



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 01:53 AM GMT

PDB ID : 2EQB  
Title : Crystal structure of the Rab GTPase Sec4p, the Sec2p GEF domain, and phosphate complex  
Authors : Sato, Y.; Fukai, S.; Ishitani, R.; Nureki, O.  
Deposited on : 2007-03-30  
Resolution : 2.70 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](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

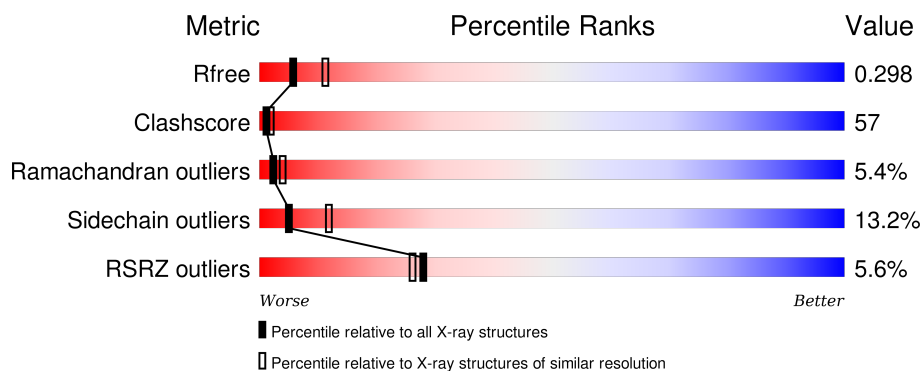
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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))
$R_{free}$	91344	2103 (2.70-2.70)
Clashscore	102246	2422 (2.70-2.70)
Ramachandran outliers	100387	2382 (2.70-2.70)
Sidechain outliers	100360	2382 (2.70-2.70)
RSRZ outliers	91569	2107 (2.70-2.70)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	174	<div> <div>10%</div> <div>26%</div> <div>56%</div> <div>16%</div> <div>••</div> </div>
2	B	97	<div> <div>%</div> <div>39%</div> <div>45%</div> <div>11%</div> <div>•</div> </div>
2	C	97	<div> <div>%</div> <div>39%</div> <div>44%</div> <div>12%</div> <div>•</div> </div>

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 3023 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 Ras-related protein SEC4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	171	Total	C	N	O	S	0	0	0
			1349	859	224	262	4			

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	14	GLY	-	CLONING ARTIFACT	UNP P07560
A	15	PRO	-	CLONING ARTIFACT	UNP P07560
A	16	LEU	-	CLONING ARTIFACT	UNP P07560
A	17	GLY	-	CLONING ARTIFACT	UNP P07560
A	18	SER	-	CLONING ARTIFACT	UNP P07560

- Molecule 2 is a protein called Rab guanine nucleotide exchange factor SEC2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	93	Total	C	N	O	S	0	0	0
			775	469	138	167	1			
2	C	93	Total	C	N	O	S	0	0	0
			775	469	138	167	1			

There are 10 discrepancies between the modelled and reference sequences:

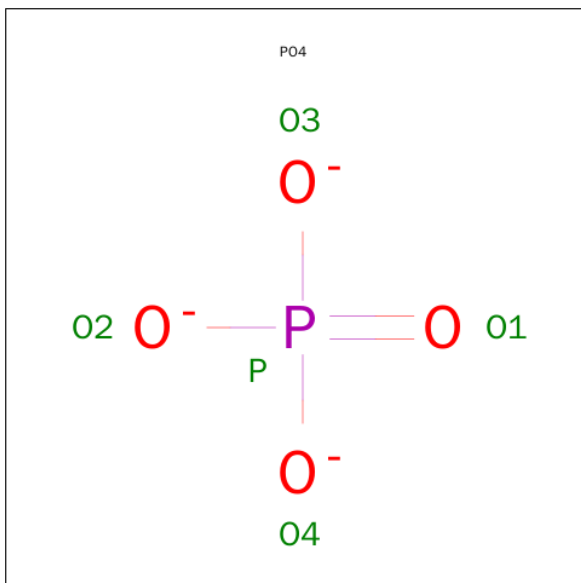
Chain	Residue	Modelled	Actual	Comment	Reference
B	46	GLY	-	CLONING ARTIFACT	UNP P17065
B	47	PRO	-	CLONING ARTIFACT	UNP P17065
B	48	LEU	-	CLONING ARTIFACT	UNP P17065
B	49	GLY	-	CLONING ARTIFACT	UNP P17065
B	50	SER	-	CLONING ARTIFACT	UNP P17065
C	46	GLY	-	CLONING ARTIFACT	UNP P17065
C	47	PRO	-	CLONING ARTIFACT	UNP P17065
C	48	LEU	-	CLONING ARTIFACT	UNP P17065
C	49	GLY	-	CLONING ARTIFACT	UNP P17065

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Chain	Residue	Modelled	Actual	Comment	Reference
C	50	SER	-	CLONING ARTIFACT	UNP P17065

- Molecule 3 is PHOSPHATE ION (three-letter code: PO4) (formula: O<sub>4</sub>P).



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

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	39	Total O 39 39	0	0
4	B	42	Total O 42 42	0	0
4	C	33	Total O 33 33	0	0



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	116.58Å 117.42Å 123.33Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.08 – 2.70 48.08 – 2.70	Depositor EDS
% Data completeness (in resolution range)	98.2 (48.08-2.70) 98.4 (48.08-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.40 (at 2.69Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.273 , 0.298 0.275 , 0.298	Depositor DCC
$R_{free}$ test set	1121 reflections (4.83%)	DCC
Wilson B-factor (Å <sup>2</sup> )	50.5	Xtriage
Anisotropy	0.843	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 54.1	EDS
Estimated twinning fraction	0.000 for -k,-h,-l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Outliers	1 of 23220 reflections (0.004%)	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	3023	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	77.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.60% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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	0.44	0/1368	0.74	0/1843
2	B	0.39	0/778	0.67	0/1038
2	C	0.39	0/778	0.69	0/1038
All	All	0.41	0/2924	0.71	0/3919

There are no bond length outliers.

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	1349	0	1366	198	0
2	B	775	0	762	95	0
2	C	775	0	762	93	0
3	A	5	0	0	1	0
3	C	5	0	0	0	0
4	A	39	0	0	10	0
4	B	42	0	0	11	0
4	C	33	0	0	2	0
All	All	3023	0	2890	330	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 57.

All (330) 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:101:ASP:H	1:A:107:THR:HG21	1.16	1.10
1:A:108:PHE:CZ	1:A:150:LEU:HD11	1.98	0.99
1:A:81:ARG:HD3	1:A:82:PHE:CE1	2.07	0.89
1:A:114:TRP:O	1:A:118:VAL:HG23	1.73	0.88
2:B:137:LEU:HB2	2:C:137:LEU:HD21	1.56	0.88
1:A:143:THR:HG23	1:A:146:GLN:HE21	1.41	0.86
2:B:80:ILE:HD13	2:C:80:ILE:HG13	1.56	0.85
1:A:41:VAL:HA	1:A:60:LYS:NZ	1.91	0.85
1:A:96:ILE:HD12	1:A:97:ILE:N	1.92	0.84
1:A:130:LEU:HB3	1:A:158:PHE:HD1	1.42	0.83
2:B:80:ILE:CD1	2:C:80:ILE:HG13	2.09	0.83
1:A:170:ASN:O	1:A:174:PHE:HD1	1.61	0.82
2:B:132:ARG:HG3	2:B:132:ARG:HH11	1.44	0.82
1:A:17:GLY:N	1:A:68:LYS:HZ2	1.76	0.82
1:A:64:ILE:O	1:A:67:LYS:HG2	1.80	0.81
1:A:159:ILE:HG22	1:A:160:GLU:H	1.42	0.81
1:A:106:ARG:H	1:A:106:ARG:HD3	1.46	0.81
1:A:136:ASP:OD1	1:A:162:SER:HB3	1.81	0.81
2:B:137:LEU:HB2	2:C:137:LEU:CD2	2.11	0.79
2:B:87:ARG:HH11	2:C:86:LEU:HD12	1.47	0.79
1:A:24:LEU:HD12	1:A:25:LEU:N	1.96	0.79
1:A:98:LEU:HD11	1:A:128:LEU:HD12	1.65	0.79
2:B:87:ARG:HA	2:C:87:ARG:HG3	1.65	0.78
2:C:98:ASN:N	2:C:98:ASN:HD22	1.79	0.78
1:A:136:ASP:OD1	1:A:164:LYS:HB2	1.85	0.76
1:A:101:ASP:H	1:A:107:THR:CG2	1.97	0.75
1:A:22:LYS:C	1:A:23:ILE:HD12	2.08	0.73
2:B:83:GLU:HG3	2:B:83:GLU:O	1.89	0.73
2:B:80:ILE:HG12	2:C:80:ILE:CD1	2.19	0.73
1:A:140:ARG:HD3	1:A:142:VAL:O	1.90	0.72
2:B:53:ASN:HB3	4:B:154:HOH:O	1.87	0.72
2:C:74:LYS:O	2:C:78:GLU:HG3	1.89	0.72
1:A:98:LEU:HD11	1:A:128:LEU:CD1	2.20	0.72
1:A:176:LEU:HD12	1:A:180:ILE:HD11	1.70	0.71
2:B:96:LYS:O	2:B:100:GLU:HG3	1.90	0.71
1:A:101:ASP:N	1:A:107:THR:HG21	1.99	0.71
1:A:18:SER:HB2	1:A:68:LYS:HD2	1.73	0.71
2:B:55:LEU:HD23	2:C:55:LEU:HD23	1.72	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:64:ILE:HG13	1:A:67:LYS:NZ	2.04	0.70
1:A:39:ARG:HD2	1:A:163:ALA:HB1	1.71	0.70
1:A:139:THR:O	1:A:141:VAL:HG13	1.92	0.70
1:A:72:GLN:C	1:A:73:LEU:HD23	2.12	0.70
1:A:144:ALA:O	1:A:148:GLU:HG3	1.92	0.69
1:A:60:LYS:HG3	1:A:62:VAL:HG23	1.75	0.69
1:A:106:ARG:H	1:A:106:ARG:CD	2.05	0.69
1:A:118:VAL:O	1:A:122:ALA:HB3	1.92	0.68
1:A:84:THR:HB	2:C:100:GLU:OE2	1.94	0.68
1:A:39:ARG:HH21	1:A:166:ASP:HB2	1.59	0.67
2:C:142:THR:HG23	2:C:142:THR:O	1.92	0.67
1:A:100:TYR:HE1	1:A:130:LEU:HD12	1.58	0.67
1:A:97:ILE:HG22	1:A:99:VAL:CG2	2.25	0.67
2:C:85:GLU:HA	2:C:85:GLU:OE1	1.95	0.65
1:A:123:ASN:O	1:A:125:GLU:N	2.28	0.65
1:A:81:ARG:HD3	1:A:82:PHE:CZ	2.31	0.64
2:B:92:GLU:O	2:B:95:ASP:HB3	1.98	0.64
1:A:47:PRO:HA	4:A:203:HOH:O	1.97	0.64
1:A:139:THR:O	1:A:141:VAL:N	2.31	0.64
1:A:33:LYS:HB2	3:A:201:PO4:O1	1.98	0.64
2:B:87:ARG:CA	2:C:87:ARG:HG3	2.27	0.63
2:B:76:LEU:HD11	2:C:77:ARG:HH11	1.62	0.63
2:B:132:ARG:HH11	2:B:132:ARG:CG	2.11	0.63
1:A:180:ILE:O	1:A:184:ILE:HG13	1.99	0.62
2:C:139:GLU:HA	2:C:142:THR:HG22	1.80	0.62
2:B:60:ASN:HA	2:B:63:LYS:HE3	1.82	0.62
2:B:126:ILE:HG22	2:C:126:ILE:CG2	2.30	0.62
2:B:88:THR:HG22	2:B:89:LYS:N	2.13	0.62
2:B:55:LEU:CD2	2:C:55:LEU:HD23	2.29	0.62
1:A:159:ILE:HG22	1:A:160:GLU:N	2.13	0.61
1:A:129:LEU:HD12	1:A:157:PRO:HG2	1.80	0.61
1:A:26:ILE:HG23	1:A:114:TRP:CE3	2.35	0.61
2:C:132:ARG:HG3	2:C:136:GLN:NE2	2.15	0.61
2:C:132:ARG:O	2:C:136:GLN:HG3	2.01	0.61
1:A:83:ARG:HA	1:A:86:THR:OG1	2.01	0.60
2:B:51:ASN:N	4:B:154:HOH:O	2.34	0.60
1:A:162:SER:C	1:A:164:LYS:H	2.05	0.60
1:A:168:ASN:HA	1:A:171:GLU:CD	2.22	0.60
1:A:100:TYR:CE1	1:A:130:LEU:HD12	2.37	0.60
1:A:143:THR:HG23	1:A:146:GLN:NE2	2.16	0.60
2:B:87:ARG:CD	2:C:86:LEU:HD12	2.31	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:28:ASP:HB3	4:A:221:HOH:O	2.02	0.59
2:C:98:ASN:H	2:C:98:ASN:HD22	1.47	0.59
1:A:100:TYR:HH	1:A:158:PHE:HE1	1.51	0.59
2:B:87:ARG:HH11	2:C:86:LEU:CD1	2.14	0.59
2:B:87:ARG:HG3	2:C:87:ARG:N	2.17	0.59
2:B:126:ILE:HG22	2:C:126:ILE:HG22	1.85	0.59
2:C:134:THR:HG23	4:C:215:HOH:O	2.02	0.59
1:A:122:ALA:O	1:A:124:ASP:N	2.37	0.58
2:B:73:VAL:HG23	2:C:73:VAL:HG23	1.84	0.58
1:A:41:VAL:HA	1:A:60:LYS:HZ1	1.69	0.58
2:B:134:THR:O	2:B:138:ARG:HB2	2.03	0.58
2:C:63:LYS:HE2	2:C:63:LYS:O	2.02	0.58
1:A:103:THR:HG21	1:A:137:MET:CE	2.33	0.57
2:C:133:LEU:HD23	2:C:136:GLN:NE2	2.19	0.57
2:C:80:ILE:HG22	2:C:81:ALA:N	2.19	0.57
2:B:75:ARG:O	2:B:78:GLU:HG3	2.05	0.57
1:A:33:LYS:NZ	1:A:33:LYS:HB2	2.19	0.57
2:C:98:ASN:N	2:C:98:ASN:ND2	2.51	0.57
1:A:80:GLU:HA	1:A:83:ARG:CZ	2.35	0.57
2:B:87:ARG:HD2	2:C:86:LEU:HD12	1.86	0.57
1:A:128:LEU:HB2	1:A:156:ILE:HG21	1.87	0.56
1:A:148:GLU:HG2	1:A:158:PHE:CD2	2.41	0.56
1:A:20:ILE:HG22	1:A:21:MET:N	2.20	0.56
1:A:32:GLY:HA2	4:A:227:HOH:O	2.04	0.56
1:A:62:VAL:HG12	1:A:63:ASP:N	2.20	0.56
1:A:134:LYS:C	1:A:136:ASP:H	2.09	0.56
2:B:80:ILE:HG12	2:C:80:ILE:HD11	1.85	0.56
1:A:129:LEU:HD22	4:A:211:HOH:O	2.06	0.56
1:A:97:ILE:HD11	1:A:176:LEU:HG	1.88	0.56
1:A:97:ILE:HG22	1:A:99:VAL:HG23	1.86	0.55
1:A:96:ILE:C	1:A:96:ILE:HD12	2.27	0.55
1:A:64:ILE:HG13	1:A:67:LYS:HZ2	1.70	0.55
2:B:77:ARG:HG2	2:C:76:LEU:HD11	1.88	0.55
1:A:162:SER:O	1:A:164:LYS:N	2.34	0.55
1:A:39:ARG:HE	1:A:166:ASP:HA	1.71	0.55
1:A:86:THR:HA	1:A:89:TYR:CD1	2.42	0.55
1:A:104:ASP:HB2	1:A:107:THR:OG1	2.06	0.55
2:B:132:ARG:O	2:B:136:GLN:HG3	2.06	0.55
1:A:20:ILE:HD12	1:A:20:ILE:N	2.21	0.54
1:A:26:ILE:HD12	1:A:96:ILE:CD1	2.37	0.54
2:B:137:LEU:CB	2:C:137:LEU:HD21	2.32	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:129:LEU:HD22	2:B:133:LEU:HD22	1.88	0.54
2:B:102:GLU:HB3	4:B:181:HOH:O	2.06	0.54
1:A:17:GLY:N	1:A:70:LYS:HD3	2.23	0.54
1:A:100:TYR:HB2	1:A:107:THR:HG22	1.90	0.54
2:B:88:THR:HA	4:B:145:HOH:O	2.07	0.54
2:B:123:LYS:HD2	2:C:122:GLU:HB2	1.90	0.54
1:A:136:ASP:CG	1:A:162:SER:HB3	2.27	0.54
1:A:121:HIS:CE1	4:A:215:HOH:O	2.60	0.54
1:A:134:LYS:HD3	1:A:137:MET:CE	2.38	0.54
2:B:69:ARG:HH11	2:B:69:ARG:HA	1.73	0.53
2:B:70:ASP:OD2	2:C:69:ARG:NH1	2.42	0.53
1:A:19:SER:HB3	1:A:69:VAL:HG12	1.89	0.53
2:C:132:ARG:HG3	2:C:136:GLN:HE21	1.73	0.53
1:A:108:PHE:CE2	1:A:150:LEU:HD21	2.43	0.53
1:A:41:VAL:HA	1:A:60:LYS:HZ3	1.74	0.53
1:A:103:THR:HG21	1:A:137:MET:HE1	1.91	0.53
1:A:119:ASN:HA	1:A:124:ASP:OD1	2.09	0.53
2:B:62:LEU:HD21	2:C:62:LEU:HB2	1.91	0.53
1:A:130:LEU:HD23	1:A:156:ILE:HD11	1.91	0.52
2:B:73:VAL:CG2	2:C:73:VAL:HG23	2.38	0.52
2:B:82:LYS:C	2:B:84:ASN:H	2.12	0.52
1:A:143:THR:H	1:A:146:GLN:NE2	2.07	0.52
1:A:143:THR:N	1:A:146:GLN:HE21	2.07	0.52
1:A:37:LEU:CD1	1:A:75:ASP:HB2	2.40	0.52
1:A:63:ASP:O	1:A:64:ILE:HG12	2.10	0.52
1:A:143:THR:OG1	1:A:146:GLN:HG3	2.10	0.52
1:A:176:LEU:HD23	4:A:211:HOH:O	2.11	0.51
1:A:49:PHE:N	1:A:56:ASP:OD2	2.43	0.51
1:A:26:ILE:HD13	1:A:118:VAL:HG22	1.92	0.51
1:A:80:GLU:HA	1:A:83:ARG:NH2	2.26	0.51
2:C:72:GLU:HG3	2:C:75:ARG:NH1	2.25	0.51
1:A:20:ILE:O	1:A:21:MET:HG2	2.10	0.51
2:B:118:ASP:O	2:B:122:GLU:HG3	2.10	0.51
1:A:134:LYS:HD3	1:A:137:MET:HE1	1.92	0.51
1:A:23:ILE:O	1:A:73:LEU:HA	2.11	0.50
1:A:176:LEU:HB2	4:A:211:HOH:O	2.11	0.50
1:A:176:LEU:HD12	1:A:180:ILE:CD1	2.41	0.50
2:B:124:TYR:O	2:B:127:GLU:HB3	2.12	0.49
1:A:77:ALA:O	1:A:79:GLN:N	2.33	0.49
1:A:118:VAL:O	1:A:122:ALA:CB	2.59	0.49
2:B:137:LEU:HB2	2:C:137:LEU:HD23	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:143:THR:H	1:A:146:GLN:HE21	1.61	0.49
2:B:87:ARG:HD2	2:C:86:LEU:CD1	2.42	0.49
1:A:21:MET:HA	1:A:94:MET:SD	2.52	0.49
1:A:39:ARG:HE	1:A:166:ASP:CA	2.25	0.49
1:A:18:SER:HA	4:A:229:HOH:O	2.13	0.49
1:A:64:ILE:HG21	1:A:178:LYS:HZ2	1.77	0.49
1:A:136:ASP:CG	1:A:164:LYS:HG3	2.34	0.48
1:A:62:VAL:CG1	1:A:63:ASP:N	2.76	0.48
2:B:102:GLU:O	2:B:104:LEU:N	2.45	0.48
1:A:64:ILE:HD13	1:A:178:LYS:HZ2	1.77	0.48
2:C:139:GLU:HA	2:C:142:THR:CG2	2.44	0.48
1:A:124:ASP:C	1:A:126:ALA:H	2.16	0.48
1:A:169:VAL:O	1:A:172:ILE:HB	2.13	0.48
2:B:69:ARG:CG	2:C:69:ARG:HB3	2.43	0.48
2:B:84:ASN:HA	2:C:83:GLU:OE1	2.13	0.48
2:C:116:VAL:O	2:C:120:ARG:HG3	2.12	0.48
1:A:150:LEU:O	1:A:154:LEU:HG	2.13	0.48
1:A:106:ARG:HD3	1:A:106:ARG:N	2.21	0.48
1:A:81:ARG:C	1:A:83:ARG:H	2.18	0.48
2:B:64:ARG:HD2	4:B:151:HOH:O	2.13	0.48
1:A:133:ASN:CG	1:A:134:LYS:H	2.18	0.47
2:B:132:ARG:NH1	2:B:132:ARG:CG	2.74	0.47
1:A:160:GLU:O	1:A:161:SER:HB3	2.13	0.47
1:A:71:LEU:HB3	1:A:73:LEU:HD21	1.97	0.47
2:C:138:ARG:C	2:C:140:LYS:H	2.18	0.47
1:A:24:LEU:HD12	1:A:25:LEU:H	1.78	0.47
1:A:47:PRO:HB3	2:B:116:VAL:HG11	1.96	0.47
2:B:80:ILE:HG22	2:B:81:ALA:N	2.29	0.47
1:A:132:GLY:O	1:A:160:GLU:HA	2.15	0.47
2:B:135:GLU:HA	2:B:138:ARG:HB2	1.97	0.47
1:A:115:PHE:CD2	1:A:154:LEU:HD22	2.50	0.47
1:A:86:THR:HA	1:A:89:TYR:CE1	2.49	0.47
2:B:86:LEU:HB2	2:C:87:ARG:HD3	1.97	0.47
2:C:133:LEU:HD23	2:C:136:GLN:HE22	1.80	0.47
2:B:75:ARG:NH1	4:B:156:HOH:O	2.48	0.47
2:B:69:ARG:HG2	2:C:69:ARG:HB3	1.95	0.47
1:A:161:SER:HB2	1:A:167:ASP:O	2.15	0.47
2:B:87:ARG:HG3	2:C:86:LEU:HB2	1.97	0.47
2:B:88:THR:CA	4:B:145:HOH:O	2.61	0.47
1:A:21:MET:CE	1:A:177:ALA:HA	2.45	0.47
1:A:91:ARG:NH2	2:B:99:LYS:HB2	2.30	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:118:VAL:HG11	1:A:128:LEU:HD11	1.95	0.47
1:A:100:TYR:CG	1:A:111:ILE:HD11	2.50	0.47
1:A:37:LEU:CD2	1:A:73:LEU:HD12	2.45	0.47
2:B:76:LEU:HD11	2:C:77:ARG:NH1	2.28	0.47
2:B:116:VAL:HG22	2:C:115:MET:HB2	1.97	0.47
1:A:59:ILE:HA	1:A:71:LEU:O	2.15	0.46
1:A:71:LEU:CB	1:A:73:LEU:HD21	2.45	0.46
1:A:112:LYS:O	1:A:115:PHE:HB3	2.15	0.46
2:B:87:ARG:N	2:C:87:ARG:HG3	2.30	0.46
1:A:85:ILE:O	1:A:88:ALA:N	2.45	0.46
2:C:89:LYS:C	2:C:91:GLU:H	2.19	0.46
2:C:69:ARG:HD3	2:C:69:ARG:HA	1.38	0.46
1:A:57:PHE:C	1:A:58:LYS:HG3	2.35	0.46
2:B:86:LEU:HB3	2:C:87:ARG:HD2	1.98	0.46
1:A:23:ILE:N	1:A:23:ILE:HD12	2.30	0.46
1:A:169:VAL:HG12	1:A:170:ASN:N	2.31	0.46
2:B:116:VAL:HG21	2:C:115:MET:SD	2.55	0.46
1:A:142:VAL:HA	1:A:146:GLN:NE2	2.31	0.45
1:A:170:ASN:H	1:A:170:ASN:HD22	1.65	0.45
1:A:134:LYS:HB3	1:A:137:MET:CE	2.46	0.45
1:A:33:LYS:HB2	1:A:33:LYS:HZ2	1.80	0.45
2:C:97:LEU:O	2:C:100:GLU:HB2	2.16	0.45
2:B:82:LYS:C	2:B:84:ASN:N	2.70	0.45
1:A:17:GLY:N	1:A:68:LYS:NZ	2.58	0.45
2:B:69:ARG:CA	2:B:69:ARG:HH11	2.29	0.45
2:C:57:GLU:HB2	4:C:229:HOH:O	2.17	0.45
1:A:98:LEU:HD11	1:A:128:LEU:HB3	1.98	0.45
1:A:38:VAL:O	1:A:41:VAL:O	2.34	0.45
1:A:77:ALA:C	1:A:79:GLN:H	2.19	0.45
1:A:176:LEU:O	1:A:180:ILE:HG13	2.17	0.45
2:C:78:GLU:O	2:C:82:LYS:HB2	2.16	0.45
2:B:80:ILE:HG12	2:C:80:ILE:HD12	1.95	0.45
1:A:54:GLY:HA3	1:A:79:GLN:HE21	1.81	0.45
1:A:140:ARG:C	1:A:142:VAL:H	2.20	0.45
2:B:114:ASN:O	2:B:118:ASP:N	2.48	0.45
1:A:123:ASN:C	1:A:125:GLU:H	2.20	0.44
1:A:146:GLN:O	1:A:149:ALA:HB3	2.17	0.44
2:C:86:LEU:O	2:C:89:LYS:N	2.48	0.44
2:C:77:ARG:CG	2:C:77:ARG:HH11	2.30	0.44
1:A:81:ARG:O	1:A:83:ARG:N	2.49	0.44
1:A:80:GLU:O	1:A:83:ARG:HB2	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:95:ASP:HA	4:B:170:HOH:O	2.17	0.44
1:A:85:ILE:HG23	2:B:101:VAL:HG11	2.00	0.44
2:C:123:LYS:HE3	2:C:127:GLU:OE2	2.17	0.44
1:A:106:ARG:CD	1:A:106:ARG:N	2.79	0.44
2:C:73:VAL:O	2:C:74:LYS:C	2.56	0.44
2:B:93:GLU:C	2:B:95:ASP:N	2.72	0.44
1:A:125:GLU:HG2	1:A:125:GLU:O	2.17	0.44
1:A:167:ASP:C	1:A:169:VAL:H	2.22	0.43
1:A:63:ASP:C	1:A:64:ILE:CG1	2.86	0.43
1:A:134:LYS:HB3	1:A:137:MET:HE1	2.01	0.43
2:B:87:ARG:O	2:B:91:GLU:HG3	2.18	0.43
2:B:88:THR:CG2	2:B:89:LYS:N	2.81	0.43
1:A:46:ASN:HD22	1:A:46:ASN:HA	1.62	0.43
1:A:80:GLU:O	1:A:81:ARG:O	2.37	0.43
1:A:55:ILE:HG22	1:A:56:ASP:N	2.34	0.43
2:B:136:GLN:HE21	2:C:137:LEU:CD1	2.32	0.43
2:B:136:GLN:HE21	2:C:137:LEU:HD11	1.82	0.43
1:A:150:LEU:H	1:A:150:LEU:HG	1.65	0.43
1:A:64:ILE:O	1:A:67:LYS:HE3	2.18	0.43
1:A:171:GLU:O	1:A:172:ILE:C	2.57	0.43
1:A:136:ASP:O	1:A:137:MET:C	2.56	0.43
1:A:65:ASN:HD21	1:A:178:LYS:HE3	1.81	0.43
1:A:182:GLU:HG3	1:A:183:LYS:N	2.34	0.43
1:A:168:ASN:O	1:A:172:ILE:HG13	2.19	0.43
1:A:97:ILE:CG2	1:A:99:VAL:HG22	2.48	0.43
1:A:26:ILE:HG13	1:A:96:ILE:HD13	2.01	0.43
2:B:86:LEU:HB3	2:C:87:ARG:CD	2.49	0.43
2:B:76:LEU:HD23	2:B:76:LEU:HA	1.74	0.43
1:A:49:PHE:O	1:A:53:ILE:N	2.44	0.43
1:A:85:ILE:HG23	2:B:101:VAL:CG1	2.49	0.43
1:A:39:ARG:NH2	1:A:166:ASP:HB2	2.30	0.43
2:B:123:LYS:O	2:B:124:TYR:C	2.57	0.43
1:A:142:VAL:HG12	1:A:143:THR:N	2.33	0.42
1:A:182:GLU:C	1:A:184:ILE:H	2.21	0.42
1:A:53:ILE:N	1:A:53:ILE:HD13	2.34	0.42
1:A:80:GLU:O	1:A:81:ARG:C	2.57	0.42
2:B:77:ARG:HG2	2:C:76:LEU:CD1	2.49	0.42
2:B:87:ARG:CD	2:C:86:LEU:HB2	2.50	0.42
2:B:95:ASP:O	2:B:96:LYS:C	2.57	0.42
1:A:80:GLU:O	1:A:83:ARG:CB	2.67	0.42
1:A:33:LYS:CB	1:A:33:LYS:NZ	2.81	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:91:ARG:HD2	4:B:155:HOH:O	2.18	0.42
2:B:87:ARG:HG3	2:C:87:ARG:H	1.85	0.42
2:B:87:ARG:HD3	2:C:86:LEU:HD12	2.01	0.42
2:C:87:ARG:O	2:C:91:GLU:HG3	2.20	0.42
2:C:133:LEU:O	2:C:136:GLN:N	2.53	0.42
2:C:128:ILE:HG22	2:C:129:LEU:N	2.34	0.42
1:A:39:ARG:HD2	1:A:163:ALA:CB	2.44	0.41
2:C:93:GLU:O	2:C:95:ASP:N	2.53	0.41
1:A:150:LEU:HD23	4:A:226:HOH:O	2.20	0.41
2:B:83:GLU:OE2	2:C:84:ASN:HB2	2.20	0.41
2:C:75:ARG:O	2:C:78:GLU:N	2.42	0.41
2:B:97:LEU:HD23	2:C:98:ASN:HD21	1.83	0.41
2:B:119:ALA:HB2	2:C:116:VAL:HG13	2.02	0.41
1:A:63:ASP:HB2	1:A:67:LYS:O	2.20	0.41
1:A:159:ILE:CG2	1:A:160:GLU:H	2.24	0.41
2:C:98:ASN:O	2:C:102:GLU:HG2	2.21	0.41
2:C:93:GLU:O	2:C:94:ALA:C	2.58	0.41
2:C:95:ASP:O	2:C:96:LYS:C	2.57	0.41
1:A:26:ILE:HB	1:A:96:ILE:HD11	2.03	0.41
2:B:86:LEU:CB	2:C:87:ARG:HD3	2.51	0.41
2:C:64:ARG:O	2:C:67:SER:N	2.53	0.41
1:A:118:VAL:HG12	1:A:122:ALA:CB	2.51	0.41
1:A:98:LEU:HD12	1:A:129:LEU:H	1.85	0.41
1:A:134:LYS:C	1:A:136:ASP:N	2.74	0.41
2:C:73:VAL:HG13	2:C:77:ARG:HD2	2.03	0.41
2:B:66:LEU:HA	2:C:66:LEU:CD1	2.51	0.41
2:C:64:ARG:O	2:C:66:LEU:N	2.54	0.41
2:C:88:THR:O	2:C:92:GLU:HG2	2.21	0.41
1:A:108:PHE:O	1:A:111:ILE:HG13	2.21	0.41
1:A:64:ILE:HG21	1:A:178:LYS:NZ	2.35	0.41
1:A:162:SER:C	1:A:164:LYS:N	2.71	0.41
1:A:72:GLN:O	1:A:73:LEU:HD23	2.19	0.41
2:B:92:GLU:HB3	4:B:180:HOH:O	2.20	0.41
2:B:93:GLU:HG3	4:B:179:HOH:O	2.21	0.41
1:A:34:SER:HB2	4:A:227:HOH:O	2.21	0.41
2:B:130:ASN:HB2	2:C:130:ASN:HD21	1.86	0.41
2:B:137:LEU:O	2:B:137:LEU:HD23	2.21	0.41
1:A:54:GLY:HA3	1:A:79:GLN:NE2	2.35	0.41
1:A:97:ILE:CG2	1:A:99:VAL:CG2	2.97	0.40
1:A:133:ASN:ND2	1:A:134:LYS:H	2.19	0.40
2:B:69:ARG:N	2:B:69:ARG:NH1	2.69	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:185:ASP:C	1:A:187:ASN:N	2.72	0.40
1:A:108:PHE:HE2	1:A:150:LEU:HD21	1.86	0.40
2:C:98:ASN:H	2:C:98:ASN:ND2	2.15	0.40
1:A:20:ILE:HD12	1:A:20:ILE:H	1.83	0.40
1:A:185:ASP:C	1:A:187:ASN:H	2.24	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	169/174 (97%)	133 (79%)	23 (14%)	13 (8%)	1	1
2	B	91/97 (94%)	63 (69%)	26 (29%)	2 (2%)	8	22
2	C	91/97 (94%)	74 (81%)	13 (14%)	4 (4%)	3	6
All	All	351/368 (95%)	270 (77%)	62 (18%)	19 (5%)	2	4

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	81	ARG
1	A	124	ASP
1	A	140	ARG
1	A	79	GLN
1	A	82	PHE
1	A	163	ALA
2	B	103	ASP
1	A	78	GLY
1	A	136	ASP
2	B	102	GLU
2	C	94	ALA
1	A	18	SER

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Mol	Chain	Res	Type
1	A	80	GLU
2	C	65	GLU
1	A	161	SER
1	A	141	VAL
2	C	75	ARG
2	C	93	GLU
1	A	159	ILE

### 5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	149/151 (99%)	127 (85%)	22 (15%)	4	9
2	B	85/87 (98%)	74 (87%)	11 (13%)	5	12
2	C	85/87 (98%)	76 (89%)	9 (11%)	8	19
All	All	319/325 (98%)	277 (87%)	42 (13%)	5	12

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	24	LEU
1	A	33	LYS
1	A	46	ASN
1	A	53	ILE
1	A	56	ASP
1	A	60	LYS
1	A	63	ASP
1	A	64	ILE
1	A	73	LEU
1	A	76	THR
1	A	80	GLU
1	A	86	THR
1	A	96	ILE
1	A	106	ARG
1	A	113	GLN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	121	HIS
1	A	128	LEU
1	A	130	LEU
1	A	135	SER
1	A	140	ARG
1	A	150	LEU
1	A	176	LEU
2	B	62	LEU
2	B	69	ARG
2	B	77	ARG
2	B	88	THR
2	B	101	VAL
2	B	103	ASP
2	B	111	GLU
2	B	129	LEU
2	B	132	ARG
2	B	133	LEU
2	B	137	LEU
2	C	63	LYS
2	C	69	ARG
2	C	77	ARG
2	C	80	ILE
2	C	83	GLU
2	C	85	GLU
2	C	88	THR
2	C	98	ASN
2	C	123	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	46	ASN
1	A	65	ASN
1	A	79	GLN
1	A	119	ASN
1	A	133	ASN
1	A	146	GLN
1	A	170	ASN
1	A	181	GLN
2	B	130	ASN
2	B	136	GLN
2	C	60	ASN

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Mol	Chain	Res	Type
2	C	98	ASN
2	C	114	ASN
2	C	130	ASN
2	C	136	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 carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

2 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	PO4	A	201	-	4,4,4	1.14	0	6,6,6	0.27	0
3	PO4	C	202	-	4,4,4	1.08	0	6,6,6	0.27	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	PO4	A	201	-	-	0/0/0/0	0/0/0/0
3	PO4	C	202	-	-	0/0/0/0	0/0/0/0

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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	201	PO4	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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	171/174 (98%)	0.60	18 (10%) 8 6	42, 95, 145, 162	0
2	B	93/97 (95%)	0.10	1 (1%) 82 83	32, 55, 94, 160	0
2	C	93/97 (95%)	0.13	1 (1%) 82 83	29, 56, 95, 161	0
All	All	357/368 (97%)	0.35	20 (5%) 28 26	29, 71, 144, 162	0

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	108	PHE	5.3
2	B	142	THR	3.9
2	C	140	LYS	3.8
1	A	26	ILE	3.1
1	A	111	ILE	2.9
1	A	100	TYR	2.5
1	A	109	THR	2.5
1	A	105	GLU	2.5
1	A	36	LEU	2.4
1	A	112	LYS	2.4
1	A	187	ASN	2.4
1	A	127	GLN	2.3
1	A	163	ALA	2.2
1	A	91	ARG	2.2
1	A	18	SER	2.1
1	A	130	LEU	2.1
1	A	39	ARG	2.1
1	A	66	GLY	2.1
1	A	133	ASN	2.0
1	A	17	GLY	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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> 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	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	PO4	A	201	5/5	0.96	0.20	-0.08	79,84,85,85	0
3	PO4	C	202	5/5	0.98	0.17	-0.19	66,67,70,72	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.