



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 06:13 PM GMT

PDB ID : 4KXY  
Title : Human transketolase in complex with ThDP analogue (R)-2-(1,2-dihydroxyethyl)-3-deaza-ThDP  
Authors : Neumann, P.; Luedtke, S.; Erixon, K.M.; Leeper, F.; Kluger, R.; Ficner, R.; Tittmann, K.  
Deposited on : 2013-05-28  
Resolution : 1.26 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  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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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 : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

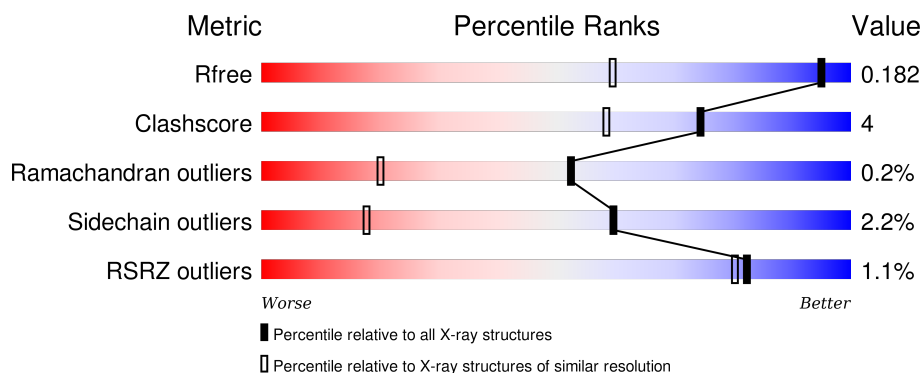
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.26 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))
$R_{free}$	91344	1442 (1.30-1.22)
Clashscore	102246	1530 (1.30-1.22)
Ramachandran outliers	100387	1467 (1.30-1.22)
Sidechain outliers	100360	1465 (1.30-1.22)
RSRZ outliers	91569	1442 (1.30-1.22)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	637	<div> <div style="width: 100%; height: 10px; position: relative;"> <div style="position: absolute; top: -10px; left: 0; width: 100%; text-align: center;">%</div> <div style="position: absolute; top: 10px; left: 0; width: 100%; text-align: center;">84% 13% . .</div> </div> </div>
1	B	637	<div> <div style="width: 100%; height: 10px; position: relative;"> <div style="position: absolute; top: -10px; left: 0; width: 100%; text-align: center;">%</div> <div style="position: absolute; top: 10px; left: 0; width: 100%; text-align: center;">85% 10% . .</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
2	EDO	A	701[A]	-	-	-	X
2	EDO	A	701[B]	-	-	-	X
2	EDO	A	703	-	-	-	X
2	EDO	A	710[A]	-	-	-	X
2	EDO	A	713	-	-	-	X
2	EDO	A	714	-	-	-	X
2	EDO	A	715	-	-	-	X
2	EDO	A	717[A]	-	-	-	X
2	EDO	A	717[B]	-	-	-	X
2	EDO	A	718	-	-	-	X
2	EDO	B	1003	-	-	-	X
2	EDO	B	1004	-	-	-	X
2	EDO	B	1008	-	-	-	X
2	EDO	B	1009	-	-	-	X
2	EDO	B	1011[A]	-	-	-	X
2	EDO	B	1011[B]	-	-	-	X
2	EDO	B	1015	-	-	-	X
6	SO4	A	716[B]	-	-	-	X
6	SO4	B	1013	-	-	-	X

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 11716 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 Transketolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	620	Total	C	N	O	S	0	34	0
			5006	3156	874	950	26			
1	B	620	Total	C	N	O	S	0	34	0
			5012	3158	878	949	27			

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	624	LEU	-	EXPRESSION TAG	UNP P29401
A	625	VAL	-	EXPRESSION TAG	UNP P29401
A	626	PRO	-	EXPRESSION TAG	UNP P29401
A	627	ARG	-	EXPRESSION TAG	UNP P29401
A	628	GLY	-	EXPRESSION TAG	UNP P29401
A	629	SER	-	EXPRESSION TAG	UNP P29401
A	630	LEU	-	EXPRESSION TAG	UNP P29401
A	631	GLU	-	EXPRESSION TAG	UNP P29401
A	632	HIS	-	EXPRESSION TAG	UNP P29401
A	633	HIS	-	EXPRESSION TAG	UNP P29401
A	634	HIS	-	EXPRESSION TAG	UNP P29401
A	635	HIS	-	EXPRESSION TAG	UNP P29401
A	636	HIS	-	EXPRESSION TAG	UNP P29401
A	637	HIS	-	EXPRESSION TAG	UNP P29401
B	624	LEU	-	EXPRESSION TAG	UNP P29401
B	625	VAL	-	EXPRESSION TAG	UNP P29401
B	626	PRO	-	EXPRESSION TAG	UNP P29401
B	627	ARG	-	EXPRESSION TAG	UNP P29401
B	628	GLY	-	EXPRESSION TAG	UNP P29401
B	629	SER	-	EXPRESSION TAG	UNP P29401
B	630	LEU	-	EXPRESSION TAG	UNP P29401
B	631	GLU	-	EXPRESSION TAG	UNP P29401
B	632	HIS	-	EXPRESSION TAG	UNP P29401
B	633	HIS	-	EXPRESSION TAG	UNP P29401
B	634	HIS	-	EXPRESSION TAG	UNP P29401

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Chain	Residue	Modelled	Actual	Comment	Reference
B	635	HIS	-	EXPRESSION TAG	UNP P29401
B	636	HIS	-	EXPRESSION TAG	UNP P29401
B	637	HIS	-	EXPRESSION TAG	UNP P29401

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



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

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 8 4 4	0	1
2	A	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 8 4 4	0	1
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0

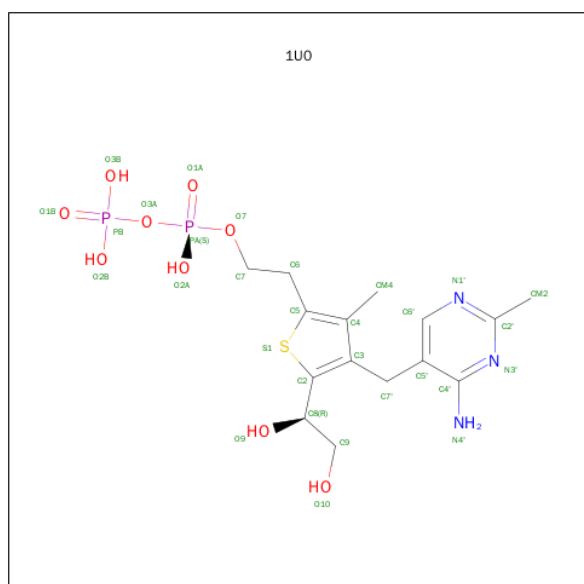
- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total Ca 1 1	0	0
3	A	1	Total Ca 1 1	0	0

- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

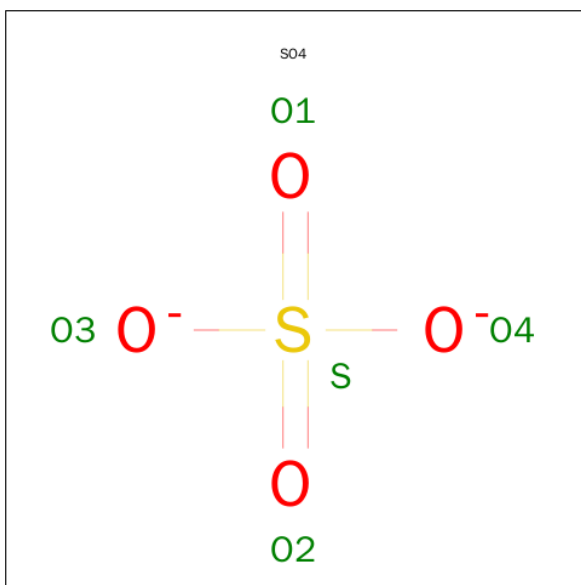
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	Na	0	0
			1	1		
4	A	1	Total	Na	0	0
			1	1		

- Molecule 5 is 2-{4-[(4-AMINO-2-METHYLPYRIMIDIN-5-YL)METHYL]-5-[(1R)-1,2-DIHYDROXYETHYL]-3-METHYLTHIOPHEN-2-YL}ETHYL TRIHYDROGEN DIPHOSPHATE (three-letter code: 1U0) (formula: C<sub>15</sub>H<sub>23</sub>N<sub>3</sub>O<sub>9</sub>P<sub>2</sub>S).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
5	A	1	Total	C	N	O	P	S	0	1
			32	16	3	10	2	1		
5	B	1	Total	C	N	O	P	S	0	1
			32	16	3	10	2	1		

- Molecule 6 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



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

- Molecule 7 is water.

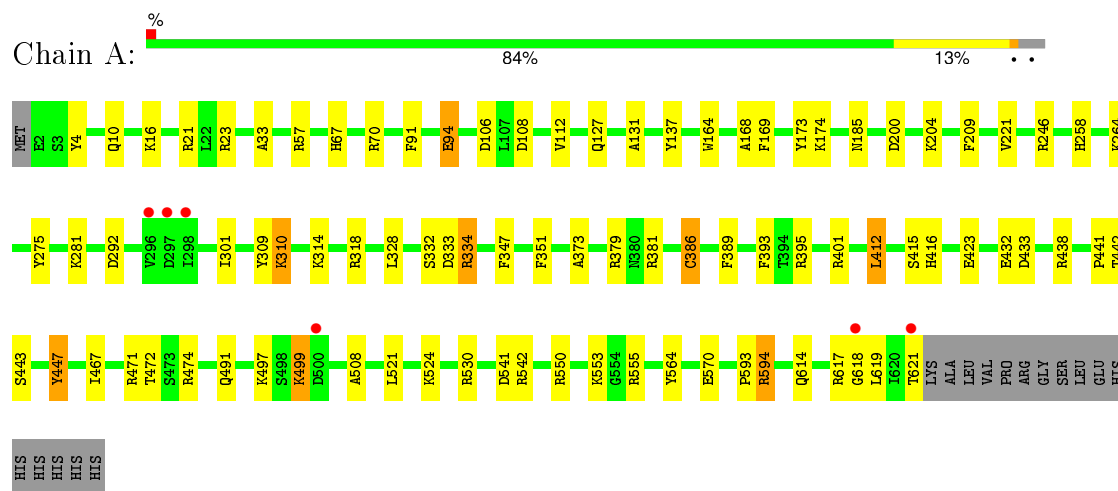
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	756	Total	O	0	22
			778	778		
7	B	706	Total	O	0	17
			722	722		



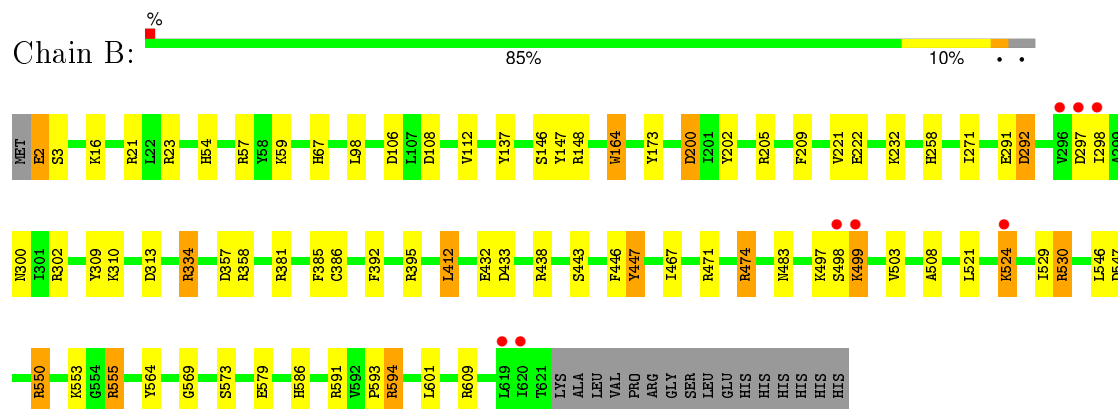
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: Transketolase



#### • Molecule 1: Transketolase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	73.15Å 86.05Å 92.73Å 90.00° 94.12° 90.00°	Depositor
Resolution (Å)	30.00 – 1.26 48.88 – 1.26	Depositor EDS
% Data completeness (in resolution range)	99.7 (30.00-1.26) 89.7 (48.88-1.26)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	0.00	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.50 (at 1.26Å)	Xtriage
Refinement program	SHELXL-12	Depositor
R, $R_{free}$	0.154 , 0.204 0.149 , 0.182	Depositor DCC
$R_{free}$ test set	13796 reflections (5.23%)	DCC
Wilson B-factor (Å <sup>2</sup> )	7.4	Xtriage
Anisotropy	0.168	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 83.6	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 307297 reflections	Xtriage
$F_o, F_c$ correlation	0.98	EDS
Total number of atoms	11716	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	16.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 89.48 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 3.3596e-08. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, 1U0, CA, EDO, NA

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	0.64	0/5114	1.33	57/6915 (0.8%)
1	B	0.63	0/5121	1.38	68/6924 (1.0%)
All	All	0.64	0/10235	1.36	125/13839 (0.9%)

There are no bond length outliers.

All (125) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	395[A]	ARG	NE-CZ-NH2	15.57	128.09	120.30
1	B	395[B]	ARG	NE-CZ-NH2	15.57	128.09	120.30
1	B	381	ARG	NE-CZ-NH2	-12.65	113.98	120.30
1	A	334	ARG	NE-CZ-NH1	12.16	126.38	120.30
1	A	334	ARG	NE-CZ-NH2	-11.90	114.35	120.30
1	B	358	ARG	NE-CZ-NH2	-11.52	114.54	120.30
1	A	555	ARG	NE-CZ-NH2	-11.52	114.54	120.30
1	A	542	ARG	NE-CZ-NH2	-11.23	114.69	120.30
1	A	550	ARG	NE-CZ-NH2	11.04	125.82	120.30
1	A	70	ARG	NE-CZ-NH1	-10.49	115.06	120.30
1	B	555	ARG	NE-CZ-NH1	10.35	125.47	120.30
1	B	474	ARG	NE-CZ-NH2	-9.85	115.38	120.30
1	B	148	ARG	NE-CZ-NH1	9.33	124.97	120.30
1	A	617	ARG	NE-CZ-NH1	-8.88	115.86	120.30
1	A	474	ARG	NE-CZ-NH1	8.46	124.53	120.30
1	A	594	ARG	NE-CZ-NH2	8.30	124.45	120.30
1	A	221	VAL	CG1-CB-CG2	8.27	124.13	110.90
1	B	412[A]	LEU	CA-CB-CG	8.03	133.76	115.30
1	B	412[B]	LEU	CA-CB-CG	8.03	133.76	115.30
1	B	471	ARG	NE-CZ-NH1	7.99	124.30	120.30
1	A	173	TYR	CB-CG-CD2	7.90	125.74	121.00
1	A	91	PHE	CB-CG-CD1	-7.66	115.44	120.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	334	ARG	CD-NE-CZ	7.57	134.19	123.60
1	B	258	HIS	CG-ND1-CE1	7.56	118.78	108.20
1	A	57	ARG	NE-CZ-NH1	7.49	124.04	120.30
1	A	108	ASP	O-C-N	-7.29	110.81	123.20
1	A	108	ASP	C-N-CA	7.28	137.58	122.30
1	A	474	ARG	NE-CZ-NH2	-7.27	116.66	120.30
1	B	385	PHE	CB-CG-CD1	-7.27	115.71	120.80
1	B	594	ARG	NE-CZ-NH1	7.17	123.88	120.30
1	B	302	ARG	CD-NE-CZ	7.12	133.57	123.60
1	A	23	ARG	NE-CZ-NH1	7.11	123.86	120.30
1	A	550	ARG	NE-CZ-NH1	-7.10	116.75	120.30
1	A	91	PHE	CB-CG-CD2	6.87	125.61	120.80
1	B	21	ARG	NE-CZ-NH1	-6.82	116.89	120.30
1	A	471	ARG	NE-CZ-NH1	6.80	123.70	120.30
1	B	530	ARG	NE-CZ-NH2	-6.73	116.94	120.30
1	B	313	ASP	CB-CG-OD2	-6.67	112.30	118.30
1	B	385	PHE	CB-CG-CD2	6.63	125.44	120.80
1	A	530	ARG	NE-CZ-NH2	-6.62	116.99	120.30
1	A	381	ARG	NE-CZ-NH2	-6.62	116.99	120.30
1	A	347	PHE	O-C-N	-6.53	112.25	122.70
1	A	438	ARG	NE-CZ-NH1	6.53	123.56	120.30
1	B	508	ALA	O-C-N	-6.44	112.25	123.20
1	A	318	ARG	NE-CZ-NH2	6.37	123.48	120.30
1	B	471	ARG	NE-CZ-NH2	-6.32	117.14	120.30
1	B	221	VAL	CG1-CB-CG2	6.32	121.01	110.90
1	B	108	ASP	C-N-CA	6.29	135.51	122.30
1	A	351	PHE	CB-CG-CD2	6.28	125.20	120.80
1	B	386[A]	CYS	CB-CA-C	-6.26	97.87	110.40
1	B	386[B]	CYS	CB-CA-C	-6.26	97.87	110.40
1	B	106	ASP	O-C-N	-6.25	112.69	122.70
1	B	164	TRP	CA-CB-CG	-6.22	101.87	113.70
1	A	258	HIS	CG-ND1-CE1	6.22	116.91	108.20
1	B	106	ASP	C-N-CA	6.18	137.15	121.70
1	B	222	GLU	O-C-N	-6.18	112.81	122.70
1	B	412[A]	LEU	CB-CG-CD2	6.18	121.50	111.00
1	B	412[B]	LEU	CB-CG-CD2	6.18	121.50	111.00
1	A	508	ALA	O-C-N	-6.13	112.77	123.20
1	B	594	ARG	NE-CZ-NH2	-6.13	117.24	120.30
1	A	164	TRP	CA-CB-CG	-6.12	102.08	113.70
1	B	200	ASP	CB-CG-OD2	-6.05	112.86	118.30
1	B	508	ALA	C-N-CA	6.01	134.92	122.30
1	A	389	PHE	CB-CG-CD1	6.00	125.00	120.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	106	ASP	O-C-N	-5.98	113.13	122.70
1	B	381	ARG	NE-CZ-NH1	5.98	123.29	120.30
1	A	275[A]	TYR	CG-CD1-CE1	-5.96	116.53	121.30
1	A	275[B]	TYR	CG-CD1-CE1	-5.96	116.53	121.30
1	B	395[A]	ARG	NH1-CZ-NH2	-5.96	112.84	119.40
1	B	395[B]	ARG	NH1-CZ-NH2	-5.96	112.84	119.40
1	B	447	TYR	CB-CG-CD1	5.96	124.58	121.00
1	B	57	ARG	CD-NE-CZ	5.94	131.91	123.60
1	B	202	TYR	CB-CG-CD2	5.92	124.55	121.00
1	B	298	ILE	CB-CA-C	-5.89	99.81	111.60
1	B	108	ASP	O-C-N	-5.88	113.21	123.20
1	B	392	PHE	CB-CG-CD1	-5.87	116.69	120.80
1	B	446	PHE	CB-CG-CD1	-5.86	116.70	120.80
1	B	54	HIS	CG-ND1-CE1	5.85	116.40	108.20
1	A	137	TYR	CB-CG-CD2	5.84	124.50	121.00
1	B	547	ASP	CB-CG-OD2	5.77	123.49	118.30
1	B	148	ARG	NE-CZ-NH2	-5.76	117.42	120.30
1	B	137	TYR	CB-CG-CD1	-5.75	117.55	121.00
1	A	21	ARG	NE-CZ-NH1	-5.73	117.43	120.30
1	B	205	ARG	NE-CZ-NH2	-5.72	117.44	120.30
1	A	334	ARG	CG-CD-NE	5.71	123.80	111.80
1	B	148	ARG	CD-NE-CZ	5.70	131.59	123.60
1	B	106	ASP	CB-CG-OD2	-5.70	113.17	118.30
1	A	379	ARG	CD-NE-CZ	5.61	131.45	123.60
1	A	292	ASP	O-C-N	-5.58	113.76	122.70
1	A	472	THR	C-N-CA	5.54	135.54	121.70
1	B	564	TYR	CB-CG-CD1	-5.53	117.68	121.00
1	A	106	ASP	C-N-CA	5.53	135.52	121.70
1	B	147	TYR	CB-CG-CD2	5.53	124.31	121.00
1	A	246	ARG	NE-CZ-NH2	5.52	123.06	120.30
1	B	173	TYR	CB-CG-CD2	5.52	124.31	121.00
1	A	185	ASN	OD1-CG-ND2	-5.51	109.22	121.90
1	A	401	ARG	NE-CZ-NH1	5.49	123.04	120.30
1	B	67	HIS	CG-ND1-CE1	5.48	115.87	108.20
1	A	395[A]	ARG	NE-CZ-NH2	-5.47	117.56	120.30
1	A	395[B]	ARG	NE-CZ-NH2	-5.47	117.56	120.30
1	B	550	ARG	NE-CZ-NH2	5.44	123.02	120.30
1	B	221	VAL	CA-CB-CG1	-5.43	102.75	110.90
1	B	438	ARG	CD-NE-CZ	5.43	131.20	123.60
1	B	232[A]	LYS	CA-CB-CG	5.38	125.25	113.40
1	B	232[B]	LYS	CA-CB-CG	5.38	125.25	113.40
1	A	541	ASP	CB-CG-OD2	-5.37	113.47	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	386[A]	CYS	CB-CA-C	-5.34	99.73	110.40
1	A	386[B]	CYS	CB-CA-C	-5.34	99.73	110.40
1	A	564	TYR	CB-CG-CD2	5.33	124.20	121.00
1	A	67	HIS	CG-ND1-CE1	5.31	115.64	108.20
1	A	332	SER	N-CA-CB	-5.31	102.53	110.50
1	A	570	GLU	OE1-CD-OE2	5.31	129.67	123.30
1	A	530	ARG	NE-CZ-NH1	5.29	122.95	120.30
1	B	358	ARG	NE-CZ-NH1	5.28	122.94	120.30
1	A	23	ARG	CG-CD-NE	-5.27	100.74	111.80
1	B	609	ARG	NE-CZ-NH1	5.26	122.93	120.30
1	A	447	TYR	CB-CG-CD1	5.25	124.15	121.00
1	B	292	ASP	O-C-N	-5.21	114.37	122.70
1	B	21	ARG	NE-CZ-NH2	5.20	122.90	120.30
1	A	555	ARG	CD-NE-CZ	5.19	130.87	123.60
1	B	23	ARG	CG-CD-NE	-5.16	100.96	111.80
1	B	23	ARG	NE-CZ-NH2	-5.14	117.73	120.30
1	B	591	ARG	NE-CZ-NH2	5.14	122.87	120.30
1	B	530	ARG	NH1-CZ-NH2	5.08	124.99	119.40
1	A	4	TYR	CB-CG-CD1	5.00	124.00	121.00

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts ⓘ

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	5006	0	5002	44	0
1	B	5012	0	5005	34	0
2	A	64	0	96	11	0
2	B	56	0	84	5	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	32	0	8	0	0
5	B	32	0	8	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	5	0	0	0	0
6	B	5	0	0	0	0
7	A	778	0	0	26	0
7	B	722	0	0	19	0
All	All	11716	0	10203	83	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 4.

All (83) 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:16[C]:LYS:HE3	7:B:1729:HOH:O	1.69	0.92
1:B:357[B]:ASP:OD1	7:B:1480:HOH:O	1.98	0.80
1:B:271:ILE:HG21	7:B:1759:HOH:O	1.84	0.77
1:A:614:GLN:HG3	7:A:8594:HOH:O	1.86	0.76
2:B:1015:EDO:H22	7:B:1295:HOH:O	1.86	0.74
1:A:204:LYS:HG2	7:A:8737:HOH:O	1.87	0.72
1:A:209:PHE:HE1	2:B:1008:EDO:H22	1.56	0.71
1:A:334:ARG:HG2	7:A:8722:HOH:O	1.90	0.70
1:B:200:ASP:HB3	7:B:1803:HOH:O	1.92	0.69
1:B:16[C]:LYS:HG3	7:B:1729:HOH:O	1.95	0.67
1:A:16[B]:LYS:HE2	7:A:8465:HOH:O	1.95	0.66
1:A:333:ASP:O	2:A:718:EDO:H22	1.95	0.65
2:A:713:EDO:H22	1:B:209:PHE:HE1	1.60	0.65
1:B:521:LEU:O	1:B:524:LYS:HG3	1.96	0.65
1:A:524:LYS:HD3	7:A:8585:HOH:O	2.00	0.62
1:B:499:LYS:HD3	7:B:1666:HOH:O	2.00	0.61
1:B:16[C]:LYS:CG	7:B:1729:HOH:O	2.48	0.60
1:A:16[B]:LYS:CG	7:A:8662:HOH:O	2.49	0.60
1:B:499:LYS:HE2	7:B:1772:HOH:O	2.03	0.59
1:B:16[C]:LYS:HE2	7:B:1436:HOH:O	2.04	0.57
1:A:423:GLU:HG2	2:A:701[B]:EDO:H21	1.85	0.57
1:A:16[B]:LYS:CE	7:A:8662:HOH:O	2.51	0.57
1:A:393:PHE:CZ	1:A:412[A]:LEU:HG	2.39	0.57
1:A:200[B]:ASP:HB3	7:A:8737:HOH:O	2.04	0.57
1:B:553:LYS:HD3	1:B:555:ARG:NH1	2.20	0.56
1:A:16[B]:LYS:HG3	7:A:8292:HOH:O	2.08	0.53
1:A:16[B]:LYS:HE3	7:A:8662:HOH:O	2.08	0.53
1:A:127:GLN:OE1	2:A:717[B]:EDO:H12	2.08	0.53
2:A:718:EDO:H12	7:A:8602:HOH:O	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:16[B]:LYS:HG3	7:A:8662:HOH:O	2.10	0.52
1:A:393:PHE:CE1	1:A:412[A]:LEU:HG	2.45	0.52
1:A:94[B]:GLU:HG3	7:A:8490:HOH:O	2.09	0.51
1:A:314:LYS:HE3	7:A:8679:HOH:O	2.10	0.51
1:A:619:LEU:HD22	7:A:8496:HOH:O	2.09	0.51
1:B:16[C]:LYS:CE	7:B:1729:HOH:O	2.41	0.51
1:A:16[B]:LYS:CD	7:A:8662:HOH:O	2.59	0.50
1:A:309[A]:TYR:O	1:A:310:LYS:HG2	2.11	0.50
1:A:415[B]:SER:O	1:A:416:HIS:HB2	2.12	0.50
2:A:701[B]:EDO:H12	7:A:8187:HOH:O	2.12	0.49
1:B:59:LYS:HE3	1:B:291:GLU:OE2	2.12	0.49
1:A:618:GLY:O	1:A:621:THR:OG1	2.30	0.49
1:A:281:LYS:HE2	7:A:8681:HOH:O	2.12	0.48
1:A:491:GLN:HB2	7:A:8719:HOH:O	2.13	0.48
1:A:131:ALA:HB2	2:A:717[A]:EDO:C1	2.45	0.47
1:A:200[A]:ASP:HB2	7:A:8737:HOH:O	2.14	0.47
1:A:168:ALA:HB3	2:A:710[A]:EDO:H22	1.96	0.47
1:A:499:LYS:HE2	1:A:499:LYS:H	1.80	0.46
1:A:521:LEU:O	1:A:524:LYS:HD3	2.16	0.46
1:B:573:SER:OG	1:B:586[B]:HIS:HE1	1.99	0.45
1:A:169:PHE:HB2	2:A:710[A]:EDO:H11	1.98	0.45
1:B:474:ARG:NH2	7:B:1724[A]:HOH:O	2.50	0.45
1:B:300:ASN:ND2	7:B:1639:HOH:O	2.49	0.45
1:A:497:LYS:NZ	7:A:8734:HOH:O	2.50	0.45
1:B:271:ILE:HD13	7:B:1759:HOH:O	2.16	0.44
1:B:297:ASP:O	1:B:334:ARG:NH2	2.50	0.44
1:B:498:SER:O	1:B:530:ARG:NH2	2.50	0.44
2:B:1008:EDO:O2	2:B:1009:EDO:H21	2.16	0.44
1:A:614:GLN:HB2	1:A:614:GLN:HE21	1.45	0.44
1:B:309:TYR:O	1:B:483[A]:ASN:ND2	2.48	0.44
1:B:16[C]:LYS:CD	7:B:1729:HOH:O	2.63	0.44
1:B:164:TRP:CD1	2:B:1008:EDO:H21	2.52	0.44
1:A:433:ASP:HB3	7:A:8179:HOH:O	2.17	0.44
1:A:174[A]:LYS:NZ	7:A:8547:HOH:O	2.50	0.44
1:A:33:ALA:O	2:B:1011[A]:EDO:H22	2.18	0.44
1:B:499:LYS:HG3	7:B:1772:HOH:O	2.17	0.44
1:A:373:ALA:HB2	1:A:386[A]:CYS:SG	2.58	0.43
2:A:704:EDO:H11	7:A:8638:HOH:O	2.19	0.43
1:A:443:SER:HA	1:A:467:ILE:O	2.19	0.43
1:B:2:GLU:N	7:B:1660:HOH:O	2.52	0.43
1:A:441[B]:PRO:O	1:A:442[B]:THR:OG1	2.30	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:10[B]:GLN:HG2	2:A:711:EDO:C2	2.49	0.42
1:A:264:LYS:NZ	7:A:8692:HOH:O	2.50	0.42
1:B:443:SER:HA	1:B:467:ILE:O	2.19	0.42
1:B:503[A]:VAL:HG12	1:B:529:ILE:HG22	2.02	0.42
1:B:16[C]:LYS:HG3	7:B:1231:HOH:O	2.19	0.41
1:B:569:GLY:HA3	1:B:586[A]:HIS:CE1	2.54	0.41
1:B:546:LEU:O	1:B:550:ARG:HG3	2.20	0.41
1:B:146[B]:SER:OG	1:B:292:ASP:OD2	2.30	0.41
1:B:550:ARG:NH2	1:B:579:GLU:OE1	2.54	0.41
1:B:2:GLU:N	1:B:2:GLU:OE2	2.53	0.41
1:A:310:LYS:HA	7:A:8512:HOH:O	2.20	0.40
1:B:433:ASP:HB3	7:B:1456:HOH:O	2.20	0.40
1:A:301:ILE:HG22	1:A:328:LEU:HD11	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	652/637 (102%)	631 (97%)	20 (3%)	1 (0%)	52	20
1	B	652/637 (102%)	634 (97%)	17 (3%)	1 (0%)	52	20
All	All	1304/1274 (102%)	1265 (97%)	37 (3%)	2 (0%)	52	20

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	593	PRO
1	A	593	PRO

### 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	536/518 (104%)	525 (98%)	11 (2%)	61	19
1	B	536/518 (104%)	521 (97%)	15 (3%)	51	10
All	All	1072/1036 (104%)	1046 (98%)	26 (2%)	60	15

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	94[A]	GLU
1	A	94[B]	GLU
1	A	112	VAL
1	A	310	LYS
1	A	412[A]	LEU
1	A	412[B]	LEU
1	A	432	GLU
1	A	447	TYR
1	A	499	LYS
1	A	553	LYS
1	A	594	ARG
1	B	2	GLU
1	B	3[A]	SER
1	B	3[B]	SER
1	B	98	LEU
1	B	112	VAL
1	B	310	LYS
1	B	412[A]	LEU
1	B	412[B]	LEU
1	B	432	GLU
1	B	447	TYR
1	B	497	LYS
1	B	499	LYS
1	B	524	LYS
1	B	594	ARG
1	B	601	LEU

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	198	GLN
1	A	230	GLN
1	A	614	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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 40 ligands modelled in this entry, 4 are monoatomic - leaving 36 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
2	EDO	A	701[A]	-	3,3,3	0.42	0	2,2,2	0.66	0
2	EDO	A	701[B]	-	3,3,3	0.33	0	2,2,2	0.79	0
2	EDO	A	702	-	3,3,3	0.28	0	2,2,2	1.00	0
2	EDO	A	703	-	3,3,3	0.33	0	2,2,2	0.31	0
2	EDO	A	704	-	3,3,3	0.09	0	2,2,2	0.31	0
2	EDO	A	705	-	3,3,3	0.52	0	2,2,2	0.35	0
2	EDO	A	706	-	3,3,3	0.47	0	2,2,2	0.30	0
5	1U0	A	709[A]	-	25,31,31	2.77	9 (36%)	32,46,46	1.86	7 (21%)
5	1U0	A	709[B]	-	25,31,31	2.76	8 (32%)	32,46,46	1.86	7 (21%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	EDO	A	710[A]	-	3,3,3	0.40	0	2,2,2	0.56	0
2	EDO	A	711	-	3,3,3	0.54	0	2,2,2	0.80	0
2	EDO	A	712	-	3,3,3	0.43	0	2,2,2	0.93	0
2	EDO	A	713	-	3,3,3	0.66	0	2,2,2	1.46	0
2	EDO	A	714	-	3,3,3	0.39	0	2,2,2	0.61	0
2	EDO	A	715	-	3,3,3	0.34	0	2,2,2	0.51	0
6	SO4	A	716[B]	-	4,4,4	0.84	0	6,6,6	1.86	2 (33%)
2	EDO	A	717[A]	-	3,3,3	0.36	0	2,2,2	0.49	0
2	EDO	A	717[B]	-	3,3,3	0.39	0	2,2,2	0.85	0
2	EDO	A	718	-	3,3,3	0.31	0	2,2,2	0.53	0
2	EDO	B	1001	-	3,3,3	0.26	0	2,2,2	0.91	0
2	EDO	B	1002	-	3,3,3	0.57	0	2,2,2	0.26	0
2	EDO	B	1003	-	3,3,3	0.46	0	2,2,2	0.35	0
2	EDO	B	1004	-	3,3,3	0.53	0	2,2,2	0.55	0
2	EDO	B	1005	-	3,3,3	0.49	0	2,2,2	0.09	0
5	1U0	B	1006[A]	-	25,31,31	2.43	7 (28%)	32,46,46	2.40	12 (37%)
5	1U0	B	1006[B]	-	25,31,31	2.43	7 (28%)	32,46,46	2.44	12 (37%)
2	EDO	B	1008	-	3,3,3	0.46	0	2,2,2	0.83	0
2	EDO	B	1009	-	3,3,3	0.29	0	2,2,2	0.65	0
2	EDO	B	1010	-	3,3,3	0.41	0	2,2,2	0.66	0
2	EDO	B	1011[A]	-	3,3,3	0.46	0	2,2,2	0.70	0
2	EDO	B	1011[B]	-	3,3,3	0.28	0	2,2,2	0.43	0
2	EDO	B	1012	-	3,3,3	0.45	0	2,2,2	0.68	0
6	SO4	B	1013	-	4,4,4	0.75	0	6,6,6	1.54	1 (16%)
2	EDO	B	1015	-	3,3,3	0.34	0	2,2,2	0.49	0
2	EDO	B	1016	-	3,3,3	0.27	0	2,2,2	1.05	0
2	EDO	B	1017	-	3,3,3	0.28	0	2,2,2	0.48	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	EDO	A	701[A]	-	-	0/1/1/1	0/0/0/0
2	EDO	A	701[B]	-	-	0/1/1/1	0/0/0/0
2	EDO	A	702	-	-	0/1/1/1	0/0/0/0
2	EDO	A	703	-	-	0/1/1/1	0/0/0/0
2	EDO	A	704	-	-	0/1/1/1	0/0/0/0
2	EDO	A	705	-	-	0/1/1/1	0/0/0/0
2	EDO	A	706	-	-	0/1/1/1	0/0/0/0
5	1U0	A	709[A]	-	-	0/18/23/23	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	1U0	A	709[B]	-	-	0/18/23/23	0/2/2/2
2	EDO	A	710[A]	-	-	0/1/1/1	0/0/0/0
2	EDO	A	711	-	-	0/1/1/1	0/0/0/0
2	EDO	A	712	-	-	0/1/1/1	0/0/0/0
2	EDO	A	713	-	-	0/1/1/1	0/0/0/0
2	EDO	A	714	-	-	0/1/1/1	0/0/0/0
2	EDO	A	715	-	-	0/1/1/1	0/0/0/0
6	SO4	A	716[B]	-	-	0/0/0/0	0/0/0/0
2	EDO	A	717[A]	-	-	0/1/1/1	0/0/0/0
2	EDO	A	717[B]	-	-	0/1/1/1	0/0/0/0
2	EDO	A	718	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1001	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1002	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1003	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1004	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1005	-	-	0/1/1/1	0/0/0/0
5	1U0	B	1006[A]	-	-	0/18/23/23	0/2/2/2
5	1U0	B	1006[B]	-	-	0/18/23/23	0/2/2/2
2	EDO	B	1008	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1009	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1010	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1011[A]	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1011[B]	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1012	-	-	0/1/1/1	0/0/0/0
6	SO4	B	1013	-	-	0/0/0/0	0/0/0/0
2	EDO	B	1015	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1016	-	-	0/1/1/1	0/0/0/0
2	EDO	B	1017	-	-	0/1/1/1	0/0/0/0

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	709[A]	1U0	C7'-C5'	-3.94	1.44	1.52
5	A	709[B]	1U0	C7'-C5'	-3.94	1.44	1.52
5	A	709[A]	1U0	PB-O2B	-2.23	1.46	1.54
5	A	709[B]	1U0	PB-O2B	-2.23	1.46	1.54
5	B	1006[B]	1U0	C7'-C3	2.07	1.57	1.52
5	B	1006[A]	1U0	C7'-C3	2.07	1.57	1.52
5	A	709[A]	1U0	O10-C9	2.32	1.52	1.42
5	B	1006[B]	1U0	C2-C8	2.58	1.54	1.51
5	B	1006[A]	1U0	C2-C8	2.58	1.54	1.51
5	A	709[A]	1U0	C6'-C5'	2.95	1.44	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	709[B]	1U0	C6'-C5'	2.95	1.44	1.37
5	A	709[A]	1U0	C6'-N1'	2.96	1.40	1.34
5	A	709[B]	1U0	C6'-N1'	2.96	1.40	1.34
5	B	1006[B]	1U0	C2'-N3'	2.97	1.39	1.34
5	B	1006[A]	1U0	C2'-N3'	2.97	1.39	1.34
5	A	709[A]	1U0	C2-S1	3.12	1.80	1.74
5	A	709[B]	1U0	C2-S1	3.12	1.80	1.74
5	A	709[A]	1U0	C3-C4	3.13	1.47	1.37
5	A	709[B]	1U0	C3-C4	3.13	1.47	1.37
5	B	1006[B]	1U0	C2-S1	3.29	1.80	1.74
5	B	1006[A]	1U0	C2-S1	3.29	1.80	1.74
5	B	1006[B]	1U0	C4'-N4'	3.39	1.42	1.34
5	B	1006[A]	1U0	C4'-N4'	3.39	1.42	1.34
5	B	1006[B]	1U0	C3-C4	5.13	1.52	1.37
5	B	1006[A]	1U0	C3-C4	5.13	1.52	1.37
5	A	709[A]	1U0	C2-C8	7.34	1.58	1.51
5	A	709[B]	1U0	C2-C8	7.34	1.58	1.51
5	A	709[A]	1U0	O9-C8	7.79	1.60	1.42
5	A	709[B]	1U0	O9-C8	7.79	1.60	1.42
5	B	1006[B]	1U0	O9-C8	8.10	1.61	1.42
5	B	1006[A]	1U0	O9-C8	8.10	1.61	1.42

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1006[B]	1U0	O9-C8-C9	-7.16	95.43	109.97
5	B	1006[A]	1U0	O9-C8-C9	-6.84	96.08	109.97
5	A	709[B]	1U0	O9-C8-C9	-5.55	98.71	109.97
5	A	709[A]	1U0	O9-C8-C9	-5.51	98.79	109.97
5	B	1006[B]	1U0	N1'-C2'-N3'	-4.37	117.51	125.60
5	B	1006[A]	1U0	N1'-C2'-N3'	-4.37	117.51	125.60
5	A	709[A]	1U0	C5'-C4'-N4'	-4.14	116.17	122.25
5	A	709[B]	1U0	C5'-C4'-N4'	-4.14	116.17	122.25
5	B	1006[B]	1U0	N4'-C4'-N3'	-3.72	111.55	116.95
5	B	1006[A]	1U0	N4'-C4'-N3'	-3.72	111.55	116.95
5	B	1006[B]	1U0	C6'-C5'-C4'	-3.71	110.39	115.72
5	B	1006[A]	1U0	C6'-C5'-C4'	-3.71	110.39	115.72
5	B	1006[B]	1U0	O10-C9-C8	-3.11	103.03	111.17
6	B	1013	SO4	O2-S-O1	-2.72	100.87	109.50
5	A	709[A]	1U0	C6'-C5'-C4'	-2.69	111.86	115.72
5	A	709[B]	1U0	C6'-C5'-C4'	-2.69	111.86	115.72
6	A	716[B]	SO4	O2-S-O1	-2.66	101.08	109.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1006[A]	1U0	O10-C9-C8	-2.62	104.33	111.17
5	B	1006[B]	1U0	CM4-C4-C3	-2.38	120.27	125.24
5	B	1006[A]	1U0	CM4-C4-C3	-2.38	120.27	125.24
5	A	709[A]	1U0	N1'-C2'-N3'	-2.06	121.79	125.60
5	A	709[B]	1U0	N1'-C2'-N3'	-2.06	121.79	125.60
5	B	1006[B]	1U0	C5'-C4'-N3'	2.10	124.73	121.23
5	B	1006[A]	1U0	C5'-C4'-N3'	2.10	124.73	121.23
5	B	1006[B]	1U0	O2B-PB-O1B	2.31	118.02	110.58
5	B	1006[A]	1U0	O2B-PB-O1B	2.31	118.02	110.58
5	A	709[A]	1U0	N4'-C4'-N3'	2.34	120.34	116.95
5	A	709[B]	1U0	N4'-C4'-N3'	2.34	120.34	116.95
5	A	709[A]	1U0	O3B-PB-O2B	2.50	116.91	107.38
5	A	709[B]	1U0	O3B-PB-O2B	2.50	116.91	107.38
5	B	1006[B]	1U0	CM2-C2'-N1'	2.54	120.07	117.03
5	B	1006[A]	1U0	CM2-C2'-N1'	2.54	120.07	117.03
5	A	709[A]	1U0	C7'-C5'-C4'	2.94	125.97	122.21
5	A	709[B]	1U0	C7'-C5'-C4'	2.94	125.97	122.21
5	B	1006[B]	1U0	CM2-C2'-N3'	3.06	122.42	117.20
5	B	1006[A]	1U0	CM2-C2'-N3'	3.06	122.42	117.20
5	B	1006[B]	1U0	C6'-N1'-C2'	3.12	121.22	115.77
5	B	1006[A]	1U0	C6'-N1'-C2'	3.12	121.22	115.77
6	A	716[B]	SO4	O4-S-O3	3.29	122.38	108.98
5	B	1006[B]	1U0	C7'-C5'-C6'	4.93	129.03	121.72
5	B	1006[A]	1U0	C7'-C5'-C6'	4.93	129.03	121.72

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

12 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	701[B]	EDO	2	0
2	A	704	EDO	1	0
2	A	710[A]	EDO	2	0
2	A	711	EDO	1	0
2	A	713	EDO	1	0
2	A	717[A]	EDO	1	0
2	A	717[B]	EDO	1	0
2	A	718	EDO	2	0
2	B	1008	EDO	3	0
2	B	1009	EDO	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1011[A]	EDO	1	0
2	B	1015	EDO	1	0

## 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<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	620/637 (97%)	-0.49	6 (0%) 84 82	5, 9, 29, 73	0
1	B	620/637 (97%)	-0.41	8 (1%) 79 76	5, 11, 34, 75	0
All	All	1240/1274 (97%)	-0.45	14 (1%) 82 80	5, 10, 32, 75	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	298	ILE	5.0
1	B	620	ILE	4.3
1	A	298	ILE	4.0
1	A	296[A]	VAL	3.0
1	B	499	LYS	2.6
1	A	297	ASP	2.5
1	B	296	VAL	2.5
1	B	297	ASP	2.4
1	A	618	GLY	2.4
1	B	619	LEU	2.3
1	A	621	THR	2.3
1	B	524	LYS	2.1
1	A	500	ASP	2.1
1	B	498	SER	2.1

### 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 ⓘ

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	EDO	A	710[A]	4/4	0.59	0.29	18.85	67,69,69,71	0
2	EDO	A	715	4/4	0.74	0.24	16.97	43,46,83,84	0
2	EDO	B	1011[B]	4/4	0.93	0.12	11.66	6,7,7,9	4
2	EDO	B	1011[A]	4/4	0.93	0.12	10.89	19,21,31,59	4
6	SO4	B	1013	5/5	0.86	0.15	9.14	41,46,47,49	0
6	SO4	A	716[B]	5/5	0.84	0.14	8.82	35,38,43,43	0
2	EDO	A	717[A]	4/4	0.95	0.14	8.34	6,12,13,14	4
2	EDO	B	1009	4/4	0.90	0.14	7.90	23,28,31,60	0
2	EDO	A	717[B]	4/4	0.95	0.14	7.29	22,28,36,40	4
2	EDO	A	718	4/4	0.83	0.21	6.73	28,66,70,87	0
2	EDO	A	701[B]	4/4	0.97	0.09	6.41	28,29,31,33	4
2	EDO	A	701[A]	4/4	0.97	0.09	6.09	8,8,11,11	4
2	EDO	A	714	4/4	0.93	0.09	4.97	20,22,23,23	0
2	EDO	B	1003	4/4	0.95	0.08	3.94	13,22,23,23	0
2	EDO	B	1015	4/4	0.95	0.12	3.43	16,40,42,45	0
2	EDO	A	713	4/4	0.96	0.09	3.17	14,18,20,30	0
2	EDO	B	1008	4/4	0.96	0.09	3.05	13,17,18,19	0
2	EDO	B	1004	4/4	0.98	0.07	2.68	11,14,15,17	0
2	EDO	A	703	4/4	0.97	0.07	2.26	9,12,13,14	0
2	EDO	B	1016	4/4	0.97	0.09	1.95	14,23,27,32	0
2	EDO	A	705	4/4	0.98	0.05	1.92	9,10,12,16	0
2	EDO	A	711	4/4	0.91	0.08	1.72	21,25,26,28	0
2	EDO	A	702	4/4	0.91	0.10	1.32	21,23,25,28	0
2	EDO	B	1012	4/4	0.96	0.07	0.85	21,25,27,28	0
2	EDO	B	1010	4/4	0.94	0.07	0.68	25,27,31,41	0
2	EDO	B	1005	4/4	0.99	0.05	0.54	8,11,12,13	0
2	EDO	B	1001	4/4	0.93	0.07	0.39	19,19,22,32	0
2	EDO	A	706	4/4	0.98	0.05	0.38	11,17,17,18	0
2	EDO	A	704	4/4	0.98	0.05	0.26	11,16,18,21	0
5	1U0	A	709[A]	30/30	0.99	0.05	-0.21	4,6,9,18	2
2	EDO	B	1002	4/4	0.98	0.05	-0.24	10,14,15,15	0
5	1U0	B	1006[A]	30/30	0.99	0.05	-0.34	5,6,8,9	2
5	1U0	B	1006[B]	30/30	0.99	0.05	-0.34	5,6,9,17	2
5	1U0	A	709[B]	30/30	0.99	0.05	-0.63	4,6,10,15	2

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	CA	B	1007	1/1	1.00	0.03	-1.86	6,6,6,6	0
4	NA	B	1014	1/1	1.00	0.04	-2.47	11,11,11,11	0
4	NA	A	708	1/1	1.00	0.02	-2.76	7,7,7,7	0
3	CA	A	707	1/1	1.00	0.03	-3.72	6,6,6,6	0
2	EDO	B	1017	4/4	0.74	0.13	-	47,49,53,54	0
2	EDO	A	712	4/4	0.90	0.09	-	29,30,30,31	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.