



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 09:17 pm GMT

PDB ID : 1Z82
Title : Crystal structure of glycerol-3-phosphate dehydrogenase (TM0378) from THERMOTOGA MARITIMA at 2.00 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2005-03-29
Resolution : 2.00 Å(reported)

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

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

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity	:	4.02b-467
Mogul	:	1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix)	:	1.9-1692
EDS	:	trunk28620
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
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)	:	recalc28949

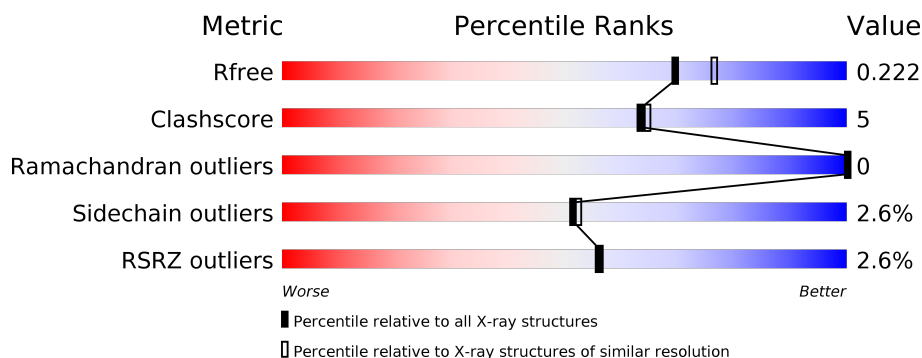
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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}	100719	6609 (2.00-2.00)
Clashscore	112137	7775 (2.00-2.00)
Ramachandran outliers	110173	7679 (2.00-2.00)
Sidechain outliers	110143	7678 (2.00-2.00)
RSRZ outliers	101464	6696 (2.00-2.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	335	<div> <div>3%</div> <div> <div></div> <div>84%</div> <div>8% • 7%</div> </div> </div>
1	B	335	<div> <div>%</div> <div> <div></div> <div>84%</div> <div>8% • 7%</div> </div> </div>

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	G3H	A	600	X	-	-	-
4	G3P	B	600	X	-	-	-
5	MRD	B	601	-	-	-	X
5	MRD	B	602	-	-	-	X
5	MRD	B	603	-	-	-	X
6	MPD	A	602	-	-	-	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 5339 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 glycerol-3-phosphate dehydrogenase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	312	Total	C	N	O	S	Se	0	4	0
			2422	1548	415	445	3	11			
1	B	312	Total	C	N	O	S	Se	0	2	0
			2414	1543	413	444	3	11			

There are 46 discrepancies between the modelled and reference sequences:

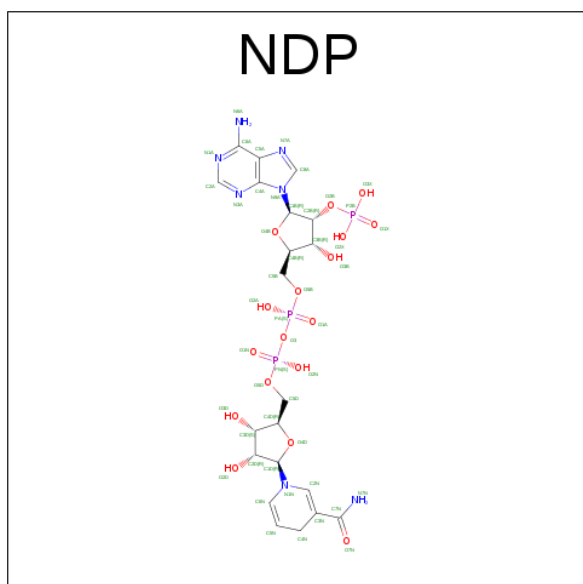
Chain	Residue	Modelled	Actual	Comment	Reference
A	-11	MET	-	LEADER SEQUENCE	GB 15644628
A	-10	GLY	-	LEADER SEQUENCE	GB 15644628
A	-9	SER	-	LEADER SEQUENCE	GB 15644628
A	-8	ASP	-	LEADER SEQUENCE	GB 15644628
A	-7	LYS	-	LEADER SEQUENCE	GB 15644628
A	-6	ILE	-	LEADER SEQUENCE	GB 15644628
A	-5	HIS	-	LEADER SEQUENCE	GB 15644628
A	-4	HIS	-	LEADER SEQUENCE	GB 15644628
A	-3	HIS	-	LEADER SEQUENCE	GB 15644628
A	-2	HIS	-	LEADER SEQUENCE	GB 15644628
A	-1	HIS	-	LEADER SEQUENCE	GB 15644628
A	0	HIS	-	LEADER SEQUENCE	GB 15644628
A	1	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	3	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	20	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	94	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	215	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	225	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	234	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	278	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	288	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	308	MSE	MET	MODIFIED RESIDUE	GB 15644628
A	312	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	-11	MET	-	LEADER SEQUENCE	GB 15644628
B	-10	GLY	-	LEADER SEQUENCE	GB 15644628

Continued on next page...

Continued from previous page...

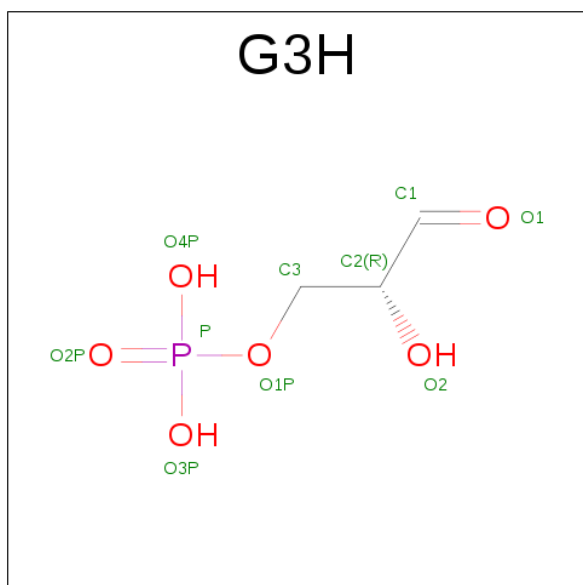
Chain	Residue	Modelled	Actual	Comment	Reference
B	-9	SER	-	LEADER SEQUENCE	GB 15644628
B	-8	ASP	-	LEADER SEQUENCE	GB 15644628
B	-7	LYS	-	LEADER SEQUENCE	GB 15644628
B	-6	ILE	-	LEADER SEQUENCE	GB 15644628
B	-5	HIS	-	LEADER SEQUENCE	GB 15644628
B	-4	HIS	-	LEADER SEQUENCE	GB 15644628
B	-3	HIS	-	LEADER SEQUENCE	GB 15644628
B	-2	HIS	-	LEADER SEQUENCE	GB 15644628
B	-1	HIS	-	LEADER SEQUENCE	GB 15644628
B	0	HIS	-	LEADER SEQUENCE	GB 15644628
B	1	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	3	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	20	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	94	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	215	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	225	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	234	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	278	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	288	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	308	MSE	MET	MODIFIED RESIDUE	GB 15644628
B	312	MSE	MET	MODIFIED RESIDUE	GB 15644628

- Molecule 2 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula: $C_{21}H_{30}N_7O_{17}P_3$).



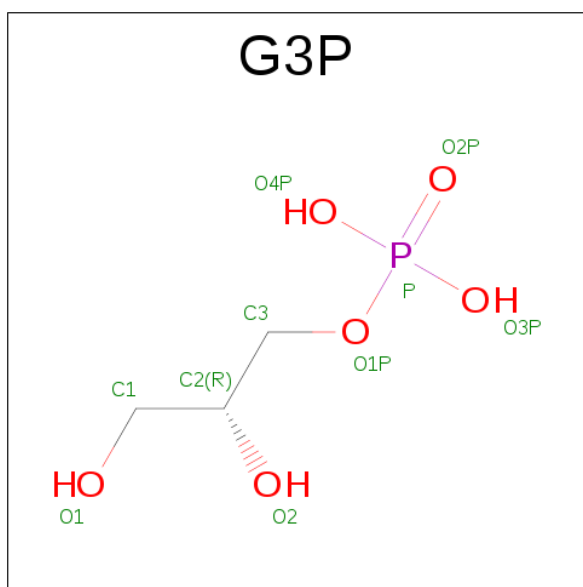
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	B	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 3 is GLYCERALDEHYDE-3-PHOSPHATE (three-letter code: G3H) (formula: $C_3H_7O_6P$).



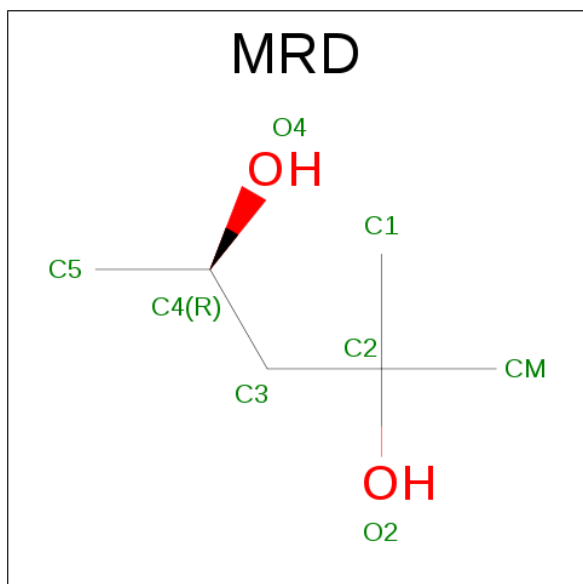
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	O	P	0	0
			10	3	6	1		

- Molecule 4 is SN-GLYCEROL-3-PHOSPHATE (three-letter code: G3P) (formula: $C_3H_9O_6P$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	B	1	Total	C	O	P	0	0
			10	3	6	1		

- Molecule 5 is (4R)-2-METHYLPENTANE-2,4-DIOL (three-letter code: MRD) (formula: $C_6H_{14}O_2$).



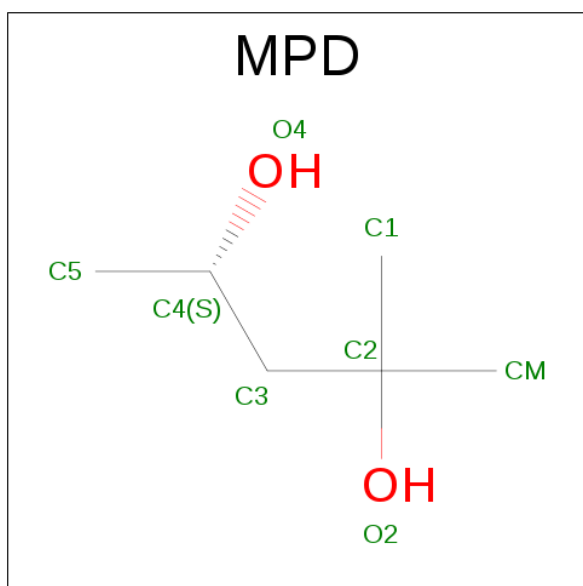
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	C	O	0	0
			8	6	2		
5	A	1	Total	C	O	0	0
			8	6	2		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	C	O	0	0
			8	6	2		
5	B	1	Total	C	O	0	0
			8	6	2		
5	B	1	Total	C	O	0	0
			8	6	2		

- Molecule 6 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula: $C_6H_{14}O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			8	6	2		
6	A	1	Total	C	O	0	0
			8	6	2		
6	A	1	Total	C	O	0	0
			8	6	2		

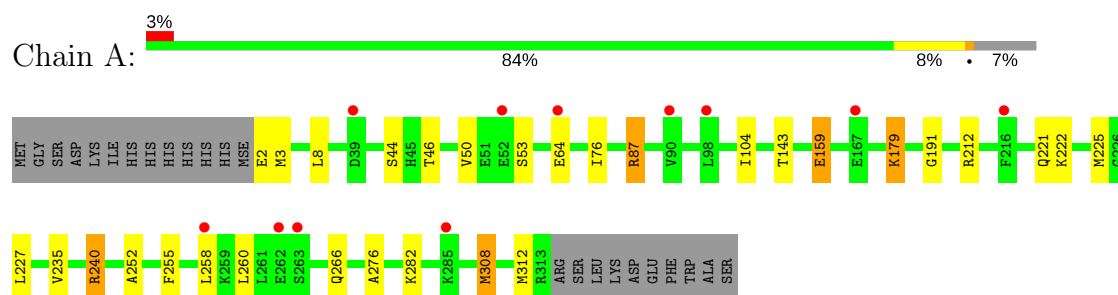
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	161	Total	O	0	0
			161	161		
7	B	162	Total	O	0	0
			162	162		

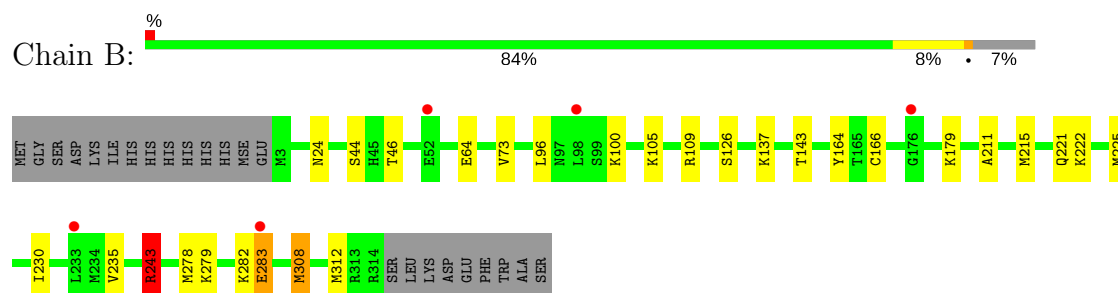
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: glycerol-3-phosphate dehydrogenase



- Molecule 1: glycerol-3-phosphate dehydrogenase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	65.09Å 67.45Å 75.60Å 90.00° 113.67° 90.00°	Depositor
Resolution (Å)	29.81 – 2.00 29.81 – 2.00	Depositor EDS
% Data completeness (in resolution range)	98.3 (29.81-2.00) 98.4 (29.81-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.35 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.166 , 0.211 0.177 , 0.222	Depositor DCC
R_{free} test set	2024 reflections (5.33%)	DCC
Wilson B-factor (Å ²)	23.0	Xtriage
Anisotropy	0.804	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 52.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.019 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	5339	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.81% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MRD, G3P, MPD, NDP, G3H

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	0.73	1/2470 (0.0%)	0.74	5/3321 (0.2%)
1	B	0.76	1/2453 (0.0%)	0.77	3/3298 (0.1%)
All	All	0.75	2/4923 (0.0%)	0.76	8/6619 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	166	CYS	CB-SG	-5.59	1.72	1.81
1	A	159	GLU	CB-CG	5.50	1.62	1.52

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	243	ARG	NE-CZ-NH2	-9.40	115.60	120.30
1	B	243	ARG	NE-CZ-NH1	7.55	124.08	120.30
1	B	109	ARG	NE-CZ-NH2	-6.85	116.88	120.30
1	A	87	ARG	NE-CZ-NH1	6.09	123.35	120.30
1	A	240	ARG	NE-CZ-NH1	6.04	123.32	120.30
1	A	240	ARG	NE-CZ-NH2	-5.93	117.34	120.30
1	A	87	ARG	NE-CZ-NH2	-5.86	117.37	120.30
1	A	212	ARG	NE-CZ-NH2	-5.29	117.65	120.30

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	2422	0	2452	25	0
1	B	2414	0	2438	21	0
2	A	48	0	26	1	0
2	B	48	0	26	1	0
3	A	10	0	5	1	0
4	B	10	0	7	1	0
5	A	8	0	14	0	0
5	B	32	0	56	1	0
6	A	24	0	42	5	0
7	A	161	0	0	2	0
7	B	162	0	0	4	0
All	All	5339	0	5066	49	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 5.

All (49) 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:A:312:MSE:SE	1:A:312:MSE:CE	2.15	1.44
1:A:308:MSE:HE1	1:A:312:MSE:SE	1.90	1.21
1:B:308:MSE:CE	1:B:312:MSE:SE	2.54	1.05
2:B:500:NDP:H8A	7:B:652:HOH:O	1.60	1.01
1:B:308:MSE:HE1	1:B:312:MSE:SE	2.16	0.96
1:A:308:MSE:CE	1:A:312:MSE:SE	2.67	0.92
1:B:308:MSE:HE3	1:B:312:MSE:SE	2.21	0.89
1:B:211:ALA:HB1	1:B:215:MSE:CE	2.12	0.79
1:B:211:ALA:HB1	1:B:215:MSE:HE3	1.65	0.79
2:A:500:NDP:H8A	7:A:664:HOH:O	1.89	0.72
1:A:222:LYS:HA	1:A:225[B]:MSE:HE3	1.76	0.68
1:B:44[A]:SER:OG	1:B:46:THR:HG22	1.97	0.64
1:B:215:MSE:HE2	1:B:221:GLN:HA	1.79	0.64
1:A:258:LEU:C	1:A:258:LEU:HD23	2.24	0.58
1:A:44:SER:O	1:A:46:THR:HG23	2.03	0.58
1:B:222:LYS:HA	1:B:225[A]:MSE:HE3	1.86	0.58
1:A:266:GLN:HB2	6:A:603:MPD:H51	1.85	0.57
1:A:191:GLY:HA3	1:A:252:ALA:HB3	1.89	0.55
1:A:308:MSE:HE2	1:A:312:MSE:HG3	1.88	0.55
1:B:211:ALA:HB1	1:B:215:MSE:HE1	1.89	0.55

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:240:ARG:HD3	7:B:641:HOH:O	2.06	0.55
1:A:104:ILE:HA	1:A:276:ALA:HB2	1.91	0.52
6:A:602:MPD:H53	7:A:735:HOH:O	2.08	0.52
3:A:600:G3H:O4P	1:B:243:ARG:HD3	2.10	0.52
1:B:279:LYS:O	1:B:283:GLU:OE1	2.28	0.51
1:A:308:MSE:HE2	1:A:308:MSE:O	2.13	0.49
1:A:260:LEU:HD22	6:A:603:MPD:HM3	1.94	0.48
1:A:255:PHE:CD1	6:A:604:MPD:H11	2.49	0.47
1:A:179:LYS:NZ	4:B:600:G3P:H2	2.30	0.47
1:A:308:MSE:CE	1:A:312:MSE:HG3	2.45	0.47
1:B:308:MSE:HA	5:B:601:MRD:O2	2.15	0.46
1:A:8:LEU:HG	1:A:76:ILE:HD11	1.98	0.46
1:A:222:LYS:CA	1:A:225[B]:MSE:HE3	2.45	0.44
1:A:308:MSE:CE	1:A:312:MSE:CG	2.96	0.43
1:B:24:ASN:ND2	7:B:763:HOH:O	2.39	0.43
1:A:221:GLN:HG2	1:A:225[B]:MSE:HE2	2.00	0.42
1:A:282:LYS:HD3	1:A:282:LYS:HA	1.86	0.42
1:B:215:MSE:CE	1:B:221:GLN:HG3	2.49	0.42
1:B:278:MSE:O	1:B:282:LYS:HG2	2.20	0.42
1:B:143:THR:HA	1:B:164:TYR:O	2.20	0.41
1:A:255:PHE:CE1	6:A:604:MPD:H11	2.55	0.41
1:A:143[A]:THR:HG23	1:A:227:LEU:HB2	2.03	0.41
1:B:230:ILE:HD12	1:B:230:ILE:HA	1.92	0.41
1:B:100:LYS:HE2	1:B:126:SER:OG	2.21	0.41
1:B:137:LYS:HE3	7:B:713:HOH:O	2.20	0.41
1:B:222:LYS:HA	1:B:225[A]:MSE:CE	2.50	0.41
1:A:2:GLU:HG2	1:A:3:MSE:HE3	2.02	0.41
1:B:73:VAL:HA	1:B:96:LEU:O	2.21	0.40
1:A:50:VAL:HG12	1:A:53:SER:HB3	2.04	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	314/335 (94%)	308 (98%)	6 (2%)	0	100	100
1	B	312/335 (93%)	303 (97%)	9 (3%)	0	100	100
All	All	626/670 (93%)	611 (98%)	15 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	256/272 (94%)	250 (98%)	6 (2%)	56	58
1	B	253/272 (93%)	246 (97%)	7 (3%)	49	49
All	All	509/544 (94%)	496 (97%)	13 (3%)	51	52

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

Mol	Chain	Res	Type
1	A	64	GLU
1	A	87	ARG
1	A	159	GLU
1	A	179	LYS
1	A	235	VAL
1	A	308	MSE
1	B	64	GLU
1	B	105	LYS
1	B	179	LYS
1	B	235	VAL
1	B	243	ARG
1	B	283	GLU
1	B	308	MSE

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	148	ASN
1	A	265	ASN
1	B	24	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

12 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	NDP	A	500	-	43,52,52	1.63	5 (11%)	49,80,80	1.98	9 (18%)
3	G3H	A	600	-	9,9,9	2.02	1 (11%)	10,12,12	2.12	2 (20%)
5	MRD	A	601	-	7,7,7	0.39	0	9,10,10	0.51	0
6	MPD	A	602	-	7,7,7	0.40	0	9,10,10	0.99	1 (11%)
6	MPD	A	603	-	7,7,7	0.38	0	9,10,10	0.52	0
6	MPD	A	604	-	7,7,7	0.22	0	9,10,10	0.77	0
2	NDP	B	500	-	43,52,52	1.72	5 (11%)	49,80,80	2.03	9 (18%)
4	G3P	B	600	-	9,9,9	0.68	0	11,12,12	1.19	1 (9%)
5	MRD	B	601	-	7,7,7	0.31	0	9,10,10	0.33	0
5	MRD	B	602	-	7,7,7	0.34	0	9,10,10	0.83	0
5	MRD	B	603	-	7,7,7	0.30	0	9,10,10	0.39	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	MRD	B	604	-	7,7,7	0.33	0	9,10,10	0.61	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	NDP	A	500	-	-	0/30/77/77	0/5/5/5
3	G3H	A	600	-	1/1/2/3	0/6/8/8	0/0/0/0
5	MRD	A	601	-	-	0/5/5/5	0/0/0/0
6	MPD	A	602	-	-	0/5/5/5	0/0/0/0
6	MPD	A	603	-	-	0/5/5/5	0/0/0/0
6	MPD	A	604	-	-	0/5/5/5	0/0/0/0
2	NDP	B	500	-	-	0/30/77/77	0/5/5/5
4	G3P	B	600	-	1/1/2/2	0/8/8/8	0/0/0/0
5	MRD	B	601	-	-	0/5/5/5	0/0/0/0
5	MRD	B	602	-	-	0/5/5/5	0/0/0/0
5	MRD	B	603	-	-	0/5/5/5	0/0/0/0
5	MRD	B	604	-	-	0/5/5/5	0/0/0/0

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	500	NDP	C4A-N3A	-2.15	1.32	1.35
2	A	500	NDP	C4A-N3A	-2.09	1.32	1.35
2	B	500	NDP	C6N-C5N	2.33	1.37	1.33
2	A	500	NDP	C6N-C5N	2.92	1.38	1.33
2	A	500	NDP	C2A-N1A	3.46	1.40	1.33
2	A	500	NDP	C2A-N3A	3.73	1.38	1.32
2	B	500	NDP	C2A-N3A	4.74	1.40	1.32
2	B	500	NDP	C2A-N1A	5.00	1.43	1.33
3	A	600	G3H	O1-C1	5.27	1.42	1.19
2	B	500	NDP	O7N-C7N	6.37	1.40	1.24
2	A	500	NDP	O7N-C7N	6.96	1.41	1.24

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	500	NDP	N3A-C2A-N1A	-9.24	120.81	128.86
2	B	500	NDP	C4B-O4B-C1B	-6.15	103.22	109.77
3	A	600	G3H	O1-C1-C2	-5.80	111.20	125.06

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	500	NDP	C5A-C6A-N6A	-4.51	111.27	120.47
2	B	500	NDP	N3A-C2A-N1A	-4.32	125.10	128.86
2	A	500	NDP	O4B-C1B-C2B	-3.96	99.66	106.59
2	A	500	NDP	C4B-O4B-C1B	-3.63	105.91	109.77
2	B	500	NDP	O4B-C1B-C2B	-3.31	100.81	106.59
2	B	500	NDP	C3B-C2B-C1B	-3.17	96.55	102.75
2	A	500	NDP	O4D-C1D-C2D	-2.81	100.42	106.64
2	A	500	NDP	C3B-C2B-C1B	-2.53	97.80	102.75
6	A	602	MPD	CM-C2-C1	-2.50	104.84	110.42
2	A	500	NDP	C3D-C2D-C1D	2.05	105.36	101.43
4	B	600	G3P	O2-C2-C1	2.40	120.18	108.84
3	A	600	G3H	O4P-P-O3P	2.52	117.78	107.61
2	A	500	NDP	N6A-C6A-N1A	2.69	124.11	118.77
2	A	500	NDP	C4A-C5A-N7A	3.05	112.36	109.41
2	B	500	NDP	N6A-C6A-N1A	3.37	125.44	118.77
2	A	500	NDP	O4D-C1D-N1N	3.57	115.27	108.07
2	B	500	NDP	O4D-C1D-N1N	3.90	115.92	108.07
2	B	500	NDP	C4A-C5A-N7A	4.40	113.66	109.41
2	B	500	NDP	C1B-N9A-C4A	5.42	136.00	126.64

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	B	600	G3P	C2
3	A	600	G3H	C2

There are no torsion outliers.

There are no ring outliers.

8 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	500	NDP	1	0
3	A	600	G3H	1	0
6	A	602	MPD	1	0
6	A	603	MPD	2	0
6	A	604	MPD	2	0
2	B	500	NDP	1	0
4	B	600	G3P	1	0
5	B	601	MRD	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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	302/335 (90%)	0.28	11 (3%) 43 44	22, 31, 40, 54	0
1	B	302/335 (90%)	0.13	5 (1%) 70 69	21, 31, 40, 51	0
All	All	604/670 (90%)	0.21	16 (2%) 56 56	21, 31, 40, 54	0

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	90	VAL	3.9
1	A	64	GLU	3.1
1	A	263	SER	3.0
1	A	52	GLU	2.8
1	B	283	GLU	2.7
1	A	39	ASP	2.5
1	A	285	LYS	2.5
1	B	98	LEU	2.4
1	A	262	GLU	2.4
1	A	216	PHE	2.4
1	A	167	GLU	2.4
1	A	258	LEU	2.3
1	B	52	GLU	2.3
1	A	98	LEU	2.3
1	B	233	LEU	2.2
1	B	176	GLY	2.2

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. 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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å ²)	Q<0.9
5	MRD	B	601	8/8	0.95	0.19	6.23	25,28,29,30	0
6	MPD	A	602	8/8	0.76	0.29	5.26	54,55,57,57	0
5	MRD	B	602	8/8	0.82	0.24	4.79	45,46,48,49	0
5	MRD	B	603	8/8	0.84	0.23	3.71	51,52,55,56	0
6	MPD	A	603	8/8	0.90	0.22	1.26	57,58,60,61	0
5	MRD	B	604	8/8	0.78	0.17	0.11	69,72,73,74	0
5	MRD	A	601	8/8	0.94	0.11	-0.38	30,33,34,35	0
2	NDP	A	500	48/48	0.94	0.12	-0.58	18,25,38,40	0
2	NDP	B	500	48/48	0.96	0.08	-1.41	16,22,34,35	0
4	G3P	B	600	10/10	0.98	0.08	-1.70	18,23,25,25	0
3	G3H	A	600	10/10	0.98	0.08	-1.89	18,21,22,22	0
6	MPD	A	604	8/8	0.76	0.28	-	65,67,69,69	0

6.5 Other polymers [i](#)

There are no such residues in this entry.