Full wwPDB X-ray Structure Validation Report (i)

Dec 17, 2023 – 06:40 pm GMT

PDB ID	:	2X5D
Title	:	Crystal Structure of a probable aminotransferase from Pseudomonas aeruginosa
Authors	:	Oke, M.; Carter, L.G.; Johnson, K.A.; Liu, H.; Mcmahon, S.A.; White, M.F.; Naismith, J.H.
Deposited on	:	2010-02-08
Resolution	:	2.25 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:

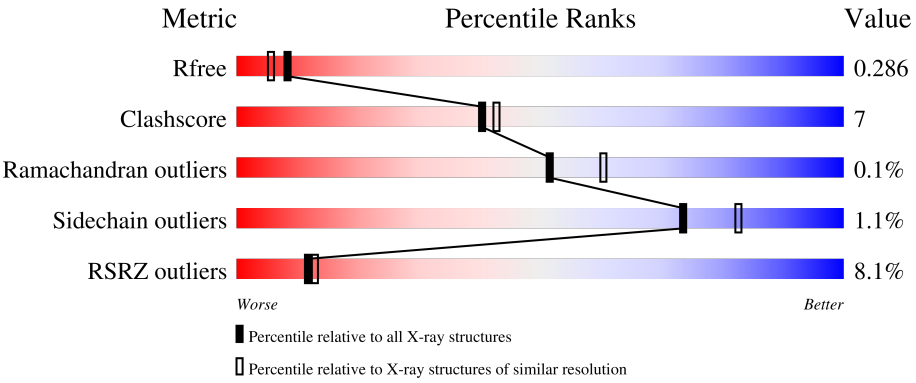
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.25 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	1377 (2.26-2.26)
Clashscore	141614	1487 (2.26-2.26)
Ramachandran outliers	138981	1449 (2.26-2.26)
Sidechain outliers	138945	1450 (2.26-2.26)
RSRZ outliers	127900	1356 (2.26-2.26)

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	412	6% 76% 13% • 10%
1	B	412	10% 75% 14% 11%
1	C	412	10% 74% 16% • 10%
1	D	412	3% 80% 12% 8%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 12078 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.

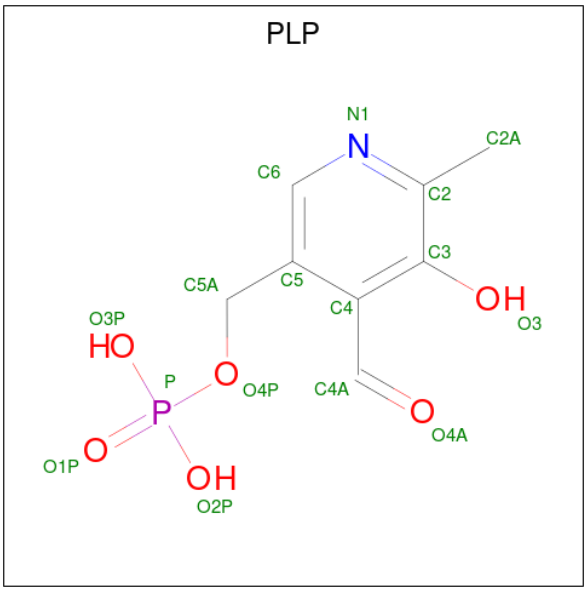
- Molecule 1 is a protein called PROBABLE AMINOTRANSFERASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	371	Total	C	N	O	S	0	0	0
			2914	1862	513	524	15			
1	B	367	Total	C	N	O	S	0	0	0
			2887	1844	510	518	15			
1	C	371	Total	C	N	O	S	0	0	0
			2920	1864	517	524	15			
1	D	380	Total	C	N	O	S	0	0	0
			2986	1904	528	539	15			

There are 4 discrepancies between the modelled and reference sequences:

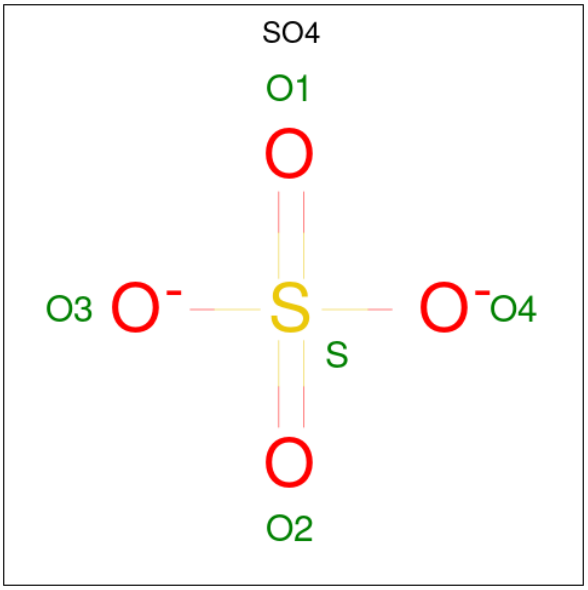
Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP Q9HV83
B	0	GLY	-	expression tag	UNP Q9HV83
C	0	GLY	-	expression tag	UNP Q9HV83
D	0	GLY	-	expression tag	UNP Q9HV83

- Molecule 2 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: 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	D	1	Total	C	N	O	P	0	0
			16	8	1	6	1		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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		

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

- Molecule 4 is water.

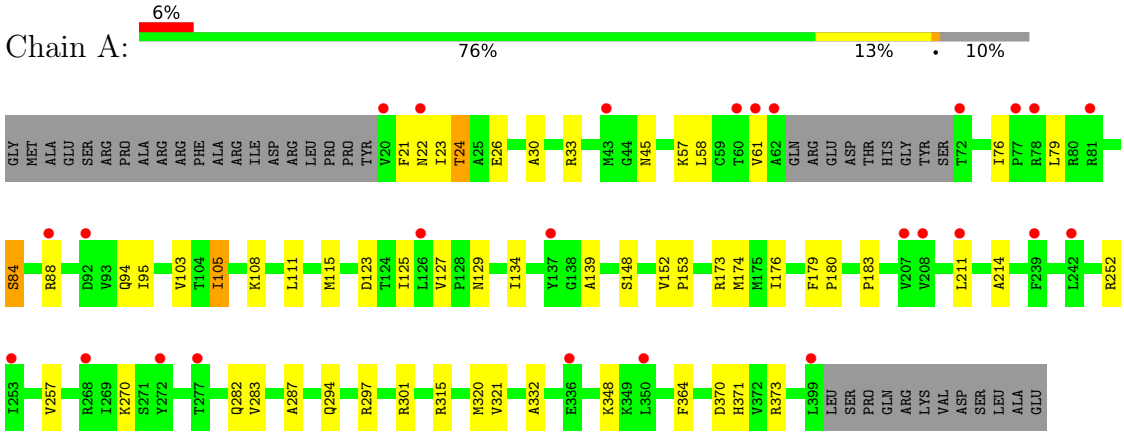
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	84	Total O 84 84	0	0
4	B	57	Total O 57 57	0	0
4	C	48	Total O 48 48	0	0
4	D	96	Total O 96 96	0	0

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.

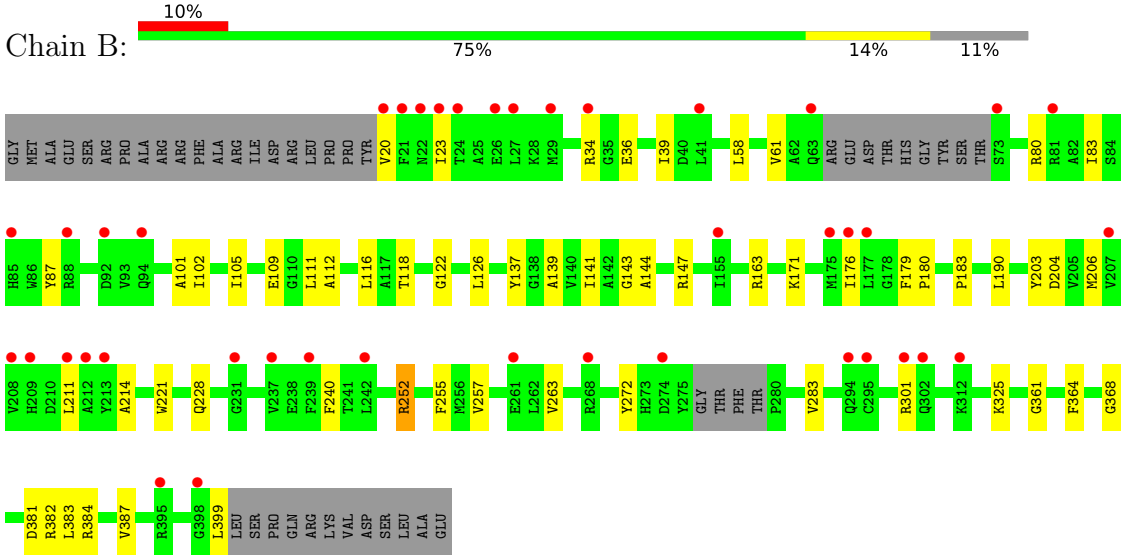
• Molecule 1: PROBABLE AMINOTRANSFERASE

Chain A:



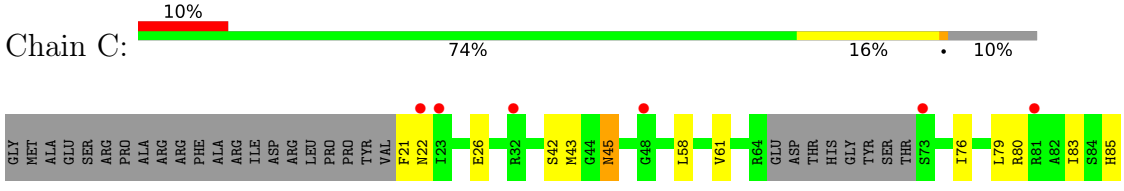
• Molecule 1: PROBABLE AMINOTRANSFERASE

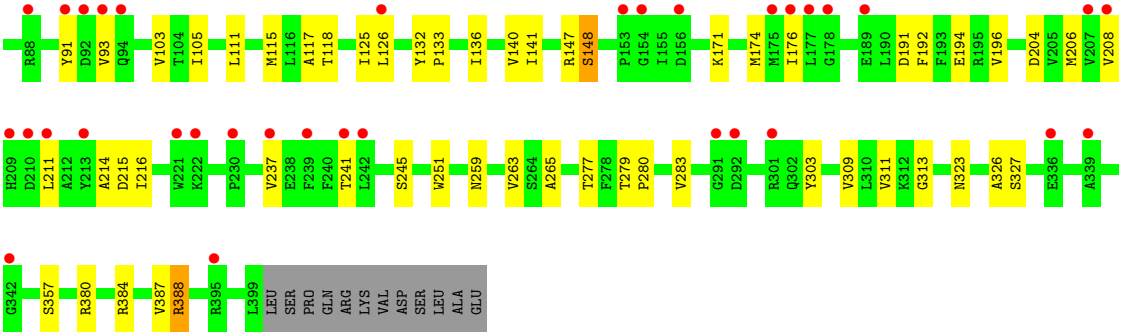
Chain B:



• Molecule 1: PROBABLE AMINOTRANSFERASE

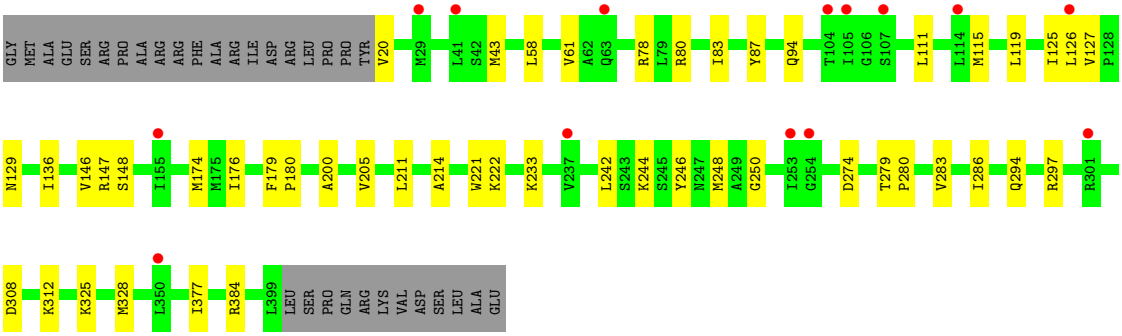
Chain C:





• Molecule 1: PROBABLE AMINOTRANSFERASE

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	66.86Å 173.81Å 76.97Å 90.00° 114.51° 90.00°	Depositor
Resolution (Å)	28.89 – 2.25 28.89 – 2.27	Depositor EDS
% Data completeness (in resolution range)	93.4 (28.89-2.25) 50.2 (28.89-2.27)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.14 (at 2.26Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.216 , 0.244 0.261 , 0.286	Depositor DCC
R_{free} test set	1853 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	37.1	Xtriage
Anisotropy	0.668	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 36.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.52$, $< L^2 > = 0.36$	Xtriage
Estimated twinning fraction	0.036 for h,-k,-h-l	Xtriage
Reported twinning fraction	0.953 for H, K, L 0.047 for -H, -K, H+L	Depositor
Outliers	0 of 36793 reflections	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	12078	wwPDB-VP
Average B, all atoms (Å^2)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.92% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PLP, 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	0.61	0/2982	0.73	0/4044
1	B	0.51	0/2953	0.62	0/4001
1	C	0.53	0/2988	0.66	0/4050
1	D	0.62	1/3057 (0.0%)	0.69	0/4147
All	All	0.57	1/11980 (0.0%)	0.68	0/16242

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	87	TYR	CD1-CE1	5.29	1.47	1.39

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	2914	0	2919	48	0
1	B	2887	0	2896	42	0
1	C	2920	0	2926	50	0
1	D	2986	0	2980	39	0
2	A	15	0	6	1	0
2	D	16	0	8	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	10	0	0	0	0
3	B	10	0	0	0	0
3	C	20	0	0	1	0
3	D	15	0	0	1	0
4	A	84	0	0	1	0
4	B	57	0	0	0	0
4	C	48	0	0	2	0
4	D	96	0	0	3	0
All	All	12078	0	11735	170	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 7.

All (170) 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:105:ILE:HG22	1:A:252:ARG:HG2	1.35	1.08
1:B:118:THR:HG21	1:B:206:MET:HE3	1.37	1.03
1:B:83:ILE:CD1	1:B:101:ALA:HB1	1.93	0.98
1:B:34:ARG:NH1	1:B:36:GLU:OE1	2.00	0.94
1:D:119:LEU:HD11	1:D:174:MET:HE1	1.49	0.94
1:A:103:VAL:O	1:A:270:LYS:NZ	2.03	0.90
1:B:83:ILE:HD11	1:B:101:ALA:HB1	1.59	0.82
1:B:118:THR:HG21	1:B:206:MET:CE	2.10	0.80
1:B:111:LEU:HD21	1:B:176:ILE:HD13	1.68	0.76
1:D:221:TRP:CZ3	1:D:325:LYS:NZ	2.54	0.76
1:A:105:ILE:HG22	1:A:252:ARG:CG	2.13	0.75
1:A:58:LEU:HD21	1:D:58:LEU:CD2	2.18	0.73
1:B:83:ILE:CD1	1:B:101:ALA:CB	2.67	0.72
1:B:83:ILE:HD11	1:B:101:ALA:CB	2.21	0.71
1:B:211:LEU:HG	1:B:214:ALA:HB2	1.71	0.70
1:B:221:TRP:CZ3	1:B:325:LYS:HD2	2.26	0.70
1:C:117:ALA:HB1	1:C:265:ALA:HB1	1.73	0.70
1:C:105:ILE:HG22	1:C:105:ILE:O	1.94	0.68
1:C:79:LEU:HD23	1:C:103:VAL:HG21	1.76	0.68
1:D:80:ARG:HA	1:D:83:ILE:HD12	1.78	0.66
1:A:94:GLN:HA	1:A:94:GLN:OE1	1.97	0.64
1:D:43:MET:O	1:D:377:ILE:HD13	1.97	0.64
1:C:147:ARG:NH1	1:C:148:SER:O	2.30	0.64
1:D:211:LEU:HG	1:D:214:ALA:HB2	1.79	0.64
1:B:240:PHE:HB3	1:B:255:PHE:CE2	2.34	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:21:PHE:HA	1:A:24:THR:HG23	1.80	0.62
1:C:111:LEU:HG	1:C:115:MET:HE3	1.80	0.62
1:B:83:ILE:HG22	1:B:255:PHE:CE1	2.34	0.62
1:B:111:LEU:HD21	1:B:176:ILE:CD1	2.30	0.62
1:D:200:ALA:HB1	1:D:205:VAL:O	2.00	0.61
1:A:294:GLN:OE1	1:A:297:ARG:NH2	2.33	0.61
1:A:45:ASN:OD1	2:A:1400:PLP:N1	2.34	0.60
1:A:23:ILE:HG21	1:A:348:LYS:HZ1	1.65	0.60
1:C:42:SER:OG	1:C:43:MET:N	2.32	0.60
1:D:242:LEU:HD23	1:D:248:MET:CE	2.31	0.60
1:A:58:LEU:HD21	1:D:58:LEU:HD21	1.83	0.60
1:C:216:ILE:HD12	1:C:303:TYR:CD2	2.37	0.59
1:C:384:ARG:O	1:C:388:ARG:HG3	2.02	0.59
1:D:174:MET:HE3	1:D:176:ILE:HD11	1.83	0.59
1:C:58:LEU:HD12	1:C:251:TRP:CZ3	2.37	0.59
1:B:80:ARG:O	1:B:83:ILE:HG13	2.04	0.58
1:D:244:LYS:HZ1	2:D:1400:PLP:C4A	2.17	0.58
1:B:83:ILE:HG22	1:B:255:PHE:CZ	2.39	0.58
1:A:61:VAL:HG21	1:A:283:VAL:HG11	1.85	0.57
1:C:91:TYR:O	1:C:93:VAL:HG23	2.05	0.57
1:D:221:TRP:HZ3	1:D:325:LYS:HZ1	1.40	0.57
1:A:108:LYS:HG3	1:A:134:ILE:HG21	1.87	0.56
1:C:171:LYS:HG3	4:C:2019:HOH:O	2.04	0.56
1:A:211:LEU:HG	1:A:214:ALA:HB2	1.87	0.56
1:B:83:ILE:CG2	1:B:255:PHE:CE1	2.88	0.56
1:C:118:THR:HG21	1:C:206:MET:HE1	1.87	0.56
1:B:171:LYS:HD2	1:B:203:TYR:O	2.06	0.55
1:D:78:ARG:NH1	4:D:2016:HOH:O	2.40	0.55
1:C:309:VAL:HG21	1:C:380:ARG:HG2	1.89	0.54
1:A:115:MET:HE1	1:A:176:ILE:HD11	1.89	0.54
1:D:129:ASN:HB2	1:D:148:SER:HB2	1.90	0.53
1:B:116:LEU:HD22	1:C:141:ILE:HD13	1.89	0.53
1:C:216:ILE:HD12	1:C:303:TYR:HD2	1.74	0.53
1:C:126:LEU:HD23	1:C:147:ARG:HB3	1.90	0.53
1:C:58:LEU:HD23	1:C:58:LEU:O	2.09	0.53
1:B:102:ILE:HB	1:B:263:VAL:HG13	1.90	0.53
1:C:191:ASP:HA	1:C:194:GLU:HG2	1.91	0.53
1:A:123:ASP:CG	1:A:173:ARG:HD3	2.30	0.53
1:A:127:VAL:O	1:A:148:SER:HA	2.09	0.53
1:C:58:LEU:HD23	1:C:58:LEU:C	2.30	0.52
1:C:259:ASN:O	1:C:263:VAL:HG23	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:43:MET:HG3	1:C:45:ASN:OD1	2.09	0.52
1:D:179:PHE:HA	1:D:180:PRO:C	2.30	0.52
1:B:116:LEU:CD2	1:C:141:ILE:HD13	2.40	0.52
1:A:115:MET:CE	1:A:176:ILE:HD11	2.39	0.52
1:D:78:ARG:HG2	1:D:286:ILE:HD13	1.92	0.52
1:A:301:ARG:NH2	4:A:2059:HOH:O	2.42	0.51
1:A:23:ILE:HG21	1:A:348:LYS:NZ	2.26	0.51
1:A:179:PHE:HA	1:A:180:PRO:C	2.31	0.51
1:C:211:LEU:HG	1:C:214:ALA:HB2	1.93	0.51
1:B:58:LEU:HD21	1:C:58:LEU:HD21	1.93	0.50
1:B:83:ILE:HG21	1:B:255:PHE:CD1	2.46	0.50
1:C:215:ASP:HB2	1:C:245:SER:OG	2.12	0.50
1:C:21:PHE:N	4:C:2001:HOH:O	2.44	0.49
1:C:61:VAL:HG21	1:C:283:VAL:HG11	1.93	0.49
1:C:76:ILE:HG22	1:C:79:LEU:H	1.76	0.49
1:C:111:LEU:HG	1:C:115:MET:CE	2.41	0.49
1:B:381:ASP:OD1	1:B:384:ARG:NH2	2.45	0.49
1:C:42:SER:C	1:C:43:MET:O	2.49	0.49
1:D:221:TRP:CD1	1:D:222:LYS:O	2.66	0.49
1:A:125:ILE:CD1	1:A:176:ILE:HD12	2.43	0.49
1:A:125:ILE:HD12	1:A:176:ILE:HD12	1.95	0.49
1:A:88:ARG:NE	1:A:94:GLN:HE22	2.11	0.48
1:A:111:LEU:O	1:A:115:MET:HG2	2.13	0.48
1:A:315:ARG:O	1:A:320:MET:HE1	2.13	0.48
1:C:111:LEU:HD21	1:C:176:ILE:HD13	1.94	0.48
1:B:87:TYR:CZ	1:B:257:VAL:HG21	2.48	0.48
1:A:129:ASN:HB2	1:A:148:SER:HB2	1.96	0.47
1:A:22:ASN:O	1:A:26:GLU:HG2	2.14	0.47
1:A:58:LEU:HD21	1:D:58:LEU:HD22	1.94	0.47
1:A:30:ALA:HA	1:A:33:ARG:HD3	1.97	0.47
1:A:152:VAL:HG13	1:A:153:PRO:HD2	1.96	0.47
1:C:384:ARG:O	1:C:388:ARG:CG	2.63	0.47
1:D:221:TRP:CD1	1:D:222:LYS:N	2.83	0.47
1:D:250:GLY:N	4:D:2067:HOH:O	2.47	0.47
1:C:80:ARG:HA	1:C:83:ILE:HD12	1.97	0.47
1:C:133:PRO:HB2	1:C:136:ILE:HD12	1.97	0.47
1:D:308:ASP:O	1:D:312:LYS:HG2	2.15	0.47
1:D:279:THR:HB	1:D:280:PRO:HD3	1.96	0.46
1:C:42:SER:HB3	1:C:357:SER:OG	2.16	0.46
1:B:179:PHE:HA	1:B:180:PRO:C	2.36	0.46
1:D:136:ILE:HG23	1:D:146:VAL:HG21	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:126:LEU:HD23	1:B:147:ARG:HB2	1.97	0.45
1:D:246:TYR:HB2	1:D:248:MET:HE2	1.99	0.45
1:D:242:LEU:HD23	1:D:248:MET:HE3	1.98	0.45
1:B:83:ILE:CG2	1:B:255:PHE:CD1	3.00	0.45
1:B:139:ALA:HA	1:B:144:ALA:HB3	1.98	0.45
1:B:87:TYR:CE1	1:B:257:VAL:HG21	2.52	0.45
1:C:313:GLY:HA3	1:C:387:VAL:HG11	1.98	0.45
1:A:23:ILE:CG2	1:A:348:LYS:NZ	2.81	0.44
1:A:76:ILE:HD12	1:A:282:GLN:CB	2.48	0.44
1:A:152:VAL:HG12	1:A:153:PRO:O	2.18	0.44
1:C:105:ILE:O	1:C:105:ILE:CG2	2.64	0.44
1:A:115:MET:CE	1:A:176:ILE:CD1	2.95	0.44
1:B:183:PRO:HG3	1:B:364:PHE:CG	2.53	0.44
1:A:88:ARG:CZ	1:A:94:GLN:HE22	2.31	0.44
1:B:190:LEU:HD11	1:B:228:GLN:HB2	2.00	0.44
1:B:272:TYR:CD1	1:C:140:VAL:HG21	2.53	0.44
1:A:108:LYS:NZ	1:D:274:ASP:O	2.50	0.43
1:D:126:LEU:HD23	1:D:147:ARG:HB3	2.00	0.43
1:D:20:VAL:N	4:D:2002:HOH:O	2.50	0.43
1:C:125:ILE:HG22	1:C:174:MET:HG2	2.00	0.43
1:D:294:GLN:OE1	1:D:297:ARG:NH2	2.48	0.43
1:A:58:LEU:CD2	1:D:58:LEU:CD2	2.95	0.43
1:A:79:LEU:HD23	1:A:103:VAL:HG21	2.01	0.43
1:D:61:VAL:HG21	1:D:283:VAL:HG11	2.00	0.43
1:D:127:VAL:O	1:D:148:SER:HA	2.19	0.43
1:D:244:LYS:NZ	2:D:1400:PLP:C4A	2.81	0.43
1:B:109:GLU:O	1:B:112:ALA:HB3	2.18	0.43
1:D:119:LEU:HD11	1:D:125:ILE:HG21	2.00	0.43
1:D:384:ARG:NH1	3:D:1403:SO4:O1	2.52	0.43
1:A:183:PRO:HG3	1:A:364:PHE:CG	2.54	0.42
1:B:122:GLY:HA2	1:B:143:GLY:O	2.18	0.42
1:C:241:THR:O	1:C:241:THR:HG23	2.19	0.42
1:A:57:LYS:HG3	1:A:287:ALA:HB2	2.00	0.42
1:A:76:ILE:HD12	1:A:282:GLN:HB3	2.00	0.42
1:B:361:GLY:HA3	1:B:368:GLY:O	2.19	0.42
1:D:58:LEU:C	1:D:58:LEU:HD23	2.40	0.42
1:B:383:LEU:O	1:B:387:VAL:HG23	2.19	0.42
1:A:84:SER:OG	1:A:95:ILE:O	2.29	0.42
1:C:22:ASN:O	1:C:26:GLU:HG2	2.20	0.42
1:A:115:MET:HE1	1:A:176:ILE:CD1	2.50	0.42
1:D:221:TRP:HZ3	1:D:325:LYS:NZ	2.08	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:61:VAL:HG21	1:B:283:VAL:HB	2.00	0.42
1:B:20:VAL:O	1:B:23:ILE:HB	2.19	0.42
1:B:399:LEU:N	1:B:399:LEU:HD12	2.35	0.42
1:A:115:MET:HE1	1:A:139:ALA:HB2	2.02	0.41
1:C:208:VAL:HG22	1:C:237:VAL:CG2	2.50	0.41
1:B:39:ILE:HD13	1:B:382:ARG:O	2.20	0.41
1:C:76:ILE:HD11	1:C:279:THR:HG23	2.02	0.41
1:C:311:VAL:HG21	1:C:323:ASN:OD1	2.20	0.41
1:C:388:ARG:CD	3:C:1400:SO4:O3	2.69	0.41
1:A:321:VAL:HG12	1:A:332:ALA:HB1	2.02	0.41
1:C:192:PHE:O	1:C:196:VAL:HG23	2.21	0.41
1:C:105:ILE:HD11	1:C:277:THR:HG23	2.03	0.41
1:C:279:THR:HB	1:C:280:PRO:HD3	2.02	0.41
1:D:94:GLN:O	1:D:233:LYS:NZ	2.49	0.41
1:B:105:ILE:O	1:B:252:ARG:HB3	2.21	0.40
1:C:132:TYR:CD2	1:C:133:PRO:HD2	2.56	0.40
1:D:111:LEU:O	1:D:115:MET:HG2	2.20	0.40
1:A:183:PRO:HB3	1:A:373:ARG:HD3	2.02	0.40
1:A:115:MET:CE	1:A:139:ALA:HB2	2.52	0.40
1:B:137:TYR:CE2	1:B:141:ILE:HD11	2.56	0.40
1:A:370:ASP:OD2	1:A:371:HIS:ND1	2.49	0.40
1:C:326:ALA:O	1:C:327:SER:CB	2.69	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	367/412 (89%)	355 (97%)	11 (3%)	1 (0%)	41 46
1	B	361/412 (88%)	351 (97%)	9 (2%)	1 (0%)	41 46
1	C	367/412 (89%)	354 (96%)	13 (4%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	D	378/412 (92%)	371 (98%)	7 (2%)	0	100 100
All	All	1473/1648 (89%)	1431 (97%)	40 (3%)	2 (0%)	51 60

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	252	ARG
1	A	105	ILE

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	306/341 (90%)	302 (99%)	4 (1%)	69 79
1	B	303/341 (89%)	300 (99%)	3 (1%)	76 84
1	C	306/341 (90%)	301 (98%)	5 (2%)	62 73
1	D	313/341 (92%)	312 (100%)	1 (0%)	92 95
All	All	1228/1364 (90%)	1215 (99%)	13 (1%)	73 82

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	24	THR
1	A	84	SER
1	A	174	MET
1	A	257	VAL
1	B	163	ARG
1	B	204	ASP
1	B	301	ARG
1	C	45	ASN
1	C	85	HIS
1	C	148	SER
1	C	204	ASP
1	C	388	ARG

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Mol	Chain	Res	Type
1	D	328	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	45	ASN

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 monosaccharides in this entry.

5.6 Ligand geometry

13 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	$\#\|Z\| > 2$
2	PLP	A	1400	1	15,15,16	2.13	5 (33%)	20,22,23	1.62	4 (20%)
3	SO4	D	1401	-	4,4,4	0.15	0	6,6,6	0.28	0
2	PLP	D	1400	-	16,16,16	1.21	1 (6%)	20,23,23	1.09	2 (10%)
3	SO4	C	1401	-	4,4,4	0.20	0	6,6,6	0.42	0
3	SO4	A	1401	-	4,4,4	0.26	0	6,6,6	0.48	0
3	SO4	D	1403	-	4,4,4	0.15	0	6,6,6	0.26	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	SO4	A	1402	-	4,4,4	0.16	0	6,6,6	0.32	0
3	SO4	C	1402	-	4,4,4	0.20	0	6,6,6	0.25	0
3	SO4	C	1403	-	4,4,4	0.12	0	6,6,6	0.20	0
3	SO4	D	1402	-	4,4,4	0.11	0	6,6,6	0.33	0
3	SO4	C	1400	-	4,4,4	0.30	0	6,6,6	0.53	0
3	SO4	B	1400	-	4,4,4	0.17	0	6,6,6	0.35	0
3	SO4	B	1401	-	4,4,4	0.12	0	6,6,6	0.14	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	PLP	A	1400	1	-	3/6/6/8	0/1/1/1
2	PLP	D	1400	-	-	5/8/8/8	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1400	PLP	O3-C3	-5.01	1.25	1.37
2	A	1400	PLP	C3-C2	-3.76	1.37	1.40
2	A	1400	PLP	C2-N1	3.37	1.40	1.33
2	D	1400	PLP	C2-N1	2.61	1.38	1.33
2	A	1400	PLP	C6-N1	2.45	1.39	1.34
2	A	1400	PLP	P-O3P	-2.00	1.47	1.54

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1400	PLP	O4P-C5A-C5	4.03	117.03	109.35
2	A	1400	PLP	C2A-C2-C3	-2.69	117.57	120.89
2	D	1400	PLP	O4A-C4A-C4	-2.48	119.50	124.91
2	A	1400	PLP	C2A-C2-N1	2.45	122.45	117.67
2	A	1400	PLP	C5-C6-N1	-2.35	119.90	123.82
2	D	1400	PLP	C5-C6-N1	-2.16	120.22	123.82

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1400	PLP	C5A-O4P-P-O1P
2	A	1400	PLP	C5A-O4P-P-O3P
2	D	1400	PLP	C3-C4-C4A-O4A
2	D	1400	PLP	C5A-O4P-P-O2P
2	D	1400	PLP	C5A-O4P-P-O3P
2	D	1400	PLP	C5A-O4P-P-O1P
2	D	1400	PLP	C5-C4-C4A-O4A
2	A	1400	PLP	C5A-O4P-P-O2P

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1400	PLP	1	0
2	D	1400	PLP	2	0
3	D	1403	SO4	1	0
3	C	1400	SO4	1	0

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} 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	371/412 (90%)	0.30	26 (7%)	16	17	2, 46, 68, 120	0
1	B	367/412 (89%)	0.59	41 (11%)	5	5	39, 56, 83, 96	0
1	C	371/412 (90%)	0.62	40 (10%)	5	5	36, 55, 83, 136	0
1	D	380/412 (92%)	0.31	14 (3%)	41	44	28, 47, 67, 79	0
All	All	1489/1648 (90%)	0.45	121 (8%)	12	13	2, 51, 78, 136	0

All (121) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	395	ARG	7.2
1	B	88	ARG	6.8
1	A	62	ALA	6.6
1	C	92	ASP	5.0
1	C	208	VAL	4.9
1	B	395	ARG	4.7
1	B	92	ASP	4.5
1	B	81	ARG	4.4
1	C	73	SER	4.2
1	A	78	ARG	4.2
1	C	88	ARG	4.1
1	B	274	ASP	3.9
1	A	60	THR	3.9
1	C	23	ILE	3.9
1	B	26	GLU	3.7
1	C	222	LYS	3.7
1	B	207	VAL	3.6
1	B	268	ARG	3.6
1	C	242	LEU	3.6
1	C	213	TYR	3.5
1	B	22	ASN	3.5

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Mol	Chain	Res	Type	RSRZ
1	B	175	MET	3.4
1	C	221	TRP	3.4
1	C	230	PRO	3.4
1	C	209	HIS	3.4
1	C	210	ASP	3.3
1	C	176	ILE	3.3
1	B	237	VAL	3.3
1	B	231	GLY	3.3
1	C	154	GLY	3.3
1	C	81	ARG	3.2
1	B	34	ARG	3.2
1	A	268	ARG	3.2
1	B	398	GLY	3.2
1	B	23	ILE	3.1
1	C	291	GLY	3.1
1	C	177	LEU	3.0
1	B	301	ARG	3.0
1	C	126	LEU	3.0
1	A	208	VAL	3.0
1	A	72	THR	3.0
1	D	107	SER	3.0
1	B	21	PHE	3.0
1	A	126	LEU	2.8
1	D	155	ILE	2.8
1	B	85	HIS	2.8
1	A	137	TYR	2.8
1	B	177	LEU	2.7
1	C	336	GLU	2.7
1	B	94	GLN	2.7
1	B	261	GLU	2.7
1	A	20	VAL	2.7
1	B	209	HIS	2.7
1	C	91	TYR	2.7
1	A	277	THR	2.7
1	B	176	ILE	2.6
1	A	336	GLU	2.6
1	A	242	LEU	2.6
1	B	213	TYR	2.6
1	C	32	ARG	2.6
1	C	241	THR	2.6
1	A	81	ARG	2.6
1	D	104	THR	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	77	PRO	2.5
1	B	302	GLN	2.5
1	A	22	ASN	2.5
1	A	253	ILE	2.5
1	B	63	GLN	2.5
1	A	350	LEU	2.5
1	B	27	LEU	2.5
1	C	211	LEU	2.5
1	B	211	LEU	2.5
1	C	175	MET	2.5
1	C	93	VAL	2.5
1	C	189	GLU	2.5
1	A	92	ASP	2.5
1	D	253	ILE	2.4
1	B	208	VAL	2.4
1	C	239	PHE	2.4
1	C	156	ASP	2.4
1	B	155	ILE	2.4
1	D	105	ILE	2.4
1	D	29	MET	2.4
1	C	48	GLY	2.4
1	A	61	VAL	2.4
1	C	178	GLY	2.4
1	B	41	LEU	2.4
1	D	41	LEU	2.4
1	C	237	VAL	2.4
1	C	339	ALA	2.3
1	B	29	MET	2.3
1	C	22	ASN	2.3
1	C	207	VAL	2.3
1	D	63	GLN	2.3
1	B	24	THR	2.3
1	A	239	PHE	2.3
1	D	301	ARG	2.3
1	C	94	GLN	2.3
1	B	242	LEU	2.2
1	C	153	PRO	2.2
1	B	312	LYS	2.2
1	C	342	GLY	2.2
1	A	399	LEU	2.2
1	B	73	SER	2.2
1	C	292	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	207	VAL	2.1
1	C	301	ARG	2.1
1	B	212	ALA	2.1
1	A	88	ARG	2.1
1	D	126	LEU	2.1
1	D	350	LEU	2.1
1	B	20	VAL	2.1
1	A	43	MET	2.1
1	B	295	CYS	2.1
1	B	239	PHE	2.1
1	D	114	LEU	2.1
1	B	294	GLN	2.0
1	A	211	LEU	2.0
1	D	254	GLY	2.0
1	D	237	VAL	2.0
1	A	272	TYR	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 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, 95^{th} 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	SO4	B	1401	5/5	0.86	0.77	67,67,68,68	5
2	PLP	D	1400	16/16	0.94	0.24	60,74,82,85	0
3	SO4	B	1400	5/5	0.95	0.12	61,62,62,66	0
3	SO4	C	1401	5/5	0.95	0.14	66,66,67,68	0
3	SO4	D	1402	5/5	0.95	0.11	65,66,67,67	0
3	SO4	D	1403	5/5	0.96	0.12	69,69,70,71	0
3	SO4	C	1403	5/5	0.97	0.09	67,69,69,69	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	SO4	D	1401	5/5	0.97	0.16	64,65,66,66	0
3	SO4	A	1401	5/5	0.98	0.09	41,41,43,44	0
3	SO4	C	1400	5/5	0.98	0.12	46,48,49,50	0
2	PLP	A	1400	15/16	0.98	0.08	2,3,5,11	0
3	SO4	C	1402	5/5	0.98	0.13	61,62,62,63	0
3	SO4	A	1402	5/5	0.99	0.17	52,52,54,55	0

6.5 Other polymers (i)

There are no such residues in this entry.