WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Dec 16, 2023 – 03:34 PM EST

PDB ID	:	3F41
Title	:	Structure of the tandemly repeated protein tyrosine phosphatase like phytase from Mitsuokella multacida
Authors	:	Gruninger, R.J.; Selinger, L.B.; Mosimann, S.C.
Deposited on	:	2008-10-31
Resolution	:	2.30 Å(reported)

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), 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 ⓘ

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.
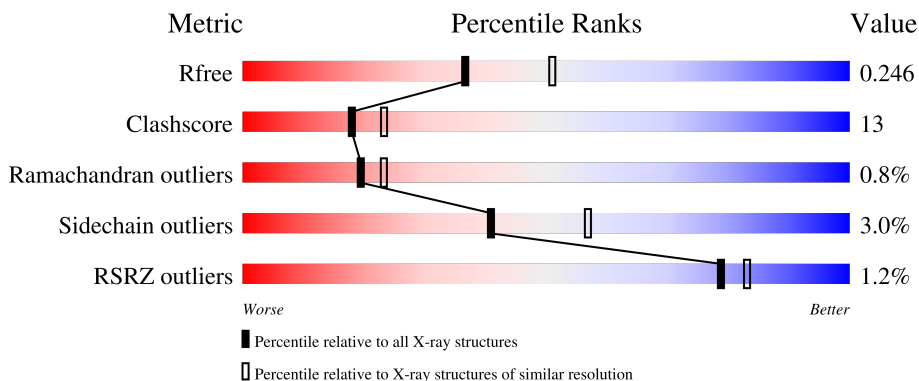
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 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	629	72% 20% · 6%
1	B	629	68% 25% · 6%

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 criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	PO4	A	1	-	-	X	-
2	PO4	A	2	-	-	X	-
2	PO4	B	3	-	-	X	-
2	PO4	B	4	-	-	X	-
3	EDO	A	7	-	-	X	-

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 10377 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 Phytase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	590	Total 4806	C 3066	N 834	O 883	S 23	0	1	0
1	B	590	Total 4805	C 3065	N 833	O 883	S 24	0	1	0

There are 46 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	12	MET	-	initiating methionine	UNP A3QMF6
A	13	GLY	-	expression tag	UNP A3QMF6
A	14	SER	-	expression tag	UNP A3QMF6
A	15	SER	-	expression tag	UNP A3QMF6
A	16	HIS	-	expression tag	UNP A3QMF6
A	17	HIS	-	expression tag	UNP A3QMF6
A	18	HIS	-	expression tag	UNP A3QMF6
A	19	HIS	-	expression tag	UNP A3QMF6
A	20	HIS	-	expression tag	UNP A3QMF6
A	21	HIS	-	expression tag	UNP A3QMF6
A	22	SER	-	expression tag	UNP A3QMF6
A	23	SER	-	expression tag	UNP A3QMF6
A	24	GLY	-	expression tag	UNP A3QMF6
A	25	LEU	-	expression tag	UNP A3QMF6
A	26	VAL	-	expression tag	UNP A3QMF6
A	27	PRO	-	expression tag	UNP A3QMF6
A	28	ARG	-	expression tag	UNP A3QMF6
A	29	GLY	-	expression tag	UNP A3QMF6
A	30	SER	-	expression tag	UNP A3QMF6
A	31	HIS	-	expression tag	UNP A3QMF6
A	32	MET	-	expression tag	UNP A3QMF6
A	33	ALA	-	expression tag	UNP A3QMF6
A	34	SER	-	expression tag	UNP A3QMF6
B	12	MET	-	initiating methionine	UNP A3QMF6
B	13	GLY	-	expression tag	UNP A3QMF6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	14	SER	-	expression tag	UNP A3QMF6
B	15	SER	-	expression tag	UNP A3QMF6
B	16	HIS	-	expression tag	UNP A3QMF6
B	17	HIS	-	expression tag	UNP A3QMF6
B	18	HIS	-	expression tag	UNP A3QMF6
B	19	HIS	-	expression tag	UNP A3QMF6
B	20	HIS	-	expression tag	UNP A3QMF6
B	21	HIS	-	expression tag	UNP A3QMF6
B	22	SER	-	expression tag	UNP A3QMF6
B	23	SER	-	expression tag	UNP A3QMF6
B	24	GLY	-	expression tag	UNP A3QMF6
B	25	LEU	-	expression tag	UNP A3QMF6
B	26	VAL	-	expression tag	UNP A3QMF6
B	27	PRO	-	expression tag	UNP A3QMF6
B	28	ARG	-	expression tag	UNP A3QMF6
B	29	GLY	-	expression tag	UNP A3QMF6
B	30	SER	-	expression tag	UNP A3QMF6
B	31	HIS	-	expression tag	UNP A3QMF6
B	32	MET	-	expression tag	UNP A3QMF6
B	33	ALA	-	expression tag	UNP A3QMF6
B	34	SER	-	expression tag	UNP A3QMF6

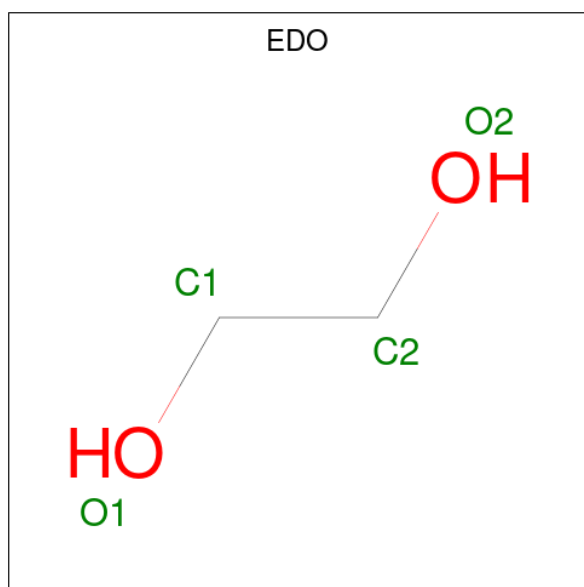- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).
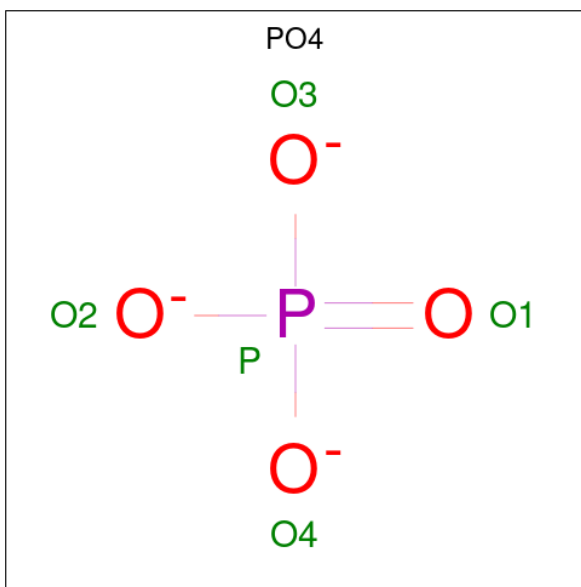
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 5	O 4	P 1	0	0

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

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).

EDO

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	368	Total 368	O 368	0	0
4	B	350	Total 350	O 350	0	0

3 Residue-property plots ⓘ

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 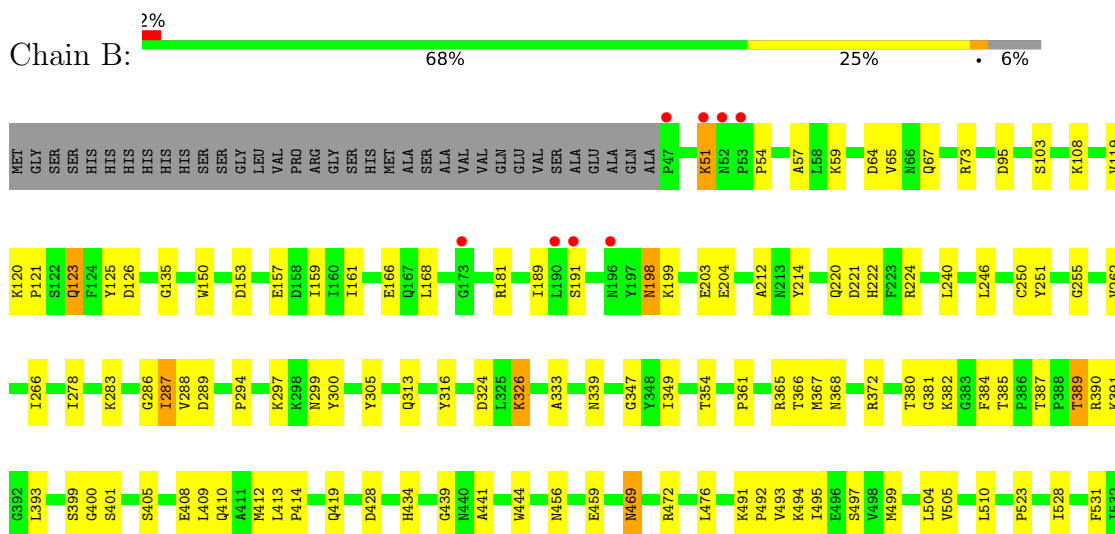the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Phytase

Chain A:

- Molecule 1: Phytase

Chain B:

N533 F534 T535 R536 T537 M538 P539 A540 N541 A542 H547 C548 Q549 A550 G553 A560 M561 Y562 D563 M564 M565 P568 D569 V570 S571 L572 G573 D574 I575 L576 S577 R578 Q579 Y580 L581 L582 N585 A592 K600 Y603 Y604 H605 H609 M610 I611 E612 K613 F614 Y615 Q616 Y617

E620 N621 H622 A623 D624 K627 T628 S629 Q632 W633 A636 HIS GLN ASP VAL
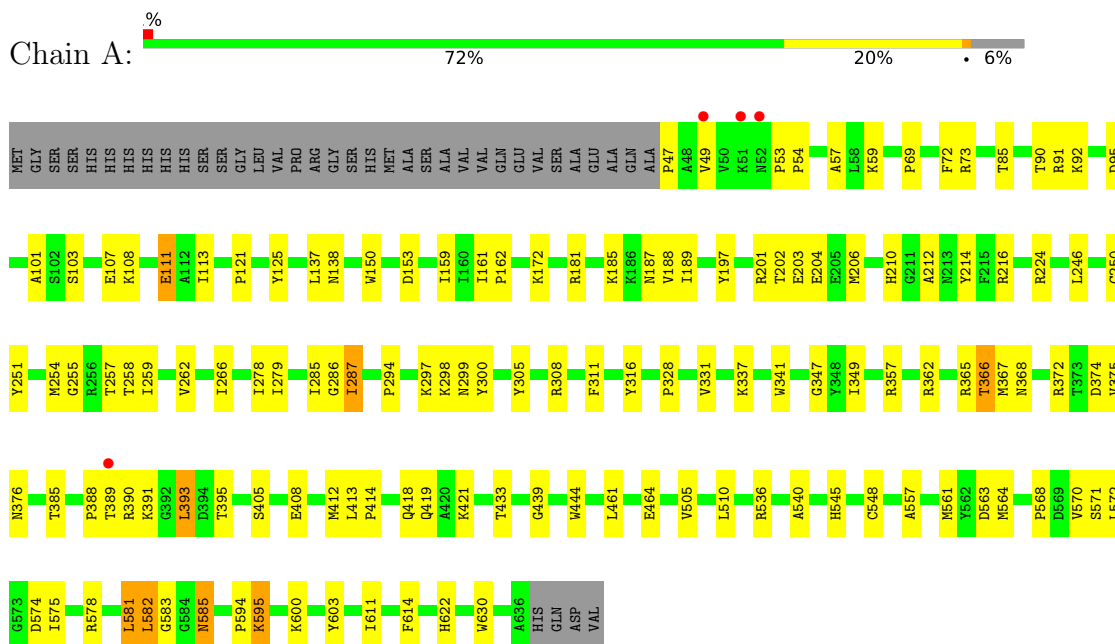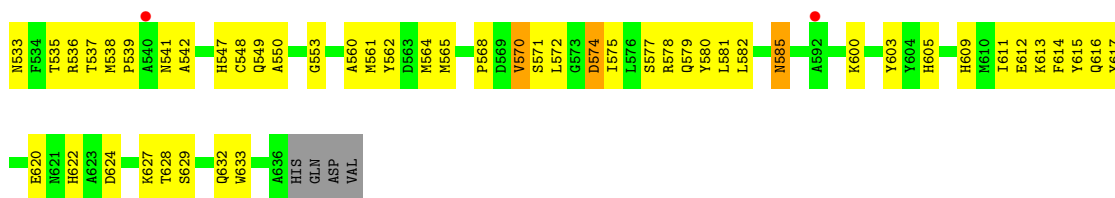
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	74.39Å 73.30Å 161.31Å 90.00° 93.71° 90.00°	Depositor
Resolution (Å)	20.00 – 2.30 65.81 – 2.20	Depositor EDS
% Data completeness (in resolution range)	96.7 (20.00-2.30) 93.6 (65.81-2.20)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	0.09	Depositor
$< I/\sigma(I) >$ [1]	2.37 (at 2.20Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.208 , 0.254 0.199 , 0.246	Depositor DCC
R_{free} test set	2491 reflections (3.01%)	wwPDB-VP
Wilson B-factor (Å^2)	35.6	Xtriage
Anisotropy	0.043	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 44.0	EDS
L-test for twinning[2]	$< |L| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	10377	wwPDB-VP
Average B, all atoms (Å^2)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 25.28 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.2673e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[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: EDO, 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	0.56	0/4931	0.68	0/6666
1	B	0.54	0/4930	0.68	0/6665
All	All	0.55	0/9861	0.68	0/13331

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	4806	0	4703	116	0
1	B	4805	0	4707	144	0
2	A	10	0	0	6	0
2	B	10	0	0	7	0
3	A	16	0	24	7	0
3	B	12	0	18	1	0
4	A	368	0	0	9	0
4	B	350	0	0	4	0
All	All	10377	0	9452	258	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 13.

All (258) 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:366:THR:HG22	1:A:368:ASN:H	1.02	1.15
1:A:294:PRO:HG2	1:A:297:LYS:HG2	1.37	1.06
1:B:65:VAL:HG12	1:B:67:GLN:HG2	1.41	1.01
1:B:533:ASN:HA	1:B:536:ARG:HD2	1.44	1.00
1:B:266:ILE:HD12	1:B:316:TYR:HD1	1.25	0.98
1:A:366:THR:HG21	1:A:419:GLN:HE22	1.28	0.96
1:B:409:LEU:HA	1:B:412:MET:HE3	1.47	0.95
1:A:90:THR:HG22	1:A:92:LYS:H	1.31	0.94
1:A:366:THR:HG22	1:A:368:ASN:N	1.84	0.92
1:B:389:THR:HG22	1:B:391:LYS:H	1.37	0.90
1:B:198:ASN:HD22	1:B:199:LYS:N	1.70	0.88
1:B:523:PRO:HB2	1:B:528:ILE:HD11	1.60	0.83
1:A:366:THR:HG21	1:A:419:GLN:NE2	1.95	0.81
1:B:389:THR:HG22	1:B:390:ARG:H	1.48	0.78
1:B:564:MET:HG2	1:B:575:ILE:HD13	1.65	0.78
1:B:572:LEU:HB2	1:B:615:TYR:CD1	2.19	0.78
1:B:51:LYS:HE2	1:B:51:LYS:N	1.98	0.77
1:B:266:ILE:HD12	1:B:316:TYR:CD1	2.17	0.76
1:B:54:PRO:HG2	1:B:57:ALA:HB2	1.67	0.76
1:B:571:SER:HA	1:B:615:TYR:OH	1.86	0.76
1:A:595:LYS:HE3	1:A:595:LYS:HA	1.68	0.74
1:A:138:ASN:HD21	1:A:197:TYR:HA	1.52	0.74
1:B:570:VAL:CG2	1:B:574:ASP:HB2	2.17	0.74
1:A:421:LYS:HE3	4:A:940:HOH:O	1.86	0.74
1:B:51:LYS:HE2	1:B:51:LYS:H	1.53	0.74
1:A:262:VAL:O	1:A:266:ILE:HD13	1.89	0.73
1:A:366:THR:CG2	1:A:368:ASN:H	1.93	0.72
1:B:389:THR:HG22	1:B:390:ARG:N	2.04	0.72
1:B:533:ASN:O	1:B:536:ARG:HG2	1.88	0.71
1:A:203:GLU:HB3	3:A:7:EDO:H12	1.72	0.70
1:A:297:LYS:HE2	1:A:305:TYR:CE1	2.27	0.70
1:B:198:ASN:HD22	1:B:198:ASN:C	1.94	0.70
1:A:53:PRO:CB	1:A:189:ILE:HD11	2.22	0.69
1:A:161:ILE:HB	1:A:162:PRO:HD3	1.75	0.68
1:A:108:LYS:HA	1:A:111:GLU:HG3	1.75	0.68
1:B:600:LYS:HD3	4:B:775:HOH:O	1.94	0.67
1:A:287:ILE:H	1:A:287:ILE:HD13	1.60	0.67
1:B:570:VAL:HG23	1:B:574:ASP:HB2	1.78	0.66
1:A:188:VAL:HG23	4:A:744:HOH:O	1.96	0.66
1:A:69:PRO:HD2	1:A:113:ILE:HD11	1.78	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:354:THR:HG22	1:B:441:ALA:HB3	1.78	0.65
1:A:85:THR:O	1:B:349:ILE:HD13	1.95	0.65
1:B:266:ILE:HD13	1:B:278:ILE:HD13	1.78	0.65
1:B:456:ASN:OD1	1:B:459:GLU:HG3	1.97	0.65
1:B:624:ASP:OD2	1:B:627:LYS:HB3	1.96	0.65
1:A:287:ILE:HD13	1:A:287:ILE:N	2.12	0.65
1:B:568:PRO:HG2	1:B:622:HIS:CD2	2.33	0.64
1:A:125:TYR:HB2	1:A:246:LEU:HD23	1.80	0.64
1:A:372:ARG:HD3	1:A:374:ASP:OD1	1.98	0.64
1:A:150:TRP:HB3	1:A:153:ASP:HB2	1.80	0.63
1:A:53:PRO:HB3	1:A:189:ILE:HD11	1.79	0.63
1:B:135:GLY:HA3	1:B:168:LEU:HD21	1.79	0.63
1:A:412:MET:HE3	1:A:545:HIS:CE1	2.34	0.62
1:B:548:CYS:HG	2:B:4:PO4:P	2.23	0.62
1:B:499:MET:HA	4:B:675:HOH:O	1.99	0.62
1:A:138:ASN:ND2	1:A:197:TYR:HA	2.16	0.61
1:A:575:ILE:O	1:A:578:ARG:HG3	2.01	0.60
1:A:574:ASP:O	1:A:578:ARG:HG2	2.01	0.60
1:A:266:ILE:HD12	1:A:278:ILE:HG21	1.83	0.60
1:B:390:ARG:O	1:B:393:LEU:HB2	2.01	0.60
1:A:600:LYS:HD3	4:A:655:HOH:O	2.02	0.59
1:B:628:THR:HA	1:B:632:GLN:HE22	1.67	0.59
1:B:614:PHE:O	1:B:617:TYR:HB3	2.02	0.59
1:B:628:THR:HA	1:B:632:GLN:NE2	2.18	0.59
1:A:72:PHE:CE1	1:A:113:ILE:HD12	2.38	0.59
1:B:313:GLN:HB3	3:B:9:EDO:H12	1.85	0.59
1:A:69:PRO:CD	1:A:113:ILE:HD11	2.32	0.58
1:A:331:VAL:HG13	3:A:6:EDO:O1	2.03	0.58
1:A:548:CYS:SG	2:A:2:PO4:O4	2.61	0.58
1:A:47:PRO:HB3	1:A:181:ARG:CZ	2.33	0.58
1:B:324:ASP:OD2	1:B:326:LYS:HB2	2.04	0.58
1:A:107:GLU:OE2	1:A:210:HIS:HE1	1.86	0.58
1:B:561:MET:O	1:B:565:MET:HE2	2.04	0.58
1:B:572:LEU:CD2	1:B:612:GLU:HG2	2.34	0.58
1:B:523:PRO:HB2	1:B:528:ILE:CD1	2.32	0.57
1:B:548:CYS:SG	2:B:4:PO4:P	3.02	0.57
1:B:570:VAL:HG22	1:B:575:ILE:HG13	1.86	0.57
1:B:266:ILE:CD1	1:B:316:TYR:HD1	2.07	0.57
1:A:548:CYS:HG	2:A:2:PO4:P	2.28	0.56
1:A:95:ASP:HB2	4:A:702:HOH:O	2.04	0.56
1:A:250:CYS:SG	2:A:1:PO4:P	3.02	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:240:LEU:HD11	1:B:246:LEU:HD21	1.86	0.56
1:B:585:ASN:C	1:B:585:ASN:HD22	2.09	0.56
1:A:585:ASN:C	1:A:585:ASN:HD22	2.09	0.56
1:B:51:LYS:H	1:B:51:LYS:CE	2.18	0.56
1:B:159:ILE:HD11	1:B:603:TYR:CE1	2.40	0.56
1:B:366:THR:HG21	1:B:419:GLN:OE1	2.06	0.56
1:A:548:CYS:SG	2:A:2:PO4:P	3.03	0.56
1:A:388:PRO:HA	1:A:574:ASP:OD1	2.05	0.56
1:B:372:ARG:HG2	1:B:581:LEU:O	2.05	0.56
1:A:294:PRO:CG	1:A:297:LYS:HG2	2.26	0.56
1:B:564:MET:HG2	1:B:575:ILE:CD1	2.35	0.55
1:B:65:VAL:CG1	1:B:67:GLN:HG2	2.25	0.55
1:B:283:LYS:HD3	1:B:289:ASP:HB2	1.87	0.55
1:B:297:LYS:HE3	1:B:305:TYR:CE1	2.41	0.55
1:A:250:CYS:SG	2:A:1:PO4:O4	2.64	0.55
1:A:285:ILE:C	1:A:285:ILE:HD12	2.27	0.55
1:A:204:GLU:H	3:A:7:EDO:H22	1.71	0.54
1:B:119:VAL:HB	1:B:123:GLN:CD	2.28	0.54
1:B:571:SER:HB2	1:B:574:ASP:OD1	2.08	0.54
1:B:354:THR:CG2	1:B:441:ALA:HB3	2.38	0.53
1:B:469:ASN:ND2	1:B:472:ARG:HH12	2.06	0.53
1:B:198:ASN:C	1:B:198:ASN:ND2	2.62	0.53
1:A:298:LYS:HD3	4:B:869:HOH:O	2.09	0.53
1:A:54:PRO:HG2	1:A:57:ALA:HB2	1.91	0.53
1:A:536:ARG:HG2	1:A:536:ARG:HH11	1.74	0.53
1:B:393:LEU:HD13	1:B:578:ARG:NH1	2.24	0.52
1:B:562:TYR:HA	1:B:565:MET:CE	2.39	0.52
1:A:433:THR:HG23	1:A:464:GLU:HG3	1.90	0.52
1:B:153:ASP:HA	1:B:220:GLN:OE1	2.10	0.52
1:B:389:THR:CG2	1:B:390:ARG:H	2.21	0.52
1:A:297:LYS:HE2	1:A:305:TYR:CD1	2.44	0.52
1:B:380:THR:HG21	1:B:384:PHE:CD1	2.43	0.52
1:A:250:CYS:HG	2:A:1:PO4:P	2.33	0.52
1:A:357:ARG:NH2	1:A:362:ARG:HD3	2.25	0.51
1:A:266:ILE:HG13	1:A:316:TYR:HD1	1.76	0.51
1:B:400:GLY:O	1:B:401:SER:HB3	2.11	0.50
1:B:366:THR:HG22	1:B:367:MET:N	2.26	0.50
1:B:550:ALA:HB3	2:B:4:PO4:O1	2.12	0.50
1:A:287:ILE:N	1:A:287:ILE:CD1	2.74	0.50
1:B:294:PRO:HG2	1:B:297:LYS:HG2	1.94	0.50
1:A:254:MET:HG2	1:A:287:ILE:HD11	1.92	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:201:ARG:NH1	1:A:206:MET:HG2	2.27	0.49
1:A:357:ARG:HH22	1:A:362:ARG:HD3	1.77	0.49
1:A:254:MET:O	1:A:258:THR:OG1	2.23	0.49
1:A:266:ILE:CD1	1:A:278:ILE:HG21	2.42	0.49
1:A:300:TYR:CG	1:B:300:TYR:HB3	2.47	0.49
1:A:90:THR:HG22	1:A:91:ARG:N	2.28	0.49
1:A:341:TRP:HA	4:A:749:HOH:O	2.12	0.49
1:B:570:VAL:HG23	1:B:574:ASP:CB	2.43	0.49
1:B:410:GLN:O	1:B:414:PRO:HD2	2.14	0.48
1:A:391:LYS:HE3	1:A:391:LYS:HB2	1.63	0.48
1:B:367:MET:CE	1:B:579:GLN:HE22	2.27	0.48
1:A:214:TYR:CE2	3:A:7:EDO:H21	2.49	0.48
1:A:216:ARG:NH1	3:A:7:EDO:H11	2.28	0.48
1:B:150:TRP:HB3	1:B:153:ASP:HB2	1.96	0.48
1:A:53:PRO:HB2	1:A:189:ILE:HD11	1.96	0.48
1:B:250:CYS:HG	2:B:3:PO4:P	2.37	0.48
1:A:107:GLU:O	1:A:111:GLU:HG2	2.14	0.48
1:B:572:LEU:HB2	1:B:615:TYR:CE1	2.49	0.48
1:B:476:LEU:HD12	1:B:476:LEU:C	2.33	0.47
1:B:181:ARG:NH2	1:B:191:SER:OG	2.47	0.47
1:B:361:PRO:HA	1:B:408:GLU:OE1	2.14	0.47
1:B:564:MET:CG	1:B:575:ILE:HD13	2.42	0.47
1:A:568:PRO:HG3	1:A:622:HIS:CD2	2.50	0.47
1:A:366:THR:CG2	1:A:367:MET:N	2.77	0.47
1:B:166:GLU:OE1	1:B:605:HIS:NE2	2.46	0.47
1:B:73:ARG:HD2	1:B:286:GLY:HA2	1.95	0.47
1:B:560:ALA:O	1:B:564:MET:HG3	2.14	0.47
1:A:73:ARG:HD2	1:A:286:GLY:HA2	1.97	0.46
1:A:389:THR:O	1:A:390:ARG:HB3	2.14	0.46
1:B:535:THR:HA	1:B:538:MET:HG2	1.98	0.46
1:A:159:ILE:HD11	1:A:603:TYR:CE1	2.51	0.46
1:A:107:GLU:OE2	1:A:210:HIS:CE1	2.69	0.46
1:A:259:ILE:HD11	1:A:308:ARG:HB2	1.98	0.46
1:B:240:LEU:CD1	1:B:246:LEU:HD21	2.44	0.46
1:B:366:THR:HG22	1:B:368:ASN:H	1.80	0.46
1:A:121:PRO:O	1:A:212:ALA:HA	2.15	0.46
1:B:372:ARG:NH2	1:B:580:TYR:CZ	2.84	0.46
1:B:539:PRO:HG2	1:B:542:ALA:HB2	1.98	0.46
1:B:611:ILE:HG23	1:B:612:GLU:N	2.31	0.46
1:B:64:ASP:OD1	1:B:108:LYS:HG3	2.15	0.45
1:B:572:LEU:N	1:B:615:TYR:CE1	2.84	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:572:LEU:H	1:B:615:TYR:HE1	1.60	0.45
1:B:541:ASN:OD1	1:B:541:ASN:N	2.45	0.45
1:A:582:LEU:HD13	1:A:582:LEU:HA	1.76	0.45
1:B:367:MET:HE3	1:B:393:LEU:HG	1.97	0.45
1:B:570:VAL:HG11	1:B:578:ARG:HH22	1.82	0.45
1:B:250:CYS:SG	2:B:3:PO4:P	3.14	0.45
1:B:367:MET:HE2	1:B:579:GLN:HE22	1.80	0.45
1:B:548:CYS:SG	2:B:4:PO4:O2	2.75	0.45
1:B:157:GLU:OE1	1:B:161:ILE:HD11	2.17	0.45
1:B:533:ASN:O	1:B:537:THR:HG23	2.16	0.45
1:A:413:LEU:N	1:A:414:PRO:HD2	2.32	0.44
1:B:476:LEU:HD11	1:B:495:ILE:HD11	1.98	0.44
1:A:300:TYR:CD1	1:B:300:TYR:HB3	2.52	0.44
1:A:564:MET:HE3	1:A:611:ILE:HD11	1.99	0.44
1:B:562:TYR:HA	1:B:565:MET:HE2	2.00	0.44
1:B:570:VAL:HG11	1:B:578:ARG:NH2	2.33	0.44
1:B:572:LEU:HB2	1:B:615:TYR:HD1	1.74	0.44
1:B:531:PHE:HE2	1:B:565:MET:HE3	1.82	0.44
1:A:187:ASN:HB3	4:A:845:HOH:O	2.18	0.44
1:B:266:ILE:HD13	1:B:278:ILE:CD1	2.46	0.44
1:B:499:MET:HE1	4:B:721:HOH:O	2.16	0.44
1:B:384:PHE:HA	1:B:577:SER:OG	2.18	0.44
1:B:562:TYR:HA	1:B:565:MET:HE3	2.00	0.44
1:A:563:ASP:OD1	1:A:578:ARG:HD2	2.18	0.43
1:B:577:SER:O	1:B:581:LEU:HG	2.18	0.43
1:B:413:LEU:HB2	1:B:414:PRO:CD	2.48	0.43
1:B:582:LEU:HA	1:B:582:LEU:HD23	1.83	0.43
1:A:347:GLY:HA3	1:A:444:TRP:CD1	2.54	0.43
1:B:125:TYR:HB2	1:B:246:LEU:HD23	2.00	0.43
1:A:390:ARG:HG3	1:A:393:LEU:HD22	1.99	0.43
1:A:393:LEU:HD13	1:A:578:ARG:CZ	2.47	0.43
1:B:476:LEU:CD1	1:B:495:ILE:HD11	2.48	0.43
1:B:365:ARG:O	1:B:399:SER:HB2	2.19	0.43
1:B:493:VAL:HG22	1:B:494:LYS:N	2.33	0.43
1:A:49:VAL:O	1:A:49:VAL:HG23	2.17	0.43
1:A:585:ASN:C	1:A:585:ASN:ND2	2.71	0.43
1:B:616:GLN:HG2	1:B:633:TRP:HZ2	1.83	0.43
1:B:629:SER:H	1:B:632:GLN:NE2	2.17	0.43
1:A:72:PHE:CD1	1:A:113:ILE:HD12	2.53	0.43
1:B:413:LEU:N	1:B:414:PRO:HD2	2.33	0.43
1:B:616:GLN:O	1:B:620:GLU:HG3	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:581:LEU:HD12	1:A:581:LEU:HA	1.79	0.43
1:B:221:ASP:O	1:B:222:HIS:HB2	2.18	0.43
1:A:557:ALA:O	1:A:561:MET:HG3	2.18	0.42
1:B:297:LYS:HE3	1:B:305:TYR:CZ	2.54	0.42
1:B:333:ALA:HB1	1:B:339:ASN:HA	2.00	0.42
1:A:101:ALA:HB1	1:A:257:THR:CG2	2.49	0.42
1:A:349:ILE:O	1:A:349:ILE:HG23	2.19	0.42
1:A:505:VAL:HG13	1:A:510:LEU:HB2	2.00	0.42
1:A:201:ARG:CZ	1:A:206:MET:HG2	2.49	0.42
1:B:262:VAL:O	1:B:266:ILE:HG12	2.20	0.42
1:A:614:PHE:HA	1:A:630:TRP:CZ3	2.55	0.42
1:B:347:GLY:HA3	1:B:444:TRP:CD1	2.55	0.42
1:A:137:LEU:O	1:A:138:ASN:HB2	2.19	0.42
1:A:254:MET:O	1:A:258:THR:CB	2.68	0.42
1:A:328:PRO:HA	4:A:863:HOH:O	2.19	0.42
1:B:616:GLN:HG2	1:B:633:TRP:CZ2	2.55	0.42
1:A:103:SER:HB2	1:A:251:TYR:O	2.20	0.42
1:B:121:PRO:O	1:B:212:ALA:HA	2.20	0.42
1:A:390:ARG:CG	1:A:390:ARG:O	2.67	0.41
1:A:393:LEU:HD13	1:A:578:ARG:NH2	2.35	0.41
1:B:204:GLU:HB2	1:B:214:TYR:CE2	2.55	0.41
1:B:366:THR:CG2	1:B:367:MET:N	2.82	0.41
1:A:408:GLU:O	1:A:412:MET:HG3	2.20	0.41
1:A:564:MET:CE	1:A:611:ILE:HD11	2.49	0.41
1:A:572:LEU:HD13	1:A:572:LEU:C	2.41	0.41
1:B:609:HIS:NE2	1:B:613:LYS:HE3	2.35	0.41
1:B:250:CYS:SG	2:B:3:PO4:O3	2.74	0.41
1:B:409:LEU:HA	1:B:412:MET:CE	2.33	0.41
1:B:491:LYS:HA	1:B:492:PRO:HD3	1.92	0.41
1:A:418:GLN:O	1:A:418:GLN:HG2	2.21	0.41
1:B:287:ILE:HG22	1:B:288:VAL:N	2.34	0.41
1:A:185:LYS:HD2	1:A:185:LYS:N	2.36	0.41
1:A:375:VAL:HG12	1:A:376:ASN:N	2.35	0.41
1:B:381:GLY:O	1:B:382:LYS:C	2.59	0.41
1:B:385:THR:HG22	1:B:387:THR:H	1.86	0.41
1:B:389:THR:HG21	1:B:391:LYS:HB2	2.03	0.41
1:A:570:VAL:HG12	1:A:571:SER:N	2.36	0.41
1:B:103:SER:HB2	1:B:251:TYR:O	2.21	0.41
1:B:126:ASP:OD2	1:B:203:GLU:OE2	2.38	0.41
1:A:214:TYR:CZ	3:A:7:EDO:H21	2.56	0.40
1:A:224:ARG:HD2	1:A:311:PHE:HB2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:405:SER:HB2	1:A:439:GLY:O	2.21	0.40
1:B:405:SER:HB2	1:B:439:GLY:O	2.20	0.40
1:B:120:LYS:O	1:B:123:GLN:HG3	2.21	0.40
1:B:505:VAL:HG13	1:B:510:LEU:HB2	2.03	0.40
1:A:172:LYS:HE3	4:A:720:HOH:O	2.20	0.40
1:B:57:ALA:HB3	1:B:189:ILE:CD1	2.52	0.40
1:B:428:ASP:OD2	1:B:434:HIS:CE1	2.75	0.40
1:A:111:GLU:HG2	1:A:111:GLU:H	1.66	0.40
1:A:202:THR:HB	3:A:7:EDO:O1	2.21	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	589/629 (94%)	559 (95%)	25 (4%)	5 (1%)	19	23
1	B	589/629 (94%)	547 (93%)	38 (6%)	4 (1%)	22	26
All	All	1178/1258 (94%)	1106 (94%)	63 (5%)	9 (1%)	19	23

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	540	ALA
1	B	255	GLY
1	B	389	THR
1	A	255	GLY
1	B	299	ASN
1	A	299	ASN
1	A	594	PRO
1	A	583	GLY
1	B	553	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	516/546 (94%)	501 (97%)	15 (3%)	42	58
1	B	516/546 (94%)	500 (97%)	16 (3%)	40	55
All	All	1032/1092 (94%)	1001 (97%)	31 (3%)	41	57

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	59	LYS
1	A	111	GLU
1	A	279	ILE
1	A	287	ILE
1	A	337	LYS
1	A	365	ARG
1	A	366	THR
1	A	385	THR
1	A	393	LEU
1	A	395	THR
1	A	461	LEU
1	A	581	LEU
1	A	582	LEU
1	A	585	ASN
1	A	595	LYS
1	B	51	LYS
1	B	59	LYS
1	B	95	ASP
1	B	123	GLN
1	B	198	ASN
1	B	224	ARG
1	B	287	ILE
1	B	326	LYS
1	B	469	ASN
1	B	497	SER
1	B	504	LEU
1	B	547	HIS

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Mol	Chain	Res	Type
1	B	549	GLN
1	B	570	VAL
1	B	574	ASP
1	B	585	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	52	ASN
1	A	71	ASN
1	A	210	HIS
1	A	368	ASN
1	A	419	GLN
1	A	527	ASN
1	A	541	ASN
1	A	585	ASN
1	A	616	GLN
1	A	622	HIS
1	B	147	ASN
1	B	198	ASN
1	B	313	GLN
1	B	358	ASN
1	B	434	HIS
1	B	452	ASN
1	B	579	GLN
1	B	585	ASN
1	B	622	HIS
1	B	632	GLN

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)

11 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	EDO	A	7	-	3,3,3	0.60	0	2,2,2	0.37	0
3	EDO	B	9	-	3,3,3	0.14	0	2,2,2	0.26	0
3	EDO	B	10	-	3,3,3	0.46	0	2,2,2	0.07	0
3	EDO	A	5	-	3,3,3	0.38	0	2,2,2	0.04	0
3	EDO	B	641	-	3,3,3	0.91	0	2,2,2	0.13	0
2	PO4	A	2	-	4,4,4	1.47	1 (25%)	6,6,6	0.39	0
2	PO4	A	1	-	4,4,4	1.42	0	6,6,6	0.47	0
2	PO4	B	3	-	4,4,4	1.48	0	6,6,6	0.45	0
2	PO4	B	4	-	4,4,4	1.56	0	6,6,6	0.44	0
3	EDO	A	8	-	3,3,3	0.54	0	2,2,2	0.16	0
3	EDO	A	6	-	3,3,3	0.41	0	2,2,2	0.01	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	EDO	A	7	-	-	0/1/1/1	-
3	EDO	B	9	-	-	0/1/1/1	-
3	EDO	B	10	-	-	0/1/1/1	-
3	EDO	A	5	-	-	0/1/1/1	-
3	EDO	B	641	-	-	1/1/1/1	-
3	EDO	A	6	-	-	0/1/1/1	-
3	EDO	A	8	-	-	0/1/1/1	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	2	PO4	P-O4	-2.06	1.48	1.54

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	641	EDO	O1-C1-C2-O2

There are no ring outliers.

7 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	7	EDO	6	0
3	B	9	EDO	1	0
2	A	2	PO4	3	0
2	A	1	PO4	3	0
2	B	3	PO4	3	0
2	B	4	PO4	4	0
3	A	6	EDO	1	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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, 95th 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(Å²)	Q<0.9
1	A	590/629 (93%)	-0.16	4 (0%) 87	91	19, 37, 58, 72	0
1	B	590/629 (93%)	-0.05	10 (1%) 70	76	19, 37, 65, 75	0
All	All	1180/1258 (93%)	-0.10	14 (1%) 79	83	19, 37, 62, 75	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	540	ALA	4.5
1	B	51	LYS	3.6
1	A	51	LYS	3.1
1	B	52	ASN	2.6
1	B	47	PRO	2.5
1	B	196	ASN	2.3
1	B	53	PRO	2.3
1	A	52	ASN	2.2
1	B	190	LEU	2.2
1	B	592	ALA	2.1
1	A	389	THR	2.1
1	B	191	SER	2.0
1	A	49	VAL	2.0
1	B	173	GLY	2.0

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

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

6.3   Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	EDO	B	641	4/4	0.72	0.15	50,52,54,55	0
3	EDO	A	7	4/4	0.84	0.25	39,44,44,47	0
3	EDO	A	8	4/4	0.91	0.18	50,50,55,57	0
3	EDO	B	10	4/4	0.92	0.12	62,63,63,64	0
2	PO4	A	1	5/5	0.93	0.16	72,73,74,76	0
3	EDO	B	9	4/4	0.95	0.16	40,43,44,50	0
3	EDO	A	5	4/4	0.95	0.16	36,40,41,44	0
3	EDO	A	6	4/4	0.95	0.22	45,46,48,50	0
2	PO4	B	3	5/5	0.96	0.11	63,65,65,68	0
2	PO4	A	2	5/5	0.98	0.10	40,43,45,48	0
2	PO4	B	4	5/5	0.99	0.12	47,48,49,49	0

6.5 Other polymers ⓘ

There are no such residues in this entry.