Full wwPDB X-ray Structure Validation Report ⓘ

Jun 30, 2025 – 10:05 AM EDT

PDB ID	:	9CIR / pdb_00009cir
Title	:	Crystal structure of pyrophosphate-dependent phosphofructokinase from Candidatus Prometheoarchaeum syntrophicum
Authors	:	Compton, J.A.; Yosaatmadja, Y.; Bashiri, G.; Vickers, C.J.; Patrick, W.M.
Deposited on	:	2024-07-04
Resolution	:	2.20 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

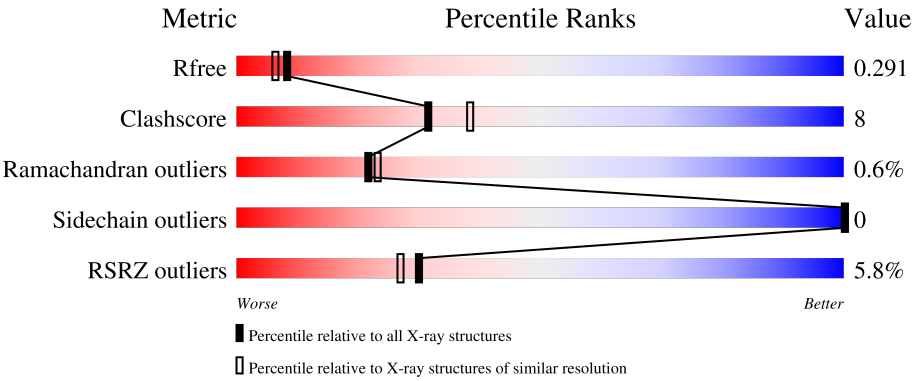
MolProbity	:	4-5-2 with Phenix2.0rc1
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

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 2.20 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}	164625	5791 (2.20-2.20)
Clashscore	180529	6634 (2.20-2.20)
Ramachandran outliers	177936	6560 (2.20-2.20)
Sidechain outliers	177891	6561 (2.20-2.20)
RSRZ outliers	164620	5791 (2.20-2.20)

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	424	4% 76% 15% 9%
1	B	424	5% 77% 15% 8%
1	C	424	6% 71% 17% 11%
1	D	424	5% 73% 14% 12%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 11226 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 6-phosphofructokinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	385	Total	C	N	O	S	0	0	0
			2787	1756	476	543	12			
1	B	391	Total	C	N	O	S	0	0	0
			2839	1791	482	553	13			
1	C	377	Total	C	N	O	S	0	0	0
			2730	1733	466	519	12			
1	D	372	Total	C	N	O	S	0	0	0
			2649	1677	456	503	13			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-17	MET	-	initiating methionine	UNP A0A5B9D762
A	-16	GLY	-	expression tag	UNP A0A5B9D762
A	-15	SER	-	expression tag	UNP A0A5B9D762
A	-14	SER	-	expression tag	UNP A0A5B9D762
A	-13	HIS	-	expression tag	UNP A0A5B9D762
A	-12	HIS	-	expression tag	UNP A0A5B9D762
A	-11	HIS	-	expression tag	UNP A0A5B9D762
A	-10	HIS	-	expression tag	UNP A0A5B9D762
A	-9	HIS	-	expression tag	UNP A0A5B9D762
A	-8	HIS	-	expression tag	UNP A0A5B9D762
A	-7	SER	-	expression tag	UNP A0A5B9D762
A	-6	SER	-	expression tag	UNP A0A5B9D762
A	-5	GLY	-	expression tag	UNP A0A5B9D762
A	-4	LEU	-	expression tag	UNP A0A5B9D762
A	-3	VAL	-	expression tag	UNP A0A5B9D762
A	-2	PRO	-	expression tag	UNP A0A5B9D762
A	-1	ARG	-	expression tag	UNP A0A5B9D762
A	0	GLY	-	expression tag	UNP A0A5B9D762
A	1	SER	-	expression tag	UNP A0A5B9D762
A	2	HIS	-	expression tag	UNP A0A5B9D762
B	-17	MET	-	initiating methionine	UNP A0A5B9D762

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	GLY	-	expression tag	UNP A0A5B9D762
B	-15	SER	-	expression tag	UNP A0A5B9D762
B	-14	SER	-	expression tag	UNP A0A5B9D762
B	-13	HIS	-	expression tag	UNP A0A5B9D762
B	-12	HIS	-	expression tag	UNP A0A5B9D762
B	-11	HIS	-	expression tag	UNP A0A5B9D762
B	-10	HIS	-	expression tag	UNP A0A5B9D762
B	-9	HIS	-	expression tag	UNP A0A5B9D762
B	-8	HIS	-	expression tag	UNP A0A5B9D762
B	-7	SER	-	expression tag	UNP A0A5B9D762
B	-6	SER	-	expression tag	UNP A0A5B9D762
B	-5	GLY	-	expression tag	UNP A0A5B9D762
B	-4	LEU	-	expression tag	UNP A0A5B9D762
B	-3	VAL	-	expression tag	UNP A0A5B9D762
B	-2	PRO	-	expression tag	UNP A0A5B9D762
B	-1	ARG	-	expression tag	UNP A0A5B9D762
B	0	GLY	-	expression tag	UNP A0A5B9D762
B	1	SER	-	expression tag	UNP A0A5B9D762
B	2	HIS	-	expression tag	UNP A0A5B9D762
C	-17	MET	-	initiating methionine	UNP A0A5B9D762
C	-16	GLY	-	expression tag	UNP A0A5B9D762
C	-15	SER	-	expression tag	UNP A0A5B9D762
C	-14	SER	-	expression tag	UNP A0A5B9D762
C	-13	HIS	-	expression tag	UNP A0A5B9D762
C	-12	HIS	-	expression tag	UNP A0A5B9D762
C	-11	HIS	-	expression tag	UNP A0A5B9D762
C	-10	HIS	-	expression tag	UNP A0A5B9D762
C	-9	HIS	-	expression tag	UNP A0A5B9D762
C	-8	HIS	-	expression tag	UNP A0A5B9D762
C	-7	SER	-	expression tag	UNP A0A5B9D762
C	-6	SER	-	expression tag	UNP A0A5B9D762
C	-5	GLY	-	expression tag	UNP A0A5B9D762
C	-4	LEU	-	expression tag	UNP A0A5B9D762
C	-3	VAL	-	expression tag	UNP A0A5B9D762
C	-2	PRO	-	expression tag	UNP A0A5B9D762
C	-1	ARG	-	expression tag	UNP A0A5B9D762
C	0	GLY	-	expression tag	UNP A0A5B9D762
C	1	SER	-	expression tag	UNP A0A5B9D762
C	2	HIS	-	expression tag	UNP A0A5B9D762
D	-17	MET	-	initiating methionine	UNP A0A5B9D762
D	-16	GLY	-	expression tag	UNP A0A5B9D762
D	-15	SER	-	expression tag	UNP A0A5B9D762

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
D	-14	SER	-	expression tag	UNP A0A5B9D762
D	-13	HIS	-	expression tag	UNP A0A5B9D762
D	-12	HIS	-	expression tag	UNP A0A5B9D762
D	-11	HIS	-	expression tag	UNP A0A5B9D762
D	-10	HIS	-	expression tag	UNP A0A5B9D762
D	-9	HIS	-	expression tag	UNP A0A5B9D762
D	-8	HIS	-	expression tag	UNP A0A5B9D762
D	-7	SER	-	expression tag	UNP A0A5B9D762
D	-6	SER	-	expression tag	UNP A0A5B9D762
D	-5	GLY	-	expression tag	UNP A0A5B9D762
D	-4	LEU	-	expression tag	UNP A0A5B9D762
D	-3	VAL	-	expression tag	UNP A0A5B9D762
D	-2	PRO	-	expression tag	UNP A0A5B9D762
D	-1	ARG	-	expression tag	UNP A0A5B9D762
D	0	GLY	-	expression tag	UNP A0A5B9D762
D	1	SER	-	expression tag	UNP A0A5B9D762
D	2	HIS	-	expression tag	UNP A0A5B9D762

- Molecule 2 is water.

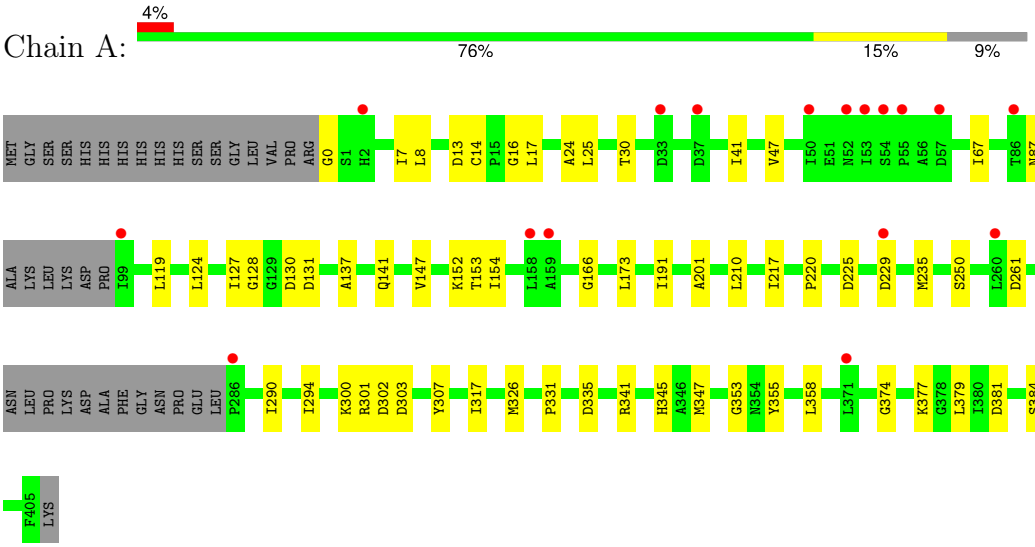
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	63	Total O 63 63	0	0
2	B	59	Total O 59 59	0	0
2	C	44	Total O 44 44	0	0
2	D	55	Total O 55 55	0	0

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.

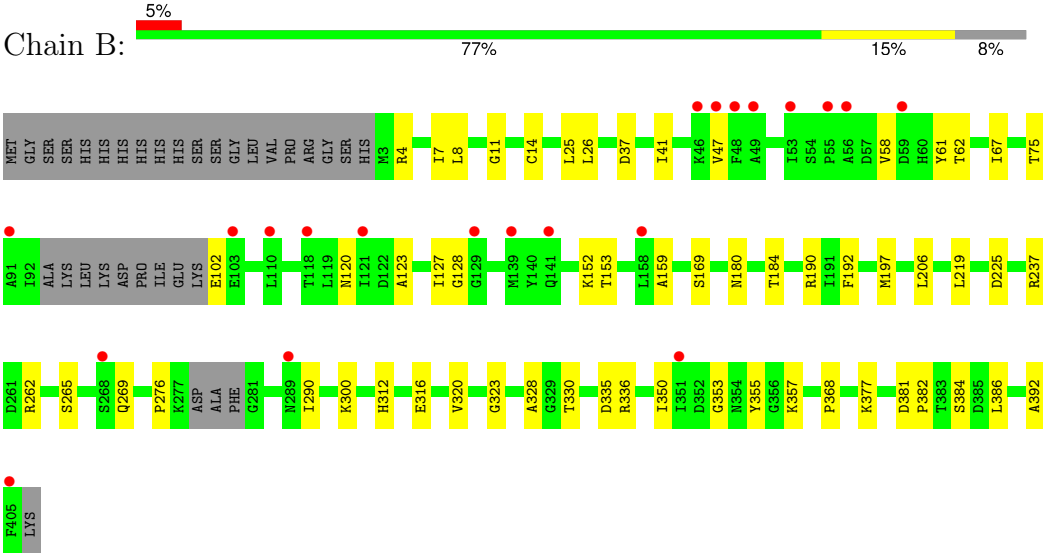
• Molecule 1: 6-phosphofructokinase

Chain A:



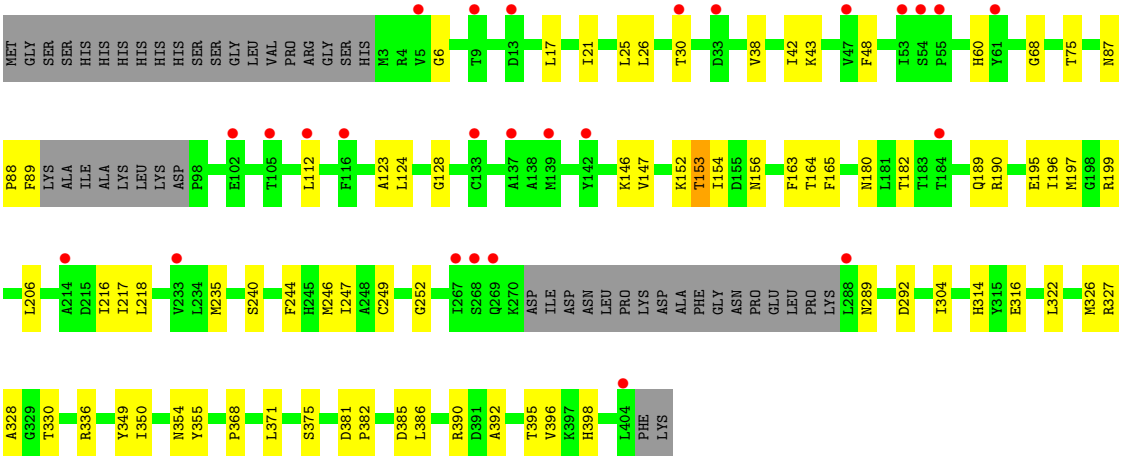
• Molecule 1: 6-phosphofructokinase

Chain B:



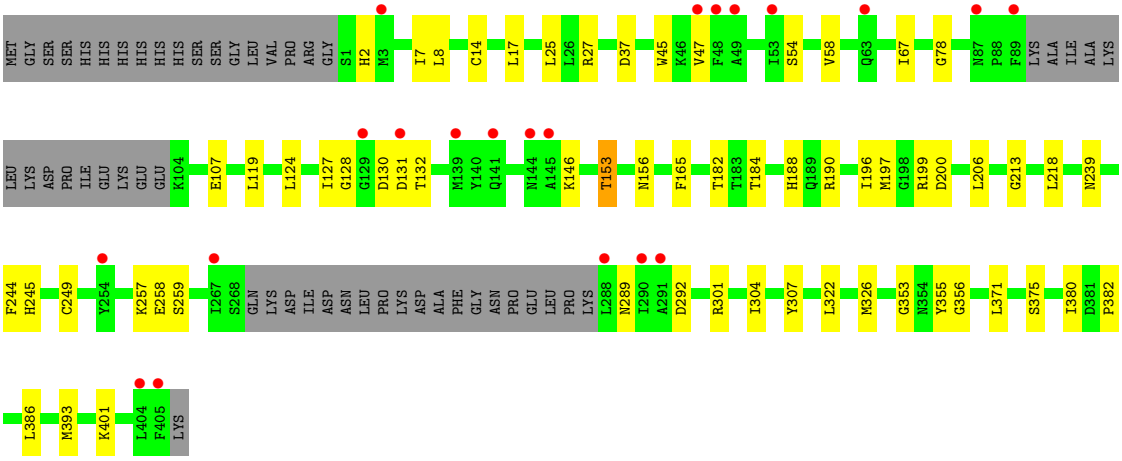
• Molecule 1: 6-phosphofructokinase

Chain C:



• Molecule 1: 6-phosphofructokinase

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	85.18Å 71.40Å 134.87Å 90.00° 91.12° 90.00°	Depositor
Resolution (Å)	49.02 – 2.20 49.02 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.9 (49.02-2.20) 100.0 (49.02-2.20)	Depositor EDS
R_{merge}	0.45	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.49 (at 2.20Å)	Xtriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.236 , 0.290 0.238 , 0.291	Depositor DCC
R_{free} test set	4160 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	41.4	Xtriage
Anisotropy	0.263	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 49.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.022 for h,-k,-l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	11226	wwPDB-VP
Average B, all atoms (Å^2)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.50% 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

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	0.39	0/2838	0.58	0/3861
1	B	0.36	0/2891	0.59	0/3936
1	C	0.36	0/2779	0.57	0/3779
1	D	0.33	0/2696	0.55	0/3674
All	All	0.36	0/11204	0.57	0/15250

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	2787	0	2576	41	0
1	B	2839	0	2629	47	0
1	C	2730	0	2570	52	0
1	D	2649	0	2456	40	0
2	A	63	0	0	2	0
2	B	59	0	0	4	0
2	C	44	0	0	2	0
2	D	55	0	0	1	0
All	All	11226	0	10231	169	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 8.

All (169) 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:42:ILE:HG22	1:C:43:LYS:HG3	1.59	0.84
1:D:196:ILE:HG23	1:D:326:MET:HE1	1.66	0.77
1:A:17:LEU:HD21	1:A:152:LYS:HG3	1.66	0.77
1:C:196:ILE:HG23	1:C:326:MET:HE1	1.67	0.75
1:B:4:ARG:NH2	1:B:120:ASN:O	2.15	0.75
1:D:322:LEU:HD12	1:D:326:MET:HE2	1.68	0.74
1:C:68:GLY:O	1:D:401:LYS:NZ	2.20	0.73
1:B:330:THR:CG2	1:B:336:ARG:HH21	2.01	0.71
1:B:25:LEU:HB3	1:B:67:ILE:HD12	1.76	0.68
1:D:239:ASN:ND2	1:D:307:TYR:OH	2.26	0.68
1:B:7:ILE:HD11	1:B:127:ILE:HD11	1.76	0.67
1:D:199:ARG:NH1	1:D:200:ASP:OD1	2.27	0.67
1:B:123:ALA:HB1	1:B:350:ILE:HD12	1.75	0.67
1:C:330:THR:HG21	1:C:336:ARG:HH21	1.57	0.67
1:D:7:ILE:HD11	1:D:127:ILE:HD11	1.77	0.66
1:A:128:GLY:HA2	1:A:152:LYS:HE3	1.78	0.66
1:B:197:MET:HE2	1:B:323:GLY:HA2	1.78	0.65
1:C:235:MET:HE3	1:C:304:ILE:HG12	1.79	0.64
1:B:128:GLY:HA2	1:B:152:LYS:HE3	1.78	0.64
1:C:330:THR:CG2	1:C:336:ARG:HH21	2.11	0.63
1:A:191:ILE:HB	1:A:317:ILE:HG13	1.81	0.63
1:B:47:VAL:HB	1:B:61:TYR:CD2	2.33	0.63
1:D:322:LEU:HD12	1:D:326:MET:CE	2.28	0.63
1:C:371:LEU:O	1:C:375:SER:OG	2.11	0.62
1:A:173:LEU:HD13	1:A:326:MET:HA	1.81	0.62
1:C:26:LEU:O	1:C:30:THR:HG23	1.99	0.62
1:B:353:GLY:HA2	1:B:355:TYR:CZ	2.35	0.62
1:D:188:HIS:HB2	1:D:190:ARG:HD2	1.83	0.60
1:C:124:LEU:HB3	1:C:147:VAL:HG12	1.85	0.59
1:D:322:LEU:HB2	1:D:326:MET:HE3	1.86	0.58
1:C:206:LEU:HD21	1:C:386:LEU:HB3	1.85	0.58
1:A:47:VAL:HG21	1:A:119:LEU:HD21	1.85	0.58
1:B:4:ARG:HG2	1:B:37:ASP:HB2	1.87	0.57
1:B:265:SER:OG	1:B:300:LYS:NZ	2.38	0.57
1:B:75:THR:O	1:B:330:THR:HG23	2.05	0.57
1:B:102:GLU:N	2:B:503:HOH:O	2.37	0.57
1:D:188:HIS:CB	1:D:190:ARG:HD2	2.35	0.56
1:C:322:LEU:HB2	1:C:326:MET:HE3	1.89	0.55
1:A:67:ILE:HD13	1:B:396:VAL:HG11	1.89	0.55
1:B:330:THR:HG21	1:B:336:ARG:HH21	1.70	0.55

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:2:HIS:NE2	1:D:37:ASP:OD2	2.40	0.55
1:A:381:ASP:HB3	1:A:384:SER:HB3	1.89	0.55
1:A:353:GLY:HA2	1:A:355:TYR:CZ	2.43	0.54
1:B:8:LEU:HB3	1:B:41:ILE:HB	1.88	0.54
1:D:146:LYS:HD3	1:D:355:TYR:CZ	2.43	0.54
1:C:330:THR:HG21	1:C:336:ARG:NH2	2.22	0.53
1:D:218:LEU:HB2	1:D:249:CYS:HA	1.91	0.53
1:A:30:THR:HG21	1:B:392:ALA:HB1	1.91	0.53
1:D:289:ASN:O	1:D:292:ASP:N	2.42	0.52
1:B:255:PRO:HD3	1:B:290:ILE:HD12	1.90	0.52
1:C:146:LYS:HB3	1:C:355:TYR:CD1	2.45	0.52
1:B:184:THR:HG22	2:B:511:HOH:O	2.08	0.51
1:C:48:PHE:HB3	1:C:112:LEU:HD22	1.92	0.51
1:D:197:MET:HG3	1:D:326:MET:SD	2.50	0.51
1:D:47:VAL:HG21	1:D:119:LEU:HD21	1.93	0.51
1:D:371:LEU:O	1:D:375:SER:OG	2.18	0.51
1:D:8:LEU:HD23	1:D:124:LEU:HD11	1.91	0.51
1:A:13:ASP:OD2	1:D:184:THR:HA	2.11	0.51
1:A:235:MET:HB3	1:A:307:TYR:CE1	2.46	0.51
1:B:206:LEU:HD21	1:B:386:LEU:HB3	1.91	0.51
1:A:25:LEU:HB3	1:A:67:ILE:HD12	1.94	0.50
1:D:25:LEU:HB3	1:D:67:ILE:HD12	1.93	0.50
1:B:11:GLY:O	1:B:83:THR:OG1	2.22	0.50
1:B:381:ASP:HB3	1:B:384:SER:HB3	1.94	0.50
1:C:349:TYR:CZ	1:C:368:PRO:HB3	2.46	0.50
1:D:45:TRP:HE1	1:D:132:THR:HG23	1.75	0.50
1:C:392:ALA:O	1:C:396:VAL:HG23	2.11	0.49
1:C:154:ILE:HD13	1:C:327:ARG:HG3	1.93	0.49
1:D:380:ILE:O	1:D:382:PRO:HD3	2.13	0.49
1:A:341:ARG:O	1:A:345:HIS:HD2	1.96	0.49
1:C:199:ARG:O	1:C:252:GLY:HA3	2.12	0.49
1:D:257:LYS:C	1:D:259:SER:H	2.21	0.48
1:A:261:ASP:OD2	2:A:501:HOH:O	2.20	0.48
1:A:303:ASP:OD1	1:A:303:ASP:N	2.40	0.48
1:B:58:VAL:O	1:B:62:THR:OG1	2.26	0.48
1:B:330:THR:HG22	1:B:336:ARG:HH21	1.77	0.48
1:C:240:SER:OG	1:C:398:HIS:O	2.28	0.48
1:A:358:LEU:HD22	1:A:374:GLY:HA3	1.95	0.47
1:B:75:THR:OG1	1:B:76:LYS:HE2	2.14	0.47
1:B:180:ASN:O	1:C:328:ALA:HB1	2.14	0.47
1:C:21:ILE:O	1:C:25:LEU:HG	2.13	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:0:GLY:N	2:A:502:HOH:O	2.38	0.47
1:A:341:ARG:HD2	1:B:386:LEU:HD21	1.95	0.47
1:B:237:ARG:HD2	2:B:536:HOH:O	2.13	0.47
1:C:152:LYS:C	1:C:152:LYS:HD2	2.39	0.47
1:C:156:ASN:OD1	1:C:163:PHE:HA	2.13	0.47
1:B:192:PHE:HE2	1:B:320:VAL:HG23	1.79	0.47
1:C:216:ILE:HB	1:C:247:ILE:HG12	1.97	0.47
1:A:137:ALA:O	1:A:141:GLN:HG2	2.14	0.47
1:D:54:SER:O	1:D:58:VAL:HG23	2.14	0.47
1:D:17:LEU:HB2	1:D:78:GLY:O	2.15	0.47
1:A:300:LYS:O	1:A:302:ASP:N	2.48	0.46
1:A:225:ASP:N	1:A:229:ASP:OD2	2.42	0.46
1:B:197:MET:HE2	1:B:323:GLY:CA	2.46	0.46
1:C:87:ASN:C	1:C:89:PHE:H	2.24	0.46
1:A:87:ASN:ND2	1:A:131:ASP:OD2	2.48	0.46
1:B:255:PRO:HG2	1:B:260:LEU:HD13	1.98	0.46
1:C:197:MET:HG3	2:C:524:HOH:O	2.16	0.45
1:D:301:ARG:HB3	1:D:304:ILE:HD12	1.98	0.45
1:A:396:VAL:HG11	1:B:26:LEU:CD2	2.47	0.45
1:C:396:VAL:HG11	1:D:67:ILE:HD13	1.98	0.45
1:C:6:GLY:N	1:C:123:ALA:O	2.48	0.45
1:C:246:MET:HE3	1:C:246:MET:HB3	1.81	0.45
1:A:377:LYS:HA	1:A:377:LYS:HD2	1.81	0.45
1:D:182:THR:HG23	1:D:244:PHE:CE2	2.51	0.45
1:D:153:THR:HG23	1:D:156:ASN:H	1.82	0.45
1:B:190:ARG:HG2	1:B:316:GLU:HB3	1.99	0.44
1:C:17:LEU:HD21	1:C:152:LYS:HG3	1.98	0.44
1:A:154:ILE:HG22	1:A:166:GLY:O	2.17	0.44
1:B:206:LEU:HD13	1:B:219:LEU:HD11	1.98	0.44
1:A:8:LEU:HB3	1:A:41:ILE:HB	2.00	0.44
1:A:13:ASP:OD1	1:A:14:CYS:N	2.44	0.44
1:B:41:ILE:HD13	1:B:62:THR:HG22	1.99	0.44
1:B:312:HIS:HB3	1:C:60:HIS:CE1	2.53	0.44
1:B:159:ALA:HB2	1:B:377:LYS:O	2.17	0.44
1:D:14:CYS:HB2	2:D:529:HOH:O	2.16	0.44
1:A:16:GLY:N	1:A:331:PRO:HG3	2.33	0.44
1:D:128:GLY:HA3	1:D:132:THR:HB	1.99	0.44
1:B:169:SER:OG	1:B:335:ASP:OD2	2.33	0.43
1:C:146:LYS:HB3	1:C:355:TYR:CE1	2.53	0.43
1:C:385:ASP:OD1	1:C:386:LEU:N	2.51	0.43
1:A:290:ILE:O	1:A:294:ILE:HG13	2.18	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:14:CYS:SG	1:A:166:GLY:HA3	2.58	0.43
1:C:182:THR:HG23	1:C:244:PHE:CE2	2.54	0.43
1:C:128:GLY:HA2	1:C:152:LYS:HE3	2.00	0.43
1:A:124:LEU:HB3	1:A:147:VAL:HG12	2.00	0.43
1:D:353:GLY:HA2	1:D:355:TYR:CZ	2.54	0.43
1:A:130:ASP:OD1	1:A:131:ASP:N	2.51	0.43
1:A:166:GLY:H	1:A:335:ASP:CG	2.27	0.43
1:B:14:CYS:SG	1:B:152:LYS:HG2	2.59	0.42
1:D:206:LEU:HD21	1:D:386:LEU:HB3	2.01	0.42
1:B:225:ASP:OD2	1:B:262:ARG:NH2	2.52	0.42
1:B:269:GLN:N	2:B:502:HOH:O	2.36	0.42
1:B:330:THR:HG21	1:B:336:ARG:NH2	2.33	0.42
1:A:220:PRO:HD3	1:A:250:SER:CB	2.50	0.42
1:B:357:LYS:HD2	1:B:368:PRO:HB2	2.01	0.42
1:C:75:THR:O	1:C:330:THR:HG23	2.20	0.42
1:C:289:ASN:O	1:C:292:ASP:N	2.53	0.42
1:C:123:ALA:HB1	1:C:350:ILE:HD12	2.02	0.42
1:A:217:ILE:HB	1:A:390:ARG:HD2	2.01	0.42
1:C:153:THR:O	1:C:164:THR:OG1	2.37	0.42
1:C:195:GLU:HA	1:C:249:CYS:O	2.19	0.42
1:D:213:GLY:HA2	1:D:393:MET:HE3	2.00	0.41
1:A:201:ALA:HB2	1:A:379:LEU:HD22	2.02	0.41
1:D:45:TRP:NE1	1:D:132:THR:HG23	2.34	0.41
1:D:356:GLY:C	1:D:371:LEU:HG	2.46	0.41
1:B:192:PHE:CE2	1:B:320:VAL:HG23	2.56	0.41
1:C:217:ILE:HB	1:C:390:ARG:HD2	2.02	0.41
1:A:7:ILE:HD11	1:A:127:ILE:HD11	2.02	0.41
1:B:381:ASP:HA	1:B:382:PRO:HD3	1.96	0.41
1:C:349:TYR:HB3	1:C:354:ASN:O	2.21	0.41
1:D:130:ASP:OD1	1:D:131:ASP:N	2.53	0.41
1:A:210:LEU:HD23	1:A:210:LEU:HA	1.86	0.41
1:D:27:ARG:HA	1:D:27:ARG:HD2	1.92	0.41
1:A:24:ALA:HB1	1:A:347:MET:HE2	2.03	0.41
1:C:25:LEU:HD23	1:C:38:VAL:HG21	2.02	0.41
1:C:199:ARG:NH1	2:C:505:HOH:O	2.53	0.41
1:D:244:PHE:C	1:D:245:HIS:CG	2.99	0.41
1:B:328:ALA:HB1	1:C:180:ASN:O	2.21	0.41
1:C:190:ARG:NE	1:C:316:GLU:OE1	2.51	0.41
1:C:218:LEU:HB2	1:C:249:CYS:HA	2.03	0.41
1:C:395:THR:HA	1:C:398:HIS:NE2	2.36	0.41
1:D:17:LEU:HD23	1:D:165:PHE:HZ	1.86	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:30:THR:HG21	1:B:392:ALA:CB	2.51	0.40
1:C:17:LEU:HD23	1:C:165:PHE:HZ	1.86	0.40
1:C:189:GLN:HB2	1:C:314:HIS:HB3	2.04	0.40
1:A:353:GLY:HA2	1:A:355:TYR:CE1	2.55	0.40
1:C:314:HIS:CD2	1:C:316:GLU:HB2	2.56	0.40
1:C:381:ASP:HA	1:C:382:PRO:HD3	1.99	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	379/424 (89%)	357 (94%)	20 (5%)	2 (0%)	25	28
1	B	385/424 (91%)	360 (94%)	23 (6%)	2 (0%)	25	28
1	C	371/424 (88%)	352 (95%)	17 (5%)	2 (0%)	25	28
1	D	366/424 (86%)	337 (92%)	26 (7%)	3 (1%)	16	16
All	All	1501/1696 (88%)	1406 (94%)	86 (6%)	9 (1%)	22	23

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	276	PRO
1	C	153	THR
1	D	107	GLU
1	D	153	THR
1	D	258	GLU
1	A	153	THR
1	B	153	THR
1	A	301	ARG
1	C	88	PRO

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	268/355 (76%)	268 (100%)	0	100	100
1	B	276/355 (78%)	276 (100%)	0	100	100
1	C	263/355 (74%)	263 (100%)	0	100	100
1	D	249/355 (70%)	249 (100%)	0	100	100
All	All	1056/1420 (74%)	1056 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	186	HIS
1	A	312	HIS
1	A	324	HIS
1	C	114	ASN
1	C	299	ASN
1	D	239	ASN
1	D	295	GLN
1	D	299	ASN
1	D	309	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

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	385/424 (90%)	0.62	19 (4%)	36	33	27, 44, 67, 84	0
1	B	391/424 (92%)	0.64	22 (5%)	31	28	27, 44, 70, 79	0
1	C	377/424 (88%)	0.76	26 (6%)	24	22	28, 48, 74, 88	0
1	D	372/424 (87%)	0.80	21 (5%)	31	28	27, 49, 71, 84	0
All	All	1525/1696 (89%)	0.71	88 (5%)	30	27	27, 46, 71, 88	0

All (88) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	49	ALA	5.2
1	D	291	ALA	4.5
1	B	49	ALA	4.0
1	C	33	ASP	3.4
1	C	13	ASP	3.4
1	B	289	ASN	3.3
1	A	53	ILE	3.1
1	C	404	LEU	3.1
1	A	99	ILE	3.1
1	B	404	LEU	3.1
1	B	268	SER	3.1
1	C	267	ILE	3.1
1	C	214	ALA	3.1
1	A	286	PRO	3.0
1	B	129	GLY	2.9
1	D	48	PHE	2.9
1	C	61	TYR	2.9
1	C	53	ILE	2.9
1	B	405	PHE	2.8
1	D	47	VAL	2.8
1	B	91	ALA	2.8

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	D	53	ILE	2.7
1	D	288	LEU	2.7
1	C	30	THR	2.6
1	C	9	THR	2.6
1	C	269	GLN	2.6
1	A	52	ASN	2.5
1	A	90	LYS	2.5
1	C	268	SER	2.5
1	D	89	PHE	2.5
1	A	33	ASP	2.4
1	D	144	ASN	2.4
1	B	118	THR	2.4
1	C	55	PRO	2.4
1	D	267	ILE	2.4
1	B	59	ASP	2.4
1	A	2	HIS	2.4
1	C	288	LEU	2.4
1	B	103	GLU	2.4
1	D	139	MET	2.4
1	C	102	GLU	2.3
1	D	131	ASP	2.3
1	C	184	THR	2.3
1	B	158	LEU	2.3
1	A	54	SER	2.3
1	A	229	ASP	2.3
1	D	63	GLN	2.3
1	A	159	ALA	2.2
1	C	137	ALA	2.2
1	D	145	ALA	2.2
1	D	129	GLY	2.2
1	A	55	PRO	2.2
1	B	48	PHE	2.2
1	B	56	ALA	2.2
1	C	54	SER	2.2
1	A	371	LEU	2.2
1	B	47	VAL	2.2
1	B	46	LYS	2.2
1	C	139	MET	2.2
1	D	290	ILE	2.1
1	C	112	LEU	2.1
1	B	141	GLN	2.1
1	C	116	PHE	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	260	LEU	2.1
1	A	86	THR	2.1
1	D	254	TYR	2.1
1	C	5	VAL	2.1
1	A	158	LEU	2.1
1	D	141	GLN	2.1
1	A	57	ASP	2.1
1	B	53	ILE	2.1
1	B	351	ILE	2.1
1	C	133	CYS	2.1
1	B	110	LEU	2.1
1	B	139	MET	2.1
1	C	105	THR	2.1
1	D	405	PHE	2.0
1	A	270	LYS	2.0
1	B	121	ILE	2.0
1	C	47	VAL	2.0
1	C	233	VAL	2.0
1	C	142	TYR	2.0
1	A	37	ASP	2.0
1	A	50	ILE	2.0
1	B	55	PRO	2.0
1	D	87	ASN	2.0
1	D	404	LEU	2.0
1	D	3	MET	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.