Full wwPDB X-ray Structure Validation Report ⓘ

Mar 25, 2024 – 03:20 pm GMT

PDB ID	:	8OJQ
Title	:	Arabidopsis thaliana Phosphoenolpyruvate carboxylase PPC1 T778 mutant with bound phosphate
Authors	:	Haesaerts, S.; Loris, R.; Larsen, P.
Deposited on	:	2023-03-24
Resolution	:	3.05 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:

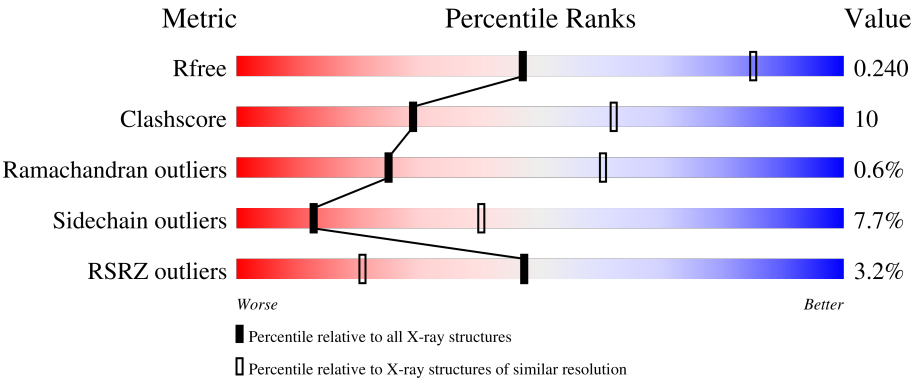
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)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

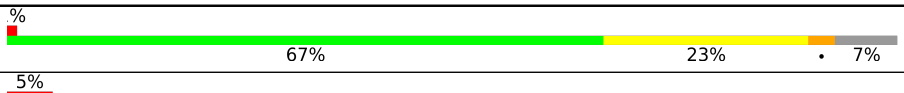
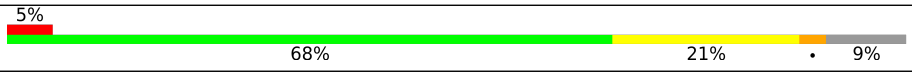
The reported resolution of this entry is 3.05 Å.

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	2752 (3.08-3.00)
Clashscore	141614	3096 (3.08-3.00)
Ramachandran outliers	138981	2986 (3.08-3.00)
Sidechain outliers	138945	2988 (3.08-3.00)
RSRZ outliers	127900	2636 (3.08-3.00)

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	974	
1	B	974	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 14446 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.

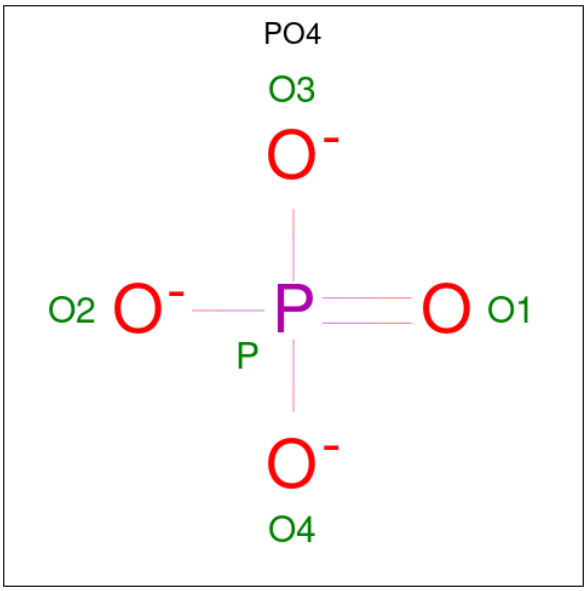
- Molecule 1 is a protein called Phosphoenolpyruvate carboxylase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	906	Total	C	N	O	S	0	3	0
			7267	4616	1273	1349	29			
1	B	890	Total	C	N	O	S	0	0	0
			7143	4535	1245	1334	29			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	MET	-	initiating methionine	UNP Q9MAH0
A	-5	HIS	-	expression tag	UNP Q9MAH0
A	-4	HIS	-	expression tag	UNP Q9MAH0
A	-3	HIS	-	expression tag	UNP Q9MAH0
A	-2	HIS	-	expression tag	UNP Q9MAH0
A	-1	HIS	-	expression tag	UNP Q9MAH0
A	0	HIS	-	expression tag	UNP Q9MAH0
A	778	ILE	THR	engineered mutation	UNP Q9MAH0
B	-6	MET	-	initiating methionine	UNP Q9MAH0
B	-5	HIS	-	expression tag	UNP Q9MAH0
B	-4	HIS	-	expression tag	UNP Q9MAH0
B	-3	HIS	-	expression tag	UNP Q9MAH0
B	-2	HIS	-	expression tag	UNP Q9MAH0
B	-1	HIS	-	expression tag	UNP Q9MAH0
B	0	HIS	-	expression tag	UNP Q9MAH0
B	778	ILE	THR	engineered mutation	UNP Q9MAH0

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



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

- Molecule 3 is water.

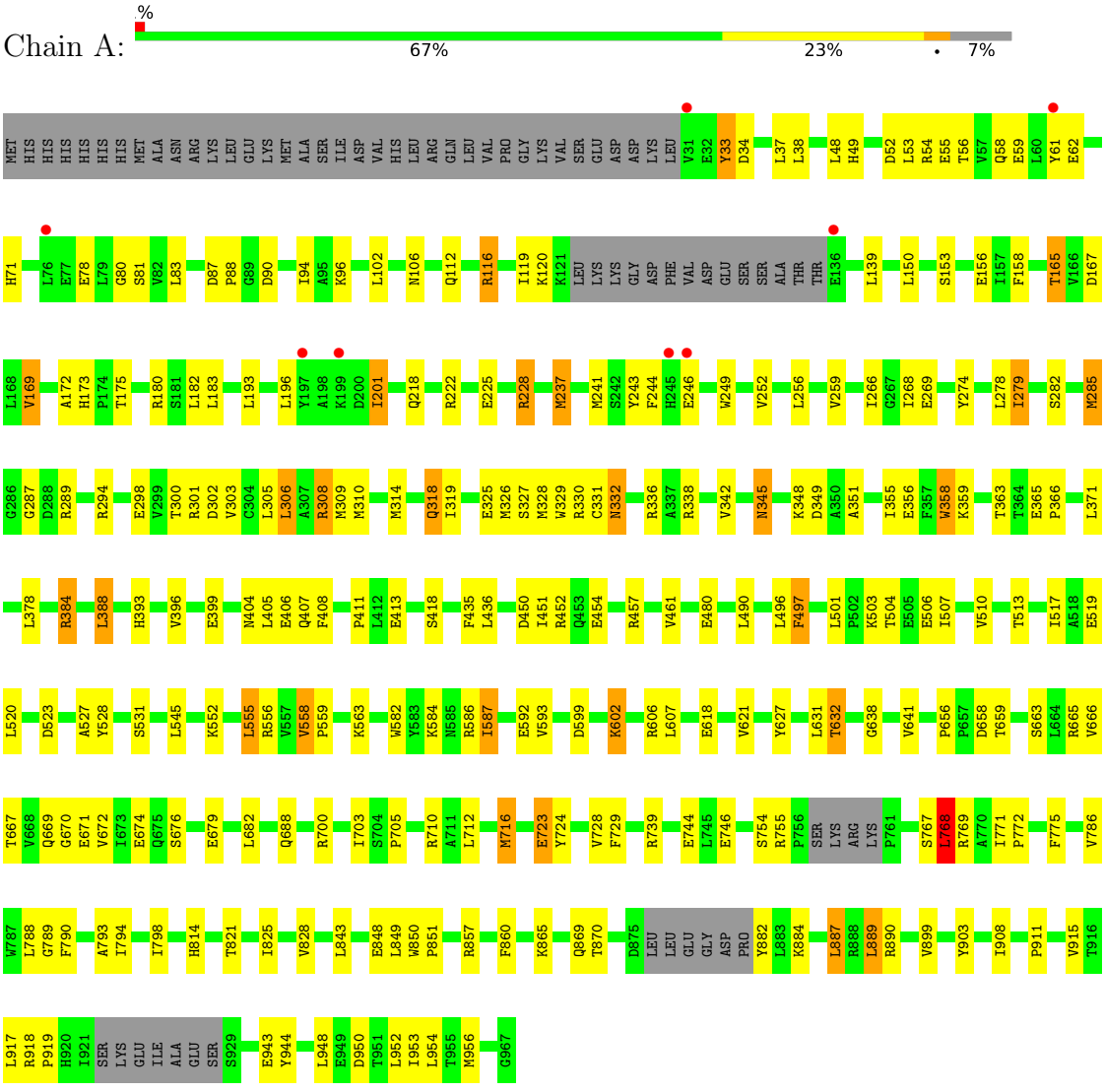
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	26	Total O 26 26	0	0

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.

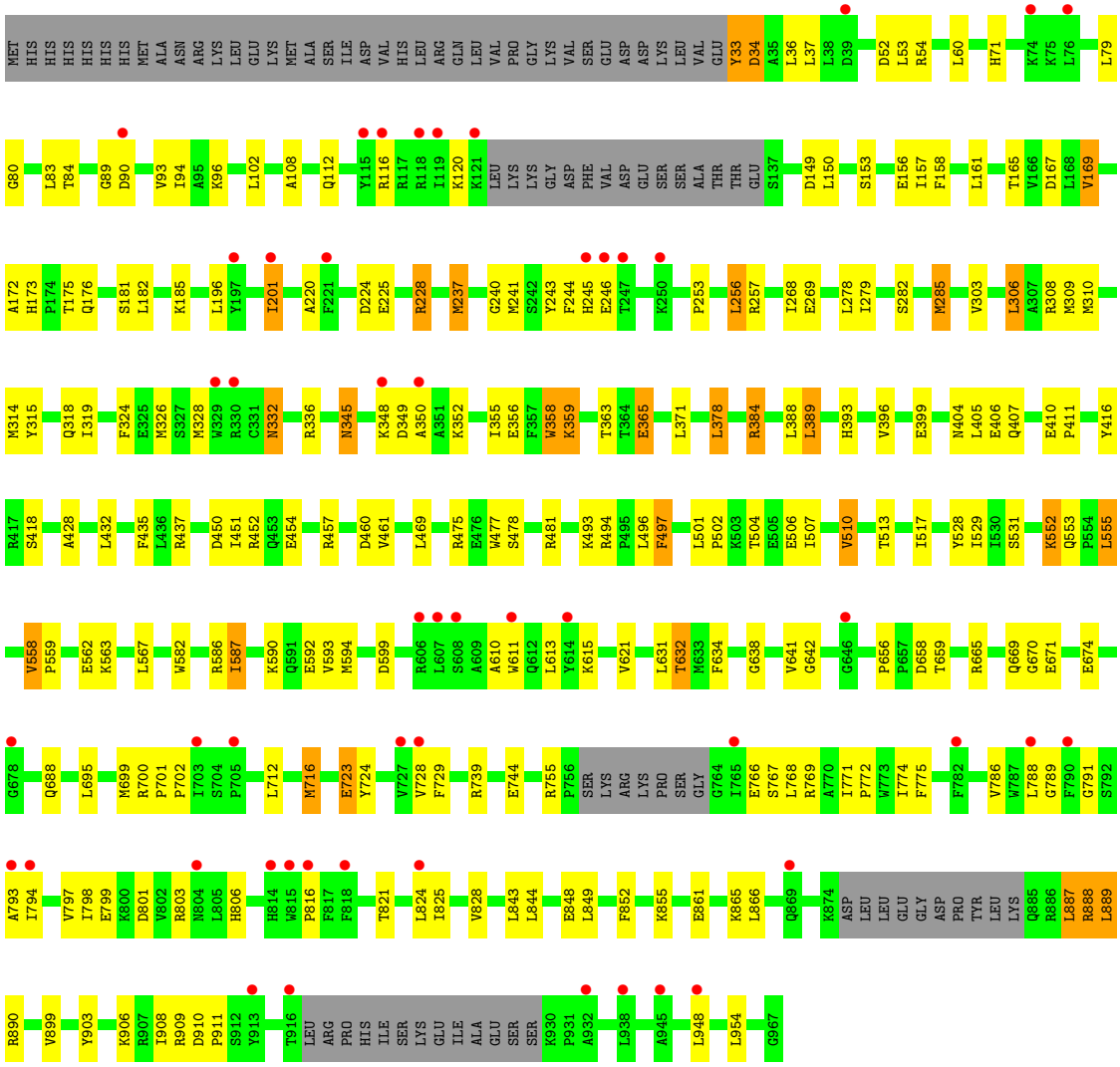
• Molecule 1: Phosphoenolpyruvate carboxylase 1

Chain A:



• Molecule 1: Phosphoenolpyruvate carboxylase 1

Chain B:


MET HIS HIS HIS HIS HIS MET ALA ASN ARG LYS LEU GLU LYS MET ALA SER ILE ASP VAL HIS LEU ARG GLN LEU VAL PRO GLY LYS LYS VAL SER GLU ASP ASP LYS LEU VAL GLU Y33 D34 A35 L36 L37 L38 D39 D52 L53 R54 L60 H71 K74 K75 L76 L79
G80 L83 T84 G89 D90 V93 I94 A95 K96 L102 A108 Q112 Y115 R116 R117 R118 I119 K120 K121 LEU LYS LYS GLY ASP PHE VAL ASP GLU SER SER ALA THR THR GLU S137 D149 L150 S153 E156 I157 F158 L161 T165 V166 D167 L168 V169
A172 H173 P174 T175 Q176 S181 L182 K185 L196 Y197 I201 A220 F221 D224 E225 R228 M237 G240 M241 S242 Y243 F244 H245 E246 T247 K250 P253 L256 R257 I268 E269 L278 I279 S282 M285 V303 L306 A307 R308 M309 M310
M314 Y315 Q318 I319 F324 E325 M326 S327 M328 W329 R330 C331 N332 R336 N345 K348 D349 A350 A351 K352 I355 E356 F357 W358 K359 T363 T364 E365 L371 L378 R384 L388 L389 H393 V396 E399 N404 L405 E406 Q407 E410 P411 Y416
R417 S418 A428 L432 F435 L436 R437 D450 I451 R452 Q453 E454 R457 D460 V461 L469 R475 E476 W477 S478 R481 K493 R494 P495 L496 F497 L501 P502 K503 T504 E505 E506 I507 V510 T513 I517 Y528 I529 I530 S531 K552 Q553 P554 L555
V558 P559 E562 K563 L567 W582 R586 I587 K590 Q591 E592 V593 M594 D599 R606 L607 S608 A609 A610 W611 Q612 L613 Y614 K615 V621 L631 T632 M633 F634 G638 V641 G642 G646 P656 P657 D658 T659 R665 Q669 G670 E671 E674
G678 Q688 L695 M699 R700 P701 P702 I703 S704 P705 L712 W716 E723 Y724 V727 V728 F729 R739 E744 R755 P756 SER LYS ARG LYS PRO SER GLY G764 I765 E766 S767 L768 R769 A770 I771 P772 W773 I774 F775 F782 V786 W787 L788 G789 F790 G791 S792
A793 I794 V797 I798 E799 K800 D801 V802 R803 N804 L805 H806 H814 W815 P816 F817 F818 T821 L824 I825 V828 L843 L844 E848 L849 F852 K855 E861 K865 L866 Q869 K874 ASP LEU LEU LEU GLU GLY ASP PRO TYR LEU LYS Q885 R886 L887 R888 L889
R890 V899 Y903 K906 R907 I908 R909 D910 P911 S912 Y913 T916 LEU ARG PRO HIS ILE SER LYS GLU ILE ALA GLU SER SER K930 P931 A932 L938 A945 L948 L954 G967

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	128.00Å 159.84Å 141.92Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.19 – 3.05 49.19 – 3.05	Depositor EDS
% Data completeness (in resolution range)	93.4 (49.19-3.05) 88.5 (49.19-3.05)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.42 (at 3.07Å)	Xtriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, R_{free}	0.205 , 0.240 0.205 , 0.240	Depositor DCC
R_{free} test set	2000 reflections (3.81%)	wwPDB-VP
Wilson B-factor (Å^2)	107.6	Xtriage
Anisotropy	0.009	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 69.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	14446	wwPDB-VP
Average B, all atoms (Å^2)	132.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.63% 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	0.38	0/7434	0.56	1/10066 (0.0%)
1	B	0.29	0/7296	0.46	0/9877
All	All	0.34	0/14730	0.51	1/19943 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	768	LEU	CA-CB-CG	5.33	127.55	115.30

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	7267	0	7204	146	0
1	B	7143	0	7088	131	0
2	A	5	0	0	1	0
2	B	5	0	0	1	0
3	A	26	0	0	0	0
All	All	14446	0	14292	276	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 10.

All (276) 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:B:173:HIS:ND1	1:B:669:GLN:OE1	2.03	0.90
1:B:332:ASN:HD21	1:B:418:SER:HA	1.43	0.83
1:B:404:ASN:HB2	1:B:407:GLN:HB2	1.63	0.79
1:A:618:GLU:OE1	1:A:710:ARG:NH2	2.15	0.79
1:A:173:HIS:ND1	1:A:669:GLN:OE1	2.17	0.78
1:A:106:ASN:OD1	1:A:890:ARG:NH2	2.17	0.76
1:B:888:ARG:O	1:B:890:ARG:N	2.21	0.74
1:B:460:ASP:OD1	1:B:475:ARG:NH1	2.20	0.74
1:B:461:VAL:HG22	1:B:507:ILE:HG23	1.69	0.74
1:A:528:TYR:HB2	1:A:555:LEU:HD13	1.69	0.73
1:A:345:ASN:OD1	1:A:345:ASN:N	2.20	0.73
1:A:169:VAL:HB	1:A:282:SER:HB2	1.71	0.71
1:A:638:GLY:HA2	1:A:669:GLN:HG3	1.71	0.71
1:B:638:GLY:HA2	1:B:669:GLN:HG3	1.72	0.70
1:A:332:ASN:HD21	1:A:418:SER:HA	1.56	0.70
1:B:345:ASN:N	1:B:345:ASN:OD1	2.24	0.70
1:B:702:PRO:HB3	1:B:816:PRO:HG2	1.74	0.69
1:A:593:VAL:HG12	1:A:631:LEU:HD11	1.75	0.69
1:B:306:LEU:HD22	1:B:389:LEU:HD11	1.75	0.69
1:A:175:THR:HG23	1:A:671:GLU:H	1.57	0.68
1:A:716:MET:HG3	1:A:793:ALA:HB1	1.75	0.68
1:B:169:VAL:HB	1:B:282:SER:HB2	1.75	0.67
1:B:175:THR:HG23	1:B:671:GLU:H	1.60	0.67
1:A:723:GLU:HG2	1:A:789:GLY:HA2	1.76	0.66
1:B:593:VAL:HG12	1:B:631:LEU:HD11	1.78	0.66
1:B:172:ALA:HB2	1:B:285:MET:HG3	1.78	0.65
1:A:332:ASN:ND2	1:A:418:SER:HA	2.10	0.65
1:A:461:VAL:HG22	1:A:507:ILE:HG23	1.77	0.65
1:A:641:VAL:HG21	1:A:828:VAL:HG21	1.79	0.65
1:B:332:ASN:ND2	1:B:418:SER:HA	2.12	0.64
1:A:336:ARG:NH2	1:A:363:THR:O	2.31	0.63
1:A:404:ASN:HB2	1:A:407:GLN:HB2	1.81	0.63
1:B:528:TYR:HB2	1:B:555:LEU:HD13	1.82	0.62
1:B:656:PRO:HG2	1:B:659:THR:HG21	1.80	0.62
1:A:37:LEU:HD21	1:A:193:LEU:HD21	1.82	0.61
1:A:243:TYR:OH	1:A:674:GLU:HG2	1.99	0.61
1:B:336:ARG:NH2	1:B:363:THR:O	2.34	0.61
1:A:237:MET:HG2	1:A:303:VAL:HG12	1.83	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:908:ILE:HD11	1:A:948:LEU:HB3	1.82	0.61
1:B:318:GLN:HB3	1:B:435:PHE:HE1	1.66	0.61
1:A:158:PHE:HB2	1:A:268:ILE:HD13	1.84	0.60
1:B:33:TYR:HE1	1:B:36:LEU:HD22	1.67	0.60
1:A:794:ILE:O	1:A:798:ILE:HG12	2.02	0.59
1:A:306:LEU:O	1:A:310:MET:HG3	2.03	0.59
1:A:739:ARG:NH1	1:A:744:GLU:OE1	2.36	0.59
1:B:237:MET:O	1:B:241:MET:HG2	2.03	0.58
1:A:34:ASP:O	1:A:38:LEU:HB2	2.03	0.58
1:B:253:PRO:O	1:B:257:ARG:HG3	2.03	0.58
1:A:33:TYR:HD2	1:A:112:GLN:HE21	1.52	0.58
1:B:355:ILE:HG22	1:B:356:GLU:HG2	1.84	0.58
1:B:861:GLU:HG3	1:B:865:LYS:HE3	1.85	0.57
1:B:497:PHE:HD1	1:B:497:PHE:H	1.52	0.57
1:A:298:GLU:OE1	1:A:301[A]:ARG:NH1	2.38	0.57
1:B:158:PHE:HB2	1:B:268:ILE:HD13	1.86	0.57
1:A:497:PHE:HD1	1:A:497:PHE:H	1.52	0.57
1:B:306:LEU:O	1:B:310:MET:HG3	2.05	0.57
1:B:801:ASP:OD2	1:B:803:ARG:NH2	2.38	0.57
1:B:37:LEU:HD11	1:B:108:ALA:HB2	1.87	0.56
1:B:723:GLU:HG2	1:B:789:GLY:HA2	1.87	0.56
1:A:150:LEU:HD11	1:A:700:ARG:HB2	1.87	0.56
1:B:824:LEU:O	1:B:828:VAL:HG23	2.06	0.56
1:A:289:ARG:NH2	1:A:300:THR:OG1	2.35	0.56
1:A:48:LEU:HD22	1:A:222:ARG:NH1	2.21	0.55
1:A:308:ARG:NH2	1:A:523:ASP:OD1	2.39	0.55
1:B:181:SER:OG	2:B:1001:PO4:O1	2.21	0.55
1:A:772:PRO:HA	1:A:775:PHE:HB3	1.88	0.55
1:B:641:VAL:HG21	1:B:828:VAL:HG21	1.89	0.54
1:B:794:ILE:O	1:B:798:ILE:HG12	2.08	0.54
1:A:355:ILE:HG22	1:A:356:GLU:HG2	1.90	0.54
1:B:60:LEU:HG	1:B:79:LEU:HD21	1.89	0.54
1:A:638:GLY:HA2	1:A:669:GLN:CG	2.37	0.53
1:A:96:LYS:HE2	1:A:225:GLU:OE2	2.08	0.53
1:B:638:GLY:HA2	1:B:669:GLN:CG	2.37	0.53
1:B:908:ILE:HD11	1:B:948:LEU:HB3	1.89	0.53
1:B:558:VAL:HG23	1:B:593:VAL:HA	1.90	0.53
1:B:755:ARG:HD3	1:B:769:ARG:NH2	2.23	0.53
1:A:252:VAL:HG13	1:A:279:ILE:HD11	1.89	0.53
1:B:513:THR:O	1:B:517:ILE:HG13	2.09	0.53
1:B:478:SER:H	1:B:481:ARG:NH1	2.07	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:237:MET:O	1:A:241:MET:HG2	2.09	0.52
1:A:228:ARG:NH2	1:A:950:ASP:OD1	2.42	0.52
1:A:329:TRP:CZ3	1:A:330:ARG:HG2	2.44	0.52
1:B:477:TRP:CG	1:B:481:ARG:HD2	2.44	0.52
1:B:786:VAL:HG11	1:B:828:VAL:HG21	1.91	0.52
1:A:201:ILE:H	1:A:201:ILE:HD13	1.74	0.52
1:B:405:LEU:HD12	1:B:405:LEU:H	1.74	0.52
1:B:739:ARG:NH1	1:B:744:GLU:OE1	2.43	0.52
1:B:821:THR:O	1:B:825:ILE:HG12	2.08	0.52
1:B:157:ILE:HG23	1:B:695:LEU:HD21	1.91	0.52
1:A:289:ARG:HG2	1:A:452:ARG:O	2.10	0.51
1:A:716:MET:CG	1:A:793:ALA:HB1	2.41	0.51
1:A:746:GLU:HG3	1:A:952:LEU:HD21	1.93	0.51
1:B:772:PRO:HA	1:B:775:PHE:HB3	1.91	0.51
1:A:167:ASP:HB3	1:A:665:ARG:HG3	1.92	0.51
1:B:384:ARG:HD2	1:B:396:VAL:HB	1.92	0.51
1:B:621:VAL:HG21	1:B:659:THR:HA	1.92	0.51
1:A:451:ILE:HG13	1:A:517:ILE:HD11	1.92	0.50
1:A:884:LYS:HA	1:A:887:LEU:HD23	1.93	0.50
1:A:915:VAL:N	1:A:943:GLU:O	2.30	0.50
1:B:844:LEU:HD22	1:B:909:ARG:HH21	1.77	0.50
1:B:315:TYR:HB3	1:B:378:LEU:HD21	1.94	0.50
1:B:642:GLY:HA3	1:B:774:ILE:HD12	1.94	0.50
1:A:755:ARG:HD3	1:A:769:ARG:NH2	2.27	0.50
1:B:201:ILE:HD13	1:B:201:ILE:H	1.77	0.50
1:A:457:ARG:NE	1:A:506:GLU:HB3	2.26	0.50
1:A:672:VAL:O	1:A:676:SER:OG	2.28	0.50
1:A:218:GLN:O	1:A:222:ARG:HB2	2.12	0.50
1:B:450:ASP:OD2	1:B:665:ARG:NH2	2.45	0.49
1:B:728:VAL:HG23	1:B:729:PHE:CD2	2.47	0.49
1:A:279:ILE:HD13	1:A:279:ILE:H	1.78	0.49
1:A:310:MET:O	1:A:314:MET:HG3	2.13	0.49
1:A:584:LYS:HE2	1:A:627:TYR:O	2.12	0.49
1:B:237:MET:HG2	1:B:303:VAL:HG12	1.94	0.49
1:A:621:VAL:HG21	1:A:659:THR:HG22	1.95	0.49
1:B:594:MET:HA	1:B:634:PHE:HB3	1.94	0.49
1:B:34:ASP:OD2	1:B:889:LEU:HD23	2.12	0.48
1:B:716:MET:SD	1:B:797:VAL:HG21	2.53	0.48
1:A:728:VAL:HG23	1:A:729:PHE:CD2	2.49	0.48
1:A:87:ASP:HB3	1:A:88:PRO:HD2	1.95	0.48
1:B:528:TYR:HB2	1:B:555:LEU:CD1	2.43	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:724:TYR:CD1	1:B:788:LEU:HD23	2.49	0.48
1:B:237:MET:HE3	1:B:303:VAL:HB	1.95	0.48
1:B:457:ARG:NE	1:B:506:GLU:HB3	2.28	0.48
1:A:34:ASP:CB	1:A:889:LEU:HD21	2.43	0.48
1:A:338:ARG:O	1:A:342:VAL:HG23	2.13	0.48
1:B:112:GLN:O	1:B:116:ARG:HB2	2.14	0.47
1:B:791:GLY:HA2	1:B:866:LEU:HD12	1.95	0.47
1:B:410:GLU:HB3	1:B:411:PRO:HD3	1.96	0.47
1:A:408:PHE:O	1:A:411:PRO:HD2	2.13	0.47
1:A:172:ALA:HB2	1:A:285:MET:HG3	1.97	0.47
1:A:490:LEU:HB3	1:A:582:TRP:CZ2	2.49	0.47
1:B:611:TRP:CZ2	1:B:615:LYS:HE3	2.49	0.47
1:A:180:ARG:N	2:A:1001:PO4:O4	2.48	0.46
1:B:90:ASP:O	1:B:94:ILE:HG12	2.14	0.46
1:A:336:ARG:NH2	1:A:366:PRO:HG3	2.30	0.46
1:A:120:LYS:HB3	1:A:120:LYS:HE2	1.83	0.46
1:A:405:LEU:H	1:A:405:LEU:HD12	1.79	0.46
1:A:618:GLU:CD	1:A:710:ARG:HH22	2.19	0.46
1:B:243:TYR:OH	1:B:674:GLU:HG2	2.15	0.46
1:B:477:TRP:HA	1:B:481:ARG:HH11	1.80	0.46
1:B:562:GLU:HG2	1:B:599:ASP:HB2	1.98	0.46
1:B:169:VAL:HA	1:B:282:SER:O	2.16	0.46
1:B:887:LEU:HD23	1:B:887:LEU:H	1.80	0.46
1:B:310:MET:O	1:B:314:MET:HG3	2.15	0.46
1:B:454:GLU:HA	1:B:531:SER:HB2	1.96	0.46
1:B:552:LYS:HG3	1:B:553:GLN:OE1	2.16	0.46
1:A:558:VAL:HG23	1:A:593:VAL:HA	1.97	0.46
1:B:153:SER:OG	1:B:156:GLU:HG3	2.15	0.46
1:B:452:ARG:HG3	1:B:529:ILE:HB	1.98	0.46
1:B:587:ILE:HD12	1:B:590:LYS:O	2.16	0.46
1:B:843:LEU:HD22	1:B:906:LYS:HD2	1.98	0.46
1:A:165:THR:HG22	1:A:663:SER:HA	1.98	0.45
1:A:384:ARG:HD2	1:A:396:VAL:HB	1.98	0.45
1:A:527:ALA:HB2	1:A:556:ARG:CZ	2.46	0.45
1:B:326:MET:HG3	1:B:371:LEU:HD11	1.97	0.45
1:A:58:GLN:O	1:A:62:GLU:HG3	2.16	0.45
1:B:167:ASP:HB3	1:B:665:ARG:HG3	1.98	0.45
1:B:610:ALA:HA	1:B:613:LEU:HD12	1.98	0.45
1:B:716:MET:HG3	1:B:793:ALA:HB1	1.98	0.45
1:B:724:TYR:O	1:B:728:VAL:HG22	2.15	0.45
1:B:582:TRP:O	1:B:586:ARG:HD3	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:38:LEU:HD12	1:A:38:LEU:HA	1.77	0.45
1:A:794:ILE:HD13	1:A:870:THR:HG21	1.99	0.45
1:B:150:LEU:HD11	1:B:700:ARG:HD3	1.97	0.45
1:B:611:TRP:CE2	1:B:615:LYS:HE3	2.52	0.45
1:A:249:TRP:HE1	1:A:318:GLN:HE22	1.65	0.45
1:A:513:THR:O	1:A:517:ILE:HG13	2.16	0.45
1:A:712:LEU:HG	1:A:716:MET:HE2	1.98	0.45
1:A:821:THR:O	1:A:825:ILE:HG12	2.17	0.45
1:B:157:ILE:O	1:B:161:LEU:HB2	2.17	0.45
1:A:582:TRP:O	1:A:586:ARG:HD3	2.17	0.45
1:B:786:VAL:HG11	1:B:828:VAL:HG11	1.98	0.45
1:A:139:LEU:HD11	1:A:259:VAL:HG22	1.99	0.44
1:A:592:GLU:HA	1:A:632:THR:O	2.16	0.44
1:B:592:GLU:HA	1:B:632:THR:O	2.17	0.44
1:A:87:ASP:OD1	1:A:87:ASP:N	2.50	0.44
1:B:96:LYS:HE2	1:B:225:GLU:OE2	2.17	0.44
1:A:244:PHE:C	1:A:246:GLU:H	2.19	0.44
1:A:294:ARG:HD3	1:A:754:SER:O	2.17	0.44
1:B:318:GLN:HB3	1:B:435:PHE:CE1	2.50	0.44
1:B:365:GLU:H	1:B:365:GLU:HG2	1.68	0.44
1:A:173:HIS:CE1	1:A:669:GLN:OE1	2.71	0.44
1:A:908:ILE:HD12	1:A:944:TYR:CD2	2.52	0.44
1:A:285:MET:HE2	1:A:285:MET:HB2	1.83	0.44
1:A:274:TYR:OH	1:A:413:GLU:HG2	2.18	0.44
1:A:587:ILE:HD13	1:A:587:ILE:HA	1.71	0.44
1:A:857:ARG:O	1:A:860:PHE:HB3	2.18	0.44
1:A:318:GLN:HB3	1:A:435:PHE:HE2	1.83	0.43
1:A:656:PRO:HG2	1:A:659:THR:HG21	2.00	0.43
1:A:843:LEU:HD11	1:A:903:TYR:CZ	2.54	0.43
1:B:712:LEU:HD11	1:B:797:VAL:HG13	1.99	0.43
1:A:173:HIS:CG	1:A:669:GLN:OE1	2.70	0.43
1:A:545:LEU:HD23	1:A:545:LEU:HA	1.89	0.43
1:A:724:TYR:CE2	1:A:728:VAL:HG21	2.52	0.43
1:A:325:GLU:O	1:A:327:SER:N	2.51	0.43
1:A:666:VAL:HG12	1:A:667:THR:O	2.17	0.43
1:B:587:ILE:HA	1:B:587:ILE:HD13	1.76	0.43
1:A:302:ASP:O	1:A:306:LEU:HB2	2.18	0.43
1:B:244:PHE:C	1:B:246:GLU:H	2.22	0.43
1:B:416:TYR:CD2	1:B:428:ALA:HB1	2.53	0.43
1:A:607:LEU:HD13	1:A:790:PHE:CE1	2.53	0.43
1:A:80:GLY:HA3	1:A:903:TYR:CE1	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:388:LEU:HD12	1:A:388:LEU:HA	1.87	0.43
1:A:287:GLY:HA3	1:A:450:ASP:O	2.18	0.43
1:A:326:MET:HG3	1:A:371:LEU:HD11	2.00	0.43
1:A:61:TYR:OH	1:A:889:LEU:HD13	2.19	0.43
1:A:305:LEU:HA	1:A:305:LEU:HD13	1.77	0.43
1:A:606[A]:ARG:HA	1:A:606[A]:ARG:HD2	1.75	0.43
1:B:120:LYS:HB3	1:B:120:LYS:HE2	1.89	0.43
1:B:256:LEU:HB3	1:B:437:ARG:CZ	2.48	0.43
1:A:496:LEU:O	1:B:494:ARG:HG3	2.19	0.42
1:B:506:GLU:O	1:B:510:VAL:HG12	2.19	0.42
1:A:90:ASP:O	1:A:94:ILE:HG12	2.19	0.42
1:A:183:LEU:HD23	1:A:183:LEU:HA	1.87	0.42
1:A:724:TYR:HD1	1:A:788:LEU:HB3	1.83	0.42
1:A:786:VAL:HG11	1:A:828:VAL:HG21	2.00	0.42
1:B:52:ASP:OD1	1:B:52:ASP:N	2.53	0.42
1:B:89:GLY:O	1:B:93:VAL:HG23	2.20	0.42
1:A:153:SER:OG	1:A:156:GLU:HG3	2.20	0.42
1:B:80:GLY:HA3	1:B:903:TYR:CE2	2.54	0.42
1:B:496:LEU:HB3	1:B:497:PHE:H	1.67	0.42
1:A:112:GLN:O	1:A:116:ARG:HB2	2.19	0.42
1:A:301[B]:ARG:HA	1:A:520:LEU:HD11	2.02	0.42
1:B:224:ASP:OD2	1:B:228:ARG:NH1	2.52	0.42
1:A:850:TRP:N	1:A:851:PRO:HD2	2.34	0.42
1:B:185:LYS:HD2	1:B:220:ALA:HA	2.02	0.42
1:B:350:ALA:HB1	1:B:352:LYS:HG3	2.02	0.42
1:B:451:ILE:HG13	1:B:517:ILE:HD11	2.01	0.42
1:A:301[A]:ARG:HA	1:A:520:LEU:HD11	2.02	0.42
1:A:301[A]:ARG:NH2	1:A:519:GLU:OE2	2.48	0.42
1:A:501:LEU:O	1:A:503:LYS:HG3	2.19	0.42
1:A:602:LYS:NZ	1:A:768:LEU:O	2.30	0.42
1:A:705:PRO:HG2	1:A:710:ARG:NH1	2.35	0.42
1:A:52:ASP:O	1:A:56:THR:HG23	2.20	0.42
1:A:436:LEU:HD23	1:A:436:LEU:HA	1.91	0.42
1:A:953:ILE:HA	1:A:956:MET:CE	2.50	0.42
1:B:53:LEU:HD12	1:B:53:LEU:HA	1.88	0.42
1:B:80:GLY:O	1:B:84:THR:HG23	2.20	0.42
1:B:558:VAL:HA	1:B:559:PRO:HD3	1.93	0.42
1:B:852:PHE:O	1:B:855:LYS:HB2	2.20	0.42
1:A:558:VAL:HA	1:A:559:PRO:HD3	1.90	0.42
1:A:865:LYS:O	1:A:869:GLN:HB2	2.20	0.42
1:B:314:MET:HB3	1:B:314:MET:HE2	1.93	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:496:LEU:HB3	1:A:497:PHE:H	1.69	0.41
1:A:83:LEU:HD12	1:A:899:VAL:HG12	2.00	0.41
1:A:563:LYS:HE3	1:A:599:ASP:HB3	2.02	0.41
1:A:78:GLU:O	1:A:81:SER:OG	2.38	0.41
1:A:724:TYR:O	1:A:728:VAL:HG22	2.21	0.41
1:B:501:LEU:HD12	1:B:502:PRO:HD2	2.02	0.41
1:A:49:HIS:HB3	1:A:53:LEU:HD23	2.03	0.41
1:B:621:VAL:HG21	1:B:659:THR:HG22	2.03	0.41
1:A:716:MET:HE2	1:A:716:MET:HB2	1.95	0.41
1:B:245:HIS:CD2	1:B:245:HIS:H	2.39	0.41
1:B:83:LEU:HD12	1:B:899:VAL:HG12	2.03	0.41
1:B:176:GLN:HA	1:B:671:GLU:HB2	2.03	0.41
1:B:794:ILE:HB	1:B:866:LEU:HD13	2.03	0.41
1:A:399:GLU:CD	1:A:399:GLU:H	2.23	0.41
1:B:176:GLN:NE2	1:B:671:GLU:HA	2.35	0.41
1:A:318:GLN:HB3	1:A:435:PHE:CE2	2.56	0.41
1:B:477:TRP:HA	1:B:481:ARG:NH1	2.36	0.41
1:B:699:MET:O	1:B:701:PRO:HD3	2.21	0.41
1:A:266:ILE:HD12	1:A:266:ILE:HG23	1.87	0.40
1:A:331:CYS:SG	1:A:366:PRO:HG2	2.61	0.40
1:B:240:GLY:HA3	1:B:285:MET:CE	2.51	0.40
1:B:326:MET:HE1	1:B:432:LEU:HD22	2.03	0.40
1:B:497:PHE:CD1	1:B:497:PHE:N	2.89	0.40
1:B:563:LYS:NZ	1:B:766:GLU:OE2	2.54	0.40
1:B:806:HIS:O	1:B:806:HIS:ND1	2.54	0.40
1:A:351:ALA:O	1:A:358:TRP:HB2	2.21	0.40
1:A:454:GLU:HA	1:A:531:SER:HB2	2.02	0.40
1:A:703:ILE:HD12	1:A:814:HIS:O	2.21	0.40
1:A:55:GLU:O	1:A:59:GLU:HG3	2.22	0.40
1:A:405:LEU:HD11	1:A:523:ASP:HB3	2.04	0.40
1:A:679:GLU:HB3	1:A:682:LEU:HG	2.04	0.40
1:A:724:TYR:CD1	1:A:788:LEU:HD23	2.56	0.40
1:B:358:TRP:HD1	1:B:359:LYS:HD2	1.86	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	899/974 (92%)	851 (95%)	42 (5%)	6 (1%)	22	57
1	B	880/974 (90%)	834 (95%)	41 (5%)	5 (1%)	25	60
All	All	1779/1948 (91%)	1685 (95%)	83 (5%)	11 (1%)	25	60

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	670	GLY
1	A	919	PRO
1	B	670	GLY
1	B	889	LEU
1	A	848	GLU
1	A	918	ARG
1	B	848	GLU
1	B	888	ARG
1	B	911	PRO
1	A	911	PRO
1	A	119	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	778/849 (92%)	720 (92%)	58 (8%)	13	41
1	B	768/849 (90%)	707 (92%)	61 (8%)	12	39

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1546/1698 (91%)	1427 (92%)	119 (8%)	13 40

All (119) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	33	TYR
1	A	54	ARG
1	A	71	HIS
1	A	102	LEU
1	A	116	ARG
1	A	165	THR
1	A	169	VAL
1	A	182	LEU
1	A	196	LEU
1	A	201	ILE
1	A	228	ARG
1	A	237	MET
1	A	256	LEU
1	A	269	GLU
1	A	278	LEU
1	A	279	ILE
1	A	285	MET
1	A	306	LEU
1	A	308	ARG
1	A	309	MET
1	A	318	GLN
1	A	319	ILE
1	A	328	MET
1	A	332	ASN
1	A	345	ASN
1	A	348	LYS
1	A	349	ASP
1	A	358	TRP
1	A	359	LYS
1	A	365	GLU
1	A	378	LEU
1	A	384	ARG
1	A	388	LEU
1	A	393	HIS
1	A	406	GLU
1	A	480	GLU
1	A	497	PHE

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Mol	Chain	Res	Type
1	A	504	THR
1	A	510	VAL
1	A	552	LYS
1	A	555	LEU
1	A	558	VAL
1	A	587	ILE
1	A	602	LYS
1	A	632	THR
1	A	658	ASP
1	A	688	GLN
1	A	716	MET
1	A	723	GLU
1	A	767	SER
1	A	768	LEU
1	A	771	ILE
1	A	849	LEU
1	A	882	TYR
1	A	887	LEU
1	A	889	LEU
1	A	917	LEU
1	A	954	LEU
1	B	33	TYR
1	B	34	ASP
1	B	54	ARG
1	B	71	HIS
1	B	102	LEU
1	B	149	ASP
1	B	165	THR
1	B	169	VAL
1	B	182	LEU
1	B	196	LEU
1	B	201	ILE
1	B	228	ARG
1	B	237	MET
1	B	256	LEU
1	B	269	GLU
1	B	278	LEU
1	B	279	ILE
1	B	285	MET
1	B	306	LEU
1	B	308	ARG
1	B	309	MET

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Mol	Chain	Res	Type
1	B	319	ILE
1	B	324	PHE
1	B	328	MET
1	B	332	ASN
1	B	345	ASN
1	B	348	LYS
1	B	349	ASP
1	B	358	TRP
1	B	359	LYS
1	B	365	GLU
1	B	378	LEU
1	B	384	ARG
1	B	388	LEU
1	B	389	LEU
1	B	393	HIS
1	B	399	GLU
1	B	406	GLU
1	B	469	LEU
1	B	493	LYS
1	B	497	PHE
1	B	504	THR
1	B	510	VAL
1	B	552	LYS
1	B	555	LEU
1	B	558	VAL
1	B	567	LEU
1	B	587	ILE
1	B	632	THR
1	B	658	ASP
1	B	688	GLN
1	B	716	MET
1	B	723	GLU
1	B	767	SER
1	B	768	LEU
1	B	771	ILE
1	B	799	GLU
1	B	849	LEU
1	B	887	LEU
1	B	910	ASP
1	B	954	LEU

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

Mol	Chain	Res	Type
1	B	332	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 monosaccharides 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	$\#\|Z\| > 2$
2	PO4	A	1001	-	4,4,4	1.30	0	6,6,6	0.46	0
2	PO4	B	1001	-	4,4,4	1.05	0	6,6,6	0.47	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.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1001	PO4	1	0
2	B	1001	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^{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	906/974 (93%)	-0.22	8 (0%) 84 62	64, 96, 149, 241	0
1	B	890/974 (91%)	0.15	50 (5%) 24 8	95, 156, 230, 272	0
All	All	1796/1948 (92%)	-0.04	58 (3%) 47 21	64, 121, 217, 272	0

All (58) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	815	TRP	5.2
1	B	118	ARG	4.8
1	A	136	GLU	4.6
1	B	782	PHE	4.5
1	B	607	LEU	4.4
1	B	245	HIS	4.4
1	B	197	TYR	4.4
1	B	246	GLU	4.3
1	B	678	GLY	4.3
1	B	116	ARG	4.2
1	B	790	PHE	4.2
1	B	608	SER	4.1
1	B	818	PHE	4.0
1	B	916	THR	3.9
1	B	705	PRO	3.6
1	B	814	HIS	3.6
1	B	869	GLN	3.5
1	B	247	THR	3.3
1	B	201	ILE	3.2
1	A	246	GLU	2.9
1	B	703	ILE	2.8
1	B	945	ALA	2.8
1	B	606	ARG	2.8
1	B	115	TYR	2.8

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Mol	Chain	Res	Type	RSRZ
1	B	611	TRP	2.8
1	B	765	ILE	2.8
1	B	74	LYS	2.7
1	B	329	TRP	2.7
1	B	221	PHE	2.7
1	B	932	ALA	2.7
1	B	330	ARG	2.7
1	A	245	HIS	2.6
1	B	948	LEU	2.6
1	A	61	TYR	2.6
1	B	121	LYS	2.6
1	B	913	TYR	2.6
1	B	728	VAL	2.6
1	A	31	VAL	2.6
1	B	90	ASP	2.5
1	B	794	ILE	2.4
1	B	76	LEU	2.4
1	A	197	TYR	2.4
1	B	804	ASN	2.4
1	B	119	ILE	2.4
1	B	793	ALA	2.3
1	B	788	LEU	2.3
1	B	350	ALA	2.3
1	B	727	VAL	2.3
1	A	199	LYS	2.3
1	B	39	ASP	2.2
1	B	938	LEU	2.2
1	B	250	LYS	2.2
1	B	646	GLY	2.1
1	B	614	TYR	2.1
1	B	348	LYS	2.1
1	A	76	LEU	2.0
1	B	824	LEU	2.0
1	B	816	PRO	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	B	1001	5/5	0.92	0.77	198,201,206,210	0
2	PO4	A	1001	5/5	0.94	0.35	125,129,130,130	0

6.5 Other polymers (i)

There are no such residues in this entry.