



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2024 – 11:06 AM EST

PDB ID : 2FUL
Title : Crystal Structure of the C-terminal Domain of *S. cerevisiae* eIF5
Authors : Wei, Z.; Xue, Y.; Xu, H.; Gong, W.
Deposited on : 2006-01-27
Resolution : 1.50 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

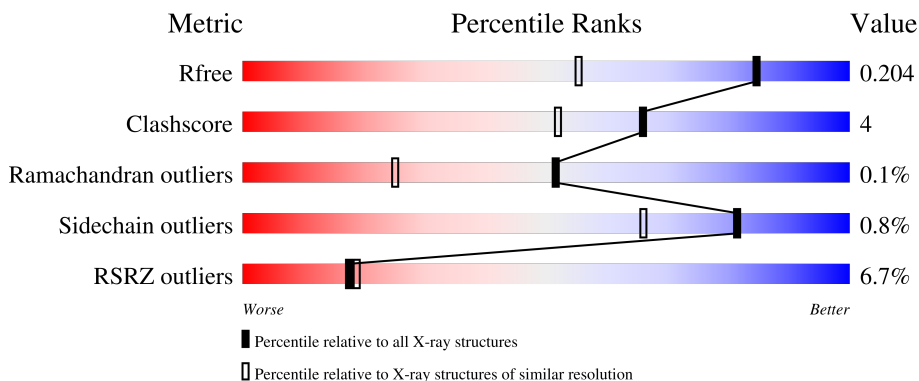
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.50 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	2936 (1.50-1.50)
Clashscore	141614	3144 (1.50-1.50)
Ramachandran outliers	138981	3066 (1.50-1.50)
Sidechain outliers	138945	3064 (1.50-1.50)
RSRZ outliers	127900	2884 (1.50-1.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	177	 5% 86% 5% 9%
1	B	177	 5% 86% 10%
1	C	177	 5% 83% 7% 8%
1	D	177	 7% 88% 8%
1	E	177	 8% 80% 12% 7%

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Mol	Chain	Length	Quality of chain
1	F	177	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a small red segment at the beginning labeled '7%', a large green segment labeled '84%', a small yellow segment labeled '7%', and a small grey segment at the end labeled '9%'.</p>

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 9151 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 Eukaryotic translation initiation factor 5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	161	1341	869	208	260	4	0	8	0
1	B	159	1314	850	207	253	4	0	5	0
1	C	162	1357	879	210	264	4	0	8	0
1	D	163	1358	878	216	260	4	0	7	0
1	E	164	1416	920	220	271	5	0	16	0
1	F	161	1349	872	214	259	4	0	8	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	236	GLY	-	cloning artifact	UNP P38431
A	237	SER	-	cloning artifact	UNP P38431
A	238	PRO	-	cloning artifact	UNP P38431
A	239	GLU	-	cloning artifact	UNP P38431
A	240	PHE	-	cloning artifact	UNP P38431
A	406	LEU	-	cloning artifact	UNP P38431
A	407	GLU	-	cloning artifact	UNP P38431
A	408	ARG	-	cloning artifact	UNP P38431
A	409	PRO	-	cloning artifact	UNP P38431
A	410	HIS	-	cloning artifact	UNP P38431
A	411	ARG	-	cloning artifact	UNP P38431
A	412	ASP	-	cloning artifact	UNP P38431
B	236	GLY	-	cloning artifact	UNP P38431
B	237	SER	-	cloning artifact	UNP P38431
B	238	PRO	-	cloning artifact	UNP P38431
B	239	GLU	-	cloning artifact	UNP P38431
B	240	PHE	-	cloning artifact	UNP P38431

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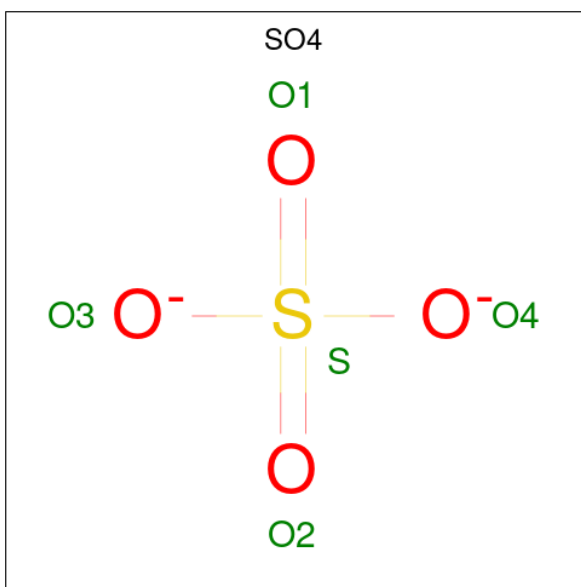
Chain	Residue	Modelled	Actual	Comment	Reference
B	406	LEU	-	cloning artifact	UNP P38431
B	407	GLU	-	cloning artifact	UNP P38431
B	408	ARG	-	cloning artifact	UNP P38431
B	409	PRO	-	cloning artifact	UNP P38431
B	410	HIS	-	cloning artifact	UNP P38431
B	411	ARG	-	cloning artifact	UNP P38431
B	412	ASP	-	cloning artifact	UNP P38431
C	236	GLY	-	cloning artifact	UNP P38431
C	237	SER	-	cloning artifact	UNP P38431
C	238	PRO	-	cloning artifact	UNP P38431
C	239	GLU	-	cloning artifact	UNP P38431
C	240	PHE	-	cloning artifact	UNP P38431
C	406	LEU	-	cloning artifact	UNP P38431
C	407	GLU	-	cloning artifact	UNP P38431
C	408	ARG	-	cloning artifact	UNP P38431
C	409	PRO	-	cloning artifact	UNP P38431
C	410	HIS	-	cloning artifact	UNP P38431
C	411	ARG	-	cloning artifact	UNP P38431
C	412	ASP	-	cloning artifact	UNP P38431
D	236	GLY	-	cloning artifact	UNP P38431
D	237	SER	-	cloning artifact	UNP P38431
D	238	PRO	-	cloning artifact	UNP P38431
D	239	GLU	-	cloning artifact	UNP P38431
D	240	PHE	-	cloning artifact	UNP P38431
D	406	LEU	-	cloning artifact	UNP P38431
D	407	GLU	-	cloning artifact	UNP P38431
D	408	ARG	-	cloning artifact	UNP P38431
D	409	PRO	-	cloning artifact	UNP P38431
D	410	HIS	-	cloning artifact	UNP P38431
D	411	ARG	-	cloning artifact	UNP P38431
D	412	ASP	-	cloning artifact	UNP P38431
E	236	GLY	-	cloning artifact	UNP P38431
E	237	SER	-	cloning artifact	UNP P38431
E	238	PRO	-	cloning artifact	UNP P38431
E	239	GLU	-	cloning artifact	UNP P38431
E	240	PHE	-	cloning artifact	UNP P38431
E	406	LEU	-	cloning artifact	UNP P38431
E	407	GLU	-	cloning artifact	UNP P38431
E	408	ARG	-	cloning artifact	UNP P38431
E	409	PRO	-	cloning artifact	UNP P38431
E	410	HIS	-	cloning artifact	UNP P38431
E	411	ARG	-	cloning artifact	UNP P38431

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Chain	Residue	Modelled	Actual	Comment	Reference
E	412	ASP	-	cloning artifact	UNP P38431
F	236	GLY	-	cloning artifact	UNP P38431
F	237	SER	-	cloning artifact	UNP P38431
F	238	PRO	-	cloning artifact	UNP P38431
F	239	GLU	-	cloning artifact	UNP P38431
F	240	PHE	-	cloning artifact	UNP P38431
F	406	LEU	-	cloning artifact	UNP P38431
F	407	GLU	-	cloning artifact	UNP P38431
F	408	ARG	-	cloning artifact	UNP P38431
F	409	PRO	-	cloning artifact	UNP P38431
F	410	HIS	-	cloning artifact	UNP P38431
F	411	ARG	-	cloning artifact	UNP P38431
F	412	ASP	-	cloning artifact	UNP P38431

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



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	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	C	1	Total 5	O 4	S 1	0	0
2	C	1	Total 5	O 4	S 1	0	0
2	D	1	Total 5	O 4	S 1	0	0
2	D	1	Total 5	O 4	S 1	0	0
2	D	1	Total 5	O 4	S 1	0	0
2	D	1	Total 5	O 4	S 1	0	0
2	D	1	Total 5	O 4	S 1	0	0
2	E	1	Total 5	O 4	S 1	0	0
2	E	1	Total 5	O 4	S 1	0	0
2	E	1	Total 5	O 4	S 1	0	0
2	E	1	Total 5	O 4	S 1	0	0
2	F	1	Total 5	O 4	S 1	0	0
2	F	1	Total 5	O 4	S 1	0	0
2	F	1	Total 5	O 4	S 1	0	0
2	F	1	Total 5	O 4	S 1	0	0

- Molecule 3 is water.

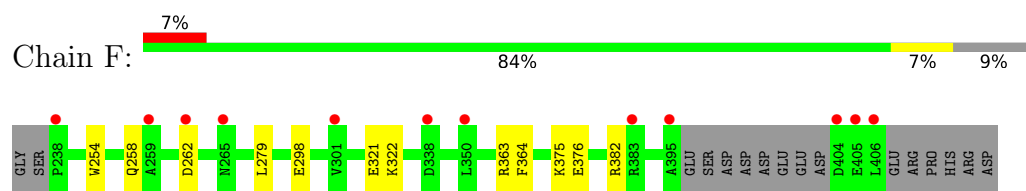
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	179	Total 179	O 179	0	0
3	B	135	Total 135	O 135	0	0
3	C	146	Total 146	O 146	0	0
3	D	146	Total 146	O 146	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	161	Total	O	0	0
			161	161		
3	F	149	Total	O	0	0
			149	149		

- Molecule 1: Eukaryotic translation initiation factor 5



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	44.85Å 64.54Å 108.92Å 88.60° 86.57° 74.93°	Depositor
Resolution (Å)	50.00 – 1.50 43.24 – 1.50	Depositor EDS
% Data completeness (in resolution range)	92.3 (50.00-1.50) 92.3 (43.24-1.50)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.40 (at 1.50Å)	Xtrriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.177 , 0.205 0.175 , 0.204	Depositor DCC
R_{free} test set	8647 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	16.9	Xtrriage
Anisotropy	0.354	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 50.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9151	wwPDB-VP
Average B, all atoms (Å ²)	18.0	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 27.44 % 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 2.1984e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	0.51	0/1390	0.60	0/1876
1	B	0.49	0/1355	0.58	0/1830
1	C	0.50	0/1406	0.57	0/1896
1	D	0.48	0/1407	0.56	0/1899
1	E	0.49	0/1489	0.61	0/2007
1	F	0.44	0/1398	0.55	0/1885
All	All	0.48	0/8445	0.58	0/11393

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	1341	0	1355	6	0
1	B	1314	0	1327	7	0
1	C	1357	0	1374	11	0
1	D	1358	0	1367	9	0
1	E	1416	0	1452	25	0
1	F	1349	0	1360	7	0
2	A	15	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	10	0	0	1	0
2	C	10	0	0	0	0
2	D	25	0	0	0	0
2	E	20	0	0	0	0
2	F	20	0	0	1	0
3	A	179	0	0	2	0
3	B	135	0	0	3	0
3	C	146	0	0	3	0
3	D	146	0	0	2	0
3	E	161	0	0	6	0
3	F	149	0	0	4	0
All	All	9151	0	8235	65	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 (65) 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:363[B]:ARG:HH21	1:D:363[B]:ARG:HG3	1.25	1.01
1:A:375:LYS:NZ	3:A:1146:HOH:O	2.17	0.75
1:D:363[B]:ARG:HG3	1:D:363[B]:ARG:NH2	1.99	0.74
1:E:322:LYS:HD2	1:E:363[B]:ARG:HH22	1.52	0.74
1:D:321[A]:GLU:OE2	3:D:1029:HOH:O	2.06	0.72
1:E:324:PHE:CE2	1:E:328[B]:ILE:HD11	2.27	0.70
1:E:363[B]:ARG:NH2	3:E:1174:HOH:O	2.24	0.69
1:F:254:TRP:O	1:F:258:GLN:HG2	1.94	0.68
2:B:1019:SO4:O3	3:B:1036:HOH:O	2.11	0.67
1:E:390:THR:O	1:E:394:THR:HG23	1.97	0.65
1:E:298[A]:GLU:H	1:E:298[A]:GLU:CD	2.03	0.60
1:C:375:LYS:HE2	1:C:379:LYS:HE3	1.83	0.60
1:F:321[B]:GLU:OE2	3:F:1036:HOH:O	2.17	0.59
1:C:286[A]:LYS:NZ	3:C:1116:HOH:O	2.37	0.57
1:E:324:PHE:HE2	1:E:328[B]:ILE:HD11	1.67	0.57
1:C:312[A]:THR:HG23	3:C:1019:HOH:O	2.05	0.56
1:F:364:PHE:O	1:F:382:ARG:HD3	2.06	0.55
1:C:261:GLU:H	1:C:261:GLU:CD	2.10	0.55
1:B:375:LYS:HE2	1:B:379:LYS:HE3	1.90	0.54
1:C:335:GLU:HB3	1:C:336:HIS:CD2	2.44	0.53
1:A:286[B]:LYS:NZ	3:A:1170:HOH:O	2.41	0.53
1:D:363[C]:ARG:NH1	3:D:1042:HOH:O	2.41	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:363[B]:ARG:HG2	1:D:367:LYS:HD2	1.91	0.52
1:D:363[C]:ARG:HH22	1:D:382:ARG:HH12	1.58	0.52
1:E:386[B]:LYS:HA	1:E:386[B]:LYS:HE2	1.92	0.52
1:E:362[B]:MET:HG2	1:E:392:LEU:HD13	1.92	0.51
1:B:312[A]:THR:HG23	3:B:1030:HOH:O	2.10	0.51
1:B:360:GLU:OE2	1:B:363[A]:ARG:NH2	2.43	0.50
1:E:371[A]:LYS:NZ	3:E:1159:HOH:O	2.35	0.50
1:F:298:GLU:H	1:F:298:GLU:CD	2.15	0.49
1:F:279:LEU:HB3	3:F:1058:HOH:O	2.10	0.49
1:B:314[B]:ILE:HD12	1:B:315:LEU:HD23	1.93	0.49
3:E:1138:HOH:O	1:F:376[A]:GLU:HG2	2.12	0.48
1:E:242[A]:ASN:HB2	1:E:245:LEU:HD12	1.96	0.47
1:E:386[B]:LYS:HD2	3:E:1152:HOH:O	2.13	0.47
1:E:298[A]:GLU:OE2	3:E:1173:HOH:O	2.20	0.47
1:C:367:LYS:HD3	1:E:405:GLU:HA	1.96	0.47
1:B:363[B]:ARG:HB3	1:B:363[B]:ARG:NH1	2.31	0.46
1:E:363[A]:ARG:CZ	1:E:363[A]:ARG:HB2	2.45	0.46
1:D:374:PRO:HD3	3:F:1073:HOH:O	2.16	0.46
1:E:257:GLU:OE2	1:E:258:GLN:NE2	2.49	0.46
1:E:322:LYS:HD2	1:E:363[B]:ARG:NH2	2.28	0.46
1:E:363[B]:ARG:HB3	1:E:363[B]:ARG:NH1	2.31	0.46
2:F:1002:SO4:O2	3:F:1110:HOH:O	2.20	0.46
1:A:239:GLU:HG2	1:A:246:THR:HG21	1.98	0.45
1:E:363[A]:ARG:HH11	1:E:363[A]:ARG:HG3	1.80	0.45
1:E:363[B]:ARG:HB3	1:E:363[B]:ARG:HH11	1.81	0.45
1:C:312[B]:THR:HG22	1:E:342:LEU:HD22	1.97	0.45
1:F:322:LYS:HD2	1:F:363[B]:ARG:HH22	1.81	0.45
1:C:273:TYR:CE1	1:C:313[B]:LYS:HE2	2.52	0.45
1:C:312[A]:THR:CG2	3:C:1019:HOH:O	2.63	0.44
1:E:379:LYS:O	1:E:383[B]:ARG:HG3	2.17	0.44
1:D:363[B]:ARG:NH2	1:D:363[B]:ARG:CG	2.72	0.44
1:C:262:ASP:C	1:C:264:GLU:H	2.21	0.43
1:A:291:LEU:CD1	1:A:314[B]:ILE:HD13	2.49	0.43
1:E:371[B]:LYS:HD2	3:E:1113:HOH:O	2.18	0.43
1:E:248:LEU:HG	1:E:290:VAL:HG21	2.01	0.43
1:D:360:GLU:OE2	1:D:363[A]:ARG:NH2	2.49	0.42
1:B:363[B]:ARG:HB3	1:B:363[B]:ARG:HH11	1.84	0.42
1:A:314[B]:ILE:HD12	1:A:315:LEU:HD23	2.01	0.42
1:A:243[A]:SER:OG	1:A:246:THR:HG23	2.19	0.42
1:B:312[A]:THR:CG2	3:B:1030:HOH:O	2.68	0.41
1:C:243:SER:H	1:C:246:THR:HB	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:363[A]:ARG:HH11	1:E:363[A]:ARG:CG	2.35	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	165/177 (93%)	164 (99%)	1 (1%)	0	100	100
1	B	162/177 (92%)	160 (99%)	2 (1%)	0	100	100
1	C	166/177 (94%)	162 (98%)	3 (2%)	1 (1%)	25	7
1	D	167/177 (94%)	164 (98%)	3 (2%)	0	100	100
1	E	176/177 (99%)	175 (99%)	1 (1%)	0	100	100
1	F	165/177 (93%)	163 (99%)	2 (1%)	0	100	100
All	All	1001/1062 (94%)	988 (99%)	12 (1%)	1 (0%)	51	25

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	263	LYS

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	152/160 (95%)	152 (100%)	0	100	100
1	B	148/160 (92%)	148 (100%)	0	100	100
1	C	154/160 (96%)	152 (99%)	2 (1%)	69	44
1	D	152/160 (95%)	150 (99%)	2 (1%)	69	44
1	E	162/160 (101%)	159 (98%)	3 (2%)	57	27
1	F	151/160 (94%)	149 (99%)	2 (1%)	69	44
All	All	919/960 (96%)	910 (99%)	9 (1%)	81	57

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	262	ASP
1	C	335	GLU
1	D	283[A]	ASN
1	D	283[B]	ASN
1	E	242[A]	ASN
1	E	242[B]	ASN
1	E	244	GLU
1	F	262	ASP
1	F	375	LYS

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

Mol	Chain	Res	Type
1	A	352	ASN
1	B	352	ASN
1	F	302	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

20 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	SO4	F	1003	-	4,4,4	0.14	0	6,6,6	0.06	0
2	SO4	A	1013	-	4,4,4	0.12	0	6,6,6	0.10	0
2	SO4	B	1019	-	4,4,4	0.17	0	6,6,6	0.15	0
2	SO4	E	1017	-	4,4,4	0.13	0	6,6,6	0.06	0
2	SO4	F	1002	-	4,4,4	0.12	0	6,6,6	0.13	0
2	SO4	C	1014	-	4,4,4	0.14	0	6,6,6	0.09	0
2	SO4	D	1004	-	4,4,4	0.16	0	6,6,6	0.06	0
2	SO4	C	1015	-	4,4,4	0.14	0	6,6,6	0.11	0
2	SO4	D	1012	-	4,4,4	0.13	0	6,6,6	0.08	0
2	SO4	E	1006	-	4,4,4	0.14	0	6,6,6	0.10	0
2	SO4	D	1008	-	4,4,4	0.14	0	6,6,6	0.14	0
2	SO4	E	1007	-	4,4,4	0.14	0	6,6,6	0.15	0
2	SO4	F	1020	-	4,4,4	0.14	0	6,6,6	0.10	0
2	SO4	B	1016	-	4,4,4	0.14	0	6,6,6	0.08	0
2	SO4	D	1005	-	4,4,4	0.16	0	6,6,6	0.19	0
2	SO4	E	1011	-	4,4,4	0.20	0	6,6,6	0.25	0
2	SO4	A	1010	-	4,4,4	0.17	0	6,6,6	0.18	0
2	SO4	D	1001	-	4,4,4	0.18	0	6,6,6	0.10	0
2	SO4	F	1009	-	4,4,4	0.18	0	6,6,6	0.09	0
2	SO4	A	1018	-	4,4,4	0.14	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.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1019	SO4	1	0
2	F	1002	SO4	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	161/177 (90%)	0.41	9 (5%) 24 26	9, 13, 19, 49	14 (8%)
1	B	159/177 (89%)	0.44	9 (5%) 23 25	10, 15, 25, 29	12 (7%)
1	C	162/177 (91%)	0.44	9 (5%) 24 26	10, 15, 26, 54	6 (3%)
1	D	163/177 (92%)	0.45	12 (7%) 14 15	10, 15, 26, 56	14 (8%)
1	E	164/177 (92%)	0.60	14 (8%) 10 11	9, 15, 30, 59	14 (8%)
1	F	161/177 (90%)	0.53	12 (7%) 14 14	11, 17, 25, 61	13 (8%)
All	All	970/1062 (91%)	0.48	65 (6%) 17 19	9, 15, 26, 61	73 (7%)

All (65) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	238	PRO	10.2
1	F	238	PRO	7.4
1	E	407	GLU	7.2
1	D	238	PRO	6.0
1	D	403	ASP	5.7
1	C	262	ASP	5.4
1	C	261	GLU	5.4
1	F	404	ASP	5.4
1	E	244	GLU	5.3
1	B	236	GLY	5.3
1	A	406	LEU	5.1
1	B	237	SER	5.1
1	E	406	LEU	5.1
1	A	238	PRO	5.0
1	E	404	ASP	4.7
1	C	404	ASP	4.6
1	D	402	GLU	4.5
1	E	403	ASP	4.5
1	D	404	ASP	4.5

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Mol	Chain	Res	Type	RSRZ
1	B	259	ALA	4.5
1	F	395	ALA	4.2
1	B	261	GLU	4.1
1	C	264	GLU	4.1
1	C	403	ASP	4.1
1	D	262	ASP	4.0
1	A	237	SER	3.9
1	E	242[A]	ASN	3.8
1	D	260	GLY	3.8
1	F	406	LEU	3.6
1	C	405	GLU	3.5
1	B	262	ASP	3.5
1	A	395	ALA	3.3
1	E	405	GLU	3.3
1	C	406	LEU	3.2
1	B	238	PRO	3.2
1	D	261	GLU	3.1
1	F	405	GLU	3.0
1	D	406	LEU	3.0
1	F	265	ASN	3.0
1	C	395	ALA	2.9
1	E	245	LEU	2.9
1	F	259	ALA	2.9
1	D	407	GLU	2.7
1	F	383[A]	ARG	2.7
1	B	241	VAL	2.6
1	B	245	LEU	2.6
1	F	338	ASP	2.6
1	E	243	SER	2.5
1	A	350	LEU	2.5
1	F	262	ASP	2.5
1	A	405	GLU	2.5
1	D	265	ASN	2.3
1	D	363[A]	ARG	2.3
1	D	394	THR	2.2
1	A	245	LEU	2.2
1	A	356	ILE	2.2
1	A	347	LEU	2.2
1	F	350	LEU	2.1
1	E	396	GLU	2.1
1	E	383[A]	ARG	2.1
1	B	355	ILE	2.0

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Mol	Chain	Res	Type	RSRZ
1	E	241	VAL	2.0
1	F	301	VAL	2.0
1	C	238	PRO	2.0
1	E	335[A]	GLU	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 monosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	SO4	A	1010	5/5	0.75	0.32	33,36,36,36	5
2	SO4	D	1005	5/5	0.80	0.29	34,35,36,36	5
2	SO4	D	1004	5/5	0.81	0.19	42,42,43,43	5
2	SO4	C	1014	5/5	0.81	0.18	40,40,41,41	5
2	SO4	E	1007	5/5	0.81	0.23	50,51,51,51	5
2	SO4	D	1008	5/5	0.82	0.23	41,41,42,42	5
2	SO4	F	1020	5/5	0.82	0.23	53,53,54,54	5
2	SO4	B	1019	5/5	0.86	0.22	42,42,42,42	5
2	SO4	A	1018	5/5	0.86	0.17	44,44,45,45	5
2	SO4	C	1015	5/5	0.86	0.21	34,36,36,36	5
2	SO4	B	1016	5/5	0.86	0.24	36,37,37,37	5
2	SO4	F	1009	5/5	0.88	0.19	34,35,35,35	5
2	SO4	A	1013	5/5	0.88	0.17	36,36,36,36	5
2	SO4	E	1006	5/5	0.89	0.20	26,30,30,30	5
2	SO4	E	1011	5/5	0.90	0.20	23,24,24,27	5
2	SO4	D	1012	5/5	0.91	0.19	47,47,47,48	5
2	SO4	F	1002	5/5	0.91	0.12	36,37,37,37	5
2	SO4	E	1017	5/5	0.93	0.09	41,41,41,41	5
2	SO4	D	1001	5/5	0.93	0.11	31,32,33,33	5

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	SO4	F	1003	5/5	0.96	0.11	39,39,39,39	5

6.5 Other polymers [i](#)

There are no such residues in this entry.