



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 06:36 AM UTC

PDB ID : 3TZH / pdb_00003tzh
Title : Crystal structure of 3-ketoacyl-(acyl-carrier-protein) reductase (FabG)(F187A) from *Vibrio cholerae*
Authors : Hou, J.; Chruszcz, M.; Zheng, H.; Cooper, D.R.; Osinski, T.; Shumilin, I.; Anderson, W.F.; Minor, W.; Center for Structural Genomics of Infectious Diseases (CSGID)
Deposited on : 2011-09-27
Resolution : 2.10 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:

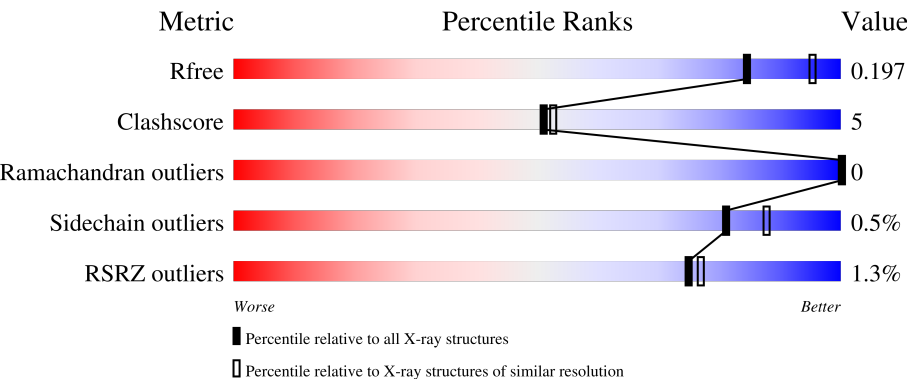
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry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

1 Overall quality at a glance i

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

The reported resolution of this entry is 2.10 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	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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	251	89%10%.
1	B	251	2% 91%8%.
1	C	251	% 90%9%.
1	D	251	2% 92%7%.

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Mol	Chain	Length	Quality of chain
1	E	251	% 91% 8% .
1	F	251	2% 88% 10% .

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
4	GOL	F	252	-	-	X	-
4	GOL	F	253	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11881 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 3-oxoacyl-[acyl-carrier protein] reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	247	Total	C	N	O	S	0	1	0
			1791	1110	317	352	12			
1	B	247	Total	C	N	O	S	0	2	0
			1797	1115	318	352	12			
1	C	248	Total	C	N	O	S	0	3	0
			1807	1121	319	354	13			
1	D	248	Total	C	N	O	S	0	3	0
			1824	1130	322	358	14			
1	E	247	Total	C	N	O	S	0	2	0
			1811	1121	321	357	12			
1	F	247	Total	C	N	O	S	0	2	0
			1799	1116	318	353	12			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	SER	-	expression tag	UNP C3NP04
A	-1	ASN	-	expression tag	UNP C3NP04
A	0	ALA	-	expression tag	UNP C3NP04
A	187	ALA	PHE	engineered mutation	UNP C3NP04
B	-2	SER	-	expression tag	UNP C3NP04
B	-1	ASN	-	expression tag	UNP C3NP04
B	0	ALA	-	expression tag	UNP C3NP04
B	187	ALA	PHE	engineered mutation	UNP C3NP04
C	-2	SER	-	expression tag	UNP C3NP04
C	-1	ASN	-	expression tag	UNP C3NP04
C	0	ALA	-	expression tag	UNP C3NP04
C	187	ALA	PHE	engineered mutation	UNP C3NP04
D	-2	SER	-	expression tag	UNP C3NP04
D	-1	ASN	-	expression tag	UNP C3NP04
D	0	ALA	-	expression tag	UNP C3NP04
D	187	ALA	PHE	engineered mutation	UNP C3NP04
E	-2	SER	-	expression tag	UNP C3NP04

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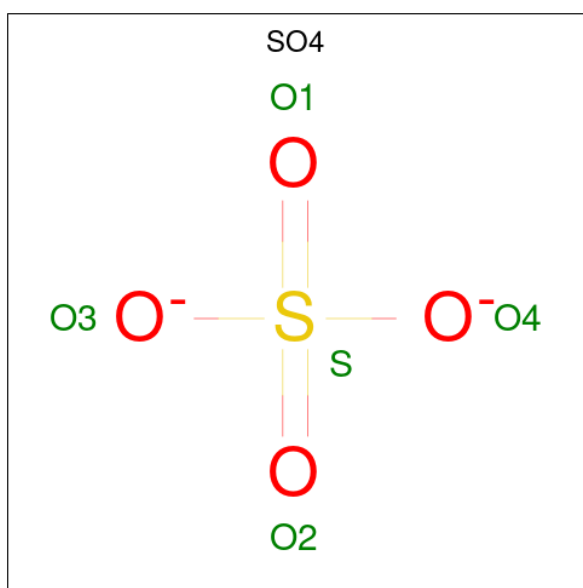
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Chain	Residue	Modelled	Actual	Comment	Reference
E	-1	ASN	-	expression tag	UNP C3NP04
E	0	ALA	-	expression tag	UNP C3NP04
E	187	ALA	PHE	engineered mutation	UNP C3NP04
F	-2	SER	-	expression tag	UNP C3NP04
F	-1	ASN	-	expression tag	UNP C3NP04
F	0	ALA	-	expression tag	UNP C3NP04
F	187	ALA	PHE	engineered mutation	UNP C3NP04

- Molecule 2 is UNKNOWN ATOM OR ION (CCD ID: UNX) (formula: X).

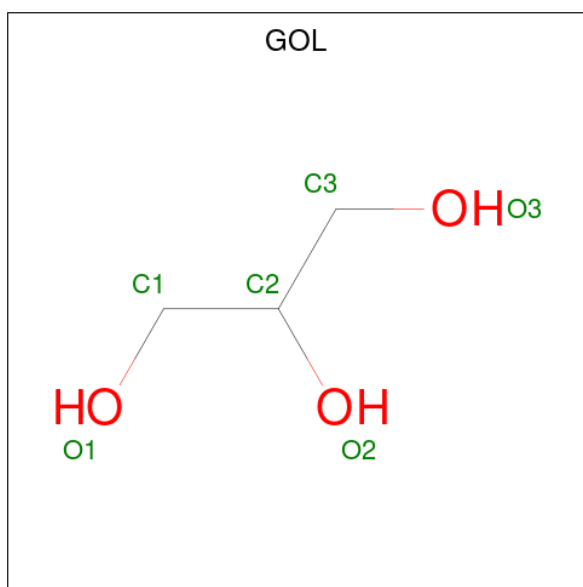
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	9	Total X 9 9	0	0
2	B	10	Total X 10 10	0	0
2	C	5	Total X 5 5	0	0
2	D	7	Total X 7 7	0	0
2	E	8	Total X 8 8	0	0
2	F	8	Total X 8 8	0	0

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	157	Total	O	0	0
			157	157		
5	B	155	Total	O	0	0
			155	155		
5	C	159	Total	O	0	0
			159	159		
5	D	136	Total	O	0	0
			136	136		
5	E	143	Total	O	0	0
			143	143		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	F	118	Total 118	O 118	0	0

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

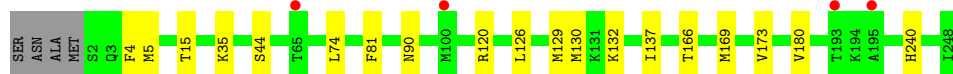
- Molecule 1: 3-oxoacyl-[acyl-carrier protein] reductase

Chain A: 



- Molecule 1: 3-oxoacyl-[acyl-carrier protein] reductase

Chain B: 

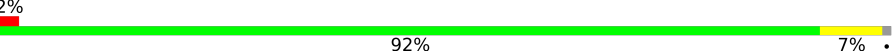


- Molecule 1: 3-oxoacyl-[acyl-carrier protein] reductase

Chain C: 



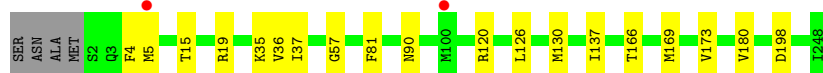
- Molecule 1: 3-oxoacyl-[acyl-carrier protein] reductase

Chain D: 

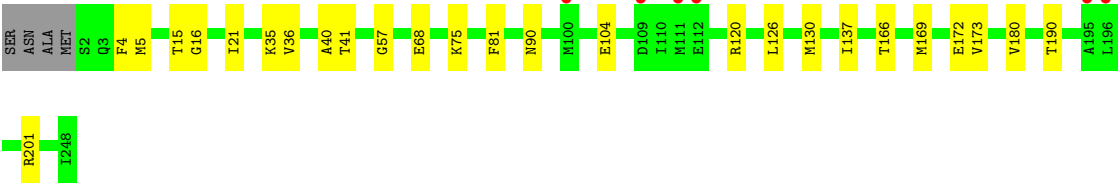
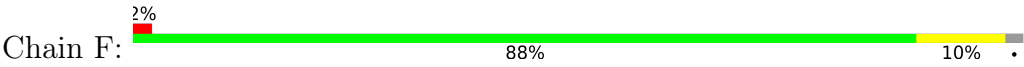


- Molecule 1: 3-oxoacyl-[acyl-carrier protein] reductase

Chain E: 



- Molecule 1: 3-oxoacyl-[acyl-carrier protein] reductase



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	63.34Å 380.35Å 63.21Å 90.00° 119.86° 90.00°	Depositor
Resolution (Å)	27.00 – 2.10 27.00 – 2.10	Depositor EDS
% Data completeness (in resolution range)	95.6 (27.00-2.10) 95.6 (27.00-2.10)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	7.56 (at 2.10Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.157 , 0.191 0.166 , 0.197	Depositor DCC
R_{free} test set	3593 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	22.9	Xtriage
Anisotropy	0.153	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 47.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	0.099 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11881	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.48% 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: GOL, UNX, SO4

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.90	1/1810 (0.1%)	0.90	0/2442
1	B	0.93	1/1819 (0.1%)	0.93	0/2453
1	C	0.91	0/1832	0.89	0/2470
1	D	0.89	0/1849	0.90	0/2491
1	E	0.92	0/1833	0.90	0/2471
1	F	0.86	0/1821	0.92	0/2456
All	All	0.90	2/10964 (0.0%)	0.91	0/14783

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	163	ILE	CA-C	5.13	1.59	1.52
1	B	240	HIS	CE1-NE2	5.02	1.37	1.32

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	1791	0	1815	22	0
1	B	1797	0	1828	18	0
1	C	1807	0	1843	17	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	1824	0	1863	16	0
1	E	1811	0	1842	17	0
1	F	1799	0	1827	31	0
2	A	9	0	0	0	0
2	B	10	0	0	0	0
2	C	5	0	0	0	0
2	D	7	0	0	0	0
2	E	8	0	0	0	0
2	F	8	0	0	0	0
3	A	15	0	0	1	0
3	B	15	0	0	0	0
3	C	25	0	0	0	0
3	D	15	0	0	0	0
3	E	10	0	0	1	0
3	F	15	0	0	1	0
4	A	6	0	8	2	0
4	B	6	0	8	0	0
4	C	6	0	8	0	0
4	E	12	0	16	0	0
4	F	12	0	16	10	0
5	A	157	0	0	4	0
5	B	155	0	0	1	0
5	C	159	0	0	2	0
5	D	136	0	0	1	0
5	E	143	0	0	1	0
5	F	118	0	0	1	0
All	All	11881	0	11074	114	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 5.

All (114) 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:5:MET:HE2	1:E:5:MET:HE2	1.32	1.06
1:A:5:MET:HE2	1:F:5:MET:HE2	1.44	0.98
1:F:126:LEU:HG	1:F:130:MET:HE2	1.51	0.92
1:D:126:LEU:HD22	1:D:169[A]:MET:HE3	1.58	0.85
1:C:126:LEU:HD22	1:C:169[A]:MET:HE3	1.59	0.84
1:A:137:ILE:CD1	1:A:169[A]:MET:HE1	2.15	0.77
1:B:137:ILE:CD1	1:B:169[A]:MET:HE1	2.14	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:126:LEU:HG	1:A:130:MET:HE2	1.68	0.74
1:C:120:ARG:NH1	5:C:983:HOH:O	2.20	0.74
1:E:137:ILE:CD1	1:E:169[A]:MET:HE1	2.18	0.74
1:A:126:LEU:HD22	1:A:169[A]:MET:HE3	1.71	0.72
1:F:126:LEU:HD11	1:F:173:VAL:HG11	1.72	0.71
1:F:21:ILE:H	4:F:253:GOL:H32	1.55	0.71
1:A:137:ILE:HD12	1:A:169[A]:MET:CE	2.21	0.70
1:C:5:MET:HE2	1:D:5:MET:HE2	1.75	0.67
1:A:2:SER:N	5:A:835:HOH:O	2.27	0.67
1:F:21:ILE:H	4:F:253:GOL:C3	2.08	0.67
1:B:120:ARG:NH1	5:B:970:HOH:O	2.29	0.66
1:C:126:LEU:HG	1:C:130:MET:HE2	1.78	0.65
1:E:137:ILE:HD12	1:E:169[A]:MET:CE	2.27	0.65
1:C:166:THR:HG23	1:C:180:VAL:HG12	1.79	0.64
1:B:137:ILE:HD12	1:B:169[A]:MET:CE	2.27	0.64
1:F:137:ILE:CD1	1:F:169[A]:MET:HE1	2.30	0.62
1:D:169[B]:MET:HE3	1:D:169[B]:MET:HA	1.81	0.61
1:A:120:ARG:NH1	5:A:826:HOH:O	2.34	0.60
1:C:118:ILE:HD12	1:C:162:VAL:HG21	1.83	0.60
1:B:5:MET:HE2	1:E:5:MET:CE	2.20	0.60
1:F:166:THR:HG23	1:F:180:VAL:HG12	1.82	0.60
1:D:166:THR:HG23	1:D:180:VAL:HG12	1.83	0.60
1:F:120:ARG:NH1	5:F:623:HOH:O	2.35	0.60
1:A:5:MET:CE	1:F:5:MET:HE2	2.27	0.59
1:F:169[B]:MET:HE1	1:F:172:GLU:OE1	2.03	0.59
1:C:1:MET:N	5:C:964:HOH:O	2.36	0.58
1:E:126:LEU:HD22	1:E:169[A]:MET:HE3	1.85	0.58
1:E:120:ARG:NH1	5:E:290:HOH:O	2.37	0.57
1:B:166:THR:HG23	1:B:180:VAL:HG12	1.86	0.57
1:A:137:ILE:HD12	1:A:169[A]:MET:HE1	1.80	0.57
1:D:169[B]:MET:HA	1:D:169[B]:MET:CE	2.33	0.56
1:B:137:ILE:CD1	1:B:169[A]:MET:CE	2.81	0.55
1:B:137:ILE:HD12	1:B:169[A]:MET:HE2	1.89	0.54
1:F:126:LEU:CG	1:F:130:MET:HE2	2.33	0.54
1:F:21:ILE:HB	4:F:253:GOL:H32	1.89	0.54
1:F:169[B]:MET:HE3	1:F:169[B]:MET:HA	1.91	0.53
1:E:137:ILE:HD12	1:E:169[A]:MET:HE1	1.87	0.52
1:A:18:SER:OG	4:A:252:GOL:H12	2.10	0.52
1:F:137:ILE:HD12	1:F:169[A]:MET:CE	2.39	0.52
1:F:40:ALA:HA	4:F:252:GOL:C3	2.40	0.52
1:F:35:LYS:HG2	1:F:81:PHE:CD1	2.45	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:126:LEU:HG	1:B:130:MET:HE2	1.93	0.51
1:E:137:ILE:HD12	1:E:169[A]:MET:HE2	1.93	0.50
1:D:35:LYS:HG2	1:D:81:PHE:CD1	2.47	0.49
1:C:35:LYS:HG2	1:C:81:PHE:CD1	2.48	0.49
1:A:137:ILE:HD12	1:A:169[A]:MET:HE2	1.92	0.49
1:D:169[B]:MET:HE3	1:D:169[B]:MET:CA	2.43	0.48
1:D:126:LEU:HD11	1:D:173:VAL:HG11	1.96	0.48
1:D:134:GLN:NE2	5:D:914:HOH:O	2.47	0.48
1:F:126:LEU:HD13	1:F:169[A]:MET:CE	2.43	0.48
1:A:37:ILE:N	1:A:37:ILE:HD12	2.29	0.48
1:A:202:THR:HG22	5:A:951:HOH:O	2.13	0.48
1:E:35:LYS:HG2	1:E:81:PHE:CD1	2.49	0.47
1:B:44:SER:OG	1:F:75:LYS:NZ	2.30	0.47
1:B:35:LYS:HG2	1:B:81:PHE:CD1	2.50	0.47
1:F:16:GLY:HA2	4:F:252:GOL:H31	1.97	0.47
1:D:118:ILE:HD12	1:D:162:VAL:HG21	1.96	0.47
1:B:126:LEU:HD22	1:B:169[A]:MET:HE3	1.97	0.47
1:C:118:ILE:HD12	1:C:162:VAL:CG2	2.45	0.47
1:D:15:THR:O	1:D:90:ASN:HB3	2.16	0.46
1:A:35:LYS:HG2	1:A:81:PHE:CD1	2.49	0.46
1:C:129:MET:HA	1:C:132:LYS:HE2	1.98	0.46
1:F:40:ALA:HA	4:F:252:GOL:H31	1.98	0.46
1:F:169[B]:MET:HA	1:F:169[B]:MET:CE	2.46	0.46
1:A:40:ALA:HA	4:A:252:GOL:H31	1.98	0.45
1:D:4:PHE:CE2	1:D:5:MET:HG3	2.51	0.45
1:A:15:THR:O	1:A:90:ASN:HB3	2.16	0.45
1:F:190:THR:HG21	4:F:253:GOL:O3	2.17	0.45
1:E:126:LEU:HG	1:E:130:MET:HE2	1.98	0.45
1:E:37:ILE:N	1:E:37:ILE:HD12	2.32	0.45
1:C:137:ILE:CD1	1:C:169[A]:MET:HE1	2.47	0.44
1:D:137:ILE:CD1	1:D:169[A]:MET:HE1	2.47	0.44
1:E:15:THR:O	1:E:90:ASN:HB3	2.17	0.44
1:A:74:LEU:CD1	1:A:124:ALA:HB1	2.48	0.44
1:A:19:ARG:HB2	3:A:249:SO4:O3	2.18	0.44
1:F:15:THR:O	1:F:90:ASN:HB3	2.17	0.43
1:E:4:PHE:CE2	1:E:5:MET:HG3	2.54	0.43
1:F:104:GLU:HG2	3:F:249:SO4:O2	2.19	0.43
1:A:4:PHE:CE2	1:A:5:MET:HG3	2.54	0.43
1:B:15:THR:O	1:B:90:ASN:HB3	2.18	0.43
1:B:129:MET:HA	1:B:132:LYS:HE2	2.01	0.43
1:E:166:THR:HG23	1:E:180:VAL:HG12	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:16:GLY:HA2	4:F:252:GOL:C3	2.49	0.43
1:C:15:THR:O	1:C:90:ASN:HB3	2.18	0.42
1:C:169[B]:MET:HA	1:C:169[B]:MET:HE3	2.00	0.42
1:F:21:ILE:N	4:F:253:GOL:H32	2.29	0.42
1:D:126:LEU:HG	1:D:130:MET:HE2	2.02	0.42
1:A:44:SER:HB3	1:D:79:ASP:OD2	2.19	0.42
1:C:4:PHE:CE2	1:C:5:MET:HG3	2.54	0.42
1:B:137:ILE:HD13	1:B:169[A]:MET:HE1	1.99	0.42
1:A:105:GLU:CB	5:A:478:HOH:O	2.67	0.42
1:F:4:PHE:CE2	1:F:5:MET:HG3	2.54	0.42
1:E:36:VAL:O	1:E:57:GLY:HA3	2.20	0.42
1:B:4:PHE:CE2	1:B:5:MET:HG3	2.56	0.41
1:E:19:ARG:HB2	3:E:250:SO4:O4	2.21	0.41
1:F:137:ILE:HD12	1:F:169[A]:MET:HE2	2.01	0.41
1:F:36:VAL:O	1:F:57:GLY:HA3	2.21	0.41
1:B:74:LEU:HD23	1:B:74:LEU:HA	1.91	0.41
1:C:36:VAL:O	1:C:57:GLY:HA3	2.21	0.41
1:C:74:LEU:CD1	1:C:124:ALA:HB1	2.51	0.40
1:F:41:THR:H	4:F:252:GOL:H11	1.85	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	246/251 (98%)	242 (98%)	4 (2%)	0	100	100
1	B	247/251 (98%)	242 (98%)	5 (2%)	0	100	100
1	C	249/251 (99%)	245 (98%)	4 (2%)	0	100	100
1	D	249/251 (99%)	245 (98%)	4 (2%)	0	100	100
1	E	247/251 (98%)	243 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	247/251 (98%)	242 (98%)	5 (2%)	0	100	100
All	All	1485/1506 (99%)	1459 (98%)	26 (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	181/188 (96%)	180 (99%)	1 (1%)	78	86
1	B	182/188 (97%)	182 (100%)	0	100	100
1	C	184/188 (98%)	184 (100%)	0	100	100
1	D	187/188 (100%)	186 (100%)	1 (0%)	81	88
1	E	185/188 (98%)	184 (100%)	1 (0%)	81	88
1	F	182/188 (97%)	180 (99%)	2 (1%)	65	74
All	All	1101/1128 (98%)	1096 (100%)	5 (0%)	81	88

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	121	LEU
1	D	198	ASP
1	E	198	ASP
1	F	68	GLU
1	F	201	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	89	ASN
1	A	149	ASN
1	A	152	GLN

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Mol	Chain	Res	Type
1	B	89	ASN
1	B	90	ASN
1	B	134	GLN
1	B	139	ASN
1	B	149	ASN
1	B	152	GLN
1	C	89	ASN
1	D	89	ASN
1	D	139	ASN
1	D	149	ASN
1	D	152	GLN
1	E	89	ASN
1	E	134	GLN
1	E	149	ASN
1	E	152	GLN
1	F	89	ASN
1	F	90	ASN
1	F	134	GLN
1	F	149	ASN
1	F	152	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 73 ligands modelled in this entry, 47 are unknown - leaving 26 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	F	252	-	5,5,5	1.04	0	5,5,5	1.44	1 (20%)
3	SO4	E	250	-	4,4,4	0.55	0	6,6,6	0.12	0
4	GOL	C	254	-	5,5,5	0.59	0	5,5,5	0.64	0
4	GOL	A	252	-	5,5,5	0.63	0	5,5,5	0.72	0
3	SO4	A	251	-	4,4,4	0.47	0	6,6,6	0.30	0
3	SO4	C	249	-	4,4,4	0.22	0	6,6,6	0.47	0
4	GOL	E	251	-	5,5,5	0.59	0	5,5,5	0.34	0
4	GOL	B	254	-	5,5,5	0.55	0	5,5,5	0.42	0
3	SO4	F	251	-	4,4,4	0.10	0	6,6,6	0.45	0
4	GOL	F	253	-	5,5,5	0.76	0	5,5,5	1.75	2 (40%)
3	SO4	A	250	-	4,4,4	0.47	0	6,6,6	0.28	0
3	SO4	B	251	-	4,4,4	0.47	0	6,6,6	0.54	0
3	SO4	C	251	-	4,4,4	0.56	0	6,6,6	0.34	0
3	SO4	D	250	-	4,4,4	0.52	0	6,6,6	0.53	0
3	SO4	C	250	-	4,4,4	0.39	0	6,6,6	0.16	0
3	SO4	D	251	-	4,4,4	0.46	0	6,6,6	0.20	0
3	SO4	D	249	-	4,4,4	0.41	0	6,6,6	0.10	0
3	SO4	E	249	-	4,4,4	0.34	0	6,6,6	0.55	0
3	SO4	F	250	-	4,4,4	0.44	0	6,6,6	0.44	0
3	SO4	A	249	-	4,4,4	0.45	0	6,6,6	0.47	0
4	GOL	E	252	-	5,5,5	0.69	0	5,5,5	0.89	0
3	SO4	C	252	-	4,4,4	0.48	0	6,6,6	0.10	0
3	SO4	C	253	-	4,4,4	0.46	0	6,6,6	0.41	0
3	SO4	B	252	-	4,4,4	0.43	0	6,6,6	0.14	0
3	SO4	F	249	-	4,4,4	0.35	0	6,6,6	0.49	0
3	SO4	B	253	-	4,4,4	0.38	0	6,6,6	0.56	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	E	252	-	-	3/4/4/4	-
4	GOL	E	251	-	-	4/4/4/4	-
4	GOL	B	254	-	-	2/4/4/4	-
4	GOL	F	252	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	F	253	-	-	2/4/4/4	-
4	GOL	C	254	-	-	2/4/4/4	-
4	GOL	A	252	-	-	2/4/4/4	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	F	253	GOL	C3-C2-C1	-2.95	100.97	111.80
4	F	253	GOL	O2-C2-C1	2.41	119.15	109.18
4	F	252	GOL	O3-C3-C2	2.27	120.59	110.38

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	252	GOL	O1-C1-C2-O2
4	A	252	GOL	O1-C1-C2-C3
4	E	251	GOL	O1-C1-C2-C3
4	E	251	GOL	C1-C2-C3-O3
4	E	251	GOL	O2-C2-C3-O3
4	E	252	GOL	C1-C2-C3-O3
4	F	252	GOL	C1-C2-C3-O3
4	F	253	GOL	O1-C1-C2-C3
4	F	252	GOL	O2-C2-C3-O3
4	F	253	GOL	O1-C1-C2-O2
4	B	254	GOL	O1-C1-C2-C3
4	C	254	GOL	C1-C2-C3-O3
4	E	252	GOL	O2-C2-C3-O3
4	B	254	GOL	O1-C1-C2-O2
4	C	254	GOL	O2-C2-C3-O3
4	E	251	GOL	O1-C1-C2-O2
4	E	252	GOL	O1-C1-C2-O2

There are no ring outliers.

6 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	F	252	GOL	5	0
3	E	250	SO4	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	252	GOL	2	0
4	F	253	GOL	5	0
3	A	249	SO4	1	0
3	F	249	SO4	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	247/251 (98%)	-0.34	0 100 100	11, 24, 46, 67	3 (1%)
1	B	247/251 (98%)	-0.33	4 (1%) 70 73	11, 24, 45, 63	6 (2%)
1	C	248/251 (98%)	-0.23	3 (1%) 76 78	12, 24, 52, 71	6 (2%)
1	D	248/251 (98%)	-0.26	4 (1%) 70 73	12, 25, 52, 72	7 (2%)
1	E	247/251 (98%)	-0.32	2 (0%) 82 84	10, 23, 46, 66	4 (1%)
1	F	247/251 (98%)	-0.19	6 (2%) 59 62	13, 26, 53, 71	7 (2%)
All	All	1484/1506 (98%)	-0.28	19 (1%) 75 77	10, 25, 50, 72	33 (2%)

All (19) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	109	ASP	3.9
1	F	195	ALA	3.5
1	F	100	MET	3.3
1	B	100	MET	3.2
1	B	195	ALA	3.1
1	C	100	MET	3.1
1	E	100	MET	3.0
1	D	111	MET	2.7
1	B	193	THR	2.7
1	C	191	ASP	2.6
1	D	100	MET	2.5
1	B	65	THR	2.4
1	D	195	ALA	2.4
1	F	196	LEU	2.4
1	C	192	MET	2.3
1	E	5	MET	2.2
1	F	111	MET	2.2
1	F	112	GLU	2.1
1	D	192	MET	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
2	UNX	E	1007	1/1	0.58	0.16	38,38,38,38	0
4	GOL	E	252	6/6	0.67	0.17	11,14,15,15	6
2	UNX	B	977	1/1	0.71	0.23	29,29,29,29	0
2	UNX	E	1005	1/1	0.71	0.20	32,32,32,32	0
4	GOL	B	254	6/6	0.72	0.16	45,49,50,50	6
2	UNX	C	991	1/1	0.72	0.22	28,28,28,28	0
2	UNX	F	982	1/1	0.73	0.13	38,38,38,38	0
2	UNX	F	983	1/1	0.74	0.21	37,37,37,37	0
2	UNX	E	1003	1/1	0.74	0.14	32,32,32,32	0
4	GOL	C	254	6/6	0.74	0.14	36,47,50,54	0
2	UNX	D	998	1/1	0.74	0.19	37,37,37,37	0
4	GOL	A	252	6/6	0.76	0.14	43,51,53,58	0
2	UNX	D	1001	1/1	0.76	0.33	42,42,42,42	0
2	UNX	B	974	1/1	0.76	0.12	34,34,34,34	0
4	GOL	E	251	6/6	0.76	0.15	38,47,49,54	0
2	UNX	F	984	1/1	0.76	0.18	32,32,32,32	0
2	UNX	F	985	1/1	0.77	0.18	30,30,30,30	0
2	UNX	D	1000	1/1	0.77	0.11	38,38,38,38	0
3	SO4	B	253	5/5	0.78	0.17	36,38,42,42	5
2	UNX	C	992	1/1	0.78	0.24	36,36,36,36	0
2	UNX	A	968	1/1	0.79	0.11	38,38,38,38	0
2	UNX	C	994	1/1	0.79	0.22	44,44,44,44	0
2	UNX	A	966	1/1	0.79	0.15	29,29,29,29	0
4	GOL	F	252	6/6	0.79	0.16	40,42,48,50	0
2	UNX	B	975	1/1	0.80	0.14	25,25,25,25	0
2	UNX	C	993	1/1	0.80	0.22	43,43,43,43	0
3	SO4	C	253	5/5	0.80	0.11	36,38,43,44	5

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	UNX	F	988	1/1	0.81	0.34	54,54,54,54	0
3	SO4	A	251	5/5	0.81	0.10	64,67,73,76	0
2	UNX	C	990	1/1	0.81	0.24	39,39,39,39	0
2	UNX	A	970	1/1	0.81	0.13	40,40,40,40	0
2	UNX	B	978	1/1	0.81	0.15	36,36,36,36	0
2	UNX	E	1006	1/1	0.83	0.18	26,26,26,26	0
2	UNX	D	996	1/1	0.84	0.21	39,39,39,39	0
2	UNX	A	965	1/1	0.84	0.18	31,31,31,31	0
2	UNX	D	999	1/1	0.84	0.24	27,27,27,27	0
2	UNX	E	1010	1/1	0.84	0.21	32,32,32,32	0
2	UNX	F	986	1/1	0.84	0.15	35,35,35,35	0
2	UNX	A	964	1/1	0.85	0.14	35,35,35,35	0
2	UNX	B	980	1/1	0.86	0.23	30,30,30,30	0
2	UNX	E	1009	1/1	0.86	0.23	35,35,35,35	0
2	UNX	A	971	1/1	0.86	0.17	29,29,29,29	0
4	GOL	F	253	6/6	0.86	0.13	26,34,35,40	0
3	SO4	C	251	5/5	0.87	0.13	55,56,61,67	0
2	UNX	A	967	1/1	0.87	0.27	33,33,33,33	0
3	SO4	D	250	5/5	0.87	0.14	53,53,55,68	0
2	UNX	B	973	1/1	0.87	0.10	29,29,29,29	0
2	UNX	F	987	1/1	0.87	0.25	37,37,37,37	0
3	SO4	F	249	5/5	0.88	0.11	55,56,58,61	0
2	UNX	A	972	1/1	0.88	0.28	37,37,37,37	0
2	UNX	E	1008	1/1	0.89	0.25	36,36,36,36	0
3	SO4	C	252	5/5	0.89	0.08	53,55,58,60	5
2	UNX	B	981	1/1	0.89	0.25	35,35,35,35	0
2	UNX	B	250	1/1	0.89	0.10	39,39,39,39	0
3	SO4	B	252	5/5	0.89	0.13	47,47,51,52	5
2	UNX	E	1004	1/1	0.89	0.13	27,27,27,27	0
2	UNX	A	969	1/1	0.90	0.09	36,36,36,36	0
2	UNX	F	989	1/1	0.90	0.24	36,36,36,36	0
3	SO4	F	250	5/5	0.90	0.12	55,57,59,68	0
2	UNX	D	995	1/1	0.90	0.12	37,37,37,37	0
2	UNX	B	979	1/1	0.90	0.25	32,32,32,32	0
2	UNX	B	249	1/1	0.91	0.09	34,34,34,34	0
3	SO4	D	249	5/5	0.91	0.06	62,68,72,74	0
3	SO4	B	251	5/5	0.91	0.11	52,56,62,64	0
3	SO4	E	250	5/5	0.92	0.09	47,56,58,62	0
3	SO4	A	249	5/5	0.92	0.11	52,53,61,68	0
3	SO4	A	250	5/5	0.93	0.09	49,55,57,58	5
3	SO4	D	251	5/5	0.93	0.09	53,55,57,58	5
3	SO4	C	250	5/5	0.93	0.06	60,70,72,72	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	UNX	D	997	1/1	0.93	0.19	34,34,34,34	0
3	SO4	F	251	5/5	0.95	0.11	39,40,43,48	0
3	SO4	C	249	5/5	0.96	0.09	35,40,47,47	0
3	SO4	E	249	5/5	0.97	0.08	36,41,43,46	0

6.5 Other polymers [i](#)

There are no such residues in this entry.