



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 03:41 PM UTC

PDB ID : 4DZI / pdb_00004dzi
Title : Crystal structure of amidohydrolase map2389c (target EFI-500390) from Mycobacterium avium subsp. paratuberculosis K-10
Authors : Patskovsky, Y.; Toro, R.; Bhosle, R.; Hillerich, B.; Seidel, R.D.; Washington, E.; Scott Glenn, A.; Chowdhury, S.; Evans, B.; Hammonds, J.; Zencheck, W.D.; Imker, H.J.; Gerlt, J.A.; Raushel, F.M.; Almo, S.C.; Enzyme Function Initiative (EFI)
Deposited on : 2012-03-01
Resolution : 1.60 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)

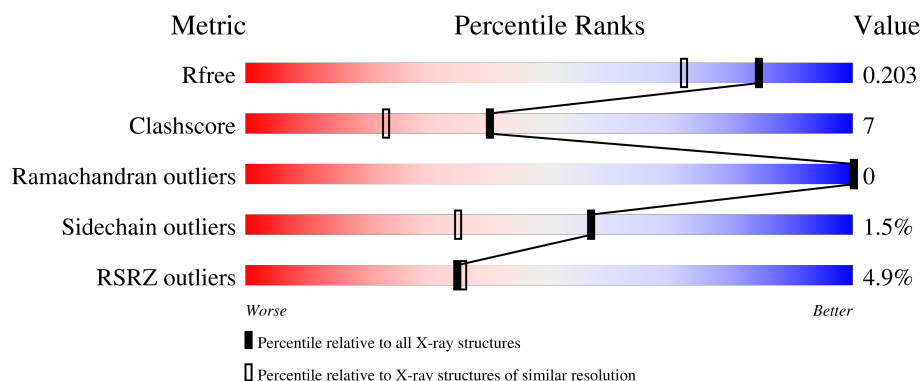
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.60 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	4673 (1.60-1.60)
Clashscore	190562	4931 (1.60-1.60)
Ramachandran outliers	187476	4831 (1.60-1.60)
Sidechain outliers	187428	4830 (1.60-1.60)
RSRZ outliers	180081	4672 (1.60-1.60)

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 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	423	
1	B	423	
1	C	423	
1	D	423	

Validation Pipeline (wwPDB-VP) : 2.49

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	CL	A	507	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 14003 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 Putative TIM-barrel metal-dependent hydrolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	384	Total	C	N	O	S	0	4	0
			3070	1962	543	555	10			
1	B	382	Total	C	N	O	S	0	7	0
			3077	1974	539	554	10			
1	C	388	Total	C	N	O	S	0	4	0
			3092	1976	542	564	10			
1	D	382	Total	C	N	O	S	0	7	0
			3070	1965	538	557	10			

There are 96 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	MET	-	expression tag	UNP F7P4T2
A	1	VAL	-	expression tag	UNP F7P4T2
A	401	ALA	-	expression tag	UNP F7P4T2
A	402	GLU	-	expression tag	UNP F7P4T2
A	403	ASN	-	expression tag	UNP F7P4T2
A	404	LEU	-	expression tag	UNP F7P4T2
A	405	TYR	-	expression tag	UNP F7P4T2
A	406	PHE	-	expression tag	UNP F7P4T2
A	407	GLN	-	expression tag	UNP F7P4T2
A	408	SER	-	expression tag	UNP F7P4T2
A	409	HIS	-	expression tag	UNP F7P4T2
A	410	HIS	-	expression tag	UNP F7P4T2
A	411	HIS	-	expression tag	UNP F7P4T2
A	412	HIS	-	expression tag	UNP F7P4T2
A	413	HIS	-	expression tag	UNP F7P4T2
A	414	HIS	-	expression tag	UNP F7P4T2
A	415	TRP	-	expression tag	UNP F7P4T2
A	416	SER	-	expression tag	UNP F7P4T2
A	417	HIS	-	expression tag	UNP F7P4T2
A	418	PRO	-	expression tag	UNP F7P4T2
A	419	GLN	-	expression tag	UNP F7P4T2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	420	PHE	-	expression tag	UNP F7P4T2
A	421	GLU	-	expression tag	UNP F7P4T2
A	422	LYS	-	expression tag	UNP F7P4T2
B	0	MET	-	expression tag	UNP F7P4T2
B	1	VAL	-	expression tag	UNP F7P4T2
B	401	ALA	-	expression tag	UNP F7P4T2
B	402	GLU	-	expression tag	UNP F7P4T2
B	403	ASN	-	expression tag	UNP F7P4T2
B	404	LEU	-	expression tag	UNP F7P4T2
B	405	TYR	-	expression tag	UNP F7P4T2
B	406	PHE	-	expression tag	UNP F7P4T2
B	407	GLN	-	expression tag	UNP F7P4T2
B	408	SER	-	expression tag	UNP F7P4T2
B	409	HIS	-	expression tag	UNP F7P4T2
B	410	HIS	-	expression tag	UNP F7P4T2
B	411	HIS	-	expression tag	UNP F7P4T2
B	412	HIS	-	expression tag	UNP F7P4T2
B	413	HIS	-	expression tag	UNP F7P4T2
B	414	HIS	-	expression tag	UNP F7P4T2
B	415	TRP	-	expression tag	UNP F7P4T2
B	416	SER	-	expression tag	UNP F7P4T2
B	417	HIS	-	expression tag	UNP F7P4T2
B	418	PRO	-	expression tag	UNP F7P4T2
B	419	GLN	-	expression tag	UNP F7P4T2
B	420	PHE	-	expression tag	UNP F7P4T2
B	421	GLU	-	expression tag	UNP F7P4T2
B	422	LYS	-	expression tag	UNP F7P4T2
C	0	MET	-	expression tag	UNP F7P4T2
C	1	VAL	-	expression tag	UNP F7P4T2
C	401	ALA	-	expression tag	UNP F7P4T2
C	402	GLU	-	expression tag	UNP F7P4T2
C	403	ASN	-	expression tag	UNP F7P4T2
C	404	LEU	-	expression tag	UNP F7P4T2
C	405	TYR	-	expression tag	UNP F7P4T2
C	406	PHE	-	expression tag	UNP F7P4T2
C	407	GLN	-	expression tag	UNP F7P4T2
C	408	SER	-	expression tag	UNP F7P4T2
C	409	HIS	-	expression tag	UNP F7P4T2
C	410	HIS	-	expression tag	UNP F7P4T2
C	411	HIS	-	expression tag	UNP F7P4T2
C	412	HIS	-	expression tag	UNP F7P4T2
C	413	HIS	-	expression tag	UNP F7P4T2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	414	HIS	-	expression tag	UNP F7P4T2
C	415	TRP	-	expression tag	UNP F7P4T2
C	416	SER	-	expression tag	UNP F7P4T2
C	417	HIS	-	expression tag	UNP F7P4T2
C	418	PRO	-	expression tag	UNP F7P4T2
C	419	GLN	-	expression tag	UNP F7P4T2
C	420	PHE	-	expression tag	UNP F7P4T2
C	421	GLU	-	expression tag	UNP F7P4T2
C	422	LYS	-	expression tag	UNP F7P4T2
D	0	MET	-	expression tag	UNP F7P4T2
D	1	VAL	-	expression tag	UNP F7P4T2
D	401	ALA	-	expression tag	UNP F7P4T2
D	402	GLU	-	expression tag	UNP F7P4T2
D	403	ASN	-	expression tag	UNP F7P4T2
D	404	LEU	-	expression tag	UNP F7P4T2
D	405	TYR	-	expression tag	UNP F7P4T2
D	406	PHE	-	expression tag	UNP F7P4T2
D	407	GLN	-	expression tag	UNP F7P4T2
D	408	SER	-	expression tag	UNP F7P4T2
D	409	HIS	-	expression tag	UNP F7P4T2
D	410	HIS	-	expression tag	UNP F7P4T2
D	411	HIS	-	expression tag	UNP F7P4T2
D	412	HIS	-	expression tag	UNP F7P4T2
D	413	HIS	-	expression tag	UNP F7P4T2
D	414	HIS	-	expression tag	UNP F7P4T2
D	415	TRP	-	expression tag	UNP F7P4T2
D	416	SER	-	expression tag	UNP F7P4T2
D	417	HIS	-	expression tag	UNP F7P4T2
D	418	PRO	-	expression tag	UNP F7P4T2
D	419	GLN	-	expression tag	UNP F7P4T2
D	420	PHE	-	expression tag	UNP F7P4T2
D	421	GLU	-	expression tag	UNP F7P4T2
D	422	LYS	-	expression tag	UNP F7P4T2

- Molecule 2 is CADMIUM ION (CCD ID: CD) (formula: Cd).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Cd 2 2	0	0
2	B	2	Total Cd 2 2	0	0
2	C	2	Total Cd 2 2	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	D	2	Total	Cd	0	0
			2	2		

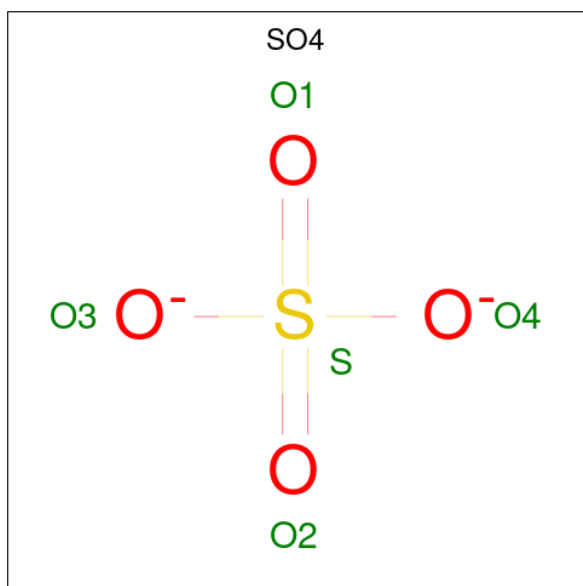
- Molecule 3 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	3	Total	Cl	0	0
			3	3		
3	B	1	Total	Cl	0	0
			1	1		
3	C	1	Total	Cl	0	0
			1	1		
3	D	1	Total	Cl	0	0
			1	1		

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Mg	0	0
			1	1		

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	O	S	0	1
			10	8	2		

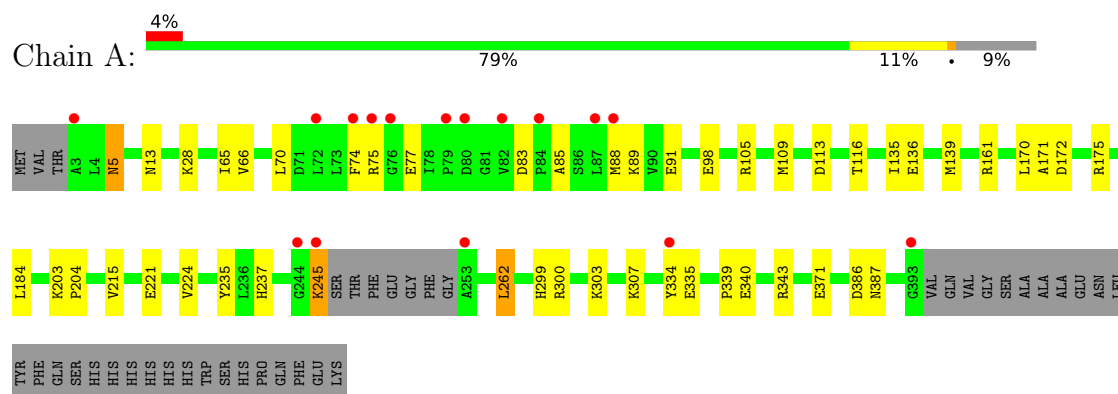
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	438	Total	O	0	0
			438	438		
6	B	448	Total	O	0	0
			448	448		
6	C	415	Total	O	0	0
			415	415		
6	D	363	Total	O	0	0
			363	363		

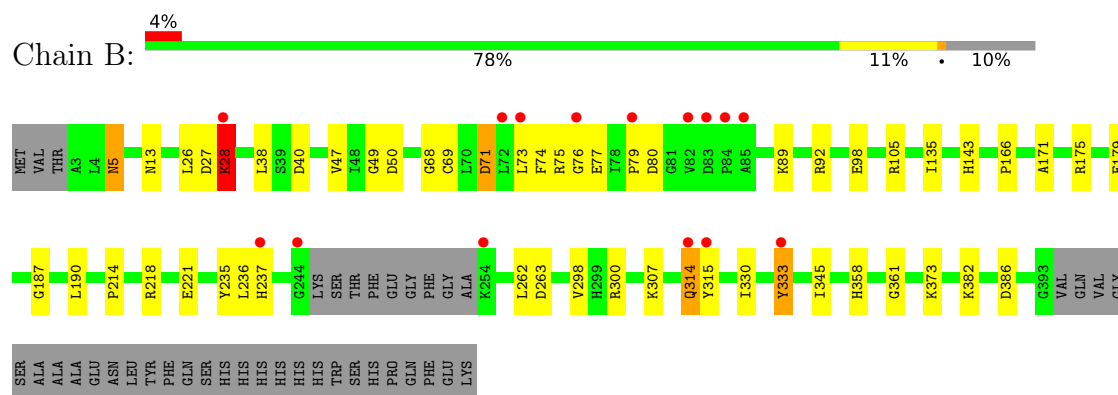
3 Residue-property plots

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.

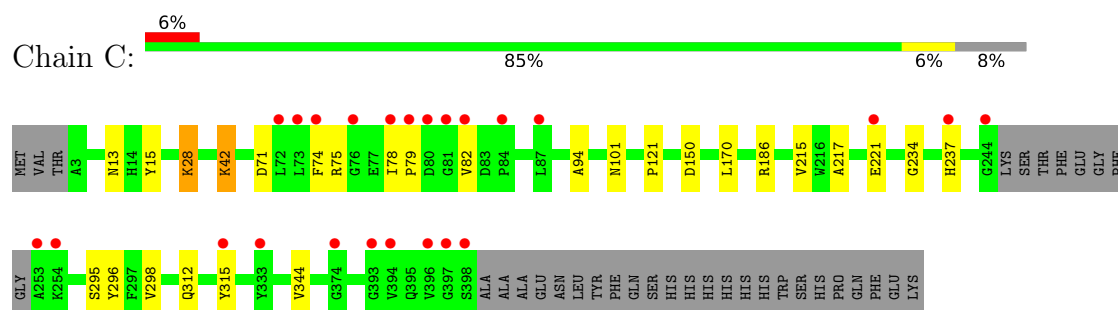
- Molecule 1: Putative TIM-barrel metal-dependent hydrolase



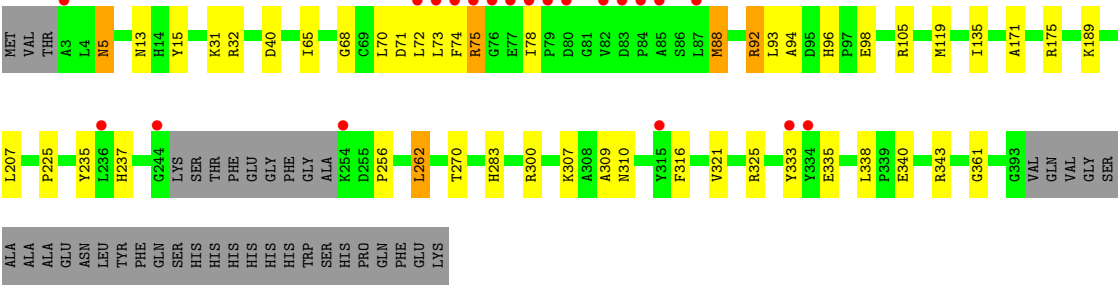
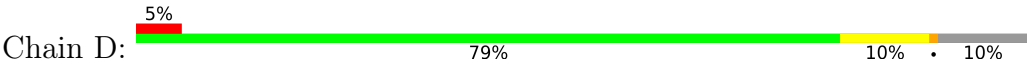
- Molecule 1: Putative TIM-barrel metal-dependent hydrolase



- Molecule 1: Putative TIM-barrel metal-dependent hydrolase



- Molecule 1: Putative TIM-barrel metal-dependent hydrolase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	75.11Å 136.13Å 93.23Å 90.00° 113.09° 90.00°	Depositor
Resolution (Å)	50.00 – 1.60 50.00 – 1.60	Depositor EDS
% Data completeness (in resolution range)	93.2 (50.00-1.60) 93.2 (50.00-1.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.38 (at 1.60Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.166 , 0.203 0.167 , 0.203	Depositor DCC
R_{free} test set	6300 reflections (2.80%)	wwPDB-VP
Wilson B-factor (Å ²)	16.8	Xtriage
Anisotropy	0.176	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 38.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.017 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	14003	wwPDB-VP
Average B, all atoms (Å ²)	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.55% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: CD, MG, SO4, CL

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	0.88	1/3162 (0.0%)	0.94	1/4295 (0.0%)
1	B	0.93	5/3180 (0.2%)	0.89	0/4322
1	C	0.85	0/3185	0.88	1/4332 (0.0%)
1	D	0.85	2/3172 (0.1%)	0.88	4/4312 (0.1%)
All	All	0.88	8/12699 (0.1%)	0.90	6/17261 (0.0%)

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	26	LEU	C-O	-8.23	1.14	1.24
1	B	358	HIS	C-O	-5.57	1.16	1.23
1	A	387	ASN	C-O	-5.52	1.17	1.24
1	B	333[A]	TYR	C-O	-5.48	1.17	1.23
1	B	333[B]	TYR	C-O	-5.48	1.17	1.23
1	B	28	LYS	C-O	-5.47	1.17	1.24
1	D	283	HIS	C-O	-5.47	1.17	1.24
1	D	300	ARG	C-O	-5.12	1.18	1.24

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	386	ASP	N-CA-C	7.54	119.58	111.36
1	D	96	HIS	N-CA-C	6.17	119.66	109.79
1	D	93	LEU	N-CA-C	-5.86	105.23	112.38
1	C	344	VAL	N-CA-C	5.43	116.09	110.82
1	D	338	LEU	CA-C-N	-5.36	113.10	119.05
1	D	338	LEU	C-N-CA	-5.36	113.10	119.05

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	3070	0	3047	55	0
1	B	3077	0	3056	48	0
1	C	3092	0	3051	19	0
1	D	3070	0	3035	44	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
3	A	3	0	0	2	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	1	0	0	0	0
5	A	5	0	0	0	0
5	B	10	0	0	1	0
6	A	438	0	0	11	0
6	B	448	0	0	8	0
6	C	415	0	0	5	0
6	D	363	0	0	3	0
All	All	14003	0	12189	161	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 7.

All (161) 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:B:71:ASP:HB3	6:B:1020:HOH:O	1.46	1.14
1:D:65:ILE:HD12	1:D:88:MET:HE1	1.32	1.09
1:A:136:GLU:HG2	1:A:175[B]:ARG:HH22	1.21	1.05
1:D:75:ARG:HG3	1:D:335:GLU:HG3	1.41	0.98
1:D:65:ILE:CD1	1:D:88:MET:HE1	1.97	0.94
1:B:69:CYS:HB2	1:B:89:LYS:HE2	1.48	0.93
1:A:307:LYS:HE2	1:C:74:PHE:O	1.70	0.92
1:B:237:HIS:HB3	6:B:964:HOH:O	1.71	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:75:ARG:NH2	1:A:334:TYR:CD1	2.40	0.89
1:D:73:LEU:CD1	1:D:78:ILE:HD11	2.06	0.85
1:D:5:ASN:C	1:D:5:ASN:HD22	1.85	0.84
1:D:75:ARG:CG	1:D:335:GLU:HG3	2.09	0.82
1:D:65:ILE:CD1	1:D:88:MET:CE	2.58	0.82
1:B:221:GLU:HG3	6:B:1000:HOH:O	1.79	0.80
1:A:335:GLU:HB2	3:A:507:CL:CL	2.19	0.79
1:D:73:LEU:HD12	1:D:78:ILE:HD11	1.62	0.78
1:B:76:GLY:C	1:D:310:ASN:OD1	2.28	0.77
1:D:75:ARG:HG3	1:D:335:GLU:CG	2.16	0.73
1:B:235:TYR:HB3	1:B:262:LEU:HD13	1.70	0.73
1:D:340:GLU:OE2	1:D:343:ARG:NH2	2.22	0.73
1:B:175:ARG:NH1	6:B:844:HOH:O	2.22	0.72
1:A:75:ARG:HG2	3:A:507:CL:CL	2.28	0.71
1:B:5:ASN:HD22	1:B:5:ASN:C	1.99	0.71
1:C:150:ASP:OD2	1:C:186:ARG:HD2	1.92	0.70
1:B:69:CYS:CB	1:B:89:LYS:HE2	2.24	0.67
1:A:172:ASP:CG	1:A:175[B]:ARG:HD2	2.20	0.66
1:A:300:ARG:CG	6:A:912:HOH:O	2.43	0.66
1:A:299:HIS:NE2	6:A:912:HOH:O	2.28	0.65
1:D:73:LEU:HD13	1:D:78:ILE:HD11	1.77	0.65
1:B:74[B]:PHE:HE1	6:B:880:HOH:O	1.79	0.65
1:B:235:TYR:HB3	1:B:262:LEU:CD1	2.27	0.65
1:D:237:HIS:NE2	6:D:863:HOH:O	2.30	0.65
1:A:74:PHE:HE1	6:A:921:HOH:O	1.79	0.65
1:A:300:ARG:HD2	6:A:912:HOH:O	1.97	0.65
1:A:221:GLU:HG3	6:A:810:HOH:O	1.98	0.64
1:A:75:ARG:NH2	1:A:334:TYR:HD1	1.92	0.64
1:D:75:ARG:CG	1:D:335:GLU:CG	2.75	0.63
1:A:83:ASP:OD1	1:A:83:ASP:C	2.42	0.63
1:B:73:LEU:HD23	1:B:73:LEU:C	2.23	0.63
1:A:172:ASP:OD2	1:A:175[B]:ARG:HD2	1.99	0.61
1:A:136:GLU:HG2	1:A:175[B]:ARG:NH2	2.03	0.61
1:A:340:GLU:OE1	1:A:343[B]:ARG:NH1	2.34	0.60
1:A:334:TYR:CZ	1:A:371:GLU:OE2	2.55	0.59
1:A:75:ARG:NH2	1:A:334:TYR:CE1	2.70	0.59
1:C:28:LYS:HG3	6:C:925:HOH:O	2.03	0.58
1:D:235:TYR:HB3	1:D:262:LEU:HD22	1.85	0.58
1:C:234:GLY:O	1:C:237:HIS:HD2	1.87	0.58
1:A:5:ASN:C	1:A:5:ASN:HD22	2.12	0.58
1:D:333[B]:TYR:CE2	1:D:335:GLU:HB2	2.39	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:217:ALA:O	1:C:221:GLU:HG2	2.04	0.57
1:B:300:ARG:NE	5:B:504[B]:SO4:O4	2.38	0.57
1:D:65:ILE:HD11	1:D:88:MET:CE	2.34	0.57
1:B:69:CYS:HB2	1:B:89:LYS:CE	2.29	0.57
1:A:334:TYR:CE2	1:A:371:GLU:HG2	2.39	0.57
1:B:235:TYR:CB	1:B:262:LEU:CD1	2.83	0.56
1:D:5:ASN:C	1:D:5:ASN:ND2	2.59	0.56
1:A:75:ARG:HD3	1:A:335:GLU:HG3	1.88	0.56
1:C:94:ALA:HA	6:C:921:HOH:O	2.05	0.56
1:B:235:TYR:CB	1:B:262:LEU:HD13	2.36	0.55
1:B:69:CYS:CB	1:B:89:LYS:CE	2.83	0.55
1:A:85:ALA:HA	6:A:1038:HOH:O	2.05	0.55
1:A:300:ARG:CD	6:A:912:HOH:O	2.53	0.55
1:A:136:GLU:CG	1:A:175[B]:ARG:HH22	2.09	0.55
1:D:75:ARG:HD2	1:D:333[B]:TYR:OH	2.06	0.55
1:A:5:ASN:C	1:A:5:ASN:ND2	2.64	0.54
1:A:75:ARG:HD3	1:A:335:GLU:CG	2.38	0.54
1:A:237:HIS:NE2	6:A:927:HOH:O	2.33	0.54
1:B:27:ASP:HB2	6:B:831:HOH:O	2.07	0.54
1:A:300:ARG:HG3	6:A:912:HOH:O	2.07	0.53
1:D:92:ARG:C	1:D:94:ALA:N	2.64	0.53
1:D:65:ILE:HG13	1:D:88:MET:HE2	1.90	0.52
1:D:74[A]:PHE:HZ	1:D:333[A]:TYR:CZ	2.28	0.52
1:D:65:ILE:HD12	1:D:88:MET:CE	2.17	0.52
1:A:77:GLU:OE1	1:A:335:GLU:OE2	2.28	0.51
1:B:5:ASN:C	1:B:5:ASN:ND2	2.69	0.51
1:A:235:TYR:HB3	1:A:262:LEU:HD13	1.92	0.51
1:B:382[B]:LYS:HA	1:B:386:ASP:HB2	1.92	0.50
1:B:382[A]:LYS:HA	1:B:386:ASP:HB2	1.92	0.50
1:A:334:TYR:CE1	1:A:371:GLU:OE2	2.65	0.50
1:A:65:ILE:HD11	1:A:70:LEU:CD1	2.42	0.49
1:A:75:ARG:CZ	1:A:334:TYR:CD1	2.96	0.49
1:B:314:GLN:O	1:B:314:GLN:HG2	2.06	0.49
1:D:68:GLY:O	1:D:71:ASP:HB2	2.13	0.49
1:C:42:LYS:CD	1:C:42:LYS:N	2.76	0.48
1:B:38:LEU:HD12	1:B:47:VAL:HG21	1.96	0.48
1:B:298:VAL:CG2	1:B:330[B]:ILE:HD13	2.44	0.48
1:A:65:ILE:HD11	1:A:70:LEU:HD11	1.94	0.48
1:C:170:LEU:HD21	1:C:215:VAL:HG11	1.96	0.48
1:A:65:ILE:CD1	1:A:70:LEU:HD11	2.44	0.48
1:B:373:LYS:HB2	6:B:692:HOH:O	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:28:LYS:N	1:B:28:LYS:HD3	2.29	0.48
1:A:245:LYS:HB3	1:A:245:LYS:NZ	2.29	0.47
1:D:309:ALA:HA	1:D:316:PHE:CD1	2.49	0.47
1:B:75:ARG:HG3	1:B:333[B]:TYR:OH	2.15	0.47
1:D:31:LYS:HE3	1:D:32:ARG:CZ	2.44	0.47
1:D:135:ILE:HD12	1:D:171:ALA:HB1	1.97	0.47
1:A:109:MET:HE1	1:A:161:ARG:O	2.15	0.47
1:B:298:VAL:HG21	1:B:330[B]:ILE:HD13	1.96	0.47
1:A:66:VAL:HG22	1:A:91:GLU:HG3	1.97	0.47
1:A:139:MET:HG3	1:A:175[B]:ARG:HD3	1.97	0.46
1:D:92:ARG:C	1:D:94:ALA:H	2.24	0.46
1:A:98:GLU:HB2	1:A:105:ARG:HA	1.96	0.46
1:A:113:ASP:OD2	6:A:860:HOH:O	2.20	0.46
1:C:312:GLN:HB3	1:C:315:TYR:HD2	1.80	0.46
1:A:303[A]:LYS:HD3	1:C:296:TYR:CZ	2.51	0.46
1:A:303[A]:LYS:HD3	1:C:296:TYR:CE2	2.51	0.45
1:B:135:ILE:HD12	1:B:171:ALA:HB1	1.99	0.45
1:C:295:SER:O	1:C:298[B]:VAL:HG22	2.17	0.45
1:B:214:PRO:O	1:B:218[B]:ARG:HG2	2.16	0.45
1:A:334:TYR:CE2	1:A:371:GLU:CG	2.99	0.45
1:C:298[B]:VAL:CG2	6:C:752:HOH:O	2.64	0.45
1:B:40:ASP:C	1:B:40:ASP:OD1	2.60	0.45
1:B:330[B]:ILE:HD12	1:B:345:ILE:HD13	1.99	0.45
1:C:71:ASP:O	1:C:75:ARG:HG3	2.17	0.44
1:D:207:LEU:CD1	1:D:270:THR:HG23	2.47	0.44
1:B:79:PRO:O	1:B:80:ASP:C	2.61	0.44
1:A:75:ARG:CB	1:A:77:GLU:HG2	2.48	0.43
1:B:92[B]:ARG:HD3	1:B:92[B]:ARG:HA	1.62	0.43
1:D:40:ASP:OD1	1:D:40:ASP:C	2.61	0.43
1:A:339:PRO:O	1:A:343[A]:ARG:HG3	2.18	0.43
1:C:42:LYS:N	1:C:42:LYS:HD3	2.33	0.43
1:C:298[B]:VAL:HG22	6:C:752:HOH:O	2.17	0.43
1:C:101:ASN:HB2	6:C:769:HOH:O	2.18	0.43
1:D:70:LEU:HD21	1:D:88:MET:HE3	2.01	0.43
1:A:116:THR:HA	1:A:161:ARG:O	2.18	0.43
1:B:73:LEU:HD23	1:B:73:LEU:O	2.18	0.43
1:D:88:MET:HE3	1:D:88:MET:HB2	1.89	0.43
1:B:68:GLY:HA2	1:B:361:GLY:O	2.19	0.42
1:D:189:LYS:O	1:D:225:PRO:HD2	2.19	0.42
1:B:143:HIS:HD1	1:B:179:GLU:CD	2.28	0.42
1:A:235:TYR:CB	1:A:262:LEU:HD13	2.49	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:184:LEU:CD2	1:A:224:VAL:HG21	2.49	0.42
1:B:236:LEU:HD23	1:B:236:LEU:HA	1.79	0.42
1:A:28:LYS:HE2	6:A:1024:HOH:O	2.20	0.42
1:A:203:LYS:HB2	1:A:204:PRO:HD2	2.01	0.41
1:B:315:TYR:CG	1:D:256:PRO:HG3	2.55	0.41
1:A:135:ILE:HD12	1:A:171:ALA:HB1	2.02	0.41
1:B:166:PRO:HD2	1:B:190:LEU:O	2.21	0.41
1:B:187:GLY:HA3	6:B:943:HOH:O	2.19	0.41
1:C:15:TYR:CE1	1:C:121:PRO:HA	2.55	0.41
1:A:170:LEU:HD21	1:A:215:VAL:HG11	2.02	0.41
1:B:69:CYS:HB3	1:B:89:LYS:CE	2.49	0.41
1:B:73:LEU:C	1:B:73:LEU:CD2	2.91	0.41
1:D:68:GLY:HA2	1:D:361:GLY:O	2.21	0.41
1:D:321:VAL:O	1:D:325[A]:ARG:HG3	2.21	0.41
1:B:262:LEU:O	1:B:263:ASP:C	2.64	0.41
1:B:49:GLY:O	1:B:50:ASP:HB2	2.21	0.41
1:D:72:LEU:HG	6:D:740:HOH:O	2.21	0.41
1:D:98:GLU:HB2	1:D:105:ARG:HA	2.02	0.41
1:A:88:MET:O	1:A:89:LYS:HD3	2.21	0.40
1:B:98:GLU:HB2	1:B:105:ARG:HA	2.03	0.40
1:D:15:TYR:HD2	1:D:119:MET:HE3	1.86	0.40
1:A:65:ILE:HD11	1:A:70:LEU:HG	2.04	0.40
1:B:74[A]:PHE:HZ	1:B:333[A]:TYR:CE2	2.40	0.40
1:C:79:PRO:HG2	1:C:82:VAL:HG21	2.02	0.40
1:D:94:ALA:HA	6:D:944:HOH:O	2.21	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	384/423 (91%)	373 (97%)	11 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	385/423 (91%)	377 (98%)	8 (2%)	0	100	100
1	C	388/423 (92%)	379 (98%)	9 (2%)	0	100	100
1	D	385/423 (91%)	374 (97%)	11 (3%)	0	100	100
All	All	1542/1692 (91%)	1503 (98%)	39 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	328/357 (92%)	324 (99%)	4 (1%)	63	43
1	B	330/357 (92%)	324 (98%)	6 (2%)	51	28
1	C	331/357 (93%)	327 (99%)	4 (1%)	63	43
1	D	329/357 (92%)	323 (98%)	6 (2%)	51	28
All	All	1318/1428 (92%)	1298 (98%)	20 (2%)	57	35

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	ASN
1	A	13	ASN
1	A	245	LYS
1	A	262	LEU
1	B	5	ASN
1	B	13	ASN
1	B	28	LYS
1	B	71	ASP
1	B	77	GLU
1	B	314	GLN
1	C	13	ASN
1	C	28	LYS
1	C	42	LYS

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Mol	Chain	Res	Type
1	C	78	ILE
1	D	5	ASN
1	D	13	ASN
1	D	75	ARG
1	D	88	MET
1	D	92	ARG
1	D	262	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	5	ASN
1	A	259	GLN
1	A	326	ASN
1	A	327	ASN
1	B	5	ASN
1	B	100	GLN
1	B	312	GLN
1	B	326	ASN
1	B	327	ASN
1	C	259	GLN
1	C	326	ASN
1	D	5	ASN
1	D	259	GLN
1	D	326	ASN
1	D	327	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 [i](#)

Of 18 ligands modelled in this entry, 15 are monoatomic - leaving 3 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	SO4	B	504[B]	-	4,4,4	0.42	0	6,6,6	0.22	0
5	SO4	B	504[A]	-	4,4,4	0.56	0	6,6,6	0.13	0
5	SO4	A	506	-	4,4,4	0.41	0	6,6,6	1.41	1 (16%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
5	A	506	SO4	O4-S-O1	2.29	121.52	109.56

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	504[B]	SO4	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 ⓘ

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	384/423 (90%)	0.05	16 (4%) 40 42	9, 20, 53, 102	4 (1%)
1	B	382/423 (90%)	-0.06	15 (3%) 43 45	8, 19, 45, 73	7 (1%)
1	C	388/423 (91%)	-0.08	24 (6%) 26 27	10, 19, 50, 126	4 (1%)
1	D	382/423 (90%)	0.11	21 (5%) 30 31	10, 21, 54, 111	7 (1%)
All	All	1536/1692 (90%)	0.00	76 (4%) 35 36	8, 20, 51, 126	22 (1%)

All (76) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	76	GLY	5.7
1	D	74[A]	PHE	5.0
1	D	73	LEU	4.8
1	C	74	PHE	4.8
1	A	334	TYR	4.7
1	D	72	LEU	4.7
1	C	394	VAL	4.7
1	C	78	ILE	4.5
1	A	253	ALA	4.3
1	C	79	PRO	4.2
1	A	74	PHE	4.0
1	D	82	VAL	3.9
1	A	72	LEU	3.7
1	D	85	ALA	3.6
1	D	78	ILE	3.6
1	B	244	GLY	3.6
1	A	79	PRO	3.5
1	C	396	VAL	3.5
1	D	75	ARG	3.5
1	D	84	PRO	3.5
1	C	76	GLY	3.3

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Mol	Chain	Res	Type	RSRZ
1	D	315	TYR	3.3
1	B	73	LEU	3.2
1	C	82	VAL	3.2
1	C	253	ALA	3.2
1	C	80	ASP	3.2
1	A	80	ASP	3.2
1	B	333[A]	TYR	3.1
1	B	79	PRO	3.0
1	B	76	GLY	3.0
1	C	398	SER	3.0
1	C	397	GLY	3.0
1	D	79	PRO	2.9
1	C	244	GLY	2.9
1	B	85	ALA	2.9
1	B	84	PRO	2.9
1	C	237	HIS	2.9
1	B	237	HIS	2.8
1	D	254	LYS	2.7
1	A	82	VAL	2.7
1	B	315	TYR	2.7
1	D	334	TYR	2.7
1	D	77	GLU	2.7
1	A	76	GLY	2.6
1	A	88	MET	2.6
1	D	244	GLY	2.6
1	B	314	GLN	2.6
1	C	315	TYR	2.5
1	D	87	LEU	2.5
1	C	333[A]	TYR	2.5
1	C	374	GLY	2.5
1	A	245	LYS	2.5
1	C	73	LEU	2.5
1	C	221	GLU	2.4
1	A	84	PRO	2.4
1	A	244	GLY	2.3
1	A	75	ARG	2.3
1	C	72	LEU	2.3
1	D	83	ASP	2.2
1	A	393	GLY	2.2
1	D	3	ALA	2.2
1	B	28	LYS	2.2
1	C	81	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	3	ALA	2.2
1	C	87	LEU	2.1
1	D	236	LEU	2.1
1	D	80	ASP	2.1
1	B	82	VAL	2.1
1	C	84	PRO	2.1
1	D	333[A]	TYR	2.1
1	C	393	GLY	2.0
1	B	83	ASP	2.0
1	A	87	LEU	2.0
1	B	72	LEU	2.0
1	C	254	LYS	2.0
1	B	254	LYS	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
3	CL	A	507	1/1	0.96	0.08	52,52,52,52	0
5	SO4	A	506	5/5	0.96	0.09	21,24,24,55	0
3	CL	D	503	1/1	0.97	0.05	25,25,25,25	0
3	CL	C	503	1/1	0.97	0.08	26,26,26,26	0
5	SO4	B	504[A]	5/5	0.97	0.07	19,21,33,37	5
5	SO4	B	504[B]	5/5	0.97	0.07	16,17,20,35	5
4	MG	A	504	1/1	0.98	0.14	30,30,30,30	0
3	CL	A	503	1/1	0.99	0.03	25,25,25,25	0
3	CL	A	505	1/1	0.99	0.07	21,21,21,21	0
2	CD	A	501	1/1	0.99	0.02	16,16,16,16	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	CL	B	503	1/1	0.99	0.04	23,23,23,23	0
2	CD	A	502	1/1	0.99	0.02	13,13,13,13	0
2	CD	D	501	1/1	1.00	0.01	16,16,16,16	0
2	CD	D	502	1/1	1.00	0.02	14,14,14,14	0
2	CD	B	501	1/1	1.00	0.02	14,14,14,14	0
2	CD	B	502	1/1	1.00	0.02	12,12,12,12	0
2	CD	C	501	1/1	1.00	0.02	14,14,14,14	0
2	CD	C	502	1/1	1.00	0.02	12,12,12,12	0

6.5 Other polymers [i](#)

There are no such residues in this entry.