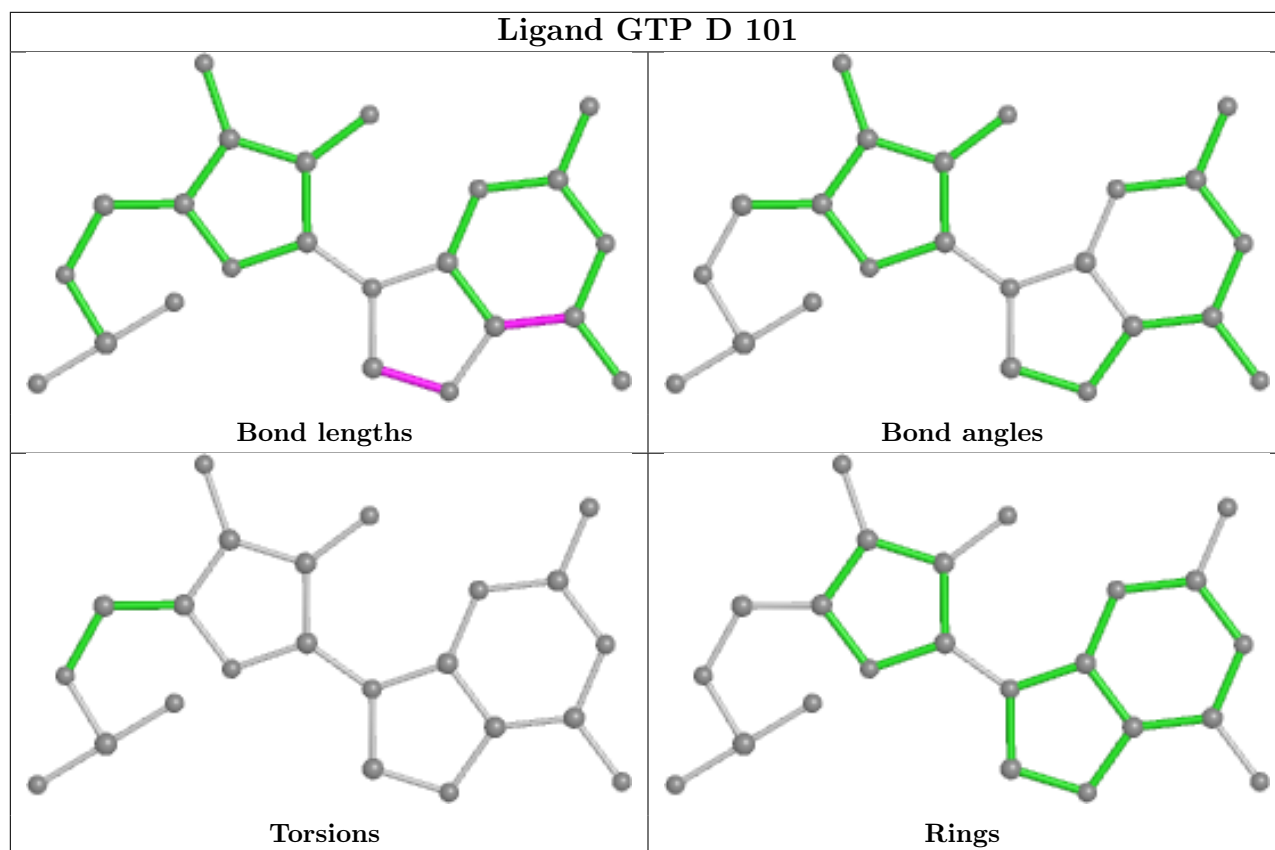
Mol	Chain	Res	Type	Atoms
4	A	602	EDO	O1-C1-C2-O2
4	C	602	EDO	O1-C1-C2-O2
4	B	607	EDO	O1-C1-C2-O2

There are no ring outliers.

3 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	101	GTP	3	0
4	B	607	EDO	2	0
5	A	603	SO4	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

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	D	2/14 (14%)	0.36	0	100 100	63, 63, 63, 80	0
1	E	2/14 (14%)	0.85	0	100 100	78, 78, 78, 84	0
1	F	3/14 (21%)	0.66	0	100 100	64, 64, 71, 88	0
2	A	163/169 (96%)	1.26	24 (14%)	2 2	49, 60, 87, 95	0
2	B	166/169 (98%)	0.97	16 (9%)	8 7	48, 56, 79, 94	0
2	C	166/169 (98%)	1.44	35 (21%)	1 0	53, 67, 88, 121	0
All	All	502/549 (91%)	1.21	75 (14%)	2 2	48, 61, 87, 121	0

All (75) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	432	ALA	11.8
2	C	425	PRO	8.8
2	B	424	SER	5.2
2	C	426	ILE	4.8
2	B	500	LEU	4.7
2	C	423	GLY	4.7
2	C	430	LEU	4.6
2	C	506	LYS	4.5
2	A	345	THR	4.4
2	C	424	SER	4.2
2	C	509	HIS	4.1
2	C	503	VAL	4.0
2	C	392	ARG	3.8
2	C	344	GLY	3.7
2	C	422	GLY	3.7
2	C	394	ALA	3.6
2	A	432	ALA	3.6
2	C	496	GLU	3.4
2	C	502	GLN	3.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	C	470	PRO	3.2
2	B	433	GLY	3.2
2	C	420	HIS	3.1
2	A	442	VAL	3.0
2	A	447	TRP	3.0
2	B	503	VAL	3.0
2	A	420	HIS	2.9
2	A	473	ILE	2.9
2	A	347	LYS	2.9
2	A	449	CYS	2.7
2	B	428	TRP	2.7
2	B	425	PRO	2.6
2	C	474	GLY	2.6
2	C	464	PRO	2.6
2	C	395	ARG	2.6
2	C	356	ARG	2.5
2	A	377	TRP	2.5
2	A	391	PHE	2.5
2	B	344	GLY	2.5
2	B	343	GLY	2.5
2	A	371	ALA	2.4
2	C	459	ALA	2.4
2	C	501	TYR	2.4
2	C	504	ILE	2.4
2	A	436	ALA	2.4
2	B	449	CYS	2.4
2	C	397	VAL	2.3
2	C	431	PRO	2.3
2	C	416	SER	2.3
2	C	345	THR	2.3
2	C	433	GLY	2.3
2	A	501	TYR	2.2
2	C	390	ALA	2.2
2	C	467	GLU	2.2
2	A	349	LYS	2.2
2	B	427	HIS	2.2
2	A	474	GLY	2.2
2	B	422	GLY	2.2
2	B	420	HIS	2.2
2	A	352	LEU	2.2
2	A	439	LEU	2.2
2	C	498	ILE	2.2

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Mol	Chain	Res	Type	RSRZ
2	B	436	ALA	2.2
2	A	507	MET	2.1
2	A	455	PHE	2.1
2	B	432	ALA	2.1
2	A	428	TRP	2.1
2	B	389	LEU	2.1
2	A	484	CYS	2.1
2	C	473	ILE	2.1
2	B	346	SER	2.0
2	A	412	PHE	2.0
2	A	443	PHE	2.0
2	C	380	LEU	2.0
2	C	428	TRP	2.0
2	A	440	GLY	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [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
1	6MZ	E	3	23/24	0.78	0.16	52,70,117,138	0
1	6MZ	F	3	19/24	0.90	0.12	54,57,75,75	0
1	6MZ	D	3	20/24	0.92	0.13	46,54,67,71	0

## 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.

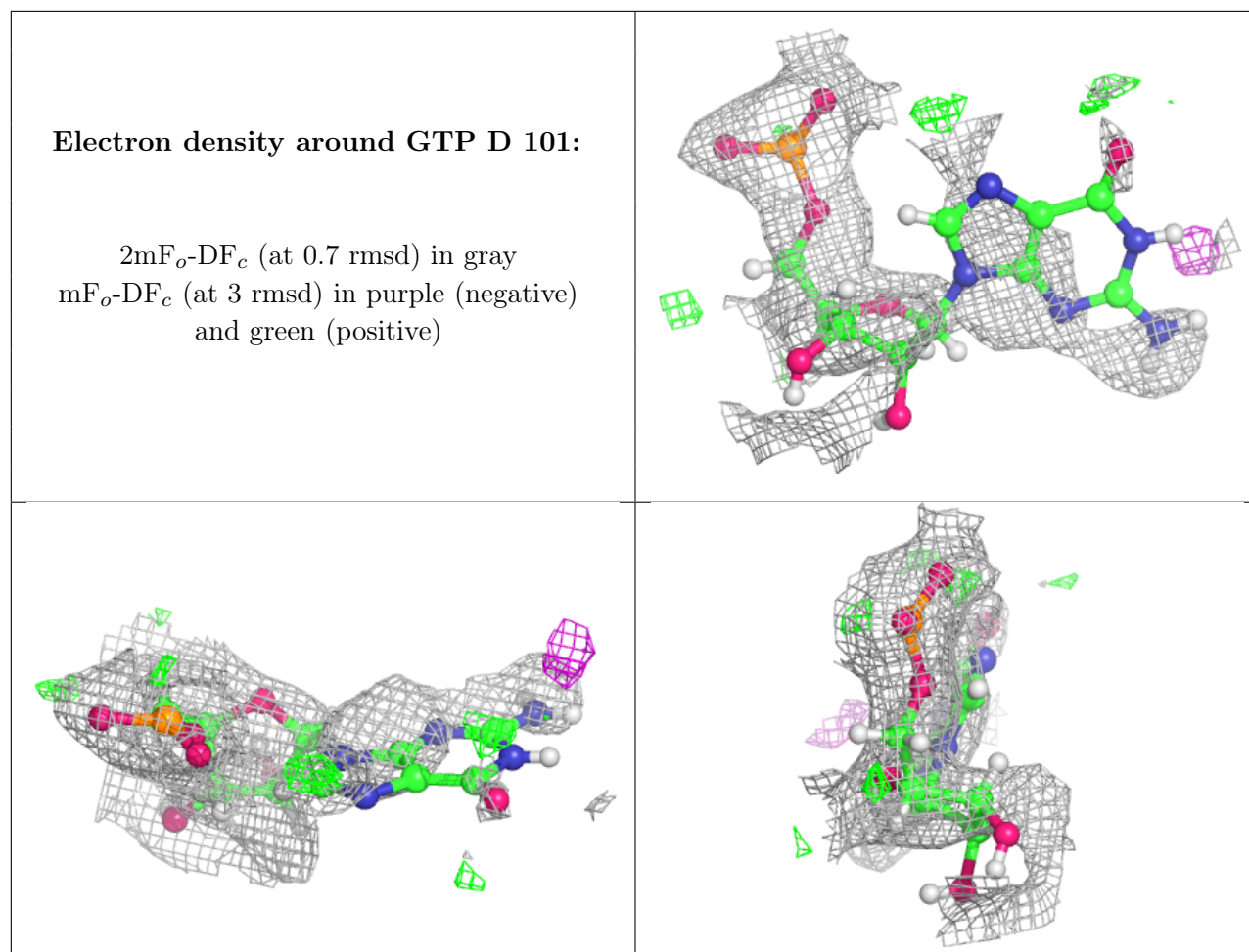
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	EDO	B	603	4/4	0.59	0.26	65,80,92,96	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
5	SO4	B	604	5/5	0.74	0.32	81,86,109,122	0
6	NA	C	605	1/1	0.77	0.26	78,78,78,78	0
5	SO4	C	603	5/5	0.78	0.19	80,83,107,109	0
3	GTP	D	101	23/32	0.78	0.29	76,116,156,174	0
5	SO4	B	602	5/5	0.79	0.20	93,95,108,122	0
5	SO4	A	603	5/5	0.79	0.29	93,97,129,136	0
4	EDO	A	602	4/4	0.80	0.20	65,78,84,86	0
5	SO4	B	606	5/5	0.83	0.25	77,83,90,98	0
4	EDO	C	602	4/4	0.83	0.19	62,74,82,90	0
4	EDO	B	607	4/4	0.89	0.15	59,77,93,93	0
5	SO4	C	604	5/5	0.89	0.29	88,88,112,115	0
5	SO4	C	601	5/5	0.89	0.16	84,88,115,128	0
4	EDO	B	605	4/4	0.92	0.17	60,72,79,79	0
4	EDO	A	601	4/4	0.95	0.18	50,60,64,66	0
4	EDO	B	601	4/4	0.96	0.18	51,61,63,66	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.