



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 13, 2025 – 02:42 PM EDT

PDB ID : 7N7S / pdb_00007n7s
Title : Crystal Structure of Hydroxymethylglutaryl-CoA reductase from Elizabethkingia anophelis NUHP1
Authors : Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on : 2021-06-11
Resolution : 2.40 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 : 20231227.v01 (using entries in the PDB archive December 27th 2023)
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) : 2.46

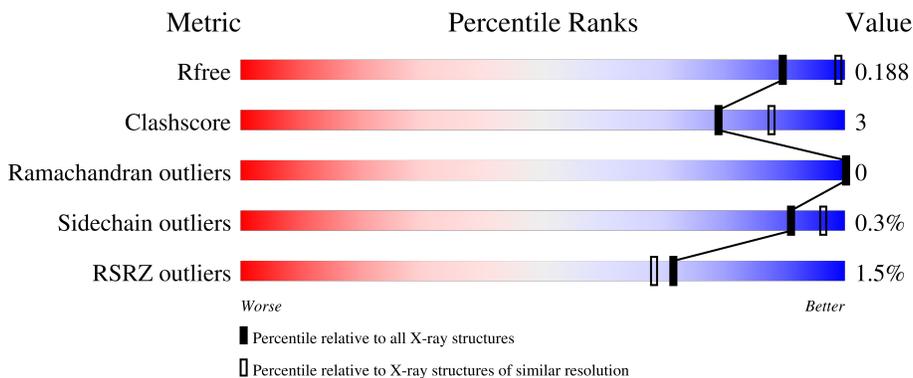
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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}	164625	4642 (2.40-2.40)
Clashscore	180529	5218 (2.40-2.40)
Ramachandran outliers	177936	5158 (2.40-2.40)
Sidechain outliers	177891	5159 (2.40-2.40)
RSRZ outliers	164620	4642 (2.40-2.40)

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	450	 80% 7% 12%
1	B	450	 92% 6%
1	C	450	 80% 6% 14%
1	D	450	 83% 14%
1	E	450	 79% 7% 14%

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Mol	Chain	Length	Quality of chain
1	F	450	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into three segments: a red segment at the beginning (representing 14%), a green segment (representing 81%), and a yellow segment at the end (representing 6%). The percentages are labeled below the bar: 14% under the red segment, 81% under the green segment, and 6% under the yellow segment. A '%' symbol is located at the top left of the bar.</p>

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 20350 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 Hydroxymethylglutaryl-CoA reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	394	3108	1975	522	597	14	0	6	0
1	B	441	3453	2199	584	655	15	0	8	0
1	C	389	3071	1952	512	594	13	0	6	0
1	D	389	3064	1949	513	589	13	0	6	0
1	E	389	3055	1943	508	591	13	0	5	0
1	F	389	3070	1950	515	592	13	0	6	0

There are 48 discrepancies between the modelled and reference sequences:

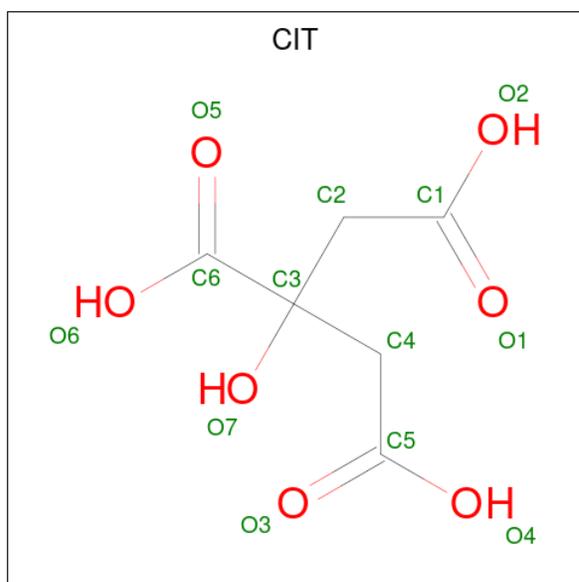
Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	MET	-	initiating methionine	UNP A0A077EA44
A	-6	ALA	-	expression tag	UNP A0A077EA44
A	-5	HIS	-	expression tag	UNP A0A077EA44
A	-4	HIS	-	expression tag	UNP A0A077EA44
A	-3	HIS	-	expression tag	UNP A0A077EA44
A	-2	HIS	-	expression tag	UNP A0A077EA44
A	-1	HIS	-	expression tag	UNP A0A077EA44
A	0	HIS	-	expression tag	UNP A0A077EA44
B	-7	MET	-	initiating methionine	UNP A0A077EA44
B	-6	ALA	-	expression tag	UNP A0A077EA44
B	-5	HIS	-	expression tag	UNP A0A077EA44
B	-4	HIS	-	expression tag	UNP A0A077EA44
B	-3	HIS	-	expression tag	UNP A0A077EA44
B	-2	HIS	-	expression tag	UNP A0A077EA44
B	-1	HIS	-	expression tag	UNP A0A077EA44
B	0	HIS	-	expression tag	UNP A0A077EA44
C	-7	MET	-	initiating methionine	UNP A0A077EA44

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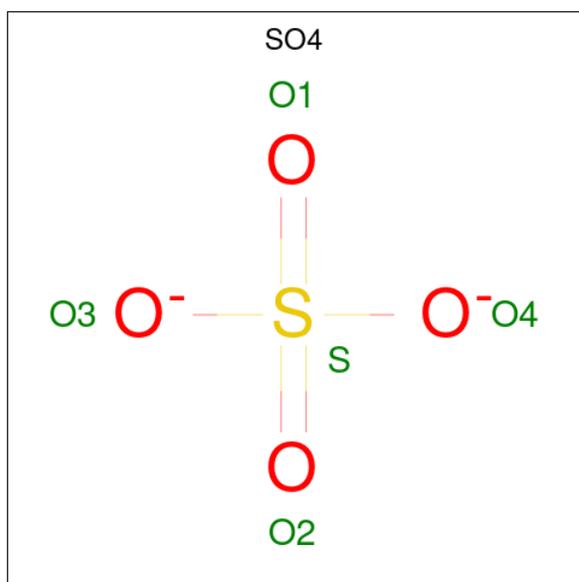
Chain	Residue	Modelled	Actual	Comment	Reference
C	-6	ALA	-	expression tag	UNP A0A077EA44
C	-5	HIS	-	expression tag	UNP A0A077EA44
C	-4	HIS	-	expression tag	UNP A0A077EA44
C	-3	HIS	-	expression tag	UNP A0A077EA44
C	-2	HIS	-	expression tag	UNP A0A077EA44
C	-1	HIS	-	expression tag	UNP A0A077EA44
C	0	HIS	-	expression tag	UNP A0A077EA44
D	-7	MET	-	initiating methionine	UNP A0A077EA44
D	-6	ALA	-	expression tag	UNP A0A077EA44
D	-5	HIS	-	expression tag	UNP A0A077EA44
D	-4	HIS	-	expression tag	UNP A0A077EA44
D	-3	HIS	-	expression tag	UNP A0A077EA44
D	-2	HIS	-	expression tag	UNP A0A077EA44
D	-1	HIS	-	expression tag	UNP A0A077EA44
D	0	HIS	-	expression tag	UNP A0A077EA44
E	-7	MET	-	initiating methionine	UNP A0A077EA44
E	-6	ALA	-	expression tag	UNP A0A077EA44
E	-5	HIS	-	expression tag	UNP A0A077EA44
E	-4	HIS	-	expression tag	UNP A0A077EA44
E	-3	HIS	-	expression tag	UNP A0A077EA44
E	-2	HIS	-	expression tag	UNP A0A077EA44
E	-1	HIS	-	expression tag	UNP A0A077EA44
E	0	HIS	-	expression tag	UNP A0A077EA44
F	-7	MET	-	initiating methionine	UNP A0A077EA44
F	-6	ALA	-	expression tag	UNP A0A077EA44
F	-5	HIS	-	expression tag	UNP A0A077EA44
F	-4	HIS	-	expression tag	UNP A0A077EA44
F	-3	HIS	-	expression tag	UNP A0A077EA44
F	-2	HIS	-	expression tag	UNP A0A077EA44
F	-1	HIS	-	expression tag	UNP A0A077EA44
F	0	HIS	-	expression tag	UNP A0A077EA44

- Molecule 2 is CITRIC ACID (CCD ID: CIT) (formula: C₆H₈O₇).



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

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

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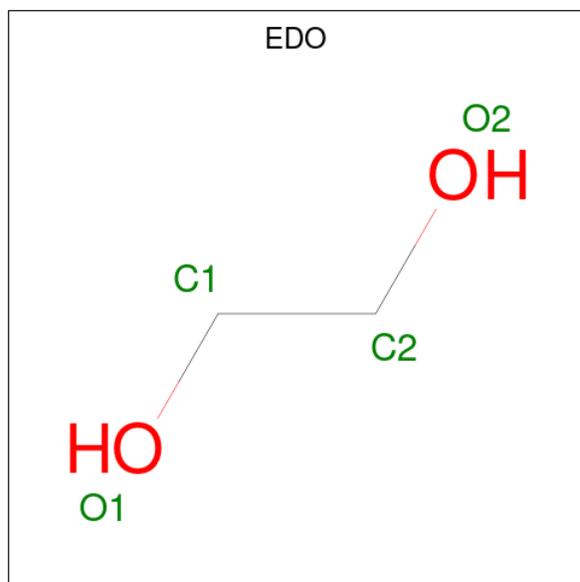
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	E	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	C	1	Total	C	O	0	0
			4	2	2		

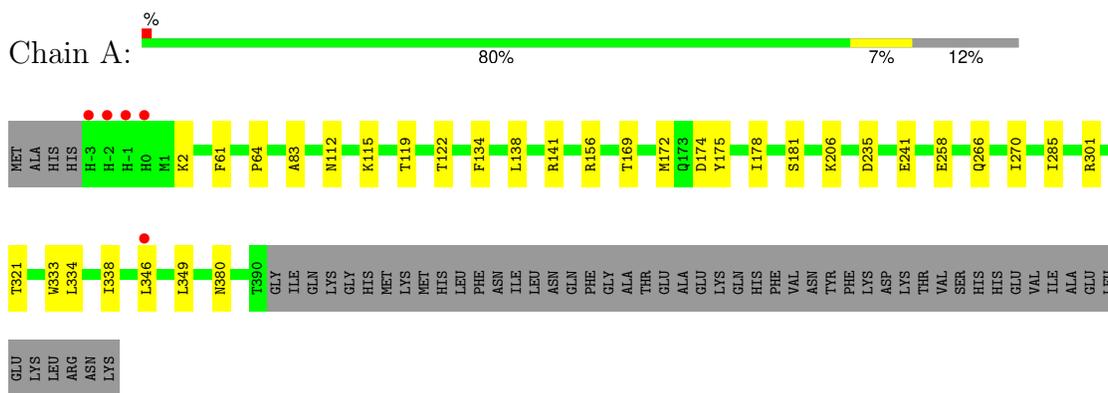
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	262	Total O 262 262	0	0
5	B	229	Total O 230 230	0	1
5	C	202	Total O 202 202	0	0
5	D	195	Total O 196 196	0	1
5	E	182	Total O 184 184	0	2
5	F	152	Total O 153 153	0	1

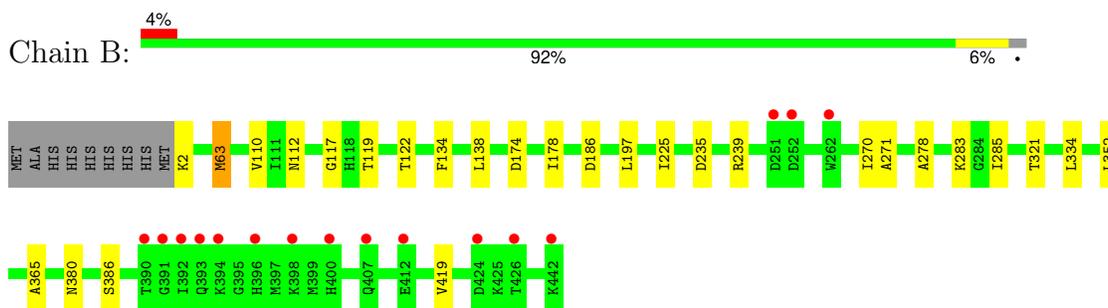
3 Residue-property plots [i](#)

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.

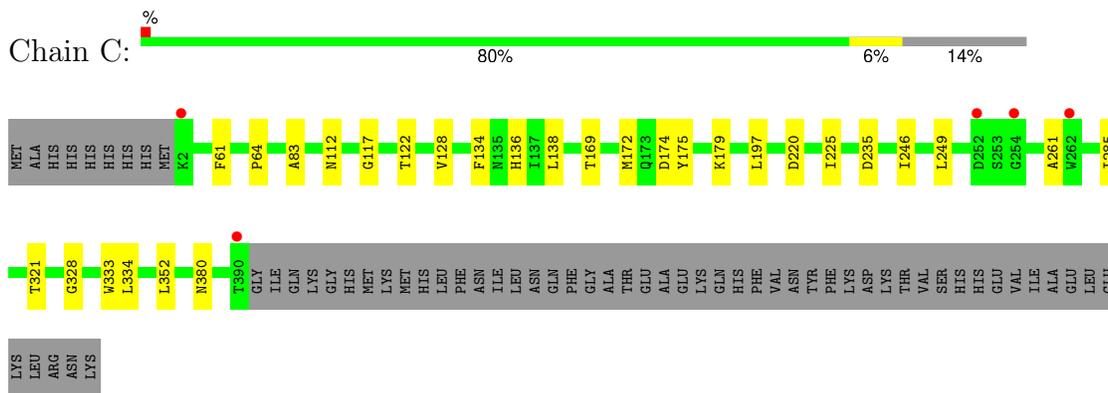
- Molecule 1: Hydroxymethylglutaryl-CoA reductase



- Molecule 1: Hydroxymethylglutaryl-CoA reductase



- Molecule 1: Hydroxymethylglutaryl-CoA reductase



- Molecule 1: Hydroxymethylglutaryl-CoA reductase

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	183.85Å 206.67Å 90.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.26 – 2.40 49.26 – 2.40	Depositor EDS
% Data completeness (in resolution range)	100.0 (49.26-2.40) 100.0 (49.26-2.40)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.58 (at 2.39Å)	Xtrriage
Refinement program	PHENIX 1.19 4224	Depositor
R, R_{free}	0.153 , 0.188 0.153 , 0.188	Depositor DCC
R_{free} test set	1956 reflections (1.45%)	wwPDB-VP
Wilson B-factor (Å ²)	39.5	Xtrriage
Anisotropy	0.192	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 49.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	20350	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.65% 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: SO4, EDO, CIT

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	0.25	0/3188	0.43	0/4312
1	B	0.24	0/3547	0.42	0/4799
1	C	0.24	0/3150	0.42	0/4262
1	D	0.22	0/3143	0.40	0/4255
1	E	0.22	0/3131	0.41	0/4238
1	F	0.21	0/3149	0.39	0/4262
All	All	0.23	0/19308	0.41	0/26128

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	3108	0	3051	22	0
1	B	3453	0	3354	20	0
1	C	3071	0	3009	20	0
1	D	3064	0	3004	12	0
1	E	3055	0	2992	21	0
1	F	3070	0	3010	16	0
2	A	13	0	5	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	13	0	5	0	0
2	C	13	0	5	0	0
2	D	13	0	5	0	0
2	E	13	0	5	0	0
2	F	13	0	5	0	0
3	A	50	0	0	1	0
3	B	30	0	0	1	0
3	C	45	0	0	1	0
3	D	35	0	0	0	0
3	E	25	0	0	1	0
3	F	35	0	0	1	0
4	C	4	0	6	1	0
5	A	262	0	0	2	0
5	B	230	0	0	0	0
5	C	202	0	0	2	0
5	D	196	0	0	1	0
5	E	184	0	0	1	0
5	F	153	0	0	2	0
All	All	20350	0	18456	99	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 3.

All (99) 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:C:333:TRP:HE1	4:C:509:EDO:H12	1.54	0.73
1:A:206:LYS:HD2	1:B:419:VAL:HG11	1.72	0.71
1:C:134:PHE:HA	1:C:138:LEU:HB3	1.75	0.68
1:F:156[B]:ARG:NH2	5:F:601:HOH:O	2.31	0.64
1:A:134:PHE:HA	1:A:138:LEU:HB3	1.81	0.63
1:F:219:LYS:NZ	5:F:602:HOH:O	2.31	0.63
1:B:2:LYS:N	3:B:504:SO4:O2	2.33	0.62
1:A:270:ILE:HD11	1:B:225:ILE:HD13	1.83	0.60
1:F:321:THR:HG22	1:F:334:LEU:HB2	1.85	0.58
1:D:285:ILE:HG12	1:D:380:ASN:HB2	1.86	0.57
1:C:321:THR:HG22	1:C:334:LEU:HB2	1.87	0.56
1:A:141[B]:ARG:NH1	5:A:602:HOH:O	2.40	0.55
1:B:134:PHE:HA	1:B:138:LEU:HB3	1.88	0.54
1:D:134:PHE:HA	1:D:138:LEU:HB3	1.89	0.54
3:E:503:SO4:O1	5:E:601:HOH:O	2.18	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:134:PHE:HA	1:F:138:LEU:HB3	1.91	0.52
1:E:119:THR:HB	1:E:178:ILE:HB	1.89	0.52
1:E:134:PHE:HA	1:E:138:LEU:HB3	1.91	0.52
1:C:220:ASP:OD1	5:C:601:HOH:O	2.19	0.52
1:F:84:VAL:HG22	1:F:86:GLU:H	1.76	0.50
1:A:119:THR:HB	1:A:178:ILE:HB	1.93	0.50
1:E:64:PRO:O	1:E:83:ALA:HA	2.12	0.50
1:F:2:LYS:HA	3:F:506:SO4:O4	2.10	0.50
1:B:285:ILE:HG12	1:B:380:ASN:HB2	1.93	0.49
1:A:122:THR:HA	1:A:174:ASP:O	2.12	0.49
1:E:117:GLY:HA3	1:E:197:LEU:HD11	1.94	0.49
1:E:321:THR:HG22	1:E:334:LEU:HB2	1.95	0.49
1:F:122:THR:HA	1:F:174:ASP:O	2.12	0.49
1:C:122:THR:HA	1:C:174:ASP:O	2.12	0.49
1:A:346:LEU:HD12	1:A:349:LEU:HD12	1.95	0.49
1:B:122:THR:HG23	1:B:225:ILE:HD11	1.95	0.49
1:D:122:THR:HA	1:D:174:ASP:O	2.13	0.48
1:A:169:THR:HA	1:A:172:MET:O	2.14	0.47
1:D:352:LEU:HD12	1:F:61:PHE:HA	1.97	0.47
1:A:61:PHE:HA	1:B:352:LEU:HD12	1.97	0.46
1:C:285:ILE:HG12	1:C:380:ASN:HB2	1.97	0.46
1:C:112:ASN:HB3	1:C:235:ASP:O	2.15	0.46
1:B:63:MET:HB2	1:B:63:MET:HE2	1.47	0.46
1:D:119:THR:HB	1:D:178:ILE:HB	1.97	0.46
1:E:352:LEU:HD23	1:E:352:LEU:HA	1.77	0.46
1:A:172:MET:HE2	1:A:175:TYR:HB2	1.99	0.45
1:C:61:PHE:HA	1:E:352:LEU:HD12	1.99	0.45
1:D:175:TYR:CZ	1:F:270:ILE:HD12	2.52	0.45
1:A:241:GLU:HG3	1:A:333:TRP:HB3	1.99	0.45
1:F:64:PRO:O	1:F:83:ALA:HA	2.17	0.45
1:A:112:ASN:HB3	1:A:235:ASP:O	2.17	0.44
1:B:117:GLY:HA3	1:B:197:LEU:HD11	1.99	0.44
1:C:64:PRO:O	1:C:83:ALA:HA	2.18	0.44
1:B:271:ALA:O	1:B:278:ALA:HB2	2.17	0.44
1:A:64:PRO:O	1:A:83:ALA:HA	2.18	0.44
1:C:122:THR:HG23	1:C:225:ILE:HD11	1.99	0.44
1:E:285:ILE:HG12	1:E:380:ASN:HB2	1.99	0.44
1:B:321:THR:HG22	1:B:334:LEU:HB2	2.00	0.44
3:C:511:SO4:O2	1:E:2:LYS:HA	2.17	0.44
1:E:111:ILE:HB	1:E:237:ILE:HG23	2.00	0.44
1:E:84:VAL:HG22	1:E:86:GLU:H	1.83	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:321:THR:HG22	1:A:334:LEU:HB2	1.99	0.43
1:B:119:THR:HB	1:B:178:ILE:HB	1.99	0.43
1:F:35:ILE:O	1:F:38:GLN:HG2	2.19	0.43
1:F:285:ILE:HG12	1:F:380:ASN:HB2	2.00	0.43
1:A:258:GLU:H	1:A:258:GLU:CD	2.26	0.43
1:A:175:TYR:CZ	1:B:270:ILE:HD12	2.53	0.43
1:D:258:GLU:H	1:D:258:GLU:CD	2.26	0.43
1:C:249:LEU:HD12	1:C:261:ALA:HB2	2.00	0.43
1:E:122:THR:HA	1:E:174:ASP:O	2.19	0.43
1:F:119:THR:HB	1:F:178:ILE:HB	2.01	0.43
1:B:239:ARG:HD2	1:C:128:VAL:HG21	2.00	0.43
1:A:301:ARG:HB3	1:B:283:LYS:HG2	2.01	0.42
1:B:186:ASP:HA	1:B:365:ALA:HB2	2.01	0.42
1:E:122:THR:HG23	1:E:225:ILE:HD11	2.01	0.42
1:E:35:ILE:O	1:E:38:GLN:HG2	2.19	0.42
1:D:168:LYS:NZ	5:D:607:HOH:O	2.50	0.42
1:C:352:LEU:HD23	1:C:352:LEU:HA	1.87	0.42
1:A:115:LYS:O	1:A:181:SER:HA	2.20	0.42
1:F:270:ILE:HG22	1:F:277:ARG:HG2	2.02	0.42
1:A:285:ILE:HG12	1:A:380:ASN:HB2	2.01	0.42
1:E:322:HIS:HB2	1:E:333:TRP:CE2	2.55	0.42
1:C:179:LYS:NZ	5:C:612:HOH:O	2.52	0.42
1:B:122:THR:HA	1:B:174:ASP:O	2.20	0.42
1:D:117:GLY:HA3	1:D:197:LEU:HD11	2.01	0.42
1:C:117:GLY:HA3	1:C:197:LEU:HD11	2.02	0.42
1:D:223:ARG:HB2	1:D:223:ARG:NH1	2.35	0.42
1:D:223:ARG:HB2	1:D:223:ARG:HH11	1.84	0.41
1:D:64:PRO:O	1:D:83:ALA:HA	2.21	0.41
1:C:352:LEU:HD12	1:E:61:PHE:HA	2.02	0.41
1:C:175:TYR:CZ	1:E:270:ILE:HD12	2.56	0.41
1:A:2:LYS:HA	3:A:507:SO4:O4	2.21	0.41
1:A:266:GLN:OE1	1:B:225:ILE:HG12	2.21	0.41
1:B:112:ASN:HB3	1:B:235:ASP:O	2.21	0.40
1:B:110:VAL:O	1:C:136:HIS:HE1	2.04	0.40
1:E:258:GLU:CD	1:E:258:GLU:H	2.29	0.40
1:A:156:ARG:NH1	5:A:605:HOH:O	2.48	0.40
1:E:63:MET:HE2	1:E:63:MET:HB2	1.75	0.40
1:E:239:ARG:HA	1:E:334:LEU:O	2.22	0.40
1:C:169:THR:HA	1:C:172:MET:O	2.21	0.40
1:C:246:ILE:HD12	1:C:328:GLY:HA2	2.03	0.40
1:E:186:ASP:HA	1:E:365:ALA:HB2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:63:MET:HB2	1:F:63:MET:HE2	1.75	0.40
1:F:122:THR:HG23	1:F:225:ILE:HD11	2.04	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	398/450 (88%)	390 (98%)	8 (2%)	0	100	100
1	B	447/450 (99%)	439 (98%)	8 (2%)	0	100	100
1	C	393/450 (87%)	387 (98%)	6 (2%)	0	100	100
1	D	393/450 (87%)	386 (98%)	7 (2%)	0	100	100
1	E	392/450 (87%)	384 (98%)	8 (2%)	0	100	100
1	F	393/450 (87%)	385 (98%)	8 (2%)	0	100	100
All	All	2416/2700 (90%)	2371 (98%)	45 (2%)	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	338/390 (87%)	337 (100%)	1 (0%)	91	96

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	367/390 (94%)	365 (100%)	2 (0%)	86	94
1	C	335/390 (86%)	335 (100%)	0	100	100
1	D	333/390 (85%)	332 (100%)	1 (0%)	91	96
1	E	333/390 (85%)	332 (100%)	1 (0%)	91	96
1	F	335/390 (86%)	332 (99%)	3 (1%)	75	88
All	All	2041/2340 (87%)	2033 (100%)	8 (0%)	91	95

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	338	ILE
1	B	63	MET
1	B	386	SER
1	D	223	ARG
1	E	222	LEU
1	F	141[A]	ARG
1	F	141[B]	ARG
1	F	223	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	-1	HIS
1	B	56	ASN
1	B	379	GLN
1	B	406	ASN
1	B	416	GLN
1	C	3	HIS
1	C	216	GLN
1	C	269	ASN
1	D	379	GLN
1	E	4	GLN
1	E	56	ASN
1	E	171	GLN
1	E	269	ASN
1	E	379	GLN
1	F	118	HIS
1	F	199	GLN
1	F	379	GLN

5.3.3 RNA [i](#)

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

51 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
3	SO4	A	502	-	4,4,4	0.31	0	6,6,6	0.20	0
3	SO4	B	504	-	4,4,4	0.25	0	6,6,6	0.21	0
3	SO4	D	502	-	4,4,4	0.26	0	6,6,6	0.06	0
2	CIT	A	501	-	12,12,12	1.29	0	17,17,17	1.42	3 (17%)
3	SO4	B	505	-	4,4,4	0.26	0	6,6,6	0.18	0
3	SO4	F	503	-	4,4,4	0.26	0	6,6,6	0.16	0
3	SO4	A	508	-	4,4,4	0.23	0	6,6,6	0.13	0
3	SO4	C	503	-	4,4,4	0.30	0	6,6,6	0.33	0
3	SO4	F	507	-	4,4,4	0.26	0	6,6,6	0.09	0
3	SO4	A	505	-	4,4,4	0.24	0	6,6,6	0.11	0
3	SO4	D	504	-	4,4,4	0.24	0	6,6,6	0.34	0
3	SO4	A	509	-	4,4,4	0.25	0	6,6,6	0.11	0
3	SO4	B	507	-	4,4,4	0.26	0	6,6,6	0.11	0
3	SO4	A	507	-	4,4,4	0.28	0	6,6,6	0.33	0
3	SO4	D	503	-	4,4,4	0.28	0	6,6,6	0.33	0
2	CIT	F	502	-	12,12,12	1.14	0	17,17,17	1.48	2 (11%)
3	SO4	C	502	-	4,4,4	0.25	0	6,6,6	0.13	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	SO4	C	504	-	4,4,4	0.30	0	6,6,6	0.38	0
3	SO4	F	506	-	4,4,4	0.23	0	6,6,6	0.23	0
3	SO4	A	510	-	4,4,4	0.24	0	6,6,6	0.11	0
3	SO4	D	506	-	4,4,4	0.26	0	6,6,6	0.13	0
3	SO4	C	505	-	4,4,4	0.25	0	6,6,6	0.11	0
3	SO4	F	508	-	4,4,4	0.25	0	6,6,6	0.12	0
3	SO4	C	508	-	4,4,4	0.24	0	6,6,6	0.06	0
3	SO4	C	511	-	4,4,4	0.24	0	6,6,6	0.24	0
3	SO4	E	502	-	4,4,4	0.24	0	6,6,6	0.25	0
3	SO4	A	506	-	4,4,4	0.25	0	6,6,6	0.11	0
2	CIT	D	501	-	12,12,12	1.09	0	17,17,17	1.59	2 (11%)
3	SO4	A	511	-	4,4,4	0.23	0	6,6,6	0.16	0
3	SO4	B	503	-	4,4,4	0.26	0	6,6,6	0.37	0
3	SO4	C	507	-	4,4,4	0.24	0	6,6,6	0.15	0
3	SO4	C	506	-	4,4,4	0.25	0	6,6,6	0.10	0
3	SO4	E	504	-	4,4,4	0.26	0	6,6,6	0.08	0
3	SO4	D	508	-	4,4,4	0.26	0	6,6,6	0.09	0
3	SO4	F	505	-	4,4,4	0.25	0	6,6,6	0.21	0
3	SO4	C	510	-	4,4,4	0.26	0	6,6,6	0.08	0
4	EDO	C	509	-	3,3,3	0.53	0	2,2,2	0.24	0
3	SO4	D	505	-	4,4,4	0.23	0	6,6,6	0.10	0
3	SO4	E	505	-	4,4,4	0.25	0	6,6,6	0.12	0
3	SO4	A	504	-	4,4,4	0.29	0	6,6,6	0.44	0
3	SO4	B	502	-	4,4,4	0.24	0	6,6,6	0.19	0
3	SO4	B	506	-	4,4,4	0.24	0	6,6,6	0.20	0
3	SO4	E	503	-	4,4,4	0.20	0	6,6,6	0.18	0
3	SO4	F	501	-	4,4,4	0.26	0	6,6,6	0.36	0
2	CIT	B	501	-	12,12,12	1.07	0	17,17,17	1.40	2 (11%)
3	SO4	A	503	-	4,4,4	0.28	0	6,6,6	0.12	0
3	SO4	D	507	-	4,4,4	0.27	0	6,6,6	0.11	0
3	SO4	F	504	-	4,4,4	0.30	0	6,6,6	0.27	0
3	SO4	E	506	-	4,4,4	0.28	0	6,6,6	0.29	0
2	CIT	C	501	-	12,12,12	1.13	0	17,17,17	1.44	2 (11%)
2	CIT	E	501	-	12,12,12	1.12	0	17,17,17	1.64	3 (17%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	CIT	A	501	-	-	2/16/16/16	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	CIT	B	501	-	-	2/16/16/16	-
2	CIT	F	502	-	-	2/16/16/16	-
2	CIT	D	501	-	-	2/16/16/16	-
4	EDO	C	509	-	-	1/1/1/1	-
2	CIT	C	501	-	-	2/16/16/16	-
2	CIT	E	501	-	-	2/16/16/16	-

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	501	CIT	O6-C6-C3	4.31	121.42	113.14
2	D	501	CIT	O6-C6-C3	4.11	121.03	113.14
2	C	501	CIT	O6-C6-C3	4.01	120.83	113.14
2	B	501	CIT	O6-C6-C3	3.62	120.08	113.14
2	F	502	CIT	O6-C6-C3	3.30	119.47	113.14
2	A	501	CIT	O6-C6-C3	3.09	119.06	113.14
2	E	501	CIT	O2-C1-C2	3.04	123.97	114.35
2	D	501	CIT	O2-C1-C2	2.63	122.69	114.35
2	F	502	CIT	O4-C5-C4	2.55	122.43	114.35
2	A	501	CIT	O4-C5-C4	2.45	122.10	114.35
2	B	501	CIT	O2-C1-C2	2.29	121.59	114.35
2	E	501	CIT	O1-C1-C2	-2.21	116.70	122.95
2	A	501	CIT	O7-C3-C4	2.09	114.15	109.38
2	C	501	CIT	O4-C5-C4	2.03	120.79	114.35

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	509	EDO	O1-C1-C2-O2
2	B	501	CIT	O2-C1-C2-C3
2	E	501	CIT	O2-C1-C2-C3
2	B	501	CIT	O1-C1-C2-C3
2	C	501	CIT	C3-C4-C5-O4
2	D	501	CIT	O2-C1-C2-C3
2	A	501	CIT	C3-C4-C5-O4
2	D	501	CIT	O1-C1-C2-C3
2	E	501	CIT	O1-C1-C2-C3
2	C	501	CIT	C3-C4-C5-O3

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Mol	Chain	Res	Type	Atoms
2	F	502	CIT	C3-C4-C5-O3
2	F	502	CIT	C3-C4-C5-O4
2	A	501	CIT	C3-C4-C5-O3

There are no ring outliers.

6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	504	SO4	1	0
3	A	507	SO4	1	0
3	F	506	SO4	1	0
3	C	511	SO4	1	0
4	C	509	EDO	1	0
3	E	503	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	394/450 (87%)	-0.82	5 (1%) 74 71	20, 37, 61, 104	6 (1%)
1	B	441/450 (98%)	-0.57	16 (3%) 46 43	22, 39, 94, 130	8 (1%)
1	C	389/450 (86%)	-0.74	5 (1%) 74 71	25, 40, 66, 106	6 (1%)
1	D	389/450 (86%)	-0.76	3 (0%) 82 80	25, 41, 68, 111	6 (1%)
1	E	389/450 (86%)	-0.70	2 (0%) 87 85	29, 43, 68, 100	5 (1%)
1	F	389/450 (86%)	-0.63	4 (1%) 79 76	26, 45, 70, 105	6 (1%)
All	All	2391/2700 (88%)	-0.70	35 (1%) 71 68	20, 41, 72, 130	37 (1%)

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	394	LYS	5.0
1	A	346	LEU	4.2
1	C	252	ASP	4.2
1	A	-3	HIS	3.9
1	C	390	THR	3.7
1	D	252	ASP	3.4
1	E	252	ASP	3.3
1	A	-2	HIS	3.3
1	B	252	ASP	3.1
1	B	426	THR	3.1
1	E	2	LYS	3.1
1	B	393	GLN	3.0
1	B	407	GLN	3.0
1	B	392	ILE	2.9
1	F	252	ASP	2.9
1	C	2	LYS	2.9
1	B	424	ASP	2.8
1	B	391	GLY	2.7
1	B	396	HIS	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	442	LYS	2.6
1	F	2	LYS	2.5
1	D	390	THR	2.5
1	F	346	LEU	2.4
1	F	390	THR	2.4
1	A	0	HIS	2.3
1	B	412	GLU	2.3
1	B	390	THR	2.2
1	B	262	TRP	2.2
1	B	400	HIS	2.2
1	C	254	GLY	2.2
1	B	398	LYS	2.1
1	D	2	LYS	2.1
1	A	-1	HIS	2.1
1	C	262	TRP	2.1
1	B	251	ASP	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	SO4	C	508	5/5	0.60	0.14	82,83,107,113	5
3	SO4	D	507	5/5	0.61	0.18	58,60,68,76	5
3	SO4	E	505	5/5	0.63	0.15	68,72,84,84	5
3	SO4	D	506	5/5	0.73	0.21	65,71,76,76	5
3	SO4	A	507	5/5	0.74	0.28	49,61,62,67	5
3	SO4	A	510	5/5	0.76	0.15	66,70,83,84	5
3	SO4	E	504	5/5	0.78	0.14	60,64,65,71	5

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	SO4	B	505	5/5	0.78	0.17	53,55,72,80	5
3	SO4	A	505	5/5	0.79	0.13	90,96,97,99	5
3	SO4	F	507	5/5	0.79	0.12	68,71,78,78	5
3	SO4	A	508	5/5	0.80	0.14	51,60,65,65	5
3	SO4	C	506	5/5	0.80	0.15	66,74,81,86	5
3	SO4	D	508	5/5	0.81	0.11	65,66,75,78	5
3	SO4	C	511	5/5	0.82	0.16	52,65,70,76	5
3	SO4	B	506	5/5	0.84	0.13	68,71,78,78	5
3	SO4	C	507	5/5	0.85	0.13	57,59,63,64	5
3	SO4	A	509	5/5	0.85	0.15	65,65,70,81	5
3	SO4	F	505	5/5	0.85	0.11	58,61,66,69	5
3	SO4	E	503	5/5	0.85	0.15	47,50,56,58	5
3	SO4	A	506	5/5	0.86	0.12	50,55,63,68	5
3	SO4	F	506	5/5	0.86	0.14	62,68,70,79	5
3	SO4	B	507	5/5	0.86	0.09	69,73,81,83	5
3	SO4	F	508	5/5	0.86	0.10	64,70,79,83	5
4	EDO	C	509	4/4	0.87	0.19	50,51,51,55	0
3	SO4	D	505	5/5	0.88	0.11	61,64,71,71	5
3	SO4	C	505	5/5	0.88	0.11	58,58,67,71	5
3	SO4	C	502	5/5	0.89	0.08	76,77,83,86	0
3	SO4	A	504	5/5	0.89	0.11	44,49,52,60	5
3	SO4	D	504	5/5	0.91	0.12	49,50,61,63	0
3	SO4	B	503	5/5	0.92	0.13	48,54,67,68	0
3	SO4	E	506	5/5	0.92	0.14	51,53,64,69	0
3	SO4	F	504	5/5	0.92	0.12	58,59,68,70	0
3	SO4	C	504	5/5	0.92	0.11	47,56,59,64	0
3	SO4	F	501	5/5	0.93	0.11	54,58,62,63	0
3	SO4	F	503	5/5	0.93	0.08	63,71,78,83	0
3	SO4	B	504	5/5	0.94	0.10	57,58,62,67	5
3	SO4	C	503	5/5	0.95	0.08	53,54,64,65	0
3	SO4	A	502	5/5	0.95	0.07	62,63,67,69	0
3	SO4	E	502	5/5	0.95	0.11	54,56,65,67	0
3	SO4	B	502	5/5	0.95	0.12	46,47,57,61	0
3	SO4	C	510	5/5	0.95	0.09	69,69,72,73	0
2	CIT	E	501	13/13	0.96	0.06	35,38,42,42	0
3	SO4	A	503	5/5	0.96	0.06	42,43,49,52	5
3	SO4	D	502	5/5	0.97	0.05	68,69,74,80	0
3	SO4	D	503	5/5	0.97	0.10	42,44,57,59	0
2	CIT	F	502	13/13	0.97	0.05	32,38,40,41	0
2	CIT	C	501	13/13	0.97	0.06	34,38,44,44	0
3	SO4	A	511	5/5	0.97	0.09	60,60,63,63	0
2	CIT	D	501	13/13	0.98	0.04	35,40,44,46	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	CIT	A	501	13/13	0.98	0.04	29,31,38,39	0
2	CIT	B	501	13/13	0.99	0.03	29,32,39,40	0

6.5 Other polymers [i](#)

There are no such residues in this entry.