



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 9, 2018 – 05:23 pm GMT

PDB ID : 2D2I
Title : Crystal Structure of NADP-Dependent Glyceraldehyde-3-Phosphate Dehydrogenase from *Synechococcus* Sp. complexed with Nadp+
Authors : Kitatani, T.; Nakamura, Y.; Wada, K.; Kinoshita, T.; Tamoi, M.; Shigeoka, S.; Tada, T.
Deposited on : 2005-09-09
Resolution : 2.50 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7.3 (157068), CSD as539be (2018)
Xtriage (Phenix) : 1.13
EDS : trunk30967
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Refmac : 5.8.0158
CCP4 : 7.0 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30967

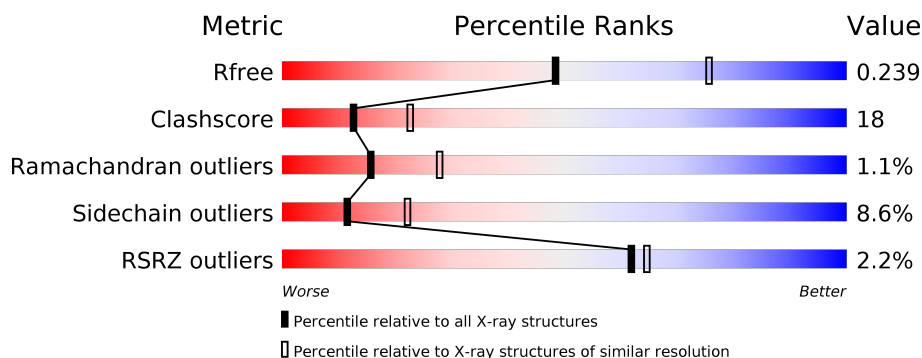
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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}	111664	4155 (2.50-2.50)
Clashscore	122126	4827 (2.50-2.50)
Ramachandran outliers	120053	4735 (2.50-2.50)
Sidechain outliers	120020	4737 (2.50-2.50)
RSRZ outliers	108989	4058 (2.50-2.50)

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	380	<div> <div>61%</div> <div>24%</div> <div>• •</div> <div>11%</div> </div>
1	B	380	<div> <div>63%</div> <div>21%</div> <div>5% •</div> <div>11%</div> </div>
1	O	380	<div> <div>62%</div> <div>23%</div> <div>•</div> <div>11%</div> </div>
1	P	380	<div> <div>3%</div> <div>58%</div> <div>28%</div> <div>• •</div> <div>11%</div> </div>
1	Q	380	<div> <div>4%</div> <div>59%</div> <div>27%</div> <div>•</div> <div>11%</div> </div>
1	R	380	<div> <div>2%</div> <div>61%</div> <div>24%</div> <div>•</div> <div>11%</div> </div>

2 Entry composition [i](#)

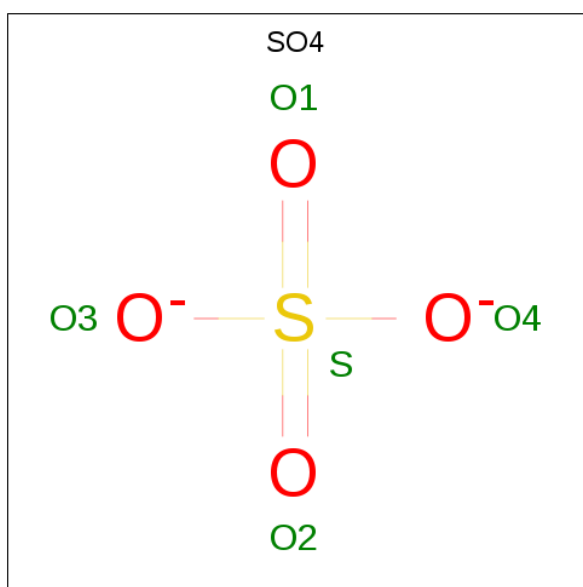
There are 4 unique types of molecules in this entry. The entry contains 16415 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 glyceraldehyde 3-phosphate dehydrogenase.

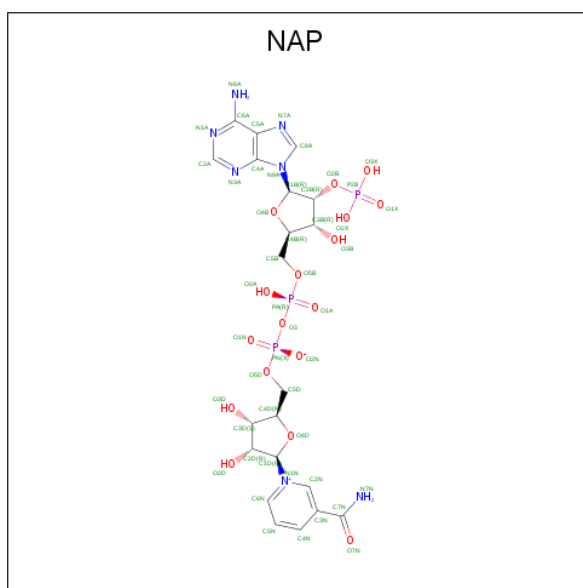
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	338	Total	C	N	O	S	0	0	0
			2588	1625	454	500	9			
1	B	338	Total	C	N	O	S	0	0	0
			2588	1625	454	500	9			
1	O	338	Total	C	N	O	S	0	0	0
			2588	1625	454	500	9			
1	P	338	Total	C	N	O	S	0	0	0
			2588	1625	454	500	9			
1	Q	338	Total	C	N	O	S	0	0	0
			2588	1625	454	500	9			
1	R	338	Total	C	N	O	S	0	0	0
			2588	1625	454	500	9			

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 5	O 4	S 1	0	0
2	A	1	Total 5	O 4	S 1	0	0
2	B	1	Total 5	O 4	S 1	0	0
2	B	1	Total 5	O 4	S 1	0	0
2	O	1	Total 5	O 4	S 1	0	0
2	O	1	Total 5	O 4	S 1	0	0
2	P	1	Total 5	O 4	S 1	0	0
2	P	1	Total 5	O 4	S 1	0	0
2	Q	1	Total 5	O 4	S 1	0	0
2	Q	1	Total 5	O 4	S 1	0	0
2	R	1	Total 5	O 4	S 1	0	0
2	R	1	Total 5	O 4	S 1	0	0

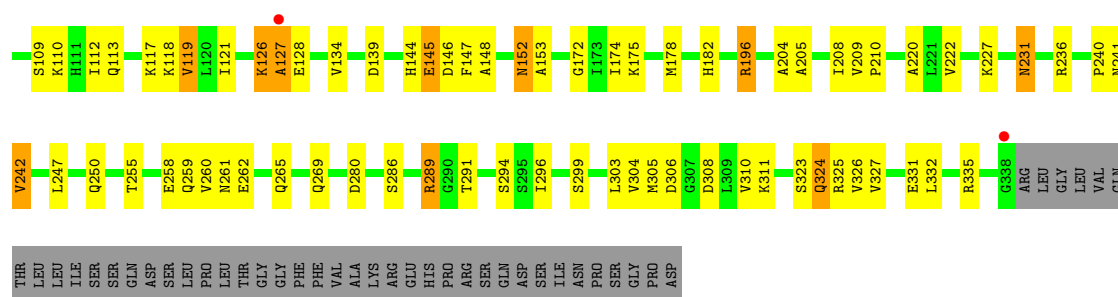
- Molecule 3 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: $C_{21}H_{28}N_7O_{17}P_3$).



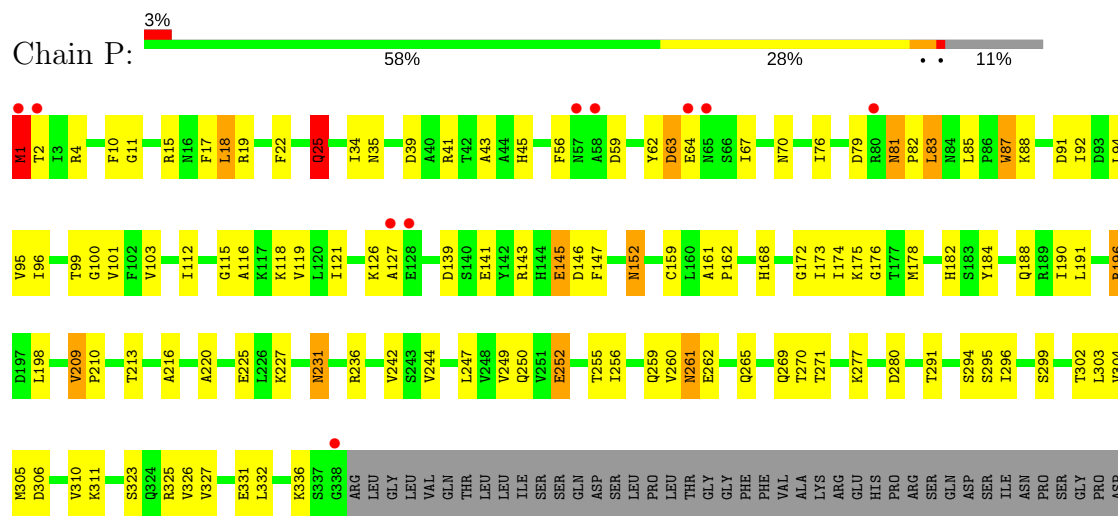
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	B	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	O	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	P	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	Q	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	R	1	Total 48	C 21	N 7	O 17	P 3	0	0

- Molecule 4 is water.

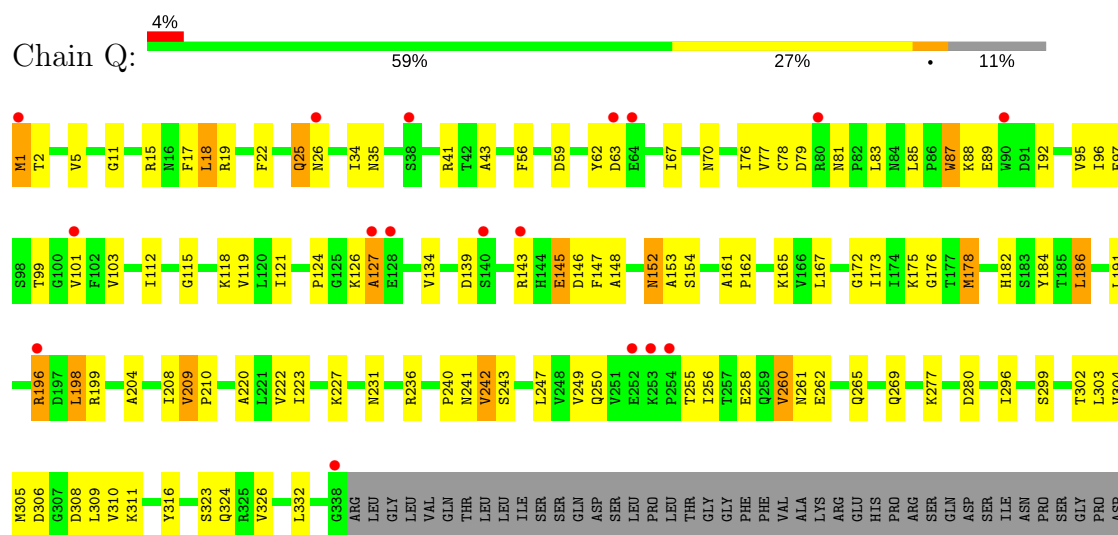
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	107	Total 107	O 107	0	0
4	B	142	Total 142	O 142	0	0
4	O	86	Total 86	O 86	0	0
4	P	82	Total 82	O 82	0	0
4	Q	47	Total 47	O 47	0	0
4	R	75	Total 75	O 75	0	0



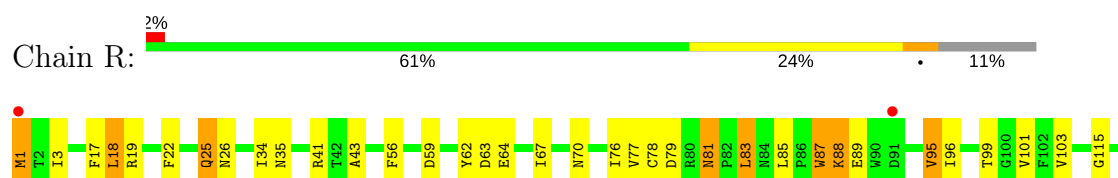
• Molecule 1: glyceraldehyde 3-phosphate dehydrogenase

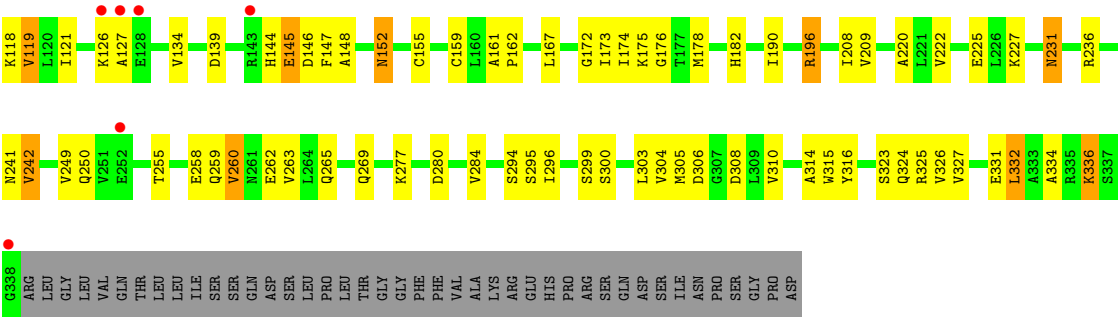


• Molecule 1: glyceraldehyde 3-phosphate dehydrogenase



• Molecule 1: glyceraldehyde 3-phosphate dehydrogenase





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	150.01Å 79.59Å 206.16Å 90.00° 101.31° 90.00°	Depositor
Resolution (Å)	19.96 – 2.50 19.95 – 2.50	Depositor EDS
% Data completeness (in resolution range)	85.9 (19.96-2.50) 86.0 (19.95-2.50)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.85 (at 2.50Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.191 , 0.240 0.190 , 0.239	Depositor DCC
R_{free} test set	7199 reflections (10.13%)	wwPDB-VP
Wilson B-factor (Å ²)	34.3	Xtriage
Anisotropy	0.536	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 54.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	16415	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 3.06% 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: NAP, 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	A	0.61	0/2629	0.87	4/3575 (0.1%)
1	B	0.63	0/2629	0.88	1/3575 (0.0%)
1	O	0.61	0/2629	0.81	3/3575 (0.1%)
1	P	0.73	7/2629 (0.3%)	0.80	2/3575 (0.1%)
1	Q	0.50	0/2629	0.72	1/3575 (0.0%)
1	R	0.60	5/2629 (0.2%)	0.75	1/3575 (0.0%)
All	All	0.62	12/15774 (0.1%)	0.81	12/21450 (0.1%)

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	P	25	GLN	C-O	11.80	1.45	1.23
1	P	25	GLN	CB-CG	9.79	1.78	1.52
1	R	89	GLU	CB-CG	-8.74	1.35	1.52
1	R	89	GLU	CG-CD	-7.77	1.40	1.51
1	P	25	GLN	CA-CB	-7.67	1.37	1.53

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	P	25	GLN	CB-CA-C	-8.27	93.85	110.40
1	A	208	ILE	N-CA-C	-7.20	91.56	111.00
1	A	335	ARG	NE-CZ-NH1	-6.65	116.97	120.30
1	A	335	ARG	NE-CZ-NH2	6.62	123.61	120.30
1	B	208	ILE	N-CA-C	-6.50	93.44	111.00

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	2588	0	2615	114	0
1	B	2588	0	2615	97	0
1	O	2588	0	2615	83	0
1	P	2588	0	2615	121	0
1	Q	2588	0	2615	102	0
1	R	2588	0	2615	84	0
2	A	10	0	0	0	0
2	B	10	0	0	0	0
2	O	10	0	0	0	0
2	P	10	0	0	1	0
2	Q	10	0	0	0	0
2	R	10	0	0	0	0
3	A	48	0	25	2	0
3	B	48	0	25	0	0
3	O	48	0	25	0	0
3	P	48	0	25	3	0
3	Q	48	0	25	1	0
3	R	48	0	25	0	0
4	A	107	0	0	13	0
4	B	142	0	0	7	0
4	O	86	0	0	5	0
4	P	82	0	0	5	0
4	Q	47	0	0	3	0
4	R	75	0	0	2	0
All	All	16415	0	15840	568	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 18.

The worst 5 of 568 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:P:25:GLN:CG	1:P:25:GLN:CB	1.79	1.61
1:A:324:GLN:HE21	1:A:324:GLN:HA	1.11	1.14
1:P:25:GLN:H	1:P:25:GLN:HG3	1.14	1.08

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:1:MET:O	1:O:1:MET:HE2	1.52	1.08
1:A:80:ARG:HG2	1:A:80:ARG:HH11	1.13	1.07

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	336/380 (88%)	308 (92%)	22 (6%)	6 (2%)	9	16
1	B	336/380 (88%)	308 (92%)	22 (6%)	6 (2%)	9	16
1	O	336/380 (88%)	313 (93%)	20 (6%)	3 (1%)	19	34
1	P	336/380 (88%)	318 (95%)	16 (5%)	2 (1%)	27	46
1	Q	336/380 (88%)	314 (94%)	18 (5%)	4 (1%)	14	26
1	R	336/380 (88%)	313 (93%)	21 (6%)	2 (1%)	27	46
All	All	2016/2280 (88%)	1874 (93%)	119 (6%)	23 (1%)	16	28

5 of 23 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	336	LYS
1	A	242	VAL
1	B	242	VAL
1	B	336	LYS
1	O	242	VAL

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	284/321 (88%)	254 (89%)	30 (11%)	7	14
1	B	284/321 (88%)	256 (90%)	28 (10%)	8	16
1	O	284/321 (88%)	262 (92%)	22 (8%)	14	27
1	P	284/321 (88%)	260 (92%)	24 (8%)	12	22
1	Q	284/321 (88%)	264 (93%)	20 (7%)	16	31
1	R	284/321 (88%)	262 (92%)	22 (8%)	14	27
All	All	1704/1926 (88%)	1558 (91%)	146 (9%)	11	22

5 of 146 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	O	87	TRP
1	P	2	THR
1	R	119	VAL
1	O	95	VAL
1	O	196	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 72 such sidechains are listed below:

Mol	Chain	Res	Type
1	O	265	GLN
1	P	113	GLN
1	R	144	HIS
1	P	25	GLN
1	P	57	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 [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

18 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	SO4	A	1339	-	4,4,4	0.39	0	6,6,6	0.38	0
2	SO4	A	1340	-	4,4,4	0.18	0	6,6,6	0.15	0
3	NAP	A	1341	-	44,52,52	1.94	12 (27%)	53,80,80	1.84	12 (22%)
2	SO4	B	2339	-	4,4,4	0.27	0	6,6,6	0.27	0
2	SO4	B	2340	-	4,4,4	0.16	0	6,6,6	0.34	0
3	NAP	B	2341	-	44,52,52	1.71	8 (18%)	53,80,80	1.78	10 (18%)
2	SO4	O	3339	-	4,4,4	0.37	0	6,6,6	0.27	0
2	SO4	O	3340	-	4,4,4	0.35	0	6,6,6	0.27	0
3	NAP	O	3341	-	44,52,52	1.86	10 (22%)	53,80,80	1.75	12 (22%)
2	SO4	P	4339	-	4,4,4	0.23	0	6,6,6	0.40	0
2	SO4	P	4340	-	4,4,4	0.26	0	6,6,6	0.25	0
3	NAP	P	4341	-	44,52,52	1.91	11 (25%)	53,80,80	1.62	11 (20%)
2	SO4	Q	5339	-	4,4,4	0.30	0	6,6,6	0.19	0
2	SO4	Q	5340	-	4,4,4	0.22	0	6,6,6	0.27	0
3	NAP	Q	5341	-	44,52,52	1.85	10 (22%)	53,80,80	1.73	12 (22%)
2	SO4	R	6339	-	4,4,4	0.37	0	6,6,6	0.17	0
2	SO4	R	6340	-	4,4,4	0.23	0	6,6,6	0.27	0
3	NAP	R	6341	-	44,52,52	1.79	10 (22%)	53,80,80	1.72	12 (22%)

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	SO4	A	1339	-	-	0/0/0/0	0/0/0/0
2	SO4	A	1340	-	-	0/0/0/0	0/0/0/0
3	NAP	A	1341	-	-	0/27/67/67	0/5/5/5
2	SO4	B	2339	-	-	0/0/0/0	0/0/0/0
2	SO4	B	2340	-	-	0/0/0/0	0/0/0/0
3	NAP	B	2341	-	-	0/27/67/67	0/5/5/5
2	SO4	O	3339	-	-	0/0/0/0	0/0/0/0
2	SO4	O	3340	-	-	0/0/0/0	0/0/0/0
3	NAP	O	3341	-	-	0/27/67/67	0/5/5/5
2	SO4	P	4339	-	-	0/0/0/0	0/0/0/0
2	SO4	P	4340	-	-	0/0/0/0	0/0/0/0
3	NAP	P	4341	-	-	0/27/67/67	0/5/5/5
2	SO4	Q	5339	-	-	0/0/0/0	0/0/0/0
2	SO4	Q	5340	-	-	0/0/0/0	0/0/0/0
3	NAP	Q	5341	-	-	0/27/67/67	0/5/5/5
2	SO4	R	6339	-	-	0/0/0/0	0/0/0/0
2	SO4	R	6340	-	-	0/0/0/0	0/0/0/0
3	NAP	R	6341	-	-	0/27/67/67	0/5/5/5

The worst 5 of 61 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1341	NAP	PA-O1A	-3.40	1.38	1.50
3	P	4341	NAP	PA-O1A	-2.86	1.40	1.50
3	Q	5341	NAP	PA-O1A	-2.82	1.40	1.50
3	R	6341	NAP	PA-O1A	-2.48	1.41	1.50
3	O	3341	NAP	PA-O1A	-2.32	1.42	1.50

The worst 5 of 69 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1341	NAP	N3A-C2A-N1A	-7.19	122.71	128.86
3	B	2341	NAP	N3A-C2A-N1A	-6.95	122.91	128.86
3	P	4341	NAP	N3A-C2A-N1A	-6.93	122.93	128.86
3	Q	5341	NAP	N3A-C2A-N1A	-6.88	122.97	128.86
3	O	3341	NAP	N3A-C2A-N1A	-6.75	123.09	128.86

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1341	NAP	2	0
2	P	4339	SO4	1	0
3	P	4341	NAP	3	0
3	Q	5341	NAP	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	338/380 (88%)	-0.46	3 (0%) 84 85	11, 25, 45, 77	0
1	B	338/380 (88%)	-0.60	3 (0%) 84 85	11, 21, 39, 81	0
1	O	338/380 (88%)	-0.45	3 (0%) 84 85	13, 27, 47, 81	0
1	P	338/380 (88%)	-0.31	10 (2%) 50 53	16, 31, 57, 89	0
1	Q	338/380 (88%)	-0.08	17 (5%) 29 31	22, 40, 62, 83	0
1	R	338/380 (88%)	-0.24	8 (2%) 59 62	19, 36, 56, 84	0
All	All	2028/2280 (88%)	-0.36	44 (2%) 62 64	11, 30, 55, 89	0

The worst 5 of 44 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	R	1	MET	11.2
1	B	1	MET	10.6
1	P	1	MET	8.9
1	A	1	MET	8.4
1	Q	1	MET	6.0

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 carbohydrates in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	SO4	P	4339	5/5	0.88	0.23	39,41,44,44	5
3	NAP	R	6341	48/48	0.95	0.13	31,43,51,56	0
3	NAP	Q	5341	48/48	0.95	0.14	36,43,53,58	0
3	NAP	O	3341	48/48	0.96	0.12	19,38,56,58	0
2	SO4	O	3339	5/5	0.96	0.18	33,35,36,37	5
2	SO4	R	6339	5/5	0.96	0.16	35,36,37,40	5
3	NAP	P	4341	48/48	0.96	0.13	25,39,48,52	0
2	SO4	O	3340	5/5	0.96	0.19	22,26,30,30	5
2	SO4	R	6340	5/5	0.97	0.17	25,27,33,35	5
2	SO4	Q	5339	5/5	0.97	0.12	45,45,47,49	5
3	NAP	A	1341	48/48	0.97	0.11	16,27,42,47	0
3	NAP	B	2341	48/48	0.97	0.10	11,25,42,45	0
2	SO4	Q	5340	5/5	0.98	0.13	27,29,34,34	5
2	SO4	P	4340	5/5	0.98	0.11	28,31,34,36	5
2	SO4	B	2339	5/5	0.98	0.12	17,21,22,25	5
2	SO4	B	2340	5/5	0.98	0.16	16,22,23,24	5
2	SO4	A	1339	5/5	0.98	0.12	14,16,19,23	5
2	SO4	A	1340	5/5	0.99	0.13	24,27,29,31	5

6.5 Other polymers [i](#)

There are no such residues in this entry.