



Full wwPDB X-ray Structure Validation Report

Feb 27, 2014 – 06:51 AM GMT

PDB ID : 1XPG
Title : Crystal Structure of T. maritima Cobalamin-IndependentMethionine Synthase
complexed with Zn²⁺ and Methyltetrahydrofolate
Authors : Pejchal, R.; Ludwig, M.L.
Deposited on : 2004-10-08
Resolution : 2.59 Å(reported)

This is a full wwPDB 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/ValidationPDFNotes.html>

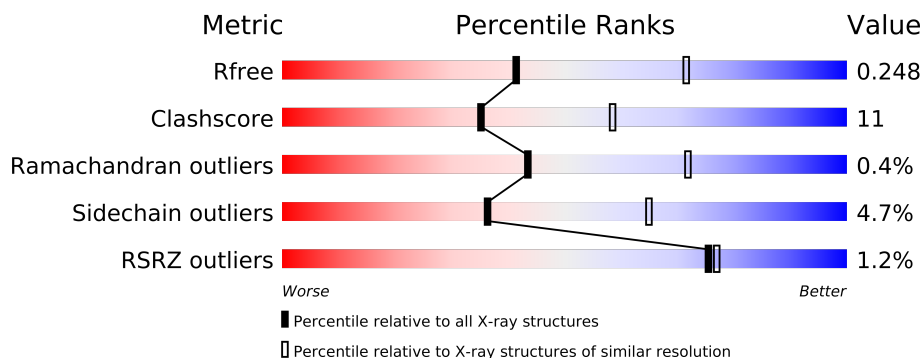
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.15 2013
Xtriage (Phenix) : dev-1323
EDS : stable22639
Percentile statistics : 21963
Refmac : 5.8.0049
CCP4 : 6.3.0 (Settle)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable22683

1 Overall quality at a glance



The reported resolution of this entry is 2.59 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}	66092	1718 (2.60-2.60)
Clashscore	79885	2154 (2.60-2.60)
Ramachandran outliers	78287	2113 (2.60-2.60)
Sidechain outliers	78261	2113 (2.60-2.60)
RSRZ outliers	66119	1718 (2.60-2.60)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	765	
1	B	765	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
4	C2F	A	1882	-	X
5	MRY	A	1890	-	X

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 11993 atoms, of which 0 are hydrogen and 0 are deuterium.

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 5-methyltetrahydropteroyltriglutamate--homocysteinemethyltransferase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	734	Total	C	N	O	S	Se	0	0	0
			5805	3773	948	1060	7	17			
1	B	734	Total	C	N	O	S	Se	0	0	0
			5827	3779	951	1073	7	17			

There are 102 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-31	MET	-	EXPRESSION TAG	UNP Q9X112
A	-30	HIS	-	EXPRESSION TAG	UNP Q9X112
A	-29	HIS	-	EXPRESSION TAG	UNP Q9X112
A	-28	HIS	-	EXPRESSION TAG	UNP Q9X112
A	-27	HIS	-	EXPRESSION TAG	UNP Q9X112
A	-26	HIS	-	EXPRESSION TAG	UNP Q9X112
A	-25	HIS	-	EXPRESSION TAG	UNP Q9X112
A	-24	GLY	-	EXPRESSION TAG	UNP Q9X112
A	-23	LYS	-	EXPRESSION TAG	UNP Q9X112
A	-22	PRO	-	EXPRESSION TAG	UNP Q9X112
A	-21	ILE	-	EXPRESSION TAG	UNP Q9X112
A	-20	PRO	-	EXPRESSION TAG	UNP Q9X112
A	-19	ASN	-	EXPRESSION TAG	UNP Q9X112
A	-18	PRO	-	EXPRESSION TAG	UNP Q9X112
A	-17	LEU	-	EXPRESSION TAG	UNP Q9X112
A	-16	LEU	-	EXPRESSION TAG	UNP Q9X112
A	-15	GLY	-	EXPRESSION TAG	UNP Q9X112
A	-14	LEU	-	EXPRESSION TAG	UNP Q9X112
A	-13	ASP	-	EXPRESSION TAG	UNP Q9X112
A	-12	SER	-	EXPRESSION TAG	UNP Q9X112
A	-11	THR	-	EXPRESSION TAG	UNP Q9X112
A	-10	GLU	-	EXPRESSION TAG	UNP Q9X112
A	-9	ASN	-	EXPRESSION TAG	UNP Q9X112
A	-8	LEU	-	EXPRESSION TAG	UNP Q9X112

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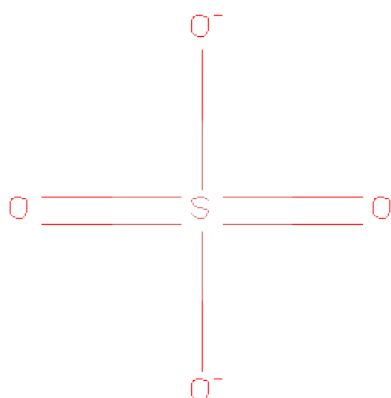
Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	TYR	-	EXPRESSION TAG	UNP Q9X112
A	-6	PHE	-	EXPRESSION TAG	UNP Q9X112
A	-5	GLN	-	EXPRESSION TAG	UNP Q9X112
A	-4	GLY	-	EXPRESSION TAG	UNP Q9X112
A	-3	ILE	-	EXPRESSION TAG	UNP Q9X112
A	-2	ASP	-	EXPRESSION TAG	UNP Q9X112
A	-1	PRO	-	EXPRESSION TAG	UNP Q9X112
A	0	PHE	-	EXPRESSION TAG	UNP Q9X112
A	1	THR	-	EXPRESSION TAG	UNP Q9X112
A	38	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	43	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	45	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	73	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	93	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	102	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	170	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	344	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	421	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	468	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	510	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	529	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	537	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	619	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	682	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	721	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	728	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
A	733	ALA	-	EXPRESSION TAG	UNP Q9X112
B	-31	MET	-	EXPRESSION TAG	UNP Q9X112
B	-30	HIS	-	EXPRESSION TAG	UNP Q9X112
B	-29	HIS	-	EXPRESSION TAG	UNP Q9X112
B	-28	HIS	-	EXPRESSION TAG	UNP Q9X112
B	-27	HIS	-	EXPRESSION TAG	UNP Q9X112
B	-26	HIS	-	EXPRESSION TAG	UNP Q9X112
B	-25	HIS	-	EXPRESSION TAG	UNP Q9X112
B	-24	GLY	-	EXPRESSION TAG	UNP Q9X112
B	-23	LYS	-	EXPRESSION TAG	UNP Q9X112
B	-22	PRO	-	EXPRESSION TAG	UNP Q9X112
B	-21	ILE	-	EXPRESSION TAG	UNP Q9X112
B	-20	PRO	-	EXPRESSION TAG	UNP Q9X112
B	-19	ASN	-	EXPRESSION TAG	UNP Q9X112
B	-18	PRO	-	EXPRESSION TAG	UNP Q9X112
B	-17	LEU	-	EXPRESSION TAG	UNP Q9X112

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	LEU	-	EXPRESSION TAG	UNP Q9X112
B	-15	GLY	-	EXPRESSION TAG	UNP Q9X112
B	-14	LEU	-	EXPRESSION TAG	UNP Q9X112
B	-13	ASP	-	EXPRESSION TAG	UNP Q9X112
B	-12	SER	-	EXPRESSION TAG	UNP Q9X112
B	-11	THR	-	EXPRESSION TAG	UNP Q9X112
B	-10	GLU	-	EXPRESSION TAG	UNP Q9X112
B	-9	ASN	-	EXPRESSION TAG	UNP Q9X112
B	-8	LEU	-	EXPRESSION TAG	UNP Q9X112
B	-7	TYR	-	EXPRESSION TAG	UNP Q9X112
B	-6	PHE	-	EXPRESSION TAG	UNP Q9X112
B	-5	GLN	-	EXPRESSION TAG	UNP Q9X112
B	-4	GLY	-	EXPRESSION TAG	UNP Q9X112
B	-3	ILE	-	EXPRESSION TAG	UNP Q9X112
B	-2	ASP	-	EXPRESSION TAG	UNP Q9X112
B	-1	PRO	-	EXPRESSION TAG	UNP Q9X112
B	0	PHE	-	EXPRESSION TAG	UNP Q9X112
B	1	THR	-	EXPRESSION TAG	UNP Q9X112
B	38	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	43	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	45	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	73	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	93	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	102	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	170	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	344	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	421	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	468	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	510	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	529	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	537	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	619	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	682	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	721	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	728	MSE	MET	MODIFIED RESIDUE	UNP Q9X112
B	733	ALA	-	EXPRESSION TAG	UNP Q9X112

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

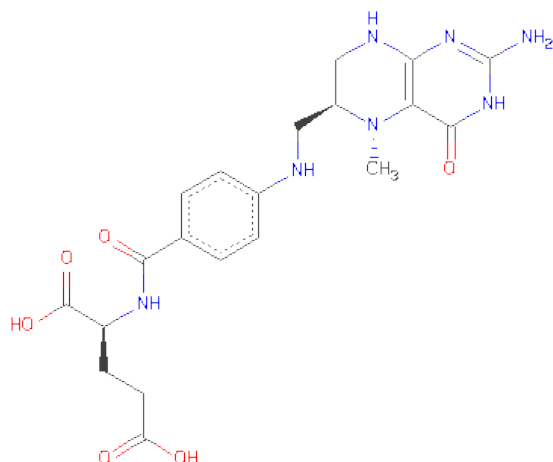


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

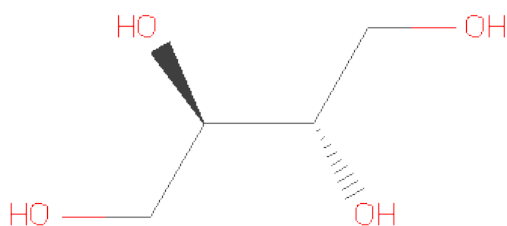
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	Zn	0	0
			1	1		
3	A	1	Total	Zn	0	0
			1	1		

- Molecule 4 is 5-METHYL-5,6,7,8-TETRAHYDROFOLICACID (three-letter code: C2F) (formula: C₂₀H₂₅N₇O₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			33	20	7	6		
4	B	1	Total	C	N	O	0	0
			33	20	7	6		

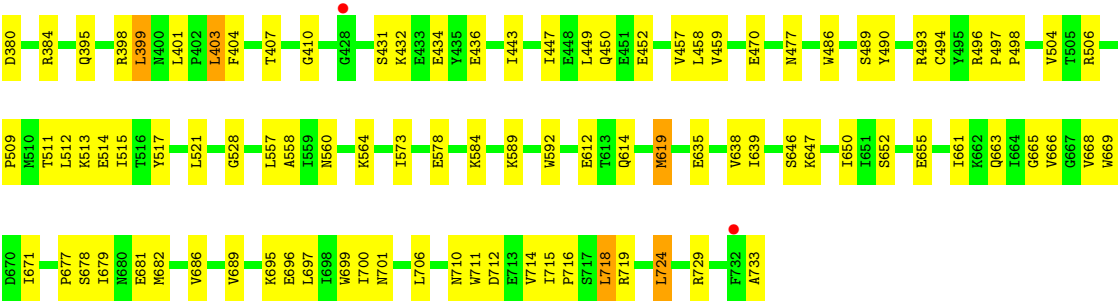
- Molecule 5 is MESO-ERYTHRITOL (three-letter code: MRY) (formula: $C_4H_{10}O_4$).



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

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	133	Total 133	O 133	0	0
6	B	129	Total 129	O 129	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	163.95Å 159.30Å 64.45Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.99 – 2.59 24.85 – 2.59	Depositor EDS
% Data completeness (in resolution range)	99.1 (19.99-2.59) 99.2 (24.85-2.59)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.15 (at 2.60Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.196 , 0.248 0.195 , 0.248	Depositor DCC
R_{free} test set	2667 reflections (5.31%)	DCC
Wilson B-factor (Å ²)	30.9	Xtriage
Anisotropy	0.073	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 16.8	EDS
Estimated twinning fraction	0.021 for k,h,-l	Xtriage
L-test for twinning	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	1 of 52913 reflections (0.002%)	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	11993	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.78% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, C2F, MRY, 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	0.34	0/5935	0.57	1/8032 (0.0%)
1	B	0.34	0/5957	0.58	1/8062 (0.0%)
All	All	0.34	0/11892	0.57	2/16094 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	528	GLY	N-CA-C	-5.87	98.42	113.10
1	A	528	GLY	N-CA-C	-5.44	99.51	113.10

There are no chirality outliers.

There are no planarity outliers.

5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5805	0	5603	132	0
1	B	5827	0	5617	111	0
2	A	10	0	0	0	0
2	B	5	0	0	0	0
3	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
4	A	33	0	23	3	0
4	B	33	0	23	4	0
5	A	8	0	10	0	0
5	B	8	0	10	0	0
6	A	133	0	0	3	0
6	B	129	0	0	3	0
All	All	11993	0	11286	245	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 11.

All (245) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:582:ARG:HG3	1:A:627:ILE:HD13	1.61	0.81
1:A:668:VAL:HG23	1:A:682:MSE:HE2	1.65	0.77
1:A:715:ILE:HB	1:A:716:PRO:HD3	1.69	0.75
1:A:665:GLY:HA2	1:A:699:TRP:HB2	1.71	0.71
1:B:403:LEU:HD11	1:B:695:LYS:HD2	1.73	0.69
1:B:450:GLN:HB3	1:B:458:LEU:HD22	1.75	0.67
1:A:620:CYS:HB2	6:A:939:HOH:O	1.95	0.66
1:B:638:VAL:HG22	1:B:663:GLN:HB2	1.78	0.66
1:A:283:ARG:HG3	1:A:309:CYS:SG	2.36	0.65
1:A:498:PRO:HD2	1:A:540:SER:HB3	1.77	0.65
1:A:467:ASP:HB3	1:A:470:GLU:HB2	1.78	0.65
1:A:232:TYR:O	1:A:233:TYR:HB2	1.98	0.64
1:A:669:TRP:HB2	1:A:682:MSE:HE3	1.79	0.64
1:B:4:TYR:HB2	1:B:306:SER:HB3	1.78	0.64
1:A:4:TYR:HB2	1:A:306:SER:HB3	1.79	0.63
1:A:377:LEU:HD11	1:A:557:LEU:HD21	1.79	0.63
1:B:665:GLY:HA2	1:B:699:TRP:HB2	1.80	0.63
1:B:399:LEU:HB3	1:B:401:LEU:HG	1.80	0.62
1:A:196:ILE:HB	1:A:227:LEU:HD23	1.82	0.62
1:B:719:ARG:HG3	1:B:719:ARG:HH11	1.64	0.62
1:A:228:THR:HG23	1:A:249:ARG:HG3	1.81	0.62
1:A:371:VAL:HG12	1:A:375:ARG:HD2	1.82	0.62
1:A:284:GLN:NE2	1:A:542:TYR:H	1.98	0.61
4:A:1882:C2F:H112	4:A:1882:C2F:O4	2.00	0.61
1:B:56:ILE:HD12	1:B:56:ILE:N	2.15	0.61
1:B:232:TYR:O	1:B:233:TYR:HB2	2.01	0.61
1:B:431:SER:OG	1:B:434:GLU:HB2	2.01	0.60
4:B:1883:C2F:H112	4:B:1883:C2F:O4	2.02	0.60

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:201:PRO:O	1:A:204:VAL:HG22	2.02	0.60
1:A:399:LEU:HB3	1:A:401:LEU:HG	1.83	0.60
1:B:432:LYS:O	1:B:436:GLU:HG3	2.02	0.59
1:B:159:ARG:HH21	1:B:159:ARG:HG3	1.67	0.59
1:A:714:VAL:HG12	1:A:718:LEU:HD22	1.85	0.58
1:A:571:ILE:N	1:A:571:ILE:HD12	2.19	0.58
1:B:270:PRO:HB2	1:B:273:LYS:HG2	1.86	0.58
1:B:679:ILE:N	1:B:679:ILE:HD12	2.20	0.57
1:A:672:HIS:C	1:A:709:ARG:HH21	2.08	0.56
1:B:560:ASN:OD1	1:B:564:LYS:HE2	2.04	0.56
1:A:171:GLU:HG3	1:A:214:LEU:HD11	1.86	0.56
1:A:624:PHE:HD2	1:A:631:ILE:HD13	1.71	0.56
1:A:638:VAL:HG22	1:A:663:GLN:HB2	1.88	0.56
1:B:324:LEU:HD13	6:B:753:HOH:O	2.05	0.56
1:A:154:LEU:HB3	1:A:170:MSE:HE3	1.88	0.55
1:B:403:LEU:HD23	1:B:404:PHE:H	1.71	0.55
1:A:462:GLU:HG2	1:A:465:ARG:HD2	1.87	0.55
1:A:230:PHE:HA	1:A:251:HIS:HB3	1.88	0.55
1:A:724:LEU:O	1:A:728:MSE:HG2	2.07	0.55
1:A:32:GLU:O	1:A:36:GLU:HG3	2.08	0.54
1:A:305:ILE:HD12	1:A:345:LEU:HD23	1.89	0.54
1:A:314:LEU:HD11	1:A:338:LYS:HE3	1.89	0.54
1:A:229:VAL:HB	1:A:250:LEU:HD23	1.89	0.54
1:A:107:ASN:ND2	1:A:283:ARG:HH12	2.07	0.53
1:A:403:LEU:O	1:A:729:ARG:HD3	2.09	0.53
1:B:372:GLU:HG3	1:B:376:ASN:ND2	2.23	0.53
1:B:341:GLU:HA	1:B:344:MSE:HE3	1.90	0.53
1:A:20:ALA:HB2	1:A:37:GLU:HG2	1.89	0.53
1:B:378:PRO:C	1:B:380:ASP:H	2.11	0.53
1:B:679:ILE:H	1:B:679:ILE:HD12	1.74	0.52
1:A:415:THR:O	1:A:418:VAL:HG12	2.08	0.52
1:B:506:ARG:HB2	1:B:558:ALA:HB1	1.91	0.52
1:A:216:LEU:HG	1:A:220:ARG:NH1	2.24	0.52
1:B:449:LEU:HD21	1:B:715:ILE:CD1	2.39	0.52
1:B:714:VAL:HG12	1:B:718:LEU:HD22	1.92	0.52
1:B:729:ARG:O	1:B:733:ALA:HB2	2.10	0.52
1:A:176:SER:O	1:A:179:SER:HB3	2.10	0.52
1:A:517:TYR:CE1	1:A:521:LEU:HD11	2.44	0.52
1:A:9:PRO:HB2	1:A:316:VAL:HG22	1.92	0.52
1:B:46:VAL:HG21	1:B:136:PHE:CE2	2.44	0.51
1:A:667:GLY:HA2	1:A:701:ASN:O	2.10	0.51
1:B:395:GLN:OE1	1:B:614:GLN:HG3	2.10	0.51

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:589:LYS:HA	1:A:592:TRP:CD1	2.46	0.51
1:A:671:ILE:C	1:A:671:ILE:HD12	2.31	0.51
1:A:154:LEU:HD13	1:A:177:LEU:HD22	1.93	0.51
1:A:232:TYR:O	1:A:233:TYR:CB	2.58	0.51
1:B:220:ARG:O	1:B:223:SER:HB2	2.11	0.51
1:B:164:ILE:HG22	1:B:170:MSE:HG2	1.93	0.51
1:B:68:LEU:HD22	1:B:113:LEU:CD1	2.40	0.50
1:B:666:VAL:HG21	1:B:689:VAL:HG11	1.92	0.50
1:A:30:THR:OG1	1:A:33:GLN:HG3	2.11	0.50
1:A:557:LEU:HD22	1:A:605:LEU:HD21	1.93	0.50
1:A:5:ALA:HB2	1:A:53:VAL:HG11	1.93	0.50
1:A:178:VAL:CG2	1:A:218:VAL:HG13	2.41	0.50
1:A:720:ASN:N	1:A:720:ASN:HD22	2.09	0.50
1:B:283:ARG:HG2	1:B:309:CYS:SG	2.51	0.50
1:A:619:MSE:HG3	1:A:639:ILE:HD11	1.92	0.50
1:A:701:ASN:HB2	1:A:702:PRO:HD2	1.93	0.50
1:A:728:MSE:HA	1:A:728:MSE:HE2	1.94	0.50
1:B:668:VAL:HG23	1:B:682:MSE:HE2	1.94	0.50
1:B:443:ILE:O	1:B:447:ILE:HG12	2.12	0.50
1:A:168:ASN:HB3	1:B:589:LYS:O	2.11	0.49
1:A:371:VAL:CG1	1:A:375:ARG:HD2	2.43	0.49
1:A:413:PRO:HG2	1:A:711:TRP:CE2	2.47	0.49
1:B:9:PRO:HB2	1:B:316:VAL:HG22	1.94	0.49
1:A:436:GLU:OE2	1:A:513:LYS:NZ	2.44	0.49
1:A:644:SER:HA	1:A:685:ILE:HD13	1.94	0.49
1:A:414:GLN:HE21	1:A:463:PHE:HA	1.77	0.49
1:B:296:LEU:O	1:B:300:LEU:HB2	2.12	0.49
1:B:47:GLU:HG2	1:B:50:ARG:NH2	2.27	0.49
1:A:624:PHE:HD2	1:A:631:ILE:CD1	2.26	0.49
1:B:686:VAL:HG21	1:B:724:LEU:HD11	1.93	0.49
1:A:284:GLN:HE22	1:A:541:TYR:HA	1.78	0.49
1:A:247:VAL:O	1:A:273:LYS:HE3	2.13	0.49
1:A:582:ARG:CG	1:A:627:ILE:HG21	2.43	0.49
1:B:509:PRO:HB3	1:B:512:LEU:HD23	1.94	0.49
1:A:446:ALA:O	1:A:450:GLN:HG3	2.12	0.49
1:A:450:GLN:HB3	1:A:458:LEU:HD22	1.94	0.49
1:B:403:LEU:HD22	1:B:404:PHE:CD2	2.48	0.48
1:B:21:LEU:HD12	1:B:25:TRP:CZ2	2.48	0.48
1:B:5:ALA:HB2	1:B:53:VAL:HG11	1.95	0.48
1:A:470:GLU:O	1:A:474:GLU:HG3	2.13	0.48
1:A:231:THR:H	1:A:251:HIS:HD2	1.60	0.48
1:A:669:TRP:CE3	1:A:702:PRO:HB3	2.48	0.48

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:63:TYR:HD2	1:B:87:LEU:HD21	1.78	0.48
1:A:293:VAL:O	1:A:297:VAL:HG23	2.13	0.48
1:A:59:ASN:HB2	6:A:781:HOH:O	2.12	0.48
1:B:619:MSE:HA	1:B:619:MSE:HE2	1.96	0.48
1:B:652:SER:HA	1:B:655:GLU:HG2	1.95	0.48
1:B:584:LYS:O	1:B:584:LYS:HG3	2.13	0.48
1:A:511:THR:O	1:A:515:ILE:HG12	2.13	0.47
1:B:477:ASN:O	1:B:504:VAL:HA	2.14	0.47
1:A:284:GLN:HG3	1:A:285:PRO:HD2	1.96	0.47
1:B:700:ILE:HD13	1:B:724:LEU:CD1	2.44	0.47
1:A:315:PRO:HB3	1:A:485:GLY:HA2	1.97	0.47
1:B:127:ASN:O	1:B:131:GLU:HG3	2.14	0.47
1:B:589:LYS:HA	1:B:592:TRP:CD1	2.49	0.47
1:B:494:CYS:O	4:B:1883:C2F:H17	2.15	0.47
1:B:266:LYS:HZ3	1:B:267:HIS:CE1	2.33	0.47
1:B:233:TYR:O	1:B:234:ASP:HB2	2.15	0.47
1:B:619:MSE:HE3	6:B:850:HOH:O	2.14	0.47
1:B:711:TRP:O	1:B:715:ILE:HG12	2.15	0.47
1:B:68:LEU:HD22	1:B:113:LEU:HD12	1.97	0.47
1:B:163:TRP:HB3	1:B:165:ARG:HG3	1.97	0.46
1:A:284:GLN:HE21	1:A:541:TYR:HB3	1.80	0.46
1:B:715:ILE:HB	1:B:716:PRO:CD	2.44	0.46
1:A:547:PRO:HG2	1:A:550:GLU:HB2	1.97	0.46
1:A:506:ARG:HB2	1:A:558:ALA:HB1	1.97	0.46
1:B:450:GLN:CB	1:B:458:LEU:HD22	2.43	0.46
1:B:56:ILE:N	1:B:56:ILE:CD1	2.78	0.46
1:B:696:GLU:H	1:B:696:GLU:CD	2.18	0.46
1:B:228:THR:HG23	1:B:249:ARG:CB	2.46	0.46
1:A:498:PRO:CD	1:A:540:SER:HB3	2.44	0.46
1:B:449:LEU:HD11	1:B:715:ILE:HD12	1.96	0.46
1:B:511:THR:O	1:B:515:ILE:HG12	2.15	0.46
1:A:284:GLN:HG3	1:A:286:TRP:CD1	2.51	0.46
1:B:677:PRO:HB2	1:B:682:MSE:HE3	1.98	0.46
1:B:403:LEU:O	1:B:729:ARG:HD2	2.16	0.45
1:B:228:THR:HG23	1:B:249:ARG:HB3	1.98	0.45
1:A:21:LEU:HD12	1:A:34:PHE:CE1	2.51	0.45
1:A:309:CYS:HB2	1:A:310:PRO:CD	2.46	0.45
1:A:497:PRO:HA	1:A:498:PRO:HD3	1.78	0.45
1:B:111:HIS:HB2	1:B:490:TYR:HB3	1.97	0.45
1:A:395:GLN:OE1	1:A:614:GLN:HG3	2.16	0.45
1:B:232:TYR:O	1:B:233:TYR:CB	2.64	0.45
1:B:5:ALA:HA	1:B:307:ASN:OD1	2.16	0.45

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:640:SER:HB2	6:A:833:HOH:O	2.15	0.45
1:A:137:LYS:HE3	1:A:142:GLU:OE2	2.16	0.45
1:B:80:ARG:HD2	1:B:98:LYS:HB2	1.99	0.45
1:B:513:LYS:HG3	1:B:514:GLU:OE2	2.16	0.45
1:A:489:SER:OG	4:A:1882:C2F:H92	2.16	0.45
1:A:647:LYS:HA	1:A:685:ILE:HG12	1.99	0.45
1:A:95:ARG:HH21	1:A:95:ARG:CB	2.29	0.45
1:A:232:TYR:HA	1:A:253:ASP:HB2	1.97	0.45
1:B:679:ILE:CD1	1:B:679:ILE:H	2.30	0.45
1:B:639:ILE:O	1:B:639:ILE:HG23	2.16	0.45
1:A:531:THR:O	1:A:559:ILE:HD13	2.15	0.45
1:B:646:SER:O	1:B:647:LYS:HB2	2.17	0.45
1:A:538:SER:HB2	1:A:584:LYS:HG3	1.98	0.45
1:B:31:GLU:HG3	1:B:87:LEU:HD12	1.99	0.45
1:B:671:ILE:C	1:B:671:ILE:HD12	2.37	0.45
1:B:186:GLU:O	1:B:190:GLU:HG3	2.17	0.44
1:A:584:LYS:HD3	1:A:584:LYS:O	2.17	0.44
1:A:84:TYR:HA	1:A:89:THR:HG21	1.99	0.44
1:A:315:PRO:HB2	1:A:334:PHE:CD2	2.52	0.44
1:A:288:VAL:HG23	1:A:290:LEU:CD1	2.47	0.44
1:B:154:LEU:HD12	1:B:154:LEU:HA	1.84	0.44
1:B:20:ALA:HB2	1:B:37:GLU:HG2	2.00	0.44
1:A:104:LYS:NZ	1:A:583:GLU:OE2	2.50	0.43
1:A:178:VAL:HG22	1:A:218:VAL:HG13	2.00	0.43
1:A:644:SER:HA	1:A:685:ILE:CD1	2.48	0.43
1:A:91:PHE:O	1:A:95:ARG:HG2	2.18	0.43
1:B:367:ASP:O	1:B:371:VAL:HG23	2.18	0.43
1:A:477:ASN:ND2	1:A:507:PRO:HD3	2.33	0.43
1:A:327:GLY:O	1:A:331:LYS:HD3	2.18	0.43
1:A:548:GLU:OE2	1:A:584:LYS:HE3	2.19	0.43
1:B:384:ARG:HG3	1:B:635:GLU:OE2	2.17	0.43
1:A:669:TRP:HB2	1:A:682:MSE:CE	2.46	0.43
1:A:321:GLU:O	1:A:329:LYS:HD2	2.18	0.43
1:A:11:ILE:HA	1:A:17:PHE:HB3	2.01	0.43
1:A:438:PHE:O	1:A:442:GLN:HG2	2.18	0.43
1:B:650:ILE:O	1:B:650:ILE:HG12	2.18	0.43
1:A:432:LYS:O	1:A:436:GLU:HG3	2.19	0.43
1:A:371:VAL:O	1:A:375:ARG:HG3	2.19	0.43
1:B:159:ARG:NH2	1:B:159:ARG:HG3	2.34	0.43
1:A:413:PRO:HB3	1:A:709:ARG:O	2.19	0.43
1:B:497:PRO:HA	1:B:498:PRO:HD3	1.96	0.43
1:B:264:LEU:C	1:B:264:LEU:HD23	2.39	0.42

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:7:GLY:O	1:A:312:PHE:N	2.52	0.42
1:A:582:ARG:HG3	1:A:627:ILE:HG21	2.00	0.42
1:B:489:SER:OG	4:B:1883:C2F:H92	2.20	0.42
1:A:398:ARG:NH1	1:A:572:LYS:HG2	2.34	0.42
1:A:650:ILE:HG12	1:A:650:ILE:O	2.20	0.42
1:B:368:LEU:C	1:B:368:LEU:HD13	2.39	0.42
1:B:719:ARG:HG3	1:B:719:ARG:NH1	2.31	0.42
1:B:661:ILE:O	1:B:697:LEU:HD21	2.20	0.42
1:A:128:LYS:N	1:A:129:PRO:CD	2.83	0.42
1:B:407:THR:HB	1:B:457:VAL:HB	2.02	0.42
1:B:459:VAL:HB	6:B:922:HOH:O	2.19	0.42
1:A:330:GLU:N	1:A:330:GLU:OE1	2.53	0.42
1:A:14:LYS:HB2	1:A:16:GLU:OE1	2.19	0.42
1:B:578:GLU:O	1:B:619:MSE:HE1	2.18	0.42
1:B:253:ASP:OD2	1:B:308:SER:HB2	2.20	0.42
1:B:678:SER:OG	1:B:681:GLU:HG3	2.19	0.42
1:A:112:TYR:CE2	1:A:156:LEU:HB3	2.55	0.41
1:B:378:PRO:C	1:B:380:ASP:N	2.73	0.41
1:B:449:LEU:HD21	1:B:715:ILE:HD11	2.01	0.41
1:A:235:SER:CB	1:A:259:GLU:HB2	2.50	0.41
1:A:348:PHE:CG	1:A:356:LEU:HD11	2.54	0.41
1:B:517:TYR:CE2	1:B:521:LEU:HD11	2.55	0.41
1:A:439:ILE:HG22	1:A:440:LYS:N	2.36	0.41
1:A:467:ASP:OD2	1:A:495:TYR:HE2	2.03	0.41
1:B:486:TRP:CE3	1:B:496:ARG:HG3	2.55	0.41
1:A:448:GLU:O	1:A:452:GLU:HG3	2.20	0.41
1:B:669:TRP:HB2	1:B:682:MSE:CE	2.51	0.41
1:B:231:THR:H	1:B:251:HIS:HD2	1.68	0.41
1:B:0:PHE:HA	1:B:350:GLU:HG2	2.02	0.41
1:A:46:VAL:HG11	1:A:141:ILE:HD13	2.02	0.41
1:A:600:ILE:HD13	1:A:633:GLN:HB2	2.03	0.41
1:A:104:LYS:HD2	1:A:111:HIS:CD2	2.56	0.41
1:B:4:TYR:CE1	1:B:55:VAL:HG21	2.57	0.40
1:A:515:ILE:HG21	1:A:571:ILE:HG12	2.02	0.40
1:A:571:ILE:CD1	1:A:571:ILE:N	2.84	0.40
1:A:18:LYS:NZ	4:A:1882:C2F:O2	2.41	0.40
1:A:580:ALA:O	1:A:581:PHE:C	2.60	0.40
1:B:201:PRO:O	1:B:204:VAL:HG22	2.20	0.40
1:A:107:ASN:CG	1:A:283:ARG:HH12	2.25	0.40
4:B:1883:C2F:O4	4:B:1883:C2F:C11	2.69	0.40
1:B:573:ILE:HG12	1:B:614:GLN:HB3	2.03	0.40
1:B:154:LEU:HB3	1:B:170:MSE:HE3	2.04	0.40

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:7:GLY:O	1:B:312:PHE:N	2.54	0.40
1:A:453:ILE:HG22	1:A:722:VAL:HG21	2.02	0.40
1:B:710:ASN:HB3	1:B:712:ASP:OD1	2.22	0.40
1:B:37:GLU:HA	1:B:40:LYS:HD3	2.03	0.40
1:A:2:LYS:O	1:A:304:ALA:HA	2.21	0.40
1:B:214:LEU:O	1:B:218:VAL:HG23	2.21	0.40
1:A:431:SER:O	1:A:434:GLU:N	2.54	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	732/765 (96%)	695 (95%)	34 (5%)	3 (0%)	43 72
1	B	732/765 (96%)	693 (95%)	36 (5%)	3 (0%)	43 72
All	All	1464/1530 (96%)	1388 (95%)	70 (5%)	6 (0%)	43 72

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	64	TYR
1	A	64	TYR
1	A	359	VAL
1	A	233	TYR
1	B	359	VAL
1	B	410	GLY

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	597/668 (89%)	565 (95%)	32 (5%)	31	57
1	B	604/668 (90%)	580 (96%)	24 (4%)	42	73
All	All	1201/1336 (90%)	1145 (95%)	56 (5%)	36	65

All (56) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	15	ARG
1	A	21	LEU
1	A	31	GLU
1	A	50	ARG
1	A	61	LEU
1	A	95	ARG
1	A	104	LYS
1	A	154	LEU
1	A	214	LEU
1	A	217	ASN
1	A	245	LEU
1	A	285	PRO
1	A	290	LEU
1	A	300	LEU
1	A	312	PHE
1	A	323	ASN
1	A	324	LEU
1	A	339	LEU
1	A	398	ARG
1	A	399	LEU
1	A	403	LEU
1	A	412	PHE
1	A	476	LEU
1	A	488	LEU
1	A	540	SER
1	A	557	LEU
1	A	582	ARG
1	A	680	ASN
1	A	687	GLU
1	A	701	ASN
1	A	718	LEU
1	A	720	ASN
1	B	21	LEU
1	B	124	LEU
1	B	154	LEU

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Mol	Chain	Res	Type
1	B	162	GLU
1	B	194	LYS
1	B	227	LEU
1	B	245	LEU
1	B	285	PRO
1	B	300	LEU
1	B	312	PHE
1	B	324	LEU
1	B	398	ARG
1	B	399	LEU
1	B	403	LEU
1	B	452	GLU
1	B	470	GLU
1	B	493	ARG
1	B	557	LEU
1	B	612	GLU
1	B	619	MSE
1	B	701	ASN
1	B	706	LEU
1	B	718	LEU
1	B	724	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	251	HIS
1	A	284	GLN
1	A	414	GLN
1	A	477	ASN
1	A	720	ASN
1	B	251	HIS
1	B	376	ASN
1	B	477	ASN
1	B	720	ASN

5.3.3 RNA ⓘ

There are no RNA chains 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 ⓘ

Of 9 ligands modelled in this entry, 2 are monoatomic - leaving 7 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	$\# Z > 2$
4	C2F	A	1882	-	35,35,35	1.44	2 (5%)	47,49,49	1.32	6 (12%)
2	SO4	A	1884	-	4,4,4	0.88	0	6,6,6	0.07	0
2	SO4	A	1886	-	4,4,4	1.04	0	6,6,6	0.07	0
5	MRY	A	1890	-	7,7,7	0.27	0	8,8,8	0.41	0
4	C2F	B	1883	-	35,35,35	1.44	2 (5%)	47,49,49	1.26	6 (12%)
2	SO4	B	1885	-	4,4,4	0.91	0	6,6,6	0.07	0
5	MRY	B	1889	-	7,7,7	0.27	0	8,8,8	0.46	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
4	C2F	A	1882	-	-	0/22/35/35	0/1/3/3
2	SO4	A	1884	-	-	0/0/0/0	0/0/0/0
2	SO4	A	1886	-	-	0/0/0/0	0/0/0/0
5	MRY	A	1890	-	-	0/8/8/8	0/0/0/0
4	C2F	B	1883	-	-	0/22/35/35	0/1/3/3
2	SO4	B	1885	-	-	0/0/0/0	0/0/0/0
5	MRY	B	1889	-	-	0/8/8/8	0/0/0/0

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1883	C2F	O4-C4	6.09	1.36	1.24
4	A	1882	C2F	O4-C4	6.08	1.36	1.24
4	B	1883	C2F	C8A-N8	2.72	1.40	1.34
4	A	1882	C2F	C8A-N8	2.69	1.40	1.34

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1882	C2F	C9-C6-N5	-4.24	107.09	111.75
4	B	1883	C2F	C9-C6-N5	-3.70	107.68	111.75
4	B	1883	C2F	C4-C4A-C8A	3.03	116.93	114.43
4	A	1882	C2F	C4-C4A-C8A	2.98	116.89	114.43
4	A	1882	C2F	C7-C6-N5	2.66	111.15	108.42
4	B	1883	C2F	C7-C6-N5	2.66	111.14	108.42
4	B	1883	C2F	C2-N1-C8A	2.49	121.15	117.61
4	A	1882	C2F	C2-N1-C8A	2.41	121.03	117.61
4	B	1883	C2F	N8-C8A-N1	2.28	119.16	115.82
4	A	1882	C2F	N8-C8A-N1	2.22	119.07	115.82
4	A	1882	C2F	NA2-C2-N3	2.21	120.29	117.86
4	B	1883	C2F	NA2-C2-N3	2.13	120.20	117.86

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5.7 Other polymers ⓘ

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	734/765 (95%)	-0.22	13 (1%) 65 64	11, 26, 56, 77	0
1	B	734/765 (95%)	-0.30	5 (0%) 84 86	10, 24, 46, 61	0
All	All	1468/1530 (95%)	-0.26	18 (1%) 75 77	10, 25, 51, 77	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	360	SER	3.5
1	A	361	PHE	3.4
1	B	354	PHE	3.2
1	A	377	LEU	3.1
1	A	359	VAL	3.0
1	A	423	SER	2.9
1	A	732	PHE	2.8
1	A	428	GLY	2.8
1	A	362	GLU	2.7
1	B	732	PHE	2.6
1	B	358	ASN	2.6
1	B	428	GLY	2.5
1	A	358	ASN	2.5
1	B	361	PHE	2.4
1	A	425	TYR	2.4
1	A	429	GLU	2.3
1	A	733	ALA	2.3
1	A	363	ASP	2.2

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

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

6.3 Carbohydrates ⓘ

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, 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	RSR	LLDF	B-factors(Å ²)	Q<0.9
5	MRY	A	1890	8/8	0.24	3.20	38,43,45,46	0
4	C2F	A	1882	33/33	0.21	2.31	36,40,55,57	0
2	SO4	A	1886	5/5	0.21	1.99	68,69,70,70	0
5	MRY	B	1889	8/8	0.20	1.63	31,41,44,45	0
4	C2F	B	1883	33/33	0.21	1.35	27,31,51,53	0
2	SO4	A	1884	5/5	0.09	-1.61	27,28,30,31	0
2	SO4	B	1885	5/5	0.07	-1.69	25,26,28,28	0
3	ZN	A	1887	1/1	0.02	-3.73	32,32,32,32	0
3	ZN	B	1888	1/1	0.03	-4.64	33,33,33,33	0

6.5 Other polymers ⓘ

There are no such residues in this entry.