WORLDWIDE PDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Oct 18, 2023 – 09:36 AM EDT

PDB ID	:	2E6B
Title	:	Crystal structure of the stationary phase survival protein SurE from Thermus thermophilus HB8 in complex with magnesium and tungstate
Authors	:	Iwasaki, W.; Miki, K.
Deposited on	:	2006-12-26
Resolution	:	2.50 Å(reported)

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 ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	Percentile Ranks	Value
Rfree		0.226
Clashscore		14
Ramachandran outliers		0.7%
Sidechain outliers		2.7%
RSRZ outliers		2.0%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
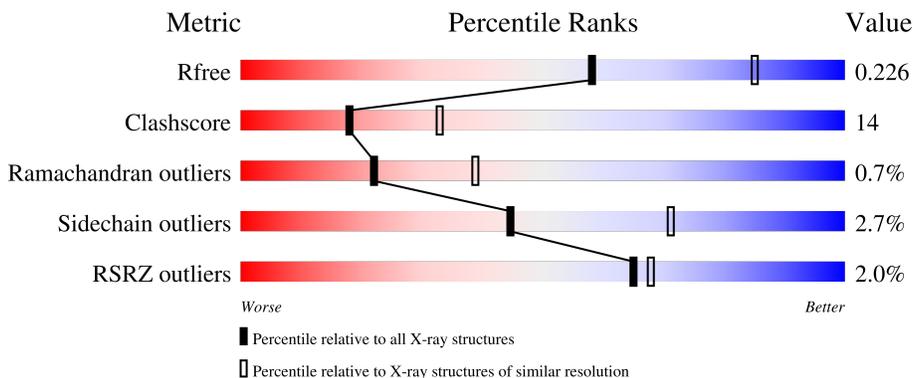
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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 <=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	244	2% 70% 26% • •
1	B	244	2% 75% 20% • 5%
1	C	244	2% 68% 23% • 5%
1	D	244	2% 73% 20% • 5%

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:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	GOL	A	501	-	-	X	-

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 7414 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 5'-nucleotidase surE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	237	Total	C	N	O	S	0	0	0
			1834	1189	321	321	3			
1	B	233	Total	C	N	O	S	0	0	0
			1810	1175	315	317	3			
1	C	232	Total	C	N	O	S	0	0	0
			1803	1169	316	315	3			
1	D	231	Total	C	N	O	S	0	0	0
			1794	1164	314	313	3			

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Mg	0	0
			1	1		
2	B	1	Total	Mg	0	0
			1	1		
2	C	1	Total	Mg	0	0
			1	1		
2	D	1	Total	Mg	0	0
			1	1		

- Molecule 3 is TUNGSTATE(VI)ION (three-letter code: WO4) (formula: O_4W).

WO4

O1

O

O3 O⁻ — W — O⁻ O4

W

O

O2
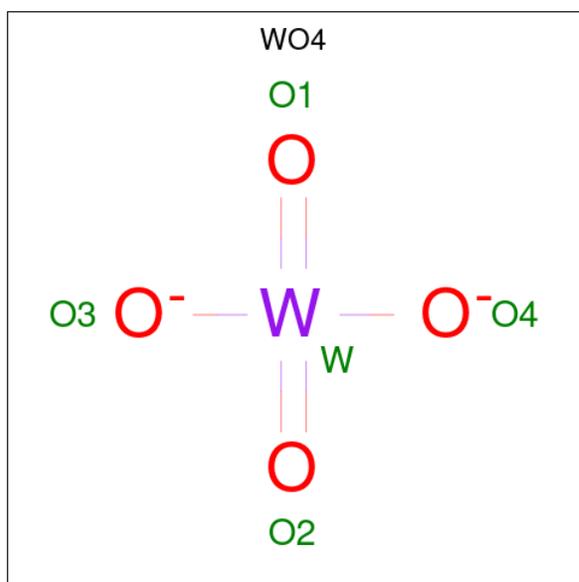
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 5	O 4	W 1	0	0
3	B	1	Total 5	O 4	W 1	0	0
3	C	1	Total 5	O 4	W 1	0	0
3	D	1	Total 5	O 4	W 1	0	0

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

SO4

O1

O

O3 O⁻ — S — O⁻ O4

S

O

O2
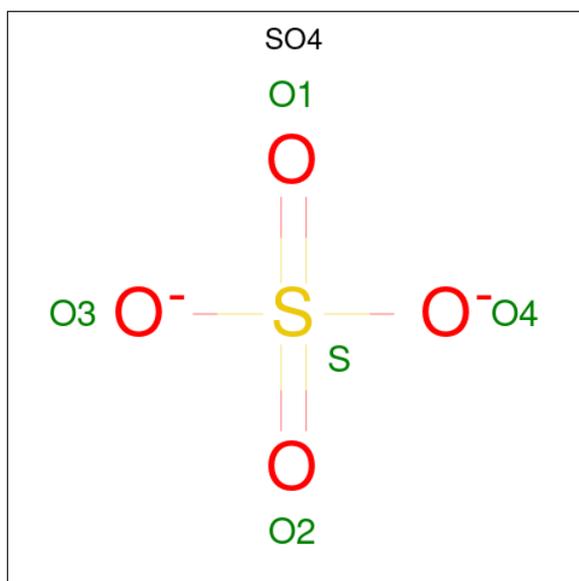
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total 5	O 4	S 1	0	0
4	A	1	Total 5	O 4	S 1	0	0
4	A	1	Total 5	O 4	S 1	0	0
4	A	1	Total 5	O 4	S 1	0	0
4	B	1	Total 5	O 4	S 1	0	0
4	B	1	Total 5	O 4	S 1	0	0
4	B	1	Total 5	O 4	S 1	0	0
4	C	1	Total 5	O 4	S 1	0	0
4	D	1	Total 5	O 4	S 1	0	0
4	D	1	Total 5	O 4	S 1	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).
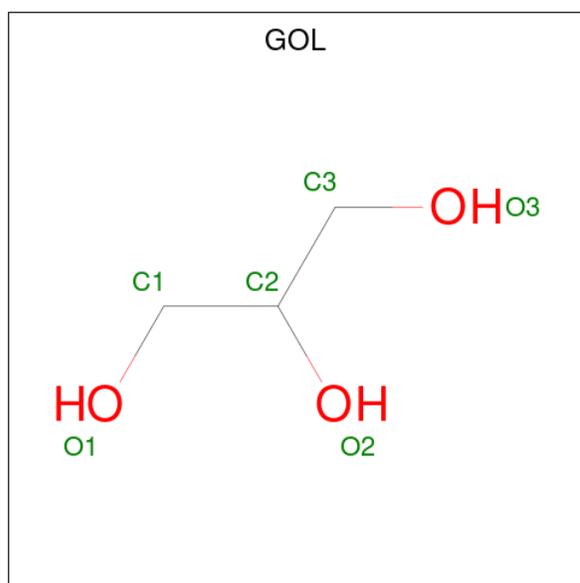
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total 6	C 3	O 3	0	0
5	B	1	Total 6	C 3	O 3	0	0

• Molecule 6 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	27	Total 27	O 27	0	0
6	B	27	Total 27	O 27	0	0
6	C	16	Total 16	O 16	0	0
6	D	17	Total 17	O 17	0	0

3 Residue-property plots ⓘ

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: 5'-nucleotidase surE
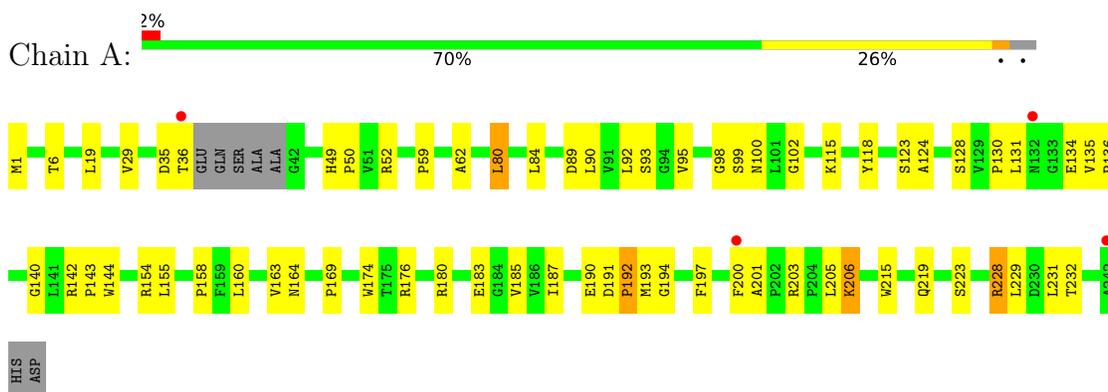
Chain A:

- Molecule 1: 5'-nucleotidase surE

Chain B:

- Molecule 1: 5'-nucleotidase surE

Chain C:

- Molecule 1: 5'-nucleotidase surE

Chain D:

M1 T6 I11 L19 D35 T36 GLU GLN SER ALA ALA GLY H43 A48 H49 P50 V51 R52 A53 Y54 S58 P59 L60 H61 A62 P63 H64 R71 G72 T73 D76 L80 S93 G94 V95 S99 G102 T110 Y118 S123 A126 V129 P130

R142 P143 R157 P158 V163 N164 L165 Q177 A181 Y182 E183 V186 I187 D191 P192 W199 L205 S223 R228 L229 D230 L231 T232 D233 E234 T235 R236 L237 GLN PRO THR LEU ALA HIS ASP
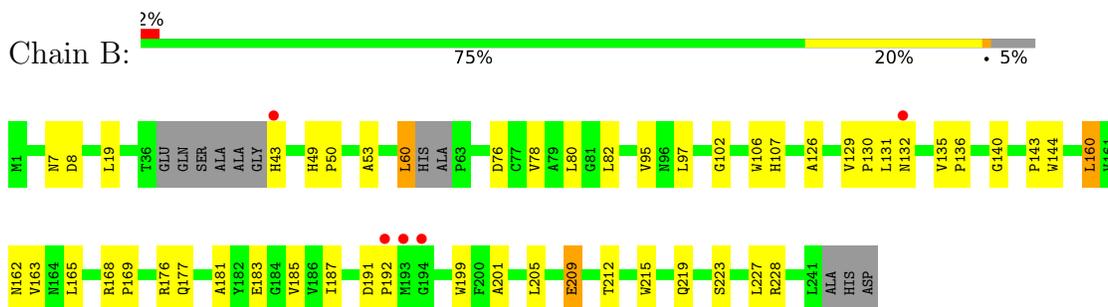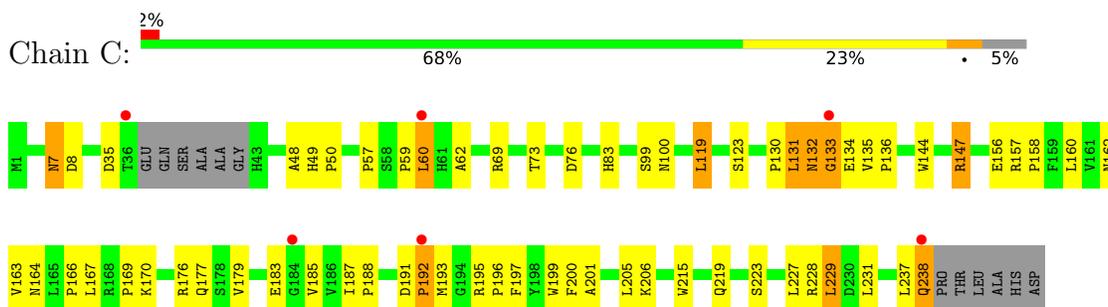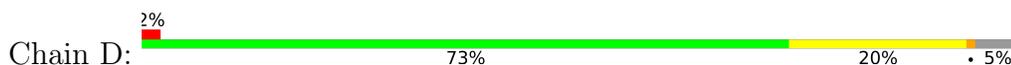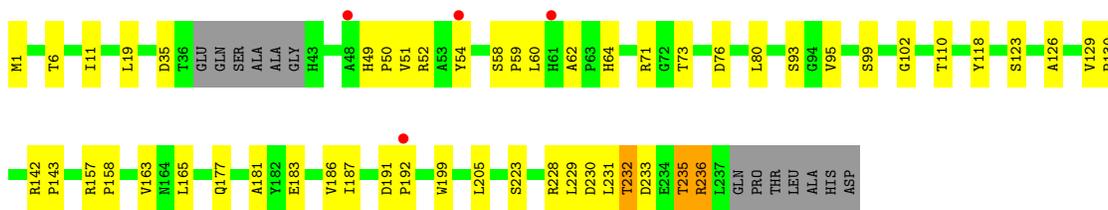
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α, β, γ	132.02Å 132.02Å 130.82Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	46.46 – 2.50 46.46 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.9 (46.46-2.50) 99.9 (46.46-2.50)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	8.46 (at 2.51Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.198 , 0.230 0.193 , 0.226	Depositor DCC
R_{free} test set	2293 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	38.7	Xtriage
Anisotropy	0.288	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 47.3	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.021 for -h,-k,l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7414	wwPDB-VP
Average B, all atoms (Å^2)	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.17% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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, WO4, GOL, MG

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	0.34	0/1893	0.63	0/2594
1	B	0.33	0/1867	0.63	0/2556
1	C	0.32	0/1861	0.60	0/2549
1	D	0.33	0/1852	0.62	0/2537
All	All	0.33	0/7473	0.62	0/10236

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	1834	0	1815	66	0
1	B	1810	0	1795	48	0
1	C	1803	0	1782	64	0
1	D	1794	0	1774	52	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	5	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	5	0	0	0	0
3	C	5	0	0	0	0
3	D	5	0	0	0	0
4	A	20	0	0	2	0
4	B	15	0	0	1	0
4	C	5	0	0	0	0
4	D	10	0	0	1	0
5	A	6	0	8	4	0
5	B	6	0	8	0	0
6	A	27	0	0	0	0
6	B	27	0	0	2	0
6	C	16	0	0	0	0
6	D	17	0	0	0	0
All	All	7414	0	7182	196	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 14.

All (196) 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:B:60:LEU:HD12	1:B:60:LEU:H	1.20	1.04
1:A:231:LEU:H	1:B:177:GLN:NE2	1.58	1.00
1:C:60:LEU:H	1:C:60:LEU:HD23	1.30	0.94
1:A:231:LEU:H	1:B:177:GLN:HE22	1.16	0.90
1:C:238:GLN:HE21	1:C:238:GLN:HA	1.36	0.89
1:A:49:HIS:HB2	1:A:50:PRO:HD2	1.59	0.84
1:D:236:ARG:HH21	1:D:236:ARG:HB3	1.47	0.80
1:A:191:ASP:HB2	1:A:192:PRO:HD2	1.65	0.79
1:A:176:ARG:HD3	6:B:1405:HOH:O	1.82	0.78
1:A:100:ASN:H	1:A:164:ASN:HD21	1.32	0.77
1:A:29:VAL:H	5:A:501:GOL:H31	1.47	0.77
1:D:191:ASP:HB2	1:D:192:PRO:HD2	1.68	0.76
1:C:238:GLN:HA	1:C:238:GLN:NE2	2.00	0.76
1:B:60:LEU:H	1:B:60:LEU:CD1	1.99	0.76
1:D:59:PRO:HG2	1:D:62:ALA:HB3	1.67	0.76
1:D:230:ASP:OD1	1:D:232:THR:HG23	1.87	0.74
1:C:237:LEU:O	1:C:238:GLN:HG2	1.87	0.74
1:C:100:ASN:H	1:C:164:ASN:HD21	1.36	0.74
1:B:49:HIS:HB2	1:B:50:PRO:HD2	1.70	0.73
1:C:195:ARG:HD2	1:D:52:ARG:HH22	1.53	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:191:ASP:HB2	1:B:192:PRO:HD2	1.72	0.70
1:B:168:ARG:HB2	1:B:168:ARG:HH21	1.56	0.70
1:C:49:HIS:HB2	1:C:50:PRO:HD2	1.73	0.69
1:C:231:LEU:H	1:D:177:GLN:NE2	1.90	0.68
1:C:131:LEU:O	1:C:133:GLY:N	2.27	0.67
1:C:59:PRO:HG2	1:C:62:ALA:HB3	1.74	0.67
1:D:49:HIS:HB2	1:D:50:PRO:HD2	1.77	0.67
1:C:195:ARG:HD2	1:D:52:ARG:NH2	2.11	0.66
1:C:238:GLN:HE21	1:C:238:GLN:CA	2.05	0.66
1:D:1:MET:HE1	1:D:157:ARG:HH22	1.60	0.66
1:B:183:GLU:HB3	1:B:205:LEU:HD21	1.78	0.66
1:A:231:LEU:N	1:B:177:GLN:HE22	1.92	0.65
1:A:180:ARG:HG2	1:A:206:LYS:HE2	1.78	0.64
1:B:168:ARG:HB2	1:B:168:ARG:NH2	2.14	0.62
1:A:180:ARG:HG2	1:A:206:LYS:CE	2.30	0.62
1:C:231:LEU:O	1:D:228:ARG:HG2	2.00	0.62
1:B:78:VAL:O	1:B:82:LEU:HD13	2.00	0.61
1:D:230:ASP:OD1	1:D:232:THR:CG2	2.48	0.61
1:D:233:ASP:OD2	1:D:235:THR:HB	2.00	0.61
1:A:29:VAL:H	5:A:501:GOL:C3	2.14	0.61
1:D:129:VAL:HG23	1:D:165:LEU:O	2.01	0.61
1:A:35:ASP:O	1:A:36:THR:HB	2.00	0.60
1:C:191:ASP:O	1:C:193:MET:N	2.34	0.60
1:C:205:LEU:O	1:C:206:LYS:HD3	2.01	0.60
1:C:135:VAL:HG13	1:C:136:PRO:HD2	1.83	0.60
1:C:60:LEU:H	1:C:60:LEU:CD2	2.08	0.60
1:D:118:TYR:HD2	1:D:229:LEU:HD11	1.67	0.59
1:C:200:PHE:HZ	1:D:80:LEU:HB2	1.68	0.59
1:A:118:TYR:HD1	1:A:229:LEU:HD11	1.68	0.58
1:B:199:TRP:CZ3	1:C:192:PRO:HD2	2.39	0.57
1:A:228:ARG:HH11	1:A:228:ARG:CB	2.18	0.57
1:C:191:ASP:C	1:C:193:MET:H	2.08	0.57
1:C:183:GLU:HB3	1:C:205:LEU:HD21	1.86	0.57
1:D:1:MET:CE	1:D:157:ARG:HH22	2.17	0.56
1:B:131:LEU:CD2	1:B:136:PRO:HD3	2.35	0.56
1:A:228:ARG:HE	1:B:228:ARG:CZ	2.18	0.56
1:C:231:LEU:H	1:D:177:GLN:HE22	1.54	0.56
1:C:185:VAL:HB	1:C:201:ALA:O	2.06	0.55
1:B:19:LEU:HB2	1:B:95:VAL:HG23	1.88	0.55
1:C:177:GLN:H	1:D:232:THR:CG2	2.19	0.55
1:D:102:GLY:HA3	4:D:3401:SO4:O2	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:228:ARG:HH11	1:A:228:ARG:HB3	1.73	0.54
1:C:119:LEU:HD13	1:C:229:LEU:HD21	1.89	0.54
1:A:140:GLY:O	1:A:143:PRO:HD2	2.08	0.54
1:D:187:ILE:HB	1:D:199:TRP:HB2	1.89	0.54
1:A:154:ARG:HH21	1:A:154:ARG:HG2	1.72	0.54
1:C:7:ASN:C	1:C:7:ASN:ND2	2.62	0.53
1:C:144:TRP:CD1	1:C:169:PRO:HB2	2.44	0.53
1:D:52:ARG:CZ	1:D:54:TYR:HE1	2.21	0.53
1:A:155:LEU:HD21	1:A:174:TRP:HH2	1.75	0.51
1:A:183:GLU:HB2	1:A:205:LEU:HD21	1.93	0.51
1:C:160:LEU:HG	1:C:227:LEU:HB2	1.93	0.51
1:C:73:THR:O	1:C:76:ASP:HB2	2.10	0.51
1:D:142:ARG:HB3	1:D:143:PRO:HD3	1.93	0.51
1:A:144:TRP:CE2	1:A:169:PRO:HB2	2.45	0.50
1:A:29:VAL:O	5:A:501:GOL:H12	2.11	0.50
1:A:185:VAL:HB	1:A:201:ALA:O	2.11	0.50
1:A:50:PRO:HD3	1:B:199:TRP:CH2	2.47	0.50
1:C:200:PHE:CZ	1:D:80:LEU:HB2	2.46	0.50
1:A:190:GLU:OE2	1:A:194:GLY:HA2	2.11	0.49
1:A:52:ARG:HH22	1:B:191:ASP:HB3	1.77	0.49
1:A:35:ASP:O	1:A:36:THR:CB	2.60	0.49
1:B:102:GLY:HA3	4:B:1401:SO4:O1	2.13	0.49
1:C:215:TRP:O	1:C:219:GLN:HG2	2.13	0.49
1:A:203:ARG:HH21	1:A:203:ARG:HG3	1.78	0.49
1:B:97:LEU:HB3	1:B:131:LEU:HD11	1.93	0.49
1:A:228:ARG:HB2	4:A:403:SO4:O3	2.13	0.49
1:A:131:LEU:CD2	1:A:136:PRO:HD3	2.43	0.49
1:B:199:TRP:CH2	1:C:192:PRO:HD2	2.47	0.49
1:C:166:PRO:O	1:C:169:PRO:HG3	2.12	0.49
1:D:236:ARG:HB3	1:D:236:ARG:NH2	2.21	0.49
1:A:80:LEU:HD22	1:A:84:LEU:HG	1.95	0.49
1:D:181:ALA:HB3	1:D:205:LEU:HD12	1.94	0.49
1:A:123:SER:OG	1:A:158:PRO:HA	2.13	0.48
1:B:187:ILE:HB	1:B:199:TRP:HB2	1.96	0.48
1:D:236:ARG:HH21	1:D:236:ARG:CB	2.23	0.48
1:A:90:LEU:HD21	1:A:92:LEU:HD21	1.95	0.48
1:D:118:TYR:CD2	1:D:229:LEU:HD11	2.48	0.48
1:C:83:HIS:HB2	1:D:186:VAL:HG21	1.95	0.48
1:A:52:ARG:HH22	1:B:191:ASP:CB	2.27	0.48
1:C:176:ARG:HB2	1:D:232:THR:HG21	1.96	0.48
1:A:215:TRP:O	1:A:219:GLN:HG2	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:50:PRO:HD3	1:D:199:TRP:CH2	2.49	0.47
1:B:140:GLY:O	1:B:143:PRO:HD2	2.14	0.47
1:D:183:GLU:HB2	1:D:205:LEU:HD21	1.95	0.47
1:D:235:THR:HG22	1:D:236:ARG:HG3	1.97	0.47
1:C:200:PHE:CE1	1:D:51:VAL:HG21	2.50	0.47
1:D:35:ASP:HB2	1:D:71:ARG:HB3	1.96	0.47
1:C:7:ASN:C	1:C:7:ASN:HD22	2.18	0.47
1:C:193:MET:CE	1:C:195:ARG:HH11	2.28	0.47
1:D:6:THR:O	1:D:93:SER:HA	2.14	0.47
1:B:126:ALA:HB3	1:B:162:ASN:HD22	1.78	0.46
1:B:130:PRO:HD2	1:B:165:LEU:O	2.15	0.46
1:B:228:ARG:HG3	6:B:1425:HOH:O	2.15	0.46
1:D:58:SER:OG	1:D:64:HIS:HD2	1.98	0.46
1:D:35:ASP:CB	1:D:71:ARG:HB3	2.44	0.46
1:A:49:HIS:HA	1:B:199:TRP:CZ3	2.50	0.46
1:A:115:LYS:HZ1	1:B:107:HIS:CE1	2.34	0.46
1:B:7:ASN:OD1	1:B:7:ASN:C	2.53	0.46
1:C:167:LEU:O	1:C:169:PRO:HD3	2.15	0.46
1:A:115:LYS:HE2	1:B:106:TRP:CD2	2.51	0.46
1:D:183:GLU:HB2	1:D:205:LEU:CD2	2.45	0.45
1:A:135:VAL:HG21	1:C:57:PRO:HG3	1.99	0.45
1:A:228:ARG:HE	1:B:228:ARG:NH1	2.13	0.45
1:A:142:ARG:HB3	1:A:143:PRO:HD3	1.99	0.45
1:B:53:ALA:CB	1:B:80:LEU:HD21	2.47	0.45
1:B:131:LEU:HD22	1:B:136:PRO:HD3	1.99	0.45
1:A:197:PHE:CD1	1:B:50:PRO:HB2	2.52	0.45
1:A:155:LEU:HD21	1:A:174:TRP:CH2	2.52	0.45
1:C:179:VAL:HG13	1:C:179:VAL:O	2.17	0.45
1:D:163:VAL:HA	1:D:223:SER:O	2.16	0.45
1:A:59:PRO:HG2	1:A:62:ALA:HB3	1.98	0.45
1:C:177:GLN:H	1:D:232:THR:HG22	1.81	0.44
1:C:147:ARG:O	1:C:147:ARG:HD3	2.17	0.44
1:A:191:ASP:C	1:A:193:MET:H	2.21	0.44
1:C:183:GLU:O	1:C:183:GLU:HG3	2.17	0.44
1:A:98:GLY:O	1:A:128:SER:HB3	2.18	0.44
1:A:49:HIS:HB2	1:A:50:PRO:CD	2.38	0.44
1:B:209:GLU:HB3	1:B:212:THR:HG23	1.98	0.44
1:A:1:MET:HG3	1:A:89:ASP:HB2	1.99	0.44
1:B:160:LEU:HD13	1:B:227:LEU:HB2	1.99	0.44
1:A:203:ARG:HG3	1:A:203:ARG:NH2	2.32	0.43
1:B:135:VAL:HG23	1:B:136:PRO:HD2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:99:SER:HB3	1:C:130:PRO:HB3	2.01	0.43
1:C:131:LEU:HD12	1:C:132:ASN:N	2.33	0.43
1:C:162:ASN:HB2	1:C:227:LEU:HD11	2.00	0.43
1:A:99:SER:HB3	1:A:130:PRO:HB3	2.01	0.43
1:A:232:THR:HG21	1:B:176:ARG:HB2	2.00	0.43
1:A:131:LEU:HB3	1:A:134:GLU:O	2.18	0.43
1:C:191:ASP:C	1:C:193:MET:N	2.70	0.43
1:C:199:TRP:CH2	1:D:50:PRO:HD3	2.53	0.43
1:D:60:LEU:O	1:D:60:LEU:HD23	2.18	0.43
1:D:123:SER:OG	1:D:158:PRO:HA	2.19	0.43
1:A:185:VAL:HG12	1:A:187:ILE:CD1	2.48	0.43
1:C:157:ARG:HH11	1:C:157:ARG:HG3	1.83	0.42
1:D:129:VAL:HG13	1:D:129:VAL:O	2.19	0.42
1:B:144:TRP:CD1	1:B:169:PRO:HB2	2.53	0.42
1:B:215:TRP:O	1:B:219:GLN:HG2	2.19	0.42
1:D:11:ILE:O	1:D:11:ILE:HG13	2.19	0.42
1:D:110:THR:HG22	1:D:126:ALA:HB1	2.00	0.42
1:A:124:ALA:O	1:A:160:LEU:HA	2.19	0.42
1:A:197:PHE:CD1	1:A:197:PHE:C	2.93	0.42
1:B:163:VAL:HA	1:B:223:SER:O	2.18	0.42
1:D:19:LEU:HB2	1:D:95:VAL:HG23	2.01	0.42
1:C:187:ILE:HA	1:C:188:PRO:HD3	1.85	0.42
1:C:170:LYS:HE2	1:C:219:GLN:O	2.19	0.42
1:A:6:THR:O	1:A:93:SER:HA	2.19	0.42
1:A:200:PHE:HE1	1:B:76:ASP:HB3	1.83	0.42
1:B:185:VAL:HB	1:B:201:ALA:O	2.19	0.42
1:C:237:LEU:HD23	1:C:237:LEU:HA	1.73	0.42
1:A:187:ILE:HD12	1:A:187:ILE:N	2.35	0.42
1:C:193:MET:O	1:C:193:MET:HG2	2.20	0.42
1:C:228:ARG:HG2	1:D:231:LEU:O	2.20	0.42
1:A:163:VAL:HA	1:A:223:SER:O	2.20	0.41
1:C:35:ASP:HB3	1:C:69:ARG:CG	2.49	0.41
1:C:35:ASP:HB3	1:C:69:ARG:HG2	2.02	0.41
1:A:102:GLY:HA3	4:A:401:SO4:O3	2.21	0.41
1:A:144:TRP:CD2	1:A:169:PRO:HB2	2.55	0.41
1:C:131:LEU:HB2	1:C:134:GLU:O	2.20	0.41
1:D:73:THR:O	1:D:76:ASP:HB2	2.20	0.41
1:D:99:SER:HB3	1:D:130:PRO:HG3	2.01	0.41
1:B:129:VAL:HG23	1:B:129:VAL:O	2.20	0.41
1:C:8:ASP:OD2	1:C:8:ASP:C	2.58	0.41
1:C:123:SER:OG	1:C:158:PRO:HA	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:156:GLU:HG3	1:D:236:ARG:HH11	1.86	0.41
1:A:29:VAL:N	5:A:501:GOL:H31	2.25	0.41
1:A:228:ARG:CB	1:A:228:ARG:NH1	2.84	0.41
1:B:181:ALA:HB3	1:B:205:LEU:HD12	2.02	0.41
1:A:118:TYR:CD1	1:A:229:LEU:HD11	2.53	0.40
1:A:115:LYS:HE2	1:B:106:TRP:CG	2.56	0.40
1:B:228:ARG:HH21	1:B:228:ARG:HG2	1.86	0.40
1:C:163:VAL:HA	1:C:223:SER:O	2.21	0.40
1:A:19:LEU:HB2	1:A:95:VAL:HG23	2.02	0.40
1:D:52:ARG:NH2	1:D:54:TYR:HE1	2.20	0.40
1:B:49:HIS:HB2	1:B:50:PRO:CD	2.46	0.40
1:C:167:LEU:C	1:C:169:PRO:HD3	2.41	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	233/244 (96%)	228 (98%)	4 (2%)	1 (0%)	34	54
1	B	227/244 (93%)	218 (96%)	8 (4%)	1 (0%)	34	54
1	C	228/244 (93%)	216 (95%)	8 (4%)	4 (2%)	8	14
1	D	227/244 (93%)	223 (98%)	4 (2%)	0	100	100
All	All	915/976 (94%)	885 (97%)	24 (3%)	6 (1%)	22	39

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	132	ASN
1	C	192	PRO
1	C	48	ALA

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Mol	Chain	Res	Type
1	B	132	ASN
1	C	133	GLY
1	A	192	PRO

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	189/194 (97%)	186 (98%)	3 (2%)	62	84
1	B	188/194 (97%)	183 (97%)	5 (3%)	44	71
1	C	186/194 (96%)	177 (95%)	9 (5%)	25	48
1	D	185/194 (95%)	182 (98%)	3 (2%)	62	84
All	All	748/776 (96%)	728 (97%)	20 (3%)	44	71

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	80	LEU
1	A	206	LYS
1	A	228	ARG
1	B	8	ASP
1	B	43	HIS
1	B	60	LEU
1	B	160	LEU
1	B	209	GLU
1	C	7	ASN
1	C	60	LEU
1	C	119	LEU
1	C	131	LEU
1	C	147	ARG
1	C	196	PRO
1	C	197	PHE
1	C	229	LEU
1	C	238	GLN
1	D	232	THR

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Mol	Chain	Res	Type
1	D	235	THR
1	D	236	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	25	GLN
1	A	107	HIS
1	A	116	GLN
1	A	164	ASN
1	B	116	GLN
1	B	162	ASN
1	B	177	GLN
1	B	238	GLN
1	C	7	ASN
1	C	100	ASN
1	C	103	HIS
1	C	164	ASN
1	C	238	GLN
1	D	25	GLN
1	D	64	HIS
1	D	107	HIS
1	D	132	ASN
1	D	177	GLN

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 ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 20 ligands modelled in this entry, 4 are monoatomic - leaving 16 for Mogul analysis.

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	#$|Z| > 2$
4	SO4	A	402	-	4,4,4	0.28	0	6,6,6	0.04	0
3	WO4	D	3302	1,2	2,4,4	0.27	0	-		
4	SO4	D	3402	-	4,4,4	0.28	0	6,6,6	0.07	0
4	SO4	B	1403	-	4,4,4	0.59	0	6,6,6	0.22	0
4	SO4	B	1401	-	4,4,4	0.20	0	6,6,6	0.09	0
5	GOL	A	501	-	5,5,5	0.23	0	5,5,5	0.28	0
3	WO4	B	1302	1,2	2,4,4	0.26	0	-		
4	SO4	A	403	-	4,4,4	0.29	0	6,6,6	0.06	0
4	SO4	C	2401	-	4,4,4	0.19	0	6,6,6	0.09	0
3	WO4	A	302	1,2	2,4,4	0.31	0	-		
4	SO4	D	3401	-	4,4,4	0.20	0	6,6,6	0.10	0
4	SO4	B	1402	-	4,4,4	0.29	0	6,6,6	0.08	0
5	GOL	B	502	-	5,5,5	0.40	0	5,5,5	0.33	0
3	WO4	C	2302	1,2	2,4,4	0.27	0	-		
4	SO4	A	404	-	4,4,4	0.29	0	6,6,6	0.07	0
4	SO4	A	401	-	4,4,4	0.19	0	6,6,6	0.10	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GOL	B	502	-	-	0/4/4/4	-
5	GOL	A	501	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

W O R L D W I D E
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PROTEIN DATA BANK

There are no ring outliers.

5 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	1401	SO4	1	0
5	A	501	GOL	4	0
4	A	403	SO4	1	0
4	D	3401	SO4	1	0
4	A	401	SO4	1	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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(Å²)	Q<0.9
1	A	237/244 (97%)	-0.14	4 (1%) 70	72	19, 33, 55, 67	0
1	B	233/244 (95%)	-0.18	5 (2%) 63	66	20, 33, 64, 78	0
1	C	232/244 (95%)	-0.12	6 (2%) 56	59	23, 38, 65, 74	0
1	D	231/244 (94%)	-0.22	4 (1%) 70	72	21, 34, 65, 75	0
All	All	933/976 (95%)	-0.17	19 (2%) 65	68	19, 35, 63, 78	0

All (19) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	193	MET	4.0
1	A	36	THR	3.2
1	B	132	ASN	3.1
1	C	192	PRO	3.1
1	D	192	PRO	3.0
1	B	192	PRO	2.9
1	C	36	THR	2.6
1	A	132	ASN	2.6
1	C	60	LEU	2.6
1	D	48	ALA	2.5
1	C	184	GLY	2.4
1	B	194	GLY	2.4
1	A	200	PHE	2.4
1	D	61	HIS	2.4
1	A	242	ALA	2.3
1	C	133	GLY	2.0
1	D	54	TYR	2.0
1	B	43	HIS	2.0
1	C	238	GLN	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides 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(Å^2)	Q<0.9
5	GOL	B	502	6/6	0.77	0.38	53,56,58,60	0
4	SO4	B	1403	5/5	0.79	0.33	67,69,73,77	0
2	MG	C	2301	1/1	0.81	0.25	49,49,49,49	0
5	GOL	A	501	6/6	0.84	0.31	53,58,60,63	0
2	MG	A	301	1/1	0.87	0.23	38,38,38,38	0
2	MG	B	1301	1/1	0.88	0.20	51,51,51,51	0
4	SO4	A	404	5/5	0.90	0.24	78,80,83,83	0
4	SO4	D	3402	5/5	0.91	0.22	82,82,84,84	0
4	SO4	B	1402	5/5	0.92	0.27	84,84,85,85	0
4	SO4	A	402	5/5	0.94	0.13	92,93,94,94	0
2	MG	D	3301	1/1	0.95	0.19	43,43,43,43	0
4	SO4	A	403	5/5	0.96	0.13	69,70,73,73	0
4	SO4	B	1401	5/5	0.99	0.16	36,38,42,42	0
3	WO4	D	3302	5/5	0.99	0.13	43,46,53,56	0
4	SO4	A	401	5/5	0.99	0.14	36,37,38,40	0
4	SO4	C	2401	5/5	0.99	0.14	36,36,38,40	0
4	SO4	D	3401	5/5	0.99	0.16	40,42,43,46	0
3	WO4	A	302	5/5	0.99	0.13	39,41,48,49	0
3	WO4	B	1302	5/5	0.99	0.13	41,41,48,55	0
3	WO4	C	2302	5/5	0.99	0.12	33,49,50,53	0

6.5 Other polymers ⓘ

There are no such residues in this entry.