



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 15, 2020 – 08:53 pm BST

PDB ID : 1UQR  
Title : Type II 3-dehydroquinate dehydratase (DHQase) from *Actinobacillus pleuropneumoniae*  
Authors : Maes, D.; Gonzalez-Ramirez, L.A.; Lopez-Jaramillo, J.; Yu, B.; De Bondt, H.; Zegers, I.; Afonina, E.; Garcia-Ruiz, J.M.; Gulnik, S.  
Deposited on : 2003-10-16  
Resolution : 1.70 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

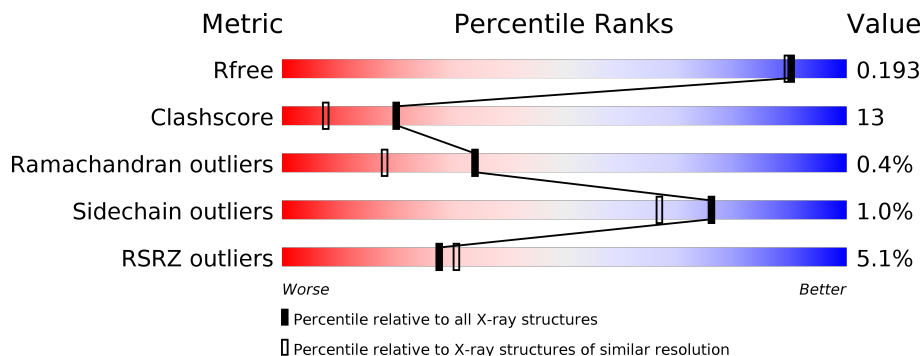
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.70 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	4298 (1.70-1.70)
Clashscore	141614	4695 (1.70-1.70)
Ramachandran outliers	138981	4610 (1.70-1.70)
Sidechain outliers	138945	4610 (1.70-1.70)
RSRZ outliers	127900	4222 (1.70-1.70)

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  $\geq 3$ , 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	154	 7% 77% 17% • 5%
1	B	154	 3% 77% 12% • 10%
1	C	154	 3% 77% 18% • •
1	D	154	 6% 75% 22% •••
1	E	154	 5% 75% 18% 7%
1	F	154	 5% 81% 14% 5%

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Mol	Chain	Length	Quality of chain
1	G	154	<p>4% 71% 19% 9%</p>
1	H	154	<p>3% 81% 15% 5%</p>
1	I	154	<p>4% 70% 21% 8%</p>
1	J	154	<p>8% 82% 10% 5%</p>
1	K	154	<p>8% 81% 16% 5%</p>
1	L	154	<p>3% 71% 18% 10%</p>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 16147 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 3-DEHYDROQUINATE DEHYDRATASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	146	1156	736	201	214	5	0	1	0
1	B	138	1089	694	188	202	5	0	1	0
1	C	148	1161	735	203	216	7	0	1	1
1	D	152	1195	759	208	222	6	0	1	1
1	E	143	1130	720	196	209	5	0	1	0
1	F	146	1145	726	200	213	6	0	1	1
1	G	140	1106	703	193	205	5	0	1	0
1	H	148	1161	735	203	216	7	0	1	1
1	I	141	1115	708	194	208	5	0	1	0
1	J	146	1156	736	201	214	5	0	1	0
1	K	152	1195	759	208	222	6	0	1	1
1	L	138	1089	694	188	202	5	0	1	0

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



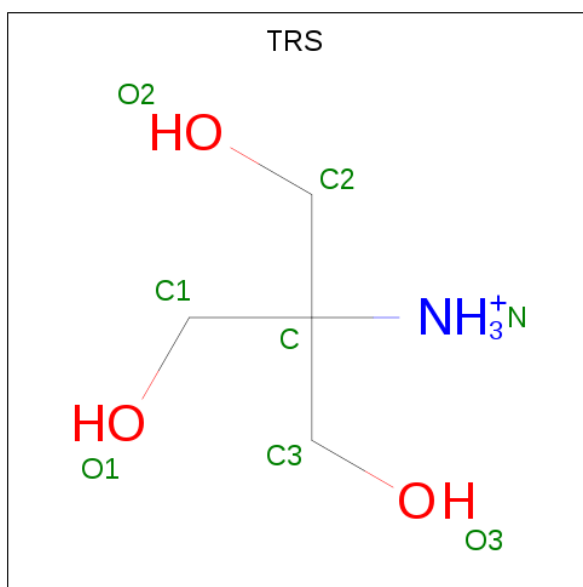
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total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

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	F	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	G	1	Total	O	S	0	0
			5	4	1		
2	H	1	Total	O	S	0	0
			5	4	1		
2	H	1	Total	O	S	0	0
			5	4	1		
2	H	1	Total	O	S	0	0
			5	4	1		
2	H	1	Total	O	S	0	0
			5	4	1		
2	I	1	Total	O	S	0	0
			5	4	1		
2	J	1	Total	O	S	0	0
			5	4	1		
2	J	1	Total	O	S	0	0
			5	4	1		
2	J	1	Total	O	S	0	0
			5	4	1		
2	K	1	Total	O	S	0	0
			5	4	1		
2	K	1	Total	O	S	0	0
			5	4	1		
2	K	1	Total	O	S	0	0
			5	4	1		
2	L	1	Total	O	S	0	0
			5	4	1		
2	L	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: C<sub>4</sub>H<sub>12</sub>NO<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	B	1	Total	C	N	O	0	0
			8	4	1	3		
3	E	1	Total	C	N	O	0	0
			8	4	1	3		
3	H	1	Total	C	N	O	0	0
			8	4	1	3		
3	K	1	Total	C	N	O	0	0
			8	4	1	3		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	195	Total	O	0	0
			195	195		
4	B	204	Total	O	0	0
			204	204		
4	C	216	Total	O	0	0
			216	216		
4	D	203	Total	O	0	0
			203	203		
4	E	162	Total	O	0	0
			162	162		
4	F	216	Total	O	0	0
			216	216		
4	G	156	Total	O	0	0
			156	156		
4	H	199	Total	O	0	0
			199	199		

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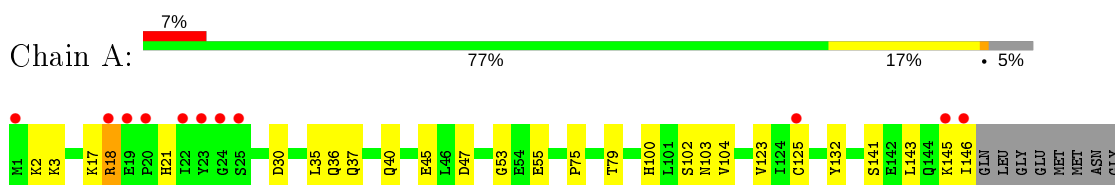
<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
4	I	179	Total 179	O 179	0	0
4	J	152	Total 152	O 152	0	0
4	K	199	Total 199	O 199	0	0
4	L	181	Total 181	O 181	0	0



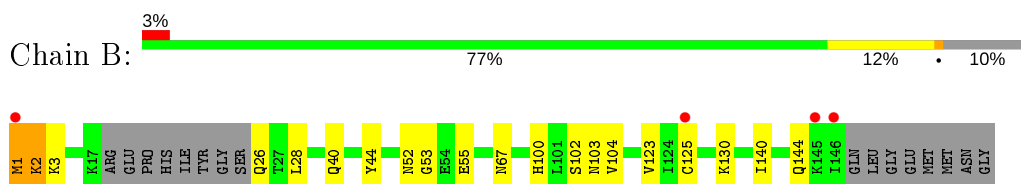
### 3 Residue-property plots [i](#)

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

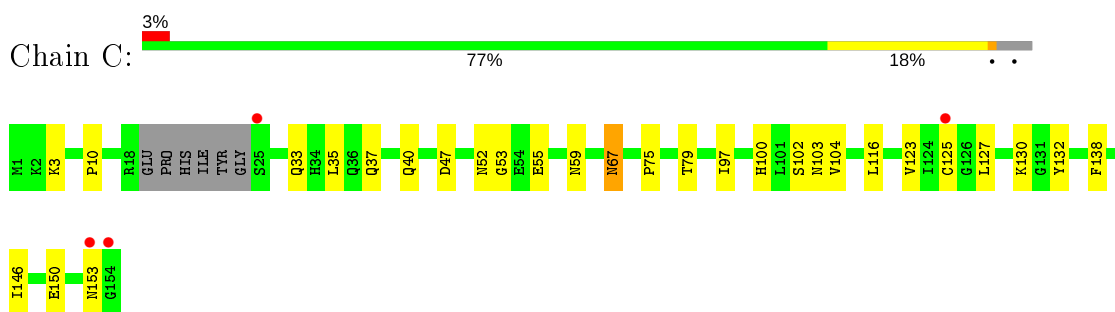
- Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



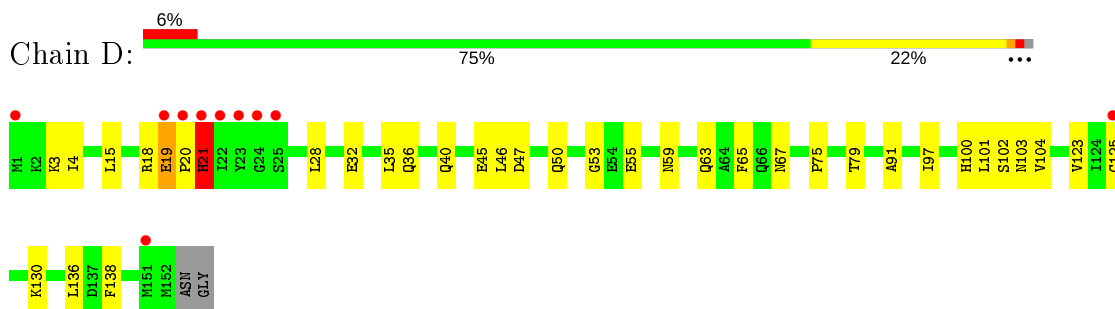
- Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



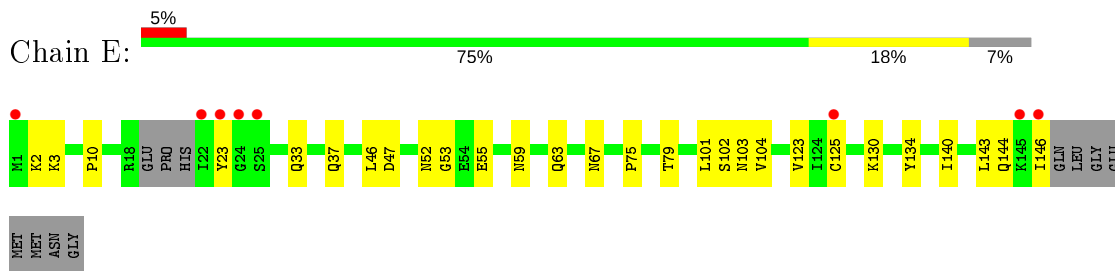
- Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



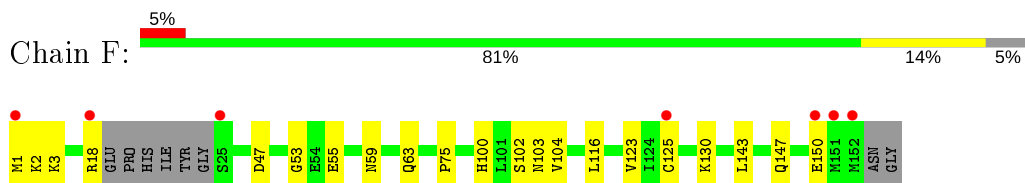
- Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



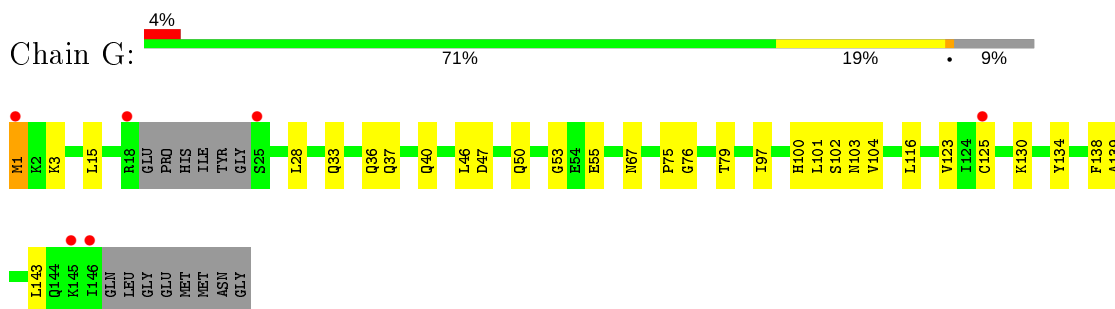
- Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



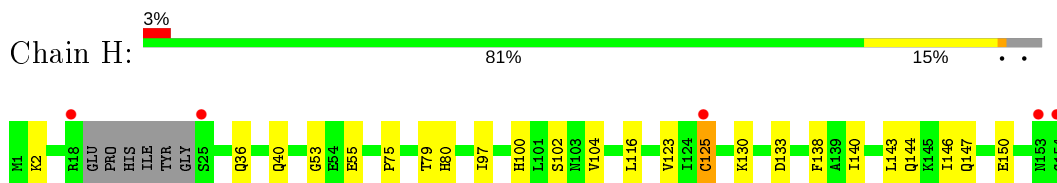
• Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



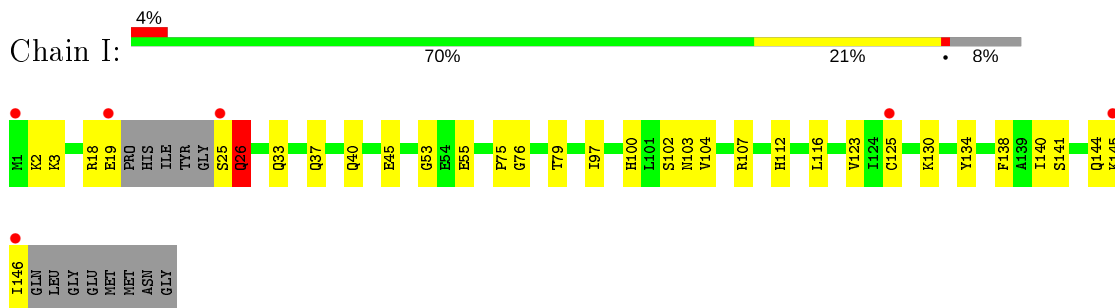
• Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



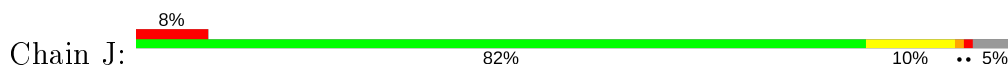
• Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



• Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE

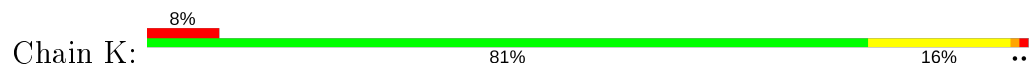


• Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE





- Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



- Molecule 1: 3-DEHYDROQUINATE DEHYDRATASE



GLN  
LEU  
GLY  
MET  
MET  
ASN  
GLY

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	129.09Å 131.33Å 161.62Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 1.70 14.99 – 1.71	Depositor EDS
% Data completeness (in resolution range)	98.0 (20.00-1.70) 98.5 (14.99-1.71)	Depositor EDS
$R_{merge}$	0.04	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	5.88 (at 1.71Å)	Xtrriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.178 , 0.199 0.173 , 0.193	Depositor DCC
$R_{free}$ test set	14401 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	19.4	Xtrriage
Anisotropy	0.355	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.41 , 63.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.015 for k,h,-l	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	16147	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	26.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.55% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: TRS, 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	0.40	0/1189	0.63	0/1609
1	B	0.40	0/1118	0.64	0/1511
1	C	0.39	0/1190	0.62	0/1606
1	D	0.39	0/1228	0.61	0/1661
1	E	0.38	0/1160	0.61	0/1567
1	F	0.38	0/1174	0.63	0/1585
1	G	0.40	0/1135	0.61	0/1533
1	H	0.44	3/1190 (0.3%)	0.60	3/1606 (0.2%)
1	I	0.42	0/1144	0.66	0/1545
1	J	0.44	1/1189 (0.1%)	0.65	0/1609
1	K	0.39	0/1228	0.64	0/1661
1	L	0.39	0/1118	0.63	0/1511
All	All	0.40	4/14063 (0.0%)	0.63	3/19004 (0.0%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	J	2	LYS	C-N	6.11	1.48	1.34
1	H	125[A]	CYS	CB-SG	5.27	1.91	1.82
1	H	125[B]	CYS	CB-SG	5.27	1.91	1.82
1	H	125[C]	CYS	CB-SG	5.27	1.91	1.82

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	125[A]	CYS	N-CA-CB	5.34	120.22	110.60
1	H	125[B]	CYS	N-CA-CB	5.34	120.22	110.60
1	H	125[C]	CYS	N-CA-CB	5.34	120.22	110.60

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	1156	0	1141	39	0
1	B	1089	0	1079	28	0
1	C	1161	0	1149	29	0
1	D	1195	0	1178	37	0
1	E	1130	0	1120	26	0
1	F	1145	0	1134	36	0
1	G	1106	0	1097	34	0
1	H	1161	0	1149	26	0
1	I	1115	0	1103	48	0
1	J	1156	0	1141	22	0
1	K	1195	0	1178	31	0
1	L	1089	0	1079	31	0
2	A	10	0	0	0	0
2	B	10	0	0	0	0
2	C	15	0	0	0	0
2	D	15	0	0	0	0
2	E	15	0	0	0	0
2	F	20	0	0	0	0
2	G	5	0	0	0	0
2	H	20	0	0	0	0
2	I	5	0	0	0	0
2	J	15	0	0	0	0
2	K	15	0	0	0	0
2	L	10	0	0	0	0
3	B	8	0	12	0	0
3	E	8	0	12	0	0
3	H	8	0	12	0	0
3	K	8	0	12	0	0
4	A	195	0	0	7	0
4	B	204	0	0	7	0
4	C	216	0	0	4	0
4	D	203	0	0	4	0
4	E	162	0	0	1	0
4	F	216	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	G	156	0	0	3	0
4	H	199	0	0	5	0
4	I	179	0	0	14	0
4	J	152	0	0	3	0
4	K	199	0	0	3	0
4	L	181	0	0	6	0
All	All	16147	0	13596	345	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 13.

The worst 5 of 345 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:F:125[B]:CYS:CB	1:F:125[B]:CYS:SG	2.30	1.19
1:F:125[C]:CYS:SG	1:F:125[C]:CYS:CB	2.32	1.17
1:I:79:THR:HG21	1:I:100:HIS:HE1	1.10	1.10
1:D:19:GLU:HB3	1:D:20:PRO:HD3	1.35	1.07
1:G:75:PRO:HG2	1:G:79:THR:CG2	1.89	1.02

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	146/154 (95%)	139 (95%)	7 (5%)	0	<a href="#">100</a> <a href="#">100</a>
1	B	136/154 (88%)	133 (98%)	2 (2%)	1 (1%)	<a href="#">22</a> <a href="#">8</a>
1	C	146/154 (95%)	144 (99%)	2 (1%)	0	<a href="#">100</a> <a href="#">100</a>
1	D	152/154 (99%)	146 (96%)	5 (3%)	1 (1%)	<a href="#">22</a> <a href="#">8</a>
1	E	141/154 (92%)	139 (99%)	2 (1%)	0	<a href="#">100</a> <a href="#">100</a>

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	144/154 (94%)	142 (99%)	2 (1%)	0	100	100
1	G	138/154 (90%)	136 (99%)	2 (1%)	0	100	100
1	H	146/154 (95%)	144 (99%)	2 (1%)	0	100	100
1	I	139/154 (90%)	135 (97%)	3 (2%)	1 (1%)	22	8
1	J	146/154 (95%)	142 (97%)	3 (2%)	1 (1%)	22	8
1	K	152/154 (99%)	147 (97%)	3 (2%)	2 (1%)	12	2
1	L	136/154 (88%)	133 (98%)	3 (2%)	0	100	100
All	All	1722/1848 (93%)	1680 (98%)	36 (2%)	6 (0%)	34	24

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	I	26	GLN
1	D	21	HIS
1	J	2	LYS
1	K	151	MET
1	K	19	GLU

### 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	125/129 (97%)	124 (99%)	1 (1%)	81	74
1	B	118/129 (92%)	117 (99%)	1 (1%)	81	74
1	C	126/129 (98%)	125 (99%)	1 (1%)	81	74
1	D	129/129 (100%)	127 (98%)	2 (2%)	62	48
1	E	122/129 (95%)	121 (99%)	1 (1%)	81	74
1	F	124/129 (96%)	124 (100%)	0	100	100
1	G	120/129 (93%)	119 (99%)	1 (1%)	81	74
1	H	126/129 (98%)	126 (100%)	0	100	100
1	I	121/129 (94%)	120 (99%)	1 (1%)	81	74

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	J	125/129 (97%)	122 (98%)	3 (2%)	49	31
1	K	129/129 (100%)	127 (98%)	2 (2%)	62	48
1	L	118/129 (92%)	117 (99%)	1 (1%)	81	74
All	All	1483/1548 (96%)	1469 (99%)	14 (1%)	76	70

5 of 14 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	1	MET
1	I	26	GLN
1	K	103	ASN
1	E	67	ASN
1	J	35	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 61 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	144	GLN
1	G	112	HIS
1	K	144	GLN
1	F	26	GLN
1	F	144	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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

35 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	SO4	F	1154	-	4,4,4	0.28	0	6,6,6	0.15	0
3	TRS	K	1155	-	7,7,7	1.30	0	9,9,9	1.70	4 (44%)
2	SO4	C	1154	-	4,4,4	0.23	0	6,6,6	0.09	0
2	SO4	E	1147	-	4,4,4	0.23	0	6,6,6	0.09	0
2	SO4	G	1147	-	4,4,4	0.23	0	6,6,6	0.11	0
2	SO4	D	1152	-	4,4,4	0.20	0	6,6,6	0.11	0
3	TRS	H	1158	-	7,7,7	1.24	0	9,9,9	1.72	4 (44%)
2	SO4	H	1154	-	4,4,4	0.33	0	6,6,6	0.17	0
2	SO4	D	1153	-	4,4,4	0.27	0	6,6,6	0.05	0
3	TRS	B	1149	-	7,7,7	1.39	1 (14%)	9,9,9	1.75	4 (44%)
2	SO4	D	1154	-	4,4,4	0.25	0	6,6,6	0.08	0
2	SO4	L	1147	-	4,4,4	0.22	0	6,6,6	0.11	0
2	SO4	A	1148	-	4,4,4	0.21	0	6,6,6	0.14	0
2	SO4	F	1155	-	4,4,4	0.26	0	6,6,6	0.11	0
2	SO4	C	1156	-	4,4,4	0.25	0	6,6,6	0.10	0
2	SO4	L	1148	-	4,4,4	0.25	0	6,6,6	0.11	0
2	SO4	A	1147	-	4,4,4	0.26	0	6,6,6	0.10	0
2	SO4	F	1153	-	4,4,4	0.26	0	6,6,6	0.08	0
2	SO4	I	1147	-	4,4,4	0.27	0	6,6,6	0.09	0
2	SO4	K	1154	-	4,4,4	0.26	0	6,6,6	0.06	0
2	SO4	H	1155	-	4,4,4	0.24	0	6,6,6	0.07	0
2	SO4	K	1153	-	4,4,4	0.27	0	6,6,6	0.07	0
2	SO4	J	1148	-	4,4,4	0.25	0	6,6,6	0.05	0
2	SO4	J	1149	-	4,4,4	0.28	0	6,6,6	0.10	0
2	SO4	F	1152	-	4,4,4	0.27	0	6,6,6	0.18	0
2	SO4	H	1157	-	4,4,4	0.26	0	6,6,6	0.09	0
2	SO4	B	1148	-	4,4,4	0.28	0	6,6,6	0.04	0
2	SO4	C	1155	-	4,4,4	0.27	0	6,6,6	0.06	0
2	SO4	K	1152	-	4,4,4	0.23	0	6,6,6	0.08	0
2	SO4	J	1147	-	4,4,4	0.24	0	6,6,6	0.08	0
2	SO4	E	1148	-	4,4,4	0.27	0	6,6,6	0.06	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	SO4	H	1156	-	4,4,4	0.28	0	6,6,6	0.05	0
2	SO4	E	1149	-	4,4,4	0.26	0	6,6,6	0.09	0
3	TRS	E	1150	-	7,7,7	1.36	0	9,9,9	1.82	4 (44%)
2	SO4	B	1147	-	4,4,4	0.20	0	6,6,6	0.09	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
3	TRS	K	1155	-	-	0/9/9/9	-
3	TRS	H	1158	-	-	0/9/9/9	-
3	TRS	E	1150	-	-	0/9/9/9	-
3	TRS	B	1149	-	-	0/9/9/9	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1149	TRS	C-N	-2.09	1.42	1.49

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1149	TRS	C2-C-N	2.71	116.07	107.98
3	K	1155	TRS	C2-C-N	2.66	115.91	107.98
3	E	1150	TRS	C2-C-N	2.63	115.82	107.98
3	H	1158	TRS	C2-C-N	2.62	115.81	107.98
3	B	1149	TRS	O1-C1-C	-2.46	103.20	111.00

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	146/154 (94%)	-0.16	11 (7%) 14 16	11, 18, 49, 66	0
1	B	138/154 (89%)	-0.38	4 (2%) 51 56	10, 16, 33, 62	0
1	C	148/154 (96%)	-0.30	4 (2%) 54 58	11, 20, 38, 74	0
1	D	152/154 (98%)	-0.01	10 (6%) 18 20	13, 21, 56, 73	0
1	E	143/154 (92%)	-0.02	8 (5%) 24 27	14, 23, 48, 73	0
1	F	146/154 (94%)	-0.30	7 (4%) 30 34	12, 18, 40, 70	0
1	G	140/154 (90%)	-0.10	6 (4%) 35 39	13, 22, 45, 69	0
1	H	148/154 (96%)	-0.18	5 (3%) 45 50	13, 21, 37, 72	0
1	I	141/154 (91%)	-0.26	6 (4%) 35 39	12, 18, 39, 67	0
1	J	146/154 (94%)	0.11	12 (8%) 11 13	15, 25, 52, 71	0
1	K	152/154 (98%)	-0.06	12 (7%) 12 14	15, 21, 50, 74	0
1	L	138/154 (89%)	-0.24	4 (2%) 51 56	14, 18, 36, 70	0
All	All	1738/1848 (94%)	-0.16	89 (5%) 28 31	10, 20, 45, 74	0

The worst 5 of 89 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	154	GLY	11.1
1	L	146	ILE	10.6
1	H	154	GLY	10.6
1	K	152	MET	8.9
1	A	23	TYR	8.8

### 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 carbohydrates 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, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
2	SO4	F	1155	5/5	0.80	0.37	41,55,67,68	0
2	SO4	H	1157	5/5	0.85	0.32	50,60,67,70	0
2	SO4	F	1154	5/5	0.89	0.23	31,33,41,49	0
2	SO4	D	1153	5/5	0.91	0.24	43,52,63,67	0
2	SO4	B	1148	5/5	0.92	0.27	57,58,71,74	0
2	SO4	C	1155	5/5	0.92	0.22	31,36,49,53	0
2	SO4	D	1154	5/5	0.94	0.15	53,56,60,66	0
3	TRS	E	1150	8/8	0.94	0.08	14,16,19,19	0
2	SO4	J	1148	5/5	0.95	0.28	46,53,65,66	0
2	SO4	J	1149	5/5	0.95	0.20	39,40,46,52	0
2	SO4	E	1148	5/5	0.95	0.27	33,47,55,56	0
2	SO4	C	1156	5/5	0.95	0.24	35,44,55,57	0
2	SO4	K	1153	5/5	0.96	0.17	41,42,46,46	0
3	TRS	H	1158	8/8	0.96	0.07	15,16,18,19	0
3	TRS	K	1155	8/8	0.96	0.07	16,18,19,22	0
3	TRS	B	1149	8/8	0.96	0.08	14,15,16,17	0
2	SO4	A	1148	5/5	0.97	0.08	21,29,36,38	0
2	SO4	H	1156	5/5	0.97	0.23	33,34,54,55	0
2	SO4	E	1149	5/5	0.97	0.13	39,42,49,50	0
2	SO4	J	1147	5/5	0.97	0.09	22,27,31,32	0
2	SO4	K	1152	5/5	0.98	0.06	24,25,30,33	0
2	SO4	D	1152	5/5	0.98	0.06	17,27,33,43	0
2	SO4	B	1147	5/5	0.98	0.07	18,21,36,38	0
2	SO4	F	1153	5/5	0.99	0.05	17,25,35,47	0
2	SO4	I	1147	5/5	0.99	0.06	22,29,38,39	0
2	SO4	K	1154	5/5	0.99	0.09	28,29,37,47	0
2	SO4	H	1155	5/5	0.99	0.07	19,25,38,40	0
2	SO4	G	1147	5/5	0.99	0.07	23,27,39,44	0
2	SO4	C	1154	5/5	0.99	0.06	18,23,29,33	0
2	SO4	E	1147	5/5	0.99	0.04	20,24,28,29	0
2	SO4	F	1152	5/5	0.99	0.04	15,17,19,22	0
2	SO4	L	1148	5/5	0.99	0.06	25,27,38,46	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	SO4	H	1154	5/5	1.00	0.04	15,16,18,23	0
2	SO4	L	1147	5/5	1.00	0.05	17,18,20,25	0
2	SO4	A	1147	5/5	1.00	0.04	13,13,16,20	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.