



wwPDB X-ray Structure Validation Summary Report ⓘ

May 26, 2020 – 08:29 am BST

PDB ID : 3AYX
Title : Membrane-bound respiratory [NiFe] hydrogenase from *Hydrogenovibrio marinus* in an H₂-reduced condition
Authors : Shomura, Y.; Yoon, K.S.; Nishihara, H.; Higuchi, Y.
Deposited on : 2011-05-20
Resolution : 1.18 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 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

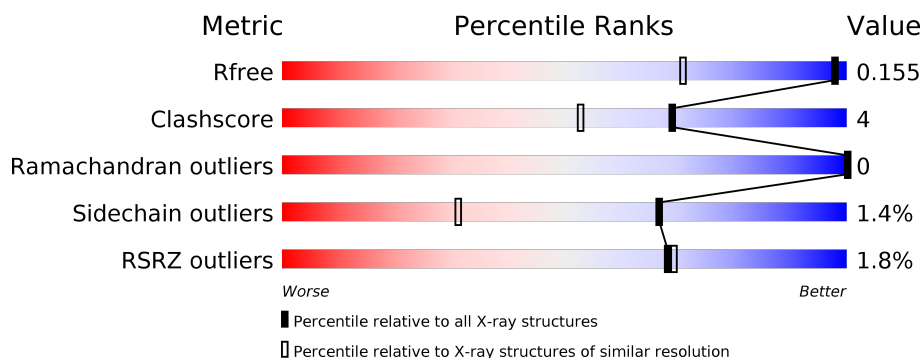
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.18 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	1123 (1.20-1.16)
Clashscore	141614	1182 (1.20-1.16)
Ramachandran outliers	138981	1134 (1.20-1.16)
Sidechain outliers	138945	1134 (1.20-1.16)
RSRZ outliers	127900	1102 (1.20-1.16)

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 ≥ 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	596	
1	C	596	
2	B	283	
2	D	283	

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
7	O	A	607	-	-	X	-
7	O	C	606	-	-	X	-
7	O	C	607	-	-	X	-
8	GOL	A	703	-	-	X	-
8	GOL	C	703	-	X	-	-

2 Entry composition [i](#)

There are 13 unique types of molecules in this entry. The entry contains 15472 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 Membrane-bound hydrogenase large subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	595	Total	C	N	O	S	0	14	0
			4739	3008	825	880	26			
1	C	595	Total	C	N	O	S	0	14	0
			4739	3010	827	877	25			

- Molecule 2 is a protein called Membrane-bound hydrogenase small subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	273	Total	C	N	O	S	0	7	0
			2151	1366	366	398	21			
2	D	267	Total	C	N	O	S	0	5	0
			2092	1328	356	387	21			

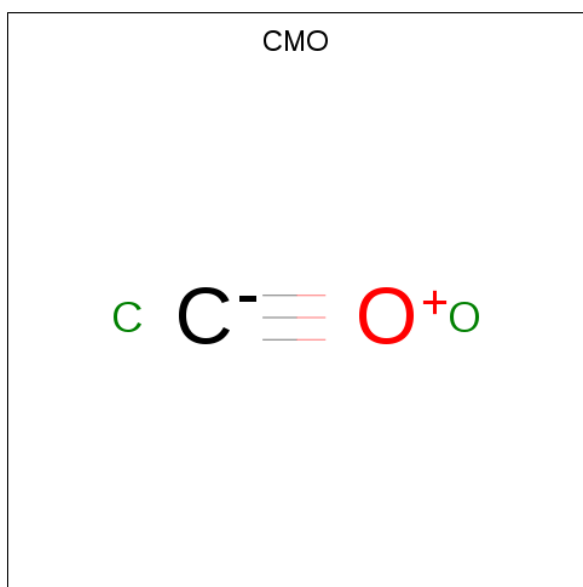
- Molecule 3 is FE (II) ION (three-letter code: FE2) (formula: Fe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Fe	0	0
			1	1		
3	C	1	Total	Fe	0	0
			1	1		

- Molecule 4 is NICKEL (II) ION (three-letter code: NI) (formula: Ni).

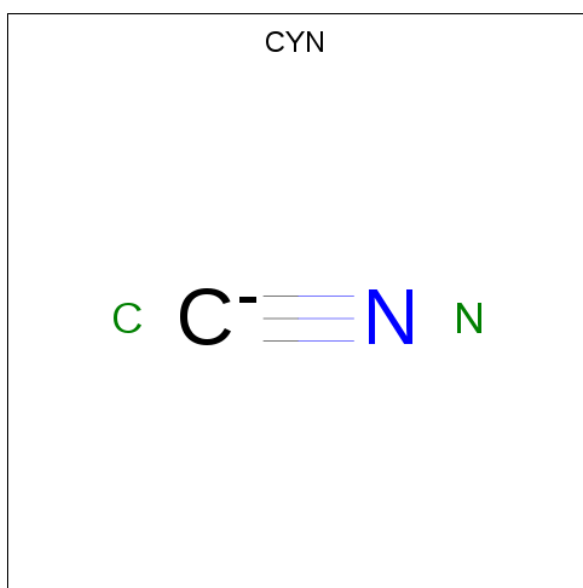
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Ni	0	0
			1	1		
4	C	1	Total	Ni	0	0
			1	1		

- Molecule 5 is CARBON MONOXIDE (three-letter code: CMO) (formula: CO).



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

- Molecule 6 is CYANIDE ION (three-letter code: CYN) (formula: CN).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	N	0	0
			2	1	1		
6	A	1	Total	C	N	0	0
			2	1	1		

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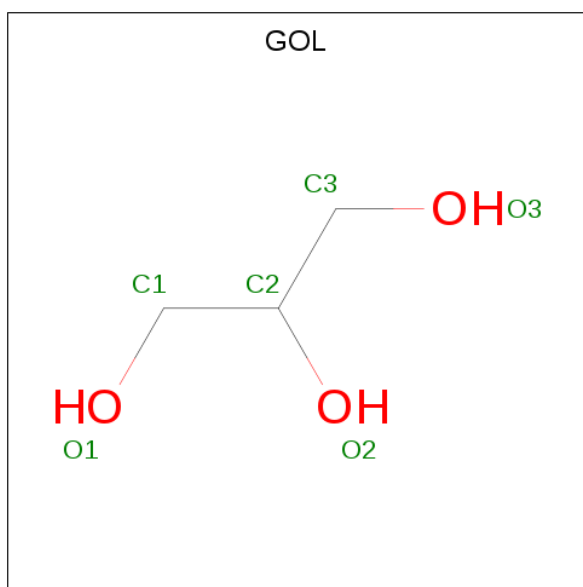
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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	C	1	Total	C	N	0	0
			2	1	1		
6	C	1	Total	C	N	0	0
			2	1	1		

- Molecule 7 is OXYGEN ATOM (three-letter code: O) (formula: O).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	5	Total	O	0	0
			5	5		
7	C	5	Total	O	0	0
			5	5		

- Molecule 8 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).

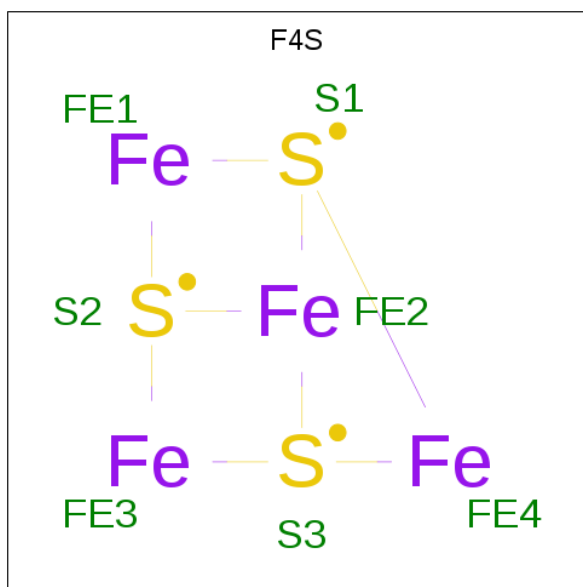


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			6	3	3		
8	A	1	Total	C	O	0	0
			6	3	3		
8	C	1	Total	C	O	0	0
			6	3	3		
8	C	1	Total	C	O	0	0
			6	3	3		

- Molecule 9 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

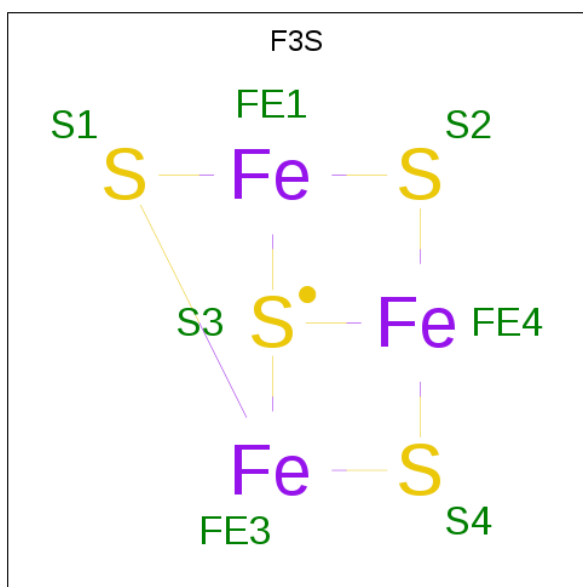
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	1	Total	Mg	0	0
			1	1		
9	C	1	Total	Mg	0	0
			1	1		

- Molecule 10 is FE4-S3 CLUSTER (three-letter code: F4S) (formula: Fe_4S_3).



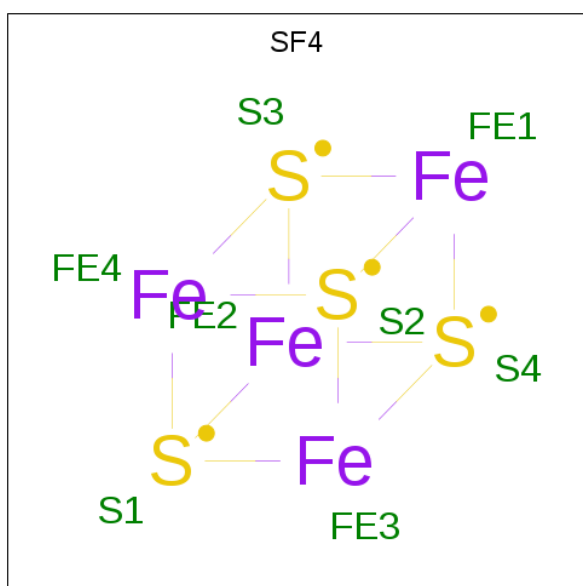
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
10	B	1	Total	Fe	S	0	0
			7	4	3		
10	D	1	Total	Fe	S	0	0
			7	4	3		

- Molecule 11 is FE3-S4 CLUSTER (three-letter code: F3S) (formula: Fe_3S_4).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
11	B	1	Total	Fe	S	0	0
			7	3	4		
11	D	1	Total	Fe	S	0	0
			7	3	4		

- Molecule 12 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
12	B	1	Total	Fe	S	0	0
			8	4	4		
12	D	1	Total	Fe	S	0	0
			8	4	4		

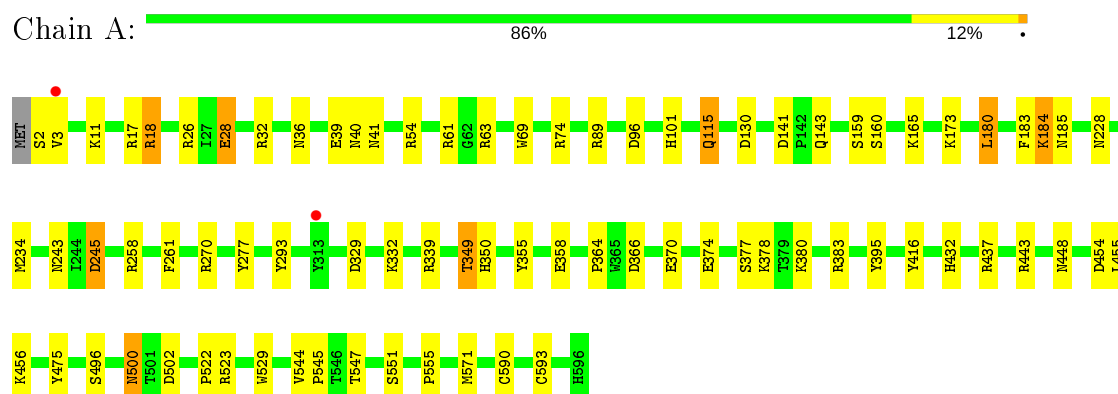
- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	A	638	Total 638	O 638	0	0
13	B	271	Total 271	O 271	0	0
13	C	529	Total 529	O 529	0	0
13	D	217	Total 217	O 217	0	0

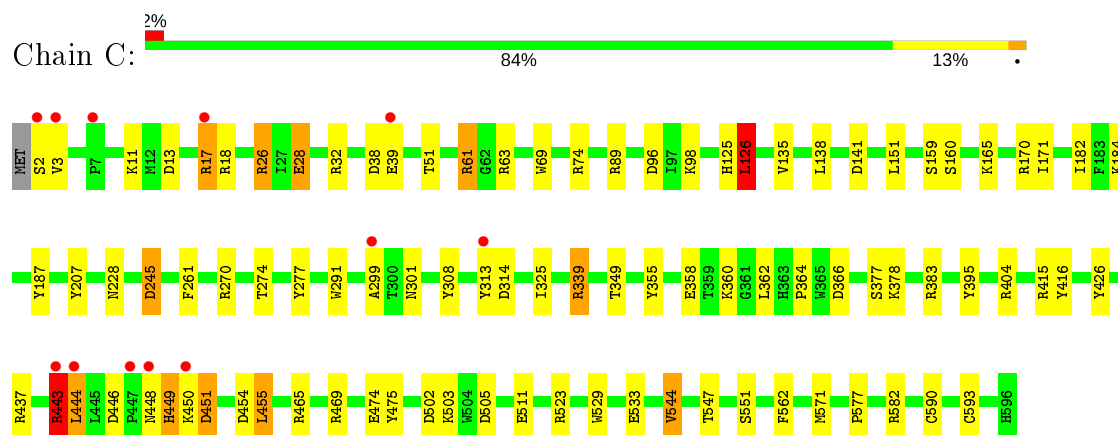
3 Residue-property plots

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.

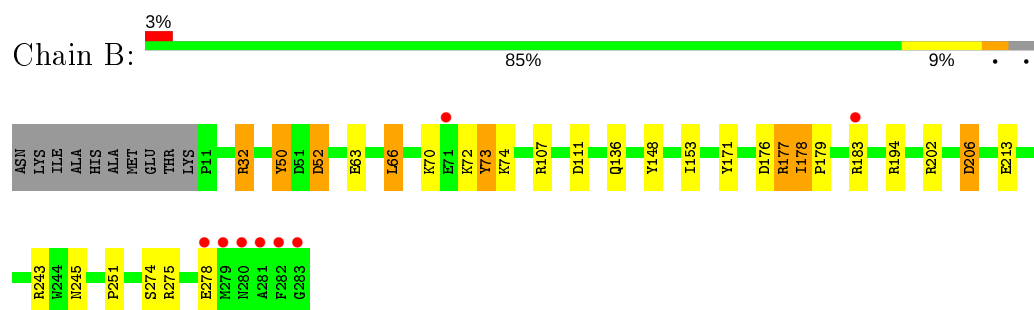
- Molecule 1: Membrane-bound hydrogenase large subunit



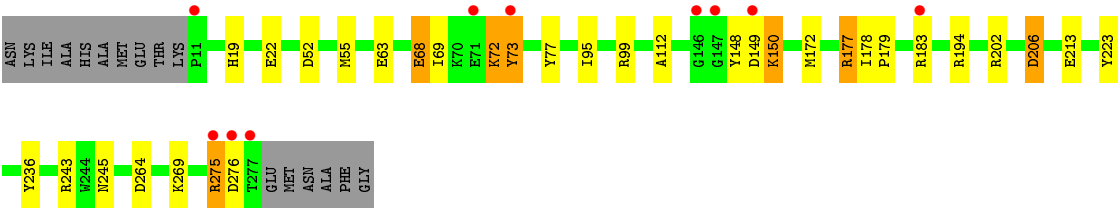
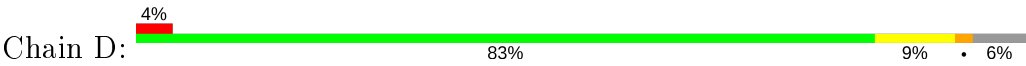
- Molecule 1: Membrane-bound hydrogenase large subunit



- Molecule 2: Membrane-bound hydrogenase small subunit



● Molecule 2: Membrane-bound hydrogenase small subunit



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	75.73Å 116.33Å 113.63Å 90.00° 91.40° 90.00°	Depositor
Resolution (Å)	20.00 – 1.18 19.96 – 1.18	Depositor EDS
% Data completeness (in resolution range)	100.0 (20.00-1.18) 93.1 (19.96-1.18)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.37 (at 1.18Å)	Xtriage
Refinement program	SHELXL-97	Depositor
R, R_{free}	0.139 , 0.169 0.134 , 0.155	Depositor DCC
R_{free} test set	59041 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	11.4	Xtriage
Anisotropy	0.177	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 64.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.008 for -h,-l,-k 0.003 for -h,l,k 0.095 for h,-k,-l	Xtriage
F_o, F_c correlation	0.98	EDS
Total number of atoms	15472	wwPDB-VP
Average B, all atoms (Å ²)	17.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.19% of the height of the origin peak. No significant pseudotranslation is detected.*

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: CMO, GOL, MG, NI, SF4, F4S, O, F3S, FE2, CYN

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	0.97	6/4905 (0.1%)	1.45	76/6679 (1.1%)
1	C	0.95	4/4909 (0.1%)	1.56	87/6685 (1.3%)
2	B	0.94	1/2230 (0.0%)	1.49	31/3019 (1.0%)
2	D	0.93	0/2164	1.51	29/2931 (1.0%)
All	All	0.95	11/14208 (0.1%)	1.50	223/19314 (1.2%)

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	B	0	1

The worst 5 of 11 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	377[A]	SER	CB-OG	9.08	1.54	1.42
1	C	377[B]	SER	CB-OG	9.08	1.54	1.42
1	A	377[A]	SER	CB-OG	8.44	1.53	1.42
1	A	377[B]	SER	CB-OG	8.44	1.53	1.42
1	A	101	HIS	CB-CG	6.85	1.62	1.50

The worst 5 of 223 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	383	ARG	NE-CZ-NH1	25.76	133.18	120.30
1	A	383	ARG	NE-CZ-NH1	-19.22	110.69	120.30
1	C	17	ARG	CD-NE-CZ	17.45	148.03	123.60
2	D	177	ARG	NE-CZ-NH1	17.22	128.91	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	339	ARG	NE-CZ-NH2	-16.34	112.13	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	32	ARG	Sidechain

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	4739	0	4657	34	0
1	C	4739	0	4663	51	0
2	B	2151	0	2091	11	0
2	D	2092	0	2032	12	0
3	A	1	0	0	0	0
3	C	1	0	0	0	0
4	A	1	0	0	0	0
4	C	1	0	0	0	0
5	A	2	0	0	0	0
5	C	2	0	0	0	0
6	A	4	0	0	1	0
6	C	4	0	0	0	0
7	A	5	0	0	4	0
7	C	5	0	0	6	0
8	A	12	0	15	4	0
8	C	12	0	15	1	0
9	A	1	0	0	0	0
9	C	1	0	0	0	0
10	B	7	0	0	0	0
10	D	7	0	0	0	0
11	B	7	0	0	0	0
11	D	7	0	0	0	0
12	B	8	0	0	0	0
12	D	8	0	0	0	0
13	A	638	0	0	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
13	B	271	0	0	2	0
13	C	529	0	0	13	0
13	D	217	0	0	2	0
All	All	15472	0	13473	100	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.

The worst 5 of 100 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:590:CYS:CB	7:A:606:O:O	2.09	0.99
1:C:590:CYS:CB	7:C:606:O:O	2.08	0.97
1:C:151[A]:LEU:HD11	1:C:444:LEU:HD23	1.64	0.78
1:C:274[A]:THR:HG22	1:C:474:GLU:OE2	1.86	0.75
8:A:703:GOL:H32	13:A:1420:HOH:O	1.88	0.74

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	607/596 (102%)	596 (98%)	11 (2%)	0	100	100
1	C	607/596 (102%)	597 (98%)	10 (2%)	0	100	100
2	B	278/283 (98%)	269 (97%)	9 (3%)	0	100	100
2	D	270/283 (95%)	259 (96%)	11 (4%)	0	100	100
All	All	1762/1758 (100%)	1721 (98%)	41 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	518/505 (103%)	514 (99%)	4 (1%)	81	53
1	C	518/505 (103%)	510 (98%)	8 (2%)	65	28
2	B	232/233 (100%)	225 (97%)	7 (3%)	41	7
2	D	226/233 (97%)	223 (99%)	3 (1%)	69	33
All	All	1494/1476 (101%)	1472 (98%)	22 (2%)	67	28

5 of 22 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	231	LYS
1	C	126[A]	LEU
2	D	150	LYS
2	B	251	PRO
1	C	17	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	493	ASN
2	B	245	ASN
1	C	558	ASN
1	A	500	ASN
1	C	41	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 32 ligands modelled in this entry, 16 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	$\# Z > 2$
12	SF4	B	309	2	0,12,12	0.00	-	-		
5	CMO	A	603	-	0,1,1	0.00	-	-		
5	CMO	C	603	-	0,1,1	0.00	-	-		
11	F3S	B	308	2	0,9,9	0.00	-	-		
8	GOL	A	702	-	5,5,5	0.83	0	5,5,5	1.97	1 (20%)
6	CYN	C	604	-	0,1,1	0.00	-	-		
10	F4S	B	301	2	0,9,9	0.00	-	-		
6	CYN	C	605	-	0,1,1	0.00	-	-		
12	SF4	D	309	2	0,12,12	0.00	-	-		
6	CYN	A	605	-	0,1,1	0.00	-	-		
10	F4S	D	301	2	0,9,9	0.00	-	-		
6	CYN	A	604	-	0,1,1	0.00	-	-		
8	GOL	C	702	-	5,5,5	0.57	0	5,5,5	1.52	1 (20%)
8	GOL	C	703	-	5,5,5	1.28	0	5,5,5	5.20	4 (80%)
8	GOL	A	703	-	5,5,5	0.98	0	5,5,5	2.94	2 (40%)
11	F3S	D	308	2	0,9,9	0.00	-	-		

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
12	SF4	B	309	2	-	-	0/6/5/5
12	SF4	D	309	2	-	-	0/6/5/5
11	F3S	B	308	2	-	-	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
10	F4S	B	301	2	-	-	0/3/3/3
8	GOL	A	702	-	-	0/4/4/4	-
10	F4S	D	301	2	-	-	0/3/3/3
8	GOL	C	702	-	-	1/4/4/4	-
11	F3S	D	308	2	-	-	0/3/3/3
8	GOL	A	703	-	-	2/4/4/4	-
8	GOL	C	703	-	-	2/4/4/4	-

There are no bond length outliers.

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	C	703	GOL	O2-C2-C3	6.70	138.61	109.12
8	C	703	GOL	C3-C2-C1	-6.40	86.82	111.70
8	A	703	GOL	O2-C2-C1	5.55	133.57	109.12
8	C	703	GOL	O1-C1-C2	-5.08	85.86	110.20
8	C	703	GOL	O2-C2-C1	4.83	130.41	109.12

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	703	GOL	O2-C2-C3-O3
8	A	703	GOL	C1-C2-C3-O3
8	C	703	GOL	C1-C2-C3-O3
8	C	703	GOL	O1-C1-C2-O2
8	C	702	GOL	C1-C2-C3-O3

There are no ring outliers.

3 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	605	CYN	1	0
8	C	703	GOL	1	0
8	A	703	GOL	4	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	595/596 (99%)	-0.28	2 (0%) 94 94	7, 12, 27, 49	0
1	C	595/596 (99%)	-0.16	12 (2%) 65 66	7, 15, 34, 61	0
2	B	273/283 (96%)	-0.18	8 (2%) 51 53	7, 11, 32, 53	0
2	D	267/283 (94%)	-0.10	10 (3%) 41 43	8, 13, 39, 71	0
All	All	1730/1758 (98%)	-0.20	32 (1%) 68 69	7, 13, 32, 71	0

The worst 5 of 32 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	277	THR	8.0
1	A	313	TYR	4.9
1	C	448	ASN	4.5
1	C	313	TYR	4.4
2	B	281	ALA	4.2

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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(\AA^2)	Q<0.9
7	O	A	606	1/1	0.88	0.15	11,11,11,11	1
7	O	A	607	1/1	0.88	0.15	8,8,8,8	1
7	O	C	607	1/1	0.90	0.15	9,9,9,9	1
8	GOL	C	702	6/6	0.91	0.10	23,26,30,39	0
8	GOL	A	703	6/6	0.92	0.12	19,32,37,42	0
8	GOL	C	703	6/6	0.92	0.13	19,28,33,39	0
8	GOL	A	702	6/6	0.94	0.09	21,24,27,41	0
7	O	A	609	1/1	0.95	0.43	7,7,7,7	1
7	O	C	608	1/1	0.96	0.10	11,11,11,11	1
7	O	A	608	1/1	0.96	0.15	12,12,12,12	1
7	O	C	606	1/1	0.97	0.12	11,11,11,11	1
7	O	C	609	1/1	0.97	0.14	8,8,8,8	1
6	CYN	A	605	2/2	0.98	0.06	8,8,8,9	0
7	O	A	610	1/1	0.98	0.29	8,8,8,8	1
7	O	C	610	1/1	0.99	0.15	8,8,8,8	1
6	CYN	A	604	2/2	0.99	0.04	7,7,7,8	0
6	CYN	C	604	2/2	0.99	0.03	9,9,9,11	0
6	CYN	C	605	2/2	0.99	0.04	9,9,9,10	0
5	CMO	A	603	2/2	0.99	0.04	7,7,7,10	0
4	NI	A	602	1/1	1.00	0.10	12,12,12,12	0
4	NI	C	602	1/1	1.00	0.09	14,14,14,14	0
11	F3S	D	308	7/7	1.00	0.03	8,8,8,8	0
9	MG	C	701	1/1	1.00	0.04	10,10,10,10	0
10	F4S	B	301	7/7	1.00	0.02	7,7,8,8	0
5	CMO	C	603	2/2	1.00	0.05	10,10,10,11	0
11	F3S	B	308	7/7	1.00	0.02	7,7,7,7	0
12	SF4	B	309	8/8	1.00	0.03	8,8,8,8	0
3	FE2	C	601	1/1	1.00	0.02	10,10,10,10	0
9	MG	A	701	1/1	1.00	0.03	7,7,7,7	0
3	FE2	A	601	1/1	1.00	0.02	8,8,8,8	0
12	SF4	D	309	8/8	1.00	0.03	8,9,9,9	0
10	F4S	D	301	7/7	1.00	0.02	9,9,9,9	0

6.5 Other polymers [i](#)

There are no such residues in this entry.