



# Full wwPDB X-ray Structure Validation Report ⓘ

May 15, 2020 – 10:24 am BST

PDB ID : 4EB7  
Title : A. fulgidus IscS-IscU complex structure  
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Deposited on : 2012-03-23  
Resolution : 2.75 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

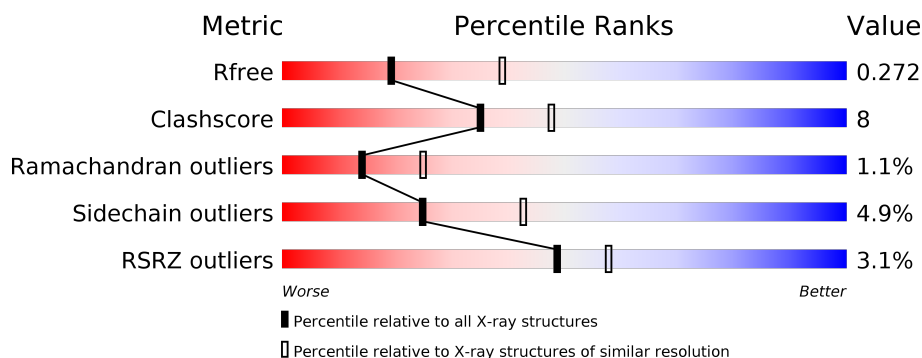
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.75 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1235 (2.78-2.74)
Clashscore	141614	1277 (2.78-2.74)
Ramachandran outliers	138981	1257 (2.78-2.74)
Sidechain outliers	138945	1257 (2.78-2.74)
RSRZ outliers	127900	1207 (2.78-2.74)

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

Mol	Chain	Length	Quality of chain
1	A	382	
1	B	382	
2	C	153	

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 6517 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 Probable cysteine desulfurase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	378	Total	C	N	O	S	0	0	0
			2820	1780	489	541	10			
1	B	377	Total	C	N	O	S	0	0	0
			2666	1675	466	515	10			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	16	ILE	VAL	SEE REMARK 999	UNP O29689
B	16	ILE	VAL	SEE REMARK 999	UNP O29689

- Molecule 2 is a protein called NifU protein (NifU-1).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	135	Total	C	N	O	S	0	0	0
			914	575	159	174	6			

- Molecule 3 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: C<sub>8</sub>H<sub>10</sub>NO<sub>6</sub>P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			16	8	1	6	1		
3	B	1	Total	C	N	O	P	0	0
			16	8	1	6	1		

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



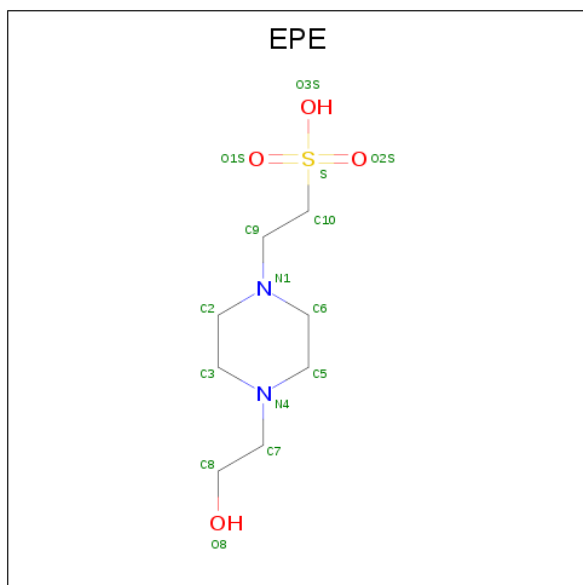
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		

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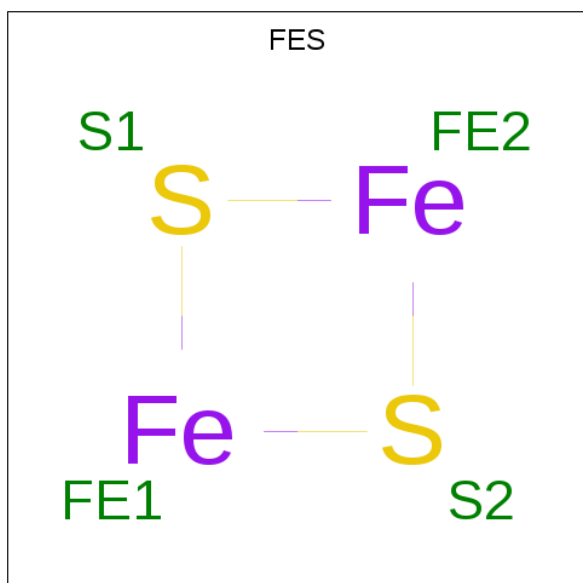
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula:  $C_8H_{18}N_2O_4S$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

- Molecule 6 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula:  $Fe_2S_2$ ).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	1	Total Fe S 3 2 1	0	0
6	C	1	Total S 1 1	0	0

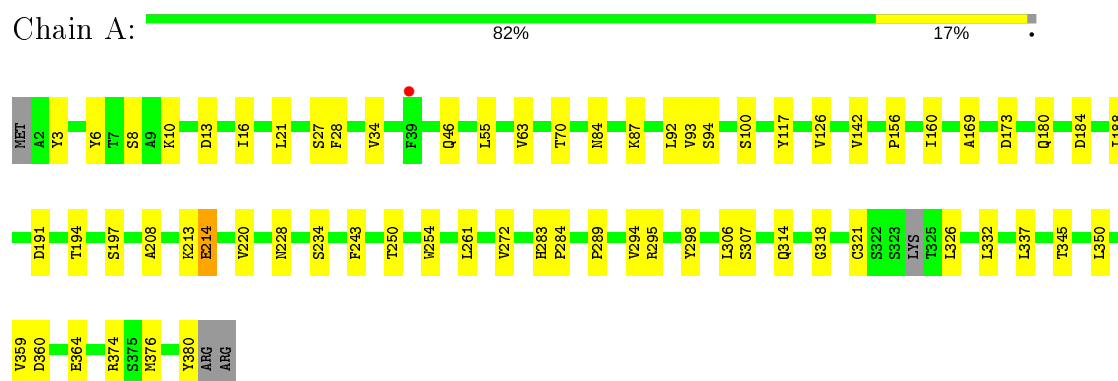
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	25	Total O 25 25	0	0
7	B	15	Total O 15 15	0	0
7	C	8	Total O 8 8	0	0

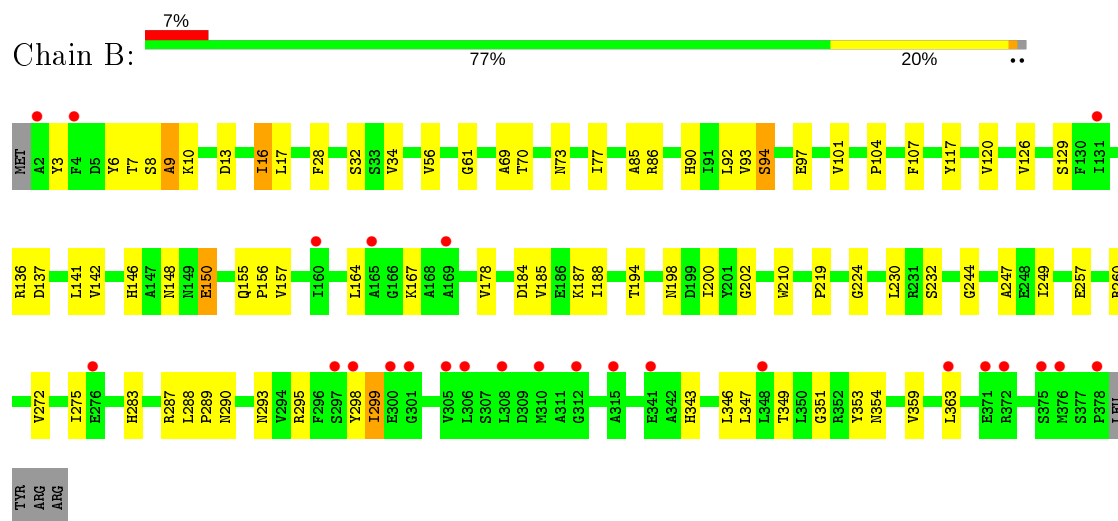
### 3 Residue-property plots [i](#)

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.

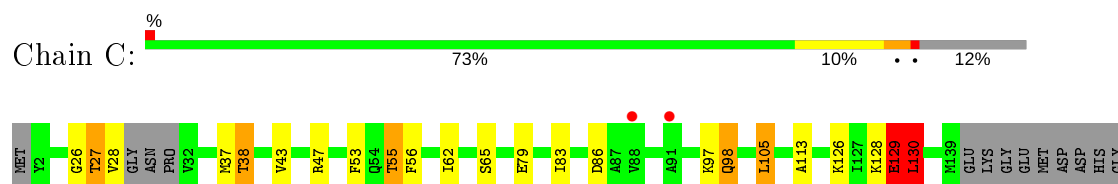
#### • Molecule 1: Probable cysteine desulfurase 2



#### • Molecule 1: Probable cysteine desulfurase 2



#### • Molecule 2: NifU protein (NifU-1)



GLU  
TYR  
CYS  
GLU  
ALA



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	75.47Å 96.13Å 152.79Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	81.37 – 2.75 55.33 – 2.75	Depositor EDS
% Data completeness (in resolution range)	98.1 (81.37-2.75) 98.1 (55.33-2.75)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.08	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.93 (at 2.77Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.214 , 0.273 0.215 , 0.272	Depositor DCC
$R_{free}$ test set	1472 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	54.7	Xtriage
Anisotropy	0.739	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 67.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	6517	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	64.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.41% 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: GOL, EPE, FES, PLP

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	0.77	0/2866	0.79	0/3885
1	B	0.64	0/2710	0.72	0/3697
2	C	0.67	0/923	0.75	0/1254
All	All	0.70	0/6499	0.76	0/8836

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	C	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	C	129	GLU	Peptide

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2820	0	2766	44	0
1	B	2666	0	2459	44	0
2	C	914	0	815	20	0
3	A	16	0	8	1	0
3	B	16	0	8	0	0
4	A	12	0	16	3	0
4	B	6	0	8	0	0
5	A	15	0	17	1	0
6	C	4	0	0	2	0
7	A	25	0	0	1	0
7	B	15	0	0	0	0
7	C	8	0	0	1	0
All	All	6517	0	6097	103	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 8.

All (103) 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:A:321:CYS:SG	6:C:201:FES:S1	2.46	1.14
1:A:13:ASP:HB3	1:A:16:ILE:HD13	1.66	0.76
1:A:321:CYS:SG	6:C:202:FES:S2	2.84	0.75
1:A:13:ASP:HB3	1:A:16:ILE:CD1	2.15	0.75
1:A:272:VAL:HG11	1:A:294:VAL:HG21	1.68	0.73
1:A:70:THR:HG23	1:A:100:SER:HB3	1.70	0.72
1:A:376:MET:CE	2:C:62:ILE:HG23	2.19	0.71
1:B:93:VAL:O	1:B:117:TYR:HA	1.90	0.70
1:A:376:MET:HE1	2:C:62:ILE:HG23	1.73	0.69
1:A:84:ASN:OD1	1:A:87:LYS:NZ	2.26	0.68
1:B:148:ASN:OD1	1:B:150:GLU:HB2	1.95	0.66
1:A:92:LEU:HB2	1:A:142:VAL:HG22	1.77	0.66
1:A:34:VAL:HG23	1:A:34:VAL:O	1.97	0.63
1:B:178:VAL:HG12	1:B:200:ILE:HG21	1.79	0.63
1:A:173:ASP:HA	1:A:194:THR:HB	1.82	0.61
1:A:55:LEU:O	4:A:402:GOL:H32	2.01	0.60
1:B:16:ILE:HD11	1:B:249:ILE:HD12	1.85	0.59
2:C:129:GLU:CB	2:C:130:LEU:HB2	2.31	0.59
3:A:401:PLP:O2P	7:A:516:HOH:O	2.17	0.59
2:C:97:LYS:O	2:C:98:GLN:HB2	2.03	0.58
1:A:376:MET:HE2	2:C:62:ILE:HG12	1.86	0.57
1:B:293:ASN:HA	1:B:346:LEU:O	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:27:THR:HB	2:C:38:THR:HB	1.86	0.57
1:B:7:THR:HG23	1:B:349:THR:CB	2.34	0.57
1:B:257:GLU:HG3	1:B:260:ARG:NH2	2.21	0.56
1:B:120:VAL:HG12	1:B:126:VAL:HA	1.89	0.55
1:B:34:VAL:HG23	1:B:34:VAL:O	2.07	0.54
1:A:184:ASP:O	1:A:188:ILE:HG12	2.08	0.54
1:A:180:GLN:HB3	1:A:289:PRO:HD2	1.89	0.54
1:B:104:PRO:O	1:B:107:PHE:HB3	2.07	0.54
2:C:37:MET:HB2	2:C:55:THR:HB	1.89	0.54
2:C:53:PHE:CD1	2:C:55:THR:HG23	2.43	0.54
1:B:298:TYR:O	1:B:299:ILE:CB	2.56	0.54
1:B:6:TYR:O	1:B:10:LYS:HE2	2.09	0.53
1:A:70:THR:HG23	1:A:100:SER:CB	2.38	0.53
1:B:16:ILE:CD1	1:B:249:ILE:HD12	2.39	0.52
1:B:224:GLY:H	1:B:232:SER:HB3	1.74	0.52
2:C:55:THR:HG21	2:C:65:SER:OG	2.08	0.52
1:B:69:ALA:O	1:B:70:THR:C	2.47	0.52
1:A:213:LYS:O	1:A:214:GLU:CB	2.57	0.51
1:B:13:ASP:O	1:B:16:ILE:HB	2.10	0.51
1:A:3:TYR:CE2	1:B:28:PHE:HE1	2.29	0.51
2:C:126:LYS:O	2:C:130:LEU:HB2	2.11	0.50
1:A:250:THR:O	1:A:254:TRP:HB3	2.11	0.50
2:C:37:MET:CE	2:C:105:LEU:HB3	2.41	0.50
1:B:6:TYR:O	1:B:10:LYS:HG2	2.11	0.50
1:A:197:SER:HB2	1:A:243:PHE:CD1	2.47	0.49
1:A:376:MET:HE2	2:C:62:ILE:HG23	1.92	0.49
1:B:272:VAL:HA	1:B:275:ILE:HD12	1.94	0.49
1:A:13:ASP:HB3	1:A:16:ILE:HD12	1.93	0.49
1:B:288:LEU:C	1:B:290:ASN:H	2.16	0.48
1:A:6:TYR:HD2	1:A:10:LYS:HG2	1.78	0.48
1:B:73:ASN:ND2	1:B:194:THR:OG1	2.47	0.48
2:C:98:GLN:HA	2:C:98:GLN:NE2	2.28	0.48
1:A:126:VAL:HG21	1:A:160:ILE:HD11	1.95	0.48
1:B:86:ARG:O	1:B:86:ARG:HG2	2.13	0.48
1:A:350:LEU:HD12	1:A:350:LEU:N	2.30	0.47
1:A:92:LEU:O	1:A:142:VAL:HA	2.15	0.47
1:A:93:VAL:O	1:A:117:TYR:HA	2.15	0.47
1:B:61:GLY:HA3	1:B:210:TRP:CZ2	2.50	0.46
1:A:21:LEU:HD22	1:B:17:LEU:HD21	1.97	0.46
1:B:359:VAL:O	1:B:363:LEU:HG	2.16	0.46
1:A:283:HIS:ND1	1:A:284:PRO:HD2	2.31	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:261:LEU:HD22	1:A:350:LEU:HB3	1.98	0.45
1:A:156:PRO:O	1:A:160:ILE:HG13	2.15	0.45
4:A:402:GOL:O3	5:A:404:EPE:H52	2.15	0.45
1:A:359:VAL:O	1:A:360:ASP:C	2.55	0.45
1:A:3:TYR:HA	1:A:314:GLN:HB2	1.98	0.45
1:B:146:HIS:HD2	1:B:146:HIS:O	2.00	0.45
2:C:26:GLY:HA3	2:C:113:ALA:N	2.32	0.44
1:B:353:TYR:CD2	1:B:353:TYR:N	2.85	0.44
2:C:43:VAL:HA	2:C:47:ARG:O	2.17	0.44
1:A:306:LEU:HD23	1:A:306:LEU:HA	1.88	0.43
2:C:83:ILE:O	2:C:83:ILE:HG22	2.17	0.43
2:C:98:GLN:HA	2:C:98:GLN:HE21	1.83	0.43
1:B:288:LEU:O	1:B:290:ASN:N	2.50	0.43
1:A:298:TYR:CD2	1:A:380:TYR:HD2	2.36	0.43
1:A:318:GLY:H	1:A:345:THR:CG2	2.31	0.42
2:C:128:LYS:O	2:C:129:GLU:C	2.57	0.42
1:A:63:VAL:HG13	1:A:208:ALA:HB1	2.00	0.42
1:A:332:LEU:HB3	1:A:337:LEU:HD13	2.00	0.42
1:B:90:HIS:HB2	1:B:136:ARG:NH2	2.34	0.42
1:B:184:ASP:HB3	1:B:187:LYS:HB2	2.02	0.42
1:A:197:SER:HB2	1:A:243:PHE:CG	2.55	0.42
1:B:219:PRO:HB3	1:B:230:LEU:HA	2.01	0.42
1:B:94:SER:HB3	1:B:97:GLU:OE2	2.20	0.42
1:A:169:ALA:HA	1:A:191:ASP:OD2	2.20	0.41
1:B:101:VAL:C	1:B:104:PRO:HD2	2.41	0.41
2:C:53:PHE:C	2:C:53:PHE:CD1	2.93	0.41
1:B:56:VAL:O	1:B:185:VAL:HG22	2.21	0.41
1:B:6:TYR:CD2	1:B:351:GLY:HA3	2.56	0.41
1:B:198:ASN:HA	1:B:202:GLY:O	2.21	0.41
1:B:92:LEU:HB2	1:B:142:VAL:HG22	2.01	0.41
1:B:283:HIS:O	1:B:287:ARG:HD2	2.20	0.41
1:B:8:SER:O	1:B:9:ALA:HB2	2.21	0.41
1:A:28:PHE:HE1	1:B:3:TYR:CE2	2.38	0.41
1:B:244:GLY:O	1:B:247:ALA:HB3	2.21	0.41
1:B:77:ILE:HD13	1:B:141:LEU:HD21	2.03	0.41
1:B:155:GLN:HA	1:B:156:PRO:HD3	1.86	0.41
1:A:34:VAL:CG2	1:A:34:VAL:O	2.68	0.41
1:B:184:ASP:O	1:B:188:ILE:HG12	2.22	0.40
1:A:220:VAL:HA	4:A:403:GOL:H2	2.03	0.40
2:C:79:GLU:HG2	7:C:305: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	374/382 (98%)	357 (96%)	15 (4%)	2 (0%)	29	47
1	B	375/382 (98%)	341 (91%)	28 (8%)	6 (2%)	9	16
2	C	131/153 (86%)	114 (87%)	15 (12%)	2 (2%)	10	18
All	All	880/917 (96%)	812 (92%)	58 (7%)	10 (1%)	14	25

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	167	LYS
1	B	299	ILE
2	C	130	LEU
1	A	214	GLU
2	C	129	GLU
1	B	9	ALA
1	B	289	PRO
1	B	85	ALA
1	B	164	LEU
1	A	326	LEU

### 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	288/316 (91%)	278 (96%)	10 (4%)	36	56
1	B	248/316 (78%)	237 (96%)	11 (4%)	28	47

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	C	75/124 (60%)	66 (88%)	9 (12%)	5	8
All	All	611/756 (81%)	581 (95%)	30 (5%)	25	43

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	8	SER
1	A	27	SER
1	A	46	GLN
1	A	94	SER
1	A	228	ASN
1	A	234	SER
1	A	295	ARG
1	A	307	SER
1	A	364	GLU
1	A	374	ARG
1	B	16	ILE
1	B	32	SER
1	B	94	SER
1	B	129	SER
1	B	137	ASP
1	B	150	GLU
1	B	157	VAL
1	B	295	ARG
1	B	343	HIS
1	B	347	LEU
1	B	354	ASN
2	C	27	THR
2	C	28	VAL
2	C	38	THR
2	C	55	THR
2	C	56	PHE
2	C	86	ASP
2	C	98	GLN
2	C	105	LEU
2	C	130	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	73	ASN

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Mol	Chain	Res	Type
1	A	111	GLN
1	A	236	ASN
1	B	73	ASN
1	B	146	HIS
1	B	354	ASN
2	C	98	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 carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

Of 8 ligands modelled in this entry, 1 is modelled with single atom - leaving 7 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	GOL	A	402	-	5,5,5	0.27	0	5,5,5	0.72	0
6	FES	C	201	2,6	0,2,4	0.00	-	-		
3	PLP	B	401	-	16,16,16	0.81	0	20,23,23	1.39	4 (20%)
4	GOL	A	403	-	5,5,5	0.27	0	5,5,5	0.58	0
3	PLP	A	401	-	16,16,16	0.98	0	20,23,23	1.65	3 (15%)
5	EPE	A	404	-	15,15,15	0.75	1 (6%)	18,20,20	2.28	8 (44%)



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	GOL	B	402	-	5,5,5	0.61	0	5,5,5	0.68	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
4	GOL	A	402	-	-	0/4/4/4	-
3	PLP	B	401	-	-	2/8/8/8	0/1/1/1
4	GOL	A	403	-	-	2/4/4/4	-
3	PLP	A	401	-	-	4/8/8/8	0/1/1/1
5	EPE	A	404	-	-	3/9/19/19	0/1/1/1
4	GOL	B	402	-	-	4/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	404	EPE	C10-S	2.03	1.80	1.77

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	404	EPE	C5-N4-C3	5.19	120.51	108.83
5	A	404	EPE	C7-N4-C3	4.09	121.70	111.23
3	A	401	PLP	O4A-C4A-C4	-3.50	117.29	124.91
3	B	401	PLP	O4P-C5A-C5	3.16	115.38	109.35
3	A	401	PLP	O4P-C5A-C5	3.10	115.26	109.35
5	A	404	EPE	C6-N1-C2	2.98	115.54	108.83
5	A	404	EPE	O3S-S-C10	2.94	110.53	105.77
5	A	404	EPE	C2-C3-N4	2.94	116.67	110.64
5	A	404	EPE	O2S-S-C10	2.49	109.91	106.92
3	A	401	PLP	C5A-C5-C6	-2.39	115.45	119.37
5	A	404	EPE	C9-N1-C6	-2.17	105.70	111.23
3	B	401	PLP	O4A-C4A-C4	-2.12	120.28	124.91
5	A	404	EPE	C7-N4-C5	2.10	116.60	111.23
3	B	401	PLP	C5-C6-N1	-2.05	120.41	123.82
3	B	401	PLP	O3P-P-O2P	2.02	115.34	107.64

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	401	PLP	C3-C4-C4A-O4A
3	A	401	PLP	C3-C4-C4A-O4A
3	A	401	PLP	C5-C4-C4A-O4A
3	A	401	PLP	C4-C5-C5A-O4P
3	A	401	PLP	C6-C5-C5A-O4P
5	A	404	EPE	C10-C9-N1-C2
5	A	404	EPE	C8-C7-N4-C3
4	B	402	GOL	C1-C2-C3-O3
4	B	402	GOL	O1-C1-C2-C3
4	B	402	GOL	O2-C2-C3-O3
3	B	401	PLP	C5-C4-C4A-O4A
4	B	402	GOL	O1-C1-C2-O2
5	A	404	EPE	N4-C7-C8-O8
4	A	403	GOL	O1-C1-C2-C3
4	A	403	GOL	O1-C1-C2-O2

There are no ring outliers.

5 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	402	GOL	2	0
6	C	201	FES	1	0
4	A	403	GOL	1	0
3	A	401	PLP	1	0
5	A	404	EPE	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, 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	378/382 (98%)	0.08	1 (0%) 94 96	38, 52, 66, 79	0
1	B	377/382 (98%)	0.29	25 (6%) 18 21	43, 70, 115, 150	8 (2%)
2	C	135/153 (88%)	0.17	2 (1%) 73 81	54, 69, 104, 116	0
All	All	890/917 (97%)	0.18	28 (3%) 49 58	38, 60, 106, 150	8 (0%)

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	375	SER	3.8
1	B	378	PRO	3.7
1	B	300	GLU	3.5
1	B	363	LEU	3.4
1	B	2	ALA	3.2
1	B	298	TYR	3.0
1	B	305	VAL	3.0
1	B	376	MET	2.9
1	B	371	GLU	2.9
2	C	91	ALA	2.9
1	B	315	ALA	2.7
1	B	306	LEU	2.7
2	C	88	VAL	2.6
1	B	372	ARG	2.5
1	B	160	ILE	2.4
1	B	310	MET	2.4
1	B	348	LEU	2.3
1	B	131	ILE	2.3
1	B	301	GLY	2.3
1	B	312	GLY	2.3
1	B	4	PHE	2.3
1	B	341	GLU	2.2
1	B	165	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	276	GLU	2.2
1	B	308	LEU	2.1
1	B	297	SER	2.1
1	A	39	PHE	2.1
1	B	169	ALA	2.1

## 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
6	FES	C	201	3/4	0.94	0.07	62,62,64,70	3
4	GOL	A	403	6/6	0.94	0.27	71,71,72,72	0
4	GOL	B	402	6/6	0.94	0.17	53,56,57,61	0
3	PLP	A	401	16/16	0.95	0.22	34,39,46,50	16
4	GOL	A	402	6/6	0.95	0.20	49,50,51,54	0
5	EPE	A	404	15/15	0.96	0.15	60,64,67,67	0
6	FES	C	202	1/4	0.96	0.09	64,64,64,64	1
3	PLP	B	401	16/16	0.97	0.20	41,48,52,54	16

## 6.5 Other polymers [i](#)

There are no such residues in this entry.