



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 10:09 AM UTC

PDB ID : 7E5U / pdb_00007e5u
Title : Crystal structure of Phm7
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Deposited on : 2021-02-20
Resolution : 1.62 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

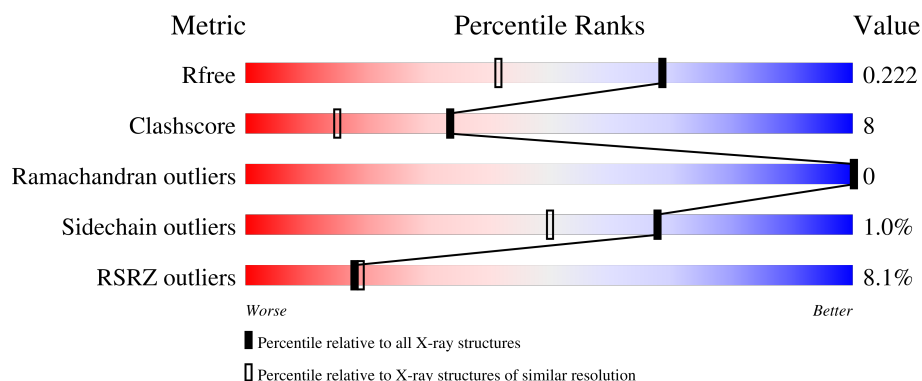
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.62 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	6728 (1.64-1.60)
Clashscore	190562	7023 (1.64-1.60)
Ramachandran outliers	187476	6898 (1.64-1.60)
Sidechain outliers	187428	6896 (1.64-1.60)
RSRZ outliers	180081	6727 (1.64-1.60)

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	389	
1	B	389	
1	C	389	

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	B	401	-	-	X	-
2	GOL	B	403	-	-	X	-
3	SO4	C	405	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 9795 atoms, of which 152 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 Diels-Alderase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	373	Total	C	N	O	S	0	4	0
			2865	1817	480	560	8			
1	B	373	Total	C	N	O	S	0	10	0
			2909	1841	490	570	8			
1	C	375	Total	C	N	O	S	0	3	0
			2873	1824	482	559	8			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP A0A2Z5XAU0
A	-1	SER	-	expression tag	UNP A0A2Z5XAU0
A	0	HIS	-	expression tag	UNP A0A2Z5XAU0
B	-2	GLY	-	expression tag	UNP A0A2Z5XAU0
B	-1	SER	-	expression tag	UNP A0A2Z5XAU0
B	0	HIS	-	expression tag	UNP A0A2Z5XAU0
C	-2	GLY	-	expression tag	UNP A0A2Z5XAU0
C	-1	SER	-	expression tag	UNP A0A2Z5XAU0
C	0	HIS	-	expression tag	UNP A0A2Z5XAU0

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



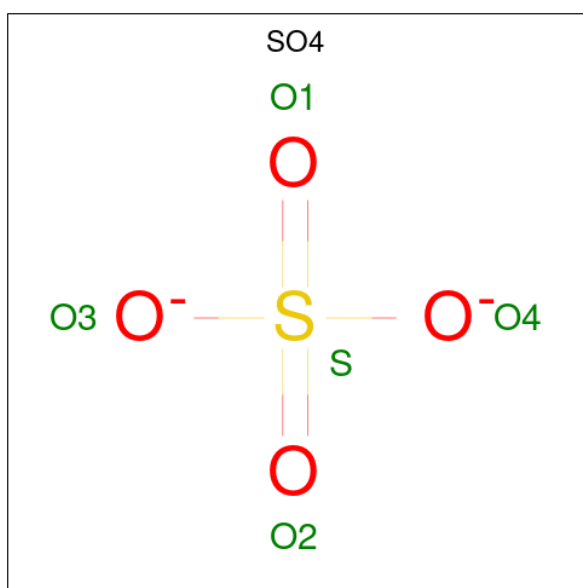
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	A	1	Total	C	H	O	0	0
			14	3	8	3		
2	B	1	Total	C	H	O	0	0
			14	3	8	3		
2	B	1	Total	C	H	O	0	0
			14	3	8	3		
2	B	1	Total	C	H	O	0	0
			14	3	8	3		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	B	1	Total	C	H	O	0	0
			14	3	8	3		
2	B	1	Total	C	H	O	0	0
			14	3	8	3		
2	B	1	Total	C	H	O	0	0
			14	3	8	3		
2	C	1	Total	C	H	O	0	0
			14	3	8	3		
2	C	1	Total	C	H	O	0	0
			14	3	8	3		

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



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

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		

- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	2	Total	Cl	0	0
			2	2		

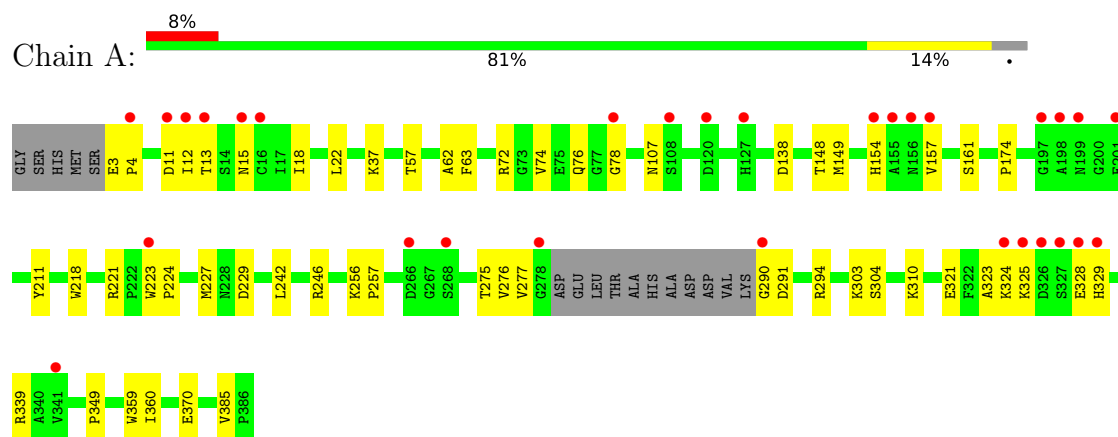
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	278	Total	O	0	0
			278	278		
5	B	264	Total	O	0	0
			264	264		
5	C	278	Total	O	0	0
			278	278		

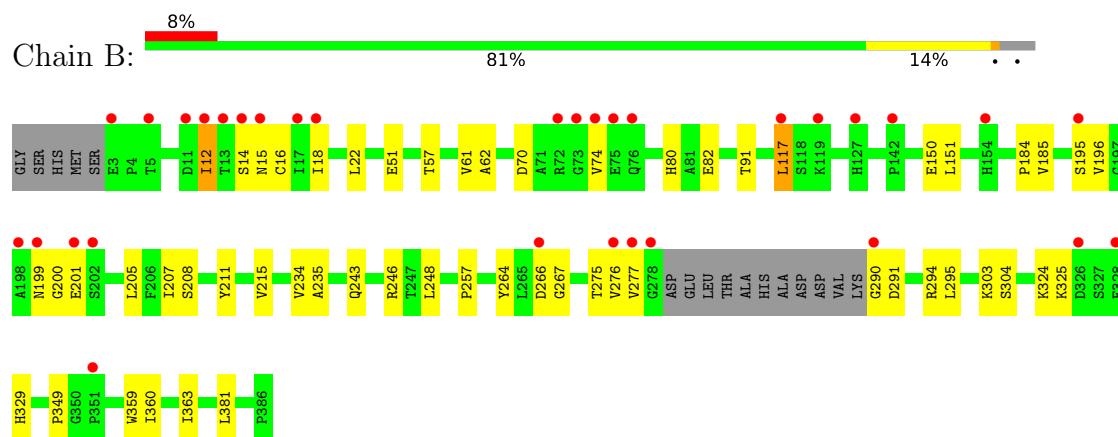
3 Residue-property plots

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.

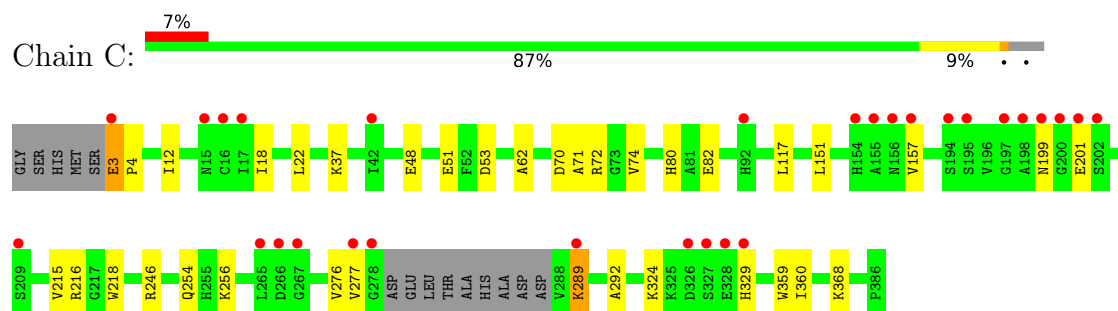
• Molecule 1: Diels-Alderase



• Molecule 1: Diels-Alderase



• Molecule 1: Diels-Alderase



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	91.21Å 150.48Å 99.33Å 90.00° 97.35° 90.00°	Depositor
Resolution (Å)	43.87 – 1.62 43.87 – 1.62	Depositor EDS
% Data completeness (in resolution range)	99.8 (43.87-1.62) 99.8 (43.87-1.62)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.77 (at 1.62Å)	Xtriage
Refinement program	PHENIX (1.11.1 _2575: ???)	Depositor
R, R_{free}	0.189 , 0.222 0.191 , 0.222	Depositor DCC
R_{free} test set	8357 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	20.3	Xtriage
Anisotropy	0.043	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 45.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9795	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.29% 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: GOL, CL, 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	0.64	0/2948	0.76	0/4016
1	B	0.65	0/2993	0.77	0/4075
1	C	0.65	0/2956	0.76	0/4024
All	All	0.65	0/8897	0.76	0/12115

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	A	0	1
1	B	0	1
1	C	0	1
All	All	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	359	TRP	Peptide
1	B	359	TRP	Peptide
1	C	359	TRP	Peptide

5.2 Too-close contacts ⓘ

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	2865	0	2703	51	0
1	B	2909	0	2732	54	0
1	C	2873	0	2718	27	0
2	A	66	88	88	8	0
2	B	36	48	48	21	0
2	C	12	16	16	1	0
3	A	10	0	0	0	0
3	B	20	0	0	0	0
3	C	30	0	0	3	0
4	B	2	0	0	0	0
5	A	278	0	0	7	0
5	B	264	0	0	5	0
5	C	278	0	0	4	0
All	All	9643	152	8305	132	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

All (132) 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:12:ILE:HG13	1:A:78:GLY:HA2	1.43	1.00
1:A:18:ILE:HD11	1:A:22:LEU:HD21	1.60	0.83
1:B:61:VAL:HG13	1:B:205:LEU:HD11	1.63	0.79
1:B:266:ASP:CG	1:B:267:GLY:H	1.91	0.79
1:A:256:LYS:HD3	5:B:614:HOH:O	1.83	0.77
1:C:18:ILE:HD11	1:C:22:LEU:HG	1.68	0.76
1:C:71:ALA:O	1:C:74:VAL:HG23	1.86	0.76
1:A:18:ILE:HD11	1:A:22:LEU:CD2	2.17	0.75
1:B:57:THR:HG23	2:B:401:GOL:O3	1.85	0.75
1:B:329:HIS:HB3	2:B:404:GOL:H31	1.73	0.71
1:B:62:ALA:HB2	1:B:360:ILE:HD11	1.73	0.71
1:A:325:LYS:HG3	5:A:591:HOH:O	1.91	0.70
1:A:15:ASN:HA	5:A:513:HOH:O	1.92	0.70
1:A:304:SER:H	2:A:409:GOL:H2	1.55	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:80:HIS:HD2	1:C:82:GLU:OE2	1.75	0.69
1:B:208[B]:SER:H	2:B:401:GOL:C1	2.06	0.68
1:B:208[A]:SER:H	2:B:401:GOL:C1	2.07	0.68
1:A:62:ALA:HB2	1:A:360:ILE:HD11	1.77	0.66
1:A:157:VAL:HG12	1:A:161:SER:OG	1.95	0.66
1:B:275:THR:HG22	1:B:276:VAL:O	1.96	0.66
1:B:208[B]:SER:H	2:B:401:GOL:H12	1.60	0.66
1:B:70:ASP:OD2	1:B:80[A]:HIS:HE1	1.80	0.65
1:B:18:ILE:HD11	1:B:22:LEU:CG	2.27	0.64
1:B:208[A]:SER:H	2:B:401:GOL:H12	1.61	0.64
1:A:18:ILE:CD1	1:A:22:LEU:HD21	2.27	0.64
1:B:15:ASN:HA	5:B:502:HOH:O	1.99	0.63
1:A:370:GLU:HA	2:A:407:GOL:O2	1.99	0.63
1:C:324:LYS:HG3	5:C:507:HOH:O	1.98	0.62
1:A:3:GLU:HG2	5:A:663:HOH:O	1.99	0.61
1:B:266:ASP:CG	1:B:267:GLY:N	2.56	0.60
1:B:295:LEU:O	2:B:403:GOL:H12	2.01	0.60
1:B:18:ILE:HD11	1:B:22:LEU:HG	1.84	0.59
1:B:207:ILE:HG23	2:B:401:GOL:H32	1.84	0.59
1:A:72:ARG:HG2	3:C:405:SO4:O2	2.02	0.59
1:B:291:ASP:CG	1:B:324:LYS:HG2	2.28	0.59
1:C:246:ARG:HD2	1:C:246:ARG:C	2.27	0.59
1:A:303:LYS:HA	2:A:409:GOL:H11	1.85	0.58
1:B:295:LEU:HB3	2:B:403:GOL:O1	2.02	0.58
1:A:11:ASP:OD1	1:A:13:THR:HG23	2.04	0.57
1:B:16:CYS:N	5:B:502:HOH:O	2.35	0.57
1:B:303:LYS:HA	2:B:405:GOL:H32	1.88	0.56
1:B:246:ARG:NE	2:B:403:GOL:O1	2.35	0.55
1:A:138:ASP:OD1	1:A:148:THR:HG22	2.07	0.54
1:A:63:PHE:HD2	1:A:149:MET:CE	2.21	0.54
1:C:368:LYS:HG3	3:C:404:SO4:O1	2.07	0.54
1:A:221:ARG:HH22	2:A:411:GOL:H11	1.73	0.54
1:C:62:ALA:HB2	1:C:360:ILE:HD11	1.90	0.53
1:A:310:LYS:NZ	5:A:503:HOH:O	2.41	0.53
1:A:3:GLU:O	1:A:3:GLU:HG3	2.08	0.53
1:C:117:LEU:C	1:C:117:LEU:HD13	2.34	0.53
1:B:18:ILE:HD11	1:B:22:LEU:HD21	1.90	0.53
1:B:57:THR:HG23	2:B:401:GOL:HO3	1.74	0.52
1:A:3:GLU:HG3	1:A:107:ASN:HB3	1.90	0.52
1:B:18:ILE:HD11	1:B:22:LEU:CD2	2.39	0.52
1:B:257:PRO:HG2	1:B:276:VAL:HG21	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:349:PRO:HD3	5:B:691:HOH:O	2.10	0.52
1:A:12:ILE:HD12	1:A:74:VAL:HG22	1.93	0.51
1:B:266:ASP:OD1	1:B:267:GLY:N	2.21	0.51
1:A:63:PHE:CD2	1:A:149:MET:CE	2.94	0.51
1:A:277:VAL:HG11	1:A:294:ARG:HH21	1.76	0.50
1:A:290:GLY:O	1:A:325:LYS:HE3	2.11	0.50
1:B:208[A]:SER:H	2:B:401:GOL:H11	1.77	0.50
1:A:174:PRO:HD2	2:A:411:GOL:H31	1.94	0.50
1:A:329:HIS:CE1	5:A:507:HOH:O	2.63	0.49
1:B:277:VAL:HG11	1:B:294:ARG:HH21	1.76	0.49
1:A:349:PRO:HD3	5:A:622:HOH:O	2.12	0.49
1:A:63:PHE:CD2	1:A:149:MET:HE3	2.48	0.49
1:B:246:ARG:HE	2:B:403:GOL:C1	2.25	0.49
1:B:208[B]:SER:OG	2:B:401:GOL:H11	2.13	0.49
1:A:223[B]:TRP:O	1:A:227:MET:HG3	2.13	0.49
1:C:80:HIS:CD2	1:C:82:GLU:OE2	2.62	0.49
1:A:294:ARG:HD2	1:A:321:GLU:OE1	2.11	0.49
1:B:295:LEU:HB3	2:B:403:GOL:HO1	1.79	0.48
1:A:154:HIS:NE2	2:A:410:GOL:H32	2.29	0.48
1:C:70:ASP:HB2	2:C:401:GOL:H12	1.95	0.48
1:A:291:ASP:CG	1:A:324:LYS:HG2	2.38	0.48
1:C:70:ASP:OD2	1:C:80:HIS:HE1	1.96	0.48
1:B:246:ARG:HD2	1:B:246:ARG:C	2.39	0.48
1:B:304:SER:H	2:B:405:GOL:H32	1.78	0.48
1:C:329:HIS:HB2	5:C:568:HOH:O	2.13	0.47
1:A:18:ILE:HD11	1:A:22:LEU:CG	2.44	0.47
1:A:257:PRO:HG2	1:A:276:VAL:HG21	1.96	0.47
1:B:12:ILE:HD12	1:B:74:VAL:HG22	1.96	0.47
1:B:117:LEU:C	1:B:117:LEU:HD13	2.39	0.47
1:B:290:GLY:O	1:B:325:LYS:HE3	2.14	0.47
1:B:57:THR:HG22	1:B:211:TYR:CE2	2.50	0.47
1:B:234:VAL:HG23	1:B:243:GLN:HG3	1.97	0.46
1:B:51:GLU:HB3	1:B:215:VAL:HB	1.97	0.46
1:C:3:GLU:N	1:C:4:PRO:CD	2.78	0.46
1:A:246:ARG:HD2	1:A:246:ARG:C	2.41	0.46
1:A:63:PHE:CE2	1:A:149:MET:HE3	2.50	0.46
1:A:303:LYS:HG3	2:A:409:GOL:H31	1.98	0.46
1:A:37:LYS:HG3	1:A:218:TRP:CE2	2.51	0.46
1:C:72:ARG:NH2	5:C:508:HOH:O	2.50	0.45
1:B:208[B]:SER:H	2:B:401:GOL:H11	1.77	0.45
1:A:227:MET:HE2	1:A:229:ASP:N	2.32	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:289:LYS:HE2	1:C:289:LYS:HB2	1.64	0.44
1:B:195[B]:SER:OG	1:B:200:GLY:HA2	2.16	0.44
1:B:303:LYS:HG3	2:B:405:GOL:H2	2.00	0.44
1:C:12:ILE:HD11	1:C:74:VAL:HG22	1.99	0.44
1:A:57:THR:HG22	1:A:211:TYR:CE2	2.52	0.44
1:A:3:GLU:N	1:A:4:PRO:HD3	2.32	0.44
1:A:224:PRO:HB3	1:A:385:VAL:HG21	1.98	0.44
1:B:184:PRO:HG3	1:B:264:TYR:CG	2.52	0.44
1:B:14:SER:O	5:B:502:HOH:O	2.21	0.44
1:B:91:THR:HG21	1:B:196:VAL:HG12	1.99	0.44
1:C:51:GLU:OE2	1:C:53:ASP:OD2	2.36	0.43
1:B:246:ARG:HG3	2:B:403:GOL:O1	2.18	0.43
1:C:199:ASN:ND2	1:C:201:GLU:OE1	2.49	0.43
1:C:151:LEU:N	1:C:151:LEU:HD12	2.34	0.43
1:C:277:VAL:HG13	1:C:292:ALA:HB1	2.01	0.42
1:B:80[A]:HIS:HD2	1:B:82:GLU:OE2	2.02	0.42
1:C:3:GLU:N	1:C:4:PRO:HD3	2.35	0.42
1:C:51:GLU:HB3	1:C:215:VAL:HB	2.02	0.42
1:A:3:GLU:N	1:A:4:PRO:CD	2.83	0.41
1:A:3:GLU:CG	1:A:107:ASN:HB3	2.50	0.41
1:A:154:HIS:NE2	2:A:410:GOL:C3	2.83	0.41
1:A:242:LEU:C	1:A:242:LEU:HD12	2.44	0.41
1:B:248:LEU:HD21	2:B:403:GOL:H11	2.03	0.41
1:C:37:LYS:HG3	1:C:218:TRP:CE2	2.56	0.41
1:C:329:HIS:CB	5:C:568:HOH:O	2.68	0.41
1:A:76:GLN:NE2	5:A:519:HOH:O	2.54	0.41
1:A:275:THR:HG22	1:A:276:VAL:N	2.35	0.41
1:A:275:THR:HG22	1:A:276:VAL:O	2.21	0.41
1:A:291:ASP:HB3	1:A:323:ALA:O	2.21	0.41
1:B:150:GLU:C	1:B:151:LEU:HD12	2.46	0.41
1:B:199:ASN:HB3	1:B:201:GLU:OE1	2.21	0.41
1:C:254:GLN:OE1	1:C:256:LYS:NZ	2.54	0.41
1:B:151:LEU:HD23	1:B:185:VAL:HG21	2.01	0.41
1:C:48:GLU:HB3	1:C:216:ARG:HH12	1.86	0.40
1:B:235:ALA:HB1	1:B:363:ILE:HD12	2.04	0.40
1:C:254:GLN:NE2	3:C:405:SO4:O3	2.53	0.40

There are no symmetry-related clashes.

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	373/389 (96%)	365 (98%)	8 (2%)	0	100	100
1	B	379/389 (97%)	369 (97%)	10 (3%)	0	100	100
1	C	374/389 (96%)	366 (98%)	8 (2%)	0	100	100
All	All	1126/1167 (96%)	1100 (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	304/313 (97%)	302 (99%)	2 (1%)	76	62
1	B	310/313 (99%)	307 (99%)	3 (1%)	68	50
1	C	305/313 (97%)	301 (99%)	4 (1%)	61	39
All	All	919/939 (98%)	910 (99%)	9 (1%)	68	50

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	328	GLU
1	A	339	ARG
1	B	12	ILE
1	B	117	LEU
1	B	381	LEU

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Mol	Chain	Res	Type
1	C	3	GLU
1	C	157	VAL
1	C	276	VAL
1	C	289	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	58	ASN
1	A	127	HIS
1	B	107	ASN
1	B	154	HIS
1	C	23	GLN
1	C	80	HIS

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 33 ligands modelled in this entry, 2 are monoatomic - leaving 31 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	A	408	-	5,5,5	0.47	0	5,5,5	0.51	0
2	GOL	A	411	-	5,5,5	0.45	0	5,5,5	1.12	0
2	GOL	A	401	-	5,5,5	0.31	0	5,5,5	0.67	0
2	GOL	A	402	-	5,5,5	0.40	0	5,5,5	0.68	0
2	GOL	A	410	-	5,5,5	0.41	0	5,5,5	0.72	0
2	GOL	A	405	-	5,5,5	0.75	0	5,5,5	0.28	0
3	SO4	C	405	-	4,4,4	0.30	0	6,6,6	0.24	0
2	GOL	A	406	-	5,5,5	0.42	0	5,5,5	0.30	0
3	SO4	B	407	-	4,4,4	0.28	0	6,6,6	0.45	0
2	GOL	A	403	-	5,5,5	0.46	0	5,5,5	0.98	0
3	SO4	A	412	-	4,4,4	0.32	0	6,6,6	0.26	0
3	SO4	A	413	-	4,4,4	0.28	0	6,6,6	0.27	0
3	SO4	B	408	-	4,4,4	0.44	0	6,6,6	0.20	0
2	GOL	C	401	-	5,5,5	0.47	0	5,5,5	0.67	0
3	SO4	C	406	-	4,4,4	0.32	0	6,6,6	0.39	0
3	SO4	C	408	-	4,4,4	0.25	0	6,6,6	0.21	0
3	SO4	B	409	-	4,4,4	0.26	0	6,6,6	0.15	0
2	GOL	A	404	-	5,5,5	0.38	0	5,5,5	0.30	0
3	SO4	C	403	-	4,4,4	0.27	0	6,6,6	0.22	0
3	SO4	C	407	-	4,4,4	0.29	0	6,6,6	0.23	0
2	GOL	B	404	-	5,5,5	0.38	0	5,5,5	0.39	0
2	GOL	B	403	-	5,5,5	0.76	0	5,5,5	1.23	0
3	SO4	B	410	-	4,4,4	0.28	0	6,6,6	0.44	0
2	GOL	C	402	-	5,5,5	0.51	0	5,5,5	1.01	0
2	GOL	B	406	-	5,5,5	0.29	0	5,5,5	0.50	0
2	GOL	B	405	-	5,5,5	0.41	0	5,5,5	0.41	0
2	GOL	A	409	-	5,5,5	0.39	0	5,5,5	0.24	0
2	GOL	A	407	-	5,5,5	0.46	0	5,5,5	0.29	0
2	GOL	B	402	-	5,5,5	0.28	0	5,5,5	0.57	0
3	SO4	C	404	-	4,4,4	0.22	0	6,6,6	0.27	0
2	GOL	B	401	-	5,5,5	0.52	0	5,5,5	0.80	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	GOL	A	408	-	-	0/4/4/4	-
2	GOL	A	411	-	-	2/4/4/4	-
2	GOL	A	401	-	-	0/4/4/4	-
2	GOL	A	402	-	-	0/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GOL	A	410	-	-	4/4/4/4	-
2	GOL	A	405	-	-	2/4/4/4	-
2	GOL	A	406	-	-	2/4/4/4	-
2	GOL	A	403	-	-	0/4/4/4	-
2	GOL	C	401	-	-	2/4/4/4	-
2	GOL	A	404	-	-	4/4/4/4	-
2	GOL	B	404	-	-	0/4/4/4	-
2	GOL	B	403	-	-	2/4/4/4	-
2	GOL	C	402	-	-	4/4/4/4	-
2	GOL	B	406	-	-	2/4/4/4	-
2	GOL	B	405	-	-	2/4/4/4	-
2	GOL	A	409	-	-	2/4/4/4	-
2	GOL	A	407	-	-	4/4/4/4	-
2	GOL	B	402	-	-	2/4/4/4	-
2	GOL	B	401	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	404	GOL	C1-C2-C3-O3
2	A	407	GOL	O1-C1-C2-C3
2	A	409	GOL	C1-C2-C3-O3
2	A	410	GOL	O1-C1-C2-O2
2	A	410	GOL	O1-C1-C2-C3
2	A	410	GOL	C1-C2-C3-O3
2	A	411	GOL	O1-C1-C2-O2
2	A	411	GOL	O1-C1-C2-C3
2	B	402	GOL	O1-C1-C2-C3
2	B	403	GOL	O2-C2-C3-O3
2	C	402	GOL	O1-C1-C2-C3
2	C	402	GOL	C1-C2-C3-O3
2	A	407	GOL	O1-C1-C2-O2
2	B	405	GOL	O1-C1-C2-O2
2	A	404	GOL	O1-C1-C2-C3
2	A	405	GOL	O1-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
2	A	407	GOL	C1-C2-C3-O3
2	B	403	GOL	C1-C2-C3-O3
2	B	405	GOL	O1-C1-C2-C3
2	B	406	GOL	O1-C1-C2-C3
2	C	401	GOL	O1-C1-C2-C3
2	A	404	GOL	O2-C2-C3-O3
2	A	409	GOL	O2-C2-C3-O3
2	A	405	GOL	O1-C1-C2-O2
2	A	410	GOL	O2-C2-C3-O3
2	B	402	GOL	O1-C1-C2-O2
2	C	402	GOL	O2-C2-C3-O3
2	A	406	GOL	O1-C1-C2-O2
2	C	401	GOL	O1-C1-C2-O2
2	C	402	GOL	O1-C1-C2-O2
2	A	406	GOL	O1-C1-C2-C3
2	A	407	GOL	O2-C2-C3-O3
2	B	401	GOL	O1-C1-C2-O2
2	A	404	GOL	O1-C1-C2-O2
2	B	401	GOL	O1-C1-C2-C3
2	B	406	GOL	O1-C1-C2-O2

There are no ring outliers.

11 monomers are involved in 33 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	411	GOL	2	0
2	A	410	GOL	2	0
3	C	405	SO4	2	0
2	C	401	GOL	1	0
2	B	404	GOL	1	0
2	B	403	GOL	7	0
2	B	405	GOL	3	0
2	A	409	GOL	3	0
2	A	407	GOL	1	0
3	C	404	SO4	1	0
2	B	401	GOL	10	0

5.7 Other polymers [i](#)

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

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	373/389 (95%)	0.41	30 (8%)	18 19	8, 22, 51, 72	4 (1%)
1	B	373/389 (95%)	0.45	32 (8%)	16 17	8, 21, 48, 79	10 (2%)
1	C	375/389 (96%)	0.47	29 (7%)	19 20	8, 22, 53, 95	3 (0%)
All	All	1121/1167 (96%)	0.45	91 (8%)	18 19	8, 22, 50, 95	17 (1%)

All (91) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	278	GLY	6.6
1	C	198	ALA	6.2
1	C	157	VAL	5.0
1	B	13	THR	4.9
1	B	15	ASN	4.7
1	A	12	ILE	4.4
1	A	329	HIS	4.4
1	C	156	ASN	4.2
1	A	15	ASN	4.2
1	C	197	GLY	4.2
1	B	3	GLU	3.8
1	C	3	GLU	3.7
1	B	278	GLY	3.7
1	A	156	ASN	3.7
1	C	277	VAL	3.7
1	C	16	CYS	3.7
1	A	325	LYS	3.6
1	A	13	THR	3.6
1	B	14	SER	3.5
1	A	198	ALA	3.5
1	A	157	VAL	3.5
1	B	266	ASP	3.4
1	B	12	ILE	3.4

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Mol	Chain	Res	Type	RSRZ
1	B	195[A]	SER	3.3
1	C	199	ASN	3.2
1	A	326	ASP	3.1
1	A	154	HIS	3.1
1	A	155	ALA	3.1
1	C	15	ASN	3.0
1	B	202	SER	3.0
1	B	290	GLY	3.0
1	B	198	ALA	3.0
1	A	11	ASP	2.9
1	A	266	ASP	2.9
1	B	74	VAL	2.9
1	C	155	ALA	2.9
1	A	197	GLY	2.8
1	B	117	LEU	2.8
1	C	154	HIS	2.8
1	B	326	ASP	2.8
1	B	127[A]	HIS	2.8
1	A	327	SER	2.8
1	C	17	ILE	2.6
1	B	142	PRO	2.6
1	A	278	GLY	2.5
1	B	75	GLU	2.5
1	B	73	GLY	2.5
1	A	341	VAL	2.5
1	B	76	GLN	2.5
1	C	289	LYS	2.5
1	C	201	GLU	2.5
1	B	199	ASN	2.5
1	B	351	PRO	2.5
1	C	329	HIS	2.5
1	C	209	SER	2.5
1	A	120	ASP	2.4
1	C	266	ASP	2.4
1	B	17	ILE	2.4
1	B	277	VAL	2.4
1	A	4	PRO	2.3
1	C	92	HIS	2.3
1	A	201	GLU	2.3
1	A	290	GLY	2.3
1	B	328	GLU	2.3
1	A	108	SER	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	5[A]	THR	2.2
1	A	16	CYS	2.2
1	C	327	SER	2.2
1	B	276	VAL	2.2
1	B	11	ASP	2.2
1	B	201	GLU	2.2
1	B	72	ARG	2.2
1	B	18	ILE	2.2
1	A	268	SER	2.2
1	A	223[A]	TRP	2.1
1	C	328	GLU	2.1
1	B	154	HIS	2.1
1	C	265	LEU	2.1
1	C	194	SER	2.1
1	C	42	ILE	2.1
1	A	324	LYS	2.1
1	B	119	LYS	2.1
1	C	200	GLY	2.0
1	C	267	GLY	2.0
1	C	326	ASP	2.0
1	C	195	SER	2.0
1	A	127	HIS	2.0
1	A	328	GLU	2.0
1	A	78	GLY	2.0
1	A	199	ASN	2.0
1	C	202	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($\text{\AA}^2$)	Q<0.9
3	SO4	C	405	5/5	0.46	0.19	60,68,83,101	0
3	SO4	C	407	5/5	0.68	0.16	46,65,88,106	0
2	GOL	A	410	6/6	0.74	0.17	40,49,58,60	0
3	SO4	A	413	5/5	0.74	0.12	57,60,76,91	0
2	GOL	A	411	6/6	0.76	0.15	27,41,55,62	0
3	SO4	B	410	5/5	0.77	0.16	36,39,62,90	0
3	SO4	C	404	5/5	0.79	0.12	39,67,78,82	0
2	GOL	B	406	6/6	0.80	0.14	39,56,70,72	0
2	GOL	A	407	6/6	0.80	0.14	42,55,71,71	0
2	GOL	C	401	6/6	0.81	0.14	31,45,67,67	0
2	GOL	A	408	6/6	0.81	0.15	33,45,57,62	0
2	GOL	A	409	6/6	0.83	0.14	34,52,65,78	0
2	GOL	A	406	6/6	0.84	0.13	48,61,73,73	0
2	GOL	C	402	6/6	0.85	0.14	24,46,56,56	0
2	GOL	B	402	6/6	0.86	0.12	37,54,61,67	0
2	GOL	B	405	6/6	0.86	0.13	36,47,77,92	0
3	SO4	C	408	5/5	0.86	0.10	52,60,72,83	0
2	GOL	B	401	6/6	0.87	0.10	24,35,52,62	0
2	GOL	A	404	6/6	0.88	0.13	29,52,66,79	0
3	SO4	C	406	5/5	0.88	0.11	32,49,65,90	0
2	GOL	B	403	6/6	0.88	0.15	14,39,46,54	0
2	GOL	A	402	6/6	0.88	0.11	31,43,57,57	0
3	SO4	B	407	5/5	0.89	0.11	43,48,53,66	0
3	SO4	B	409	5/5	0.90	0.09	51,59,76,81	0
2	GOL	A	403	6/6	0.91	0.12	25,38,50,61	0
2	GOL	B	404	6/6	0.92	0.09	28,35,66,79	0
2	GOL	A	405	6/6	0.93	0.10	19,30,49,49	0
3	SO4	C	403	5/5	0.94	0.07	29,35,51,55	0
4	CL	B	412	1/1	0.94	0.19	54,54,54,54	0
4	CL	B	411	1/1	0.95	0.14	37,37,37,37	0
3	SO4	A	412	5/5	0.95	0.09	26,35,55,67	0
2	GOL	A	401	6/6	0.96	0.07	18,26,32,32	0
3	SO4	B	408	5/5	0.96	0.08	24,32,39,58	0

6.5 Other polymers ⓘ

There are no such residues in this entry.