



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 1, 2026 – 03:36 PM UTC

PDB ID : 5A4J / pdb_00005a4j
Title : Crystal structure of FTHFS1 from T.acetoxydans Re1
Authors : Bergdahl, R.; Jacobson, F.; Muller, B.; Mikkelsen, N.; Schurer, A.; Sandgren, M.
Deposited on : 2015-06-10
Resolution : 2.15 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

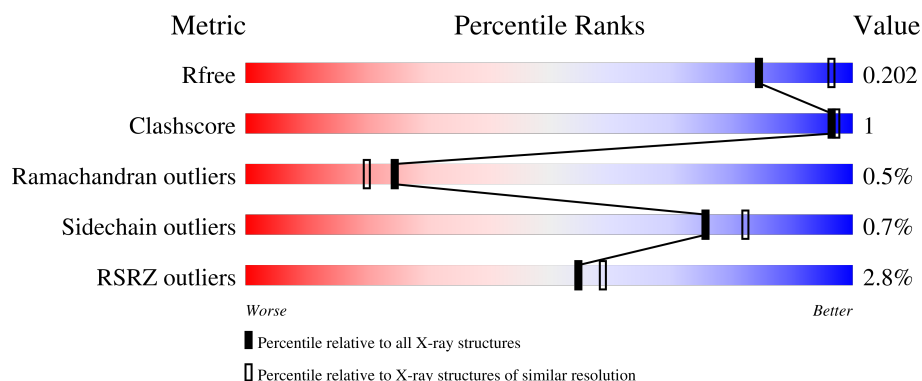
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.15 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	2057 (2.16-2.16)
Clashscore	190562	2159 (2.16-2.16)
Ramachandran outliers	187476	2134 (2.16-2.16)
Sidechain outliers	187428	2133 (2.16-2.16)
RSRZ outliers	180081	2059 (2.16-2.16)

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 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	559	97%
1	B	559	96%
1	C	559	96%
1	D	559	96%

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 18075 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 FORMATE--TETRAHYDROFOLATE LIGASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	559	Total	C	N	O	S	0	7	0
			4295	2730	733	809	23			
1	B	556	Total	C	N	O	S	0	8	0
			4265	2710	728	806	21			
1	C	556	Total	C	N	O	S	0	1	0
			4228	2685	727	797	19			
1	D	556	Total	C	N	O	S	0	1	0
			4231	2686	728	798	19			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	377	THR	ALA	cloning artifact	UNP K7SWE7
B	377	THR	ALA	cloning artifact	UNP K7SWE7
C	377	THR	ALA	cloning artifact	UNP K7SWE7
D	377	THR	ALA	cloning artifact	UNP K7SWE7

- Molecule 2 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



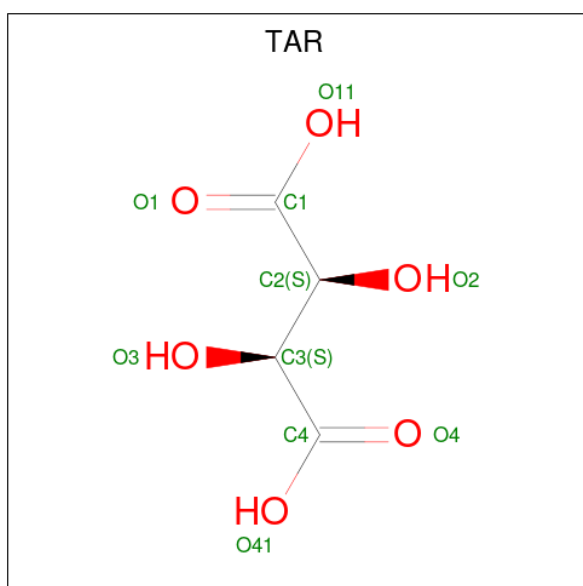
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			4	2	2		
2	A	1	Total	C	O	0	0
			4	2	2		
2	A	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 3 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			7	4	3		
3	B	1	Total	C	O	0	0
			7	4	3		

- Molecule 4 is D(-)-TARTARIC ACID (CCD ID: TAR) (formula: $C_4H_6O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			10	4	6		
4	B	1	Total	C	O	0	0
			10	4	6		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	C	1	Total	C	O	0	0
			10	4	6		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 6 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	K	0	0
			2	2		
6	B	2	Total	K	0	0
			2	2		
6	C	2	Total	K	0	0
			2	2		
6	D	2	Total	K	0	0
			2	2		

- Molecule 7 is ACETATE ION (CCD ID: ACT) (formula: $\text{C}_2\text{H}_3\text{O}_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	B	1	Total	C	O	0	0
			4	2	2		

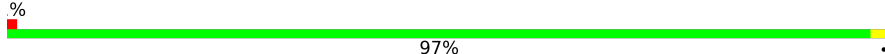
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	377	Total	O	0	0
			377	377		
8	B	303	Total	O	0	1
			304	304		
8	C	151	Total	O	0	0
			151	151		
8	D	120	Total	O	0	0
			120	120		

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: FORMATE--TETRAHYDROFOLATE LIGASE

Chain A: 

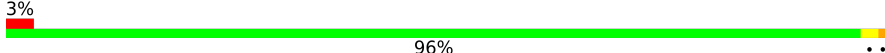


- Molecule 1: FORMATE--TETRAHYDROFOLATE LIGASE

Chain B: 

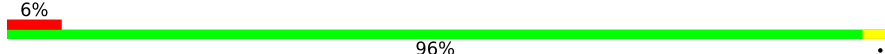


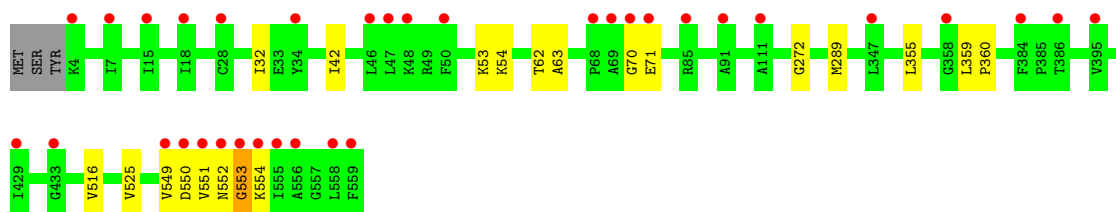
- Molecule 1: FORMATE--TETRAHYDROFOLATE LIGASE

Chain C: 



- Molecule 1: FORMATE--TETRAHYDROFOLATE LIGASE

Chain D: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	90.04Å 100.98Å 258.05Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.62 – 2.15 29.62 – 2.15	Depositor EDS
% Data completeness (in resolution range)	98.7 (29.62-2.15) 98.7 (29.62-2.15)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.19 (at 2.16Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.184 , 0.220 (Not available) , 0.202	Depositor DCC
R_{free} test set	6356 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	27.9	Xtriage
Anisotropy	0.279	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 38.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	18075	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.25% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: TAR, PEG, K, GOL, ACT, EDO

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	0.45	0/4374	0.67	0/5908
1	B	0.44	0/4352	0.67	0/5881
1	C	0.41	0/4297	0.67	0/5807
1	D	0.42	0/4297	0.68	0/5807
All	All	0.43	0/17320	0.67	0/23403

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	4295	0	4404	6	0
1	B	4265	0	4376	11	0
1	C	4228	0	4331	8	0
1	D	4231	0	4330	10	0
2	A	12	0	18	0	0
2	B	12	0	18	0	0
3	A	7	0	10	1	0
3	B	7	0	10	0	0
4	A	10	0	4	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	10	0	4	0	0
4	C	10	0	4	1	0
5	A	12	0	16	0	0
5	C	6	0	8	0	0
5	D	6	0	8	0	0
6	A	2	0	0	0	0
6	B	2	0	0	0	0
6	C	2	0	0	0	0
6	D	2	0	0	0	0
7	B	4	0	3	0	0
8	A	377	0	0	0	0
8	B	304	0	0	1	0
8	C	151	0	0	1	0
8	D	120	0	0	0	0
All	All	18075	0	17544	34	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 1.

All (34) 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:162[A]:ARG:NH1	8:B:2120:HOH:O	2.07	0.81
1:B:442[A]:ASP:OD2	1:B:444[A]:ASP:CG	2.33	0.71
1:B:442[A]:ASP:OD2	1:B:444[A]:ASP:OD1	2.16	0.63
1:C:334[A]:ARG:NH2	8:C:2126:HOH:O	2.37	0.57
1:B:444[A]:ASP:OD1	1:B:444[A]:ASP:C	2.49	0.55
1:C:28:CYS:SG	1:C:29:GLU:N	2.80	0.54
1:A:516:VAL:HG13	1:A:525:VAL:CG1	2.41	0.51
1:D:32:ILE:HG22	1:D:42:ILE:HD12	1.96	0.48
1:D:42:ILE:HB	1:D:289:MET:HE1	1.96	0.47
1:D:359:LEU:N	1:D:360:PRO:CD	2.78	0.47
1:A:336:LEU:HD13	1:A:359:LEU:HD13	1.96	0.46
1:A:73:LYS:NZ	1:A:303:PHE:O	2.48	0.46
1:C:187:ALA:O	4:C:1560:TAR:H2	2.16	0.46
1:C:359:LEU:N	1:C:360:PRO:CD	2.79	0.45
1:D:516:VAL:HG13	1:D:525:VAL:CG1	2.47	0.45
1:B:75[A]:THR:HG22	1:B:113:GLY:N	2.31	0.45
1:B:516:VAL:HG13	1:B:525:VAL:CG1	2.46	0.45
1:A:132:PHE:CE1	1:A:205:MET:HE1	2.52	0.44
1:A:46:LEU:C	1:A:46:LEU:HD12	2.43	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:516:VAL:HG13	1:B:525:VAL:HG13	2.00	0.43
1:A:376:PRO:HA	3:A:1563:PEG:H22	2.00	0.43
1:C:32:ILE:HG22	1:C:42:ILE:HD12	2.01	0.43
1:C:251:LYS:HD2	1:D:553:GLY:O	2.17	0.43
1:C:359:LEU:N	1:C:360:PRO:HD2	2.34	0.43
1:D:551:VAL:O	1:D:552:ASN:HB3	2.18	0.43
1:D:62:THR:OG1	1:D:63:ALA:N	2.51	0.42
1:B:279:HIS:HA	1:B:311:LYS:HD3	2.02	0.42
1:D:53:LYS:O	1:D:54:LYS:HB3	2.20	0.42
1:B:336:LEU:O	1:B:358:GLY:HA3	2.20	0.41
1:C:72:GLY:HA3	1:C:73:LYS:HA	1.85	0.41
1:B:44:TYR:CZ	1:B:214[B]:MET:HG3	2.55	0.41
1:B:257:ASN:O	1:B:268:PHE:HA	2.21	0.41
1:D:70:GLY:HA3	1:D:71:GLU:HA	1.87	0.40
1:D:355:LEU:O	1:D:359:LEU:HB2	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	564/559 (101%)	545 (97%)	16 (3%)	3 (0%)	24	20
1	B	562/559 (100%)	545 (97%)	17 (3%)	0	100	100
1	C	555/559 (99%)	529 (95%)	21 (4%)	5 (1%)	14	9
1	D	555/559 (99%)	528 (95%)	23 (4%)	4 (1%)	18	13
All	All	2236/2236 (100%)	2147 (96%)	77 (3%)	12 (0%)	24	20

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	72	GLY
1	D	550	ASP
1	A	71[A]	GLU
1	A	71[B]	GLU
1	C	69	ALA
1	D	553	GLY
1	C	71	GLU
1	C	272	GLY
1	D	549	VAL
1	C	70	GLY
1	D	272	GLY
1	A	272	GLY

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	449/442 (102%)	445 (99%)	4 (1%)	70	77
1	B	447/442 (101%)	444 (99%)	3 (1%)	76	82
1	C	440/442 (100%)	434 (99%)	6 (1%)	59	66
1	D	440/442 (100%)	439 (100%)	1 (0%)	87	92
All	All	1776/1768 (100%)	1762 (99%)	14 (1%)	76	79

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	32	ILE
1	A	37	LYS
1	A	359	LEU
1	A	383	GLN
1	B	30	ASP
1	B	53	LYS
1	B	438	LYS
1	C	53	LYS
1	C	71	GLU
1	C	75	THR

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Mol	Chain	Res	Type
1	C	334[A]	ARG
1	C	334[B]	ARG
1	C	359	LEU
1	D	554	LYS

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	212	ASN
1	A	348	ASN
1	A	349	GLN
1	B	65	ASN
1	B	172	ASN
1	B	361	ASN
1	B	400	ASN
1	B	484	ASN
1	C	45	ASN
1	C	172	ASN
1	C	475	ASN
1	D	11	GLN
1	D	17	HIS
1	D	260	GLN
1	D	382	ASN
1	D	484	ASN
1	D	512	ASN
1	D	552	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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 24 ligands modelled in this entry, 8 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	$\# Z > 2$
2	EDO	B	1561	-	3,3,3	0.47	0	2,2,2	0.29	0
7	ACT	B	1564	-	3,3,3	0.82	0	3,3,3	0.75	0
3	PEG	A	1563	-	6,6,6	0.55	0	5,5,5	0.41	0
4	TAR	C	1560	-	9,9,9	1.23	0	12,12,12	1.12	1 (8%)
2	EDO	A	1561	-	3,3,3	0.52	0	2,2,2	0.24	0
2	EDO	B	1562	-	3,3,3	0.44	0	2,2,2	0.23	0
4	TAR	B	1565	-	9,9,9	1.11	0	12,12,12	1.27	2 (16%)
5	GOL	D	1560	-	5,5,5	0.37	0	5,5,5	0.11	0
5	GOL	A	1565	-	5,5,5	0.37	0	5,5,5	0.17	0
2	EDO	B	1560	-	3,3,3	0.46	0	2,2,2	0.29	0
2	EDO	A	1560	-	3,3,3	0.44	0	2,2,2	0.33	0
4	TAR	A	1564	-	9,9,9	1.15	0	12,12,12	1.34	2 (16%)
5	GOL	A	1566	-	5,5,5	0.40	0	5,5,5	0.22	0
5	GOL	C	1561	-	5,5,5	0.30	0	5,5,5	0.33	0
2	EDO	A	1562	-	3,3,3	0.49	0	2,2,2	0.12	0
3	PEG	B	1563	-	6,6,6	0.49	0	5,5,5	0.19	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
2	EDO	B	1561	-	-	0/1/1/1	-
3	PEG	A	1563	-	-	1/4/4/4	-
4	TAR	C	1560	-	-	6/12/12/12	-
2	EDO	A	1561	-	-	0/1/1/1	-
2	EDO	B	1562	-	-	0/1/1/1	-
4	TAR	B	1565	-	-	6/12/12/12	-
5	GOL	D	1560	-	-	4/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GOL	A	1565	-	-	2/4/4/4	-
2	EDO	B	1560	-	-	1/1/1/1	-
2	EDO	A	1560	-	-	1/1/1/1	-
4	TAR	A	1564	-	-	8/12/12/12	-
5	GOL	A	1566	-	-	4/4/4/4	-
5	GOL	C	1561	-	-	0/4/4/4	-
2	EDO	A	1562	-	-	0/1/1/1	-
3	PEG	B	1563	-	-	1/4/4/4	-

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1564	TAR	O11-C1-C2	2.55	120.41	113.31
4	B	1565	TAR	O11-C1-C2	2.48	120.19	113.31
4	C	1560	TAR	O41-C4-C3	2.12	119.20	113.31
4	A	1564	TAR	O41-C4-C3	2.07	119.06	113.31
4	B	1565	TAR	O41-C4-C3	2.05	119.01	113.31

There are no chirality outliers.

All (34) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1566	GOL	O1-C1-C2-C3
5	A	1566	GOL	C1-C2-C3-O3
5	D	1560	GOL	O1-C1-C2-C3
4	A	1564	TAR	O1-C1-C2-O2
4	A	1564	TAR	O11-C1-C2-O2
4	B	1565	TAR	O1-C1-C2-O2
4	B	1565	TAR	O11-C1-C2-O2
4	B	1565	TAR	O1-C1-C2-C3
4	B	1565	TAR	O11-C1-C2-C3
4	B	1565	TAR	O3-C3-C4-O4
4	B	1565	TAR	O3-C3-C4-O41
4	C	1560	TAR	C2-C3-C4-O41
4	A	1564	TAR	O11-C1-C2-C3
4	A	1564	TAR	O3-C3-C4-O4
4	C	1560	TAR	C2-C3-C4-O4
5	A	1565	GOL	C1-C2-C3-O3
5	D	1560	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
4	A	1564	TAR	O3-C3-C4-O41
5	A	1566	GOL	O1-C1-C2-O2
5	A	1566	GOL	O2-C2-C3-O3
5	D	1560	GOL	O2-C2-C3-O3
4	A	1564	TAR	O1-C1-C2-C3
5	A	1565	GOL	O2-C2-C3-O3
5	D	1560	GOL	O1-C1-C2-O2
2	B	1560	EDO	O1-C1-C2-O2
4	C	1560	TAR	C1-C2-C3-C4
4	C	1560	TAR	O3-C3-C4-O4
4	C	1560	TAR	O3-C3-C4-O41
4	C	1560	TAR	O2-C2-C3-O3
4	A	1564	TAR	C2-C3-C4-O4
3	A	1563	PEG	C1-C2-O2-C3
4	A	1564	TAR	C2-C3-C4-O41
2	A	1560	EDO	O1-C1-C2-O2
3	B	1563	PEG	O1-C1-C2-O2

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1563	PEG	1	0
4	C	1560	TAR	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	559/559 (100%)	-0.34	5 (0%) 81 83	9, 22, 37, 65	15 (2%)
1	B	556/559 (99%)	-0.28	4 (0%) 84 85	10, 24, 40, 60	8 (1%)
1	C	556/559 (99%)	0.55	19 (3%) 48 52	19, 46, 66, 85	1 (0%)
1	D	556/559 (99%)	0.68	34 (6%) 27 31	17, 45, 66, 85	1 (0%)
All	All	2227/2236 (99%)	0.15	62 (2%) 55 59	9, 31, 61, 85	25 (1%)

All (62) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	69	ALA	5.2
1	D	551	VAL	5.1
1	D	550	ASP	4.2
1	D	28	CYS	4.1
1	D	559	PHE	3.8
1	B	70	GLY	3.8
1	C	551	VAL	3.8
1	C	71	GLU	3.4
1	D	558	LEU	3.4
1	D	4	LYS	3.4
1	C	69	ALA	3.3
1	D	384	PHE	3.3
1	A	28	CYS	3.2
1	C	72	GLY	3.1
1	A	3	TYR	3.1
1	A	106[A]	ILE	3.1
1	B	71	GLU	3.0
1	D	70	GLY	2.9
1	B	72	GLY	2.9
1	D	111	ALA	2.9
1	D	386	THR	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	556	ALA	2.7
1	D	554	LYS	2.7
1	D	553	GLY	2.7
1	D	552	ASN	2.7
1	C	556	ALA	2.6
1	D	68	PRO	2.6
1	A	71[A]	GLU	2.5
1	C	70	GLY	2.5
1	D	46	LEU	2.5
1	D	556	ALA	2.5
1	D	15	ILE	2.5
1	C	46	LEU	2.4
1	C	336	LEU	2.4
1	D	347	LEU	2.4
1	D	7	ILE	2.4
1	D	395	VAL	2.4
1	D	47	LEU	2.4
1	D	429	ILE	2.3
1	C	366	VAL	2.3
1	C	111	ALA	2.3
1	D	50	PHE	2.2
1	D	18	ILE	2.2
1	D	85[A]	ARG	2.2
1	D	34	TYR	2.2
1	C	50	PHE	2.2
1	C	429	ILE	2.2
1	D	71	GLU	2.2
1	C	552	ASN	2.2
1	D	433	GLY	2.1
1	D	91	ALA	2.1
1	C	402	LEU	2.1
1	C	384	PHE	2.1
1	D	555	ILE	2.1
1	C	342	VAL	2.1
1	D	48	LYS	2.1
1	B	28	CYS	2.0
1	C	68	PRO	2.0
1	C	341	GLY	2.0
1	D	549	VAL	2.0
1	C	88	GLY	2.0
1	D	358	GLY	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 [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($\text{\AA}^2$)	Q<0.9
4	TAR	B	1565	10/10	0.51	0.17	61,63,67,68	0
4	TAR	C	1560	10/10	0.73	0.15	56,57,61,63	0
5	GOL	D	1560	6/6	0.74	0.17	54,55,57,58	0
4	TAR	A	1564	10/10	0.75	0.11	39,45,46,48	0
3	PEG	A	1563	7/7	0.75	0.17	36,38,39,41	0
5	GOL	C	1561	6/6	0.77	0.13	42,43,44,45	0
3	PEG	B	1563	7/7	0.77	0.16	43,44,46,46	0
2	EDO	B	1560	4/4	0.80	0.16	45,45,46,46	0
5	GOL	A	1566	6/6	0.82	0.13	48,48,48,48	0
5	GOL	A	1565	6/6	0.83	0.12	38,39,39,40	0
7	ACT	B	1564	4/4	0.83	0.13	42,43,44,44	0
2	EDO	B	1561	4/4	0.85	0.13	34,35,35,35	0
2	EDO	A	1562	4/4	0.89	0.10	37,37,37,37	0
2	EDO	A	1561	4/4	0.90	0.10	29,30,31,31	0
2	EDO	B	1562	4/4	0.92	0.09	30,31,32,34	0
2	EDO	A	1560	4/4	0.93	0.09	40,41,41,41	0
6	K	C	1563	1/1	0.96	0.05	35,35,35,35	0
6	K	D	1562	1/1	0.97	0.04	33,33,33,33	0
6	K	B	1567	1/1	0.99	0.11	34,34,34,34	0
6	K	C	1562	1/1	0.99	0.13	36,36,36,36	0
6	K	A	1567	1/1	0.99	0.02	14,14,14,14	0
6	K	D	1561	1/1	0.99	0.05	31,31,31,31	0
6	K	A	1568	1/1	0.99	0.12	31,31,31,31	0
6	K	B	1566	1/1	0.99	0.02	18,18,18,18	0

6.5 Other polymers [i](#)

There are no such residues in this entry.