Full wwPDB X-ray Structure Validation Report (i)

Jun 16, 2024 – 01:11 PM EDT

PDB ID	:	5DDU
Title	:	Crystal structure of aminotransferase CrmG from Actinoalloteichus sp. WH1-2216-6 in complex with PMP
Authors	:	Xu, J.; Feng, Z.; Liu, J.
Deposited on	:	2015-08-25
Resolution	:	2.46 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 (i) 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 (i)) were used in the production of this report:

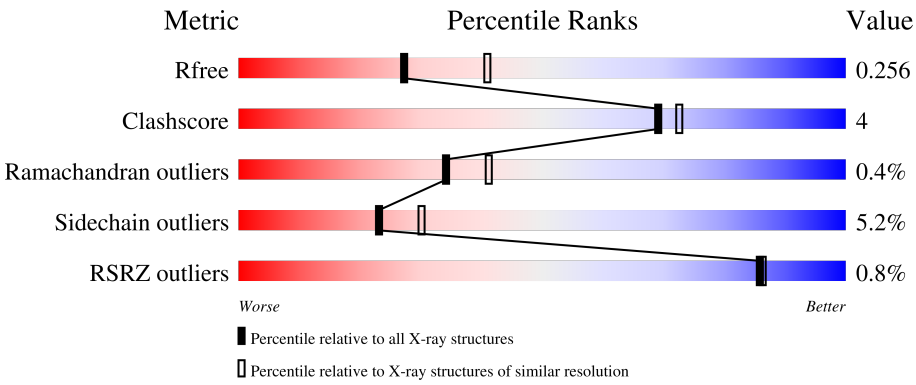
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.46 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}	130704	1544 (2.48-2.44)
Clashscore	141614	1613 (2.48-2.44)
Ramachandran outliers	138981	1598 (2.48-2.44)
Sidechain outliers	138945	1598 (2.48-2.44)
RSRZ outliers	127900	1523 (2.48-2.44)

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 <=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	85% 12% • •
1	B	523	% 85% 12% • •
1	C	523	2% 86% 11% • •
1	D	523	% 85% 12% • •

2 Entry composition (i)

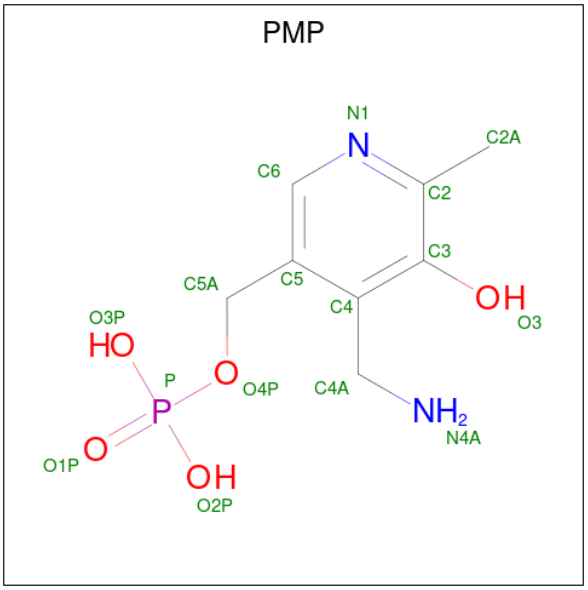
There are 5 unique types of molecules in this entry. The entry contains 16242 atoms, of which 0 are hydrogens and 0 are deuteriums.

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
			Total	C	N	O	S			
1	A	513	3964	2479	717	757	11	0	0	0
1	B	512	3958	2476	716	755	11	0	0	0
1	C	511	3950	2472	715	752	11	0	0	0
1	D	513	3964	2479	717	757	11	0	0	0

- Molecule 2 is 4'-DEOXY-4'-AMINOPYRIDOXAL-5'-PHOSPHATE (three-letter code: PMP) (formula: $C_8H_{13}N_2O_5P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	16	8	2	5	1	0	0
2	B	1	16	8	2	5	1	0	0

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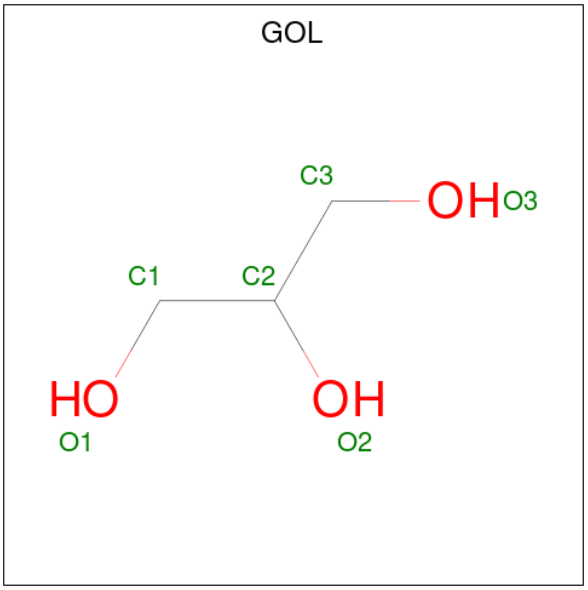
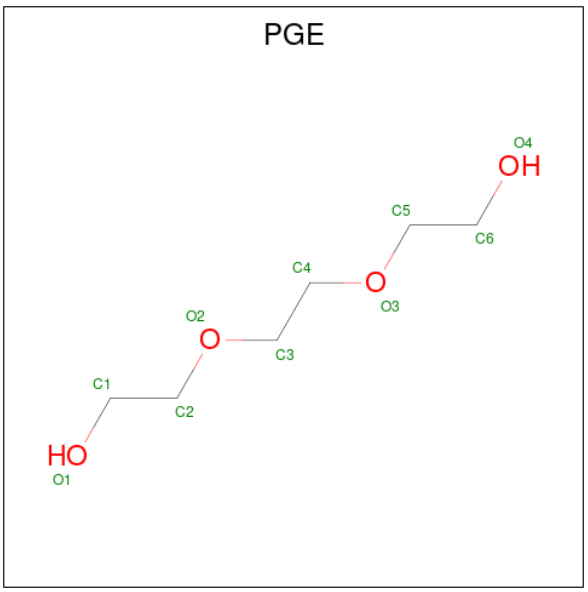
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	C	1	16	8	2	5	1	0	0
			Total	C	N	O	P		
2	D	1	16	8	2	5	1	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 4 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: $C_6H_{14}O_4$).



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

- Molecule 5 is water.

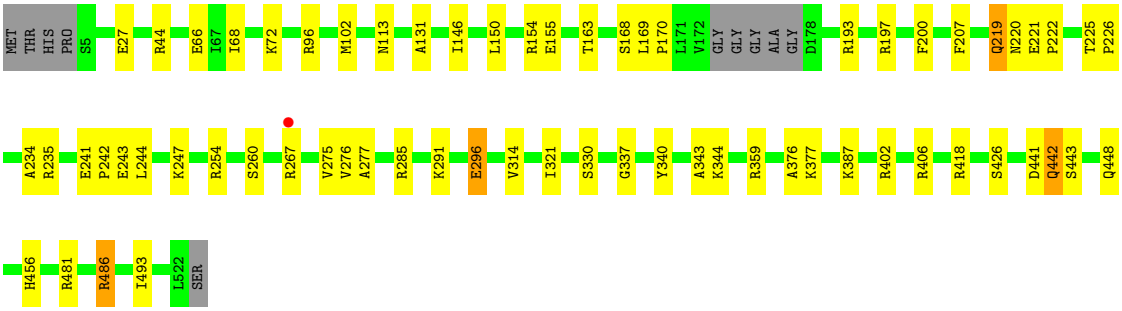
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	50	50	50	0	0
			Total	O		
5	B	70	70	70	0	0
			Total	O		
5	C	89	89	89	0	0
			Total	O		
5	D	69	69	69	0	0

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.

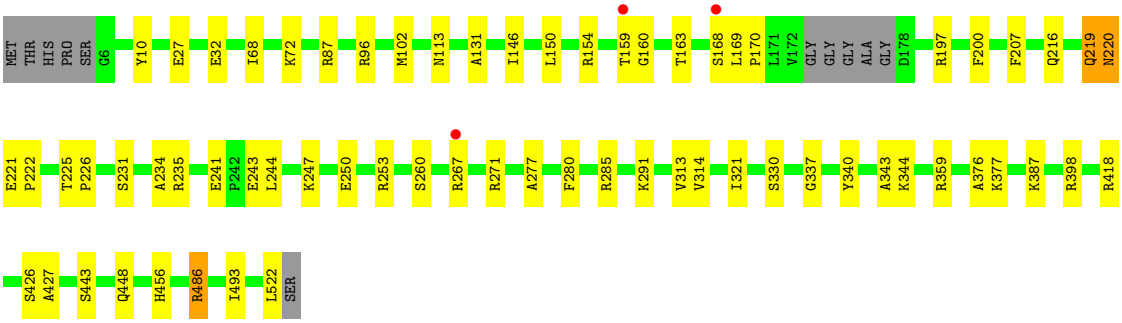
• Molecule 1: CrmG

Chain A:



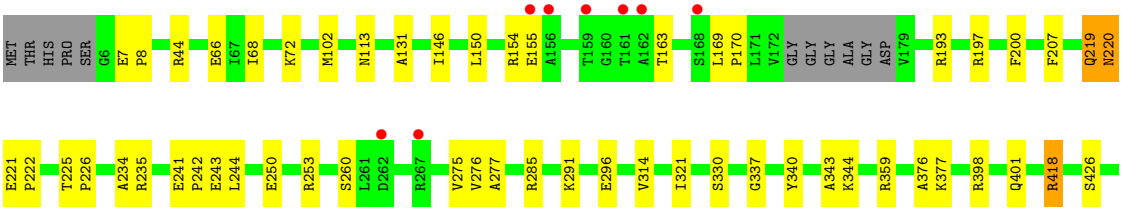
• Molecule 1: CrmG

Chain B:

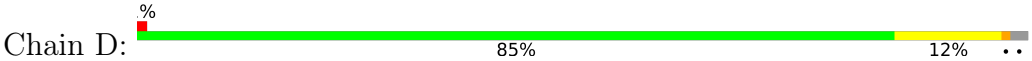


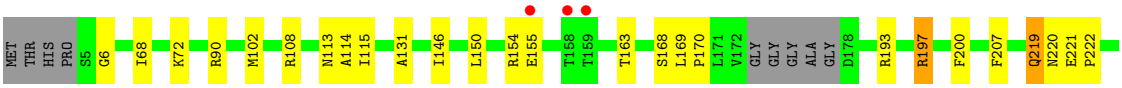
• Molecule 1: CrmG

Chain C:



• Molecule 1: CrmG





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	83.87Å 83.86Å 88.44Å 106.66° 109.25° 94.84°	Depositor
Resolution (Å)	50.51 – 2.46 50.51 – 2.46	Depositor EDS
% Data completeness (in resolution range)	88.2 (50.51-2.46) 97.3 (50.51-2.46)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.36 (at 2.45Å)	Xtriage
Refinement program	REFMAC 5.8.0103	Depositor
R, R_{free}	0.206 , 0.238 0.229 , 0.256	Depositor DCC
R_{free} test set	3748 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å^2)	30.5	Xtriage
Anisotropy	0.287	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 4.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.147 for -k,-h,-l	Xtriage
Reported twinning fraction	0.928 for H, K, L 0.072 for -K, -H, -L	Depositor
Outliers	0 of 75342 reflections	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	16242	wwPDB-VP
Average B, all atoms (Å^2)	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.51% of the height of the origin peak. No significant pseudotranslation is detected.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: PMP, GOL, PGE

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	0.63	0/4031	0.48	2/5461 (0.0%)
1	B	0.63	0/4025	0.49	0/5453
1	C	0.64	1/4017 (0.0%)	0.49	0/5442
1	D	0.63	0/4031	0.48	0/5461
All	All	0.63	1/16104 (0.0%)	0.49	2/21817 (0.0%)

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	B	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	66	GLU	CD-OE1	5.75	1.31	1.25

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	406	ARG	NE-CZ-NH2	6.24	123.42	120.30
1	A	406	ARG	NE-CZ-NH1	-5.99	117.31	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	160	GLY	Peptide

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	3964	0	3942	31	0
1	B	3958	0	3937	30	0
1	C	3950	0	3933	26	0
1	D	3964	0	3942	34	0
2	A	16	0	10	0	0
2	B	16	0	10	0	0
2	C	16	0	11	1	0
2	D	16	0	11	0	0
3	A	12	0	16	0	0
3	B	18	0	24	1	0
3	C	24	0	32	1	0
4	A	10	0	14	3	0
5	A	50	0	0	1	0
5	B	70	0	0	3	0
5	C	89	0	0	0	0
5	D	69	0	0	1	0
All	All	16242	0	15882	119	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 4.

All (119) 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:418:ARG:HH21	1:C:418:ARG:HG2	1.35	0.92
1:A:418:ARG:HG2	1:A:418:ARG:HH11	1.45	0.81
1:C:250:GLU:OE1	1:C:253:ARG:NH2	2.17	0.75
1:B:159:THR:HG22	1:B:159:THR:O	1.89	0.72
1:C:418:ARG:HH21	1:C:418:ARG:CG	2.06	0.68
1:B:486:ARG:HG2	5:B:733:HOH:O	1.94	0.67
1:D:197:ARG:O	1:D:197:ARG:HD2	1.95	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:241:GLU:HB3	1:A:244:LEU:HD13	1.78	0.65
1:C:442:GLN:HE22	1:C:515:GLN:HE22	1.45	0.64
1:D:402:ARG:HH21	1:D:402:ARG:CG	2.10	0.64
1:B:418:ARG:HH11	1:B:427:ALA:HA	1.63	0.63
1:C:241:GLU:HB3	1:C:244:LEU:HD13	1.78	0.63
1:B:168:SER:HB3	1:B:267:ARG:HD3	1.81	0.63
1:B:241:GLU:HB3	1:B:244:LEU:HD13	1.79	0.62
1:D:168:SER:HB3	1:D:267:ARG:HD3	1.82	0.62
1:A:66:GLU:HG2	1:A:387:LYS:HE3	1.82	0.62
1:A:168:SER:HB3	1:A:267:ARG:HD3	1.82	0.62
1:A:418:ARG:HG2	1:A:418:ARG:NH1	2.11	0.61
2:C:601:PMP:O3	2:C:601:PMP:N4A	2.35	0.60
1:C:418:ARG:HG2	1:C:418:ARG:NH2	2.10	0.58
1:D:402:ARG:HH21	1:D:402:ARG:HG2	1.68	0.58
1:C:200:PHE:O	1:C:234:ALA:HA	2.03	0.58
1:A:200:PHE:O	1:A:234:ALA:HA	2.03	0.57
1:B:200:PHE:O	1:B:234:ALA:HA	2.04	0.57
1:A:169:LEU:N	1:A:170:PRO:CD	2.67	0.57
1:C:169:LEU:N	1:C:170:PRO:CD	2.68	0.57
1:B:285:ARG:HG3	1:B:291:LYS:O	2.05	0.56
1:B:169:LEU:N	1:B:170:PRO:CD	2.68	0.56
1:C:285:ARG:HG3	1:C:291:LYS:O	2.06	0.56
1:D:200:PHE:O	1:D:234:ALA:HA	2.04	0.56
1:D:285:ARG:HG3	1:D:291:LYS:O	2.05	0.55
1:D:197:ARG:HD2	1:D:197:ARG:C	2.26	0.55
1:D:115:ILE:HD12	1:D:115:ILE:N	2.22	0.55
1:D:169:LEU:N	1:D:170:PRO:CD	2.69	0.55
1:A:285:ARG:HG3	1:A:291:LYS:O	2.07	0.55
1:D:241:GLU:HB2	1:D:244:LEU:HD13	1.88	0.55
1:A:441:ASP:OD1	1:A:443:SER:OG	2.24	0.54
1:A:146:ILE:O	1:A:150:LEU:HG	2.08	0.54
1:D:146:ILE:O	1:D:150:LEU:HG	2.08	0.53
1:C:146:ILE:O	1:C:150:LEU:HG	2.08	0.53
1:D:108:ARG:HH21	1:D:336:ARG:HG2	1.74	0.53
1:D:241:GLU:HG3	1:D:244:LEU:HD22	1.90	0.53
1:B:146:ILE:O	1:B:150:LEU:HG	2.09	0.53
1:D:486:ARG:HG2	5:D:737:HOH:O	2.08	0.52
1:D:441:ASP:OD2	1:D:443:SER:OG	2.28	0.51
1:B:32:GLU:HG2	1:B:32:GLU:O	2.11	0.50
1:D:486:ARG:NH2	1:D:488:SER:OG	2.45	0.50
1:A:169:LEU:N	1:A:170:PRO:HD2	2.27	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:238:PRO:HB2	1:D:241:GLU:HG2	1.94	0.50
1:A:96:ARG:HG3	1:B:10:TYR:CE2	2.47	0.50
1:B:243:GLU:HG2	1:B:244:LEU:HD12	1.95	0.49
1:C:169:LEU:N	1:C:170:PRO:HD2	2.27	0.49
1:B:169:LEU:N	1:B:170:PRO:HD2	2.28	0.49
1:D:102:MET:HE3	1:D:340:TYR:CE1	2.48	0.49
1:D:225:THR:N	1:D:226:PRO:CD	2.76	0.48
1:C:225:THR:N	1:C:226:PRO:CD	2.76	0.48
1:A:225:THR:N	1:A:226:PRO:CD	2.76	0.48
1:D:169:LEU:N	1:D:170:PRO:HD2	2.28	0.48
1:D:299:GLU:HA	1:D:299:GLU:OE1	2.14	0.48
1:A:27:GLU:HB3	4:A:604:PGE:H22	1.96	0.48
1:D:275:VAL:HG23	1:D:276:VAL:HG23	1.96	0.47
1:B:376:ALA:O	1:B:377:LYS:CB	2.63	0.47
1:A:314:VAL:HG11	1:A:330:SER:HB3	1.97	0.47
1:A:486:ARG:HG2	5:A:734:HOH:O	2.14	0.47
1:A:131:ALA:HB1	1:A:277:ALA:O	2.15	0.47
1:A:219:GLN:O	1:A:220:ASN:C	2.53	0.47
1:C:131:ALA:HB1	1:C:277:ALA:O	2.15	0.47
1:A:275:VAL:HG23	1:A:276:VAL:HG23	1.97	0.47
1:C:242:PRO:HG3	1:C:296:GLU:HG2	1.97	0.47
1:D:131:ALA:HB1	1:D:277:ALA:O	2.15	0.47
1:B:314:VAL:HG11	1:B:330:SER:HB3	1.96	0.46
4:A:604:PGE:H5	1:B:87:ARG:HH11	1.80	0.46
1:B:225:THR:N	1:B:226:PRO:CD	2.78	0.46
1:C:376:ALA:O	1:C:377:LYS:CB	2.64	0.46
1:D:314:VAL:HG11	1:D:330:SER:HB3	1.97	0.46
1:A:193:ARG:NH2	1:A:254:ARG:HD2	2.30	0.46
1:A:243:GLU:HG2	1:A:244:LEU:HD12	1.96	0.46
1:C:219:GLN:O	1:C:220:ASN:C	2.54	0.46
1:D:114:ALA:C	1:D:115:ILE:HD12	2.35	0.46
1:D:219:GLN:O	1:D:220:ASN:C	2.53	0.46
1:B:131:ALA:HB1	1:B:277:ALA:O	2.15	0.46
1:A:68:ILE:O	1:A:72:LYS:HG3	2.16	0.46
1:B:216:GLN:HG3	1:B:231:SER:HB2	1.98	0.46
1:C:314:VAL:HG11	1:C:330:SER:HB3	1.97	0.46
1:D:68:ILE:O	1:D:72:LYS:HG3	2.15	0.46
1:B:219:GLN:O	1:B:220:ASN:C	2.54	0.46
1:B:68:ILE:O	1:B:72:LYS:HG3	2.15	0.45
1:C:275:VAL:HG23	1:C:276:VAL:HG23	1.98	0.45
1:C:68:ILE:O	1:C:72:LYS:HG3	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:314:VAL:HG23	1:D:337:GLY:HA3	1.99	0.45
1:A:242:PRO:HG3	1:A:296:GLU:HG2	1.99	0.45
1:A:102:MET:HE3	1:A:340:TYR:CE1	2.52	0.44
1:A:481:ARG:CZ	1:C:443:SER:HB3	2.46	0.44
1:B:159:THR:O	1:B:159:THR:CG2	2.56	0.44
1:D:406:ARG:NH2	1:D:409:ARG:HD2	2.33	0.44
1:A:244:LEU:HD21	1:C:418:ARG:NH1	2.32	0.44
1:C:102:MET:HE3	1:C:340:TYR:CE1	2.53	0.43
1:B:102:MET:HE3	1:B:340:TYR:CE1	2.52	0.43
1:A:376:ALA:O	1:A:377:LYS:CB	2.65	0.43
1:B:387:LYS:NZ	3:B:604:GOL:O2	2.38	0.43
1:C:221:GLU:N	1:C:222:PRO:HD2	2.34	0.43
1:D:496:GLU:CD	1:D:496:GLU:H	2.21	0.43
1:A:314:VAL:HG23	1:A:337:GLY:HA3	2.01	0.43
1:D:376:ALA:O	1:D:377:LYS:CB	2.66	0.42
3:C:604:GOL:O2	1:D:90:ARG:NH2	2.52	0.42
1:B:27:GLU:OE2	5:B:701:HOH:O	2.22	0.42
1:C:314:VAL:HG23	1:C:337:GLY:HA3	2.01	0.42
1:D:494:THR:OG1	1:D:496:GLU:HG2	2.19	0.42
1:A:27:GLU:H	4:A:604:PGE:H32	1.83	0.42
1:B:221:GLU:N	1:B:222:PRO:HD2	2.35	0.42
1:A:442:GLN:HE21	1:A:442:GLN:HB2	1.67	0.41
1:D:221:GLU:N	1:D:222:PRO:HD2	2.35	0.41
1:B:250:GLU:OE2	1:B:253:ARG:HD2	2.20	0.41
1:C:220:ASN:ND2	1:C:222:PRO:HD2	2.35	0.41
1:A:221:GLU:N	1:A:222:PRO:HD2	2.36	0.41
1:B:280:PHE:CE2	1:B:313:VAL:HG11	2.55	0.41
1:C:7:GLU:HB2	1:C:8:PRO:HD2	2.02	0.41
1:B:271:ARG:HD2	5:B:705:HOH:O	2.21	0.41
1:B:314:VAL:HG23	1:B:337:GLY:HA3	2.02	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	509/523 (97%)	487 (96%)	20 (4%)	2 (0%)	34	41
1	B	508/523 (97%)	486 (96%)	20 (4%)	2 (0%)	34	41
1	C	507/523 (97%)	485 (96%)	20 (4%)	2 (0%)	34	41
1	D	509/523 (97%)	487 (96%)	20 (4%)	2 (0%)	34	41
All	All	2033/2092 (97%)	1945 (96%)	80 (4%)	8 (0%)	34	41

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	344	LYS
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	6	GLY

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	417/422 (99%)	396 (95%)	21 (5%)	24	32
1	B	416/422 (99%)	395 (95%)	21 (5%)	24	32
1	C	415/422 (98%)	391 (94%)	24 (6%)	20	25
1	D	417/422 (99%)	396 (95%)	21 (5%)	24	32
All	All	1665/1688 (99%)	1578 (95%)	87 (5%)	23	30

All (87) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	44	ARG
1	A	113	ASN
1	A	154	ARG
1	A	155	GLU
1	A	163	THR
1	A	197	ARG
1	A	207	PHE
1	A	219	GLN
1	A	235	ARG
1	A	247	LYS
1	A	260	SER
1	A	296	GLU
1	A	321	ILE
1	A	359	ARG
1	A	402	ARG
1	A	426	SER
1	A	442	GLN
1	A	448	GLN
1	A	456	HIS
1	A	486	ARG
1	A	493	ILE
1	B	96	ARG
1	B	113	ASN
1	B	154	ARG
1	B	163	THR
1	B	197	ARG
1	B	207	PHE
1	B	219	GLN
1	B	220	ASN
1	B	235	ARG
1	B	247	LYS
1	B	260	SER
1	B	321	ILE
1	B	359	ARG
1	B	398	ARG
1	B	426	SER
1	B	443	SER
1	B	448	GLN
1	B	456	HIS
1	B	486	ARG
1	B	493	ILE
1	B	522	LEU
1	C	44	ARG

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Mol	Chain	Res	Type
1	C	113	ASN
1	C	154	ARG
1	C	155	GLU
1	C	163	THR
1	C	193	ARG
1	C	197	ARG
1	C	207	PHE
1	C	219	GLN
1	C	220	ASN
1	C	235	ARG
1	C	243	GLU
1	C	260	SER
1	C	321	ILE
1	C	359	ARG
1	C	398	ARG
1	C	401	GLN
1	C	418	ARG
1	C	426	SER
1	C	443	SER
1	C	448	GLN
1	C	456	HIS
1	C	486	ARG
1	C	493	ILE
1	D	113	ASN
1	D	154	ARG
1	D	155	GLU
1	D	163	THR
1	D	193	ARG
1	D	197	ARG
1	D	207	PHE
1	D	219	GLN
1	D	235	ARG
1	D	243	GLU
1	D	260	SER
1	D	321	ILE
1	D	359	ARG
1	D	398	ARG
1	D	402	ARG
1	D	426	SER
1	D	456	HIS
1	D	486	ARG
1	D	493	ILE

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Mol	Chain	Res	Type
1	D	496	GLU
1	D	522	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	442	GLN
1	B	220	ASN
1	C	220	ASN
1	C	442	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

14 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	B	603	-	5,5,5	0.51	0	5,5,5	0.12	0
2	PMP	D	601	-	16,16,16	1.08	1 (6%)	21,23,23	0.98	1 (4%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	GOL	A	602	-	5,5,5	0.36	0	5,5,5	0.14	0
3	GOL	B	602	-	5,5,5	0.30	0	5,5,5	0.25	0
2	PMP	A	601	-	16,16,16	1.14	1 (6%)	21,23,23	1.25	4 (19%)
3	GOL	C	603	-	5,5,5	0.40	0	5,5,5	0.26	0
3	GOL	C	605	-	5,5,5	0.34	0	5,5,5	0.24	0
4	PGE	A	604	-	9,9,9	0.57	0	8,8,8	0.21	0
3	GOL	C	602	-	5,5,5	0.31	0	5,5,5	0.12	0
2	PMP	B	601	-	16,16,16	0.94	1 (6%)	21,23,23	1.11	1 (4%)
3	GOL	A	603	-	5,5,5	0.30	0	5,5,5	0.21	0
3	GOL	B	604	-	5,5,5	0.40	0	5,5,5	0.08	0
2	PMP	C	601	-	16,16,16	1.06	1 (6%)	21,23,23	1.26	3 (14%)
3	GOL	C	604	-	5,5,5	0.37	0	5,5,5	0.16	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	B	603	-	-	4/4/4/4	-
2	PMP	D	601	-	-	0/8/8/8	0/1/1/1
3	GOL	A	602	-	-	2/4/4/4	-
3	GOL	B	602	-	-	2/4/4/4	-
2	PMP	A	601	-	-	1/8/8/8	0/1/1/1
3	GOL	C	603	-	-	2/4/4/4	-
3	GOL	C	605	-	-	2/4/4/4	-
4	PGE	A	604	-	-	5/7/7/7	-
3	GOL	C	602	-	-	4/4/4/4	-
2	PMP	B	601	-	-	0/8/8/8	0/1/1/1
3	GOL	A	603	-	-	2/4/4/4	-
3	GOL	B	604	-	-	2/4/4/4	-
2	PMP	C	601	-	-	2/8/8/8	0/1/1/1
3	GOL	C	604	-	-	3/4/4/4	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	601	PMP	C3-C2	-3.26	1.37	1.40
2	A	601	PMP	C3-C4	-2.91	1.35	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601	PMP	C3-C2	-2.34	1.38	1.40
2	C	601	PMP	C3-C4	-2.21	1.36	1.40

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	601	PMP	O4P-C5A-C5	-2.94	103.75	109.35
2	C	601	PMP	C6-C5-C4	2.67	120.01	118.12
2	C	601	PMP	C5-C6-N1	-2.55	119.57	123.82
2	B	601	PMP	C5-C6-N1	-2.35	119.90	123.82
2	A	601	PMP	C6-C5-C4	2.21	119.68	118.12
2	D	601	PMP	C5-C6-N1	-2.20	120.16	123.82
2	A	601	PMP	C5-C6-N1	-2.09	120.34	123.82
2	A	601	PMP	O3-C3-C2	2.05	121.95	117.49
2	A	601	PMP	O4P-C5A-C5	-2.00	105.54	109.35

There are no chirality outliers.

All (31) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	601	PMP	C3-C4-C4A-N4A
2	C	601	PMP	C5-C4-C4A-N4A
3	A	602	GOL	O1-C1-C2-C3
3	A	603	GOL	C1-C2-C3-O3
3	B	603	GOL	O1-C1-C2-C3
3	B	603	GOL	C1-C2-C3-O3
3	B	603	GOL	O2-C2-C3-O3
3	B	604	GOL	O1-C1-C2-C3
3	C	602	GOL	O1-C1-C2-C3
3	C	602	GOL	C1-C2-C3-O3
3	C	602	GOL	O2-C2-C3-O3
4	A	604	PGE	O2-C3-C4-O3
3	B	603	GOL	O1-C1-C2-O2
4	A	604	PGE	O3-C5-C6-O4
3	B	602	GOL	C1-C2-C3-O3
3	C	604	GOL	O1-C1-C2-C3
3	B	604	GOL	O1-C1-C2-O2
3	C	604	GOL	O1-C1-C2-O2
3	A	602	GOL	O1-C1-C2-O2
3	A	603	GOL	O2-C2-C3-O3
3	C	602	GOL	O1-C1-C2-O2
3	C	603	GOL	O2-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
4	A	604	PGE	C1-C2-O2-C3
3	C	605	GOL	O1-C1-C2-O2
4	A	604	PGE	C3-C4-O3-C5
2	A	601	PMP	C5-C4-C4A-N4A
4	A	604	PGE	C4-C3-O2-C2
3	C	605	GOL	O1-C1-C2-C3
3	C	604	GOL	O2-C2-C3-O3
3	B	602	GOL	O2-C2-C3-O3
3	C	603	GOL	C1-C2-C3-O3

There are no ring outliers.

4 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	604	PGE	3	0
3	B	604	GOL	1	0
2	C	601	PMP	1	0
3	C	604	GOL	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 (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	513/523 (98%)	-0.30	1 (0%)	95	95	7, 18, 33, 47	0
1	B	512/523 (97%)	-0.23	3 (0%)	89	89	9, 18, 35, 55	0
1	C	511/523 (97%)	-0.25	8 (1%)	72	69	7, 18, 36, 52	0
1	D	513/523 (98%)	-0.26	5 (0%)	82	83	8, 19, 36, 54	0
All	All	2049/2092 (97%)	-0.26	17 (0%)	86	86	7, 18, 35, 55	0

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	267	ARG	4.2
1	B	159	THR	3.7
1	B	267	ARG	3.6
1	A	267	ARG	3.2
1	C	155	GLU	3.0
1	C	262	ASP	2.9
1	D	159	THR	2.8
1	C	159	THR	2.7
1	D	262	ASP	2.7
1	D	158	THR	2.5
1	D	155	GLU	2.3
1	B	168	SER	2.3
1	C	156	ALA	2.3
1	C	168	SER	2.2
1	C	161	THR	2.2
1	C	162	ALA	2.1
1	D	267	ARG	2.1

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 monosaccharides 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	B	602	6/6	0.76	0.15	48,53,57,57	0
3	GOL	C	603	6/6	0.80	0.16	43,45,48,48	0
4	PGE	A	604	10/10	0.80	0.27	43,50,53,57	0
3	GOL	C	605	6/6	0.81	0.20	49,53,56,60	0
3	GOL	B	603	6/6	0.82	0.22	41,43,45,46	0
3	GOL	C	604	6/6	0.82	0.24	41,51,54,57	0
3	GOL	A	602	6/6	0.85	0.18	47,48,50,51	0
3	GOL	B	604	6/6	0.85	0.19	44,48,49,53	0
3	GOL	A	603	6/6	0.89	0.13	41,42,45,46	0
3	GOL	C	602	6/6	0.90	0.16	41,41,44,45	0
2	PMP	C	601	16/16	0.97	0.12	14,18,20,21	0
2	PMP	D	601	16/16	0.97	0.14	22,24,29,29	0
2	PMP	A	601	16/16	0.98	0.12	15,18,22,24	0
2	PMP	B	601	16/16	0.98	0.13	19,26,31,32	0

6.5 Other polymers (i)

There are no such residues in this entry.