



# Full wwPDB X-ray Structure Validation Report

Feb 28, 2014 – 06:42 PM GMT

PDB ID : 2WU0  
Title : CRYSTAL STRUCTURE ANALYSIS OF KLEBSIELLA SP ASR1 PHY-  
TASE  
Authors : Bohm, K.; Mueller, J.J.; Heinemann, U.  
Deposited on : 2009-09-25  
Resolution : 2.57 Å(reported)

This is a full wwPDB validation 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 <http://wwpdb.org/ValidationPDFNotes.html>

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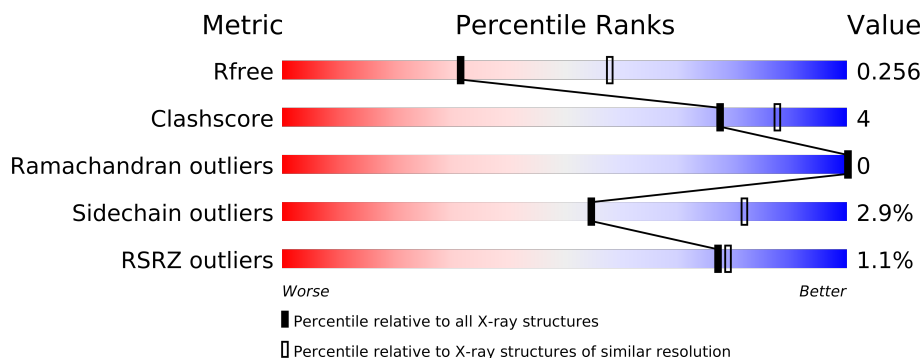
The following versions of software and data (see [references](#)) were used in the production of this report:

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

# 1 Overall quality at a glance

The reported resolution of this entry is 2.57 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	66092	1891 (2.60-2.56)
Clashscore	79885	2358 (2.60-2.56)
Ramachandran outliers	78287	2316 (2.60-2.56)
Sidechain outliers	78261	2316 (2.60-2.56)
RSRZ outliers	66119	1891 (2.60-2.56)

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

Mol	Chain	Length	Quality of chain
1	A	418	
1	B	418	
1	C	418	
1	D	418	

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

Mol	Type	Chain	Res	Geometry	Electron density
2	SO4	A	1407	-	X
2	SO4	A	1409	-	X
2	SO4	B	1407	-	X
2	SO4	B	1408	-	X

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Mol	Type	Chain	Res	Geometry	Electron density
2	SO4	B	1409	-	X
2	SO4	C	1407	-	X
2	SO4	D	1407	-	X

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 12516 atoms, of which 0 are hydrogen and 0 are deuterium.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called PHYTASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	395	Total	C	N	O	S	0	0	0
			3058	1917	562	566	13			
1	B	394	Total	C	N	O	S	0	0	0
			3047	1911	558	565	13			
1	C	395	Total	C	N	O	S	0	0	0
			3058	1917	562	566	13			
1	D	394	Total	C	N	O	S	0	0	0
			3047	1911	558	565	13			

There are 116 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	EXPRESSION TAG	UNP Q84CN9
A	2	ASP	-	EXPRESSION TAG	UNP Q84CN9
A	3	ILE	-	EXPRESSION TAG	UNP Q84CN9
A	4	GLY	-	EXPRESSION TAG	UNP Q84CN9
A	5	ILE	-	EXPRESSION TAG	UNP Q84CN9
A	6	ASN	-	EXPRESSION TAG	UNP Q84CN9
A	7	SER	-	EXPRESSION TAG	UNP Q84CN9
A	8	ASP	-	EXPRESSION TAG	UNP Q84CN9
A	9	PRO	-	EXPRESSION TAG	UNP Q84CN9
A	10	PRO	-	EXPRESSION TAG	UNP Q84CN9
A	11	PRO	-	EXPRESSION TAG	UNP Q84CN9
A	12	ARG	-	EXPRESSION TAG	UNP Q84CN9
A	25	ALA	HIS	ENGINEERED MUTATION	UNP Q84CN9
A	123	ALA	VAL	ENGINEERED MUTATION	UNP Q84CN9
A	279	SER	ASN	ENGINEERED MUTATION	UNP Q84CN9
A	397	ALA	THR	ENGINEERED MUTATION	UNP Q84CN9
A	406	LYS	-	EXPRESSION TAG	UNP Q84CN9
A	407	LEU	-	EXPRESSION TAG	UNP Q84CN9
A	408	ALA	-	EXPRESSION TAG	UNP Q84CN9
A	409	ALA	-	EXPRESSION TAG	UNP Q84CN9
A	410	ALA	-	EXPRESSION TAG	UNP Q84CN9

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Chain	Residue	Modelled	Actual	Comment	Reference
A	411	LEU	-	EXPRESSION TAG	UNP Q84CN9
A	412	GLU	-	EXPRESSION TAG	UNP Q84CN9
A	413	HIS	-	EXPRESSION TAG	UNP Q84CN9
A	414	HIS	-	EXPRESSION TAG	UNP Q84CN9
A	415	HIS	-	EXPRESSION TAG	UNP Q84CN9
A	416	HIS	-	EXPRESSION TAG	UNP Q84CN9
A	417	HIS	-	EXPRESSION TAG	UNP Q84CN9
A	418	HIS	-	EXPRESSION TAG	UNP Q84CN9
B	1	MET	-	EXPRESSION TAG	UNP Q84CN9
B	2	ASP	-	EXPRESSION TAG	UNP Q84CN9
B	3	ILE	-	EXPRESSION TAG	UNP Q84CN9
B	4	GLY	-	EXPRESSION TAG	UNP Q84CN9
B	5	ILE	-	EXPRESSION TAG	UNP Q84CN9
B	6	ASN	-	EXPRESSION TAG	UNP Q84CN9
B	7	SER	-	EXPRESSION TAG	UNP Q84CN9
B	8	ASP	-	EXPRESSION TAG	UNP Q84CN9
B	9	PRO	-	EXPRESSION TAG	UNP Q84CN9
B	10	PRO	-	EXPRESSION TAG	UNP Q84CN9
B	11	PRO	-	EXPRESSION TAG	UNP Q84CN9
B	12	ARG	-	EXPRESSION TAG	UNP Q84CN9
B	25	ALA	HIS	ENGINEERED MUTATION	UNP Q84CN9
B	123	ALA	VAL	ENGINEERED MUTATION	UNP Q84CN9
B	279	SER	ASN	ENGINEERED MUTATION	UNP Q84CN9
B	397	ALA	THR	ENGINEERED MUTATION	UNP Q84CN9
B	406	LYS	-	EXPRESSION TAG	UNP Q84CN9
B	407	LEU	-	EXPRESSION TAG	UNP Q84CN9
B	408	ALA	-	EXPRESSION TAG	UNP Q84CN9
B	409	ALA	-	EXPRESSION TAG	UNP Q84CN9
B	410	ALA	-	EXPRESSION TAG	UNP Q84CN9
B	411	LEU	-	EXPRESSION TAG	UNP Q84CN9
B	412	GLU	-	EXPRESSION TAG	UNP Q84CN9
B	413	HIS	-	EXPRESSION TAG	UNP Q84CN9
B	414	HIS	-	EXPRESSION TAG	UNP Q84CN9
B	415	HIS	-	EXPRESSION TAG	UNP Q84CN9
B	416	HIS	-	EXPRESSION TAG	UNP Q84CN9
B	417	HIS	-	EXPRESSION TAG	UNP Q84CN9
B	418	HIS	-	EXPRESSION TAG	UNP Q84CN9
C	1	MET	-	EXPRESSION TAG	UNP Q84CN9
C	2	ASP	-	EXPRESSION TAG	UNP Q84CN9
C	3	ILE	-	EXPRESSION TAG	UNP Q84CN9
C	4	GLY	-	EXPRESSION TAG	UNP Q84CN9
C	5	ILE	-	EXPRESSION TAG	UNP Q84CN9

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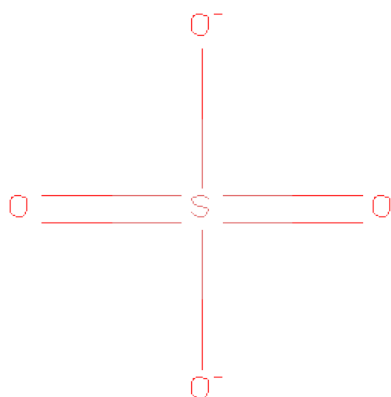
Chain	Residue	Modelled	Actual	Comment	Reference
C	6	ASN	-	EXPRESSION TAG	UNP Q84CN9
C	7	SER	-	EXPRESSION TAG	UNP Q84CN9
C	8	ASP	-	EXPRESSION TAG	UNP Q84CN9
C	9	PRO	-	EXPRESSION TAG	UNP Q84CN9
C	10	PRO	-	EXPRESSION TAG	UNP Q84CN9
C	11	PRO	-	EXPRESSION TAG	UNP Q84CN9
C	12	ARG	-	EXPRESSION TAG	UNP Q84CN9
C	25	ALA	HIS	ENGINEERED MUTATION	UNP Q84CN9
C	123	ALA	VAL	ENGINEERED MUTATION	UNP Q84CN9
C	279	SER	ASN	ENGINEERED MUTATION	UNP Q84CN9
C	397	ALA	THR	ENGINEERED MUTATION	UNP Q84CN9
C	406	LYS	-	EXPRESSION TAG	UNP Q84CN9
C	407	LEU	-	EXPRESSION TAG	UNP Q84CN9
C	408	ALA	-	EXPRESSION TAG	UNP Q84CN9
C	409	ALA	-	EXPRESSION TAG	UNP Q84CN9
C	410	ALA	-	EXPRESSION TAG	UNP Q84CN9
C	411	LEU	-	EXPRESSION TAG	UNP Q84CN9
C	412	GLU	-	EXPRESSION TAG	UNP Q84CN9
C	413	HIS	-	EXPRESSION TAG	UNP Q84CN9
C	414	HIS	-	EXPRESSION TAG	UNP Q84CN9
C	415	HIS	-	EXPRESSION TAG	UNP Q84CN9
C	416	HIS	-	EXPRESSION TAG	UNP Q84CN9
C	417	HIS	-	EXPRESSION TAG	UNP Q84CN9
C	418	HIS	-	EXPRESSION TAG	UNP Q84CN9
D	1	MET	-	EXPRESSION TAG	UNP Q84CN9
D	2	ASP	-	EXPRESSION TAG	UNP Q84CN9
D	3	ILE	-	EXPRESSION TAG	UNP Q84CN9
D	4	GLY	-	EXPRESSION TAG	UNP Q84CN9
D	5	ILE	-	EXPRESSION TAG	UNP Q84CN9
D	6	ASN	-	EXPRESSION TAG	UNP Q84CN9
D	7	SER	-	EXPRESSION TAG	UNP Q84CN9
D	8	ASP	-	EXPRESSION TAG	UNP Q84CN9
D	9	PRO	-	EXPRESSION TAG	UNP Q84CN9
D	10	PRO	-	EXPRESSION TAG	UNP Q84CN9
D	11	PRO	-	EXPRESSION TAG	UNP Q84CN9
D	12	ARG	-	EXPRESSION TAG	UNP Q84CN9
D	25	ALA	HIS	ENGINEERED MUTATION	UNP Q84CN9
D	123	ALA	VAL	ENGINEERED MUTATION	UNP Q84CN9
D	279	SER	ASN	ENGINEERED MUTATION	UNP Q84CN9
D	397	ALA	THR	ENGINEERED MUTATION	UNP Q84CN9
D	406	LYS	-	EXPRESSION TAG	UNP Q84CN9
D	407	LEU	-	EXPRESSION TAG	UNP Q84CN9

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Chain	Residue	Modelled	Actual	Comment	Reference
D	408	ALA	-	EXPRESSION TAG	UNP Q84CN9
D	409	ALA	-	EXPRESSION TAG	UNP Q84CN9
D	410	ALA	-	EXPRESSION TAG	UNP Q84CN9
D	411	LEU	-	EXPRESSION TAG	UNP Q84CN9
D	412	GLU	-	EXPRESSION TAG	UNP Q84CN9
D	413	HIS	-	EXPRESSION TAG	UNP Q84CN9
D	414	HIS	-	EXPRESSION TAG	UNP Q84CN9
D	415	HIS	-	EXPRESSION TAG	UNP Q84CN9
D	416	HIS	-	EXPRESSION TAG	UNP Q84CN9
D	417	HIS	-	EXPRESSION TAG	UNP Q84CN9
D	418	HIS	-	EXPRESSION TAG	UNP Q84CN9

- 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	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		

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

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	71	Total	O	0	0
			71	71		
3	B	65	Total	O	0	0
			65	65		
3	C	39	Total	O	0	0
			39	39		
3	D	51	Total	O	0	0
			51	51		

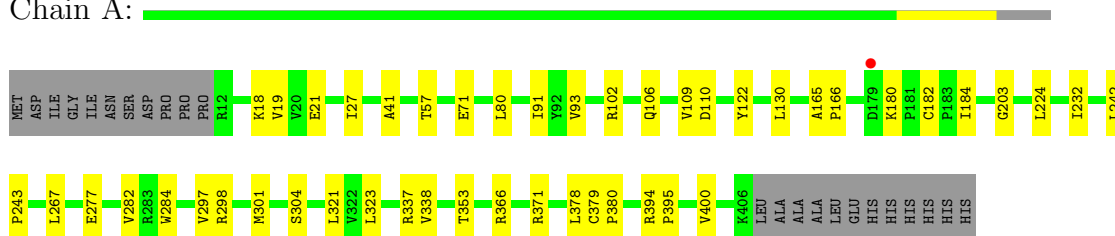


### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

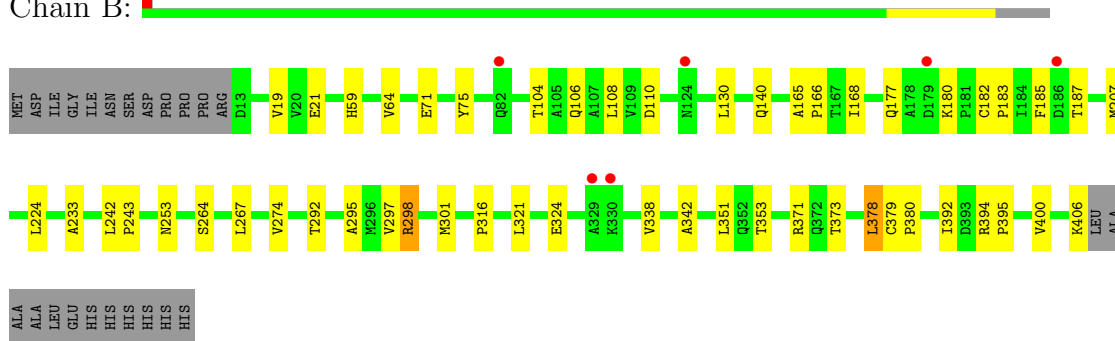
#### • Molecule 1: PHYTASE

Chain A:



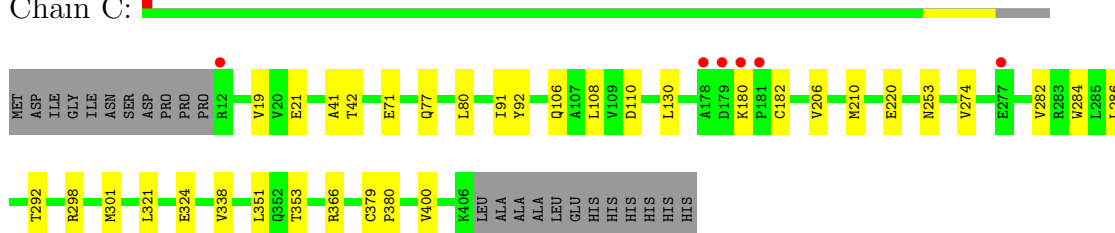
#### • Molecule 1: PHYTASE

Chain B:



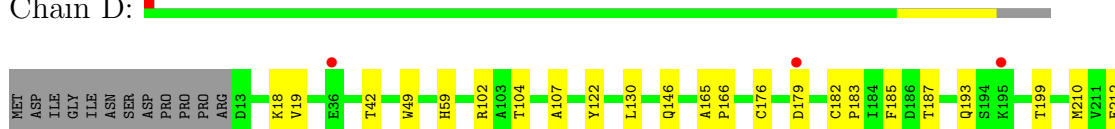
#### • Molecule 1: PHYTASE

Chain C:



#### • Molecule 1: PHYTASE

Chain D:





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	81.71Å 122.93Å 205.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.15 – 2.57 49.12 – 2.57	Depositor EDS
% Data completeness (in resolution range)	99.2 (49.15-2.57) 99.2 (49.12-2.57)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.39 (at 2.58Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, $R_{free}$	0.198 , 0.243 0.216 , 0.256	Depositor DCC
$R_{free}$ test set	3356 reflections (5.35%)	DCC
Wilson B-factor (Å <sup>2</sup> )	22.6	Xtriage
Anisotropy	0.310	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 6.6	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	1 of 66143 reflections (0.002%)	Xtriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	12516	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.90% of the height of the origin peak. No significant pseudotranslation is detected.*

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

## 5 Model quality ⓘ

### 5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.50	0/3125	0.62	0/4254
1	B	0.51	0/3114	0.62	0/4240
1	C	0.48	0/3125	0.62	0/4254
1	D	0.50	0/3114	0.62	0/4240
All	All	0.50	0/12478	0.62	0/16988

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3058	0	3051	22	0
1	B	3047	0	3038	24	0
1	C	3058	0	3051	21	0
1	D	3047	0	3038	23	0
2	A	20	0	0	0	0
2	B	20	0	0	0	0
2	C	15	0	0	0	0
2	D	25	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	71	0	0	1	0
3	B	65	0	0	0	0
3	C	39	0	0	0	0
3	D	51	0	0	0	0
All	All	12516	0	12178	90	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 4.

All (90) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:18:LYS:NZ	1:D:273:GLY:O	2.12	0.81
1:A:130:LEU:HD21	1:A:400:VAL:HG21	1.72	0.72
1:C:41:ALA:HB3	1:C:210:MET:HE3	1.79	0.65
1:D:146:GLN:OE1	1:D:258:THR:OG1	2.12	0.65
1:B:253:ASN:OD1	1:B:292:THR:HG22	1.98	0.63
1:C:42:THR:HG23	1:C:210:MET:CE	2.29	0.62
1:C:42:THR:HG23	1:C:210:MET:HE2	1.81	0.60
1:C:41:ALA:HB3	1:C:210:MET:CE	2.31	0.60
1:B:301:MET:CE	1:B:338:VAL:HG11	2.31	0.60
1:A:41:ALA:HB1	1:A:184:ILE:HB	1.87	0.56
1:C:21:GLU:OE1	1:C:71:GLU:OE2	2.23	0.56
1:B:19:VAL:HG22	1:B:324:GLU:HG2	1.88	0.56
1:B:130:LEU:HD21	1:B:400:VAL:HG21	1.88	0.55
1:C:130:LEU:HD21	1:C:400:VAL:HG21	1.89	0.55
1:C:301:MET:CE	1:C:338:VAL:HG11	2.37	0.54
1:D:301:MET:HE1	1:D:338:VAL:HG11	1.90	0.54
1:D:301:MET:CE	1:D:338:VAL:HG11	2.39	0.53
1:D:165:ALA:HB3	1:D:166:PRO:HD3	1.90	0.52
1:A:323:LEU:HD22	1:A:338:VAL:HG22	1.91	0.52
1:D:193:GLN:HG3	1:D:199:THR:HG22	1.92	0.51
1:C:220:GLU:HG3	1:C:220:GLU:O	2.10	0.51
1:B:301:MET:HE3	1:B:338:VAL:HG11	1.90	0.51
1:B:185:PHE:HA	1:B:207:MET:CE	2.41	0.51
1:D:338:VAL:HB	1:D:365:TRP:HB3	1.93	0.50
1:A:91:ILE:HD12	1:A:284:TRP:CE3	2.45	0.50
1:B:106:GLN:O	1:B:110:ASP:HB2	2.11	0.49
1:B:224:LEU:HD13	1:B:233:ALA:HA	1.94	0.49
1:A:18:LYS:HE3	1:A:282:VAL:O	2.12	0.49
1:A:267:LEU:HD13	1:A:297:VAL:HG13	1.93	0.49
1:B:267:LEU:HD13	1:B:297:VAL:HG13	1.94	0.49
1:A:301:MET:CE	1:A:338:VAL:HG11	2.43	0.49

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:C:41:ALA:CB	1:C:210:MET:HE3	2.43	0.49
1:B:64:VAL:HG21	1:B:104:THR:HG23	1.95	0.49
1:D:19:VAL:HG22	1:D:324:GLU:HG2	1.95	0.49
1:C:41:ALA:HB2	1:C:206:VAL:HG11	1.95	0.48
1:C:253:ASN:OD1	1:C:292:THR:HG22	2.12	0.48
1:A:19:VAL:HG23	1:A:80:LEU:CD2	2.44	0.48
1:B:379:CYS:O	1:B:380:PRO:C	2.52	0.48
1:A:165:ALA:HB3	1:A:166:PRO:HD3	1.95	0.47
1:A:304:SER:HA	3:A:2050:HOH:O	2.14	0.47
1:D:59:HIS:CE1	1:D:351:LEU:HG	2.48	0.47
1:B:19:VAL:HG21	1:B:75:TYR:CZ	2.49	0.47
1:D:242:LEU:N	1:D:243:PRO:CD	2.77	0.47
1:A:102:ARG:HD3	1:A:122:TYR:CG	2.50	0.46
1:D:42:THR:HG23	1:D:210:MET:CE	2.46	0.46
1:B:168:ILE:HG23	1:B:207:MET:HE1	1.97	0.46
1:B:394:ARG:HB2	1:B:395:PRO:HD3	1.98	0.46
1:A:242:LEU:N	1:A:243:PRO:CD	2.79	0.45
1:C:19:VAL:HG22	1:C:324:GLU:HG2	1.97	0.45
1:B:21:GLU:OE1	1:B:71:GLU:OE2	2.34	0.45
1:A:106:GLN:O	1:A:110:ASP:HB2	2.17	0.45
1:B:316:PRO:HG2	1:B:342:ALA:HB1	1.99	0.45
1:B:59:HIS:CE1	1:B:351:LEU:HG	2.51	0.44
1:C:91:ILE:HD12	1:C:284:TRP:CE3	2.53	0.44
1:D:379:CYS:O	1:D:380:PRO:C	2.53	0.44
1:C:379:CYS:O	1:C:380:PRO:C	2.56	0.44
1:D:18:LYS:CE	1:D:282:VAL:O	2.65	0.44
1:A:184:ILE:HD11	1:A:203:GLY:HA2	1.98	0.44
1:C:301:MET:HE1	1:C:338:VAL:HG11	2.00	0.43
1:B:183:PRO:O	1:B:187:THR:HG23	2.18	0.43
1:A:337:ARG:HB2	1:A:378:LEU:HD12	2.01	0.43
1:A:379:CYS:O	1:A:380:PRO:C	2.56	0.43
1:D:49:TRP:N	1:D:49:TRP:CD1	2.86	0.43
1:A:93:VAL:HG21	1:A:109:VAL:HG11	2.00	0.43
1:C:108:LEU:HD13	1:C:286:LEU:HD21	2.01	0.43
1:D:146:GLN:HG2	1:D:199:THR:HG23	2.00	0.43
1:B:242:LEU:N	1:B:243:PRO:CD	2.82	0.43
1:A:323:LEU:CD2	1:A:338:VAL:HG22	2.49	0.43
1:D:339:TYR:CD2	1:D:362:ARG:HD2	2.54	0.43
1:D:183:PRO:O	1:D:187:THR:HG23	2.19	0.42
1:C:41:ALA:CB	1:C:210:MET:CE	2.96	0.42
1:D:102:ARG:HD3	1:D:122:TYR:CG	2.55	0.42
1:A:21:GLU:OE1	1:A:71:GLU:OE2	2.37	0.42

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:301:MET:HB3	1:D:301:MET:HE2	1.84	0.42
1:D:104:THR:O	1:D:107:ALA:HB3	2.19	0.42
1:A:394:ARG:HB2	1:A:395:PRO:HD3	2.01	0.42
1:B:373:THR:HG21	1:B:378:LEU:HD22	2.01	0.42
1:C:19:VAL:HG23	1:C:80:LEU:HD22	2.02	0.41
1:D:130:LEU:HD21	1:D:400:VAL:HG21	2.02	0.41
1:B:295:ALA:O	1:B:298:ARG:HG3	2.20	0.41
1:A:224:LEU:HD22	1:A:232:ILE:O	2.21	0.41
1:C:106:GLN:O	1:C:110:ASP:HB2	2.21	0.41
1:B:165:ALA:N	1:B:166:PRO:CD	2.84	0.41
1:B:64:VAL:CG1	1:B:108:LEU:HG	2.51	0.41
1:C:351:LEU:HD23	1:C:351:LEU:HA	1.93	0.41
1:D:212:GLU:OE1	1:D:245:LEU:HD21	2.22	0.40
1:C:92:TYR:HB2	1:C:282:VAL:HG11	2.03	0.40
1:B:264:SER:HB3	1:B:392:ILE:HG23	2.03	0.40
1:D:176:CYS:SG	1:D:185:PHE:CE1	3.15	0.40
1:A:27:ILE:O	1:A:57:THR:HG23	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	393/418 (94%)	383 (98%)	10 (2%)	0	100	100
1	B	392/418 (94%)	381 (97%)	11 (3%)	0	100	100
1	C	393/418 (94%)	382 (97%)	11 (3%)	0	100	100
1	D	392/418 (94%)	381 (97%)	11 (3%)	0	100	100
All	All	1570/1672 (94%)	1527 (97%)	43 (3%)	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	319/338 (94%)	311 (98%)	8 (2%)	60	85
1	B	318/338 (94%)	307 (96%)	11 (4%)	48	76
1	C	319/338 (94%)	311 (98%)	8 (2%)	60	85
1	D	318/338 (94%)	308 (97%)	10 (3%)	52	80
All	All	1274/1352 (94%)	1237 (97%)	37 (3%)	55	82

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	180	LYS
1	A	182	CYS
1	A	277	GLU
1	A	298	ARG
1	A	321	LEU
1	A	353	THR
1	A	366	ARG
1	A	371	ARG
1	B	140	GLN
1	B	177	GLN
1	B	180	LYS
1	B	182	CYS
1	B	274	VAL
1	B	298	ARG
1	B	321	LEU
1	B	353	THR
1	B	371	ARG
1	B	378	LEU
1	B	406	LYS
1	C	77	GLN
1	C	180	LYS
1	C	182	CYS
1	C	274	VAL
1	C	298	ARG
1	C	321	LEU
1	C	353	THR

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Mol	Chain	Res	Type
1	C	366	ARG
1	D	179	ASP
1	D	182	CYS
1	D	298	ARG
1	D	321	LEU
1	D	330	LYS
1	D	353	THR
1	D	366	ARG
1	D	371	ARG
1	D	390	GLN
1	D	400	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	34	ASN
1	A	73	GLN
1	A	106	GLN
1	A	209	ASN
1	A	248	ASN
1	A	302	ASN
1	B	34	ASN
1	B	73	GLN
1	B	82	GLN
1	B	106	GLN
1	B	169	GLN
1	B	173	GLN
1	B	209	ASN
1	B	248	ASN
1	B	302	ASN
1	C	34	ASN
1	C	73	GLN
1	C	106	GLN
1	C	209	ASN
1	C	248	ASN
1	C	358	HIS
1	D	15	GLN
1	D	34	ASN
1	D	52	HIS
1	D	73	GLN
1	D	106	GLN
1	D	169	GLN

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Mol	Chain	Res	Type
1	D	173	GLN
1	D	193	GLN
1	D	209	ASN
1	D	302	ASN

### 5.3.3 RNA ⓘ

There are no RNA chains in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

16 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	A	1407	-	4,4,4	0.15	0	6,6,6	0.47	0
2	SO4	A	1408	-	4,4,4	0.58	0	6,6,6	0.38	0
2	SO4	A	1409	-	4,4,4	0.18	0	6,6,6	0.24	0
2	SO4	A	1410	-	4,4,4	0.29	0	6,6,6	0.20	0
2	SO4	B	1407	-	4,4,4	0.11	0	6,6,6	0.33	0
2	SO4	B	1408	-	4,4,4	0.16	0	6,6,6	0.23	0
2	SO4	B	1409	-	4,4,4	0.38	0	6,6,6	0.35	0
2	SO4	B	1410	-	4,4,4	0.32	0	6,6,6	0.48	0
2	SO4	C	1407	-	4,4,4	0.14	0	6,6,6	0.42	0
2	SO4	C	1408	-	4,4,4	0.15	0	6,6,6	0.21	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	SO4	C	1409	-	4,4,4	0.49	0	6,6,6	0.24	0
2	SO4	D	1407	-	4,4,4	0.05	0	6,6,6	0.32	0
2	SO4	D	1408	-	4,4,4	0.14	0	6,6,6	0.16	0
2	SO4	D	1409	-	4,4,4	0.54	0	6,6,6	0.12	0
2	SO4	D	1410	-	4,4,4	0.36	0	6,6,6	0.52	0
2	SO4	D	1411	-	4,4,4	0.20	0	6,6,6	0.35	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
2	SO4	A	1407	-	-	0/0/0/0	0/0/0/0
2	SO4	A	1408	-	-	0/0/0/0	0/0/0/0
2	SO4	A	1409	-	-	0/0/0/0	0/0/0/0
2	SO4	A	1410	-	-	0/0/0/0	0/0/0/0
2	SO4	B	1407	-	-	0/0/0/0	0/0/0/0
2	SO4	B	1408	-	-	0/0/0/0	0/0/0/0
2	SO4	B	1409	-	-	0/0/0/0	0/0/0/0
2	SO4	B	1410	-	-	0/0/0/0	0/0/0/0
2	SO4	C	1407	-	-	0/0/0/0	0/0/0/0
2	SO4	C	1408	-	-	0/0/0/0	0/0/0/0
2	SO4	C	1409	-	-	0/0/0/0	0/0/0/0
2	SO4	D	1407	-	-	0/0/0/0	0/0/0/0
2	SO4	D	1408	-	-	0/0/0/0	0/0/0/0
2	SO4	D	1409	-	-	0/0/0/0	0/0/0/0
2	SO4	D	1410	-	-	0/0/0/0	0/0/0/0
2	SO4	D	1411	-	-	0/0/0/0	0/0/0/0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data ⓘ

### 6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	395/418 (94%)	-0.16	1 (0%) 91 93	19, 26, 41, 50	0
1	B	394/418 (94%)	-0.07	6 (1%) 70 71	20, 25, 41, 53	0
1	C	395/418 (94%)	-0.07	6 (1%) 70 71	21, 29, 45, 51	0
1	D	394/418 (94%)	-0.14	5 (1%) 74 75	19, 27, 41, 46	0
All	All	1578/1672 (94%)	-0.11	18 (1%) 77 79	19, 27, 42, 53	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	179	ASP	4.2
1	A	179	ASP	3.8
1	C	178	ALA	3.3
1	D	195	LYS	3.2
1	B	330	LYS	3.0
1	B	186	ASP	2.9
1	B	329	ALA	2.8
1	D	330	LYS	2.8
1	D	329	ALA	2.8
1	C	180	LYS	2.3
1	C	277	GLU	2.3
1	B	179	ASP	2.3
1	C	181	PRO	2.3
1	C	12	ARG	2.3
1	D	179	ASP	2.2
1	B	82	GLN	2.2
1	D	36	GLU	2.2
1	B	124	ASN	2.0

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

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

## 6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 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	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	SO4	A	1407	5/5	0.29	9.22	40,41,44,46	5
2	SO4	A	1409	5/5	0.25	6.98	45,47,48,49	5
2	SO4	B	1408	5/5	0.25	6.34	44,44,45,47	5
2	SO4	C	1407	5/5	0.25	5.13	50,51,55,55	5
2	SO4	D	1407	5/5	0.22	3.81	59,60,62,63	0
2	SO4	B	1409	5/5	0.17	2.95	27,29,31,32	0
2	SO4	B	1407	5/5	0.20	2.47	69,70,71,72	0
2	SO4	C	1409	5/5	0.16	1.81	35,36,37,38	0
2	SO4	D	1408	5/5	0.15	1.37	49,52,53,53	5
2	SO4	C	1408	5/5	0.15	1.17	48,48,52,52	5
2	SO4	A	1408	5/5	0.16	1.03	28,29,31,32	0
2	SO4	D	1409	5/5	0.16	0.95	34,34,35,36	0
2	SO4	D	1411	5/5	0.14	0.24	34,36,39,41	0
2	SO4	D	1410	5/5	0.14	-0.14	28,29,33,34	0
2	SO4	A	1410	5/5	0.12	-0.40	32,32,33,37	0
2	SO4	B	1410	5/5	0.12	-0.74	24,28,30,33	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.