



# Full wwPDB X-ray Structure Validation Report ⓘ

May 22, 2020 – 03:52 am BST

PDB ID : 3L1W  
Title : The crystal structure of a functionally unknown conserved protein from *Enterococcus faecalis* V583  
Authors : Tan, K.; Rakowski, E.; Jedrzejczak, R.; Joachimiak, A.; Midwest Center for Structural Genomics (MCSG)  
Deposited on : 2009-12-14  
Resolution : 1.60 Å(reported)

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

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

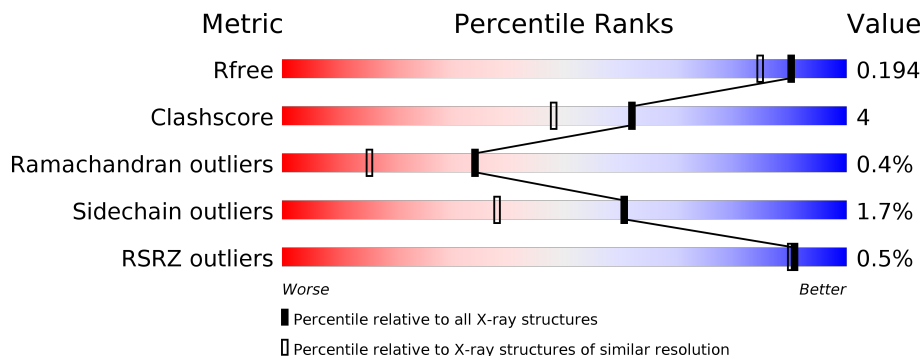
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.60 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3398 (1.60-1.60)
Clashscore	141614	3665 (1.60-1.60)
Ramachandran outliers	138981	3564 (1.60-1.60)
Sidechain outliers	138945	3563 (1.60-1.60)
RSRZ outliers	127900	3321 (1.60-1.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	257	 87% 11% .
1	B	257	 88% 10% ..
1	C	257	 88% 11% .
1	D	257	 89% 9% ..
1	E	257	 89% 9% .
1	F	257	 88% 9% .

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

<b>Mol</b>	<b>Type</b>	<b>Chain</b>	<b>Res</b>	<b>Chirality</b>	<b>Geometry</b>	<b>Clashes</b>	<b>Electron density</b>
4	FMT	A	264	-	-	X	-
4	FMT	C	263	-	-	X	-
4	FMT	D	264	-	-	X	-
4	FMT	E	263	-	-	X	-
4	FMT	F	264	-	-	X	-

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 14171 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 Uncharacterized protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	252	2083	1327	351	397	5	3	0	7	0
1	B	252	2072	1320	347	397	5	3	0	6	0
1	C	252	2075	1322	348	397	5	3	0	6	0
1	D	252	2092	1333	352	399	5	3	0	9	0
1	E	252	2072	1320	347	397	5	3	0	6	0
1	F	252	2080	1325	350	397	5	3	0	7	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	250	ALA	-	EXPRESSION TAG	UNP Q835Y1
A	251	GLY	-	EXPRESSION TAG	UNP Q835Y1
A	252	GLU	-	EXPRESSION TAG	UNP Q835Y1
A	253	ASN	-	EXPRESSION TAG	UNP Q835Y1
A	254	LEU	-	EXPRESSION TAG	UNP Q835Y1
A	255	TYR	-	EXPRESSION TAG	UNP Q835Y1
A	256	PHE	-	EXPRESSION TAG	UNP Q835Y1
A	257	GLN	-	EXPRESSION TAG	UNP Q835Y1
B	250	ALA	-	EXPRESSION TAG	UNP Q835Y1
B	251	GLY	-	EXPRESSION TAG	UNP Q835Y1
B	252	GLU	-	EXPRESSION TAG	UNP Q835Y1
B	253	ASN	-	EXPRESSION TAG	UNP Q835Y1
B	254	LEU	-	EXPRESSION TAG	UNP Q835Y1
B	255	TYR	-	EXPRESSION TAG	UNP Q835Y1
B	256	PHE	-	EXPRESSION TAG	UNP Q835Y1
B	257	GLN	-	EXPRESSION TAG	UNP Q835Y1
C	250	ALA	-	EXPRESSION TAG	UNP Q835Y1

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Chain	Residue	Modelled	Actual	Comment	Reference
C	251	GLY	-	EXPRESSION TAG	UNP Q835Y1
C	252	GLU	-	EXPRESSION TAG	UNP Q835Y1
C	253	ASN	-	EXPRESSION TAG	UNP Q835Y1
C	254	LEU	-	EXPRESSION TAG	UNP Q835Y1
C	255	TYR	-	EXPRESSION TAG	UNP Q835Y1
C	256	PHE	-	EXPRESSION TAG	UNP Q835Y1
C	257	GLN	-	EXPRESSION TAG	UNP Q835Y1
D	250	ALA	-	EXPRESSION TAG	UNP Q835Y1
D	251	GLY	-	EXPRESSION TAG	UNP Q835Y1
D	252	GLU	-	EXPRESSION TAG	UNP Q835Y1
D	253	ASN	-	EXPRESSION TAG	UNP Q835Y1
D	254	LEU	-	EXPRESSION TAG	UNP Q835Y1
D	255	TYR	-	EXPRESSION TAG	UNP Q835Y1
D	256	PHE	-	EXPRESSION TAG	UNP Q835Y1
D	257	GLN	-	EXPRESSION TAG	UNP Q835Y1
E	250	ALA	-	EXPRESSION TAG	UNP Q835Y1
E	251	GLY	-	EXPRESSION TAG	UNP Q835Y1
E	252	GLU	-	EXPRESSION TAG	UNP Q835Y1
E	253	ASN	-	EXPRESSION TAG	UNP Q835Y1
E	254	LEU	-	EXPRESSION TAG	UNP Q835Y1
E	255	TYR	-	EXPRESSION TAG	UNP Q835Y1
E	256	PHE	-	EXPRESSION TAG	UNP Q835Y1
E	257	GLN	-	EXPRESSION TAG	UNP Q835Y1
F	250	ALA	-	EXPRESSION TAG	UNP Q835Y1
F	251	GLY	-	EXPRESSION TAG	UNP Q835Y1
F	252	GLU	-	EXPRESSION TAG	UNP Q835Y1
F	253	ASN	-	EXPRESSION TAG	UNP Q835Y1
F	254	LEU	-	EXPRESSION TAG	UNP Q835Y1
F	255	TYR	-	EXPRESSION TAG	UNP Q835Y1
F	256	PHE	-	EXPRESSION TAG	UNP Q835Y1
F	257	GLN	-	EXPRESSION TAG	UNP Q835Y1

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



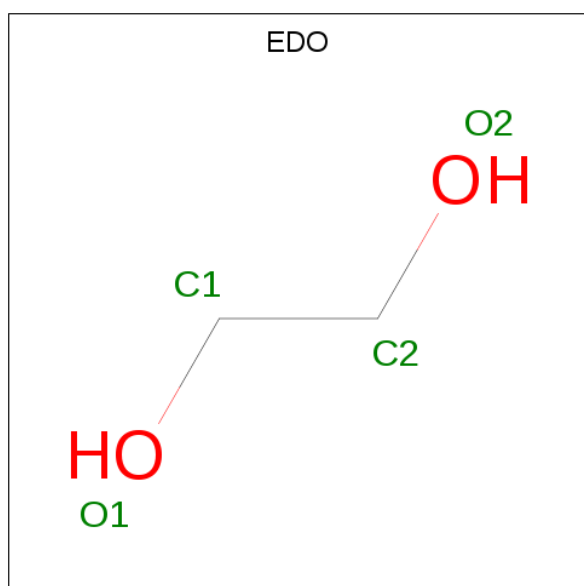
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total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

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

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



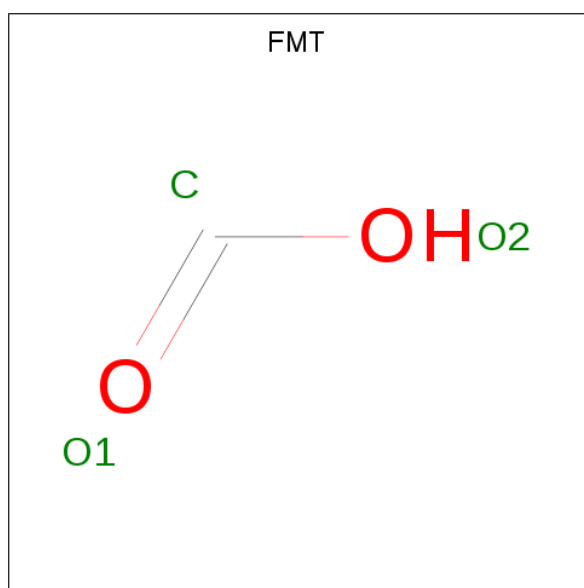
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		

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

- Molecule 4 is FORMIC ACID (three-letter code: FMT) (formula: CH<sub>2</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			3	1	2		
4	A	1	Total	C	O	0	0
			3	1	2		
4	B	1	Total	C	O	0	0
			3	1	2		
4	B	1	Total	C	O	0	0
			3	1	2		
4	C	1	Total	C	O	0	0
			3	1	2		
4	C	1	Total	C	O	0	0
			3	1	2		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	D	1	Total 3	C 1	O 2	0	0
4	D	1	Total 3	C 1	O 2	0	0
4	E	1	Total 3	C 1	O 2	0	0
4	E	1	Total 3	C 1	O 2	0	0
4	F	1	Total 3	C 1	O 2	0	0
4	F	1	Total 3	C 1	O 2	0	0

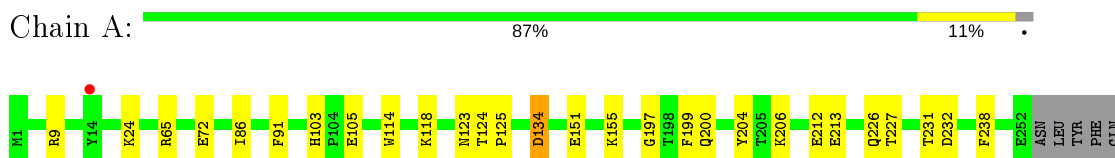
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	246	Total 246	O 246	0	0
5	B	256	Total 256	O 256	0	0
5	C	262	Total 262	O 262	0	0
5	D	243	Total 243	O 243	0	0
5	E	261	Total 261	O 261	0	0
5	F	249	Total 249	O 249	0	0

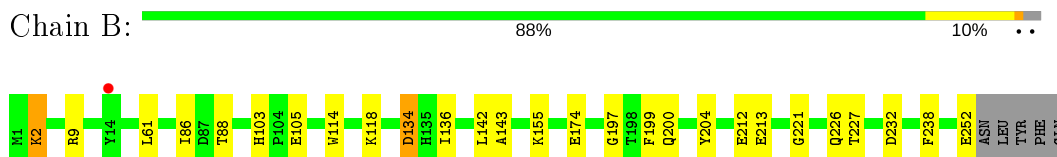
### 3 Residue-property plots [i](#)

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.

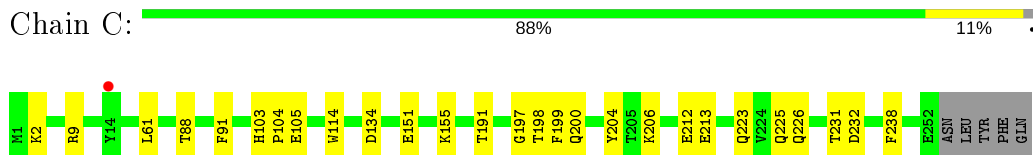
- Molecule 1: Uncharacterized protein



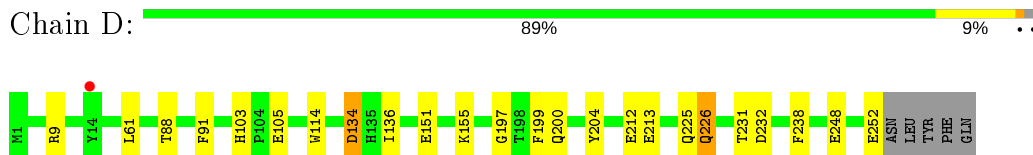
- Molecule 1: Uncharacterized protein



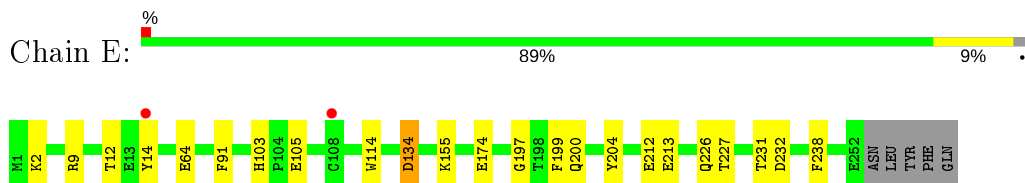
- Molecule 1: Uncharacterized protein




- Molecule 1: Uncharacterized protein



- Molecule 1: Uncharacterized protein



- Molecule 1: Uncharacterized protein

Chain F:  88% 9%



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	68.56Å 68.56Å 104.25Å 89.88° 89.79° 60.07°	Depositor
Resolution (Å)	32.61 – 1.60 32.61 – 1.60	Depositor EDS
% Data completeness (in resolution range)	94.0 (32.61-1.60) 95.8 (32.61-1.60)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.75 (at 1.60Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.5_2)	Depositor
R, $R_{free}$	0.167 , 0.198 0.163 , 0.194	Depositor DCC
$R_{free}$ test set	10569 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	20.4	Xtriage
Anisotropy	0.028	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 39.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.017 for k,-h+k,l 0.017 for h-k,h,l 0.458 for -h+k,-h,l 0.458 for -k,h-k,l 0.457 for h,h-k,-l 0.467 for -h+k,k,-l 0.017 for -h,-k,l 0.017 for k,h,-l 0.477 for -k,-h,-l 0.017 for -h,-h+k,-l 0.017 for h-k,-k,-l	Xtriage
$F_o, F_c$ correlation	0.98	EDS
Total number of atoms	14171	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.89% 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: FMT, SO4, EDO

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	0.33	0/2157	0.52	0/2930
1	B	0.32	0/2143	0.53	0/2912
1	C	0.33	0/2146	0.52	0/2916
1	D	0.33	0/2172	0.52	0/2950
1	E	0.32	0/2143	0.53	0/2912
1	F	0.33	0/2154	0.52	0/2926
All	All	0.33	0/12915	0.52	0/17546

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	2083	0	2003	19	0
1	B	2072	0	1987	15	0
1	C	2075	0	1990	22	0
1	D	2092	0	2016	17	0
1	E	2072	0	1987	14	0
1	F	2080	0	2000	16	0
2	A	20	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	20	0	0	0	0
2	C	20	0	0	0	0
2	D	20	0	0	0	0
2	E	20	0	0	0	0
2	F	20	0	0	0	0
3	A	4	0	6	3	0
3	B	4	0	6	1	0
3	C	4	0	6	3	0
3	D	4	0	6	3	0
3	E	4	0	6	1	0
3	F	4	0	6	1	0
4	A	6	0	2	5	0
4	B	6	0	2	2	0
4	C	6	0	2	5	0
4	D	6	0	2	4	0
4	E	6	0	2	4	0
4	F	6	0	2	5	0
5	A	246	0	0	2	0
5	B	256	0	0	1	0
5	C	262	0	0	4	0
5	D	243	0	0	1	0
5	E	261	0	0	3	0
5	F	249	0	0	1	0
All	All	14171	0	12031	109	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 4.

All (109) 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:231:THR:H	4:C:263:FMT:H	1.08	1.15
1:E:231:THR:H	4:E:263:FMT:H	1.01	1.09
1:F:231:THR:H	4:F:264:FMT:H	1.15	1.09
1:A:231:THR:H	4:A:264:FMT:H	1.22	1.03
1:D:231:THR:H	4:D:264:FMT:H	1.34	0.92
1:E:231:THR:N	4:E:263:FMT:H	1.84	0.90
1:C:191[B]:THR:HG23	1:C:226[B]:GLN:HG2	1.52	0.89
1:F:103:HIS:HD2	1:F:105:GLU:H	1.16	0.89
1:C:103:HIS:HD2	1:C:105:GLU:H	1.20	0.89
1:E:103:HIS:HD2	1:E:105:GLU:H	1.20	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:231:THR:N	4:C:263:FMT:H	1.89	0.87
1:B:103:HIS:HD2	1:B:105:GLU:H	1.21	0.86
1:A:103:HIS:HD2	1:A:105:GLU:H	1.20	0.85
1:F:231:THR:N	4:F:264:FMT:H	1.91	0.84
1:D:103:HIS:HD2	1:D:105:GLU:H	1.26	0.82
1:A:231:THR:H	4:A:264:FMT:C	1.96	0.76
1:F:231:THR:H	4:F:264:FMT:C	1.97	0.74
1:F:103:HIS:CD2	1:F:105:GLU:H	2.03	0.73
1:A:103:HIS:CD2	1:A:105:GLU:H	2.06	0.71
1:D:103:HIS:CD2	1:D:105:GLU:H	2.10	0.69
1:C:103:HIS:CD2	1:C:105:GLU:H	2.08	0.68
1:B:103:HIS:CD2	1:B:105:GLU:H	2.09	0.68
1:A:91:PHE:CD2	3:A:262:EDO:H22	2.28	0.68
1:D:231:THR:H	4:D:264:FMT:C	2.04	0.68
1:E:103:HIS:CD2	1:E:105:GLU:H	2.08	0.66
1:C:231:THR:H	4:C:263:FMT:C	1.98	0.65
1:E:174:GLU:HG3	5:E:1043:HOH:O	1.96	0.65
1:A:231:THR:N	4:A:264:FMT:H	2.05	0.63
1:B:2:LYS:HE3	5:B:1456:HOH:O	1.98	0.63
1:D:91:PHE:CD2	3:D:262:EDO:H11	2.36	0.61
1:E:226[B]:GLN:HG3	1:E:227:THR:N	2.16	0.60
1:F:226[B]:GLN:HG3	1:F:227:THR:N	2.17	0.59
1:A:226[B]:GLN:HG3	1:A:227:THR:N	2.18	0.57
1:F:134:ASP:CG	5:F:880:HOH:O	2.42	0.57
1:C:91:PHE:CD2	3:C:262:EDO:H11	2.39	0.56
1:B:226[B]:GLN:HG3	1:B:227:THR:N	2.20	0.56
1:F:114:TRP:CH2	1:F:155:LYS:HE3	2.42	0.55
1:B:114:TRP:HE1	3:B:262:EDO:C2	2.21	0.54
1:E:91:PHE:CD2	3:E:262:EDO:H22	2.43	0.54
1:A:114:TRP:CH2	1:A:155:LYS:HE3	2.44	0.53
1:E:204:TYR:HA	1:E:238:PHE:CE2	2.44	0.52
1:E:2:LYS:HD3	5:E:996:HOH:O	2.07	0.52
1:D:225[A]:GLN:NE2	1:D:248:GLU:HG2	2.25	0.52
1:D:114:TRP:CH2	1:D:155:LYS:HE3	2.44	0.52
1:A:204:TYR:HA	1:A:238:PHE:CE2	2.45	0.51
1:C:151:GLU:OE2	3:C:262:EDO:H22	2.11	0.51
1:C:114:TRP:HE1	3:C:262:EDO:C1	2.24	0.51
1:D:197:GLY:HA2	1:D:213[A]:GLU:HG2	1.93	0.51
1:B:86:ILE:HD13	1:B:118:LYS:HE3	1.92	0.51
1:B:114:TRP:CH2	1:B:155:LYS:HE3	2.46	0.50
1:C:191[B]:THR:HG23	1:C:226[B]:GLN:CG	2.35	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:197:GLY:HA2	1:F:213[A]:GLU:HG2	1.94	0.50
1:E:114:TRP:CH2	1:E:155:LYS:HE3	2.46	0.50
1:C:223:GLN:CD	1:C:225[B]:GLN:HE22	2.14	0.50
1:A:151:GLU:OE2	3:A:262:EDO:H11	2.12	0.49
1:D:226[A]:GLN:HG2	5:D:267:HOH:O	2.11	0.49
4:A:264:FMT:O1	4:B:264:FMT:C	2.60	0.49
1:C:114:TRP:CH2	1:C:155:LYS:HE3	2.47	0.49
1:E:12:THR:HG1	1:E:14:TYR:HD2	1.60	0.49
1:E:134:ASP:CG	5:E:927:HOH:O	2.51	0.48
1:E:197:GLY:HA2	1:E:213[A]:GLU:HG2	1.93	0.48
1:A:197:GLY:HA2	1:A:213[A]:GLU:HG2	1.94	0.48
1:F:12:THR:HG1	1:F:14:TYR:HD2	1.62	0.48
1:C:134:ASP:CG	5:C:953:HOH:O	2.52	0.48
1:B:204:TYR:HA	1:B:238:PHE:CE2	2.48	0.48
1:F:61:LEU:HD21	1:F:88[A]:THR:OG1	2.13	0.47
1:B:197:GLY:HA2	1:B:213[A]:GLU:HG2	1.95	0.47
1:D:204:TYR:HA	1:D:238:PHE:CE2	2.49	0.47
4:C:263:FMT:O1	4:D:263:FMT:C	2.62	0.47
1:C:197:GLY:HA2	1:C:213[A]:GLU:HG2	1.96	0.47
1:C:204:TYR:HA	1:C:238:PHE:CE2	2.49	0.47
1:F:204:TYR:HA	1:F:238:PHE:CE2	2.50	0.46
1:C:199:PHE:HB3	1:C:212:GLU:HB2	1.98	0.46
1:A:91:PHE:HD2	3:A:262:EDO:H22	1.77	0.46
4:E:263:FMT:O1	4:F:263:FMT:C	2.63	0.46
1:A:199:PHE:HB3	1:A:212:GLU:HB2	1.98	0.46
1:D:61:LEU:HD21	1:D:88[A]:THR:OG1	2.16	0.46
1:E:199:PHE:HB3	1:E:212:GLU:HB2	1.98	0.45
4:E:264:FMT:C	4:F:264:FMT:O1	2.64	0.45
1:B:142:LEU:HD13	1:B:174:GLU:HG2	1.97	0.45
1:B:199:PHE:HB3	1:B:212:GLU:HB2	1.99	0.45
1:B:221:GLY:O	1:B:252:GLU:HG3	2.17	0.45
1:A:124:THR:HA	1:A:125:PRO:HD3	1.82	0.44
1:D:199:PHE:HB3	1:D:212:GLU:HB2	1.99	0.44
1:D:226[B]:GLN:HE21	1:D:226[B]:GLN:HB2	1.56	0.44
1:F:199:PHE:HB3	1:F:212:GLU:HB2	2.00	0.44
4:C:264:FMT:C	4:D:264:FMT:O2	2.66	0.43
1:B:103:HIS:CE1	1:B:143:ALA:HB1	2.53	0.43
1:F:151:GLU:OE2	3:F:262:EDO:H12	2.18	0.43
1:A:134:ASP:CG	5:A:842:HOH:O	2.56	0.43
4:A:263:FMT:C	4:B:263:FMT:O2	2.66	0.43
1:D:151:GLU:OE2	3:D:262:EDO:H22	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:134:ASP:OD2	1:B:136:ILE:HG22	2.19	0.42
1:C:206:LYS:HE2	1:C:206:LYS:HB2	1.88	0.42
1:A:24:LYS:HD3	5:A:1205:HOH:O	2.19	0.42
1:F:103:HIS:CE1	1:F:143:ALA:HB1	2.55	0.42
1:D:134:ASP:OD2	1:D:136:ILE:HG22	2.19	0.41
1:C:103:HIS:CG	1:C:104:PRO:HD2	2.56	0.41
1:C:61:LEU:HD21	1:C:88[A]:THR:OG1	2.20	0.41
1:B:61:LEU:HD21	1:B:88[B]:THR:OG1	2.21	0.41
1:C:223:GLN:HG3	5:C:1248:HOH:O	2.20	0.41
1:F:92:TRP:CE2	1:F:100:PRO:HA	2.56	0.41
1:A:206:LYS:HB2	1:A:206:LYS:HE2	1.88	0.40
1:A:65[B]:ARG:HG2	1:A:72:GLU:O	2.22	0.40
1:C:2:LYS:NZ	5:C:811:HOH:O	2.48	0.40
1:D:114:TRP:HE1	3:D:262:EDO:C1	2.35	0.40
1:A:86:ILE:HD13	1:A:118:LYS:HE3	2.03	0.40
1:C:198:THR:HG23	5:C:1159:HOH:O	2.21	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	257/257 (100%)	253 (98%)	3 (1%)	1 (0%)	34 15
1	B	256/257 (100%)	250 (98%)	5 (2%)	1 (0%)	34 15
1	C	256/257 (100%)	250 (98%)	5 (2%)	1 (0%)	34 15
1	D	259/257 (101%)	253 (98%)	5 (2%)	1 (0%)	34 15
1	E	256/257 (100%)	250 (98%)	5 (2%)	1 (0%)	34 15
1	F	257/257 (100%)	250 (97%)	6 (2%)	1 (0%)	34 15
All	All	1541/1542 (100%)	1506 (98%)	29 (2%)	6 (0%)	34 15

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	9	ARG
1	B	9	ARG
1	C	9	ARG
1	E	9	ARG
1	D	9	ARG
1	F	9	ARG

### 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	226/221 (102%)	222 (98%)	4 (2%)	59	36
1	B	225/221 (102%)	221 (98%)	4 (2%)	59	36
1	C	225/221 (102%)	223 (99%)	2 (1%)	78	65
1	D	228/221 (103%)	222 (97%)	6 (3%)	46	21
1	E	225/221 (102%)	221 (98%)	4 (2%)	59	36
1	F	226/221 (102%)	223 (99%)	3 (1%)	69	50
All	All	1355/1326 (102%)	1332 (98%)	23 (2%)	60	38

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	123	ASN
1	A	134	ASP
1	A	200	GLN
1	A	232	ASP
1	B	2	LYS
1	B	134	ASP
1	B	200	GLN
1	B	232	ASP
1	C	200	GLN
1	C	232	ASP
1	D	134	ASP

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Mol	Chain	Res	Type
1	D	200	GLN
1	D	226[A]	GLN
1	D	226[B]	GLN
1	D	232	ASP
1	D	252	GLU
1	E	64	GLU
1	E	134	ASP
1	E	200	GLN
1	E	232	ASP
1	F	134	ASP
1	F	200	GLN
1	F	232	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	99	GLN
1	A	103	HIS
1	A	123	ASN
1	A	158	GLN
1	A	225	GLN
1	B	103	HIS
1	B	135	HIS
1	B	158	GLN
1	B	225	GLN
1	C	103	HIS
1	C	158	GLN
1	D	103	HIS
1	D	158	GLN
1	E	19	GLN
1	E	103	HIS
1	E	135	HIS
1	E	158	GLN
1	E	225	GLN
1	F	103	HIS
1	F	135	HIS
1	F	158	GLN
1	F	225	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](#)

42 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	C	261	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	D	261	-	4,4,4	0.14	0	6,6,6	0.11	0
3	EDO	D	262	-	3,3,3	0.48	0	2,2,2	0.27	0
2	SO4	E	261	-	4,4,4	0.14	0	6,6,6	0.08	0
2	SO4	F	261	-	4,4,4	0.14	0	6,6,6	0.11	0
4	FMT	D	263	-	0,2,2	0.00	-	0,1,1	0.00	-
4	FMT	E	264	-	0,2,2	0.00	-	0,1,1	0.00	-
2	SO4	A	260	-	4,4,4	0.19	0	6,6,6	0.16	0
4	FMT	A	263	-	0,2,2	0.00	-	0,1,1	0.00	-
2	SO4	B	259	-	4,4,4	0.11	0	6,6,6	0.09	0
2	SO4	F	259	-	4,4,4	0.15	0	6,6,6	0.11	0
2	SO4	D	259	-	4,4,4	0.15	0	6,6,6	0.10	0
4	FMT	B	264	-	0,2,2	0.00	-	0,1,1	0.00	-
2	SO4	A	261	-	4,4,4	0.14	0	6,6,6	0.06	0
2	SO4	B	258	-	4,4,4	0.15	0	6,6,6	0.18	0
4	FMT	C	264	-	0,2,2	0.00	-	0,1,1	0.00	-
2	SO4	E	260	-	4,4,4	0.18	0	6,6,6	0.16	0
2	SO4	C	260	-	4,4,4	0.22	0	6,6,6	0.14	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	FMT	F	264	-	0,2,2	0.00	-	0,1,1	0.00	-
4	FMT	F	263	-	0,2,2	0.00	-	0,1,1	0.00	-
3	EDO	C	262	-	3,3,3	0.49	0	2,2,2	0.30	0
2	SO4	C	258	-	4,4,4	0.16	0	6,6,6	0.17	0
2	SO4	D	258	-	4,4,4	0.13	0	6,6,6	0.13	0
3	EDO	B	262	-	3,3,3	0.45	0	2,2,2	0.34	0
2	SO4	E	258	-	4,4,4	0.15	0	6,6,6	0.11	0
2	SO4	F	258	-	4,4,4	0.15	0	6,6,6	0.12	0
3	EDO	E	262	-	3,3,3	0.49	0	2,2,2	0.23	0
4	FMT	D	264	-	0,2,2	0.00	-	0,1,1	0.00	-
4	FMT	A	264	-	0,2,2	0.00	-	0,1,1	0.00	-
2	SO4	A	259	-	4,4,4	0.14	0	6,6,6	0.05	0
2	SO4	B	260	-	4,4,4	0.13	0	6,6,6	0.19	0
2	SO4	F	260	-	4,4,4	0.12	0	6,6,6	0.17	0
2	SO4	D	260	-	4,4,4	0.13	0	6,6,6	0.17	0
2	SO4	A	258	-	4,4,4	0.16	0	6,6,6	0.15	0
2	SO4	B	261	-	4,4,4	0.13	0	6,6,6	0.09	0
3	EDO	F	262	-	3,3,3	0.56	0	2,2,2	0.09	0
2	SO4	E	259	-	4,4,4	0.17	0	6,6,6	0.05	0
4	FMT	B	263	-	0,2,2	0.00	-	0,1,1	0.00	-
2	SO4	C	259	-	4,4,4	0.18	0	6,6,6	0.07	0
3	EDO	A	262	-	3,3,3	0.47	0	2,2,2	0.30	0
4	FMT	E	263	-	0,2,2	0.00	-	0,1,1	0.00	-
4	FMT	C	263	-	0,2,2	0.00	-	0,1,1	0.00	-

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	EDO	C	262	-	-	1/1/1/1	-
3	EDO	B	262	-	-	0/1/1/1	-
3	EDO	A	262	-	-	1/1/1/1	-
3	EDO	D	262	-	-	1/1/1/1	-
3	EDO	F	262	-	-	1/1/1/1	-
3	EDO	E	262	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	262	EDO	O1-C1-C2-O2
3	E	262	EDO	O1-C1-C2-O2
3	C	262	EDO	O1-C1-C2-O2
3	A	262	EDO	O1-C1-C2-O2
3	F	262	EDO	O1-C1-C2-O2

There are no ring outliers.

18 monomers are involved in 31 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	262	EDO	3	0
4	D	263	FMT	1	0
4	E	264	FMT	1	0
4	A	263	FMT	1	0
4	B	264	FMT	1	0
4	C	264	FMT	1	0
4	F	264	FMT	4	0
4	F	263	FMT	1	0
3	C	262	EDO	3	0
3	B	262	EDO	1	0
3	E	262	EDO	1	0
4	D	264	FMT	3	0
4	A	264	FMT	4	0
3	F	262	EDO	1	0
4	B	263	FMT	1	0
3	A	262	EDO	3	0
4	E	263	FMT	3	0
4	C	263	FMT	4	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 [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	249/257 (96%)	-0.67	1 (0%) 92 92	14, 21, 42, 61	0
1	B	249/257 (96%)	-0.70	1 (0%) 92 92	14, 21, 42, 63	0
1	C	249/257 (96%)	-0.64	1 (0%) 92 92	14, 21, 42, 68	0
1	D	249/257 (96%)	-0.65	1 (0%) 92 92	13, 21, 42, 67	0
1	E	249/257 (96%)	-0.63	2 (0%) 86 86	14, 21, 43, 64	0
1	F	249/257 (96%)	-0.65	1 (0%) 92 92	14, 21, 43, 68	0
All	All	1494/1542 (96%)	-0.66	7 (0%) 91 90	13, 21, 43, 68	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	14	TYR	3.5
1	E	14	TYR	3.0
1	F	14	TYR	2.5
1	C	14	TYR	2.4
1	E	108	CYS	2.4
1	A	14	TYR	2.2
1	B	14	TYR	2.2

### 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	EDO	C	262	4/4	0.70	0.17	25,42,43,50	0
2	SO4	C	261	5/5	0.74	0.23	44,51,52,56	5
2	SO4	D	261	5/5	0.75	0.18	44,47,52,57	5
2	SO4	B	261	5/5	0.75	0.20	44,53,56,57	5
2	SO4	A	261	5/5	0.76	0.23	45,50,56,58	5
3	EDO	D	262	4/4	0.80	0.15	27,43,47,52	0
2	SO4	E	261	5/5	0.80	0.22	46,51,53,58	5
2	SO4	F	261	5/5	0.80	0.23	52,53,56,62	5
3	EDO	F	262	4/4	0.81	0.14	25,43,45,51	0
3	EDO	E	262	4/4	0.84	0.14	24,41,47,50	0
4	FMT	F	263	3/3	0.85	0.13	27,27,31,36	3
2	SO4	D	260	5/5	0.85	0.16	18,25,36,40	5
2	SO4	A	259	5/5	0.86	0.15	33,38,44,49	5
2	SO4	D	259	5/5	0.86	0.17	32,39,43,50	5
3	EDO	B	262	4/4	0.87	0.16	26,35,37,45	0
4	FMT	E	264	3/3	0.87	0.18	27,27,34,35	3
2	SO4	C	260	5/5	0.88	0.11	21,26,37,39	5
2	SO4	C	259	5/5	0.88	0.16	34,42,47,52	5
4	FMT	D	264	3/3	0.89	0.12	42,42,42,48	0
2	SO4	B	260	5/5	0.89	0.13	20,29,37,39	5
4	FMT	E	263	3/3	0.89	0.08	46,46,46,50	0
4	FMT	B	264	3/3	0.90	0.19	30,30,31,33	3
2	SO4	B	259	5/5	0.90	0.16	35,41,47,53	5
4	FMT	D	263	3/3	0.90	0.16	26,26,30,36	3
2	SO4	E	259	5/5	0.91	0.14	36,42,45,51	5
2	SO4	F	259	5/5	0.91	0.16	33,33,42,46	5
4	FMT	C	264	3/3	0.91	0.10	28,28,28,31	3
4	FMT	A	263	3/3	0.92	0.12	26,26,32,35	3
2	SO4	F	260	5/5	0.92	0.13	19,26,35,37	5
4	FMT	A	264	3/3	0.92	0.12	39,39,40,44	0
3	EDO	A	262	4/4	0.92	0.12	23,38,39,48	0
2	SO4	E	260	5/5	0.92	0.13	20,31,35,39	5
4	FMT	C	263	3/3	0.93	0.12	40,40,44,45	0
2	SO4	A	260	5/5	0.94	0.13	20,24,34,35	5
4	FMT	F	264	3/3	0.94	0.09	40,40,42,44	0
4	FMT	B	263	3/3	0.95	0.10	38,38,42,43	0
2	SO4	F	258	5/5	0.98	0.07	23,29,30,32	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	SO4	A	258	5/5	0.98	0.09	23,31,31,31	0
2	SO4	D	258	5/5	0.99	0.05	22,29,31,33	0
2	SO4	B	258	5/5	0.99	0.04	23,30,31,32	0
2	SO4	E	258	5/5	0.99	0.06	24,29,32,33	0
2	SO4	C	258	5/5	0.99	0.05	21,29,30,31	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.