Full wwPDB X-ray Structure Validation Report (i)

Aug 16, 2023 – 08:09 AM EDT

PDB ID	:	1ZAL
Title	:	Fructose-1,6-bisphosphate aldolase from rabbit muscle in complex with partially disordered tagatose-1,6-bisphosphate, a weak competitive inhibitor
Authors	:	St-Jean, M.; Lafrance-Vanasse, J.; Liotard, B.; Sygusch, J.
Deposited on	:	2005-04-06
Resolution	:	1.89 Å(reported)

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

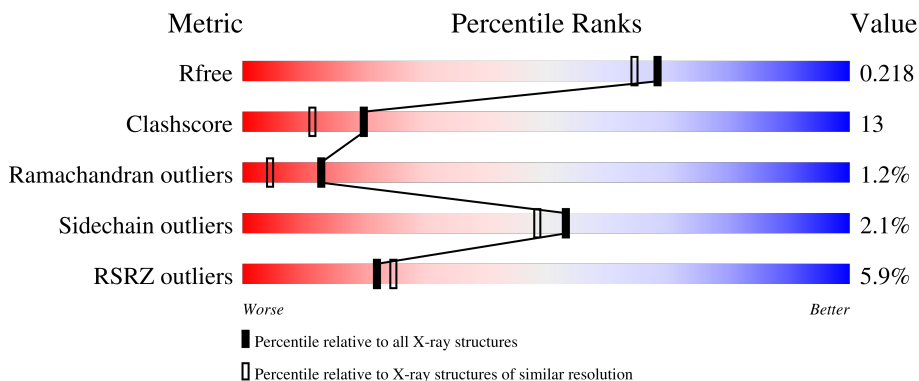|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

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 1.89 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	Percentile Ranks	Value
Rfree		0.218
Clashscore		13
Ramachandran outliers		1.2%
Sidechain outliers		2.1%
RSRZ outliers		5.9%

Worse ... *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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	363	5% / 75% 23% •
1	B	363	5% / 81% 19%
1	C	363	6% / 73% 25% •
1	D	363	7% / 74% 25% •

WORLDWIDE PDB
PROTEIN DATA BANK
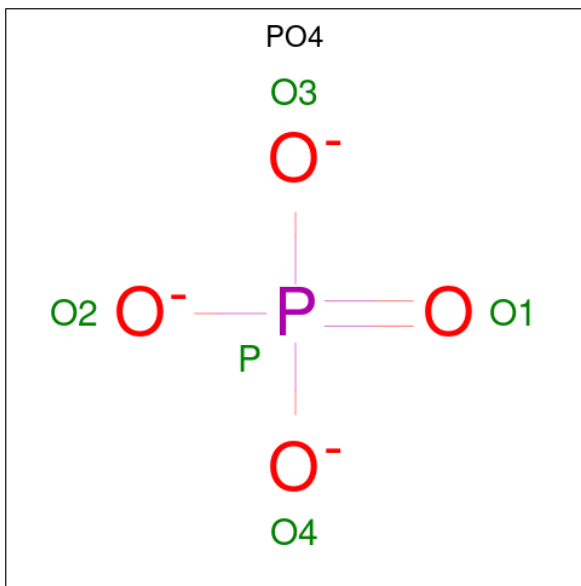
2   Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 13287 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 Fructose-bisphosphate aldolase A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	363	Total	C	N	O	S	0	0	0
			2758	1733	489	525	11			
1	B	363	Total	C	N	O	S	0	0	0
			2758	1733	489	525	11			
1	C	363	Total	C	N	O	S	0	0	0
			2758	1733	489	525	11			
1	D	363	Total	C	N	O	S	0	0	0
			2758	1733	489	525	11			

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

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

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

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	496	Total 496	O 496	0	7
3	B	538	Total 538	O 538	0	8
3	C	592	Total 592	O 592	0	8
3	D	589	Total 589	O 589	0	8

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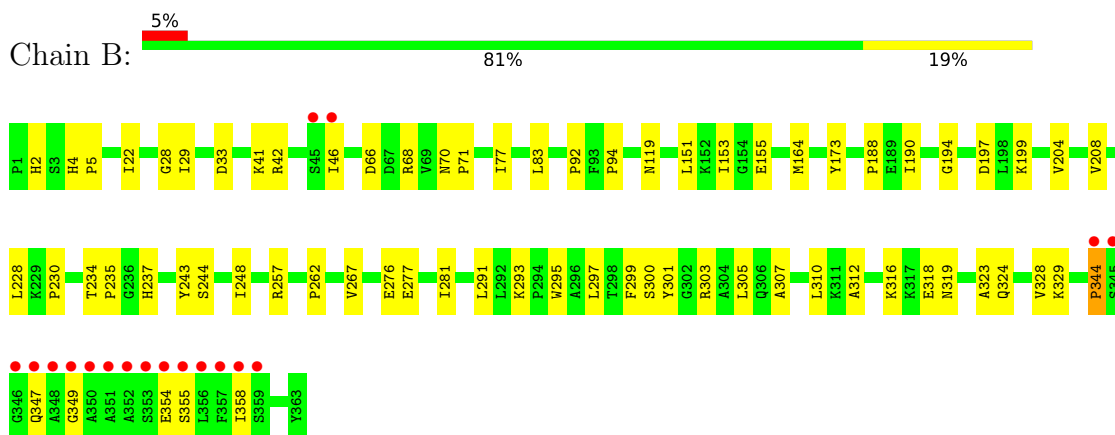of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector.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

- Molecule 1: Fructose-bisphosphate aldolase A

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I281 K288 L291 L292 K293 P294 W295 A296 L297 T298 F299 S300 Y301 G302 R303 A304 A307 K311 A312 W313 G314 G315 K316 N319 L320 K321 A322 A323 Q324 V328 T343 P344 S345 G346 Q347 A348 G349 A350 A351 A352 S353 E354 S355 L356 F357 I358 S359 N360 H361 A362 Y363

• Molecule 1: Fructose-bisphosphate aldolase A

Chain D:

7%

74%   25%   •

P1 H4 P5 D17 I18 R21 G28 I29 D33 A40 K41 R42 L43 Q44 S45 I46 E49 N50 T51 R59 Q60 L61 L62 L63 D66 D67 N70 P71 I77 L78 T82 K86 F93 P94 Q95 V96 I97 K110 R133 K138 D143 F144

A145 K146 W147 K152 E155 P158 I163 M164 Y173 N180 G181 I182 I185 P188 D193 D197 I198 K199 R200 K207 V208 L216 H219 H220 I221 L228 K229 P230 N231 M232 V233 T234 P235 Y243 M250 A251 T252 R257 P261 P262 V267

E276 E277 E278 I281 N284 L291 L292 K293 P294 W295 A296 L297 T298 F299 S300 Y301 G302 R303 A304 L305 Q306 A307 A312 K316 K317 E318 N319 L320 K321 A322 A323 Q324 E325 K329 Y342 T343 P344 S345 G346 Q347 A348 G349 A350 A351 A352 S353 E354 S355 L356 F357 I358 S359

N360 H361 A362 Y363

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	83.05Å 103.22Å 84.55Å 90.00° 98.56° 90.00°	Depositor
Resolution (Å)	50.00 – 1.89 48.31 – 1.68	Depositor EDS
% Data completeness (in resolution range)	85.4 (50.00-1.89) 76.0 (48.31-1.68)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.89 (at 1.68Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.168 , 0.211 0.176 , 0.218	Depositor DCC
R_{free} test set	6802 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	17.4	Xtriage
Anisotropy	0.655	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 61.5	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.018 for l,-k,h	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	13287	wwPDB-VP
Average B, all atoms (Å^2)	30.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.47% of the height of the origin peak. No significant pseudotranslation is detected.*

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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: 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	0.31	0/2812	0.64	3/3810 (0.1%)
1	B	0.30	0/2812	0.58	0/3810
1	C	0.31	0/2812	0.59	1/3810 (0.0%)
1	D	0.29	0/2812	0.57	0/3810
All	All	0.30	0/11248	0.60	4/15240 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	356	LEU	CA-CB-CG	7.20	131.86	115.30
1	A	350	ALA	N-CA-C	6.09	127.45	111.00
1	A	358	ILE	CG1-CB-CG2	-5.13	100.11	111.40
1	C	358	ILE	N-CA-C	-5.04	97.40	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	213	TYR	Sidechain

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2758	0	2776	78	0
1	B	2758	0	2776	49	0
1	C	2758	0	2776	86	0
1	D	2758	0	2776	76	0
2	A	10	0	0	0	0
2	B	10	0	0	0	0
2	C	10	0	0	0	0
2	D	10	0	0	0	0
3	A	496	0	0	6	0
3	B	538	0	0	6	0
3	C	592	0	0	12	0
3	D	589	0	0	8	0
All	All	13287	0	11104	280	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 (280) 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:358:ILE:HG12	1:C:358:ILE:O	1.53	1.06
1:A:63:LEU:HD22	1:A:97:ILE:HD11	1.38	1.01
1:A:22:ILE:HG23	1:A:29:ILE:HD11	1.47	0.94
1:C:22:ILE:HG23	1:C:29:ILE:HD11	1.49	0.92
1:C:164:MET:HE3	1:C:165:GLU:HA	1.49	0.92
1:A:339:GLN:HB3	1:A:341:LYS:HZ3	1.38	0.88
1:C:22:ILE:CG2	1:C:29:ILE:HD11	2.03	0.86
1:A:22:ILE:CG2	1:A:29:ILE:HD11	2.04	0.86
1:B:22:ILE:HG23	1:B:29:ILE:HD11	1.58	0.84
1:B:22:ILE:CG2	1:B:29:ILE:HD11	2.13	0.78
1:B:190:ILE:HD11	1:B:208:VAL:HG21	1.65	0.76
1:A:63:LEU:HD22	1:A:97:ILE:CD1	2.14	0.76
1:C:274:GLN:HB3	1:C:278:GLU:HG3	1.68	0.75
1:B:151:LEU:HB2	1:B:190:ILE:HD13	1.69	0.73
1:C:321:LYS:HE3	1:C:321:LYS:HA	1.70	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:110:LYS:HE3	3:B:3054:HOH:O	1.89	0.73
1:A:60:GLN:HE22	1:A:88:ASP:H	1.37	0.72
1:D:63:LEU:HD22	1:D:97:ILE:HD11	1.72	0.71
1:A:341:LYS:HB3	1:A:351:ALA:O	1.89	0.71
1:A:39:ILE:HG13	1:A:43:LEU:HD23	1.71	0.70
1:A:60:GLN:NE2	1:A:88:ASP:H	1.90	0.70
1:C:316:LYS:HB2	1:C:319:ASN:ND2	2.07	0.70
1:D:277:GLU:O	1:D:281:ILE:HG12	1.92	0.69
1:C:153:ILE:HD11	1:C:204:VAL:HG11	1.74	0.69
1:A:185:ILE:HD13	1:A:227:LEU:HB2	1.74	0.69
1:B:153:ILE:HD12	1:B:204:VAL:HG21	1.74	0.68
1:A:163:ILE:HD12	1:A:208:VAL:HG22	1.75	0.68
1:B:155:GLU:O	1:C:2:HIS:HE1	1.76	0.68
1:C:95:GLN:HG2	3:C:3212:HOH:O	1.94	0.68
1:D:284:ASN:ND2	1:D:342:TYR:H	1.92	0.67
1:C:153:ILE:CD1	1:C:204:VAL:HG11	2.24	0.66
1:C:153:ILE:HD12	1:C:204:VAL:HG21	1.78	0.66
1:D:216:LEU:HA	1:D:221:ILE:HD13	1.78	0.65
1:C:358:ILE:O	1:C:358:ILE:CG1	2.40	0.65
1:A:200:ARG:HD2	3:D:3366:HOH:O	1.95	0.65
1:D:180:ASN:O	1:D:182:ILE:HD12	1.96	0.65
1:B:66:ASP:OD1	1:B:68:ARG:HD3	1.96	0.65
1:B:197:ASP:HB2	1:B:243:TYR:OH	1.97	0.65
1:D:325:GLU:HG3	1:D:329:LYS:NZ	2.11	0.65
1:C:146:LYS:HE2	1:C:187:GLU:OE1	1.97	0.64
1:C:288:LYS:HD3	3:C:3550:HOH:O	1.97	0.64
1:B:293:LYS:HG2	1:B:297:LEU:HD11	1.80	0.64
1:D:70:ASN:HB2	1:D:71:PRO:HD3	1.80	0.64
1:A:293:LYS:HG2	1:A:297:LEU:HD11	1.80	0.64
1:D:163:ILE:HD12	1:D:208:VAL:HG22	1.79	0.64
1:A:134:CYS:HB3	1:A:182:ILE:HD12	1.80	0.63
1:D:293:LYS:HD2	1:D:297:LEU:CD1	2.28	0.63
1:B:83:LEU:HD12	1:B:94:PRO:HG3	1.80	0.63
1:C:357:PHE:O	1:C:358:ILE:HG22	1.99	0.63
1:A:68:ARG:HG3	1:A:332:LEU:HD21	1.81	0.62
1:B:228:LEU:HG	1:B:230:PRO:HD3	1.79	0.62
1:A:139:LYS:NZ	1:A:139:LYS:HB3	2.16	0.61
1:A:359:SER:O	1:A:360:ASN:HB3	2.00	0.61
1:B:194:GLY:H	1:B:237:HIS:CE1	2.18	0.61
1:D:321:LYS:HD3	1:D:321:LYS:C	2.21	0.61
1:C:106:ILE:HD13	1:C:107:LYS:O	2.01	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:358:ILE:HG21	3:C:3275:HOH:O	2.02	0.60
1:A:185:ILE:HD11	1:A:227:LEU:HD12	1.83	0.60
3:A:3134:HOH:O	1:D:200:ARG:HD2	2.01	0.60
1:D:276:GLU:CD	1:D:307:ALA:HB3	2.21	0.59
1:A:185:ILE:CD1	1:A:227:LEU:HD12	2.32	0.59
1:D:219:HIS:HB2	1:D:221:ILE:CD1	2.33	0.59
1:C:316:LYS:HD3	3:C:3557:HOH:O	2.02	0.59
1:A:29:ILE:HB	1:A:300:SER:HA	1.83	0.59
1:D:219:HIS:HB2	1:D:221:ILE:HD11	1.85	0.59
1:A:18:ILE:HD13	1:A:21:ARG:NH1	2.18	0.59
1:D:228:LEU:HG	1:D:230:PRO:HD3	1.85	0.58
1:A:290:PRO:CG	1:A:356:LEU:O	2.52	0.58
1:B:153:ILE:CD1	1:B:204:VAL:HG11	2.33	0.58
1:C:250:MET:HE3	1:C:358:ILE:HG13	1.85	0.58
1:C:250:MET:CE	1:C:358:ILE:HG13	2.34	0.57
1:C:14:GLU:O	1:C:18:ILE:HG12	2.03	0.57
1:C:40:ALA:O	1:C:44:GLN:HG2	2.05	0.57
1:B:277:GLU:O	1:B:281:ILE:HG12	2.05	0.57
1:B:316:LYS:HB2	1:B:319:ASN:ND2	2.20	0.57
1:C:180:ASN:O	1:C:182:ILE:HD12	2.05	0.56
1:D:133:ARG:HD2	3:D:3398:HOH:O	2.04	0.56
1:A:199:LYS:HD3	3:A:3022:HOH:O	2.06	0.56
1:C:244:SER:OG	1:C:247:GLU:HG3	2.06	0.56
1:B:257:ARG:O	1:C:262:PRO:HD2	2.06	0.55
1:C:164:MET:CE	1:C:165:GLU:HA	2.31	0.55
1:A:339:GLN:CB	1:A:341:LYS:HZ3	2.12	0.55
1:A:13:LYS:HE3	1:A:17:ASP:OD1	2.07	0.55
1:C:221:ILE:HD12	1:C:221:ILE:N	2.22	0.55
1:B:291:LEU:O	1:B:293:LYS:HD3	2.06	0.55
1:C:219:HIS:HB2	1:C:221:ILE:CD1	2.37	0.55
1:B:153:ILE:HD11	1:B:204:VAL:HG11	1.89	0.54
1:C:190:ILE:HD11	1:C:208:VAL:HG21	1.88	0.54
1:A:290:PRO:HG3	1:A:356:LEU:O	2.06	0.54
1:D:356:LEU:HD22	1:D:356:LEU:N	2.23	0.54
1:B:28:GLY:HA3	1:B:299:PHE:CZ	2.42	0.54
1:B:155:GLU:HG3	3:B:3251:HOH:O	2.07	0.54
1:C:176:ILE:HD11	3:D:3208:HOH:O	2.08	0.54
1:D:325:GLU:HG3	1:D:329:LYS:HZ2	1.71	0.53
1:A:42:ARG:O	1:A:45:SER:HB3	2.08	0.53
1:A:39:ILE:HG13	1:A:43:LEU:CD2	2.38	0.53
1:A:199:LYS:HG3	3:A:3194:HOH:O	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:29:ILE:HB	1:C:300:SER:HA	1.91	0.53
3:C:3463:HOH:O	1:D:110:LYS:HE3	2.08	0.53
1:A:358:ILE:HG22	1:A:359:SER:H	1.73	0.53
1:C:312:ALA:HB1	3:C:3552:HOH:O	2.09	0.53
1:D:63:LEU:HD22	1:D:97:ILE:CD1	2.39	0.53
1:C:234:THR:HB	1:C:235:PRO:HD2	1.91	0.53
1:D:28:GLY:HA3	1:D:299:PHE:CZ	2.43	0.52
1:C:277:GLU:O	1:C:281:ILE:HG12	2.09	0.52
1:D:221:ILE:HD12	1:D:221:ILE:N	2.23	0.52
1:C:311:LYS:HD3	3:C:3582:HOH:O	2.08	0.52
1:D:298:THR:OG1	1:D:299:PHE:N	2.43	0.52
1:D:250:MET:CE	1:D:291:LEU:HD11	2.39	0.52
1:A:70:ASN:HB2	1:A:71:PRO:HD3	1.92	0.52
1:B:29:ILE:HB	1:B:300:SER:HA	1.92	0.52
1:D:216:LEU:O	1:D:221:ILE:HD13	2.10	0.52
1:B:267:VAL:HB	1:B:297:LEU:HD23	1.92	0.51
1:C:33:ASP:HB3	1:C:77:ILE:HG22	1.93	0.51
1:C:216:LEU:HA	1:C:221:ILE:HD13	1.93	0.51
1:A:246:GLU:HB3	1:A:358:ILE:CD1	2.41	0.51
1:C:324:GLN:O	1:C:328:VAL:HG23	2.11	0.51
1:A:244:SER:OG	1:A:247:GLU:HG3	2.11	0.50
1:D:29:ILE:HB	1:D:300:SER:HA	1.92	0.50
1:D:312:ALA:HB3	1:D:323:ALA:HA	1.93	0.50
1:B:70:ASN:HB2	1:B:71:PRO:HD3	1.93	0.50
1:C:151:LEU:HB2	1:C:190:ILE:HD13	1.92	0.50
1:A:60:GLN:HE22	1:A:88:ASP:N	2.07	0.50
1:C:134:CYS:HB3	1:C:182:ILE:HD13	1.92	0.50
1:C:164:MET:HE3	1:C:165:GLU:CA	2.30	0.50
1:A:172:ARG:O	1:A:176:ILE:HG12	2.12	0.50
1:C:291:LEU:O	1:C:293:LYS:HE2	2.12	0.49
1:D:145:ALA:O	1:D:185:ILE:HD13	2.12	0.49
1:A:220:HIS:HD2	1:D:207:LYS:NZ	2.11	0.49
1:B:293:LYS:HG2	1:B:297:LEU:CD1	2.40	0.49
1:D:293:LYS:HD2	1:D:297:LEU:HD12	1.95	0.49
1:B:199:LYS:HG3	3:B:3105:HOH:O	2.13	0.49
1:D:63:LEU:HD13	1:D:97:ILE:HD11	1.94	0.49
1:B:276:GLU:CD	1:B:307:ALA:HB3	2.33	0.48
1:B:324:GLN:O	1:B:328:VAL:HG23	2.13	0.48
1:C:250:MET:HG2	1:C:363:TYR:CE2	2.48	0.48
1:D:93:PHE:O	1:D:97:ILE:HG12	2.13	0.48
1:D:42:ARG:HG3	1:D:42:ARG:HH11	1.77	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:14:GLU:O	1:A:18:ILE:HG12	2.14	0.48
1:A:73:ILE:HD11	1:A:327:TYR:OH	2.14	0.48
1:A:291:LEU:O	1:A:293:LYS:HD3	2.13	0.48
1:B:41:LYS:HD3	3:B:3358:HOH:O	2.13	0.48
1:C:216:LEU:O	1:C:221:ILE:HD13	2.14	0.48
1:A:339:GLN:HB3	1:A:341:LYS:NZ	2.20	0.48
1:A:290:PRO:HG2	1:A:356:LEU:O	2.12	0.48
1:C:28:GLY:HA3	1:C:299:PHE:CE1	2.49	0.48
1:D:147:TRP:HB3	1:D:173:TYR:CE2	2.48	0.48
1:A:152:LYS:NZ	1:A:193:ASP:OD1	2.46	0.48
1:B:312:ALA:HB3	1:B:323:ALA:HA	1.96	0.48
1:A:185:ILE:CD1	1:A:227:LEU:HB2	2.42	0.47
1:D:40:ALA:O	1:D:44:GLN:HG3	2.13	0.47
1:A:341:LYS:CB	1:A:351:ALA:O	2.59	0.47
1:D:267:VAL:HB	1:D:297:LEU:HD23	1.96	0.47
1:C:343:THR:C	1:C:345:SER:H	2.17	0.47
1:C:357:PHE:O	1:C:358:ILE:CG2	2.62	0.47
1:D:197:ASP:HB2	1:D:243:TYR:OH	2.14	0.47
1:A:245:HIS:HD2	1:A:282:ASN:OD1	1.97	0.47
1:A:117:GLY:HA2	1:B:4:HIS:O	2.15	0.47
1:A:139:LYS:HB3	1:A:139:LYS:HZ3	1.79	0.47
1:C:219:HIS:HB2	1:C:221:ILE:HD11	1.96	0.47
1:D:33:ASP:HB3	1:D:77:ILE:HG22	1.96	0.47
1:A:73:ILE:CD1	1:A:327:TYR:OH	2.63	0.47
1:A:313:TRP:CE2	1:A:315:GLY:HA2	2.50	0.47
1:B:244:SER:O	1:B:248:ILE:HD13	2.15	0.46
1:B:28:GLY:HA3	1:B:299:PHE:CE1	2.50	0.46
1:C:28:GLY:HA3	1:C:299:PHE:CZ	2.51	0.46
1:C:53:GLU:HB2	3:C:3112:HOH:O	2.14	0.46
1:A:134:CYS:CB	1:A:182:ILE:HD12	2.45	0.46
1:A:176:ILE:HD11	3:B:3017:HOH:O	2.15	0.46
1:B:92:PRO:HB2	1:B:94:PRO:HD2	1.98	0.46
1:C:298:THR:OG1	1:C:299:PHE:N	2.49	0.46
1:A:294:PRO:HG2	1:D:262:PRO:CG	2.46	0.46
1:D:86:LYS:HG3	3:D:3392:HOH:O	2.15	0.46
1:C:358:ILE:HD12	3:C:3275:HOH:O	2.16	0.46
1:D:49:GLU:HG3	1:D:51:THR:HG23	1.98	0.45
1:D:250:MET:HE1	1:D:291:LEU:HD11	1.97	0.45
1:A:86:LYS:HD3	1:A:90:GLY:O	2.16	0.45
1:C:275:SER:H	1:C:278:GLU:CD	2.20	0.45
1:A:272:GLY:HA2	1:A:303:ARG:NH2	2.32	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:293:LYS:HD2	1:C:297:LEU:CD1	2.46	0.45
1:A:294:PRO:HG2	1:D:262:PRO:HG3	1.99	0.45
1:D:78:LEU:HD22	1:D:82:THR:HG21	1.98	0.45
1:B:234:THR:HB	1:B:235:PRO:HD2	1.98	0.45
1:C:59:ARG:O	1:C:63:LEU:HG	2.17	0.45
1:D:163:ILE:CD1	1:D:208:VAL:HG22	2.46	0.45
1:D:17:ASP:O	1:D:21:ARG:HG3	2.16	0.45
1:B:354:GLU:HG2	1:B:355:SER:N	2.31	0.45
1:A:59:ARG:O	1:A:63:LEU:HG	2.16	0.45
1:A:234:THR:HB	1:A:235:PRO:HD2	1.99	0.44
1:A:357:PHE:O	3:A:3306:HOH:O	2.21	0.44
1:B:316:LYS:HB2	1:B:319:ASN:HD22	1.80	0.44
1:B:42:ARG:HH21	1:B:303:ARG:HD3	1.81	0.44
1:C:2:HIS:HB3	3:C:3395:HOH:O	2.16	0.44
1:C:10:GLU:HG2	3:C:3270:HOH:O	2.17	0.44
1:A:61:LEU:C	1:A:61:LEU:HD23	2.38	0.44
1:B:316:LYS:HB3	1:B:318:GLU:OE1	2.16	0.44
3:A:3442:HOH:O	1:B:2:HIS:HD2	2.00	0.44
1:C:61:LEU:HD23	1:C:61:LEU:C	2.38	0.44
1:D:316:LYS:HB2	1:D:319:ASN:ND2	2.33	0.44
1:A:290:PRO:HG2	1:A:357:PHE:HA	1.99	0.44
1:A:325:GLU:HG2	3:A:3351:HOH:O	2.17	0.44
1:B:262:PRO:CG	1:C:294:PRO:HG3	2.48	0.44
1:C:316:LYS:HD2	1:C:319:ASN:HD21	1.83	0.44
1:A:289:CYS:HA	1:A:290:PRO:HD3	1.88	0.44
1:B:301:TYR:HA	3:B:3009[B]:HOH:O	2.17	0.44
1:B:46:ILE:HD13	1:B:310:LEU:HG	2.00	0.43
1:D:28:GLY:HA3	1:D:299:PHE:CE1	2.53	0.43
1:C:228:LEU:HG	1:C:230:PRO:HD3	2.00	0.43
1:C:49:GLU:HG2	1:C:51:THR:HG23	1.99	0.43
1:D:138:LYS:HB2	1:D:182:ILE:HD11	2.00	0.43
1:D:152:LYS:HE2	3:D:3429:HOH:O	2.17	0.43
1:A:262:PRO:HD2	1:D:257:ARG:O	2.19	0.43
1:D:95:GLN:HG3	3:D:3050:HOH:O	2.17	0.43
1:B:301:TYR:HB2	1:B:305:LEU:HG	2.00	0.43
1:C:18:ILE:CD1	1:C:21:ARG:HH22	2.31	0.43
1:A:292:LEU:C	1:A:292:LEU:HD23	2.39	0.43
1:A:60:GLN:NE2	1:A:88:ASP:N	2.63	0.43
1:A:139:LYS:NZ	1:A:139:LYS:CB	2.80	0.43
1:D:199:LYS:HG3	3:D:3167:HOH:O	2.17	0.43
1:B:66:ASP:OD2	1:B:68:ARG:NH1	2.52	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:293:LYS:HD2	1:C:297:LEU:HD12	2.00	0.42
1:C:301:TYR:HB3	1:C:304:ALA:HB3	2.00	0.42
1:D:276:GLU:OE2	1:D:307:ALA:HB3	2.17	0.42
1:C:164:MET:HG3	1:C:165:GLU:N	2.34	0.42
1:D:144:PHE:HD2	1:D:185:ILE:HD13	1.83	0.42
1:D:321:LYS:HD3	1:D:321:LYS:O	2.19	0.42
1:D:234:THR:HB	1:D:235:PRO:HD2	2.00	0.42
1:B:329:LYS:HE3	1:B:329:LYS:HB2	1.87	0.42
1:D:284:ASN:HD21	1:D:342:TYR:H	1.64	0.42
1:D:59:ARG:O	1:D:63:LEU:HG	2.20	0.42
1:C:276:GLU:CD	1:C:307:ALA:HB3	2.40	0.42
1:A:313:TRP:CZ2	1:A:315:GLY:HA2	2.55	0.42
1:C:313:TRP:CE2	1:C:315:GLY:HA2	2.55	0.42
1:D:158:PRO:CG	1:D:163:ILE:HD11	2.49	0.42
1:C:155:GLU:HA	1:C:155:GLU:OE1	2.20	0.42
1:D:303:ARG:HD2	1:D:356:LEU:HB3	2.02	0.42
1:A:163:ILE:CD1	1:A:208:VAL:HG22	2.47	0.42
1:D:164:MET:SD	1:D:164:MET:C	2.98	0.42
1:A:60:GLN:HE21	1:A:87:ALA:HB1	1.84	0.41
1:B:281:ILE:HD11	1:B:344:PRO:HB3	2.01	0.41
1:C:197:ASP:HB2	1:C:243:TYR:OH	2.20	0.41
1:C:322:ALA:HB1	3:C:3552:HOH:O	2.19	0.41
1:D:301:TYR:HB2	1:D:305:LEU:HG	2.01	0.41
1:A:268:THR:HB	1:A:300:SER:HB2	2.01	0.41
1:A:293:LYS:HE2	1:A:293:LYS:HB2	1.94	0.41
1:D:43:LEU:HD13	1:D:50:ASN:HA	2.01	0.41
1:C:18:ILE:HD13	1:C:21:ARG:HH22	1.85	0.41
1:D:318:GLU:N	1:D:318:GLU:OE1	2.50	0.41
1:B:33:ASP:HB3	1:B:77:ILE:HG22	2.02	0.41
1:B:164:MET:SD	1:B:164:MET:C	2.98	0.41
1:C:106:ILE:HD13	1:C:106:ILE:C	2.41	0.41
1:C:106:ILE:HD12	1:C:137:TYR:CE2	2.56	0.41
1:C:343:THR:C	1:C:345:SER:N	2.73	0.41
1:D:261:PRO:HA	1:D:262:PRO:HD3	1.93	0.41
1:A:121:GLU:OE2	1:A:158:PRO:HA	2.21	0.41
1:C:93:PHE:N	1:C:94:PRO:CD	2.84	0.41
1:C:176:ILE:CD1	3:D:3208:HOH:O	2.67	0.41
1:A:312:ALA:HB3	1:A:323:ALA:HA	2.01	0.41
1:C:92:PRO:HD2	1:C:95:GLN:HG3	2.02	0.41
1:D:43:LEU:CD1	1:D:50:ASN:HA	2.50	0.41
1:A:83:LEU:HD12	1:A:94:PRO:HG3	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:197:ASP:HB2	1:A:243:TYR:OH	2.20	0.41
1:A:229:LYS:HG3	1:A:268:THR:O	2.21	0.41
1:D:61:LEU:C	1:D:61:LEU:HD23	2.41	0.41
1:C:42:ARG:HH21	1:C:303:ARG:HD3	1.86	0.41
1:C:222:TYR:O	1:C:226:THR:HG23	2.21	0.41
1:C:357:PHE:C	1:C:358:ILE:CG2	2.89	0.41
1:D:250:MET:CE	1:D:291:LEU:CD1	2.99	0.41
1:D:219:HIS:CB	1:D:221:ILE:HD11	2.48	0.41
1:C:36:THR:HA	1:C:39:ILE:HG22	2.02	0.40
1:B:194:GLY:H	1:B:237:HIS:HE1	1.66	0.40
1:C:185:ILE:HD12	1:C:185:ILE:N	2.36	0.40
1:D:185:ILE:HD12	1:D:185:ILE:N	2.36	0.40
1:D:231:ASN:H	1:D:231:ASN:ND2	2.18	0.40
1:D:293:LYS:HA	1:D:294:PRO:HD2	1.97	0.40
1:D:18:ILE:HD13	1:D:143:ASP:HB3	2.03	0.40
1:A:67:ASP:HA	1:A:70:ASN:OD1	2.21	0.40
1:D:233:VAL:CG2	1:D:252:THR:HA	2.51	0.40
1:C:117:GLY:HA2	1:D:4:HIS:O	2.22	0.40
1:C:145:ALA:O	1:C:185:ILE:HD13	2.22	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	361/363 (99%)	342 (95%)	15 (4%)	4 (1%)	14	5
1	B	361/363 (99%)	341 (94%)	15 (4%)	5 (1%)	11	3
1	C	361/363 (99%)	337 (93%)	19 (5%)	5 (1%)	11	3
1	D	361/363 (99%)	346 (96%)	12 (3%)	3 (1%)	19	9
All	All	1444/1452 (99%)	1366 (95%)	61 (4%)	17 (1%)	13	4

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	358	ILE
1	C	352	ALA
1	C	358	ILE
1	B	344	PRO
1	B	349	GLY
1	C	351	ALA
1	A	5	PRO
1	B	5	PRO
1	C	188	PRO
1	A	356	LEU
1	B	188	PRO
1	D	67	ASP
1	D	188	PRO
1	A	188	PRO
1	C	5	PRO
1	D	5	PRO
1	A	272	GLY

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	291/291 (100%)	286 (98%)	5 (2%)	60	57
1	B	291/291 (100%)	287 (99%)	4 (1%)	67	65
1	C	291/291 (100%)	282 (97%)	9 (3%)	40	32
1	D	291/291 (100%)	285 (98%)	6 (2%)	53	48
All	All	1164/1164 (100%)	1140 (98%)	24 (2%)	53	48

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	173	TYR
1	A	295	TRP
1	A	318	GLU

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Mol	Chain	Res	Type
1	A	356	LEU
1	A	359	SER
1	B	119	ASN
1	B	173	TYR
1	B	295	TRP
1	B	347	GLN
1	C	59	ARG
1	C	106	ILE
1	C	164	MET
1	C	173	TYR
1	C	230	PRO
1	C	295	TRP
1	C	321	LYS
1	C	357	PHE
1	C	358	ILE
1	D	59	ARG
1	D	66	ASP
1	D	173	TYR
1	D	193	ASP
1	D	230	PRO
1	D	295	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	60	GLN
1	A	220	HIS
1	A	241	GLN
1	A	245	HIS
1	A	339	GLN
1	B	54	ASN
1	B	95	GLN
1	B	119	ASN
1	B	237	HIS
1	B	319	ASN
1	B	361	HIS
1	C	2	HIS
1	C	4	HIS
1	C	54	ASN
1	C	237	HIS
1	C	241	GLN
1	C	245	HIS

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Mol	Chain	Res	Type
1	C	319	ASN
1	D	44	GLN
1	D	54	ASN
1	D	85	GLN
1	D	180	ASN
1	D	231	ASN
1	D	241	GLN
1	D	284	ASN
1	D	319	ASN
1	D	360	ASN

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 ⓘ

8 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	B	3003[A]	-	4,4,4	1.64	0	6,6,6	0.43	0
2	PO4	B	3004[A]	-	4,4,4	1.64	0	6,6,6	0.43	0
2	PO4	C	3006[A]	-	4,4,4	1.66	0	6,6,6	0.44	0
2	PO4	D	3007[A]	-	4,4,4	1.68	0	6,6,6	0.42	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
2	PO4	A	3001[A]	-	4,4,4	1.66	0	6,6,6	0.44	0
2	PO4	A	3002[A]	-	4,4,4	1.69	0	6,6,6	0.43	0
2	PO4	D	3008[A]	-	4,4,4	1.69	0	6,6,6	0.43	0
2	PO4	C	3005[A]	-	4,4,4	1.67	0	6,6,6	0.42	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.

No monomer is involved in short contacts.

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	363/363 (100%)	0.13	18 (4%)	28	32	11, 22, 52, 79	16 (4%)
1	B	363/363 (100%)	0.11	18 (4%)	28	32	12, 23, 56, 79	16 (4%)
1	C	363/363 (100%)	0.34	23 (6%)	20	22	13, 24, 54, 77	16 (4%)
1	D	363/363 (100%)	0.16	26 (7%)	15	17	12, 25, 66, 103	4 (1%)
All	All	1452/1452 (100%)	0.19	85 (5%)	22	25	11, 23, 59, 103	52 (3%)

All (85) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	358	ILE	30.0
1	B	350	ALA	29.6
1	A	350	ALA	24.6
1	A	356	LEU	20.2
1	C	357	PHE	20.2
1	A	355	SER	18.5
1	D	362	ALA	18.5
1	A	351	ALA	16.3
1	C	352	ALA	15.3
1	B	358	ILE	14.8
1	A	353	SER	14.4
1	D	363	TYR	14.2
1	C	348	ALA	14.1
1	A	357	PHE	13.9
1	B	357	PHE	13.8
1	C	356	LEU	13.3
1	C	355	SER	13.2
1	B	352	ALA	13.2
1	A	354	GLU	13.0
1	A	352	ALA	13.0
1	B	356	LEU	12.7

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Mol	Chain	Res	Type	RSRZ
1	B	353	SER	12.1
1	B	349	GLY	10.7
1	C	354	GLU	10.5
1	D	361	HIS	9.7
1	D	348	ALA	9.6
1	B	354	GLU	8.2
1	C	350	ALA	8.2
1	B	351	ALA	8.1
1	C	349	GLY	7.9
1	A	358	ILE	7.8
1	C	351	ALA	7.3
1	D	358	ILE	7.1
1	A	347	GLN	7.0
1	D	349	GLY	6.8
1	C	353	SER	6.6
1	A	346	GLY	6.3
1	C	346	GLY	6.2
1	B	348	ALA	6.2
1	D	356	LEU	6.1
1	A	348	ALA	6.0
1	B	345	SER	6.0
1	C	345	SER	6.0
1	B	355	SER	5.9
1	D	353	SER	5.8
1	B	344	PRO	5.8
1	D	345	SER	5.7
1	D	360	ASN	5.2
1	D	359	SER	5.1
1	D	347	GLN	5.0
1	B	347	GLN	4.8
1	A	349	GLY	4.8
1	A	359	SER	4.8
1	D	355	SER	4.7
1	A	345	SER	4.7
1	C	344	PRO	4.7
1	D	350	ALA	4.5
1	D	344	PRO	4.4
1	D	352	ALA	4.4
1	D	357	PHE	3.9
1	C	44	GLN	3.8
1	D	346	GLY	3.7
1	B	359	SER	3.6

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Mol	Chain	Res	Type	RSRZ
1	B	45	SER	3.3
1	C	359	SER	3.3
1	A	344	PRO	3.2
1	B	346	GLY	3.2
1	A	360	ASN	3.2
1	D	46	ILE	3.0
1	C	347	GLN	2.8
1	D	44	GLN	2.7
1	C	321	LYS	2.7
1	C	315	GLY	2.7
1	D	354	GLU	2.6
1	C	343	THR	2.6
1	A	44	GLN	2.6
1	C	360	ASN	2.5
1	D	155	GLU	2.4
1	D	42	ARG	2.3
1	D	281	ILE	2.2
1	B	46	ILE	2.1
1	C	36	THR	2.1
1	D	40	ALA	2.1
1	C	362	ALA	2.0
1	D	278	GLU	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
2	PO4	B	3003[A]	5/5	0.85	0.11	37,39,40,40	5

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	PO4	C	3006[A]	5/5	0.88	0.17	41,41,42,43	5
2	PO4	A	3002[A]	5/5	0.89	0.20	45,45,45,45	5
2	PO4	B	3004[A]	5/5	0.90	0.10	52,53,53,54	5
2	PO4	C	3005[A]	5/5	0.91	0.11	37,38,39,40	5
2	PO4	A	3001[A]	5/5	0.93	0.09	33,33,35,35	5
2	PO4	D	3008[A]	5/5	0.95	0.09	41,42,42,42	5
2	PO4	D	3007[A]	5/5	0.96	0.08	24,25,27,27	5

6.5 Other polymers ⓘ

There are no such residues in this entry.