



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 14, 2026 – 11:53 AM UTC

PDB ID : 3SFP / pdb_00003sfp
Title : Crystal Structure of the Mono-Zinc-boundform of New Delhi Metallo-beta-Lactamase-1 from *Klebsiella pneumoniae*
Authors : Kim, Y.; Tesar, C.; Jedrzejczak, R.; Babnigg, J.; Binkowski, T.A.; Joachimiak, A.; Midwest Center for Structural Genomics (MCSG); Structures of Mtb Proteins Conferring Susceptibility to Known Mtb Inhibitors (MTBI)
Deposited on : 2011-06-13
Resolution : 2.27 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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

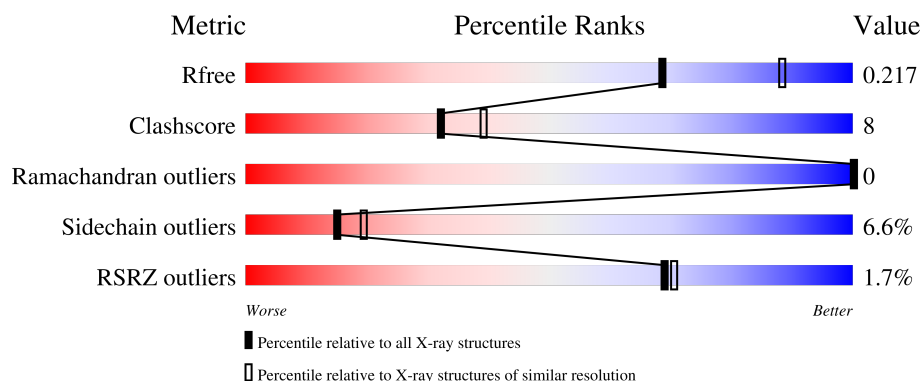
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.27 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}	180053	9078 (2.30-2.26)
Clashscore	190562	9802 (2.30-2.26)
Ramachandran outliers	187476	9690 (2.30-2.26)
Sidechain outliers	187428	9691 (2.30-2.26)
RSRZ outliers	180081	9085 (2.30-2.26)

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	237	
1	B	237	
1	C	237	
1	D	237	

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
5	GOL	B	284	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 7367 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 Beta-lactamase NDM-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	231	Total	C	N	O	S	0	1	0
			1723	1081	306	327	9			
1	B	231	Total	C	N	O	S	0	4	0
			1755	1099	317	330	9			
1	C	231	Total	C	N	O	S	0	0	0
			1717	1078	305	326	8			
1	D	232	Total	C	N	O	S	0	1	0
			1736	1089	310	328	9			

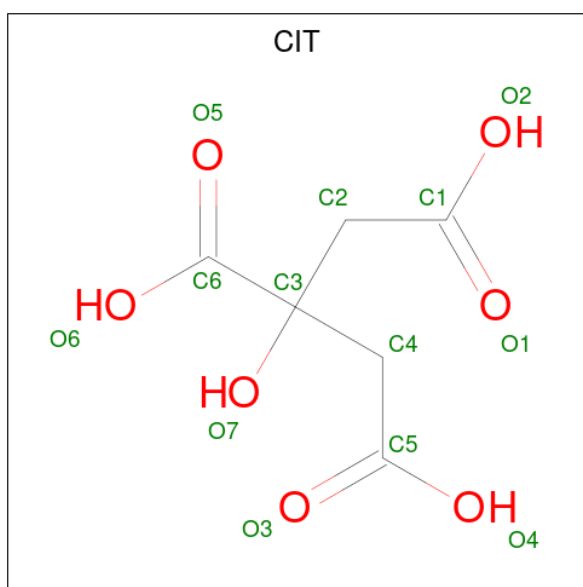
There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	34	SER	-	expression tag	UNP C7C422
A	35	ASN	-	expression tag	UNP C7C422
A	36	ALA	-	expression tag	UNP C7C422
A	37	ASN	-	expression tag	UNP C7C422
A	38	TYR	-	expression tag	UNP C7C422
B	34	SER	-	expression tag	UNP C7C422
B	35	ASN	-	expression tag	UNP C7C422
B	36	ALA	-	expression tag	UNP C7C422
B	37	ASN	-	expression tag	UNP C7C422
B	38	TYR	-	expression tag	UNP C7C422
C	34	SER	-	expression tag	UNP C7C422
C	35	ASN	-	expression tag	UNP C7C422
C	36	ALA	-	expression tag	UNP C7C422
C	37	ASN	-	expression tag	UNP C7C422
C	38	TYR	-	expression tag	UNP C7C422
D	34	SER	-	expression tag	UNP C7C422
D	35	ASN	-	expression tag	UNP C7C422
D	36	ALA	-	expression tag	UNP C7C422
D	37	ASN	-	expression tag	UNP C7C422
D	38	TYR	-	expression tag	UNP C7C422

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

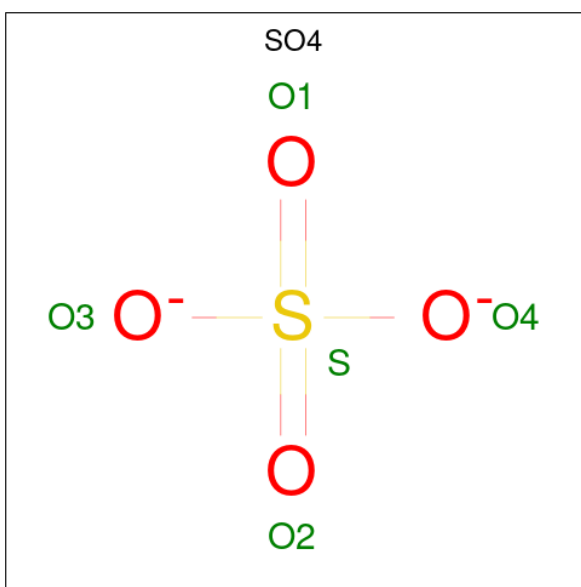
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Zn	0	0
			1	1		
2	B	1	Total	Zn	0	0
			1	1		
2	C	1	Total	Zn	0	0
			1	1		
2	D	1	Total	Zn	0	0
			1	1		

- Molecule 3 is CITRIC ACID (CCD ID: CIT) (formula: C₆H₈O₇).



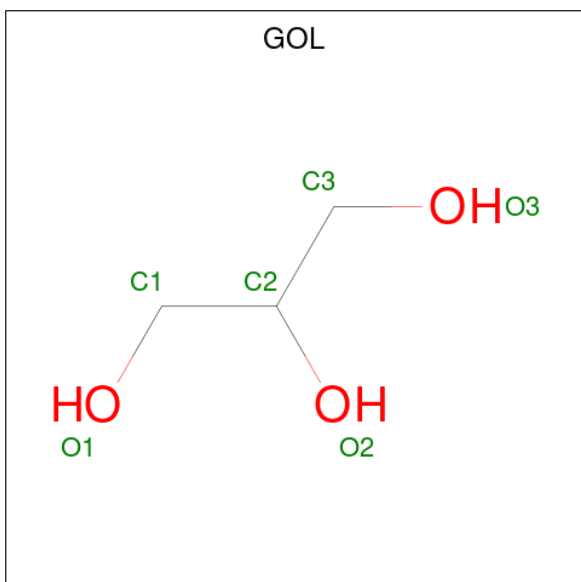
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			13	6	7		
3	B	1	Total	C	O	0	0
			13	6	7		
3	C	1	Total	C	O	0	0
			13	6	7		
3	D	1	Total	C	O	0	0
			13	6	7		

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	C	1	Total C O 6 3 3	0	0
5	C	1	Total C O 6 3 3	0	0
5	D	1	Total C O 6 3 3	0	0

- Molecule 6 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	1	Total Cl 1 1	0	0

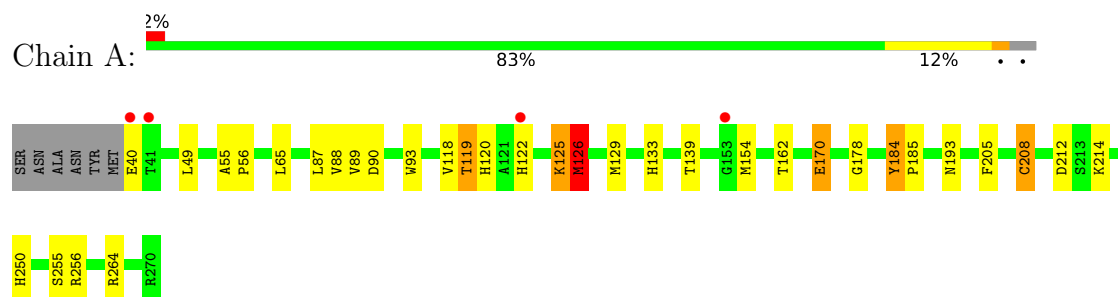
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	86	Total O 86 86	0	0
7	B	91	Total O 91 91	0	0
7	C	60	Total O 60 60	0	0
7	D	87	Total O 87 87	0	0

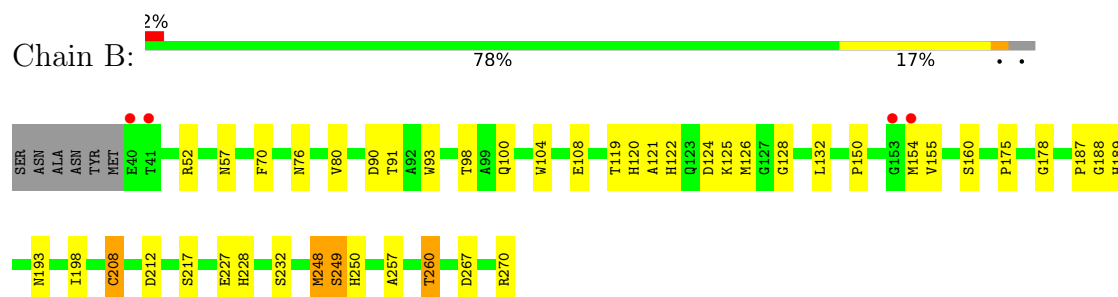
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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.

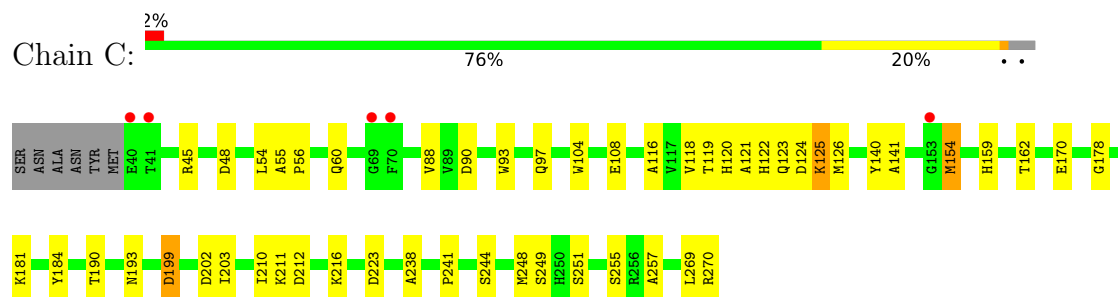
• Molecule 1: Beta-lactamase NDM-1



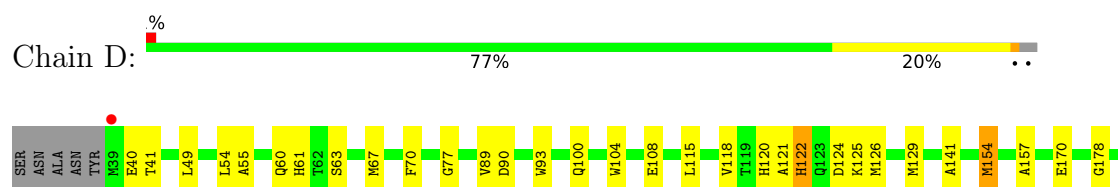
• Molecule 1: Beta-lactamase NDM-1

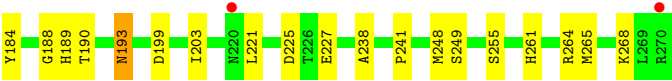


• Molecule 1: Beta-lactamase NDM-1



• Molecule 1: Beta-lactamase NDM-1





4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	97.94Å 97.94Å 187.55Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.41 – 2.27 46.41 – 2.27	Depositor EDS
% Data completeness (in resolution range)	98.9 (46.41-2.27) 99.1 (46.41-2.27)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.06 (at 2.27Å)	Xtriage
Refinement program	PHENIX (phenix.refine: dev_761)	Depositor
R, R_{free}	0.181 , 0.236 (Not available) , 0.217	Depositor DCC
R_{free} test set	2141 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	30.3	Xtriage
Anisotropy	0.505	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 43.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7367	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 29.49 % 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 1.5361e-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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CIT, SO4, CL, GOL, ZN

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	0.78	1/1763 (0.1%)	0.98	8/2401 (0.3%)
1	B	0.68	0/1795	0.94	7/2441 (0.3%)
1	C	0.64	0/1757	0.93	5/2393 (0.2%)
1	D	0.66	1/1776 (0.1%)	0.95	12/2417 (0.5%)
All	All	0.69	2/7091 (0.0%)	0.95	32/9652 (0.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	89	VAL	C-O	-5.90	1.17	1.24
1	D	55	ALA	CA-CB	-5.01	1.47	1.54

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	178	GLY	CA-C-N	7.46	127.62	119.87
1	C	178	GLY	C-N-CA	7.46	127.62	119.87
1	A	119	THR	N-CA-C	7.29	119.30	111.36
1	B	189	HIS	N-CA-C	-6.63	104.06	111.28
1	D	184	TYR	CA-C-N	6.31	125.93	119.56
1	D	184	TYR	C-N-CA	6.31	125.93	119.56
1	A	250	HIS	N-CA-C	6.25	121.04	113.17
1	A	178	GLY	CA-C-N	6.00	125.63	119.56
1	A	178	GLY	C-N-CA	6.00	125.63	119.56
1	D	122	HIS	N-CA-C	-5.99	99.63	108.79
1	D	70	PHE	N-CA-C	5.80	120.48	113.17
1	B	188	GLY	CA-C-N	5.66	127.86	120.28
1	B	188	GLY	C-N-CA	5.66	127.86	120.28
1	D	203	ILE	N-CA-C	5.60	116.64	108.58
1	D	170	GLU	CA-C-N	5.58	125.68	119.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	170	GLU	C-N-CA	5.58	125.68	119.32
1	D	89	VAL	CA-C-N	5.55	132.14	121.54
1	D	89	VAL	C-N-CA	5.55	132.14	121.54
1	B	250	HIS	N-CA-C	5.22	120.30	112.94
1	C	203	ILE	N-CA-C	5.22	115.83	108.36
1	C	184	TYR	CA-C-N	5.17	125.24	119.87
1	C	184	TYR	C-N-CA	5.17	125.24	119.87
1	B	249	SER	N-CA-C	5.16	116.90	111.28
1	A	184	TYR	CA-C-N	5.15	125.22	119.87
1	A	184	TYR	C-N-CA	5.15	125.22	119.87
1	A	126	MET	N-CA-C	5.14	119.64	113.17
1	D	178	GLY	CA-C-N	5.13	124.75	119.56
1	D	178	GLY	C-N-CA	5.13	124.75	119.56
1	D	41	THR	N-CA-C	5.10	119.19	112.92
1	A	88	VAL	N-CA-C	5.07	115.20	108.11
1	B	178	GLY	CA-C-N	5.04	125.11	119.87
1	B	178	GLY	C-N-CA	5.04	125.11	119.87

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	1723	0	1668	21	0
1	B	1755	0	1699	34	0
1	C	1717	0	1664	25	0
1	D	1736	0	1685	29	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	13	0	5	1	2
3	B	13	0	5	0	1
3	C	13	0	5	0	0
3	D	13	0	5	0	2

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	10	0	0	0	0
4	B	10	0	0	0	0
4	C	5	0	0	0	0
5	A	6	0	8	3	0
5	B	6	0	8	4	0
5	C	12	0	16	1	0
5	D	6	0	8	3	0
6	C	1	0	0	0	0
7	A	86	0	0	2	0
7	B	91	0	0	5	0
7	C	60	0	0	2	0
7	D	87	0	0	7	0
All	All	7367	0	6776	111	3

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 8.

All (111) 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:118:VAL:HG11	1:A:126:MET:HG3	1.37	1.04
1:B:160:SER:H	5:B:284:GOL:H31	1.26	0.99
1:B:120:HIS:CE1	1:B:208[B]:CYS:SG	2.57	0.97
1:B:120:HIS:HE1	1:B:208[B]:CYS:SG	1.94	0.90
1:B:120:HIS:CE1	1:B:125:LYS:HG3	2.17	0.80
1:C:123:GLN:HA	1:C:154:MET:HE1	1.64	0.79
1:A:256:ARG:HE	5:A:284:GOL:H12	1.55	0.72
1:D:49:LEU:HD23	1:D:63:SER:HB3	1.71	0.71
1:B:150:PRO:HB2	7:B:328:HOH:O	1.90	0.70
1:C:216:LYS:NZ	7:C:293:HOH:O	2.24	0.69
1:B:175:PRO:O	7:B:290:HOH:O	2.11	0.68
1:C:93:TRP:HB2	1:C:97:GLN:OE1	1.95	0.67
1:A:126:MET:O	1:A:129:MET:HG2	1.97	0.64
1:D:188:GLY:HA3	1:D:193:ASN:OD1	1.96	0.64
1:B:228[B]:HIS:CD2	1:B:232:SER:OG	2.51	0.63
1:C:120:HIS:CE1	1:C:125:LYS:HG3	2.33	0.63
1:B:187:PRO:HD2	1:B:228[B]:HIS:CD2	2.35	0.62
1:B:267:ASP:OD1	1:B:270[B]:ARG:NH1	2.32	0.62
1:D:261:HIS:CD2	1:D:265:MET:HE2	2.36	0.61
1:D:90:ASP:OD2	1:D:125:LYS:HD2	2.02	0.59
1:A:55:ALA:HB1	1:A:56:PRO:HD2	1.83	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:190:THR:HG22	1:C:223:ASP:HB2	1.85	0.59
1:D:40:GLU:HG3	7:D:321:HOH:O	2.03	0.59
1:B:120:HIS:ND1	1:B:125:LYS:HG3	2.18	0.59
1:C:118:VAL:HG22	1:C:141:ALA:HB2	1.85	0.58
1:B:160:SER:HB2	5:B:284:GOL:O2	2.04	0.57
1:D:189:HIS:ND1	7:D:306:HOH:O	2.32	0.57
1:A:125:LYS:N	1:A:125:LYS:HD2	2.18	0.57
1:B:160:SER:N	5:B:284:GOL:H31	2.09	0.56
1:C:55:ALA:HB1	1:C:56:PRO:HD2	1.87	0.56
1:C:238:ALA:O	1:C:241:PRO:HD3	2.06	0.55
1:C:248:MET:HB2	1:C:251:SER:O	2.05	0.55
1:D:118:VAL:HG21	1:D:126:MET:HE3	1.88	0.55
1:D:118:VAL:HG22	1:D:141:ALA:HB2	1.87	0.55
1:D:49:LEU:CD2	1:D:63:SER:HB3	2.36	0.54
1:B:90:ASP:OD2	1:B:125:LYS:HD3	2.08	0.54
1:C:255:SER:HB2	7:C:279:HOH:O	2.08	0.53
1:A:162:THR:OG1	1:A:170:GLU:HG3	2.08	0.53
1:D:221:LEU:N	7:D:343:HOH:O	2.36	0.53
1:D:264[A]:ARG:HD3	5:D:282:GOL:H2	1.90	0.53
1:D:61:HIS:NE2	1:D:77:GLY:HA3	2.24	0.53
1:B:52:ARG:HD2	7:B:348:HOH:O	2.09	0.52
1:C:121:ALA:O	1:C:122:HIS:CD2	2.63	0.52
1:C:162:THR:OG1	1:C:170:GLU:HG3	2.09	0.52
1:D:93:TRP:CZ3	1:D:124:ASP:HB3	2.45	0.52
1:C:202:ASP:HB2	1:C:244:SER:OG	2.10	0.52
1:A:120:HIS:CE1	1:A:208[B]:CYS:SG	3.04	0.51
1:B:119:THR:O	1:B:120:HIS:HB3	2.08	0.51
1:D:54:LEU:HD11	1:D:60:GLN:HB2	1.92	0.51
1:B:154:MET:HA	1:B:154:MET:HE2	1.94	0.50
1:D:255:SER:HB2	7:D:27:HOH:O	2.10	0.50
1:A:90:ASP:CG	1:A:125:LYS:HG3	2.36	0.50
1:A:122:HIS:CA	1:A:154:MET:HE1	2.42	0.50
1:D:115:LEU:C	1:D:115:LEU:HD12	2.37	0.49
1:D:261:HIS:ND1	5:D:282:GOL:H11	2.27	0.49
1:A:65:LEU:HD22	1:A:93:TRP:CE3	2.47	0.49
1:B:93:TRP:CZ3	1:B:124:ASP:HB3	2.48	0.49
1:D:121:ALA:O	1:D:122:HIS:CD2	2.65	0.49
1:A:256:ARG:NE	5:A:284:GOL:H12	2.26	0.48
1:B:120:HIS:CE1	1:B:125:LYS:CG	2.92	0.48
1:C:54:LEU:HD11	1:C:60:GLN:HB2	1.94	0.48
1:D:61:HIS:CE1	1:D:77:GLY:HA3	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:154:MET:HA	1:D:154:MET:HE2	1.95	0.47
1:C:124:ASP:OD1	1:C:125:LYS:HG2	2.15	0.47
1:A:120:HIS:HE1	1:A:208[B]:CYS:SG	2.38	0.46
1:B:70:PHE:N	1:B:70:PHE:CD1	2.82	0.46
1:B:257:ALA:HA	1:B:260:THR:HG23	1.97	0.46
1:C:90:ASP:CG	1:C:125:LYS:HB3	2.41	0.46
1:B:104:TRP:NE1	1:B:108:GLU:HG3	2.30	0.46
1:B:228[B]:HIS:HD2	1:B:232:SER:OG	1.98	0.46
1:C:88:VAL:O	1:C:116:ALA:HA	2.14	0.46
1:D:225:ASP:HA	7:D:290:HOH:O	2.15	0.46
1:A:256:ARG:HE	5:A:284:GOL:C1	2.27	0.46
1:B:91:THR:HG22	1:B:132:LEU:HD11	1.98	0.45
1:C:154:MET:HE2	1:C:154:MET:HB3	1.79	0.45
1:B:90:ASP:CG	1:B:125:LYS:HD3	2.42	0.44
1:B:121:ALA:O	1:B:122:HIS:CD2	2.70	0.44
1:D:49:LEU:HD11	1:D:100:GLN:HB2	1.99	0.44
1:B:76:ASN:O	1:B:125:LYS:NZ	2.51	0.44
1:B:227:GLU:HG3	1:B:270[A]:ARG:NH2	2.33	0.44
1:B:98:THR:OG1	1:B:128:GLY:HA3	2.17	0.44
1:D:264[B]:ARG:NH1	7:D:2:HOH:O	2.51	0.44
1:A:119:THR:HG21	1:A:205:PHE:HE2	1.83	0.43
1:A:214:LYS:HD3	1:A:214:LYS:HA	1.76	0.43
1:A:122:HIS:HA	1:A:154:MET:HE1	1.99	0.43
1:B:248:MET:HB3	1:B:248:MET:HE2	1.47	0.42
1:C:90:ASP:OD2	1:C:125:LYS:HD3	2.18	0.42
1:D:189:HIS:CD2	1:D:190:THR:HG23	2.54	0.42
1:A:255:SER:HB2	7:A:353:HOH:O	2.19	0.42
1:B:100:GLN:HG2	7:B:347:HOH:O	2.19	0.42
1:D:104:TRP:NE1	1:D:108:GLU:HG3	2.35	0.42
1:D:129:MET:HE2	1:D:157:ALA:HA	2.01	0.42
1:B:80:VAL:HG21	1:B:198:ILE:HD12	2.02	0.42
1:C:257:ALA:HB2	5:C:283:GOL:H12	2.02	0.42
1:D:120:HIS:CE1	1:D:125:LYS:HG3	2.55	0.42
1:C:104:TRP:NE1	1:C:108:GLU:HG3	2.34	0.41
1:C:140:TYR:CD2	1:C:159:HIS:HB2	2.54	0.41
1:A:65:LEU:HD12	1:A:65:LEU:HA	1.87	0.41
5:D:282:GOL:H12	7:D:314:HOH:O	2.20	0.41
1:D:238:ALA:O	1:D:241:PRO:HD3	2.20	0.41
1:A:264:ARG:NH1	7:A:318:HOH:O	2.45	0.41
1:B:126:MET:HE2	1:B:155:VAL:O	2.21	0.41
1:C:181:LYS:HE3	1:C:199:ASP:OD1	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:119:THR:O	1:C:120:HIS:HB3	2.21	0.41
1:D:126:MET:O	1:D:129:MET:HG2	2.20	0.40
1:A:133:HIS:HE1	1:A:139:THR:OG1	2.04	0.40
1:B:160:SER:OG	5:B:284:GOL:H11	2.20	0.40
1:C:118:VAL:HG21	1:C:126:MET:HE3	2.02	0.40
1:A:184:TYR:HA	1:A:185:PRO:HD2	1.96	0.40
1:B:57:ASN:HB2	7:B:356:HOH:O	2.20	0.40
3:A:281:CIT:O2	3:A:281:CIT:C6	2.69	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:281:CIT:O7	3:D:281:CIT:O5[7_556]	2.03	0.17
3:B:281:CIT:O7	3:B:281:CIT:O7[7_556]	2.06	0.14
3:A:281:CIT:O7	3:D:281:CIT:O7[7_556]	2.09	0.11

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	230/237 (97%)	228 (99%)	2 (1%)	0	100	100
1	B	232/237 (98%)	230 (99%)	2 (1%)	0	100	100
1	C	229/237 (97%)	228 (100%)	1 (0%)	0	100	100
1	D	231/237 (98%)	230 (100%)	1 (0%)	0	100	100
All	All	922/948 (97%)	916 (99%)	6 (1%)	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	140/178 (79%)	130 (93%)	10 (7%)	13	17
1	B	65/178 (36%)	57 (88%)	8 (12%)	4	4
1	C	173/178 (97%)	161 (93%)	12 (7%)	14	18
1	D	175/178 (98%)	167 (95%)	8 (5%)	24	34
All	All	553/712 (78%)	515 (93%)	38 (7%)	15	18

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	40	GLU
1	A	49	LEU
1	A	87	LEU
1	A	125	LYS
1	A	126	MET
1	A	170	GLU
1	A	193	ASN
1	A	208[A]	CYS
1	A	208[B]	CYS
1	A	212	ASP
1	B	193	ASN
1	B	208[A]	CYS
1	B	208[B]	CYS
1	B	212	ASP
1	B	217	SER
1	B	248	MET
1	B	249	SER
1	B	260	THR
1	C	45	ARG
1	C	48	ASP
1	C	125	LYS
1	C	154	MET
1	C	193	ASN
1	C	199	ASP

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Mol	Chain	Res	Type
1	C	210	ILE
1	C	211	LYS
1	C	212	ASP
1	C	249	SER
1	C	269	LEU
1	C	270	ARG
1	D	67	MET
1	D	154	MET
1	D	193	ASN
1	D	199	ASP
1	D	227	GLU
1	D	248	MET
1	D	249	SER
1	D	268	LYS

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

Mol	Chain	Res	Type
1	A	76	ASN
1	A	133	HIS
1	B	189	HIS
1	C	76	ASN
1	C	120	HIS
1	C	189	HIS
1	D	176	ASN
1	D	189	HIS
1	D	220	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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 19 ligands modelled in this entry, 5 are monoatomic - leaving 14 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
5	GOL	B	284	-	5,5,5	0.68	0	5,5,5	0.75	0
5	GOL	C	284	-	5,5,5	0.33	0	5,5,5	0.43	0
4	SO4	A	283	-	4,4,4	0.28	0	6,6,6	0.13	0
4	SO4	B	283	-	4,4,4	0.23	0	6,6,6	0.17	0
5	GOL	C	283	-	5,5,5	0.40	0	5,5,5	0.41	0
5	GOL	D	282	-	5,5,5	0.46	0	5,5,5	0.59	0
3	CIT	B	281	-	12,12,12	1.07	0	17,17,17	2.42	7 (41%)
4	SO4	C	282	-	4,4,4	0.42	0	6,6,6	0.76	0
3	CIT	C	281	-	12,12,12	1.11	0	17,17,17	1.90	6 (35%)
4	SO4	A	282	-	4,4,4	0.21	0	6,6,6	0.19	0
3	CIT	A	281	-	12,12,12	0.98	0	17,17,17	2.62	8 (47%)
4	SO4	B	282	-	4,4,4	0.23	0	6,6,6	0.19	0
3	CIT	D	281	-	12,12,12	1.02	0	17,17,17	2.12	4 (23%)
5	GOL	A	284	-	5,5,5	0.43	0	5,5,5	0.30	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
5	GOL	B	284	-	-	2/4/4/4	-
5	GOL	C	284	-	-	2/4/4/4	-
5	GOL	D	282	-	-	2/4/4/4	-
3	CIT	B	281	-	-	1/16/16/16	-
3	CIT	C	281	-	-	2/16/16/16	-
5	GOL	A	284	-	-	2/4/4/4	-
3	CIT	A	281	-	-	4/16/16/16	-
5	GOL	C	283	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	CIT	D	281	-	-	1/16/16/16	-

There are no bond length outliers.

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	281	CIT	O7-C3-C6	-6.06	100.36	108.96
3	B	281	CIT	O7-C3-C6	-5.58	101.04	108.96
3	A	281	CIT	O6-C6-C3	5.28	123.27	113.14
3	B	281	CIT	O6-C6-C3	5.01	122.75	113.14
3	D	281	CIT	O6-C6-C3	4.96	122.66	113.14
3	D	281	CIT	O7-C3-C6	-4.40	102.72	108.96
3	C	281	CIT	O6-C6-C3	4.17	121.14	113.14
3	C	281	CIT	O7-C3-C6	-3.29	104.30	108.96
3	A	281	CIT	O2-C1-C2	3.14	124.29	114.35
3	A	281	CIT	O2-C1-O1	-2.71	116.37	123.33
3	B	281	CIT	O2-C1-C2	2.66	122.76	114.35
3	C	281	CIT	O2-C1-C2	2.58	122.50	114.35
3	A	281	CIT	O4-C5-C4	2.54	122.39	114.35
3	A	281	CIT	C4-C3-C6	2.44	115.42	110.03
3	D	281	CIT	O2-C1-C2	2.32	121.70	114.35
3	C	281	CIT	O4-C5-C4	2.32	121.69	114.35
3	B	281	CIT	O5-C6-C3	-2.31	117.62	122.09
3	D	281	CIT	O4-C5-C4	2.29	121.61	114.35
3	B	281	CIT	O4-C5-C4	2.26	121.51	114.35
3	B	281	CIT	C4-C3-C6	2.22	114.95	110.03
3	B	281	CIT	C4-C3-C2	2.19	114.93	109.31
3	A	281	CIT	O5-C6-C3	-2.18	117.86	122.09
3	C	281	CIT	C4-C3-C2	2.10	114.69	109.31
3	A	281	CIT	O7-C3-C4	-2.06	104.68	109.38
3	C	281	CIT	O5-C6-C3	-2.05	118.11	122.09

There are no chirality outliers.

All (18) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	284	GOL	C1-C2-C3-O3
5	C	284	GOL	O1-C1-C2-O2
5	C	284	GOL	O1-C1-C2-C3
5	D	282	GOL	O1-C1-C2-O2
5	D	282	GOL	O1-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
5	A	284	GOL	C1-C2-C3-O3
5	A	284	GOL	O2-C2-C3-O3
5	B	284	GOL	O2-C2-C3-O3
3	D	281	CIT	O7-C3-C4-C5
3	C	281	CIT	O7-C3-C4-C5
3	B	281	CIT	O7-C3-C4-C5
3	A	281	CIT	O2-C1-C2-C3
3	A	281	CIT	C4-C3-C6-O6
5	C	283	GOL	O2-C2-C3-O3
3	C	281	CIT	C2-C3-C4-C5
3	A	281	CIT	O1-C1-C2-C3
5	C	283	GOL	O1-C1-C2-O2
3	A	281	CIT	O7-C3-C4-C5

There are no ring outliers.

7 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	284	GOL	4	0
5	C	283	GOL	1	0
5	D	282	GOL	3	0
3	B	281	CIT	0	1
3	A	281	CIT	1	2
3	D	281	CIT	0	2
5	A	284	GOL	3	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	231/237 (97%)	-0.41	4 (1%) 69 70	13, 28, 56, 80	1 (0%)
1	B	231/237 (97%)	-0.39	4 (1%) 69 70	11, 26, 51, 73	5 (2%)
1	C	231/237 (97%)	-0.24	5 (2%) 62 64	18, 32, 60, 86	1 (0%)
1	D	232/237 (97%)	-0.35	3 (1%) 75 76	16, 29, 55, 91	1 (0%)
All	All	925/948 (97%)	-0.35	16 (1%) 69 70	11, 29, 57, 91	8 (0%)

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	41	THR	4.2
1	D	39	MET	3.7
1	A	153	GLY	3.1
1	C	40	GLU	2.7
1	B	40	GLU	2.6
1	C	69	GLY	2.5
1	C	70	PHE	2.4
1	A	40	GLU	2.4
1	D	270	ARG	2.3
1	D	220	ASN	2.2
1	B	154	MET	2.2
1	B	153	GLY	2.1
1	C	153	GLY	2.1
1	B	41	THR	2.0
1	C	41	THR	2.0
1	A	122	HIS	2.0

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 oligosaccharides 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
4	SO4	C	282	5/5	0.67	0.17	74,74,79,83	0
5	GOL	B	284	6/6	0.74	0.20	48,54,64,69	0
6	CL	C	285	1/1	0.75	0.16	81,81,81,81	0
5	GOL	C	283	6/6	0.77	0.21	64,66,68,70	0
2	ZN	B	280	1/1	0.79	0.18	112,112,112,112	0
5	GOL	D	282	6/6	0.82	0.17	46,49,52,54	0
5	GOL	A	284	6/6	0.87	0.12	34,45,45,47	0
5	GOL	C	284	6/6	0.88	0.11	46,52,55,59	0
2	ZN	A	280	1/1	0.90	0.11	94,94,94,94	0
2	ZN	C	280	1/1	0.91	0.12	85,85,85,85	0
3	CIT	C	281	13/13	0.94	0.09	27,37,50,52	0
3	CIT	A	281	13/13	0.94	0.08	22,27,40,42	0
3	CIT	D	281	13/13	0.95	0.08	21,30,39,44	0
4	SO4	A	282	5/5	0.95	0.10	60,61,61,63	0
4	SO4	B	282	5/5	0.95	0.09	64,65,65,68	0
3	CIT	B	281	13/13	0.95	0.07	21,26,34,37	0
2	ZN	D	280	1/1	0.95	0.10	70,70,70,70	0
4	SO4	B	283	5/5	0.97	0.07	41,47,54,55	0
4	SO4	A	283	5/5	0.97	0.07	43,49,52,53	0

6.5 Other polymers [i](#)

There are no such residues in this entry.