



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 02:39 PM UTC

PDB ID : 2FUL / pdb_00002ful
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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

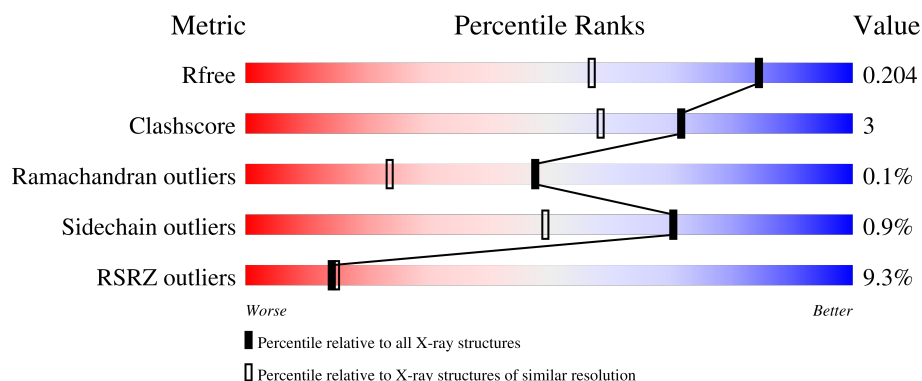
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.50 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}	180053	4037 (1.50-1.50)
Clashscore	190562	4235 (1.50-1.50)
Ramachandran outliers	187476	4153 (1.50-1.50)
Sidechain outliers	187428	4150 (1.50-1.50)
RSRZ outliers	180081	4039 (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	3% 86% 5% 9%
1	B	177	4% 86% • 10%
1	C	177	9% 82% 8% • 8%
1	D	177	10% 89% • 8%
1	E	177	14% 80% 12% • 7%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	177	11% 84% 7% 9%

2 Entry composition

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

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

Continued on next page...

Continued from previous page...

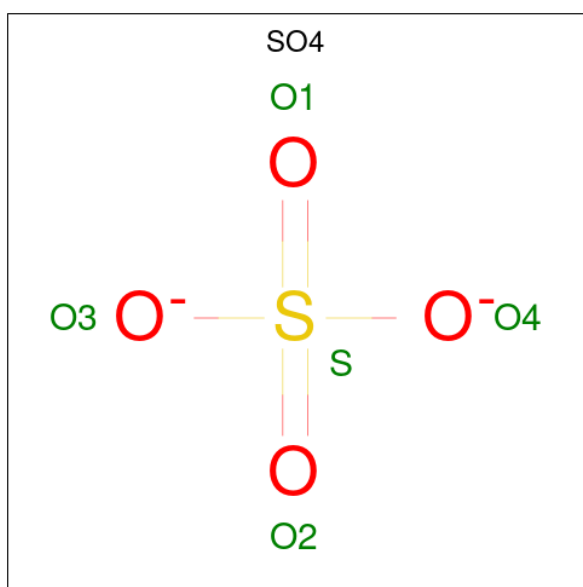
Chain	Residue	Modelled	Actual	Comment	Reference
B	406	LEU	-	cloning artifact	UNP P38431
B	407	GLU	-	cloning artifact	UNP P38431
B	408	ARG	-	cloning artifact	UNP P38431
B	409	PRO	-	cloning artifact	UNP P38431
B	410	HIS	-	cloning artifact	UNP P38431
B	411	ARG	-	cloning artifact	UNP P38431
B	412	ASP	-	cloning 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

Continued on next page...

Continued from previous page...

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 (CCD ID: 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		

Continued on next page...

Continued from previous page...

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

- Molecule 3 is water.

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

Continued on next page...

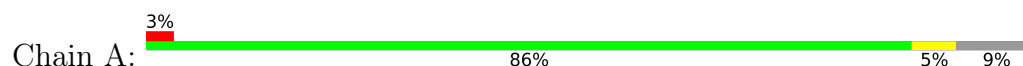
Continued from previous page...

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

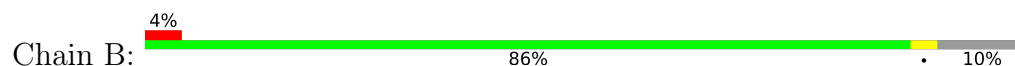
3 Residue-property plots [i](#)

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

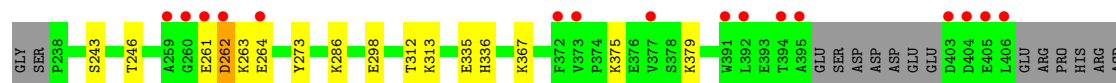
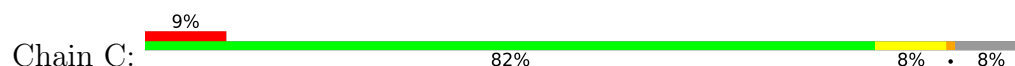
- Molecule 1: Eukaryotic translation initiation factor 5



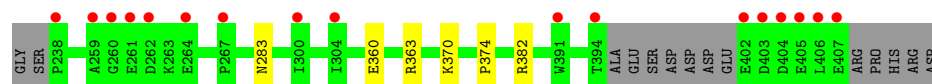
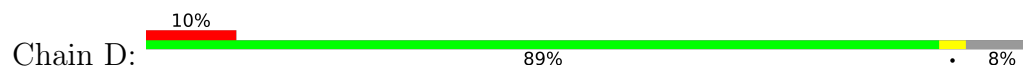
- Molecule 1: Eukaryotic translation initiation factor 5



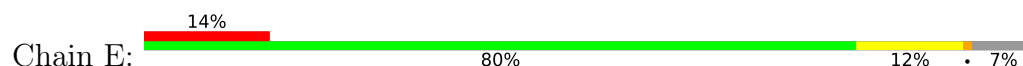
- Molecule 1: Eukaryotic translation initiation factor 5

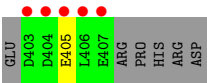


- Molecule 1: Eukaryotic translation initiation factor 5

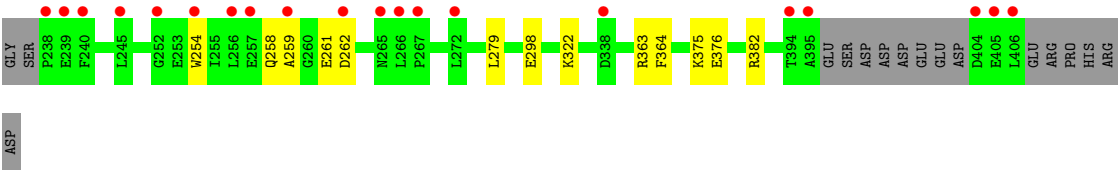
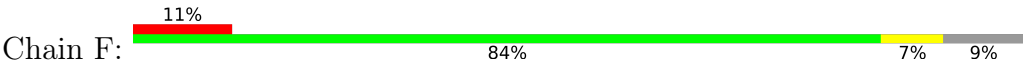


- Molecule 1: Eukaryotic translation initiation factor 5





● 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 50.00 – 1.50	Depositor EDS
% Data completeness (in resolution range)	92.3 (50.00-1.50) 92.3 (50.00-1.50)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.40 (at 1.50Å)	Xtriage
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 (4.60%)	wwPDB-VP
Wilson B-factor (Å ²)	16.9	Xtriage
Anisotropy	0.354	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 45.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
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

Xtriage'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

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	0.57	0/1390	0.76	0/1876
1	B	0.55	0/1355	0.73	0/1830
1	C	0.58	0/1406	0.73	0/1896
1	D	0.54	0/1407	0.73	0/1899
1	E	0.54	0/1489	0.74	2/2007 (0.1%)
1	F	0.52	0/1398	0.74	1/1885 (0.1%)
All	All	0.55	0/8445	0.74	3/11393 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	259	ALA	N-CA-C	6.00	118.78	111.82
1	F	259	ALA	N-CA-C	5.33	117.08	111.28
1	E	300	ILE	N-CA-C	5.07	116.40	110.62

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-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 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	5	0
1	B	1314	0	1327	5	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	1357	0	1374	10	0
1	D	1358	0	1367	7	0
1	E	1416	0	1452	21	0
1	F	1349	0	1360	7	0
2	A	15	0	0	0	0
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	0	0
3	A	179	0	0	1	0
3	B	135	0	0	1	0
3	C	146	0	0	1	0
3	D	146	0	0	1	0
3	E	161	0	0	3	0
3	F	149	0	0	2	0
All	All	9151	0	8235	54	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 3.

All (54) 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: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:E:324:PHE:CE2	1:E:328[B]:ILE:HD11	2.27	0.70
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	0.65
1:C:375:LYS:HE2	1:C:379:LYS:HE3	1.83	0.60
1:C:261:GLU:H	1:C:261:GLU:CD	2.10	0.60
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:F:364:PHE:O	1:F:382:ARG:HD3	2.06	0.55
1:F:298:GLU:H	1:F:298:GLU:CD	2.15	0.54
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

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:363[C]:ARG:NH1	3:D:1042:HOH:O	2.41	0.53
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:360:GLU:OE2	1:B:363[A]:ARG:NH2	2.43	0.50
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
1:C:262:ASP:C	1:C:264:GLU:H	2.21	0.48
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: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: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
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: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: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:C:298[A]:GLU:H	1:C:298[A]:GLU:CD	2.27	0.43
1:D:360:GLU:OE2	1:D:363[A]:ARG:NH2	2.49	0.42
1:F:261:GLU:H	1:F:261:GLU:CD	2.27	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:C:243:SER:H	1:C:246:THR:HB	1.85	0.41
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

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	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%)	21	6
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%)	48	24

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	263	LYS

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	152/160 (95%)	151 (99%)	1 (1%)	76	57
1	B	148/160 (92%)	148 (100%)	0	100	100
1	C	154/160 (96%)	153 (99%)	1 (1%)	78	62
1	D	152/160 (95%)	149 (98%)	3 (2%)	48	20
1	E	162/160 (101%)	159 (98%)	3 (2%)	50	22
1	F	151/160 (94%)	149 (99%)	2 (1%)	61	35

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	919/960 (96%)	909 (99%)	10 (1%)	70	41

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	383	ARG
1	C	262	ASP
1	D	283[A]	ASN
1	D	283[B]	ASN
1	D	370	LYS
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 (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	308	ASN
1	A	352	ASN
1	A	353	ASN
1	B	323	ASN
1	B	352	ASN
1	E	349	GLN
1	E	352	ASN
1	F	302	ASN
1	F	323	ASN
1	F	352	ASN

5.3.3 RNA ⓘ

There are no RNA molecules 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 [i](#)

There are no oligosaccharides 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	1020	-	4,4,4	0.21	0	6,6,6	0.13	0
2	SO4	D	1001	-	4,4,4	0.26	0	6,6,6	0.10	0
2	SO4	D	1008	-	4,4,4	0.23	0	6,6,6	0.15	0
2	SO4	E	1017	-	4,4,4	0.22	0	6,6,6	0.04	0
2	SO4	A	1018	-	4,4,4	0.24	0	6,6,6	0.12	0
2	SO4	B	1016	-	4,4,4	0.22	0	6,6,6	0.05	0
2	SO4	D	1005	-	4,4,4	0.27	0	6,6,6	0.20	0
2	SO4	C	1015	-	4,4,4	0.24	0	6,6,6	0.12	0
2	SO4	E	1006	-	4,4,4	0.22	0	6,6,6	0.15	0
2	SO4	E	1007	-	4,4,4	0.21	0	6,6,6	0.13	0
2	SO4	F	1003	-	4,4,4	0.23	0	6,6,6	0.09	0
2	SO4	B	1019	-	4,4,4	0.26	0	6,6,6	0.18	0
2	SO4	E	1011	-	4,4,4	0.24	0	6,6,6	0.24	0
2	SO4	F	1002	-	4,4,4	0.22	0	6,6,6	0.13	0
2	SO4	C	1014	-	4,4,4	0.24	0	6,6,6	0.10	0
2	SO4	A	1013	-	4,4,4	0.21	0	6,6,6	0.12	0
2	SO4	A	1010	-	4,4,4	0.27	0	6,6,6	0.18	0
2	SO4	D	1004	-	4,4,4	0.25	0	6,6,6	0.05	0
2	SO4	F	1009	-	4,4,4	0.27	0	6,6,6	0.13	0
2	SO4	D	1012	-	4,4,4	0.22	0	6,6,6	0.10	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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1019	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%)	0.11	6 (3%)	45 49	6, 13, 19, 49	22 (13%)
1	B	159/177 (89%)	0.29	7 (4%)	39 43	6, 15, 25, 29	17 (10%)
1	C	162/177 (91%)	0.57	16 (9%)	13 13	8, 14, 26, 54	14 (8%)
1	D	163/177 (92%)	0.48	17 (10%)	11 12	6, 15, 25, 56	21 (12%)
1	E	164/177 (92%)	0.86	24 (14%)	6 6	6, 15, 27, 59	30 (18%)
1	F	161/177 (90%)	0.73	20 (12%)	8 8	7, 16, 25, 61	21 (13%)
All	All	970/1062 (91%)	0.51	90 (9%)	14 15	6, 15, 25, 61	125 (12%)

All (90) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	406	LEU	7.4
1	E	238	PRO	7.2
1	C	391	TRP	7.1
1	D	402	GLU	6.3
1	E	405	GLU	6.2
1	E	407	GLU	6.1
1	A	406	LEU	6.0
1	D	238	PRO	5.8
1	A	395	ALA	5.7
1	E	241	VAL	5.6
1	F	406	LEU	5.5
1	F	404	ASP	5.4
1	E	403	ASP	5.2
1	C	392	LEU	5.2
1	B	236	GLY	5.1
1	D	406	LEU	5.0
1	E	404	ASP	5.0
1	D	404	ASP	5.0
1	C	406	LEU	5.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	403	ASP	4.9
1	D	403	ASP	4.7
1	F	395	ALA	4.7
1	C	404	ASP	4.5
1	A	238	PRO	4.4
1	F	240	PHE	4.2
1	B	237	SER	4.1
1	C	394	THR	4.1
1	D	262	ASP	4.0
1	C	395	ALA	3.8
1	F	405	GLU	3.7
1	E	256	LEU	3.7
1	C	405	GLU	3.7
1	F	259	ALA	3.6
1	E	240	PHE	3.6
1	D	260	GLY	3.5
1	D	394	THR	3.5
1	B	241	VAL	3.5
1	C	261	GLU	3.3
1	D	407	GLU	3.3
1	E	243	SER	3.2
1	F	238	PRO	3.2
1	E	246	THR	3.2
1	E	248	LEU	3.1
1	F	266	LEU	3.1
1	F	252	GLY	3.1
1	F	265	ASN	3.0
1	A	405	GLU	2.9
1	E	239	GLU	2.9
1	E	395	ALA	2.8
1	A	245	LEU	2.8
1	C	377	VAL	2.7
1	C	264	GLU	2.7
1	B	259	ALA	2.7
1	C	259	ALA	2.7
1	C	262	ASP	2.7
1	F	338	ASP	2.6
1	B	238	PRO	2.6
1	C	372	PHE	2.6
1	E	254	TRP	2.6
1	E	259	ALA	2.6
1	F	254	TRP	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	244	GLU	2.5
1	B	245	LEU	2.5
1	E	252	GLY	2.5
1	C	260	GLY	2.5
1	E	251	TYR	2.5
1	C	373	VAL	2.5
1	D	259	ALA	2.4
1	E	394	THR	2.4
1	D	391	TRP	2.4
1	E	396	GLU	2.4
1	F	256	LEU	2.4
1	E	242[A]	ASN	2.4
1	F	267	PRO	2.3
1	F	272	LEU	2.3
1	D	261	GLU	2.3
1	F	245	LEU	2.3
1	A	257	GLU	2.3
1	D	405	GLU	2.2
1	D	300	ILE	2.2
1	F	239	GLU	2.2
1	B	254	TRP	2.2
1	F	257	GLU	2.2
1	E	383[A]	ARG	2.1
1	F	262	ASP	2.1
1	F	394	THR	2.1
1	E	245	LEU	2.1
1	D	264	GLU	2.0
1	D	304	ILE	2.0
1	D	267	PRO	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 oligosaccharides 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. 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($\text{\AA}^2$)	Q<0.9
2	SO4	A	1010	5/5	0.72	0.19	33,36,36,36	5
2	SO4	D	1008	5/5	0.73	0.28	41,41,42,42	5
2	SO4	E	1007	5/5	0.75	0.21	50,51,51,51	5
2	SO4	C	1014	5/5	0.76	0.19	40,40,41,41	5
2	SO4	D	1005	5/5	0.78	0.15	34,35,36,36	5
2	SO4	D	1004	5/5	0.79	0.18	42,42,43,43	5
2	SO4	A	1013	5/5	0.79	0.18	36,36,36,36	5
2	SO4	F	1002	5/5	0.79	0.19	36,37,37,37	5
2	SO4	F	1009	5/5	0.79	0.18	34,35,35,35	5
2	SO4	A	1018	5/5	0.80	0.18	44,44,45,45	5
2	SO4	B	1019	5/5	0.81	0.22	42,42,42,42	5
2	SO4	C	1015	5/5	0.81	0.16	34,36,36,36	5
2	SO4	B	1016	5/5	0.82	0.18	36,37,37,37	5
2	SO4	F	1020	5/5	0.84	0.23	53,53,54,54	5
2	SO4	E	1017	5/5	0.85	0.16	41,41,41,41	5
2	SO4	D	1012	5/5	0.85	0.15	47,47,47,48	5
2	SO4	E	1006	5/5	0.87	0.15	26,30,30,30	5
2	SO4	E	1011	5/5	0.87	0.17	23,24,24,27	5
2	SO4	F	1003	5/5	0.88	0.15	39,39,39,39	5
2	SO4	D	1001	5/5	0.89	0.13	31,32,33,33	5

6.5 Other polymers

There are no such residues in this entry.