



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 14, 2026 – 01:18 pm BST

PDB ID : 9RX3 / pdb_00009rx3
Title : Crystal Structure of SusD-like Protein MfFctB from Mariniflexile fucanivorans
Authors : Roret, T.; Nikolic Chenais, J.; Czjzek, M.; Michel, G.
Deposited on : 2025-07-10
Resolution : 2.43 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	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

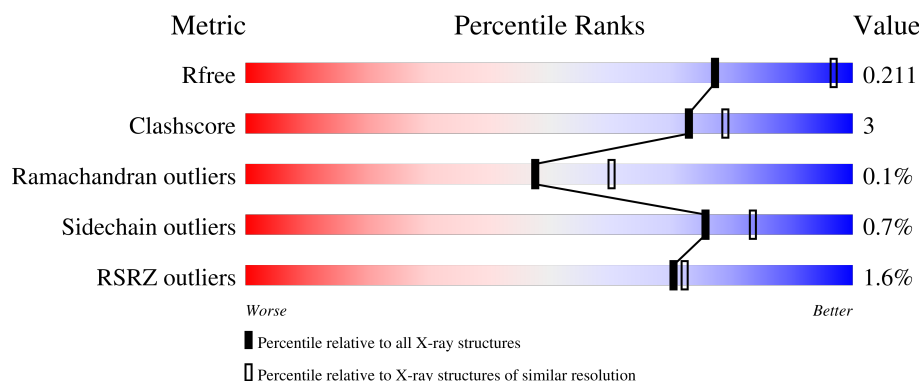
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.43 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	2340 (2.46-2.42)
Clashscore	190562	2400 (2.46-2.42)
Ramachandran outliers	187476	2379 (2.46-2.42)
Sidechain outliers	187428	2379 (2.46-2.42)
RSRZ outliers	180081	2340 (2.46-2.42)

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	513	% 86% 6% 8%
1	B	513	2% 86% 5% 8%
1	C	513	2% 83% 8% 8%
1	D	513	% 83% 8% 8%
1	E	513	% 87% 5% 8%

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Mol	Chain	Length	Quality of chain
1	F	513	 2% 83% 8% • 8%

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
2	GOL	A	601	-	-	X	-
2	GOL	B	602	-	-	X	-

2 Entry composition [i](#)

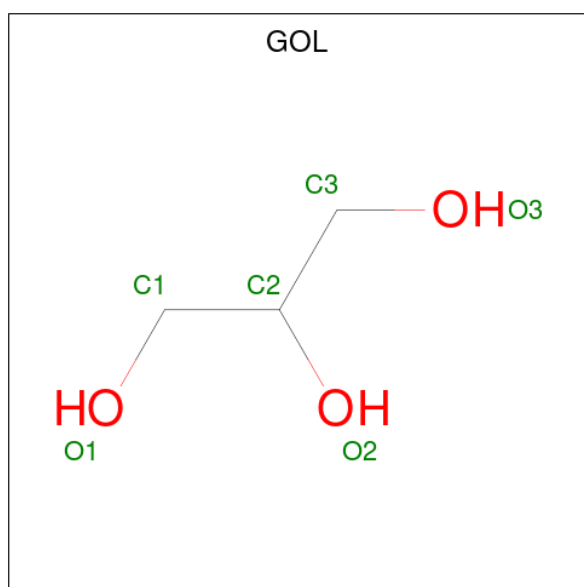
There are 5 unique types of molecules in this entry. The entry contains 23365 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Putative outer membrane starch-binding protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	471	Total	C	N	O	S	0	0	0
			3691	2341	623	720	7			
1	B	470	Total	C	N	O	S	0	0	0
			3687	2339	622	719	7			
1	C	470	Total	C	N	O	S	0	0	0
			3687	2339	622	719	7			
1	D	470	Total	C	N	O	S	0	0	0
			3687	2339	622	719	7			
1	E	470	Total	C	N	O	S	0	0	0
			3687	2339	622	719	7			
1	F	470	Total	C	N	O	S	0	0	0
			3687	2339	622	719	7			

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).

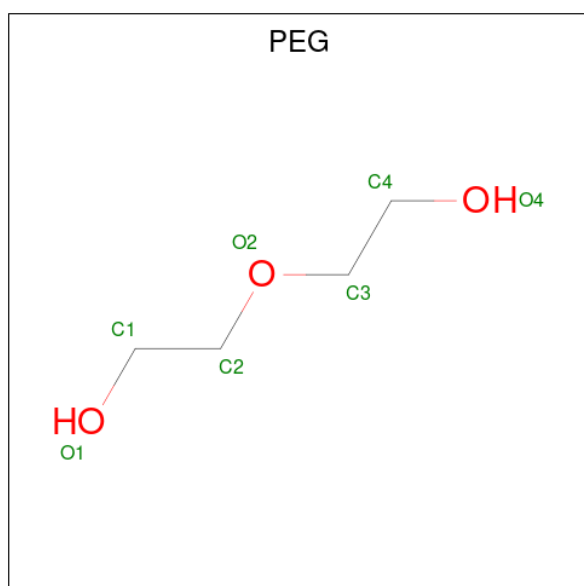


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 3 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Cl	0	0
			2	2		
3	B	3	Total	Cl	0	0
			3	3		
3	C	2	Total	Cl	0	0
			2	2		
3	D	2	Total	Cl	0	0
			2	2		
3	E	2	Total	Cl	0	0
			2	2		
3	F	2	Total	Cl	0	0
			2	2		

- Molecule 4 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: C₄H₁₀O₃).



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

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

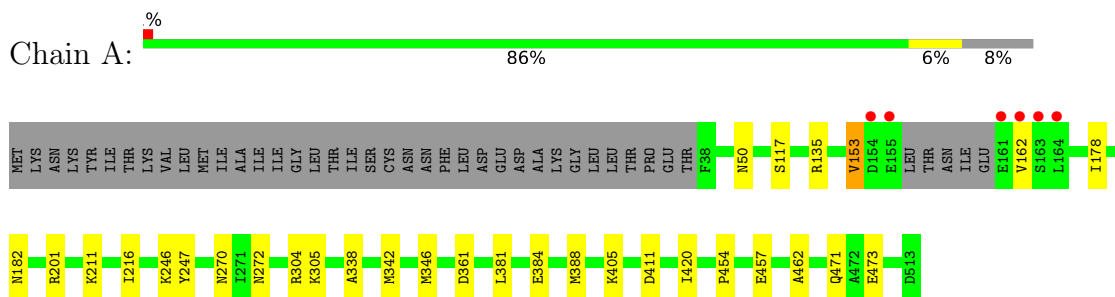
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	274	Total	O	0	0
			274	274		
5	B	273	Total	O	0	0
			273	273		
5	C	172	Total	O	0	0
			172	172		
5	D	177	Total	O	0	0
			177	177		
5	E	155	Total	O	0	0
			155	155		
5	F	135	Total	O	0	0
			135	135		

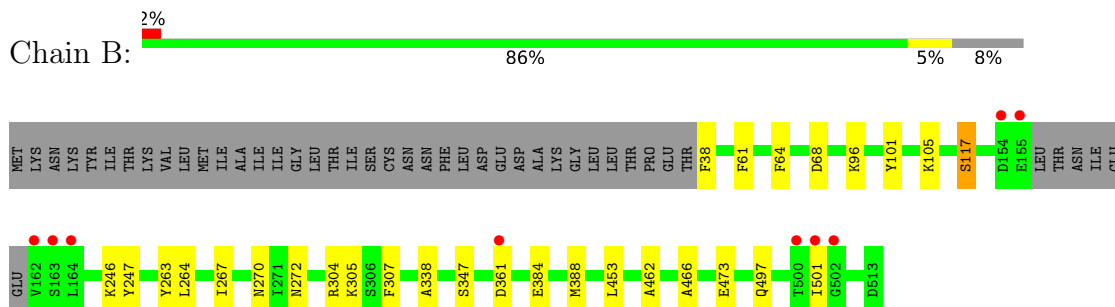
3 Residue-property plots [i](#)

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.

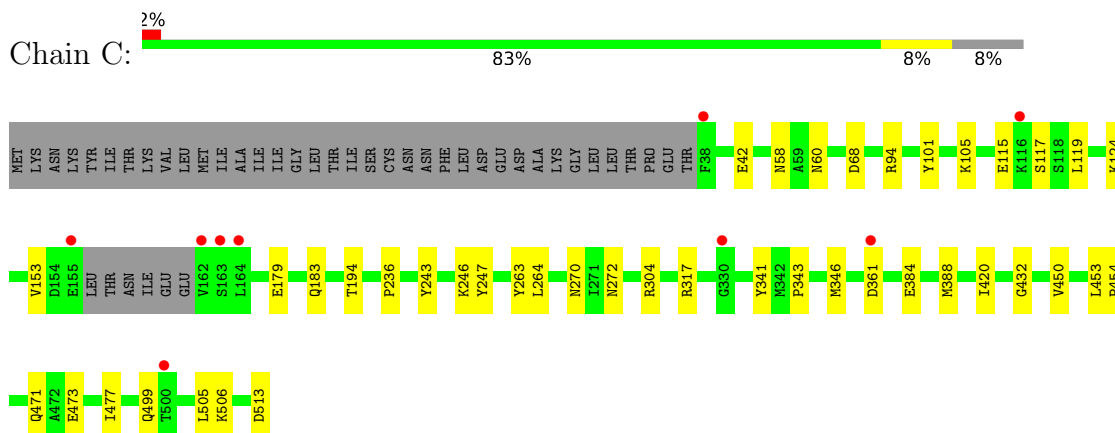
- Molecule 1: Putative outer membrane starch-binding protein



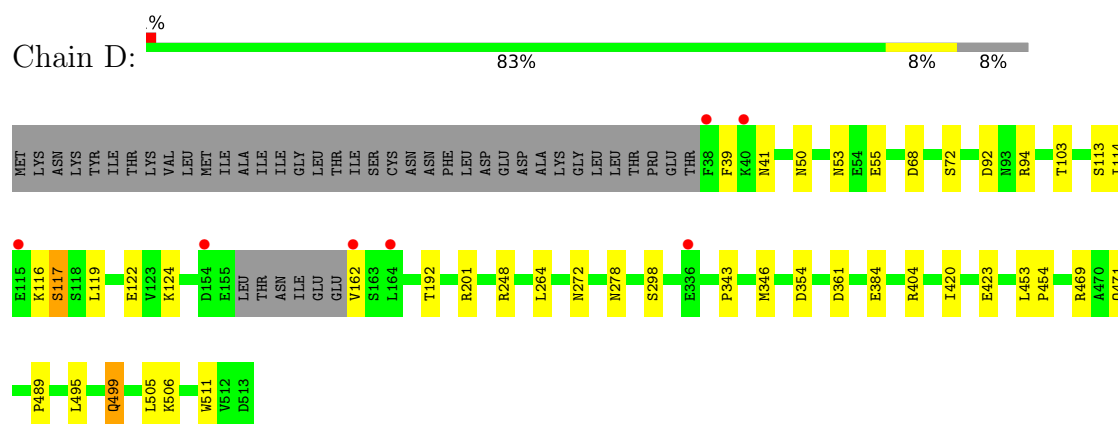
- Molecule 1: Putative outer membrane starch-binding protein



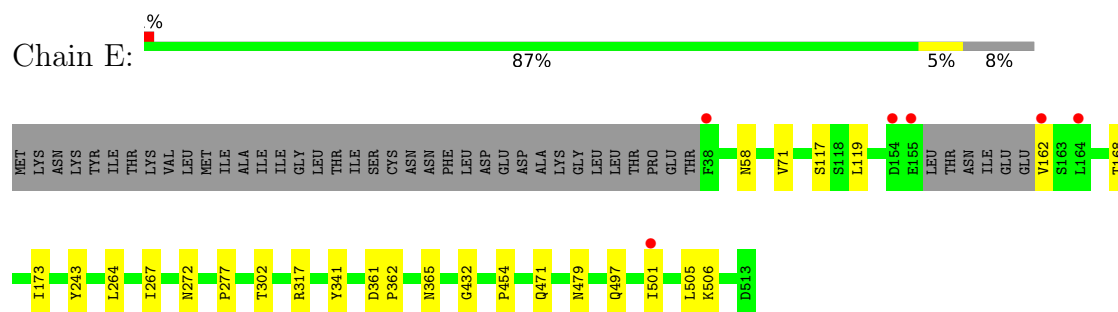
- Molecule 1: Putative outer membrane starch-binding protein



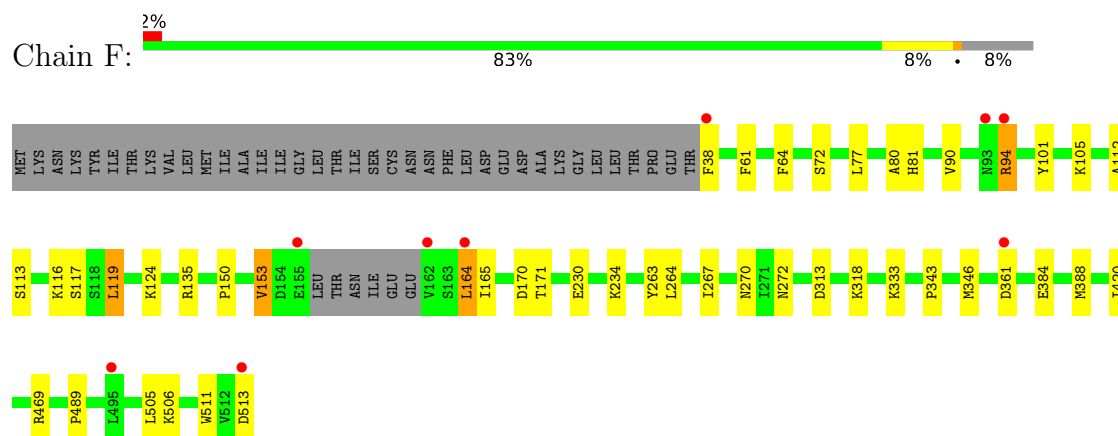
- Molecule 1: Putative outer membrane starch-binding protein



- Molecule 1: Putative outer membrane starch-binding protein



- Molecule 1: Putative outer membrane starch-binding protein



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	180.58Å 187.41Å 222.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.82 – 2.43 47.82 – 2.43	Depositor EDS
% Data completeness (in resolution range)	100.0 (47.82-2.43) 100.0 (47.82-2.43)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.32 (at 2.42Å)	Xtriage
Refinement program	PHENIX 1.20rc3	Depositor
R, R_{free}	0.197 , 0.215 0.194 , 0.211	Depositor DCC
R_{free} test set	7006 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	47.5	Xtriage
Anisotropy	0.070	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 44.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.087 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	23365	wwPDB-VP
Average B, all atoms (Å ²)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.92% 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: CL, GOL, PEG

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	0.14	0/3772	0.35	0/5130
1	B	0.13	0/3768	0.34	0/5125
1	C	0.14	0/3768	0.35	0/5125
1	D	0.16	0/3768	0.36	0/5125
1	E	0.13	0/3768	0.35	0/5125
1	F	0.15	0/3768	0.37	0/5125
All	All	0.14	0/22612	0.35	0/30755

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
1	F	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
1	F	94	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	3691	0	3584	22	0
1	B	3687	0	3583	20	0
1	C	3687	0	3583	27	0
1	D	3687	0	3583	24	1
1	E	3687	0	3583	16	0
1	F	3687	0	3583	28	1
2	A	6	0	8	5	0
2	B	6	0	8	5	0
3	A	2	0	0	0	0
3	B	3	0	0	1	0
3	C	2	0	0	0	0
3	D	2	0	0	0	0
3	E	2	0	0	0	0
3	F	2	0	0	0	0
4	A	14	0	20	3	0
4	B	7	0	10	1	0
4	F	7	0	10	0	0
5	A	274	0	0	0	0
5	B	273	0	0	2	0
5	C	172	0	0	3	0
5	D	177	0	0	3	0
5	E	155	0	0	2	0
5	F	135	0	0	1	0
All	All	23365	0	21555	138	1

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 3.

All (138) 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:305:LYS:H	2:B:602:GOL:H11	1.34	0.92
1:A:305:LYS:H	2:A:601:GOL:H11	1.44	0.83
1:D:113:SER:HA	1:D:116:LYS:HD3	1.64	0.78
1:F:164:LEU:HD22	1:F:165:ILE:HG23	1.69	0.75
1:E:479:ASN:ND2	5:E:701:HOH:O	2.24	0.70
1:F:234:LYS:NZ	5:F:701:HOH:O	2.26	0.69
1:F:119:LEU:O	1:F:124:LYS:NZ	2.28	0.67
1:D:495:LEU:O	1:D:499:GLN:HG2	1.95	0.66
1:A:270:ASN:HD21	4:A:603:PEG:H22	1.58	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:305:LYS:N	2:B:602:GOL:H11	2.07	0.65
1:F:272:ASN:HD22	1:F:361:ASP:HB3	1.63	0.64
1:A:272:ASN:HD22	1:A:361:ASP:HB3	1.63	0.63
1:B:272:ASN:HD22	1:B:361:ASP:HB3	1.62	0.62
1:C:119:LEU:O	1:C:124:LYS:NZ	2.34	0.60
1:D:404:ARG:NH1	1:D:423:GLU:OE2	2.34	0.60
1:D:53:ASN:ND2	5:D:703:HOH:O	2.33	0.59
1:C:94:ARG:NH1	5:C:702:HOH:O	2.35	0.59
1:F:38:PHE:N	1:F:113:SER:HG	2.01	0.59
1:E:272:ASN:HD22	1:E:361:ASP:HB3	1.67	0.58
1:C:499:GLN:HE22	1:C:506:LYS:HE2	1.68	0.58
1:F:343:PRO:HA	1:F:346:MET:HE3	1.86	0.57
1:F:112:ALA:O	1:F:116:LYS:HD3	2.06	0.56
1:F:505:LEU:C	1:F:506:LYS:HD2	2.30	0.56
1:C:505:LEU:C	1:C:506:LYS:HD2	2.31	0.55
1:F:101:TYR:O	1:F:105:LYS:HG3	2.07	0.55
1:C:272:ASN:HD22	1:C:361:ASP:HB3	1.71	0.55
1:C:499:GLN:NE2	1:C:506:LYS:HE2	2.22	0.54
1:A:270:ASN:ND2	4:A:603:PEG:H22	2.22	0.54
1:F:264:LEU:HD23	1:F:267:ILE:HD13	1.90	0.54
1:E:162:VAL:N	5:E:704:HOH:O	2.39	0.54
1:F:313:ASP:OD1	1:F:318:LYS:NZ	2.38	0.53
1:D:114:ILE:O	1:D:124:LYS:HE3	2.08	0.53
1:B:264:LEU:HD23	1:B:267:ILE:HG13	1.90	0.52
1:D:162:VAL:N	5:D:712:HOH:O	2.43	0.52
1:A:305:LYS:N	2:A:601:GOL:H11	2.18	0.51
1:D:92:ASP:OD1	1:D:94:ARG:HD2	2.09	0.51
1:D:272:ASN:HD22	1:D:361:ASP:HB3	1.75	0.51
1:D:114:ILE:HG13	1:D:124:LYS:HG2	1.94	0.50
1:A:270:ASN:HD21	4:A:603:PEG:C2	2.25	0.50
1:C:101:TYR:O	1:C:105:LYS:HG3	2.11	0.50
1:B:272:ASN:ND2	1:B:361:ASP:HB3	2.27	0.50
1:D:39:PHE:O	1:D:117:SER:OG	2.27	0.49
1:D:343:PRO:HA	1:D:346:MET:HE3	1.93	0.49
1:E:264:LEU:HD23	1:E:267:ILE:HD12	1.94	0.49
1:E:505:LEU:C	1:E:506:LYS:HD2	2.37	0.49
1:C:343:PRO:HA	1:C:346:MET:HE3	1.95	0.49
1:C:454:PRO:HG3	1:C:471:GLN:HA	1.93	0.48
1:A:272:ASN:ND2	1:A:361:ASP:HB3	2.29	0.48
1:B:307:PHE:HA	4:B:603:PEG:H41	1.95	0.48
1:C:263:TYR:CG	1:C:270:ASN:HB2	2.48	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:71:VAL:O	1:E:302:THR:OG1	2.26	0.48
1:C:194:THR:HG23	1:C:236:PRO:HB2	1.95	0.47
1:F:81:HIS:N	1:F:81:HIS:CD2	2.81	0.47
1:D:384:GLU:HA	1:D:420:ILE:HD13	1.97	0.47
1:D:454:PRO:HG3	1:D:471:GLN:HA	1.96	0.47
1:E:454:PRO:HG3	1:E:471:GLN:HA	1.95	0.47
1:C:246:LYS:HE2	1:C:247:TYR:CE2	2.50	0.46
1:C:341:TYR:HB3	1:C:346:MET:HE2	1.98	0.46
1:C:505:LEU:O	1:C:506:LYS:HD2	2.15	0.46
1:F:263:TYR:CG	1:F:270:ASN:HB2	2.51	0.46
1:F:384:GLU:O	1:F:388:MET:HG2	2.16	0.46
1:A:405:LYS:NZ	1:A:411:ASP:OD2	2.49	0.46
1:A:462:ALA:HB1	2:A:601:GOL:H12	1.98	0.46
1:C:450:VAL:HG11	1:C:477:ILE:HG13	1.98	0.46
1:A:338:ALA:O	2:A:601:GOL:H32	2.15	0.45
1:E:243:TYR:CG	1:E:317:ARG:HG2	2.51	0.45
1:F:72:SER:O	1:F:469:ARG:NH1	2.49	0.45
1:F:135:ARG:NH1	1:F:153:VAL:HG22	2.31	0.45
1:B:466:ALA:HB2	2:B:602:GOL:H31	1.98	0.45
1:C:42:GLU:OE1	5:C:701:HOH:O	2.20	0.45
1:E:117:SER:OG	1:E:119:LEU:HG	2.16	0.45
1:F:61:PHE:HA	1:F:64:PHE:HB3	1.98	0.45
1:F:164:LEU:CD1	1:F:164:LEU:H	2.29	0.45
1:F:72:SER:HB3	1:F:77:LEU:HD22	1.99	0.45
1:D:55:GLU:HG2	1:D:103:THR:HB	1.98	0.45
1:A:178:ILE:HG23	1:A:211:LYS:HE2	1.99	0.45
1:F:343:PRO:CA	1:F:346:MET:HE3	2.47	0.45
1:E:168:THR:HB	1:E:173:ILE:HD11	1.99	0.45
1:C:179:GLU:O	1:C:183:GLN:HG3	2.18	0.44
1:E:277:PRO:HB3	1:E:341:TYR:CZ	2.52	0.44
1:B:384:GLU:O	1:B:388:MET:HG2	2.17	0.44
1:F:80:ALA:HA	1:F:94:ARG:NE	2.32	0.44
1:C:68:ASP:OD1	1:C:68:ASP:N	2.49	0.44
1:C:243:TYR:CG	1:C:317:ARG:HG2	2.53	0.44
1:D:72:SER:O	1:D:469:ARG:NH1	2.50	0.44
1:B:304:ARG:HH22	1:B:473:GLU:CD	2.25	0.43
3:B:604:CL:CL	5:B:933:HOH:O	2.58	0.43
1:C:343:PRO:CA	1:C:346:MET:HE3	2.48	0.43
1:E:505:LEU:O	1:E:506:LYS:HD2	2.18	0.43
1:D:278:ASN:ND2	5:D:723:HOH:O	2.52	0.43
1:E:272:ASN:ND2	1:E:361:ASP:HB3	2.34	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:135:ARG:NH1	1:A:153:VAL:HG22	2.34	0.43
1:B:338:ALA:O	2:B:602:GOL:H32	2.19	0.43
1:B:246:LYS:HE2	1:B:247:TYR:CE2	2.54	0.43
1:B:101:TYR:O	1:B:105:LYS:HG3	2.19	0.43
1:A:457:GLU:OE1	2:A:601:GOL:O1	2.31	0.43
1:D:68:ASP:HA	1:D:453:LEU:HD21	2.00	0.43
1:C:58:ASN:HB2	1:C:432:GLY:O	2.19	0.43
1:F:489:PRO:HB3	1:F:511:TRP:CG	2.54	0.43
1:A:454:PRO:HG3	1:A:471:GLN:HA	2.01	0.42
1:B:96:LYS:O	5:B:701:HOH:O	2.21	0.42
1:A:384:GLU:HA	1:A:420:ILE:HD13	2.00	0.42
1:D:50:ASN:OD1	1:D:201:ARG:NH2	2.51	0.42
1:D:248:ARG:NH2	1:D:354:ASP:OD2	2.44	0.42
1:B:497:GLN:O	1:B:501:ILE:HG12	2.19	0.42
1:C:384:GLU:O	1:C:388:MET:HG2	2.19	0.42
1:A:304:ARG:HH22	1:A:473:GLU:CD	2.28	0.42
1:A:342:MET:O	1:A:346:MET:HG3	2.19	0.42
1:D:505:LEU:C	1:D:506:LYS:HD2	2.45	0.42
1:A:384:GLU:O	1:A:388:MET:HG2	2.20	0.42
1:B:38:PHE:CD2	1:B:117:SER:HA	2.55	0.42
1:B:68:ASP:OD1	1:B:68:ASP:N	2.53	0.42
1:D:343:PRO:CA	1:D:346:MET:HE3	2.49	0.42
1:E:58:ASN:HB2	1:E:432:GLY:O	2.20	0.42
1:C:304:ARG:HH22	1:C:473:GLU:CD	2.28	0.42
1:C:384:GLU:HA	1:C:420:ILE:HD13	2.01	0.42
1:F:170:ASP:OD1	1:F:171:THR:N	2.52	0.42
1:B:462:ALA:HB1	2:B:602:GOL:H12	2.02	0.41
1:D:489:PRO:HB3	1:D:511:TRP:CG	2.55	0.41
1:C:60:ASN:HB3	5:C:764:HOH:O	2.20	0.41
1:D:264:LEU:HD23	1:D:264:LEU:HA	1.87	0.41
1:F:117:SER:OG	1:F:119:LEU:HD13	2.21	0.41
1:F:384:GLU:HA	1:F:420:ILE:HD13	2.02	0.41
1:C:264:LEU:HD23	1:C:264:LEU:HA	1.85	0.41
1:B:68:ASP:HA	1:B:453:LEU:HD21	2.03	0.41
1:B:263:TYR:CG	1:B:270:ASN:HB2	2.55	0.41
1:E:497:GLN:O	1:E:501:ILE:HG12	2.20	0.41
1:F:272:ASN:ND2	1:F:361:ASP:HB3	2.34	0.41
1:B:61:PHE:HA	1:B:64:PHE:HB3	2.02	0.41
1:E:362:PRO:HG2	1:E:365:ASN:HB3	2.02	0.41
1:F:101:TYR:OH	1:F:150:PRO:O	2.36	0.41
1:F:230:GLU:O	1:F:234:LYS:HB2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:182:ASN:HB2	1:A:211:LYS:HE3	2.03	0.41
1:C:68:ASP:HA	1:C:453:LEU:HD21	2.02	0.41
1:A:50:ASN:OD1	1:A:201:ARG:NH1	2.51	0.40
1:A:216:ILE:HD13	1:A:381:LEU:HD22	2.03	0.40
1:A:246:LYS:HE2	1:A:247:TYR:CE2	2.57	0.40
1:D:119:LEU:H	1:D:124:LYS:NZ	2.19	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:192:THR:OG1	1:F:333:LYS:NZ[5_555]	2.17	0.03

5.3 Torsion angles

5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	467/513 (91%)	453 (97%)	13 (3%)	1 (0%)	43	53
1	B	466/513 (91%)	455 (98%)	11 (2%)	0	100	100
1	C	466/513 (91%)	453 (97%)	13 (3%)	0	100	100
1	D	466/513 (91%)	454 (97%)	11 (2%)	1 (0%)	43	53
1	E	466/513 (91%)	454 (97%)	12 (3%)	0	100	100
1	F	466/513 (91%)	455 (98%)	11 (2%)	0	100	100
All	All	2797/3078 (91%)	2724 (97%)	71 (2%)	2 (0%)	48	60

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	41	ASN
1	A	162	VAL

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	387/426 (91%)	385 (100%)	2 (0%)	81	87
1	B	387/426 (91%)	385 (100%)	2 (0%)	81	87
1	C	387/426 (91%)	383 (99%)	4 (1%)	68	77
1	D	387/426 (91%)	383 (99%)	4 (1%)	68	77
1	E	387/426 (91%)	387 (100%)	0	100	100
1	F	387/426 (91%)	382 (99%)	5 (1%)	61	72
All	All	2322/2556 (91%)	2305 (99%)	17 (1%)	76	83

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	117	SER
1	A	153	VAL
1	B	117	SER
1	B	347	SER
1	C	115	GLU
1	C	117	SER
1	C	153	VAL
1	C	513	ASP
1	D	117	SER
1	D	122	GLU
1	D	298	SER
1	D	499	GLN
1	F	90	VAL
1	F	119	LEU
1	F	153	VAL
1	F	164	LEU
1	F	513	ASP

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	182	ASN
1	A	418	GLN
1	B	182	ASN
1	B	418	GLN
1	B	422	ASN
1	B	471	GLN
1	C	53	ASN
1	C	182	ASN
1	C	183	GLN
1	C	418	GLN
1	C	497	GLN
1	C	499	GLN
1	D	130	GLN
1	D	499	GLN
1	E	262	GLN
1	E	479	ASN
1	F	418	GLN
1	F	471	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 19 ligands modelled in this entry, 13 are monoatomic - leaving 6 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	GOL	B	602	-	5,5,5	0.71	0	5,5,5	1.17	1 (20%)
4	PEG	A	604	-	6,6,6	0.14	0	5,5,5	0.13	0
4	PEG	F	603	-	6,6,6	0.13	0	5,5,5	0.09	0
4	PEG	B	603	-	6,6,6	0.15	0	5,5,5	0.09	0
4	PEG	A	603	-	6,6,6	0.11	0	5,5,5	0.16	0
2	GOL	A	601	-	5,5,5	0.65	0	5,5,5	1.24	1 (20%)

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	GOL	B	602	-	-	3/4/4/4	-
4	PEG	A	604	-	-	1/4/4/4	-
4	PEG	F	603	-	-	3/4/4/4	-
4	PEG	B	603	-	-	4/4/4/4	-
4	PEG	A	603	-	-	2/4/4/4	-
2	GOL	A	601	-	-	2/4/4/4	-

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	GOL	C3-C2-C1	-2.44	102.20	111.70
2	B	602	GOL	C3-C2-C1	-2.21	103.12	111.70

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	602	GOL	O1-C1-C2-O2
2	A	601	GOL	O1-C1-C2-C3
2	B	602	GOL	O1-C1-C2-C3
2	B	602	GOL	C1-C2-C3-O3
4	B	603	PEG	O2-C3-C4-O4
2	A	601	GOL	O1-C1-C2-O2
4	F	603	PEG	O2-C3-C4-O4
4	A	603	PEG	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
4	B	603	PEG	O1-C1-C2-O2
4	B	603	PEG	C1-C2-O2-C3
4	F	603	PEG	C1-C2-O2-C3
4	B	603	PEG	C4-C3-O2-C2
4	F	603	PEG	O1-C1-C2-O2
4	A	603	PEG	O2-C3-C4-O4
4	A	604	PEG	O2-C3-C4-O4

There are no ring outliers.

4 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	602	GOL	5	0
4	B	603	PEG	1	0
4	A	603	PEG	3	0
2	A	601	GOL	5	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	471/513 (91%)	-0.25	6 (1%) 75 77	35, 47, 66, 80	0
1	B	470/513 (91%)	-0.18	9 (1%) 66 67	36, 49, 70, 82	0
1	C	470/513 (91%)	-0.09	9 (1%) 66 67	38, 54, 77, 88	0
1	D	470/513 (91%)	0.00	7 (1%) 72 73	41, 56, 81, 95	0
1	E	470/513 (91%)	-0.01	6 (1%) 75 77	45, 58, 88, 99	0
1	F	470/513 (91%)	0.09	9 (1%) 66 67	47, 58, 94, 105	0
All	All	2821/3078 (91%)	-0.07	46 (1%) 70 72	35, 54, 81, 105	0

All (46) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	164	LEU	5.0
1	F	38	PHE	4.7
1	A	164	LEU	3.9
1	B	164	LEU	3.9
1	D	38	PHE	3.8
1	E	38	PHE	3.6
1	C	38	PHE	3.5
1	B	162	VAL	3.5
1	F	155	GLU	3.4
1	F	93	ASN	3.3
1	A	161	GLU	3.3
1	D	164	LEU	3.2
1	E	164	LEU	3.2
1	B	500	THR	3.1
1	C	164	LEU	2.9
1	D	154	ASP	2.9
1	F	162	VAL	2.8
1	B	155	GLU	2.8
1	C	330	GLY	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	162	VAL	2.7
1	E	154	ASP	2.6
1	C	116	LYS	2.6
1	A	163	SER	2.6
1	F	495	LEU	2.5
1	A	155	GLU	2.4
1	E	155	GLU	2.4
1	F	94	ARG	2.3
1	B	154	ASP	2.3
1	B	163	SER	2.3
1	F	361	ASP	2.3
1	E	162	VAL	2.3
1	D	336	GLU	2.3
1	C	155	GLU	2.2
1	D	115	GLU	2.2
1	B	361	ASP	2.2
1	D	40	LYS	2.2
1	C	162	VAL	2.1
1	B	502	GLY	2.1
1	F	513	ASP	2.1
1	D	162	VAL	2.0
1	B	501	ILE	2.0
1	E	501	ILE	2.0
1	A	154	ASP	2.0
1	C	500	THR	2.0
1	C	361	ASP	2.0
1	C	163	SER	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(Å ²)	Q<0.9
2	GOL	B	602	6/6	0.87	0.15	44,44,44,44	0
4	PEG	B	603	7/7	0.89	0.14	48,48,48,48	0
4	PEG	F	603	7/7	0.90	0.12	57,57,57,57	0
2	GOL	A	601	6/6	0.91	0.12	42,42,42,42	0
3	CL	D	602	1/1	0.91	0.13	56,56,56,56	0
4	PEG	A	603	7/7	0.92	0.18	43,43,43,43	0
4	PEG	A	604	7/7	0.92	0.14	45,45,45,45	0
3	CL	C	602	1/1	0.93	0.14	57,57,57,57	0
3	CL	A	605	1/1	0.93	0.08	40,40,40,40	0
3	CL	E	601	1/1	0.94	0.14	48,48,48,48	0
3	CL	F	602	1/1	0.95	0.09	49,49,49,49	0
3	CL	E	602	1/1	0.96	0.07	44,44,44,44	0
3	CL	B	604	1/1	0.96	0.08	65,65,65,65	1
3	CL	D	601	1/1	0.97	0.06	43,43,43,43	0
3	CL	B	605	1/1	0.97	0.06	42,42,42,42	0
3	CL	B	601	1/1	0.97	0.08	40,40,40,40	0
3	CL	C	601	1/1	0.98	0.05	43,43,43,43	0
3	CL	F	601	1/1	0.99	0.04	45,45,45,45	0
3	CL	A	602	1/1	0.99	0.04	36,36,36,36	0

6.5 Other polymers [i](#)

There are no such residues in this entry.