



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 30, 2024 – 11:50 PM EST

PDB ID : 1JXH
Title : 4-Amino-5-hydroxymethyl-2-methylpyrimidine Phosphate Kinase from
Salmonella typhimurium
Authors : Cheng, G.; Bennett, E.M.; Begley, T.P.; Ealick, S.E.
Deposited on : 2001-09-07
Resolution : 2.30 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

<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>.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
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

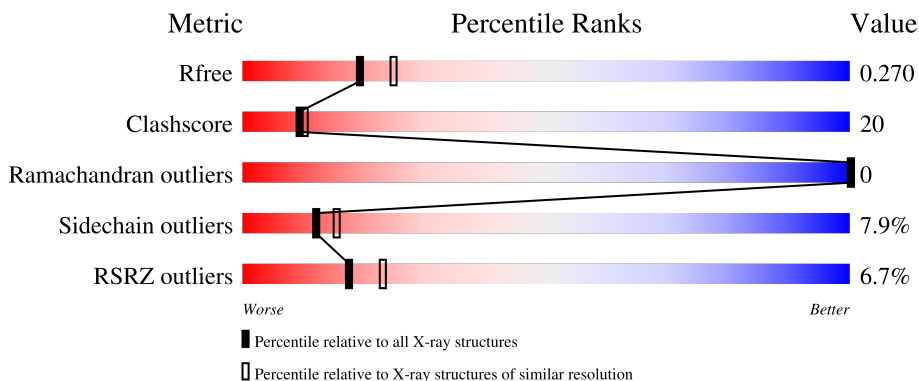
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	288	 6% 61% 22% 14%
1	B	288	 6% 61% 21% 14%

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 3923 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 PHOSPHOMETHYLPYRIMIDINE KINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	248	1882	1181	340	351	10	0	0	0
1	B	248	1882	1181	340	351	10	0	0	0

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-21	MET	-	expression tag	UNP P55882
A	-20	GLY	-	expression tag	UNP P55882
A	-19	HIS	-	expression tag	UNP P55882
A	-18	HIS	-	expression tag	UNP P55882
A	-17	HIS	-	expression tag	UNP P55882
A	-16	HIS	-	expression tag	UNP P55882
A	-15	HIS	-	expression tag	UNP P55882
A	-14	HIS	-	expression tag	UNP P55882
A	-13	HIS	-	expression tag	UNP P55882
A	-12	HIS	-	expression tag	UNP P55882
A	-11	HIS	-	expression tag	UNP P55882
A	-10	HIS	-	expression tag	UNP P55882
A	-9	SER	-	expression tag	UNP P55882
A	-8	SER	-	expression tag	UNP P55882
A	-7	GLY	-	expression tag	UNP P55882
A	-6	TYR	-	expression tag	UNP P55882
A	-5	HIS	-	expression tag	UNP P55882
A	-4	ILE	-	expression tag	UNP P55882
A	-3	GLN	-	expression tag	UNP P55882
A	-2	GLY	-	expression tag	UNP P55882
A	-1	ARG	-	expression tag	UNP P55882
A	0	HIS	-	expression tag	UNP P55882
B	-21	MET	-	expression tag	UNP P55882
B	-20	GLY	-	expression tag	UNP P55882
B	-19	HIS	-	expression tag	UNP P55882

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	HIS	-	expression tag	UNP P55882
B	-17	HIS	-	expression tag	UNP P55882
B	-16	HIS	-	expression tag	UNP P55882
B	-15	HIS	-	expression tag	UNP P55882
B	-14	HIS	-	expression tag	UNP P55882
B	-13	HIS	-	expression tag	UNP P55882
B	-12	HIS	-	expression tag	UNP P55882
B	-11	HIS	-	expression tag	UNP P55882
B	-10	HIS	-	expression tag	UNP P55882
B	-9	SER	-	expression tag	UNP P55882
B	-8	SER	-	expression tag	UNP P55882
B	-7	GLY	-	expression tag	UNP P55882
B	-6	TYR	-	expression tag	UNP P55882
B	-5	HIS	-	expression tag	UNP P55882
B	-4	ILE	-	expression tag	UNP P55882
B	-3	GLN	-	expression tag	UNP P55882
B	-2	GLY	-	expression tag	UNP P55882
B	-1	ARG	-	expression tag	UNP P55882
B	0	HIS	-	expression tag	UNP P55882

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



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

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

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	71	Total	O	0	0
			71	71		
3	B	68	Total	O	0	0
			68	68		

4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	77.72Å 77.72Å 183.42Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	25.00 – 2.30 35.21 – 2.10	Depositor EDS
% Data completeness (in resolution range)	(Not available) (25.00-2.30) 99.8 (35.21-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.17 (at 2.10Å)	Xtrriage
Refinement program	CNS	Depositor
R, R_{free}	0.235 , 0.272 0.232 , 0.270	Depositor DCC
R_{free} test set	3349 reflections (9.96%)	wwPDB-VP
Wilson B-factor (Å ²)	36.0	Xtrriage
Anisotropy	0.647	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 45.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	3923	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 23.69 % 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 4.4379e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.33	0/1913	0.59	0/2597
1	B	0.33	0/1913	0.59	0/2597
All	All	0.33	0/3826	0.59	0/5194

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1882	0	1893	80	0
1	B	1882	0	1893	77	0
2	A	10	0	0	0	0
2	B	10	0	0	0	0
3	A	71	0	0	6	0
3	B	68	0	0	2	0
All	All	3923	0	3786	149	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 20.

All (149) 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:213:CYS:HB3	3:A:2069:HOH:O	1.75	0.85
1:A:228:SER:O	1:A:232:THR:HG22	1.83	0.79
1:B:154:THR:HG22	1:B:157:GLU:HG3	1.64	0.78
1:A:46:THR:CG2	1:A:255:GLY:H	1.96	0.78
1:B:46:THR:CG2	1:B:255:GLY:H	1.97	0.77
1:A:29:ALA:HA	1:A:265:TRP:CH2	2.20	0.77
1:A:154:THR:HG22	1:A:157:GLU:HG3	1.66	0.77
1:B:228:SER:O	1:B:232:THR:HG22	1.84	0.77
1:B:29:ALA:HA	1:B:265:TRP:CH2	2.20	0.76
1:A:45:ASN:HD21	1:B:70:ASP:HB2	1.51	0.75
1:B:60:VAL:HG21	1:B:86:ILE:HD12	1.69	0.75
1:A:70:ASP:HB2	1:B:45:ASN:HD21	1.52	0.73
1:A:60:VAL:HG21	1:A:86:ILE:HD12	1.69	0.72
1:A:126:ARG:HA	1:A:130:LEU:HD22	1.72	0.71
1:B:126:ARG:HA	1:B:130:LEU:HD22	1.73	0.69
1:A:22:ALA:HB3	3:A:2069:HOH:O	1.94	0.68
1:B:45:ASN:HB2	1:B:50:GLN:HE22	1.60	0.67
1:A:95:GLN:HB2	1:A:132:GLN:HE22	1.61	0.66
1:B:95:GLN:HB2	1:B:132:GLN:HE22	1.60	0.66
1:B:100:ARG:HB3	1:B:100:ARG:HH11	1.60	0.66
1:B:29:ALA:HA	1:B:265:TRP:CZ3	2.31	0.65
1:A:29:ALA:HA	1:A:265:TRP:CZ3	2.30	0.65
1:B:10:ALA:HB1	3:B:2019:HOH:O	1.96	0.65
1:A:45:ASN:HB2	1:A:50:GLN:HE22	1.61	0.65
1:A:100:ARG:HH11	1:A:100:ARG:HB3	1.63	0.64
1:B:46:THR:HG21	1:B:253:GLY:HA3	1.81	0.63
1:A:46:THR:HG21	1:A:253:GLY:HA3	1.82	0.62
1:B:126:ARG:HB3	3:B:2064:HOH:O	2.02	0.59
1:A:4:ILE:HD12	1:A:224:PRO:HG2	1.83	0.59
1:A:10:ALA:HB1	3:A:2012:HOH:O	2.02	0.59
1:A:42:VAL:HG22	1:A:44:GLU:HB2	1.85	0.59
1:B:4:ILE:HD12	1:B:224:PRO:HG2	1.84	0.58
1:B:136:ILE:HG12	1:B:138:PRO:HD3	1.84	0.58
1:B:42:VAL:HG22	1:B:44:GLU:HB2	1.85	0.58
1:A:229:TRP:HA	1:A:232:THR:HG23	1.86	0.57
1:A:136:ILE:HG12	1:A:138:PRO:HD3	1.85	0.57
1:A:37:VAL:HG21	1:A:64:LEU:HD13	1.86	0.57
1:B:75:THR:HG22	1:B:101:ASN:HB3	1.87	0.56
1:B:191:THR:HG22	1:B:192:ARG:N	2.19	0.56
1:B:46:THR:HG23	1:B:255:GLY:H	1.69	0.56
1:B:60:VAL:O	1:B:64:LEU:HD22	2.06	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:60:VAL:O	1:A:64:LEU:HD22	2.05	0.56
1:A:191:THR:HG22	1:A:192:ARG:N	2.20	0.56
1:B:229:TRP:HA	1:B:232:THR:HG23	1.88	0.55
1:A:46:THR:HG23	1:A:255:GLY:H	1.69	0.55
1:B:223:ARG:HB3	1:B:224:PRO:HD3	1.89	0.54
1:B:226:HIS:NE2	1:B:235:GLU:OE1	2.40	0.54
1:A:223:ARG:HB3	1:A:224:PRO:HD3	1.89	0.54
1:A:75:THR:HG22	1:A:101:ASN:HB3	1.91	0.53
1:A:225:ARG:HD2	3:A:2017:HOH:O	2.09	0.53
1:B:37:VAL:HG21	1:B:64:LEU:HD13	1.89	0.53
1:A:38:ILE:H	1:A:63:GLN:HE22	1.57	0.52
1:A:229:TRP:HA	1:A:232:THR:CG2	2.39	0.52
1:B:229:TRP:HA	1:B:232:THR:CG2	2.39	0.52
1:A:75:THR:HG21	1:A:220:ALA:O	2.10	0.51
1:B:38:ILE:H	1:B:63:GLN:HE22	1.57	0.51
1:B:100:ARG:HH11	1:B:100:ARG:CB	2.24	0.51
1:B:38:ILE:H	1:B:63:GLN:NE2	2.09	0.51
1:A:38:ILE:H	1:A:63:GLN:NE2	2.09	0.50
1:B:207:ASN:ND2	1:B:257:GLY:H	2.09	0.50
1:A:226:HIS:NE2	1:A:235:GLU:OE1	2.42	0.50
1:B:75:THR:HG21	1:B:220:ALA:O	2.12	0.50
1:A:207:ASN:ND2	1:A:257:GLY:H	2.09	0.50
1:B:61:ALA:HB1	1:B:93:ARG:NH2	2.27	0.50
1:A:109:LEU:O	1:A:109:LEU:HG	2.12	0.49
1:A:61:ALA:HB1	1:A:93:ARG:NH2	2.27	0.49
1:A:106:THR:HG21	1:A:138:PRO:HB3	1.95	0.49
1:B:123:GLU:HA	1:B:126:ARG:HD3	1.95	0.49
1:A:125:LEU:HD23	1:A:130:LEU:HD13	1.94	0.48
1:A:126:ARG:NH2	1:A:146:LEU:O	2.45	0.48
1:A:260:HIS:HD2	3:A:2066:HOH:O	1.96	0.48
1:B:12:THR:O	1:B:42:VAL:HG13	2.14	0.48
1:B:45:ASN:HB2	1:B:50:GLN:NE2	2.27	0.48
1:B:77:LYS:C	1:B:77:LYS:HD3	2.33	0.48
1:A:123:GLU:HA	1:A:126:ARG:HD3	1.96	0.48
1:B:125:LEU:HD23	1:B:130:LEU:HD13	1.95	0.48
1:B:109:LEU:HG	1:B:109:LEU:O	2.13	0.48
1:A:46:THR:HG21	1:A:255:GLY:H	1.75	0.48
1:A:45:ASN:HB2	1:A:50:GLN:NE2	2.28	0.48
1:B:106:THR:HG21	1:B:138:PRO:HB3	1.96	0.47
1:B:126:ARG:NH2	1:B:146:LEU:O	2.47	0.47
1:B:140:LEU:HD23	1:B:151:HIS:HE1	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:144:ALA:HB1	1:B:149:ALA:O	2.14	0.47
1:A:77:LYS:HD3	1:A:77:LYS:C	2.34	0.47
1:A:75:THR:HG22	1:A:101:ASN:CB	2.44	0.47
1:B:75:THR:HG22	1:B:101:ASN:CB	2.45	0.47
1:A:144:ALA:HB1	1:A:149:ALA:O	2.15	0.46
1:B:140:LEU:HD23	1:B:151:HIS:CE1	2.50	0.46
1:A:70:ASP:CB	1:B:45:ASN:HD21	2.25	0.46
1:A:46:THR:HG23	1:A:255:GLY:N	2.30	0.46
1:A:100:ARG:HH11	1:A:100:ARG:CB	2.28	0.46
1:A:140:LEU:HD23	1:A:151:HIS:CE1	2.50	0.46
1:A:46:THR:HG23	1:A:255:GLY:CA	2.47	0.45
1:A:75:THR:HG21	1:A:224:PRO:HD3	1.98	0.45
1:B:46:THR:HG23	1:B:255:GLY:N	2.31	0.45
1:B:75:THR:HG21	1:B:224:PRO:HD3	1.99	0.45
1:A:28:SER:O	1:A:265:TRP:HH2	1.99	0.45
1:A:140:LEU:HD23	1:A:151:HIS:HE1	1.80	0.45
1:B:20:ILE:O	1:B:24:LEU:HB2	2.17	0.45
1:A:12:THR:O	1:A:42:VAL:HG13	2.15	0.45
1:A:191:THR:CG2	1:A:193:GLU:HG2	2.46	0.45
1:A:265:TRP:CE3	1:B:265:TRP:CZ3	3.05	0.45
1:A:262:PHE:HD1	1:A:265:TRP:CE3	2.35	0.45
1:A:265:TRP:CZ3	1:B:265:TRP:CE3	3.05	0.45
1:B:46:THR:HG23	1:B:255:GLY:CA	2.48	0.44
1:B:46:THR:HG21	1:B:255:GLY:H	1.76	0.44
1:A:20:ILE:O	1:A:24:LEU:HB2	2.18	0.44
1:B:28:SER:O	1:B:265:TRP:HH2	2.01	0.44
1:B:46:THR:HG21	1:B:253:GLY:CA	2.47	0.44
1:B:262:PHE:HD1	1:B:265:TRP:CE3	2.36	0.44
1:B:93:ARG:HG2	1:B:93:ARG:HH11	1.83	0.44
1:B:191:THR:CG2	1:B:193:GLU:HG2	2.47	0.44
1:B:191:THR:CG2	1:B:192:ARG:N	2.81	0.43
1:A:45:ASN:HD21	1:B:70:ASP:CB	2.24	0.43
1:B:88:GLU:OE1	1:B:128:ARG:HD3	2.18	0.43
1:A:260:HIS:HE1	1:A:266:TRP:OXT	2.00	0.43
1:A:93:ARG:HH11	1:A:93:ARG:HG2	1.84	0.43
1:B:123:GLU:O	1:B:126:ARG:HG2	2.18	0.43
1:B:260:HIS:HE1	1:B:266:TRP:OXT	2.01	0.43
1:A:57:PRO:HA	1:A:86:ILE:CD1	2.49	0.43
1:A:88:GLU:OE1	1:A:128:ARG:HD3	2.19	0.42
1:A:191:THR:CG2	1:A:192:ARG:N	2.82	0.42
1:B:229:TRP:O	1:B:233:VAL:HG23	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:46:THR:HG21	1:A:253:GLY:CA	2.48	0.42
1:A:191:THR:HG22	1:A:193:GLU:HG2	2.01	0.42
1:A:191:THR:HG22	1:A:193:GLU:H	1.85	0.42
1:B:154:THR:CG2	1:B:157:GLU:HG3	2.43	0.42
1:A:154:THR:CG2	1:A:157:GLU:HG3	2.44	0.41
1:B:57:PRO:HA	1:B:86:ILE:CD1	2.49	0.41
1:B:191:THR:HG22	1:B:193:GLU:H	1.84	0.41
1:A:123:GLU:O	1:A:126:ARG:HG2	2.19	0.41
1:A:57:PRO:HA	1:A:86:ILE:HD13	2.03	0.41
1:A:45:ASN:OD1	1:A:46:THR:N	2.54	0.41
1:B:191:THR:HG22	1:B:193:GLU:HG2	2.03	0.41
1:A:223:ARG:HD2	1:A:232:THR:HG21	2.02	0.41
1:A:262:PHE:CZ	1:B:28:SER:HB3	2.56	0.41
1:B:45:ASN:OD1	1:B:46:THR:N	2.54	0.41
1:B:123:GLU:HA	1:B:126:ARG:CD	2.51	0.41
1:A:60:VAL:O	1:A:64:LEU:CD2	2.69	0.41
1:A:266:TRP:CE2	1:B:31:GLY:HA2	2.56	0.41
1:B:57:PRO:HA	1:B:86:ILE:HD13	2.03	0.41
1:B:223:ARG:HD2	1:B:232:THR:HG21	2.02	0.41
1:A:108:MET:O	1:A:109:LEU:C	2.59	0.40
1:A:125:LEU:HD23	1:A:125:LEU:C	2.42	0.40
1:B:75:THR:HG23	1:B:224:PRO:HG3	2.04	0.40
1:A:116:LEU:HD22	3:A:2072:HOH:O	2.21	0.40
1:A:223:ARG:HD3	1:A:229:TRP:CZ3	2.57	0.40
1:B:108:MET:O	1:B:109:LEU:C	2.59	0.40
1:B:125:LEU:HD23	1:B:125:LEU:C	2.42	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	240/288 (83%)	233 (97%)	7 (3%)	0	100	100
1	B	240/288 (83%)	233 (97%)	7 (3%)	0	100	100
All	All	480/576 (83%)	466 (97%)	14 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	196/228 (86%)	181 (92%)	15 (8%)	13	16
1	B	196/228 (86%)	180 (92%)	16 (8%)	11	14
All	All	392/456 (86%)	361 (92%)	31 (8%)	12	15

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	ILE
1	A	24	LEU
1	A	42	VAL
1	A	46	THR
1	A	64	LEU
1	A	77	LYS
1	A	94	LEU
1	A	100	ARG
1	A	130	LEU
1	A	133	VAL
1	A	193	GLU
1	A	222	LEU
1	A	225	ARG
1	A	232	THR
1	A	252	VAL
1	B	4	ILE
1	B	24	LEU
1	B	42	VAL

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Mol	Chain	Res	Type
1	B	46	THR
1	B	64	LEU
1	B	75	THR
1	B	77	LYS
1	B	94	LEU
1	B	100	ARG
1	B	130	LEU
1	B	133	VAL
1	B	193	GLU
1	B	222	LEU
1	B	225	ARG
1	B	232	THR
1	B	252	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	50	GLN
1	A	63	GLN
1	A	132	GLN
1	A	156	GLN
1	A	161	GLN
1	A	196	GLN
1	A	207	ASN
1	A	246	GLN
1	A	260	HIS
1	A	261	HIS
1	B	50	GLN
1	B	63	GLN
1	B	132	GLN
1	B	156	GLN
1	B	161	GLN
1	B	196	GLN
1	B	207	ASN
1	B	246	GLN
1	B	260	HIS
1	B	261	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 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	2001	-	4,4,4	0.31	0	6,6,6	0.06	0
2	SO4	B	2004	-	4,4,4	0.28	0	6,6,6	0.05	0
2	SO4	A	2003	-	4,4,4	0.27	0	6,6,6	0.11	0
2	SO4	B	2002	-	4,4,4	0.31	0	6,6,6	0.06	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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, 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	248/288 (86%)	0.25	16 (6%) 18 24	25, 38, 64, 90	0
1	B	248/288 (86%)	0.35	17 (6%) 16 22	25, 38, 64, 90	0
All	All	496/576 (86%)	0.30	33 (6%) 17 23	25, 38, 65, 90	0

All (33) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	203	VAL	6.4
1	A	202	ARG	5.9
1	B	153	ARG	5.5
1	B	203	VAL	5.3
1	B	204	ASN	4.4
1	A	227	ARG	3.9
1	B	109	LEU	3.9
1	A	204	ASN	3.7
1	A	206	LYS	3.7
1	B	192	ARG	3.7
1	A	265	TRP	3.7
1	A	193	GLU	3.6
1	A	153	ARG	3.4
1	B	100	ARG	3.1
1	B	202	ARG	3.0
1	B	227	ARG	3.0
1	B	193	GLU	2.9
1	B	154	THR	2.9
1	A	192	ARG	2.8
1	B	206	LYS	2.8
1	A	123	GLU	2.7
1	B	156	GLN	2.6
1	B	116	LEU	2.5
1	B	104	LEU	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	109	LEU	2.4
1	B	20	ILE	2.4
1	A	20	ILE	2.3
1	B	103	VAL	2.2
1	B	265	TRP	2.2
1	A	100	ARG	2.2
1	A	126	ARG	2.2
1	A	102	VAL	2.1
1	A	197	ARG	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 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, 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(\AA^2)	Q<0.9
2	SO4	A	2001	5/5	0.70	0.24	76,76,77,79	0
2	SO4	B	2002	5/5	0.83	0.18	70,71,71,74	0
2	SO4	B	2004	5/5	0.84	0.20	67,67,67,69	5
2	SO4	A	2003	5/5	0.86	0.20	60,62,63,63	5

6.5 Other polymers [i](#)

There are no such residues in this entry.