



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 28, 2018 – 06:31 PM EST

PDB ID : 5IU0
Title : Rubisco from Arabidopsis thaliana
Authors : Valegaard, K.; Hasse, D.; Gunn, L.; Andersson, I.
Deposited on : 2016-03-17
Resolution : 1.50 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20030736
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20030736

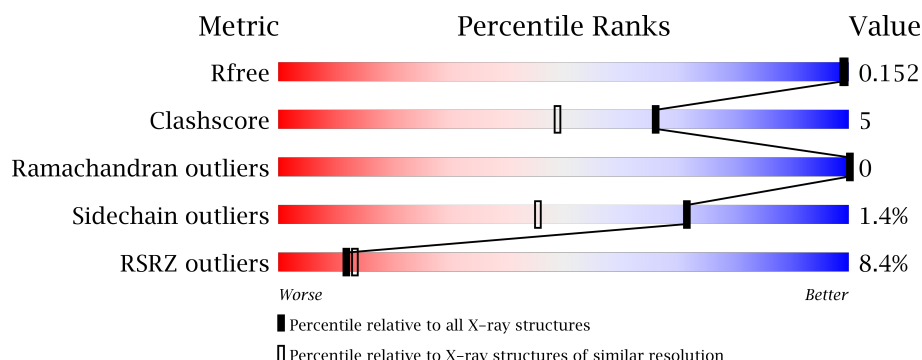
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.50 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}	100719	2279 (1.50-1.50)
Clashscore	112137	2503 (1.50-1.50)
Ramachandran outliers	110173	2445 (1.50-1.50)
Sidechain outliers	110143	2443 (1.50-1.50)
RSRZ outliers	101464	2305 (1.50-1.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	479	<div> <div>5%</div> <div>86%</div> <div>10%</div> <div>•</div> </div>
1	B	479	<div> <div>6%</div> <div>86%</div> <div>11%</div> <div>•</div> </div>
2	I	181	<div> <div>7%</div> <div>61%</div> <div>7%</div> <div>32%</div> </div>
2	J	181	<div> <div>17%</div> <div>59%</div> <div>8%</div> <div>•</div> <div>32%</div> </div>

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	EDO	A	503	-	-	-	X
5	EDO	A	504	-	-	-	X
5	EDO	A	505	-	-	-	X
5	EDO	A	509	-	-	X	X

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 10407 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 Ribulose biphosphate carboxylase large chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	463	Total	C	N	O	S	0	0	0
			3622	2305	630	671	16			
1	B	463	Total	C	N	O	S	0	0	0
			3622	2305	630	671	16			

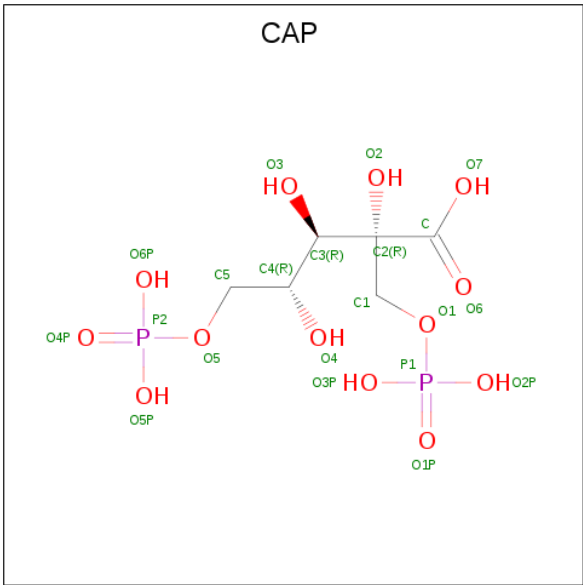
- Molecule 2 is a protein called Ribulose biphosphate carboxylase small chain 1B, chloroplastic.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	J	123	Total	C	N	O	S	0	0	0
			1025	675	163	181	6			
2	I	123	Total	C	N	O	S	0	0	0
			1025	675	163	181	6			

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

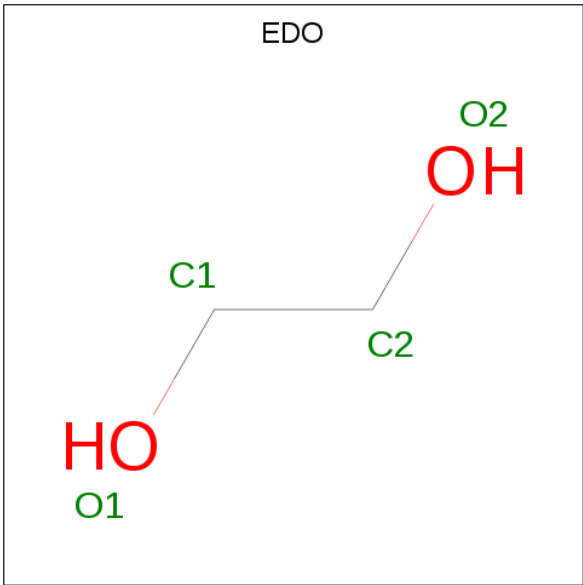
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	Mg	0	0
			1	1		
3	A	1	Total	Mg	0	0
			1	1		

- Molecule 4 is 2-CARBOXYARABINITOL-1,5-DIPHOSPHATE (three-letter code: CAP) (formula: C₆H₁₄O₁₃P₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	O	P	0	0
			21	6	13	2		
4	B	1	Total	C	O	P	0	0
			21	6	13	2		

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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

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

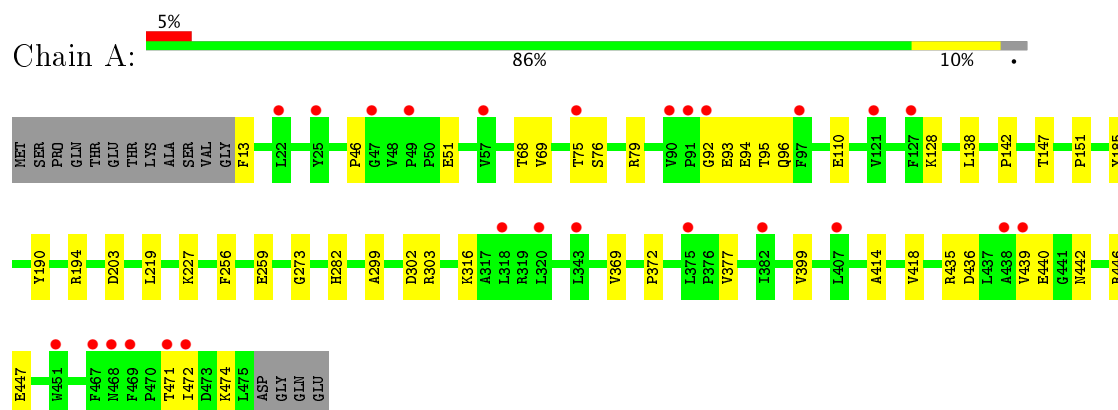
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	373	Total 373	O 373	0	0
6	B	374	Total 374	O 374	0	0
6	J	126	Total 126	O 126	0	0
6	I	144	Total 144	O 144	0	0

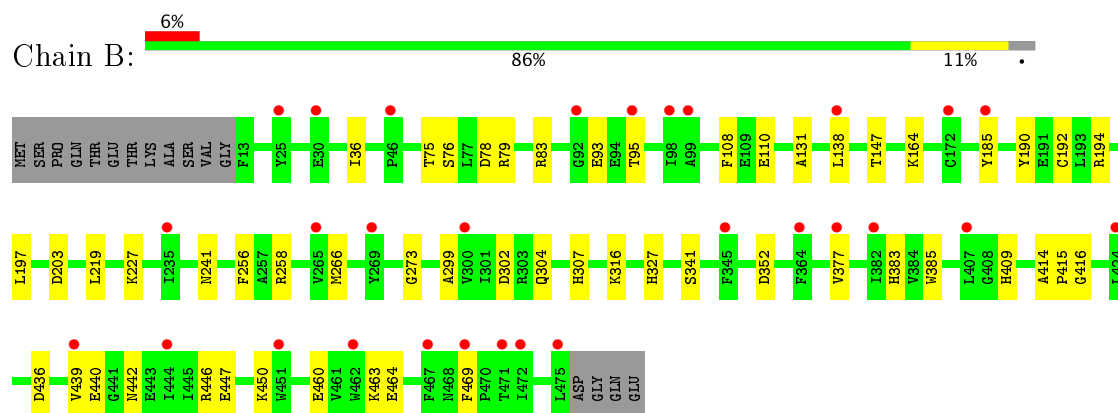
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

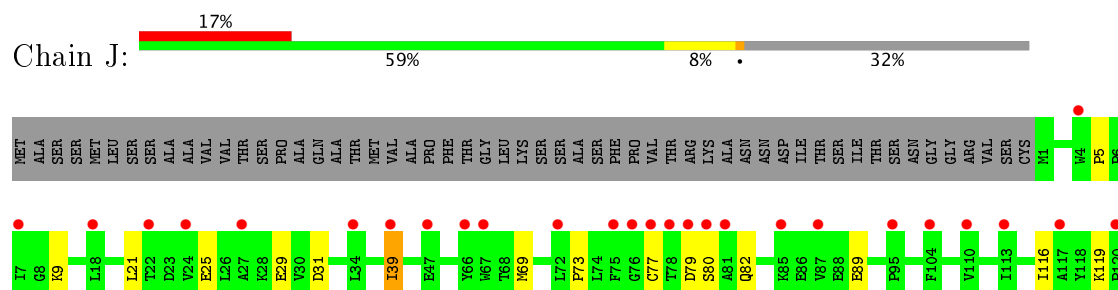
- Molecule 1: Ribulose biphosphate carboxylase large chain

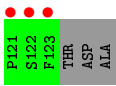


- Molecule 1: Ribulose bisphosphate carboxylase large chain

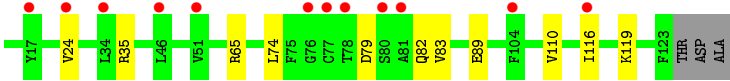
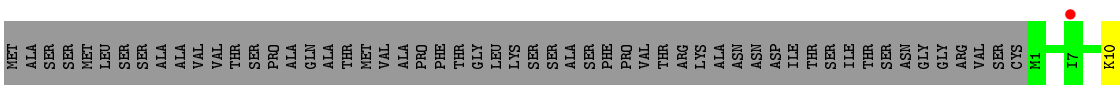


- Molecule 2: Ribulose bisphosphate carboxylase small chain 1B, chloroplastic





● Molecule 2: Ribulose biphosphate carboxylase small chain 1B, chloroplastic



4 Data and refinement statistics

Property	Value	Source
Space group	I 4	Depositor
Cell constants a, b, c, α , β , γ	111.86Å 111.86Å 197.71Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.43 – 1.50 49.43 – 1.50	Depositor EDS
% Data completeness (in resolution range)	99.7 (49.43-1.50) 99.6 (49.43-1.50)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.05 (at 1.50Å)	Xtriage
Refinement program	PHENIX (1.10_2155: ???)	Depositor
R, R_{free}	0.136 , 0.152 0.136 , 0.152	Depositor DCC
R_{free} test set	9636 reflections (5.00%)	DCC
Wilson B-factor (Å ²)	17.4	Xtriage
Anisotropy	0.113	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 40.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.38$, $\langle L^2 \rangle = 0.21$	Xtriage
Estimated twinning fraction	0.467 for h,-k,-l	Xtriage
Reported twinning fraction	0.480 for -h,k,-l	Depositor
Outliers	0 of 192721 reflections	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	10407	wwPDB-VP
Average B, all atoms (Å ²)	16.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.41% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, CAP, EDO, KCX

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	0.35	0/3701	0.55	0/5022
1	B	0.36	0/3701	0.56	0/5022
2	I	0.38	0/1059	0.55	0/1436
2	J	0.39	0/1059	0.57	0/1436
All	All	0.36	0/9520	0.55	0/12916

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 [i](#)

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	3622	0	3535	37	0
1	B	3622	0	3535	34	0
2	I	1025	0	1006	9	0
2	J	1025	0	1006	8	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	21	0	8	0	0
4	B	21	0	8	0	0
5	A	32	0	48	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	12	0	18	0	0
5	I	8	0	12	3	0
6	A	373	0	0	9	2
6	B	374	0	0	4	5
6	I	144	0	0	3	1
6	J	126	0	0	2	1
All	All	10407	0	9176	85	5

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 5.

All (85) 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)
5:A:508:EDO:H22	1:B:304:GLN:HG3	1.60	0.82
1:A:69:VAL:H	5:A:509:EDO:H22	1.44	0.82
1:A:472:ILE:HD11	1:B:131:ALA:HA	1.61	0.82
2:J:31:ASP:OD1	2:J:80:SER:OG	1.99	0.80
1:B:83:ARG:NH1	6:B:601:HOH:O	2.11	0.76
1:A:440:GLU:OE1	6:A:601:HOH:O	2.05	0.73
1:A:436:ASP:HB3	1:A:439:VAL:HG12	1.71	0.71
1:A:259:GLU:OE1	6:A:602:HOH:O	2.11	0.67
1:A:13:PHE:N	6:A:607:HOH:O	2.28	0.66
1:A:92:GLY:O	6:A:603:HOH:O	2.13	0.66
2:J:69:MET:O	6:J:201:HOH:O	2.14	0.65
2:I:65:ARG:HD2	5:I:202:EDO:H22	1.80	0.64
1:B:460:GLU:OE1	1:B:463:LYS:NZ	2.31	0.63
5:A:508:EDO:H12	1:B:307:HIS:HB3	1.81	0.62
1:A:93:GLU:HG2	1:A:96:GLN:HB3	1.83	0.61
1:B:447:GLU:HA	1:B:450:LYS:HE2	1.83	0.60
2:J:89:GLU:OE1	6:J:202:HOH:O	2.17	0.59
1:B:447:GLU:O	1:B:450:LYS:HG2	2.03	0.58
1:A:94:GLU:HG2	1:A:95:THR:HG23	1.86	0.57
1:A:93:GLU:CG	1:A:96:GLN:HB3	2.34	0.57
1:B:219:LEU:HD13	1:B:256:PHE:HZ	1.70	0.57
1:B:436:ASP:HB3	1:B:439:VAL:HG22	1.86	0.56
1:B:442:ASN:HB3	1:B:446:ARG:NH1	2.20	0.56
1:A:471:THR:HB	1:A:474:LYS:HE2	1.89	0.55
1:A:282:HIS:CE1	5:A:503:EDO:H22	2.41	0.55
2:I:35:ARG:NH2	6:I:309:HOH:O	2.40	0.54
1:A:46:PRO:O	6:A:604:HOH:O	2.19	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:219:LEU:HD13	1:A:256:PHE:HZ	1.75	0.51
2:I:65:ARG:HB2	5:I:202:EDO:H12	1.92	0.51
1:B:190:TYR:CZ	1:B:227:LYS:HE3	2.45	0.51
1:A:303:ARG:NH2	1:A:472:ILE:HD12	2.25	0.51
1:B:83:ARG:NH2	6:B:610:HOH:O	2.39	0.51
2:I:79:ASP:HB3	2:I:82:GLN:HG3	1.92	0.50
1:A:190:TYR:CZ	1:A:227:LYS:HE3	2.47	0.50
1:B:76:SER:HB3	1:B:79:ARG:HG2	1.94	0.50
1:A:190:TYR:CZ	1:A:194:ARG:HD3	2.47	0.50
1:B:383:HIS:CE1	1:B:385:TRP:HB2	2.48	0.49
1:B:138:LEU:O	1:B:316:LYS:NZ	2.39	0.49
1:A:68:THR:HA	5:A:509:EDO:H22	1.94	0.49
1:B:439:VAL:HG23	1:B:440:GLU:HG3	1.94	0.49
1:B:352:ASP:OD2	6:B:602:HOH:O	2.20	0.48
1:A:435:ARG:NH2	1:A:447:GLU:OE1	2.34	0.48
1:B:192:CYS:HB3	1:B:197:LEU:HD12	1.94	0.48
1:B:442:ASN:HB3	1:B:446:ARG:HH12	1.78	0.48
1:A:282:HIS:HE1	5:A:503:EDO:H22	1.78	0.48
2:J:25:GLU:O	2:J:29:GLU:HG2	2.13	0.47
1:A:142:PRO:HB3	1:A:369:VAL:HG11	1.95	0.47
1:B:327:HIS:HA	1:B:377:VAL:HB	1.96	0.47
2:I:74:LEU:HD12	2:I:83:VAL:HG22	1.97	0.47
1:A:377:VAL:HG22	1:A:399:VAL:HB	1.97	0.46
2:J:79:ASP:HB3	2:J:82:GLN:HG3	1.97	0.46
1:A:273:GLY:HA3	1:B:273:GLY:HA3	1.97	0.45
2:J:5:PRO:HB2	2:J:9:LYS:HG3	1.99	0.45
1:B:190:TYR:CZ	1:B:194:ARG:HD3	2.52	0.45
1:A:69:VAL:N	5:A:509:EDO:H22	2.23	0.45
2:I:119:LYS:NZ	6:I:305:HOH:O	2.32	0.44
2:J:116:ILE:HG21	2:J:119:LYS:HE2	2.00	0.44
1:A:13:PHE:N	6:A:628:HOH:O	2.49	0.44
6:A:847:HOH:O	2:I:10:LYS:HE3	2.17	0.44
2:J:39:ILE:HD11	2:J:73:PRO:CB	2.48	0.44
1:A:474:LYS:NZ	6:A:606:HOH:O	2.23	0.43
1:A:128:LYS:HB3	1:B:469:PHE:CD2	2.54	0.43
2:I:89:GLU:OE1	6:I:301:HOH:O	2.21	0.43
1:A:51:GLU:OE1	6:A:605:HOH:O	2.21	0.43
1:B:36:ILE:HD13	1:B:108:PHE:CE2	2.54	0.42
1:A:299:ALA:HA	1:A:302:ASP:OD1	2.19	0.42
1:B:299:ALA:HA	1:B:302:ASP:OD1	2.20	0.42
1:B:409:HIS:CD2	1:B:416:GLY:HA2	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:463:LYS:HG3	1:B:464:GLU:HG2	2.00	0.42
1:B:75:THR:OG1	1:B:76:SER:N	2.46	0.41
1:A:69:VAL:HG22	5:A:509:EDO:H21	2.03	0.41
1:A:138:LEU:O	1:A:316:LYS:NZ	2.46	0.41
5:A:508:EDO:H11	1:B:304:GLN:HB2	2.01	0.41
1:B:414:ALA:HB3	1:B:415:PRO:HD3	2.02	0.41
1:A:414:ALA:O	1:A:418:VAL:HG23	2.21	0.41
1:B:241:ASN:HA	1:B:266:MET:HG3	2.02	0.41
1:B:78:ASP:O	1:B:83:ARG:NH2	2.54	0.41
1:A:110:GLU:HB3	1:A:147:THR:HB	2.03	0.40
2:I:65:ARG:CB	5:I:202:EDO:H12	2.51	0.40
1:A:442:ASN:O	1:A:446:ARG:HG3	2.20	0.40
1:A:151:PRO:HD2	1:A:372:PRO:HD2	2.03	0.40
1:A:76:SER:HB3	1:A:79:ARG:HG2	2.03	0.40
1:B:164:LYS:HE3	6:B:734:HOH:O	2.22	0.40
1:A:75:THR:OG1	1:A:76:SER:N	2.52	0.40
1:B:110:GLU:HB3	1:B:147:THR:HB	2.02	0.40

All (5) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:B:639:HOH:O	6:B:877:HOH:O[3_655]	1.93	0.27
6:B:615:HOH:O	6:J:201:HOH:O[4_565]	1.96	0.24
6:A:910:HOH:O	6:B:809:HOH:O[4_565]	2.04	0.16
6:B:915:HOH:O	6:I:350:HOH:O[6_555]	2.08	0.12
6:A:858:HOH:O	6:B:949:HOH:O[4_565]	2.17	0.03

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	460/479 (96%)	443 (96%)	17 (4%)	0	100	100
1	B	460/479 (96%)	443 (96%)	17 (4%)	0	100	100
2	I	121/181 (67%)	116 (96%)	5 (4%)	0	100	100
2	J	121/181 (67%)	115 (95%)	6 (5%)	0	100	100
All	All	1162/1320 (88%)	1117 (96%)	45 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	375/388 (97%)	373 (100%)	2 (0%)	91	80
1	B	375/388 (97%)	369 (98%)	6 (2%)	68	39
2	I	111/157 (71%)	108 (97%)	3 (3%)	50	17
2	J	111/157 (71%)	108 (97%)	3 (3%)	50	17
All	All	972/1090 (89%)	958 (99%)	14 (1%)	71	45

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	185	TYR
1	A	203	ASP
1	B	93	GLU
1	B	95	THR
1	B	185	TYR
1	B	203	ASP
1	B	258	ARG
1	B	341	SER
2	J	21	LEU
2	J	39	ILE
2	J	77	CYS
2	I	24	VAL
2	I	110	VAL

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Mol	Chain	Res	Type
2	I	116	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	KCX	A	201	1,3	8,11,12	0.62	0	6,12,14	1.13	0
1	KCX	B	201	1,3	8,11,12	0.69	0	6,12,14	0.83	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
1	KCX	A	201	1,3	-	0/6/10/12	0/0/0/0
1	KCX	B	201	1,3	-	0/6/10/12	0/0/0/0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

Of 17 ligands modelled in this entry, 2 are monoatomic - leaving 15 for Mogul analysis.

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	$\# Z > 2$
4	CAP	A	502	3	14,20,20	0.80	0	17,31,31	0.77	0
5	EDO	A	503	-	3,3,3	0.45	0	2,2,2	0.28	0
5	EDO	A	504	-	3,3,3	0.46	0	2,2,2	0.12	0
5	EDO	A	505	-	3,3,3	0.46	0	2,2,2	0.19	0
5	EDO	A	506	-	3,3,3	0.37	0	2,2,2	0.31	0
5	EDO	A	507	-	3,3,3	0.49	0	2,2,2	0.15	0
5	EDO	A	508	-	3,3,3	0.40	0	2,2,2	0.43	0
5	EDO	A	509	-	3,3,3	0.42	0	2,2,2	0.59	0
5	EDO	A	510	-	3,3,3	0.44	0	2,2,2	0.32	0
4	CAP	B	502	3	14,20,20	0.81	0	17,31,31	0.83	0
5	EDO	B	503	-	3,3,3	0.44	0	2,2,2	0.26	0
5	EDO	B	504	-	3,3,3	0.45	0	2,2,2	0.20	0
5	EDO	B	505	-	3,3,3	0.50	0	2,2,2	0.22	0
5	EDO	I	201	-	3,3,3	0.45	0	2,2,2	0.24	0
5	EDO	I	202	-	3,3,3	0.56	0	2,2,2	0.34	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
4	CAP	A	502	3	-	0/23/29/29	0/0/0/0
5	EDO	A	503	-	-	0/1/1/1	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	A	504	-	-	0/1/1/1	0/0/0/0
5	EDO	A	505	-	-	0/1/1/1	0/0/0/0
5	EDO	A	506	-	-	0/1/1/1	0/0/0/0
5	EDO	A	507	-	-	0/1/1/1	0/0/0/0
5	EDO	A	508	-	-	0/1/1/1	0/0/0/0
5	EDO	A	509	-	-	0/1/1/1	0/0/0/0
5	EDO	A	510	-	-	0/1/1/1	0/0/0/0
4	CAP	B	502	3	-	0/23/29/29	0/0/0/0
5	EDO	B	503	-	-	0/1/1/1	0/0/0/0
5	EDO	B	504	-	-	0/1/1/1	0/0/0/0
5	EDO	B	505	-	-	0/1/1/1	0/0/0/0
5	EDO	I	201	-	-	0/1/1/1	0/0/0/0
5	EDO	I	202	-	-	0/1/1/1	0/0/0/0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	503	EDO	2	0
5	A	508	EDO	3	0
5	A	509	EDO	4	0
5	I	202	EDO	3	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, 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(Å ²)	Q<0.9
1	A	462/479 (96%)	0.74	26 (5%) 25 28	10, 14, 23, 30	0
1	B	462/479 (96%)	0.79	29 (6%) 21 24	10, 15, 23, 31	0
2	I	123/181 (67%)	0.93	13 (10%) 7 8	11, 18, 25, 36	0
2	J	123/181 (67%)	1.25	30 (24%) 1 1	13, 20, 27, 35	0
All	All	1170/1320 (88%)	0.83	98 (8%) 12 13	10, 15, 24, 36	0

All (98) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	451	TRP	5.6
1	A	471	THR	5.4
2	I	78	THR	5.2
2	J	77	CYS	5.1
1	B	46	PRO	4.5
2	J	81	ALA	4.3
1	A	472	ILE	3.8
1	B	235	ILE	3.6
1	B	95	THR	3.6
1	A	90	VAL	3.6
1	B	99	ALA	3.5
2	J	7	ILE	3.4
2	I	81	ALA	3.4
2	I	46	LEU	3.3
1	B	467	PHE	3.3
1	B	92	GLY	3.2
1	B	469	PHE	3.2
2	J	76	GLY	3.2
1	B	30	GLU	3.1
1	B	475	LEU	3.1
1	B	345	PHE	3.1

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Mol	Chain	Res	Type	RSRZ
2	I	51	VAL	3.1
1	A	469	PHE	3.0
1	A	25	TYR	3.0
1	B	472	ILE	3.0
2	I	77	CYS	2.9
2	J	121	PRO	2.9
1	B	471	THR	2.9
2	J	79	ASP	2.9
1	A	439	VAL	2.9
1	A	91	PRO	2.8
2	J	85	LYS	2.8
2	I	24	VAL	2.8
1	B	300	VAL	2.8
1	A	22	LEU	2.7
2	J	39	ILE	2.7
1	B	462	TRP	2.6
2	J	4	TRP	2.6
2	J	67	TRP	2.6
1	B	25	TYR	2.6
1	A	97	PHE	2.6
1	B	364	PHE	2.6
2	J	104	PHE	2.6
1	A	438	ALA	2.5
1	A	49	PRO	2.5
1	A	343	LEU	2.5
2	J	78	THR	2.5
2	J	24	VAL	2.5
1	A	451	TRP	2.4
2	J	27	ALA	2.4
1	B	269	TYR	2.4
2	J	122	SER	2.4
2	J	80	SER	2.4
2	J	72	LEU	2.4
2	J	95	PRO	2.4
2	J	87	VAL	2.4
2	J	110	VAL	2.4
2	I	80	SER	2.4
2	I	34	LEU	2.4
2	I	76	GLY	2.3
1	B	98	ILE	2.3
1	A	407	LEU	2.3
2	J	66	TYR	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	47	GLY	2.3
1	B	439	VAL	2.3
1	A	467	PHE	2.3
1	A	382	ILE	2.3
1	B	407	LEU	2.3
1	B	424	LEU	2.3
2	J	47	GLU	2.3
2	J	123	PHE	2.3
2	J	22	THR	2.3
1	A	57	VAL	2.2
1	B	265	VAL	2.2
2	J	120	PRO	2.2
1	A	318	LEU	2.2
1	B	138	LEU	2.2
2	I	104	PHE	2.2
2	J	113	ILE	2.2
1	A	75	THR	2.1
1	A	127	PHE	2.1
1	A	92	GLY	2.1
1	B	382	ILE	2.1
1	A	121	VAL	2.1
2	J	117	ALA	2.1
1	A	320	LEU	2.1
1	A	375	LEU	2.1
1	A	468	ASN	2.1
2	I	17	TYR	2.1
2	J	18	LEU	2.1
2	I	7	ILE	2.0
2	I	116	ILE	2.0
1	B	185	TYR	2.0
1	B	172	CYS	2.0
2	J	75	PHE	2.0
2	J	34	LEU	2.0
1	B	377	VAL	2.0
1	B	444	ILE	2.0

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

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 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	LLDF	B-factors(Å ²)	Q<0.9
1	KCX	B	201	12/13	0.95	0.10	-	11,12,13,13	0
1	KCX	A	201	12/13	0.94	0.11	-	11,11,12,13	0

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 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	LLDF	B-factors(Å ²)	Q<0.9
5	EDO	A	503	4/4	0.90	0.32	7.81	15,16,18,19	0
5	EDO	A	509	4/4	0.80	0.23	4.31	17,17,19,21	0
5	EDO	A	505	4/4	0.82	0.17	3.16	15,15,16,16	0
5	EDO	A	504	4/4	0.82	0.15	2.19	14,15,15,17	0
5	EDO	I	202	4/4	0.80	0.15	1.80	16,16,17,20	0
5	EDO	I	201	4/4	0.90	0.13	1.06	17,17,18,18	0
5	EDO	B	505	4/4	0.84	0.14	0.91	17,18,18,19	0
5	EDO	A	508	4/4	0.87	0.15	0.67	18,19,19,20	0
5	EDO	A	506	4/4	0.89	0.11	-0.42	17,18,19,20	0
5	EDO	B	503	4/4	0.93	0.10	-0.59	17,17,17,18	0
5	EDO	A	507	4/4	0.91	0.12	-0.61	13,14,14,14	0
3	MG	B	501	1/1	0.99	0.10	-0.63	14,14,14,14	0
4	CAP	A	502	21/21	0.96	0.10	-0.68	12,13,13,14	0
5	EDO	B	504	4/4	0.87	0.10	-0.80	16,17,17,19	0
3	MG	A	501	1/1	0.96	0.10	-0.92	13,13,13,13	0
4	CAP	B	502	21/21	0.96	0.09	-1.58	13,13,14,15	0
5	EDO	A	510	4/4	0.91	0.14	-	16,17,17,17	0

6.5 Other polymers [i](#)

There are no such residues in this entry.