



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 12:49 AM UTC

PDB ID : 5DDS / pdb_00005dds
Title : Crystal structure of aminotransferase CrmG from Actinoalloteichus sp. WH1-2216-6 in complex with PLP
Authors : Xu, J.; Feng, Z.; Liu, J.
Deposited on : 2015-08-25
Resolution : 2.60 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

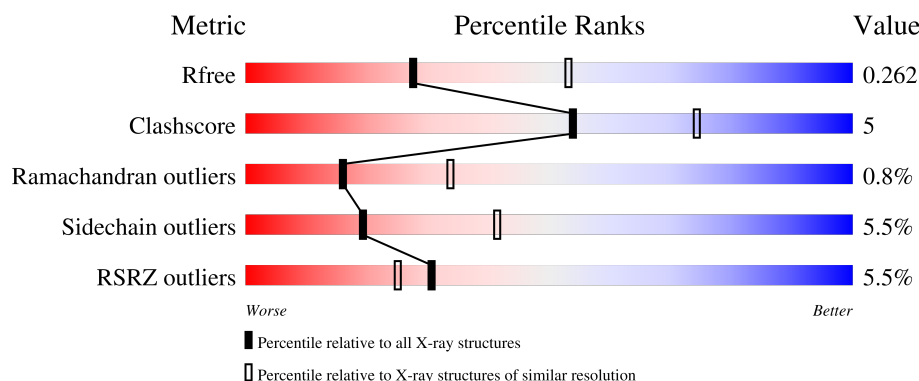
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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	523	<div> <div>6%</div> <div> <div></div> <div>81%</div> <div>15%</div> <div>..</div> </div> </div>
1	B	523	<div> <div>5%</div> <div> <div></div> <div>83%</div> <div>13%</div> <div>..</div> </div> </div>
1	C	523	<div> <div>4%</div> <div> <div></div> <div>82%</div> <div>14%</div> <div>..</div> </div> </div>
1	D	523	<div> <div>6%</div> <div> <div></div> <div>83%</div> <div>13%</div> <div>..</div> </div> </div>

2 Entry composition [i](#)

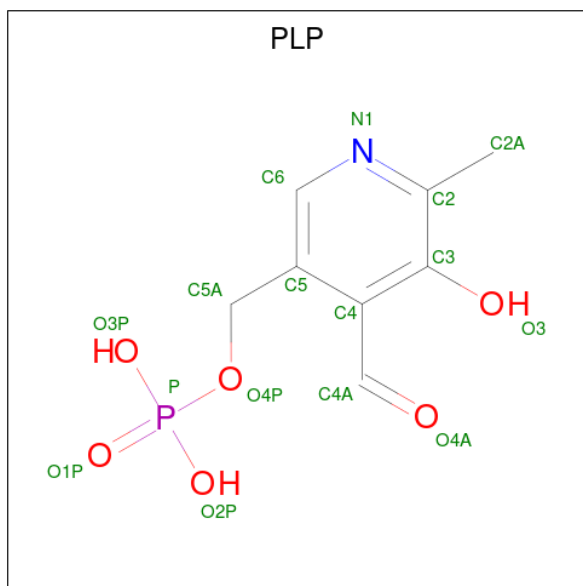
There are 5 unique types of molecules in this entry. The entry contains 16012 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 CrmG.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	514	Total	C	N	O	S	0	0	0
			3966	2480	718	757	11			
1	B	511	Total	C	N	O	S	0	0	0
			3954	2474	715	754	11			
1	C	510	Total	C	N	O	S	0	0	0
			3946	2470	714	751	11			
1	D	512	Total	C	N	O	S	0	0	0
			3958	2476	716	755	11			

- Molecule 2 is PYRIDOXAL-5'-PHOSPHATE (CCD ID: PLP) (formula: $C_8H_{10}NO_6P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
2	B	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
2	D	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 4 is ACETIC ACID (CCD ID: ACY) (formula: $C_2H_4O_2$).



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

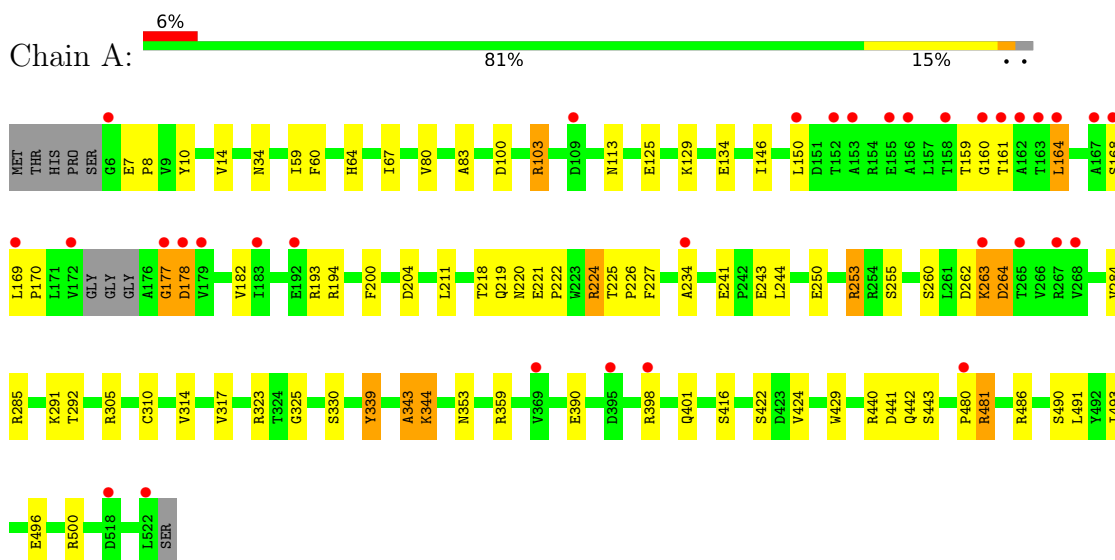
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	33	Total	O	0	0
			33	33		
5	B	32	Total	O	0	0
			32	32		
5	C	20	Total	O	0	0
			20	20		
5	D	27	Total	O	0	0
			27	27		

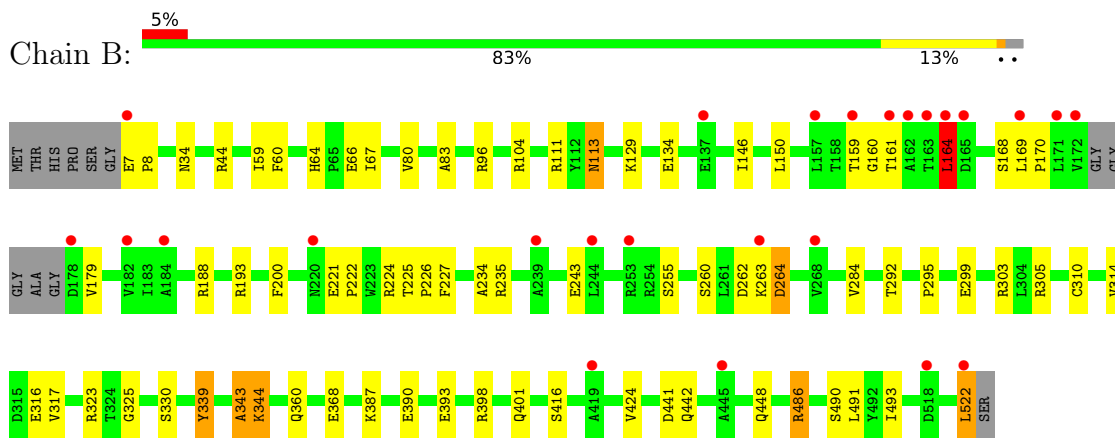
3 Residue-property plots

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.

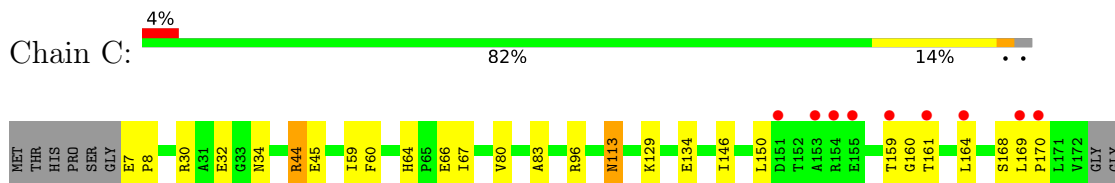
• Molecule 1: CrmG

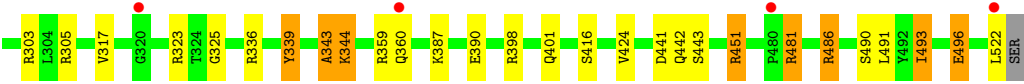
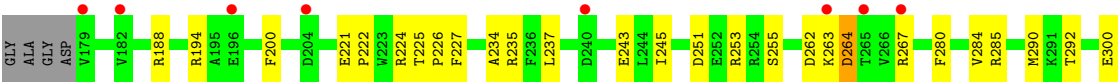


• Molecule 1: CrmG

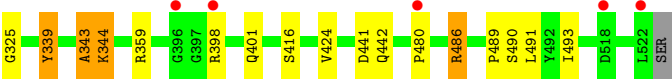
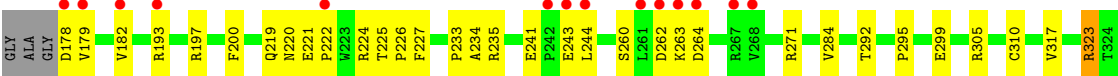
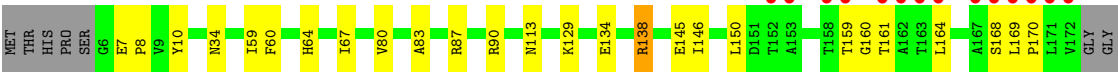
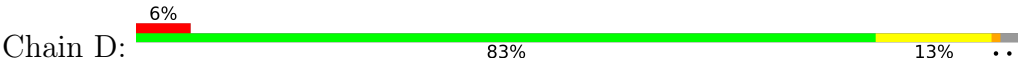


• Molecule 1: CrmG





● Molecule 1: CrmG



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	84.08Å 84.21Å 88.95Å 106.71° 109.16° 95.03°	Depositor
Resolution (Å)	62.02 – 2.60 62.02 – 2.60	Depositor EDS
% Data completeness (in resolution range)	92.8 (62.02-2.60) 92.8 (62.02-2.60)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.31 (at 2.61Å)	Xtriage
Refinement program	REFMAC 5.8.0103	Depositor
R, R_{free}	0.215 , 0.262 0.217 , 0.262	Depositor DCC
R_{free} test set	3148 reflections (4.74%)	wwPDB-VP
Wilson B-factor (Å ²)	32.4	Xtriage
Anisotropy	0.219	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 43.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.136 for -k,-h,-l	Xtriage
Reported twinning fraction	0.925 for H, K, L 0.075 for -K, -H, -L	Depositor
Outliers	0 of 61690 reflections	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	16012	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 15.54% 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, ACY, PLP

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	1.08	1/4033 (0.0%)	0.64	0/5463
1	B	1.08	3/4021 (0.1%)	0.64	0/5448
1	C	1.08	3/4013 (0.1%)	0.63	0/5437
1	D	1.07	2/4025 (0.0%)	0.64	0/5453
All	All	1.07	9/16092 (0.1%)	0.64	0/21801

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	2
1	B	0	2
1	C	0	1
1	D	0	2
All	All	0	7

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	339	TYR	N-CA	6.00	1.52	1.45
1	A	339	TYR	N-CA	5.82	1.52	1.45
1	D	339	TYR	N-CA	5.60	1.52	1.45
1	D	90	ARG	CD-NE	-5.26	1.38	1.46
1	C	280	PHE	N-CA	5.25	1.52	1.46
1	B	316	GLU	N-CA	5.23	1.52	1.46
1	B	339	TYR	N-CA	5.21	1.52	1.45
1	B	164	LEU	CA-CB	5.18	1.60	1.53
1	C	113	ASN	CA-C	-5.06	1.46	1.52

There are no bond angle outliers.

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	160	GLY	Peptide
1	A	325	GLY	Peptide
1	B	160	GLY	Peptide
1	B	325	GLY	Peptide
1	C	325	GLY	Peptide
1	D	160	GLY	Peptide
1	D	325	GLY	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	3966	0	3938	51	0
1	B	3954	0	3931	35	0
1	C	3946	0	3927	43	0
1	D	3958	0	3934	36	0
2	A	15	0	7	0	0
2	B	15	0	7	0	0
2	C	15	0	7	0	0
2	D	15	0	7	0	0
3	A	6	0	8	0	0
3	B	6	0	8	0	0
4	D	4	0	3	0	0
5	A	33	0	0	3	0
5	B	32	0	0	1	0
5	C	20	0	0	0	0
5	D	27	0	0	2	0
All	All	16012	0	15777	156	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 (156) 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:C:481:ARG:HH11	1:C:481:ARG:HG3	1.30	0.97
1:A:218:THR:O	1:A:224:ARG:NH2	2.03	0.91
1:A:224:ARG:HG3	1:A:224:ARG:HH21	1.41	0.82
1:A:177:GLY:O	1:A:178:ASP:HB3	1.80	0.82
1:A:178:ASP:O	1:A:182:VAL:HG23	1.83	0.79
1:D:178:ASP:O	1:D:182:VAL:HG23	1.85	0.76
1:C:481:ARG:HH11	1:C:481:ARG:CG	2.00	0.74
1:A:224:ARG:HH21	1:A:224:ARG:CG	2.03	0.71
1:B:486:ARG:HG2	5:B:714:HOH:O	1.91	0.69
1:C:300:GLU:OE2	1:C:303:ARG:NH1	2.25	0.68
1:D:169:LEU:N	1:D:170:PRO:HD2	2.09	0.68
1:B:169:LEU:N	1:B:170:PRO:HD2	2.10	0.67
1:C:169:LEU:N	1:C:170:PRO:HD2	2.09	0.66
1:A:169:LEU:N	1:A:170:PRO:HD2	2.09	0.66
1:D:323:ARG:NH1	1:D:489:PRO:O	2.29	0.66
1:A:250:GLU:OE2	1:A:253:ARG:HD3	1.95	0.65
1:A:204:ASP:O	1:A:204:ASP:OD1	2.15	0.65
1:D:169:LEU:N	1:D:170:PRO:CD	2.63	0.62
1:A:169:LEU:N	1:A:170:PRO:CD	2.63	0.62
1:B:134:GLU:OE1	1:B:339:TYR:OH	2.18	0.62
1:A:134:GLU:OE1	1:A:339:TYR:OH	2.17	0.61
1:B:169:LEU:N	1:B:170:PRO:CD	2.63	0.61
1:A:353:ASN:ND2	5:A:701:HOH:O	2.32	0.61
1:B:225:THR:N	1:B:226:PRO:CD	2.64	0.61
1:D:134:GLU:OE1	1:D:339:TYR:OH	2.16	0.61
1:C:305:ARG:NH1	1:C:336:ARG:O	2.32	0.61
1:C:225:THR:N	1:C:226:PRO:CD	2.64	0.61
1:D:225:THR:N	1:D:226:PRO:CD	2.64	0.61
1:C:169:LEU:N	1:C:170:PRO:CD	2.63	0.60
1:A:177:GLY:O	1:A:178:ASP:CB	2.49	0.60
1:A:225:THR:N	1:A:226:PRO:CD	2.64	0.60
1:C:64:HIS:HB3	1:C:67:ILE:HD12	1.84	0.60
1:D:295:PRO:O	1:D:299:GLU:HG2	2.02	0.59
1:A:64:HIS:HB3	1:A:67:ILE:HD12	1.85	0.59
1:A:422:SER:O	1:A:440:ARG:NH1	2.36	0.58
1:B:64:HIS:HB3	1:B:67:ILE:HD12	1.85	0.58
1:B:104:ARG:NH1	1:B:393:GLU:OE1	2.34	0.58
1:C:481:ARG:HG3	1:C:481:ARG:NH1	2.07	0.58
1:B:295:PRO:O	1:B:299:GLU:HG2	2.04	0.57
1:D:64:HIS:HB3	1:D:67:ILE:HD12	1.84	0.57
1:B:317:VAL:HG13	1:B:343:ALA:HB3	1.87	0.57
1:D:317:VAL:HG13	1:D:343:ALA:HB3	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:134:GLU:OE1	1:C:339:TYR:OH	2.15	0.56
1:A:224:ARG:NH2	1:A:224:ARG:CG	2.67	0.56
1:B:164:LEU:C	1:B:164:LEU:HD12	2.31	0.55
1:A:317:VAL:HG13	1:A:343:ALA:HB3	1.87	0.55
1:C:317:VAL:HG13	1:C:343:ALA:HB3	1.87	0.55
1:A:443:SER:HB3	1:C:481:ARG:NH2	2.23	0.53
1:A:250:GLU:OE2	1:A:253:ARG:CD	2.58	0.52
1:C:168:SER:C	1:C:170:PRO:HD2	2.36	0.51
1:C:262:ASP:O	1:C:264:ASP:N	2.44	0.51
1:A:168:SER:C	1:A:170:PRO:HD2	2.36	0.50
1:A:262:ASP:O	1:A:264:ASP:N	2.45	0.50
1:D:168:SER:C	1:D:170:PRO:HD2	2.36	0.50
1:C:443:SER:O	1:C:451:ARG:HG3	2.12	0.50
1:B:262:ASP:O	1:B:264:ASP:N	2.45	0.50
1:B:34:ASN:ND2	1:B:490:SER:OG	2.45	0.49
1:B:159:THR:O	1:B:161:THR:N	2.45	0.49
1:D:159:THR:O	1:D:161:THR:N	2.45	0.49
1:A:204:ASP:OD1	1:A:204:ASP:C	2.54	0.49
1:C:34:ASN:ND2	1:C:490:SER:OG	2.45	0.49
1:C:159:THR:O	1:C:161:THR:N	2.45	0.49
1:D:262:ASP:O	1:D:264:ASP:N	2.45	0.49
1:A:34:ASN:ND2	1:A:490:SER:OG	2.45	0.49
1:D:34:ASN:ND2	1:D:490:SER:OG	2.46	0.48
1:A:200:PHE:O	1:A:234:ALA:HA	2.13	0.48
1:B:168:SER:C	1:B:170:PRO:HD2	2.36	0.48
1:A:241:GLU:HB3	1:A:244:LEU:HD13	1.95	0.48
1:C:30:ARG:NH1	1:C:32:GLU:OE1	2.38	0.48
1:D:200:PHE:O	1:D:234:ALA:HA	2.14	0.48
1:A:221:GLU:N	1:A:222:PRO:HD2	2.29	0.48
1:B:221:GLU:N	1:B:222:PRO:HD2	2.29	0.48
1:C:227:PHE:CE1	1:D:129:LYS:HB3	2.49	0.48
1:C:44:ARG:HH21	1:C:44:ARG:CG	2.27	0.48
1:D:221:GLU:N	1:D:222:PRO:HD2	2.29	0.48
1:C:129:LYS:HB3	1:D:227:PHE:CE1	2.49	0.47
1:A:159:THR:O	1:A:161:THR:N	2.46	0.47
1:A:284:VAL:HG22	1:A:292:THR:HG22	1.96	0.47
1:A:491:LEU:C	1:A:491:LEU:HD12	2.40	0.47
1:C:200:PHE:O	1:C:234:ALA:HA	2.14	0.47
1:B:200:PHE:O	1:B:234:ALA:HA	2.14	0.47
1:D:80:VAL:HG12	1:D:83:ALA:HB2	1.97	0.47
1:C:284:VAL:HG22	1:C:292:THR:HG22	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:241:GLU:HB3	1:D:244:LEU:HD13	1.95	0.47
1:C:221:GLU:N	1:C:222:PRO:HD2	2.30	0.46
1:D:284:VAL:HG22	1:D:292:THR:HG22	1.96	0.46
1:C:44:ARG:NH2	1:C:45:GLU:O	2.49	0.46
1:D:80:VAL:CG1	1:D:83:ALA:HB2	2.45	0.46
1:A:164:LEU:HD13	1:A:164:LEU:O	2.16	0.46
1:B:284:VAL:HG22	1:B:292:THR:HG22	1.96	0.46
1:C:491:LEU:C	1:C:491:LEU:HD12	2.41	0.46
1:A:80:VAL:HG12	1:A:83:ALA:HB2	1.98	0.46
1:B:7:GLU:HB2	1:B:8:PRO:HD2	1.98	0.45
1:B:491:LEU:C	1:B:491:LEU:HD12	2.41	0.45
1:A:80:VAL:CG1	1:A:83:ALA:HB2	2.47	0.45
1:D:138:ARG:HH21	1:D:138:ARG:HG3	1.80	0.45
1:C:80:VAL:CG1	1:C:83:ALA:HB2	2.47	0.45
1:C:80:VAL:HG12	1:C:83:ALA:HB2	1.98	0.45
1:A:146:ILE:O	1:A:150:LEU:HG	2.17	0.45
1:A:224:ARG:C	1:A:226:PRO:HD2	2.42	0.45
1:D:486:ARG:NH2	5:D:702:HOH:O	2.40	0.45
1:A:305:ARG:HG2	1:A:310:CYS:O	2.16	0.45
1:D:491:LEU:HD12	1:D:491:LEU:C	2.42	0.45
1:D:7:GLU:HB2	1:D:8:PRO:HD2	1.99	0.45
1:B:146:ILE:O	1:B:150:LEU:HG	2.17	0.44
1:C:146:ILE:O	1:C:150:LEU:HG	2.17	0.44
1:D:224:ARG:C	1:D:226:PRO:HD2	2.42	0.44
1:B:80:VAL:HG12	1:B:83:ALA:HB2	1.99	0.44
1:B:224:ARG:C	1:B:226:PRO:HD2	2.42	0.44
1:C:7:GLU:HB2	1:C:8:PRO:HD2	1.99	0.44
1:A:481:ARG:NH2	1:C:443:SER:HB3	2.33	0.44
1:A:129:LYS:HB3	1:B:227:PHE:CE1	2.53	0.44
1:C:224:ARG:C	1:C:226:PRO:HD2	2.42	0.44
1:B:80:VAL:CG1	1:B:83:ALA:HB2	2.47	0.44
1:D:146:ILE:O	1:D:150:LEU:HG	2.17	0.44
1:A:7:GLU:HB2	1:A:8:PRO:HD2	1.99	0.43
1:A:164:LEU:C	1:A:164:LEU:HD22	2.43	0.43
1:A:500:ARG:NE	5:A:706:HOH:O	2.47	0.43
1:B:522:LEU:HD22	1:B:522:LEU:C	2.43	0.43
1:D:305:ARG:HG2	1:D:310:CYS:O	2.18	0.43
1:A:14:VAL:HB	1:B:368:GLU:CD	2.43	0.43
1:B:305:ARG:HG2	1:B:310:CYS:O	2.18	0.43
1:A:10:TYR:CE2	1:B:96:ARG:HG3	2.53	0.43
1:A:59:ILE:HG23	1:A:60:PHE:CD2	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:59:ILE:HG23	1:C:60:PHE:CD2	2.54	0.43
1:B:59:ILE:HG23	1:B:60:PHE:CD2	2.54	0.43
1:A:100:ASP:OD1	1:A:103:ARG:NH1	2.52	0.43
1:B:111:ARG:HG2	1:B:360:GLN:NE2	2.33	0.43
1:D:59:ILE:HG23	1:D:60:PHE:CD2	2.54	0.42
1:D:145:GLU:OE2	1:D:271:ARG:NH2	2.38	0.42
1:C:496:GLU:CD	1:C:496:GLU:H	2.27	0.42
1:C:66:GLU:HG2	1:C:387:LYS:CE	2.50	0.42
1:C:96:ARG:HG3	1:D:10:TYR:CE2	2.55	0.42
1:A:314:VAL:HG11	1:A:330:SER:HB3	2.03	0.41
1:B:113:ASN:HD22	1:B:360:GLN:HG2	1.86	0.41
1:B:314:VAL:HG11	1:B:330:SER:HB3	2.03	0.41
1:C:290:MET:HE1	1:C:486:ARG:NH2	2.35	0.41
1:A:125:GLU:OE1	1:A:211:LEU:HB2	2.20	0.41
1:C:441:ASP:OD1	1:C:441:ASP:C	2.63	0.41
1:A:219:GLN:O	1:A:220:ASN:C	2.64	0.41
1:A:291:LYS:HE2	1:A:429:TRP:CZ2	2.56	0.41
1:B:441:ASP:OD1	1:B:442:GLN:N	2.54	0.41
1:C:441:ASP:OD1	1:C:442:GLN:N	2.54	0.41
1:D:197:ARG:NH2	1:D:233:PRO:HG3	2.36	0.41
1:D:441:ASP:OD1	1:D:442:GLN:N	2.54	0.41
1:D:480:PRO:HD2	5:D:711:HOH:O	2.21	0.41
1:D:441:ASP:OD1	1:D:441:ASP:C	2.64	0.41
1:C:493:ILE:O	1:C:493:ILE:HG23	2.21	0.40
1:D:219:GLN:O	1:D:220:ASN:C	2.64	0.40
1:A:480:PRO:HD2	5:A:717:HOH:O	2.20	0.40
1:C:237:LEU:HD13	1:C:245:ILE:HG23	2.04	0.40
1:A:441:ASP:OD1	1:A:442:GLN:N	2.54	0.40
1:B:66:GLU:HG2	1:B:387:LYS:CE	2.51	0.40
1:C:481:ARG:HD2	1:C:481:ARG:HA	1.91	0.40
1:A:227:PHE:CE1	1:B:129:LYS:HB3	2.57	0.40
1:C:251:ASP:C	1:C:251:ASP:OD1	2.64	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	510/523 (98%)	484 (95%)	21 (4%)	5 (1%)	12	28
1	B	507/523 (97%)	484 (96%)	19 (4%)	4 (1%)	16	34
1	C	506/523 (97%)	485 (96%)	17 (3%)	4 (1%)	16	34
1	D	508/523 (97%)	485 (96%)	19 (4%)	4 (1%)	16	34
All	All	2031/2092 (97%)	1938 (95%)	76 (4%)	17 (1%)	16	34

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	178	ASP
1	A	263	LYS
1	B	263	LYS
1	C	263	LYS
1	D	263	LYS
1	C	160	GLY
1	A	344	LYS
1	B	179	VAL
1	B	344	LYS
1	C	344	LYS
1	D	344	LYS
1	A	343	ALA
1	B	343	ALA
1	C	343	ALA
1	D	343	ALA
1	A	177	GLY
1	D	179	VAL

5.3.2 Protein sidechains [i](#)

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	416/422 (99%)	391 (94%)	25 (6%)	17	37
1	B	416/422 (99%)	394 (95%)	22 (5%)	20	43
1	C	415/422 (98%)	388 (94%)	27 (6%)	15	35
1	D	416/422 (99%)	399 (96%)	17 (4%)	27	54
All	All	1663/1688 (98%)	1572 (94%)	91 (6%)	19	41

All (91) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	103	ARG
1	A	113	ASN
1	A	164	LEU
1	A	193	ARG
1	A	194	ARG
1	A	224	ARG
1	A	243	GLU
1	A	253	ARG
1	A	255	SER
1	A	260	SER
1	A	263	LYS
1	A	264	ASP
1	A	285	ARG
1	A	323	ARG
1	A	344	LYS
1	A	359	ARG
1	A	390	GLU
1	A	398	ARG
1	A	401	GLN
1	A	416	SER
1	A	424	VAL
1	A	481	ARG
1	A	486	ARG
1	A	493	ILE
1	A	496	GLU
1	B	44	ARG
1	B	113	ASN
1	B	164	LEU
1	B	188	ARG
1	B	193	ARG
1	B	235	ARG
1	B	243	GLU
1	B	255	SER

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Mol	Chain	Res	Type
1	B	260	SER
1	B	264	ASP
1	B	303	ARG
1	B	323	ARG
1	B	344	LYS
1	B	390	GLU
1	B	398	ARG
1	B	401	GLN
1	B	416	SER
1	B	424	VAL
1	B	448	GLN
1	B	486	ARG
1	B	493	ILE
1	B	522	LEU
1	C	44	ARG
1	C	113	ASN
1	C	164	LEU
1	C	188	ARG
1	C	194	ARG
1	C	235	ARG
1	C	243	GLU
1	C	253	ARG
1	C	255	SER
1	C	264	ASP
1	C	267	ARG
1	C	285	ARG
1	C	323	ARG
1	C	344	LYS
1	C	359	ARG
1	C	360	GLN
1	C	390	GLU
1	C	398	ARG
1	C	401	GLN
1	C	416	SER
1	C	424	VAL
1	C	451	ARG
1	C	481	ARG
1	C	486	ARG
1	C	493	ILE
1	C	496	GLU
1	C	522	LEU
1	D	87	ARG

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Mol	Chain	Res	Type
1	D	113	ASN
1	D	138	ARG
1	D	164	LEU
1	D	193	ARG
1	D	235	ARG
1	D	243	GLU
1	D	260	SER
1	D	323	ARG
1	D	344	LYS
1	D	359	ARG
1	D	398	ARG
1	D	401	GLN
1	D	416	SER
1	D	424	VAL
1	D	486	ARG
1	D	493	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	34	ASN
1	A	113	ASN
1	A	353	ASN
1	A	360	GLN
1	A	401	GLN
1	A	421	HIS
1	B	34	ASN
1	B	113	ASN
1	B	118	ASN
1	B	401	GLN
1	B	421	HIS
1	B	448	GLN
1	C	34	ASN
1	C	113	ASN
1	C	360	GLN
1	C	401	GLN
1	C	421	HIS
1	D	34	ASN
1	D	88	GLN
1	D	113	ASN
1	D	219	GLN
1	D	360	GLN

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Mol	Chain	Res	Type
1	D	401	GLN
1	D	421	HIS

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 ⓘ

7 ligands are modelled in this entry.

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	$\# Z > 2$
3	GOL	A	602	-	5,5,5	0.70	0	5,5,5	0.27	0
2	PLP	D	601	1	15,15,16	0.77	0	21,22,23	0.98	1 (4%)
2	PLP	B	601	1	15,15,16	0.94	0	21,22,23	0.95	1 (4%)
2	PLP	A	601	1	15,15,16	1.06	0	21,22,23	0.87	1 (4%)
2	PLP	C	601	1	15,15,16	1.11	2 (13%)	21,22,23	0.89	1 (4%)
4	ACY	D	602	-	3,3,3	1.02	0	3,3,3	0.73	0
3	GOL	B	602	-	5,5,5	0.63	0	5,5,5	0.29	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
3	GOL	A	602	-	-	2/4/4/4	-
2	PLP	D	601	1	-	0/6/6/8	0/1/1/1
2	PLP	B	601	1	-	0/6/6/8	0/1/1/1
2	PLP	A	601	1	-	0/6/6/8	0/1/1/1
2	PLP	C	601	1	-	0/6/6/8	0/1/1/1
3	GOL	B	602	-	-	2/4/4/4	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	601	PLP	C3-C2	-2.71	1.38	1.41
2	C	601	PLP	C2-N1	2.18	1.37	1.33

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	601	PLP	C6-C5-C4	2.34	120.01	118.10
2	C	601	PLP	C5-C6-N1	-2.09	120.44	123.83
2	A	601	PLP	C5-C6-N1	-2.06	120.49	123.83
2	B	601	PLP	C5-C6-N1	-2.04	120.51	123.83

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	602	GOL	O1-C1-C2-C3
3	B	602	GOL	C1-C2-C3-O3
3	A	602	GOL	O1-C1-C2-O2
3	B	602	GOL	O2-C2-C3-O3

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å ²)	Q<0.9
1	A	514/523 (98%)	0.46	33 (6%)	25	20	13, 30, 62, 84	0
1	B	511/523 (97%)	0.43	25 (4%)	35	29	13, 31, 64, 87	0
1	C	510/523 (97%)	0.41	21 (4%)	41	36	13, 31, 61, 100	0
1	D	512/523 (97%)	0.49	33 (6%)	25	20	13, 32, 65, 89	0
All	All	2047/2092 (97%)	0.45	112 (5%)	30	25	13, 31, 63, 100	0

All (112) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	177	GLY	4.6
1	D	162	ALA	3.9
1	D	169	LEU	3.8
1	D	164	LEU	3.6
1	D	264	ASP	3.5
1	B	263	LYS	3.5
1	D	243	GLU	3.5
1	D	168	SER	3.4
1	A	168	SER	3.2
1	D	178	ASP	3.2
1	D	158	THR	3.2
1	A	265	THR	3.1
1	D	159	THR	3.1
1	A	162	ALA	3.1
1	C	179	VAL	3.0
1	C	164	LEU	3.0
1	B	244	LEU	3.0
1	C	204	ASP	3.0
1	B	162	ALA	3.0
1	C	522	LEU	2.9
1	D	267	ARG	2.9

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Mol	Chain	Res	Type	RSRZ
1	D	518	ASP	2.9
1	A	163	THR	2.9
1	A	263	LYS	2.9
1	A	156	ALA	2.9
1	A	172	VAL	2.9
1	B	522	LEU	2.8
1	D	161	THR	2.8
1	D	179	VAL	2.8
1	A	160	GLY	2.8
1	A	518	ASP	2.8
1	C	151	ASP	2.8
1	A	169	LEU	2.8
1	C	161	THR	2.7
1	A	267	ARG	2.7
1	B	178	ASP	2.7
1	D	167	ALA	2.7
1	A	395	ASP	2.7
1	D	171	LEU	2.7
1	B	239	ALA	2.6
1	B	161	THR	2.6
1	D	163	THR	2.6
1	D	182	VAL	2.6
1	B	7	GLU	2.6
1	A	234	ALA	2.6
1	B	169	LEU	2.6
1	C	155	GLU	2.6
1	C	240	ASP	2.5
1	B	137	GLU	2.5
1	D	172	VAL	2.5
1	B	164	LEU	2.5
1	D	153	ALA	2.5
1	D	398	ARG	2.5
1	B	163	THR	2.5
1	A	164	LEU	2.5
1	D	522	LEU	2.5
1	B	184	ALA	2.5
1	D	263	LYS	2.4
1	A	158	THR	2.4
1	A	183	ILE	2.4
1	B	220	ASN	2.4
1	A	6	GLY	2.4
1	A	268	VAL	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	109	ASP	2.4
1	C	263	LYS	2.4
1	A	522	LEU	2.3
1	B	165	ASP	2.3
1	D	170	PRO	2.3
1	A	179	VAL	2.3
1	B	172	VAL	2.3
1	D	480	PRO	2.3
1	D	268	VAL	2.3
1	C	169	LEU	2.3
1	A	153	ALA	2.3
1	B	445	ALA	2.3
1	C	267	ARG	2.3
1	B	253	ARG	2.2
1	A	480	PRO	2.2
1	D	262	ASP	2.2
1	B	518	ASP	2.2
1	B	171	LEU	2.2
1	B	419	ALA	2.2
1	C	154	ARG	2.2
1	D	242	PRO	2.2
1	C	360	GLN	2.2
1	D	244	LEU	2.2
1	D	152	THR	2.2
1	B	268	VAL	2.2
1	A	167	ALA	2.1
1	C	153	ALA	2.1
1	B	159	THR	2.1
1	A	178	ASP	2.1
1	A	369	VAL	2.1
1	C	182	VAL	2.1
1	A	152	THR	2.1
1	C	159	THR	2.1
1	B	157	LEU	2.1
1	C	320	GLY	2.1
1	A	155	GLU	2.1
1	D	261	LEU	2.1
1	B	182	VAL	2.1
1	D	193	ARG	2.1
1	A	161	THR	2.1
1	D	222	PRO	2.1
1	A	398	ARG	2.0

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Mol	Chain	Res	Type	RSRZ
1	D	396	GLY	2.0
1	A	192	GLU	2.0
1	C	196	GLU	2.0
1	C	170	PRO	2.0
1	C	265	THR	2.0
1	C	480	PRO	2.0
1	A	150	LEU	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
3	GOL	A	602	6/6	0.79	0.12	32,35,36,38	0
2	PLP	D	601	15/16	0.87	0.13	32,35,39,40	0
2	PLP	A	601	15/16	0.90	0.10	25,30,33,33	0
2	PLP	B	601	15/16	0.90	0.11	29,33,35,36	0
2	PLP	C	601	15/16	0.91	0.11	28,32,40,41	0
3	GOL	B	602	6/6	0.91	0.09	28,29,31,31	0
4	ACY	D	602	4/4	0.91	0.11	29,30,31,38	0

6.5 Other polymers [i](#)

There are no such residues in this entry.