Full wwPDB X-ray Structure Validation Report ⓘ

Aug 25, 2020 – 04:52 PM BST

PDB ID	:	1IXQ
Title	:	Enzyme-Phosphate2 Complex of Pyridoxine 5'-Phosphate synthase
Authors	:	Garrido-Franco, M.; Laber, B.; Huber, R.; Clausen, T.
Deposited on	:	2002-06-28
Resolution	:	2.30 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 following versions of software and data (see references ⓘ) were used in the production of this report:

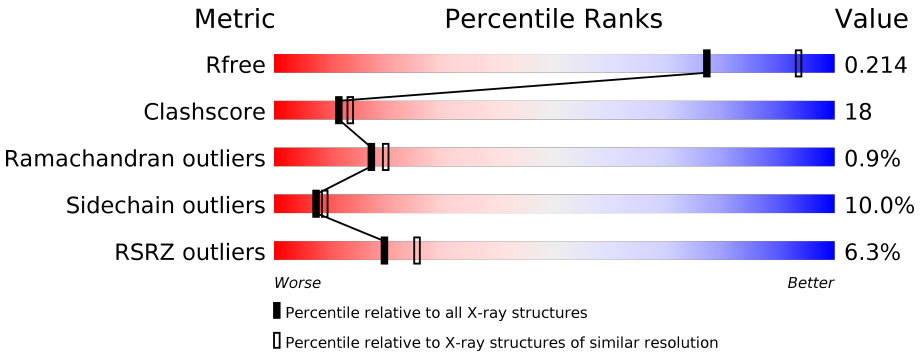
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.13
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.13

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 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 on 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	242	5%, 71%, 22%, • •
1	B	242	6%, 68%, 24%, 5% •
1	C	242	7%, 63%, 30%, • •
1	D	242	6%, 67%, 26%, • •

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	PO4	A	1001	-	-	X	-
2	PO4	B	1002	-	-	X	-
2	PO4	C	1003	-	-	X	-

2 Entry composition

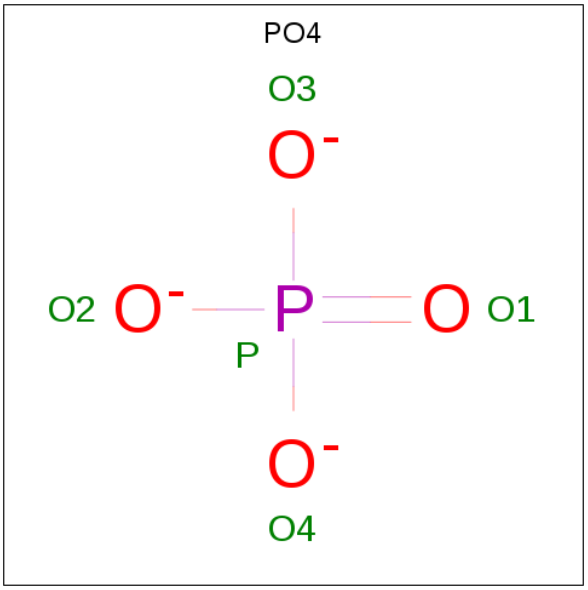
There are 3 unique types of molecules in this entry. The entry contains 7449 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Pyridoxine 5'-phosphate Synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	235	Total	C	N	O	S	0	0	0
			1774	1101	325	336	12			
1	B	235	Total	C	N	O	S	0	0	0
			1778	1103	325	338	12			
1	C	235	Total	C	N	O	S	0	0	0
			1770	1099	325	334	12			
1	D	235	Total	C	N	O	S	0	0	0
			1774	1100	324	338	12			

- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	P	0	0
			5	4	1		
2	B	1	Total	O	P	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	C	1	Total O P 5 4 1	0	0
2	D	1	Total O P 5 4 1	0	0

- Molecule 3 is water.

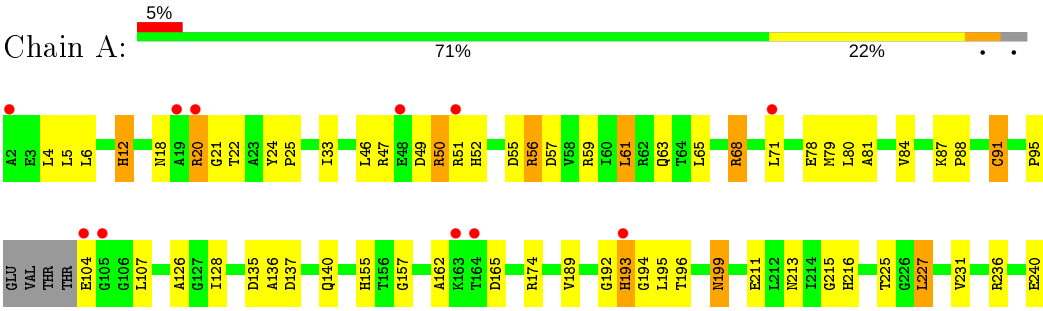
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	94	Total O 94 94	0	0
3	B	78	Total O 78 78	0	0
3	C	80	Total O 80 80	0	0
3	D	81	Total O 81 81	0	0

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.

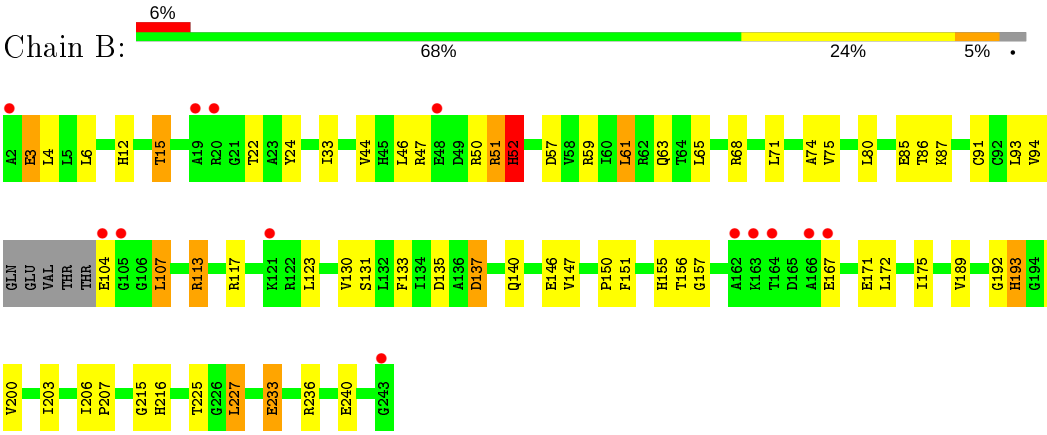
- Molecule 1: Pyridoxine 5'-phosphate Synthase

Chain A:



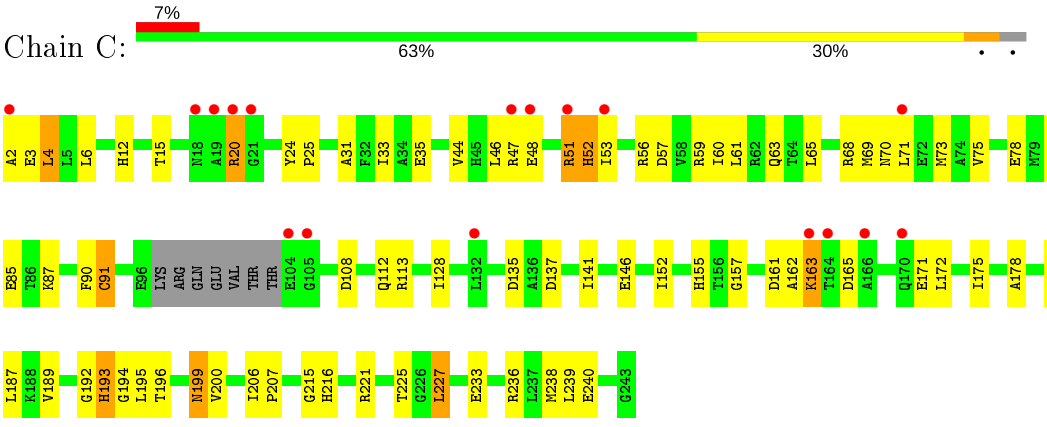
- Molecule 1: Pyridoxine 5'-phosphate Synthase

Chain B:



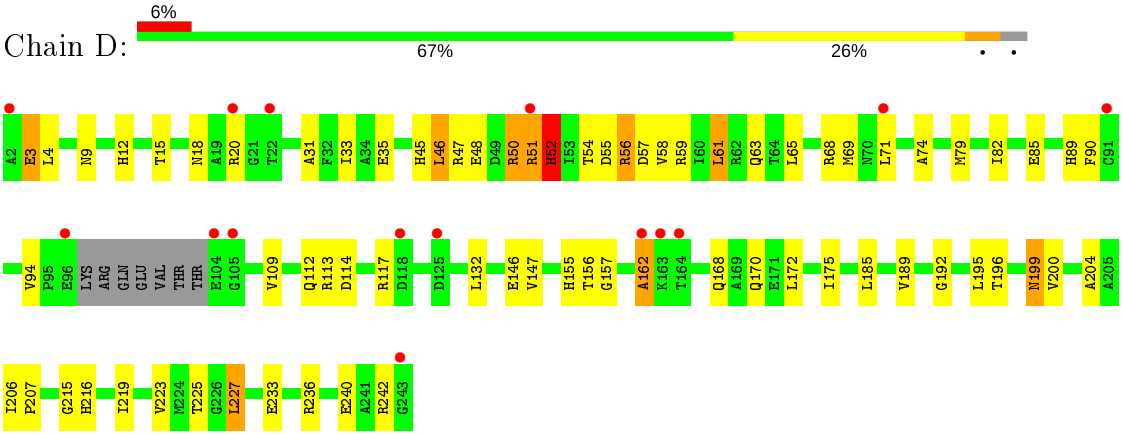
- Molecule 1: Pyridoxine 5'-phosphate Synthase

Chain C:



• Molecule 1: Pyridoxine 5'-phosphate Synthase

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	130.90Å 155.40Å 129.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.30 19.91 – 2.30	Depositor EDS
% Data completeness (in resolution range)	(Not available) (20.00-2.30) 99.2 (19.91-2.30)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	0.04	Depositor
$< I/\sigma(I) >$ [1]	2.37 (at 2.30Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.222 , 0.272 0.215 , 0.214	Depositor DCC
R_{free} test set	2937 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	44.2	Xtriage
Anisotropy	0.774	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 44.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7449	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 10.27% 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: PO4

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	0.51	1/1795 (0.1%)	0.74	0/2422
1	B	0.50	1/1799 (0.1%)	0.77	2/2427 (0.1%)
1	C	0.49	0/1791	0.71	0/2417
1	D	0.50	1/1795 (0.1%)	0.73	1/2423 (0.0%)
All	All	0.50	3/7180 (0.0%)	0.74	3/9689 (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 (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	52	HIS	CB-CG	6.39	1.61	1.50
1	D	52	HIS	CB-CG	6.08	1.60	1.50
1	A	52	HIS	CB-CG	5.76	1.60	1.50

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	52	HIS	CA-CB-CG	12.63	135.08	113.60
1	D	52	HIS	CA-CB-CG	11.93	133.88	113.60
1	B	192	GLY	N-CA-C	-5.18	100.16	113.10

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	24	TYR	Sidechain

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	1774	0	1786	55	0
1	B	1778	0	1790	61	0
1	C	1770	0	1782	63	1
1	D	1774	0	1779	77	0
2	A	5	0	0	9	0
2	B	5	0	0	2	1
2	C	5	0	0	4	0
2	D	5	0	0	1	0
3	A	94	0	0	3	0
3	B	78	0	0	3	0
3	C	80	0	0	4	0
3	D	81	0	0	3	0
All	All	7449	0	7137	251	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 18.

All (251) 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:D:51:ARG:NH2	1:D:52:HIS:HB3	1.23	1.44
1:D:51:ARG:CZ	1:D:52:HIS:HB3	1.66	1.25
1:D:51:ARG:NH2	1:D:52:HIS:CB	2.09	1.14
1:B:12:HIS:HA	1:B:15:THR:HG23	1.32	1.06
1:D:51:ARG:HH21	1:D:52:HIS:CD2	1.74	1.06
1:C:215:GLY:N	2:C:1003:PO4:O2	1.89	1.05
1:A:194:GLY:N	2:A:1001:PO4:O4	1.98	0.96
1:C:193:HIS:HA	2:C:1003:PO4:O1	1.67	0.94
1:A:193:HIS:CA	2:A:1001:PO4:O4	2.17	0.93
1:B:59:ARG:HH12	1:D:63:GLN:HE22	1.13	0.91
1:D:51:ARG:CZ	1:D:52:HIS:CB	2.50	0.89

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:63:GLN:HE22	1:C:59:ARG:HH12	0.92	0.88
1:C:12:HIS:HA	1:C:15:THR:HG23	1.58	0.84
1:A:193:HIS:HA	2:A:1001:PO4:O4	1.76	0.83
1:B:216:HIS:N	2:B:1002:PO4:O4	2.11	0.83
1:A:68:ARG:HG2	3:A:1012:HOH:O	1.78	0.82
1:A:59:ARG:HH12	1:C:63:GLN:HE22	1.24	0.82
1:B:155:HIS:HD2	1:B:157:GLY:H	1.26	0.80
2:C:1003:PO4:O3	3:C:1028:HOH:O	2.00	0.80
1:B:15:THR:HB	1:B:51:ARG:HH12	1.47	0.80
1:D:192:GLY:HA2	1:D:195:LEU:HD12	1.65	0.79
1:C:52:HIS:HB3	3:C:1009:HOH:O	1.81	0.79
1:C:192:GLY:HA2	1:C:195:LEU:HD12	1.64	0.79
1:D:51:ARG:NH2	1:D:52:HIS:CD2	2.50	0.78
1:D:51:ARG:HH21	1:D:52:HIS:CG	2.02	0.78
1:A:199:ASN:C	1:A:199:ASN:HD22	1.87	0.77
1:A:63:GLN:NE2	1:C:59:ARG:HH12	1.78	0.77
1:D:51:ARG:HE	1:D:52:HIS:CD2	2.02	0.77
1:C:57:ASP:O	1:C:61:LEU:HB2	1.84	0.76
1:A:155:HIS:CD2	1:A:157:GLY:H	2.02	0.76
1:B:12:HIS:HA	1:B:15:THR:CG2	2.14	0.76
1:D:15:THR:OG1	1:D:51:ARG:NH2	2.19	0.76
1:D:51:ARG:HG2	1:D:51:ARG:HH11	1.51	0.75
1:D:51:ARG:HH21	1:D:52:HIS:HD2	1.30	0.75
1:D:50:ARG:N	1:D:50:ARG:HD3	2.03	0.74
1:D:51:ARG:HG2	1:D:51:ARG:NH1	2.01	0.74
1:C:47:ARG:NH1	1:C:51:ARG:HH21	1.87	0.73
1:A:104:GLU:HB2	1:A:135:ASP:OD1	1.89	0.73
1:A:49:ASP:O	1:A:51:ARG:N	2.22	0.72
1:C:48:GLU:OE2	1:C:78:GLU:OE2	2.07	0.72
1:A:63:GLN:HE22	1:C:59:ARG:NH1	1.78	0.72
1:D:51:ARG:NH2	1:D:52:HIS:CG	2.56	0.72
1:C:193:HIS:HB2	3:C:1032:HOH:O	1.90	0.71
1:D:196:THR:H	1:D:199:ASN:ND2	1.88	0.71
1:A:57:ASP:O	1:A:61:LEU:HB2	1.90	0.71
1:B:15:THR:HA	1:B:51:ARG:HH22	1.55	0.71
1:C:91:CYS:HB2	1:C:128:ILE:HG21	1.73	0.70
1:D:117:ARG:HA	1:D:147:VAL:HG13	1.73	0.70
1:B:155:HIS:CD2	1:B:157:GLY:H	2.09	0.69
1:C:181:PHE:O	1:C:185:LEU:HD13	1.92	0.69
1:C:196:THR:H	1:C:199:ASN:ND2	1.89	0.69
1:D:199:ASN:HD22	1:D:199:ASN:C	1.96	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:51:ARG:CG	1:D:51:ARG:HH11	2.06	0.69
1:D:155:HIS:CD2	1:D:157:GLY:H	2.11	0.69
1:C:108:ASP:HB3	1:C:112:GLN:HE21	1.58	0.68
1:C:84:VAL:O	1:C:87:LYS:HD2	1.93	0.68
1:D:57:ASP:O	1:D:61:LEU:HB2	1.94	0.68
1:B:51:ARG:CZ	1:B:52:HIS:HB3	2.22	0.68
1:D:12:HIS:HD2	1:D:216:HIS:HD2	1.41	0.68
1:B:137:ASP:OD2	1:B:140:GLN:HG2	1.94	0.68
1:B:199:ASN:HD22	1:B:199:ASN:C	1.98	0.67
1:A:192:GLY:O	1:A:193:HIS:HB2	1.93	0.67
1:B:63:GLN:HE22	1:D:59:ARG:HH12	1.43	0.67
1:B:195:LEU:HA	1:B:199:ASN:HD21	1.59	0.66
1:C:199:ASN:C	1:C:199:ASN:HD22	1.99	0.66
1:C:196:THR:H	1:C:199:ASN:HD21	1.42	0.65
1:D:216:HIS:N	2:D:1004:PO4:O3	2.28	0.65
1:B:51:ARG:HE	1:B:51:ARG:C	2.00	0.65
1:B:74:ALA:HB2	1:B:96:GLU:HB2	1.79	0.65
1:B:233:GLU:OE1	1:B:236:ARG:NH2	2.29	0.64
1:D:196:THR:H	1:D:199:ASN:HD21	1.44	0.64
1:C:2:ALA:HB2	3:C:1081:HOH:O	1.97	0.64
1:D:3:GLU:HA	1:D:3:GLU:OE2	1.99	0.63
1:D:192:GLY:HA2	1:D:195:LEU:CD1	2.29	0.62
1:C:47:ARG:NH1	1:C:51:ARG:NH2	2.48	0.62
1:B:193:HIS:CD2	3:B:1036:HOH:O	2.51	0.62
1:B:51:ARG:HG3	1:B:52:HIS:H	1.64	0.61
1:D:56:ARG:C	1:D:56:ARG:HD3	2.21	0.61
1:A:155:HIS:HD2	1:A:157:GLY:H	1.47	0.61
1:C:91:CYS:HB2	1:C:128:ILE:CG2	2.30	0.60
1:A:193:HIS:C	2:A:1001:PO4:O4	2.40	0.60
1:D:204:ALA:O	1:D:242:ARG:HD3	2.01	0.60
1:A:196:THR:H	1:A:199:ASN:ND2	2.00	0.59
1:C:47:ARG:HE	1:C:52:HIS:CE1	2.20	0.59
1:B:225:THR:HG22	3:B:1011:HOH:O	2.03	0.59
1:C:192:GLY:HA2	1:C:195:LEU:CD1	2.32	0.58
1:A:225:THR:HG22	3:A:1005:HOH:O	2.02	0.58
1:B:236:ARG:NH1	1:B:240:GLU:OE2	2.37	0.58
1:D:50:ARG:CD	1:D:50:ARG:N	2.67	0.57
1:D:50:ARG:HH12	1:D:55:ASP:CG	2.07	0.57
1:B:80:LEU:HD23	1:B:123:LEU:HD21	1.85	0.57
1:D:47:ARG:O	1:D:50:ARG:HD2	2.05	0.57
1:A:49:ASP:OD2	1:A:51:ARG:HB2	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:87:LYS:N	1:A:88:PRO:HD3	2.20	0.57
1:B:47:ARG:NH2	1:B:51:ARG:HG2	2.20	0.57
1:A:49:ASP:C	1:A:51:ARG:H	2.07	0.56
1:A:80:LEU:O	1:A:84:VAL:HG23	2.05	0.56
1:D:51:ARG:NE	1:D:52:HIS:CD2	2.73	0.56
1:D:162:ALA:HB1	1:D:168:GLN:HB2	1.88	0.56
1:B:107:LEU:HB2	1:B:133:PHE:O	2.06	0.56
1:A:56:ARG:HD2	3:A:1075:HOH:O	2.04	0.56
1:C:163:LYS:HD2	1:C:163:LYS:H	1.69	0.56
1:B:193:HIS:HD2	3:B:1036:HOH:O	1.85	0.55
1:D:12:HIS:HE1	3:D:1069:HOH:O	1.89	0.55
1:D:50:ARG:HG3	1:D:50:ARG:HH11	1.70	0.55
1:B:15:THR:HA	1:B:51:ARG:NH2	2.20	0.55
1:C:12:HIS:HA	1:C:15:THR:CG2	2.32	0.55
1:A:193:HIS:N	2:A:1001:PO4:O4	2.40	0.55
1:B:51:ARG:NE	1:B:52:HIS:N	2.55	0.55
1:A:61:LEU:O	1:A:65:LEU:HG	2.06	0.54
1:A:84:VAL:O	1:A:87:LYS:HD2	2.07	0.54
1:B:57:ASP:O	1:B:61:LEU:HB2	2.07	0.54
1:C:56:ARG:NE	1:C:60:ILE:HD12	2.23	0.54
1:B:61:LEU:O	1:B:65:LEU:HG	2.08	0.53
1:B:74:ALA:HA	1:B:94:VAL:O	2.08	0.53
1:B:113:ARG:NH1	1:B:146:GLU:OE1	2.40	0.53
1:B:104:GLU:HB3	1:B:135:ASP:CG	2.29	0.53
1:B:33:ILE:HG21	1:B:227:LEU:HB3	1.90	0.53
1:D:45:HIS:HB3	1:D:52:HIS:HE1	1.74	0.53
1:C:141:ILE:HD11	1:C:178:ALA:HB1	1.90	0.53
1:D:199:ASN:HD22	1:D:200:VAL:N	2.06	0.53
1:C:161:ASP:O	1:C:162:ALA:C	2.48	0.53
1:A:194:GLY:H	2:A:1001:PO4:P	2.33	0.52
1:A:196:THR:H	1:A:199:ASN:HD21	1.56	0.52
1:C:80:LEU:O	1:C:84:VAL:HG23	2.09	0.52
1:C:194:GLY:N	2:C:1003:PO4:O1	2.41	0.52
1:C:56:ARG:HD3	1:C:56:ARG:C	2.30	0.52
1:C:12:HIS:CD2	1:C:216:HIS:HD2	2.27	0.52
1:D:33:ILE:HG21	1:D:227:LEU:HB3	1.92	0.51
1:D:89:HIS:HD2	1:D:90:PHE:CE1	2.28	0.51
1:D:74:ALA:HA	1:D:94:VAL:O	2.10	0.51
1:B:196:THR:H	1:B:199:ASN:ND2	2.07	0.51
1:D:225:THR:HG22	3:D:1013:HOH:O	2.11	0.51
1:C:199:ASN:HD22	1:C:200:VAL:N	2.09	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:195:LEU:HA	1:A:199:ASN:HD21	1.75	0.51
1:A:33:ILE:HG21	1:A:227:LEU:HB3	1.92	0.51
1:B:12:HIS:CD2	1:B:216:HIS:HD2	2.28	0.50
1:C:113:ARG:NH1	1:C:146:GLU:OE2	2.44	0.50
1:A:51:ARG:NH1	1:A:51:ARG:HG3	2.27	0.50
1:A:5:LEU:HB2	1:A:211:GLU:HG3	1.94	0.50
1:A:227:LEU:HD22	1:A:231:VAL:HG23	1.93	0.49
1:A:215:GLY:N	2:A:1001:PO4:O1	2.30	0.49
1:A:199:ASN:C	1:A:199:ASN:ND2	2.60	0.49
1:C:52:HIS:HD2	1:C:53:ILE:H	1.61	0.49
1:D:156:THR:HG22	1:D:175:ILE:HD13	1.93	0.49
1:A:12:HIS:HD2	1:A:216:HIS:ND1	2.11	0.49
1:B:104:GLU:O	1:B:104:GLU:HG2	2.13	0.49
1:B:199:ASN:HD22	1:B:200:VAL:N	2.10	0.48
1:A:50:ARG:NE	1:A:55:ASP:OD1	2.41	0.48
1:D:236:ARG:NH1	1:D:240:GLU:OE2	2.46	0.48
1:D:113:ARG:HD3	1:D:146:GLU:OE1	2.13	0.48
1:B:46:LEU:HD11	1:B:50:ARG:CZ	2.44	0.48
1:B:236:ARG:O	1:B:240:GLU:HG3	2.13	0.48
1:D:155:HIS:HD2	1:D:157:GLY:H	1.60	0.48
1:D:12:HIS:CD2	1:D:216:HIS:HD2	2.29	0.48
1:C:163:LYS:HD2	1:C:163:LYS:N	2.29	0.47
1:D:12:HIS:HD2	1:D:216:HIS:CD2	2.26	0.47
1:D:82:ILE:O	1:D:85:GLU:HB3	2.13	0.47
1:A:236:ARG:NH1	1:A:240:GLU:OE2	2.48	0.47
1:C:47:ARG:CZ	1:C:51:ARG:NH2	2.77	0.47
1:B:86:THR:O	1:B:87:LYS:HB2	2.13	0.47
1:B:51:ARG:HG3	1:B:52:HIS:N	2.28	0.47
1:D:46:LEU:HG	1:D:58:VAL:HG21	1.97	0.47
1:A:51:ARG:HH11	1:A:51:ARG:HG3	1.80	0.47
1:B:51:ARG:CG	1:B:52:HIS:N	2.77	0.47
1:B:94:VAL:HG13	1:B:95:PRO:HD2	1.97	0.46
1:A:49:ASP:C	1:A:51:ARG:N	2.68	0.46
1:C:3:GLU:CG	1:C:239:LEU:HD22	2.45	0.46
1:B:75:VAL:HG22	1:B:93:LEU:HD13	1.97	0.46
1:C:161:ASP:O	1:C:163:LYS:HE2	2.15	0.46
1:D:31:ALA:O	1:D:35:GLU:HG3	2.16	0.46
1:D:65:LEU:HD12	1:D:69:MET:HB2	1.98	0.45
1:B:94:VAL:HG12	1:B:95:PRO:O	2.17	0.45
1:B:50:ARG:HG2	1:B:50:ARG:HH11	1.82	0.45
1:B:12:HIS:ND1	1:B:15:THR:HG21	2.32	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:135:ASP:O	1:C:137:ASP:N	2.49	0.45
1:C:47:ARG:HG2	1:C:47:ARG:HH11	1.82	0.45
1:B:61:LEU:HA	1:B:61:LEU:HD12	1.88	0.44
1:C:155:HIS:CD2	1:C:157:GLY:H	2.34	0.44
1:C:236:ARG:NH1	1:C:240:GLU:OE2	2.50	0.44
1:A:47:ARG:HH12	1:A:51:ARG:HD2	1.82	0.44
1:B:3:GLU:HG3	1:B:3:GLU:H	1.51	0.44
1:D:3:GLU:CA	1:D:3:GLU:OE2	2.65	0.44
1:A:18:ASN:C	1:A:20:ARG:H	2.20	0.44
1:A:104:GLU:OE2	1:A:174:ARG:NH2	2.47	0.44
1:A:91:CYS:HB2	1:A:128:ILE:CG2	2.47	0.44
1:A:95:PRO:HG3	1:A:107:LEU:HA	2.00	0.44
1:D:195:LEU:HA	1:D:199:ASN:HD21	1.83	0.44
1:D:12:HIS:CD2	1:D:216:HIS:CD2	3.05	0.44
1:B:131:SER:HA	1:B:151:PHE:O	2.18	0.44
1:D:18:ASN:C	1:D:20:ARG:H	2.19	0.44
1:D:109:VAL:HG21	1:D:132:LEU:HD13	2.00	0.44
1:D:48:GLU:O	1:D:50:ARG:HD3	2.18	0.44
1:A:137:ASP:OD2	1:A:140:GLN:HG2	2.17	0.44
1:D:9:ASN:HB3	1:D:215:GLY:HA3	2.00	0.44
1:A:24:TYR:HA	1:A:25:PRO:C	2.38	0.43
1:A:192:GLY:HA3	1:A:213:ASN:O	2.19	0.43
1:B:199:ASN:C	1:B:199:ASN:ND2	2.69	0.43
1:B:206:ILE:HA	1:B:207:PRO:HD3	1.87	0.43
1:C:31:ALA:O	1:C:35:GLU:HG3	2.17	0.43
1:C:24:TYR:HA	1:C:25:PRO:C	2.38	0.43
1:C:171:GLU:O	1:C:175:ILE:HG13	2.18	0.43
1:B:117:ARG:HA	1:B:147:VAL:HG13	2.00	0.43
1:C:48:GLU:HG3	1:C:78:GLU:OE2	2.19	0.43
1:D:51:ARG:CZ	1:D:52:HIS:CD2	3.01	0.43
1:C:152:ILE:HG23	1:C:187:LEU:HD22	2.00	0.43
1:C:70:ASN:HA	1:C:90:PHE:HB2	2.00	0.43
1:D:114:ASP:HB2	3:D:1067:HOH:O	2.19	0.43
1:C:195:LEU:HA	1:C:199:ASN:HD21	1.84	0.42
1:C:206:ILE:HA	1:C:207:PRO:HD3	1.84	0.42
1:A:215:GLY:H	2:A:1001:PO4:P	2.41	0.42
1:D:51:ARG:CZ	1:D:52:HIS:CG	3.01	0.42
1:B:130:VAL:O	1:B:150:PRO:HD2	2.20	0.42
1:B:131:SER:HB2	1:B:151:PHE:HB2	2.01	0.42
1:C:108:ASP:HB3	1:C:112:GLN:NE2	2.29	0.42
1:D:89:HIS:CD2	1:D:90:PHE:CE1	3.07	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:47:ARG:NH1	1:C:47:ARG:HG2	2.35	0.42
1:D:162:ALA:HB1	1:D:168:GLN:CA	2.50	0.42
1:B:167:GLU:O	1:B:171:GLU:HG2	2.20	0.42
1:B:44:VAL:HG11	1:B:61:LEU:HD23	2.02	0.42
1:C:15:THR:HG22	1:C:52:HIS:ND1	2.35	0.42
1:A:84:VAL:HG13	1:A:126:ALA:HB2	2.01	0.42
1:A:78:GLU:O	1:A:81:ALA:HB3	2.20	0.42
1:D:20:ARG:HG3	1:D:20:ARG:O	2.19	0.42
1:D:233:GLU:OE1	1:D:236:ARG:NH2	2.46	0.42
1:D:54:THR:O	1:D:57:ASP:HB2	2.20	0.42
1:A:12:HIS:CD2	1:A:216:HIS:ND1	2.87	0.42
1:D:199:ASN:ND2	1:D:199:ASN:C	2.68	0.42
1:D:46:LEU:HB3	1:D:79:MET:HE1	2.02	0.42
1:C:61:LEU:O	1:C:65:LEU:HG	2.19	0.41
1:D:56:ARG:HD2	1:D:57:ASP:OD2	2.20	0.41
1:B:95:PRO:HG3	1:B:107:LEU:HA	2.01	0.41
1:C:33:ILE:HG21	1:C:227:LEU:HB3	2.02	0.41
1:D:206:ILE:HA	1:D:207:PRO:HD3	1.80	0.41
1:D:117:ARG:NH1	1:D:146:GLU:OE2	2.49	0.41
1:C:52:HIS:CD2	1:C:53:ILE:H	2.39	0.41
1:C:65:LEU:CD1	1:C:69:MET:HB2	2.49	0.41
1:D:112:GLN:O	1:D:113:ARG:C	2.59	0.41
1:D:162:ALA:HB1	1:D:168:GLN:CB	2.51	0.41
1:C:233:GLU:OE1	1:C:236:ARG:NH2	2.46	0.41
1:C:73:MET:SD	1:C:83:ALA:HB2	2.61	0.41
1:B:117:ARG:HG3	1:B:117:ARG:HH11	1.86	0.41
1:D:12:HIS:HB2	1:D:219:ILE:HG13	2.02	0.41
1:B:156:THR:HG22	1:B:175:ILE:HD13	2.02	0.41
1:A:193:HIS:HA	2:A:1001:PO4:P	2.60	0.41
1:B:215:GLY:N	2:B:1002:PO4:O4	2.53	0.41
1:A:136:ALA:HB3	1:A:174:ARG:NE	2.35	0.40
1:A:79:MET:HB3	1:A:79:MET:HE3	2.00	0.40
1:D:51:ARG:NE	1:D:52:HIS:CG	2.89	0.40
1:B:195:LEU:HD21	1:B:203:ILE:HG13	2.04	0.40
1:C:4:LEU:HD13	1:C:238:MET:HE3	2.02	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:20:ARG:NH2	2:B:1002:PO4:O2[4_555]	1.78	0.42

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	231/242 (96%)	214 (93%)	12 (5%)	5 (2%)	6 5
1	B	231/242 (96%)	215 (93%)	14 (6%)	2 (1%)	17 20
1	C	231/242 (96%)	219 (95%)	12 (5%)	0	100 100
1	D	231/242 (96%)	217 (94%)	13 (6%)	1 (0%)	34 42
All	All	924/968 (96%)	865 (94%)	51 (6%)	8 (1%)	17 20

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	50	ARG
1	B	193	HIS
1	D	162	ALA
1	A	22	THR
1	B	113	ARG
1	A	162	ALA
1	A	193	HIS
1	A	21	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	177/185 (96%)	163 (92%)	14 (8%)	12 15
1	B	178/185 (96%)	159 (89%)	19 (11%)	6 7

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	C	176/185 (95%)	155 (88%)	21 (12%)	5 5
1	D	177/185 (96%)	160 (90%)	17 (10%)	8 10
All	All	708/740 (96%)	637 (90%)	71 (10%)	7 9

All (71) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	LEU
1	A	6	LEU
1	A	12	HIS
1	A	20	ARG
1	A	46	LEU
1	A	56	ARG
1	A	61	LEU
1	A	68	ARG
1	A	71	LEU
1	A	91	CYS
1	A	165	ASP
1	A	189	VAL
1	A	199	ASN
1	A	227	LEU
1	B	3	GLU
1	B	4	LEU
1	B	6	LEU
1	B	15	THR
1	B	22	THR
1	B	51	ARG
1	B	52	HIS
1	B	61	LEU
1	B	68	ARG
1	B	71	LEU
1	B	85	GLU
1	B	91	CYS
1	B	107	LEU
1	B	137	ASP
1	B	172	LEU
1	B	189	VAL
1	B	199	ASN
1	B	227	LEU
1	B	233	GLU
1	C	4	LEU

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Mol	Chain	Res	Type
1	C	6	LEU
1	C	20	ARG
1	C	44	VAL
1	C	46	LEU
1	C	51	ARG
1	C	52	HIS
1	C	68	ARG
1	C	71	LEU
1	C	75	VAL
1	C	85	GLU
1	C	91	CYS
1	C	163	LYS
1	C	165	ASP
1	C	172	LEU
1	C	189	VAL
1	C	193	HIS
1	C	199	ASN
1	C	221	ARG
1	C	225	THR
1	C	227	LEU
1	D	3	GLU
1	D	4	LEU
1	D	46	LEU
1	D	50	ARG
1	D	51	ARG
1	D	52	HIS
1	D	56	ARG
1	D	61	LEU
1	D	68	ARG
1	D	71	LEU
1	D	170	GLN
1	D	172	LEU
1	D	185	LEU
1	D	189	VAL
1	D	199	ASN
1	D	223	VAL
1	D	227	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (28) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	12	HIS

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Mol	Chain	Res	Type
1	A	63	GLN
1	A	89	HIS
1	A	129	GLN
1	A	155	HIS
1	A	198	HIS
1	A	199	ASN
1	B	63	GLN
1	B	89	HIS
1	B	155	HIS
1	B	198	HIS
1	B	199	ASN
1	B	216	HIS
1	C	45	HIS
1	C	63	GLN
1	C	89	HIS
1	C	155	HIS
1	C	199	ASN
1	C	216	HIS
1	D	12	HIS
1	D	52	HIS
1	D	63	GLN
1	D	89	HIS
1	D	129	GLN
1	D	155	HIS
1	D	198	HIS
1	D	199	ASN
1	D	216	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

4 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	PO4	C	1003	-	4,4,4	1.06	0	6,6,6	0.74	0
2	PO4	D	1004	-	4,4,4	1.02	0	6,6,6	0.76	0
2	PO4	A	1001	-	4,4,4	0.84	0	6,6,6	0.93	0
2	PO4	B	1002	-	4,4,4	0.87	0	6,6,6	0.89	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1003	PO4	4	0
2	D	1004	PO4	1	0
2	A	1001	PO4	9	0
2	B	1002	PO4	2	1

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	235/242 (97%)	0.15	13 (5%)	25	31	33, 48, 73, 83	0
1	B	235/242 (97%)	0.20	14 (5%)	21	28	33, 54, 77, 93	0
1	C	235/242 (97%)	0.18	17 (7%)	15	20	32, 52, 74, 84	0
1	D	235/242 (97%)	0.18	15 (6%)	19	25	34, 49, 74, 86	0
All	All	940/968 (97%)	0.18	59 (6%)	20	25	32, 51, 76, 93	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	51	ARG	5.2
1	B	104	GLU	5.1
1	B	2	ALA	5.0
1	D	104	GLU	4.8
1	A	163	LYS	4.7
1	D	2	ALA	4.4
1	C	51	ARG	3.8
1	B	105	GLY	3.7
1	C	48	GLU	3.7
1	B	163	LYS	3.6
1	B	164	THR	3.6
1	A	20	ARG	3.4
1	A	193	HIS	3.3
1	A	96	GLU	3.3
1	D	51	ARG	3.2
1	A	104	GLU	3.1
1	D	105	GLY	3.1
1	D	22	THR	3.1
1	D	243	GLY	3.1
1	C	19	ALA	3.1
1	D	164	THR	3.0

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Mol	Chain	Res	Type	RSRZ
1	C	104	GLU	3.0
1	A	19	ALA	2.9
1	B	96	GLU	2.9
1	A	164	THR	2.9
1	B	162	ALA	2.9
1	C	71	LEU	2.9
1	D	96	GLU	2.9
1	D	163	LYS	2.8
1	A	105	GLY	2.7
1	D	162	ALA	2.7
1	C	163	LYS	2.6
1	D	91	CYS	2.6
1	C	132	LEU	2.6
1	C	2	ALA	2.6
1	D	20	ARG	2.5
1	A	48	GLU	2.5
1	A	243	GLY	2.5
1	C	20	ARG	2.4
1	D	125	ASP	2.3
1	C	21	GLY	2.3
1	B	166	ALA	2.3
1	C	166	ALA	2.3
1	C	18	ASN	2.3
1	C	53	ILE	2.3
1	B	121	LYS	2.2
1	D	118	ASP	2.2
1	B	167	GLU	2.1
1	C	105	GLY	2.1
1	B	20	ARG	2.1
1	C	164	THR	2.1
1	B	243	GLY	2.1
1	B	48	GLU	2.1
1	A	2	ALA	2.1
1	B	19	ALA	2.1
1	C	47	ARG	2.0
1	A	71	LEU	2.0
1	D	71	LEU	2.0
1	C	170	GLN	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
2	PO4	A	1001	5/5	0.78	0.35	90,91,92,92	0
2	PO4	B	1002	5/5	0.81	0.32	103,104,105,105	0
2	PO4	D	1004	5/5	0.83	0.40	102,102,102,103	0
2	PO4	C	1003	5/5	0.91	0.36	91,93,94,94	0

6.5 Other polymers (i)

There are no such residues in this entry.