



# Full wwPDB X-ray Structure Validation Report ⓘ

May 14, 2020 – 04:13 am BST

PDB ID : 6ITX  
Title : Structure of the C-terminal head domain of the avian adenovirus EDSV fiber  
Authors : Wei, Q.; Song, Y.  
Deposited on : 2018-11-26  
Resolution : 2.75 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](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

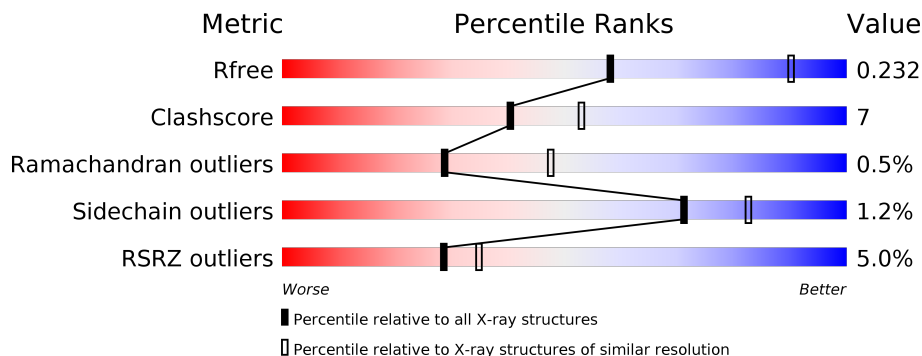
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.75 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	1235 (2.78-2.74)
Clashscore	141614	1277 (2.78-2.74)
Ramachandran outliers	138981	1257 (2.78-2.74)
Sidechain outliers	138945	1257 (2.78-2.74)
RSRZ outliers	127900	1207 (2.78-2.74)

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	301	<div style="display: flex; align-items: center;"> <div style="width: 3%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 61%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 11%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 27%; height: 10px; background-color: grey;"></div> </div> <p style="font-size: small; margin-top: 5px;">3% 61% 11% 27%</p>
1	B	301	<div style="display: flex; align-items: center;"> <div style="width: 3%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 62%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 9%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 28%; height: 10px; background-color: grey;"></div> </div> <p style="font-size: small; margin-top: 5px;">3% 62% 9% 28%</p>
1	C	301	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 60%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 11%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 28%; height: 10px; background-color: grey;"></div> </div> <p style="font-size: small; margin-top: 5px;">2% 60% 11% 28%</p>
1	D	301	<div style="display: flex; align-items: center;"> <div style="width: 5%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 62%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 12%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 26%; height: 10px; background-color: grey;"></div> </div> <p style="font-size: small; margin-top: 5px;">5% 62% 12% 26%</p>
1	E	301	<div style="display: flex; align-items: center;"> <div style="width: 4%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 54%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 17%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 28%; height: 10px; background-color: grey;"></div> </div> <p style="font-size: small; margin-top: 5px;">4% 54% 17% 28%</p>
1	F	301	<div style="display: flex; align-items: center;"> <div style="width: 5%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 61%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 11%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 27%; height: 10px; background-color: grey;"></div> </div> <p style="font-size: small; margin-top: 5px;">5% 61% 11% 27%</p>

## 2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 10245 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 Fiber protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	219	Total 1656	C 1068	N 269	O 311	S 8	0	0	0
1	B	216	Total 1632	C 1050	N 265	O 309	S 8	0	0	0
1	D	223	Total 1684	C 1083	N 274	O 319	S 8	0	0	0
1	C	217	Total 1641	C 1056	N 267	O 310	S 8	0	0	0
1	E	217	Total 1641	C 1056	N 267	O 310	S 8	0	0	0
1	F	221	Total 1666	C 1073	N 271	O 314	S 8	0	0	0

There are 204 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	expression tag	UNP S4TZM6
A	2	GLY	-	expression tag	UNP S4TZM6
A	3	SER	-	expression tag	UNP S4TZM6
A	4	SER	-	expression tag	UNP S4TZM6
A	5	HIS	-	expression tag	UNP S4TZM6
A	6	HIS	-	expression tag	UNP S4TZM6
A	7	HIS	-	expression tag	UNP S4TZM6
A	8	HIS	-	expression tag	UNP S4TZM6
A	9	HIS	-	expression tag	UNP S4TZM6
A	10	HIS	-	expression tag	UNP S4TZM6
A	11	SER	-	expression tag	UNP S4TZM6
A	12	SER	-	expression tag	UNP S4TZM6
A	13	GLY	-	expression tag	UNP S4TZM6
A	14	LEU	-	expression tag	UNP S4TZM6
A	15	VAL	-	expression tag	UNP S4TZM6
A	16	PRO	-	expression tag	UNP S4TZM6
A	17	ARG	-	expression tag	UNP S4TZM6

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Chain	Residue	Modelled	Actual	Comment	Reference
A	18	GLY	-	expression tag	UNP S4TZM6
A	19	SER	-	expression tag	UNP S4TZM6
A	20	HIS	-	expression tag	UNP S4TZM6
A	21	MET	-	expression tag	UNP S4TZM6
A	22	ALA	-	expression tag	UNP S4TZM6
A	23	SER	-	expression tag	UNP S4TZM6
A	24	MET	-	expression tag	UNP S4TZM6
A	25	THR	-	expression tag	UNP S4TZM6
A	26	GLY	-	expression tag	UNP S4TZM6
A	27	GLY	-	expression tag	UNP S4TZM6
A	28	GLN	-	expression tag	UNP S4TZM6
A	29	GLN	-	expression tag	UNP S4TZM6
A	30	MET	-	expression tag	UNP S4TZM6
A	31	GLY	-	expression tag	UNP S4TZM6
A	32	ARG	-	expression tag	UNP S4TZM6
A	33	GLY	-	expression tag	UNP S4TZM6
A	34	SER	-	expression tag	UNP S4TZM6
B	1	MET	-	expression tag	UNP S4TZM6
B	2	GLY	-	expression tag	UNP S4TZM6
B	3	SER	-	expression tag	UNP S4TZM6
B	4	SER	-	expression tag	UNP S4TZM6
B	5	HIS	-	expression tag	UNP S4TZM6
B	6	HIS	-	expression tag	UNP S4TZM6
B	7	HIS	-	expression tag	UNP S4TZM6
B	8	HIS	-	expression tag	UNP S4TZM6
B	9	HIS	-	expression tag	UNP S4TZM6
B	10	HIS	-	expression tag	UNP S4TZM6
B	11	SER	-	expression tag	UNP S4TZM6
B	12	SER	-	expression tag	UNP S4TZM6
B	13	GLY	-	expression tag	UNP S4TZM6
B	14	LEU	-	expression tag	UNP S4TZM6
B	15	VAL	-	expression tag	UNP S4TZM6
B	16	PRO	-	expression tag	UNP S4TZM6
B	17	ARG	-	expression tag	UNP S4TZM6
B	18	GLY	-	expression tag	UNP S4TZM6
B	19	SER	-	expression tag	UNP S4TZM6
B	20	HIS	-	expression tag	UNP S4TZM6
B	21	MET	-	expression tag	UNP S4TZM6
B	22	ALA	-	expression tag	UNP S4TZM6
B	23	SER	-	expression tag	UNP S4TZM6
B	24	MET	-	expression tag	UNP S4TZM6
B	25	THR	-	expression tag	UNP S4TZM6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	26	GLY	-	expression tag	UNP S4TZM6
B	27	GLY	-	expression tag	UNP S4TZM6
B	28	GLN	-	expression tag	UNP S4TZM6
B	29	GLN	-	expression tag	UNP S4TZM6
B	30	MET	-	expression tag	UNP S4TZM6
B	31	GLY	-	expression tag	UNP S4TZM6
B	32	ARG	-	expression tag	UNP S4TZM6
B	33	GLY	-	expression tag	UNP S4TZM6
B	34	SER	-	expression tag	UNP S4TZM6
D	1	MET	-	expression tag	UNP S4TZM6
D	2	GLY	-	expression tag	UNP S4TZM6
D	3	SER	-	expression tag	UNP S4TZM6
D	4	SER	-	expression tag	UNP S4TZM6
D	5	HIS	-	expression tag	UNP S4TZM6
D	6	HIS	-	expression tag	UNP S4TZM6
D	7	HIS	-	expression tag	UNP S4TZM6
D	8	HIS	-	expression tag	UNP S4TZM6
D	9	HIS	-	expression tag	UNP S4TZM6
D	10	HIS	-	expression tag	UNP S4TZM6
D	11	SER	-	expression tag	UNP S4TZM6
D	12	SER	-	expression tag	UNP S4TZM6
D	13	GLY	-	expression tag	UNP S4TZM6
D	14	LEU	-	expression tag	UNP S4TZM6
D	15	VAL	-	expression tag	UNP S4TZM6
D	16	PRO	-	expression tag	UNP S4TZM6
D	17	ARG	-	expression tag	UNP S4TZM6
D	18	GLY	-	expression tag	UNP S4TZM6
D	19	SER	-	expression tag	UNP S4TZM6
D	20	HIS	-	expression tag	UNP S4TZM6
D	21	MET	-	expression tag	UNP S4TZM6
D	22	ALA	-	expression tag	UNP S4TZM6
D	23	SER	-	expression tag	UNP S4TZM6
D	24	MET	-	expression tag	UNP S4TZM6
D	25	THR	-	expression tag	UNP S4TZM6
D	26	GLY	-	expression tag	UNP S4TZM6
D	27	GLY	-	expression tag	UNP S4TZM6
D	28	GLN	-	expression tag	UNP S4TZM6
D	29	GLN	-	expression tag	UNP S4TZM6
D	30	MET	-	expression tag	UNP S4TZM6
D	31	GLY	-	expression tag	UNP S4TZM6
D	32	ARG	-	expression tag	UNP S4TZM6
D	33	GLY	-	expression tag	UNP S4TZM6

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Chain	Residue	Modelled	Actual	Comment	Reference
D	34	SER	-	expression tag	UNP S4TZM6
C	1	MET	-	expression tag	UNP S4TZM6
C	2	GLY	-	expression tag	UNP S4TZM6
C	3	SER	-	expression tag	UNP S4TZM6
C	4	SER	-	expression tag	UNP S4TZM6
C	5	HIS	-	expression tag	UNP S4TZM6
C	6	HIS	-	expression tag	UNP S4TZM6
C	7	HIS	-	expression tag	UNP S4TZM6
C	8	HIS	-	expression tag	UNP S4TZM6
C	9	HIS	-	expression tag	UNP S4TZM6
C	10	HIS	-	expression tag	UNP S4TZM6
C	11	SER	-	expression tag	UNP S4TZM6
C	12	SER	-	expression tag	UNP S4TZM6
C	13	GLY	-	expression tag	UNP S4TZM6
C	14	LEU	-	expression tag	UNP S4TZM6
C	15	VAL	-	expression tag	UNP S4TZM6
C	16	PRO	-	expression tag	UNP S4TZM6
C	17	ARG	-	expression tag	UNP S4TZM6
C	18	GLY	-	expression tag	UNP S4TZM6
C	19	SER	-	expression tag	UNP S4TZM6
C	20	HIS	-	expression tag	UNP S4TZM6
C	21	MET	-	expression tag	UNP S4TZM6
C	22	ALA	-	expression tag	UNP S4TZM6
C	23	SER	-	expression tag	UNP S4TZM6
C	24	MET	-	expression tag	UNP S4TZM6
C	25	THR	-	expression tag	UNP S4TZM6
C	26	GLY	-	expression tag	UNP S4TZM6
C	27	GLY	-	expression tag	UNP S4TZM6
C	28	GLN	-	expression tag	UNP S4TZM6
C	29	GLN	-	expression tag	UNP S4TZM6
C	30	MET	-	expression tag	UNP S4TZM6
C	31	GLY	-	expression tag	UNP S4TZM6
C	32	ARG	-	expression tag	UNP S4TZM6
C	33	GLY	-	expression tag	UNP S4TZM6
C	34	SER	-	expression tag	UNP S4TZM6
E	1	MET	-	expression tag	UNP S4TZM6
E	2	GLY	-	expression tag	UNP S4TZM6
E	3	SER	-	expression tag	UNP S4TZM6
E	4	SER	-	expression tag	UNP S4TZM6
E	5	HIS	-	expression tag	UNP S4TZM6
E	6	HIS	-	expression tag	UNP S4TZM6
E	7	HIS	-	expression tag	UNP S4TZM6

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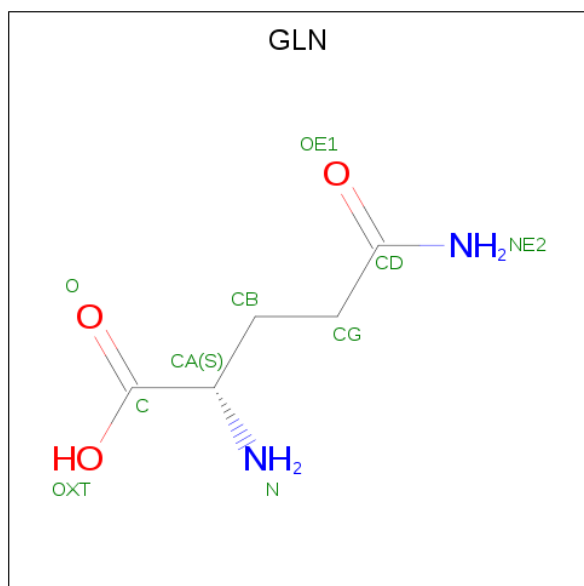
Chain	Residue	Modelled	Actual	Comment	Reference
E	8	HIS	-	expression tag	UNP S4TZM6
E	9	HIS	-	expression tag	UNP S4TZM6
E	10	HIS	-	expression tag	UNP S4TZM6
E	11	SER	-	expression tag	UNP S4TZM6
E	12	SER	-	expression tag	UNP S4TZM6
E	13	GLY	-	expression tag	UNP S4TZM6
E	14	LEU	-	expression tag	UNP S4TZM6
E	15	VAL	-	expression tag	UNP S4TZM6
E	16	PRO	-	expression tag	UNP S4TZM6
E	17	ARG	-	expression tag	UNP S4TZM6
E	18	GLY	-	expression tag	UNP S4TZM6
E	19	SER	-	expression tag	UNP S4TZM6
E	20	HIS	-	expression tag	UNP S4TZM6
E	21	MET	-	expression tag	UNP S4TZM6
E	22	ALA	-	expression tag	UNP S4TZM6
E	23	SER	-	expression tag	UNP S4TZM6
E	24	MET	-	expression tag	UNP S4TZM6
E	25	THR	-	expression tag	UNP S4TZM6
E	26	GLY	-	expression tag	UNP S4TZM6
E	27	GLY	-	expression tag	UNP S4TZM6
E	28	GLN	-	expression tag	UNP S4TZM6
E	29	GLN	-	expression tag	UNP S4TZM6
E	30	MET	-	expression tag	UNP S4TZM6
E	31	GLY	-	expression tag	UNP S4TZM6
E	32	ARG	-	expression tag	UNP S4TZM6
E	33	GLY	-	expression tag	UNP S4TZM6
E	34	SER	-	expression tag	UNP S4TZM6
F	1	MET	-	expression tag	UNP S4TZM6
F	2	GLY	-	expression tag	UNP S4TZM6
F	3	SER	-	expression tag	UNP S4TZM6
F	4	SER	-	expression tag	UNP S4TZM6
F	5	HIS	-	expression tag	UNP S4TZM6
F	6	HIS	-	expression tag	UNP S4TZM6
F	7	HIS	-	expression tag	UNP S4TZM6
F	8	HIS	-	expression tag	UNP S4TZM6
F	9	HIS	-	expression tag	UNP S4TZM6
F	10	HIS	-	expression tag	UNP S4TZM6
F	11	SER	-	expression tag	UNP S4TZM6
F	12	SER	-	expression tag	UNP S4TZM6
F	13	GLY	-	expression tag	UNP S4TZM6
F	14	LEU	-	expression tag	UNP S4TZM6
F	15	VAL	-	expression tag	UNP S4TZM6

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Chain	Residue	Modelled	Actual	Comment	Reference
F	16	PRO	-	expression tag	UNP S4TZM6
F	17	ARG	-	expression tag	UNP S4TZM6
F	18	GLY	-	expression tag	UNP S4TZM6
F	19	SER	-	expression tag	UNP S4TZM6
F	20	HIS	-	expression tag	UNP S4TZM6
F	21	MET	-	expression tag	UNP S4TZM6
F	22	ALA	-	expression tag	UNP S4TZM6
F	23	SER	-	expression tag	UNP S4TZM6
F	24	MET	-	expression tag	UNP S4TZM6
F	25	THR	-	expression tag	UNP S4TZM6
F	26	GLY	-	expression tag	UNP S4TZM6
F	27	GLY	-	expression tag	UNP S4TZM6
F	28	GLN	-	expression tag	UNP S4TZM6
F	29	GLN	-	expression tag	UNP S4TZM6
F	30	MET	-	expression tag	UNP S4TZM6
F	31	GLY	-	expression tag	UNP S4TZM6
F	32	ARG	-	expression tag	UNP S4TZM6
F	33	GLY	-	expression tag	UNP S4TZM6
F	34	SER	-	expression tag	UNP S4TZM6

- Molecule 2 is GLUTAMINE (three-letter code: GLN) (formula: C<sub>5</sub>H<sub>10</sub>N<sub>2</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
2	A	1	Total	C	N	O	0	0
			9	5	2	2		
2	B	1	Total	C	N	O	0	0
			9	5	2	2		

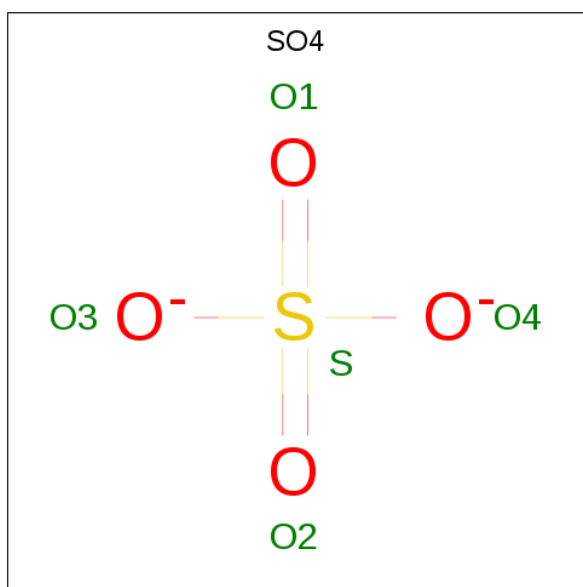
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	D	1	Total	C	N	O	0	0
			9	5	2	2		
2	E	1	Total	C	N	O	0	0
			9	5	2	2		
2	F	1	Total	C	N	O	0	0
			9	5	2	2		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



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

- Molecule 4 is water.

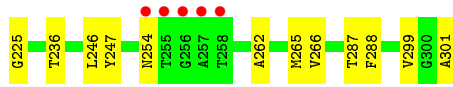
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	53	Total	O	0	0
			53	53		

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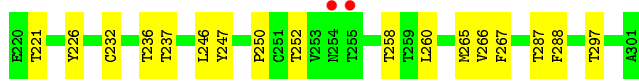
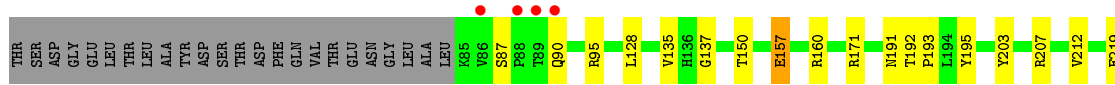
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
4	B	58	Total 58	O 58	0	0
4	D	40	Total 40	O 40	0	0
4	C	61	Total 61	O 61	0	0
4	E	25	Total 25	O 25	0	0
4	F	18	Total 18	O 18	0	0

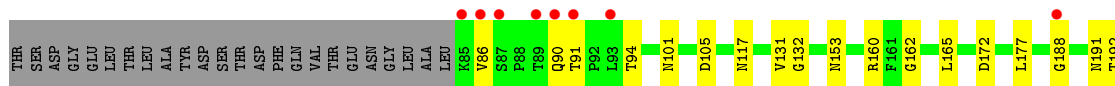




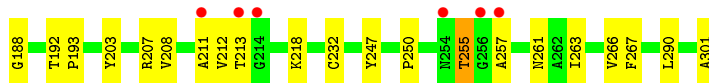
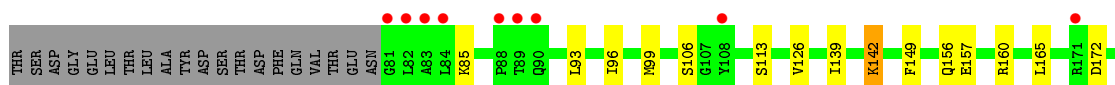
• Molecule 1: Fiber protein



• Molecule 1: Fiber protein



• Molecule 1: Fiber protein



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	105.52Å 63.24Å 165.81Å 90.00° 93.54° 90.00°	Depositor
Resolution (Å)	29.88 – 2.75 29.88 – 2.74	Depositor EDS
% Data completeness (in resolution range)	98.3 (29.88-2.75) 98.4 (29.88-2.74)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.63 (at 2.72Å)	Xtrriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, $R_{free}$	0.192 , 0.232 0.192 , 0.232	Depositor DCC
$R_{free}$ test set	2903 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	46.8	Xtrriage
Anisotropy	0.114	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 49.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	10245	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	46.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 22.70 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 5.3989e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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: 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	0.48	0/1704	0.65	1/2335 (0.0%)
1	B	0.47	0/1681	0.63	1/2306 (0.0%)
1	C	0.47	0/1690	0.63	2/2317 (0.1%)
1	D	0.46	0/1732	0.61	1/2373 (0.0%)
1	E	0.41	0/1690	0.58	1/2317 (0.0%)
1	F	0.40	0/1715	0.59	0/2351
All	All	0.45	0/10212	0.61	6/13999 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	237	THR	C-N-CA	-8.29	104.90	122.30
1	C	237	THR	C-N-CA	-5.85	110.01	122.30
1	D	157	GLU	C-N-CA	-5.79	107.22	121.70
1	B	237	THR	C-N-CA	-5.75	110.23	122.30
1	E	237	THR	C-N-CA	-5.08	111.62	122.30
1	C	157	GLU	C-N-CA	-5.01	109.18	121.70

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	89	THR	Peptide

## 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	1656	0	1607	22	0
1	B	1632	0	1573	20	0
1	C	1641	0	1586	23	0
1	D	1684	0	1629	24	0
1	E	1641	0	1586	41	0
1	F	1666	0	1616	24	0
2	A	9	0	7	1	0
2	B	9	0	7	1	0
2	D	9	0	7	1	0
2	E	9	0	7	2	0
2	F	9	0	7	1	0
3	A	5	0	0	0	0
3	C	5	0	0	0	0
3	D	15	0	0	0	0
4	A	53	0	0	3	0
4	B	58	0	0	1	0
4	C	61	0	0	1	0
4	D	40	0	0	2	0
4	E	25	0	0	3	0
4	F	18	0	0	1	0
All	All	10245	0	9632	142	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 (142) 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:D:79:GLU:HG2	1:D:85:LYS:HD3	1.51	0.93
1:E:165:LEU:HB2	1:E:263:ILE:HB	1.66	0.77
1:D:301:ALA:OXT	2:D:401:GLN:N	2.19	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:301:ALA:OXT	2:E:401:GLN:N	2.20	0.75
1:B:87:SER:H	1:B:88:PRO:HD3	1.54	0.72
1:D:189:ASP:OD2	1:D:190:SER:N	2.23	0.72
1:E:172:ASP:OD1	4:E:501:HOH:O	2.08	0.71
1:F:255:THR:HG22	1:F:257:ALA:H	1.55	0.71
1:D:78:THR:OG1	4:D:501:HOH:O	2.14	0.66
1:A:301:ALA:OXT	2:A:401:GLN:N	2.29	0.65
1:A:101:ASN:HD22	1:A:106:SER:HB3	1.61	0.65
1:C:171:ARG:NH1	1:C:191:ASN:OD1	2.30	0.64
1:E:94:THR:HG23	1:E:131:VAL:HG12	1.79	0.64
1:C:236:THR:HG23	1:C:288:PHE:H	1.64	0.62
1:F:301:ALA:OXT	2:F:401:GLN:N	2.33	0.61
1:E:90:GLN:OE1	1:F:188:GLY:N	2.33	0.61
1:E:91:THR:HA	1:F:93:LEU:HD11	1.83	0.60
1:D:106:SER:OG	1:D:107:GLY:N	2.33	0.60
1:E:214:GLY:O	4:E:502:HOH:O	2.16	0.59
1:E:212:VAL:HG21	1:E:255:THR:H	1.67	0.59
1:F:255:THR:CG2	1:F:257:ALA:H	2.16	0.59
1:D:247:TYR:HB2	1:D:266:VAL:HG13	1.85	0.58
1:A:83:ALA:HA	1:A:88:PRO:HD3	1.86	0.57
1:D:84:LEU:HD22	1:D:85:LYS:H	1.68	0.57
1:E:117:ASN:HA	1:E:215:ASN:ND2	2.20	0.57
1:E:208:VAL:HG22	1:E:224:PRO:HD2	1.86	0.57
1:D:236:THR:HG23	1:D:288:PHE:H	1.67	0.57
1:E:188:GLY:HA3	1:E:192:THR:HG21	1.87	0.57
1:C:150:THR:HG22	4:C:504:HOH:O	2.04	0.57
1:E:172:ASP:OD2	1:E:258:THR:OG1	2.24	0.56
1:E:212:VAL:HG21	1:E:255:THR:OG1	2.06	0.56
1:E:208:VAL:HG22	1:E:224:PRO:CD	2.36	0.56
1:D:165:LEU:O	1:D:262:ALA:HB1	2.05	0.55
1:F:188:GLY:HA3	1:F:192:THR:HG21	1.88	0.55
1:D:246:LEU:HD11	1:D:265:MET:HB3	1.89	0.55
1:F:172:ASP:OD1	1:F:255:THR:HG21	2.07	0.55
1:F:247:TYR:HB2	1:F:266:VAL:HG13	1.88	0.55
1:B:247:TYR:HB2	1:B:266:VAL:HG13	1.87	0.54
1:E:201:ILE:O	1:E:204:THR:HG23	2.07	0.54
1:A:131:VAL:HG13	4:A:508:HOH:O	2.08	0.53
1:A:177:LEU:HD11	1:A:253:VAL:HG11	1.89	0.53
1:A:128:LEU:HD23	1:A:137:GLY:HA3	1.91	0.53
1:C:236:THR:HG21	1:C:287:THR:HA	1.91	0.53
1:F:126:VAL:HG11	1:F:165:LEU:HD13	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:87:SER:N	1:B:88:PRO:HD3	2.24	0.52
1:C:236:THR:HG22	1:C:288:PHE:CD1	2.45	0.52
1:E:86:VAL:HG13	1:E:86:VAL:O	2.09	0.51
1:D:95:ARG:HH21	1:D:192:THR:HG22	1.75	0.51
1:E:153:ASN:HA	1:E:277:ASN:ND2	2.26	0.51
1:B:203:TYR:O	1:B:207:ARG:HG2	2.09	0.51
1:B:301:ALA:OXT	2:B:401:GLN:N	2.44	0.50
1:C:203:TYR:CD1	1:C:250:PRO:HG2	2.46	0.50
1:A:90:GLN:NE2	4:A:501:HOH:O	2.36	0.50
1:E:203:TYR:O	1:E:207:ARG:HG2	2.11	0.50
1:E:198:ALA:HB3	1:E:261:ASN:HB3	1.94	0.50
1:A:117:ASN:HD22	1:A:215:ASN:HB3	1.77	0.50
1:E:212:VAL:CG2	1:E:255:THR:H	2.24	0.50
1:A:93:LEU:HD23	1:A:95:ARG:CZ	2.44	0.48
1:E:231:PHE:O	1:E:244:GLY:N	2.46	0.48
1:D:89:THR:HG23	4:D:517:HOH:O	2.13	0.48
1:C:247:TYR:HB2	1:C:266:VAL:HG13	1.95	0.47
1:E:212:VAL:HG23	1:E:254:ASN:HB3	1.96	0.47
1:D:82:LEU:HB3	1:F:85:LYS:HD2	1.95	0.47
1:D:199:ASN:HB2	1:D:299:VAL:HG12	1.95	0.47
1:D:79:GLU:CG	1:D:85:LYS:HD3	2.35	0.47
1:C:128:LEU:HD23	1:C:137:GLY:HA3	1.97	0.47
1:E:226:TYR:CZ	1:F:232:CYS:HB2	2.49	0.47
1:B:90:GLN:O	4:B:501:HOH:O	2.19	0.47
1:D:89:THR:C	1:D:91:THR:H	2.17	0.47
1:A:117:ASN:ND2	1:A:215:ASN:HB3	2.29	0.47
1:E:192:THR:N	1:E:193:PRO:HD2	2.31	0.46
1:D:225:GLY:HA2	1:E:232:CYS:O	2.14	0.46
1:F:211:ALA:C	1:F:213:THR:H	2.19	0.46
1:A:167:PRO:O	1:A:193:PRO:HB3	2.16	0.46
1:F:142:LYS:NZ	4:F:503:HOH:O	2.47	0.46
1:F:207:ARG:NH2	1:F:261:ASN:OD1	2.48	0.46
1:A:232:CYS:HB2	1:C:226:TYR:CZ	2.51	0.46
1:E:101:ASN:ND2	1:E:105:ASP:OD1	2.43	0.46
1:A:154:SER:HB2	1:A:159:ILE:HG13	1.97	0.46
1:B:175:ALA:HA	1:B:253:VAL:HG21	1.98	0.46
1:A:203:TYR:CD1	1:A:250:PRO:HG2	2.52	0.45
1:E:91:THR:HA	1:F:93:LEU:CD1	2.47	0.45
1:D:84:LEU:HD11	1:D:86:VAL:HB	1.98	0.45
1:F:192:THR:N	1:F:193:PRO:HD2	2.31	0.45
1:E:208:VAL:HG21	1:E:223:LEU:HD22	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:195:TYR:HA	1:D:301:ALA:HB3	1.99	0.45
1:A:91:THR:HG22	1:B:93:LEU:HD21	1.99	0.45
1:E:257:ALA:HA	4:E:518:HOH:O	2.15	0.45
1:C:258:THR:HB	1:C:260:LEU:HG	2.00	0.44
1:E:212:VAL:CG2	1:E:254:ASN:HB3	2.47	0.44
1:C:207:ARG:NH2	1:C:252:THR:HG21	2.32	0.44
1:E:117:ASN:ND2	1:E:215:ASN:OD1	2.39	0.44
1:B:247:TYR:HB2	1:B:266:VAL:CG1	2.47	0.44
1:D:224:PRO:C	1:E:234:THR:HB	2.38	0.44
1:B:128:LEU:HD23	1:B:137:GLY:HA3	1.99	0.44
1:C:87:SER:OG	1:C:90:GLN:HG3	2.17	0.44
1:B:93:LEU:HD12	1:B:95:ARG:HG2	1.98	0.44
1:C:192:THR:N	1:C:193:PRO:HD2	2.32	0.43
1:C:95:ARG:HD2	1:C:195:TYR:HD2	1.83	0.43
1:A:117:ASN:ND2	4:A:506:HOH:O	2.51	0.43
1:B:111:PHE:HB3	1:B:178:SER:HA	2.01	0.43
1:E:247:TYR:HB2	1:E:266:VAL:HG13	2.00	0.43
1:E:301:ALA:O	2:E:401:GLN:HG3	2.18	0.43
1:F:157:GLU:HG3	1:F:157:GLU:H	1.59	0.43
1:B:87:SER:N	1:B:88:PRO:CD	2.82	0.43
1:F:126:VAL:HG22	1:F:139:ILE:HD12	2.01	0.43
1:B:129:THR:O	1:B:135:VAL:HA	2.19	0.42
1:C:236:THR:HG22	1:C:288:PHE:CE1	2.54	0.42
1:D:236:THR:HG21	1:D:287:THR:HA	2.00	0.42
1:C:246:LEU:HD21	1:C:265:MET:HE2	2.01	0.42
1:E:160:ARG:HA	1:E:267:PHE:O	2.19	0.42
1:B:209:ASN:HA	1:B:252:THR:HG22	2.00	0.42
1:E:132:GLY:HA2	1:F:96:ILE:HD11	2.01	0.42
1:C:171:ARG:HG3	1:C:171:ARG:HH21	1.85	0.42
1:D:209:ASN:OD1	1:D:254:ASN:HB3	2.19	0.42
1:A:226:TYR:CZ	1:B:232:CYS:HB2	2.54	0.42
1:C:160:ARG:HA	1:C:267:PHE:O	2.20	0.42
1:F:203:TYR:CD1	1:F:250:PRO:HG2	2.55	0.42
1:A:189:ASP:OD2	1:A:189:ASP:N	2.52	0.42
1:C:219:GLU:HG2	1:C:221:THR:H	1.85	0.41
1:B:158:SER:HB3	1:B:269:ILE:O	2.19	0.41
1:C:157:GLU:H	1:C:157:GLU:HG3	1.51	0.41
1:E:265:MET:HE1	1:E:296:PHE:CZ	2.56	0.41
1:A:126:VAL:HG11	1:A:165:LEU:HD13	2.02	0.41
1:E:199:ASN:HB2	1:E:300:GLY:O	2.20	0.41
1:E:210:LEU:HD22	1:E:216:PHE:HB2	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:160:ARG:HA	1:F:267:PHE:O	2.20	0.41
1:E:177:LEU:HA	1:E:177:LEU:HD23	1.83	0.41
1:F:250:PRO:HA	1:F:263:ILE:HA	2.03	0.41
1:B:209:ASN:OD1	1:B:252:THR:HG23	2.20	0.41
1:D:81:GLY:O	1:D:83:ALA:N	2.54	0.41
1:E:162:GLY:HA2	1:E:265:MET:O	2.20	0.41
1:A:248:VAL:HG22	1:A:265:MET:HE2	2.03	0.41
1:B:89:THR:HG23	1:B:90:GLN:H	1.86	0.41
1:C:212:VAL:H	1:C:212:VAL:HG22	1.64	0.40
1:F:208:VAL:HG21	1:F:218:LYS:HG3	2.03	0.40
1:C:135:VAL:O	1:C:297:THR:HA	2.21	0.40
1:D:236:THR:HG22	1:D:288:PHE:CD2	2.57	0.40
1:F:142:LYS:HG3	1:F:290:LEU:HB2	2.03	0.40
1:B:226:TYR:CZ	1:C:232:CYS:HB2	2.56	0.40
1:A:101:ASN:ND2	1:A:106:SER:HB3	2.32	0.40
1:A:99:MET:CE	1:A:167:PRO:HB3	2.50	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	215/301 (71%)	205 (95%)	10 (5%)	0	100	100
1	B	214/301 (71%)	202 (94%)	10 (5%)	2 (1%)	17	31
1	C	215/301 (71%)	207 (96%)	8 (4%)	0	100	100
1	D	219/301 (73%)	205 (94%)	13 (6%)	1 (0%)	29	47
1	E	215/301 (71%)	200 (93%)	14 (6%)	1 (0%)	29	47
1	F	219/301 (73%)	203 (93%)	13 (6%)	3 (1%)	11	19
All	All	1297/1806 (72%)	1222 (94%)	68 (5%)	7 (0%)	29	47

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	215	ASN
1	E	214	GLY
1	F	212	VAL
1	B	189	ASP
1	F	149	PHE
1	F	106	SER
1	B	87	SER

### 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	179/245 (73%)	176 (98%)	3 (2%)	60	76
1	B	177/245 (72%)	175 (99%)	2 (1%)	73	84
1	C	178/245 (73%)	178 (100%)	0	100	100
1	D	182/245 (74%)	181 (100%)	1 (0%)	88	92
1	E	178/245 (73%)	176 (99%)	2 (1%)	73	84
1	F	180/245 (74%)	175 (97%)	5 (3%)	43	63
All	All	1074/1470 (73%)	1061 (99%)	13 (1%)	71	82

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	82	LEU
1	A	171	ARG
1	A	189	ASP
1	B	121	LYS
1	B	160	ARG
1	D	117	ASN
1	E	191	ASN
1	E	207	ARG
1	F	99	MET
1	F	113	SER

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Mol	Chain	Res	Type
1	F	142	LYS
1	F	156	GLN
1	F	255	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	117	ASN
1	A	229	HIS
1	D	117	ASN

### 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](#)

10 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	D	402	-	4,4,4	0.16	0	6,6,6	0.25	0
3	SO4	D	404	-	4,4,4	0.48	0	6,6,6	0.24	0
3	SO4	D	403	-	4,4,4	0.22	0	6,6,6	0.34	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	SO4	C	401	-	4,4,4	0.28	0	6,6,6	0.38	0
3	SO4	A	402	-	4,4,4	0.23	0	6,6,6	0.08	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.

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 [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, 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	219/301 (72%)	-0.29	8 (3%) 41 49	29, 37, 77, 92	0
1	B	216/301 (71%)	-0.34	8 (3%) 41 49	28, 36, 65, 94	0
1	C	217/301 (72%)	-0.27	6 (2%) 53 62	27, 35, 64, 94	0
1	D	223/301 (74%)	-0.14	15 (6%) 17 21	32, 43, 94, 119	0
1	E	217/301 (72%)	-0.08	13 (5%) 21 26	36, 53, 83, 108	0
1	F	221/301 (73%)	0.07	15 (6%) 17 20	37, 51, 82, 110	0
All	All	1313/1806 (72%)	-0.18	65 (4%) 28 35	27, 42, 79, 119	0

All (65) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	84	LEU	6.5
1	D	83	ALA	6.4
1	F	83	ALA	5.6
1	A	83	ALA	5.6
1	F	84	LEU	5.6
1	D	254	ASN	4.8
1	D	255	THR	4.5
1	C	254	ASN	4.1
1	F	90	GLN	4.1
1	D	88	PRO	4.1
1	A	90	GLN	4.0
1	E	213	THR	3.8
1	D	80	ASN	3.7
1	E	87	SER	3.7
1	E	254	ASN	3.6
1	D	257	ALA	3.5
1	E	86	VAL	3.5
1	B	258	THR	3.4
1	E	255	THR	3.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	255	THR	3.3
1	F	213	THR	3.3
1	A	255	THR	3.3
1	B	255	THR	3.1
1	D	256	GLY	3.1
1	A	84	LEU	3.1
1	F	89	THR	3.1
1	E	89	THR	3.1
1	B	257	ALA	3.1
1	F	214	GLY	3.0
1	D	87	SER	3.0
1	A	89	THR	3.0
1	B	259	THR	3.0
1	F	254	ASN	2.9
1	F	81	GLY	2.9
1	B	254	ASN	2.8
1	B	88	PRO	2.8
1	C	89	THR	2.8
1	E	188	GLY	2.7
1	F	171	ARG	2.7
1	F	108	TYR	2.7
1	D	81	GLY	2.7
1	E	90	GLN	2.6
1	D	79	GLU	2.6
1	F	88	PRO	2.6
1	B	86	VAL	2.5
1	E	211	ALA	2.5
1	E	91	THR	2.5
1	E	257	ALA	2.5
1	D	86	VAL	2.5
1	D	258	THR	2.5
1	C	90	GLN	2.5
1	F	211	ALA	2.4
1	C	88	PRO	2.4
1	D	78	THR	2.4
1	A	254	ASN	2.4
1	E	85	LYS	2.3
1	C	86	VAL	2.3
1	F	256	GLY	2.3
1	A	86	VAL	2.3
1	F	82	LEU	2.3
1	A	257	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	190	SER	2.2
1	B	87	SER	2.0
1	E	93	LEU	2.0
1	F	257	ALA	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 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(Å <sup>2</sup> )	Q<0.9
3	SO4	D	404	5/5	0.69	0.27	56,63,70,110	0
2	GLN	D	401	9/10	0.75	0.27	57,67,85,89	0
2	GLN	E	401	9/10	0.76	0.40	68,72,83,85	0
2	GLN	A	401	9/10	0.77	0.31	41,54,78,81	0
2	GLN	F	401	9/10	0.78	0.24	55,68,75,77	0
2	GLN	B	401	9/10	0.86	0.23	45,46,74,76	0
3	SO4	D	403	5/5	0.96	0.12	51,54,58,67	0
3	SO4	C	401	5/5	0.97	0.17	47,51,57,66	0
3	SO4	D	402	5/5	0.98	0.13	54,55,59,59	0
3	SO4	A	402	5/5	0.98	0.11	38,45,54,55	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.