Full wwPDB X-ray Structure Validation Report ⓘ

Sep 26, 2023 – 02:31 AM EDT

PDB ID	:	6B4R
Title	:	The crystal structure of the aldehyde dehydrogenase KauB from Pseudomonas aeruginosa
Authors	:	Gonzalez-Segura, L.; Cardona-Cardona, Y.; Carrillo-Campos, J.; Munoz-Clares, R.A.
Deposited on	:	2017-09-27
Resolution	:	2.55 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:

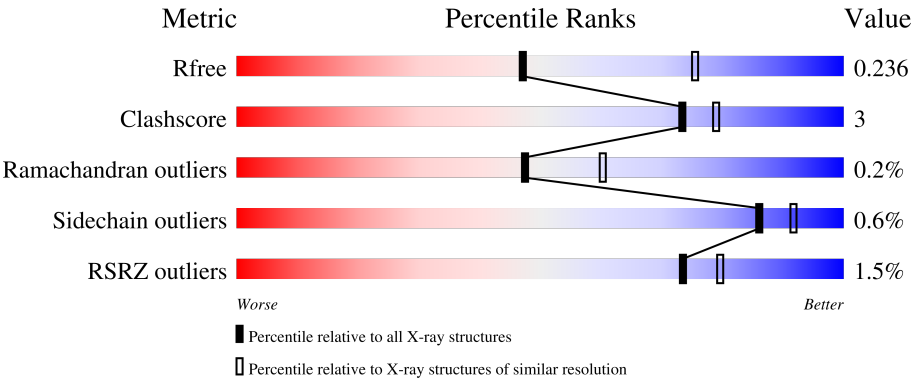
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.55 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	1284 (2.56-2.52)
Clashscore	141614	1332 (2.56-2.52)
Ramachandran outliers	138981	1315 (2.56-2.52)
Sidechain outliers	138945	1315 (2.56-2.52)
RSRZ outliers	127900	1272 (2.56-2.52)

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	497	91% 9%
1	C	497	2% 90% 10%
2	B	497	92% 8%
2	D	497	4% 90% 9%

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
1	CSD	C	302	-	-	X	-
5	TOE	C	503	-	-	X	-
6	GOL	B	503	-	-	-	X

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 15533 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.

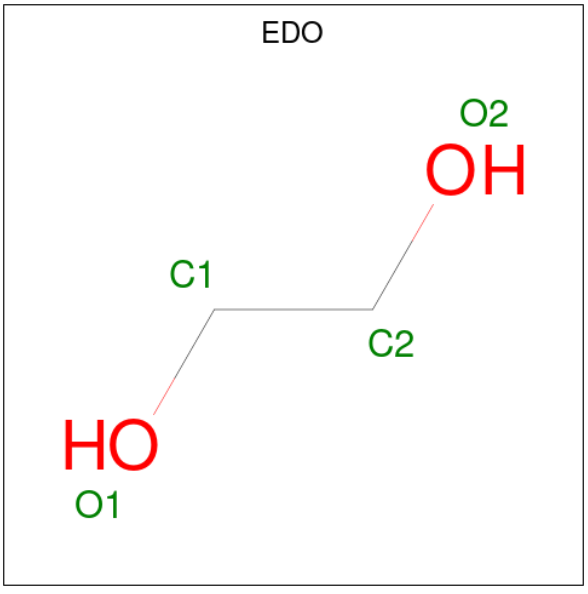
- Molecule 1 is a protein called KauB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	497	Total	C	N	O	S	0	1	0
			3752	2380	640	718	14			
1	C	495	Total	C	N	O	S	0	1	0
			3737	2371	638	715	13			

- Molecule 2 is a protein called KauB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	495	Total	C	N	O	S	0	1	0
			3735	2371	638	713	13			
2	D	495	Total	C	N	O	S	0	1	0
			3735	2371	638	713	13			

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

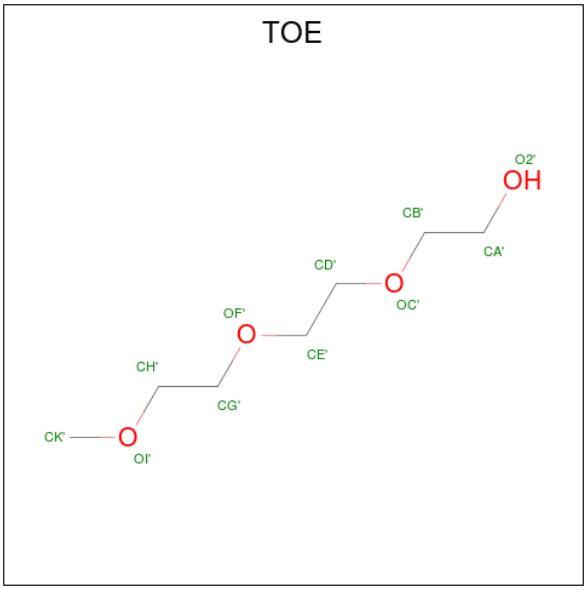


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	C	1	Total C O 4 2 2	0	0

- Molecule 4 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total K 1 1	0	0
4	B	1	Total K 1 1	0	0
4	C	1	Total K 1 1	0	0
4	D	1	Total K 1 1	0	0

- Molecule 5 is 2-[2-(2-METHOXY-ETHOXY)-ETHOXY]-ETHOXYL (three-letter code: TOE) (formula: $C_7H_{16}O_4$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 11 7 4	0	0

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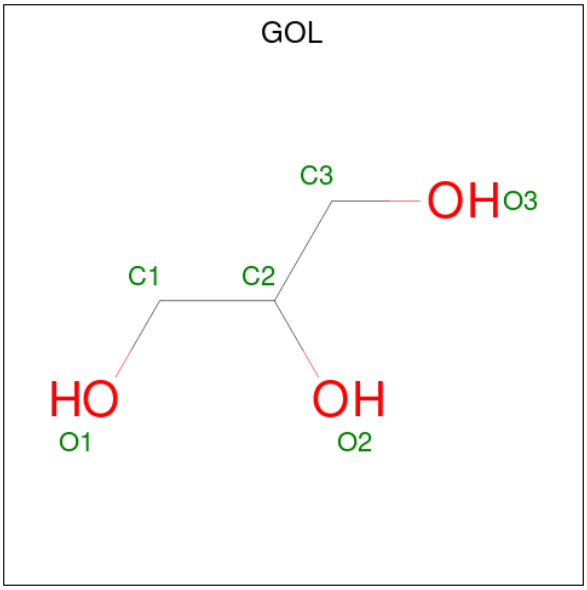
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total C O 11 7 4	0	0
5	C	1	Total C O 10 6 4	0	0

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total C O 6 3 3	0	0

- Molecule 7 is water.

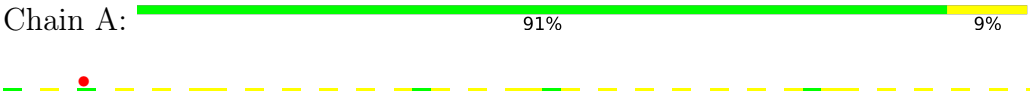
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	170	Total O 170 170	0	0
7	B	146	Total O 146 146	0	0
7	C	123	Total O 123 123	0	0
7	D	77	Total O 77 77	0	0

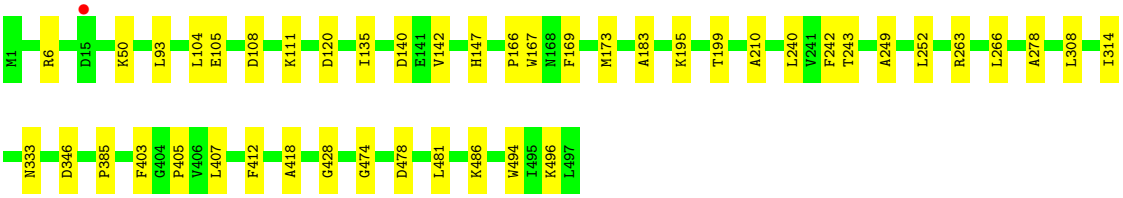
3 Residue-property plots (i)

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: KauB

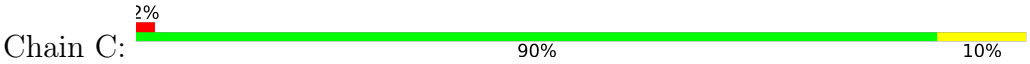
Chain A:

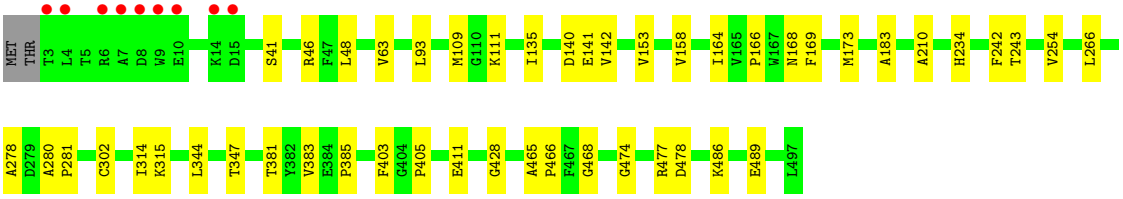




• Molecule 1: KauB

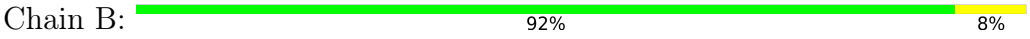
Chain C:

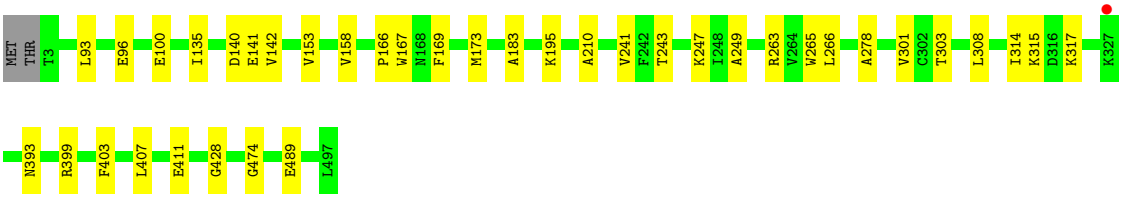




• Molecule 2: KauB

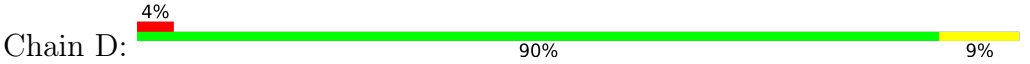
Chain B:

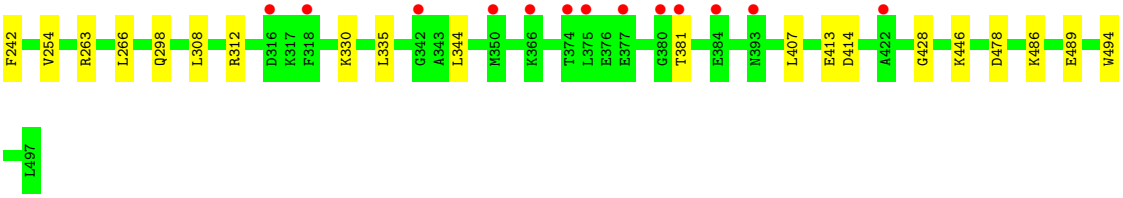




• Molecule 2: KauB

Chain D:




F242
V254
R263
L266
Q298
L308
R312
D316
K317
F318
K330
L335
G342
A343
L344
M350
K366
T374
L375
E376
E377
G380
T381
E384
N393
L407
E413
D414
A422
G428
K446
D478
K486
E489
W494
L497

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	177.64Å 93.81Å 128.86Å 90.00° 92.28° 90.00°	Depositor
Resolution (Å)	46.12 – 2.55 46.91 – 2.55	Depositor EDS
% Data completeness (in resolution range)	99.4 (46.12-2.55) 99.4 (46.91-2.55)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.82 (at 2.54Å)	Xtriage
Refinement program	PHENIX 1.8.1_1168	Depositor
R, R_{free}	0.178 , 0.234 0.180 , 0.236	Depositor DCC
R_{free} test set	3486 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	34.0	Xtriage
Anisotropy	0.177	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 41.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.020 for -h,-k,l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	15533	wwPDB-VP
Average B, all atoms (Å^2)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.29% 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: CSD, K, TOE, GOL, EDO

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	0.21	0/3818	0.39	0/5186
1	C	0.21	0/3803	0.38	0/5166
2	B	0.21	0/3809	0.38	0/5174
2	D	0.21	0/3809	0.37	0/5174
All	All	0.21	0/15239	0.38	0/20700

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	3752	0	3760	26	0
1	C	3737	0	3741	33	0
2	B	3735	0	3741	23	0
2	D	3735	0	3741	25	0
3	A	8	0	12	2	0
3	B	4	0	6	2	0
3	C	4	0	6	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	11	0	16	0	0
5	B	11	0	16	0	0
5	C	10	0	13	8	0
6	B	6	0	8	0	0
7	A	170	0	0	1	1
7	B	146	0	0	1	0
7	C	123	0	0	0	0
7	D	77	0	0	0	0
All	All	15533	0	15060	98	1

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 3.

All (98) 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:302:CSD:CB	5:C:503:TOE:H3	1.88	1.04
1:C:302:CSD:HB3	5:C:503:TOE:H3	1.33	1.03
1:C:302:CSD:SG	5:C:503:TOE:H3	2.02	0.99
1:C:302:CSD:HB3	5:C:503:TOE:CA'	2.01	0.89
1:C:302:CSD:SG	5:C:503:TOE:CA'	2.80	0.70
2:D:312:ARG:HH12	2:D:413:GLU:HG3	1.58	0.68
2:D:36:THR:HG21	2:D:50:LYS:HB3	1.80	0.64
1:A:142:VAL:HB	1:C:140:ASP:HB2	1.80	0.64
2:B:249:ALA:HB1	2:B:266:LEU:HD13	1.83	0.60
1:C:254:VAL:HG13	2:D:254:VAL:HG13	1.82	0.60
2:B:166:PRO:HD3	2:B:243:THR:HB	1.83	0.59
2:D:158:VAL:HG12	2:D:489:GLU:HG2	1.83	0.58
1:A:385:PRO:HA	1:A:405:PRO:HB2	1.86	0.58
1:C:242:PHE:HB3	1:C:266:LEU:HD23	1.86	0.57
1:C:302:CSD:CB	5:C:503:TOE:CA'	2.71	0.57
1:A:263:ARG:NH2	2:B:474:GLY:O	2.38	0.57
1:C:474:GLY:O	2:D:263:ARG:NH2	2.37	0.57
1:A:105:GLU:HG2	1:A:199:THR:HG21	1.88	0.56
1:A:140:ASP:HB2	1:C:142:VAL:HB	1.88	0.55
2:D:111:LYS:HD2	2:D:112:PRO:HD2	1.88	0.55
1:A:166:PRO:HD3	1:A:243:THR:HB	1.88	0.55
1:A:249:ALA:HB1	1:A:266:LEU:HD13	1.87	0.55
2:B:158:VAL:HG12	2:B:489:GLU:HG2	1.88	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:184:THR:OG1	2:D:186:ASN:ND2	2.40	0.54
1:C:158:VAL:HG12	1:C:489:GLU:HG2	1.89	0.54
2:B:140:ASP:HB2	2:D:142:VAL:HB	1.90	0.54
1:A:481:LEU:HD12	3:A:502:EDO:H22	1.88	0.53
2:B:315:LYS:HD2	2:B:411:GLU:HB3	1.89	0.53
2:B:169:PHE:HB2	2:B:173:MET:HG2	1.90	0.52
1:A:167:TRP:CD1	1:A:195:LYS:HD2	2.45	0.52
1:A:50:LYS:NZ	7:A:606:HOH:O	2.44	0.51
2:D:135:ILE:HG12	2:D:183:ALA:HB1	1.93	0.51
1:C:278:ALA:HA	1:C:314:ILE:HD13	1.93	0.51
2:B:100:GLU:H	3:B:501:EDO:H11	1.76	0.50
2:B:393:ASN:O	2:B:399:ARG:NH2	2.41	0.50
1:A:308:LEU:HB2	1:A:407:LEU:HD11	1.92	0.50
2:B:135:ILE:HG12	2:B:183:ALA:HB1	1.94	0.50
1:C:478:ASP:OD1	1:C:486:LYS:NZ	2.42	0.50
2:D:9:TRP:HB3	2:D:335:LEU:HD12	1.94	0.50
1:A:481:LEU:HB2	3:A:502:EDO:H22	1.93	0.50
1:C:135:ILE:HG12	1:C:183:ALA:HB1	1.93	0.50
2:B:317:LYS:NZ	7:B:602:HOH:O	2.45	0.49
2:D:242:PHE:HB3	2:D:266:LEU:HD23	1.94	0.49
2:B:141:GLU:HB2	2:B:153:VAL:HB	1.95	0.49
2:D:344:LEU:HB2	2:D:381:THR:HG22	1.95	0.49
1:A:240:LEU:HD11	1:A:252:LEU:HD13	1.95	0.49
1:C:468:GLY:HA3	1:C:477:ARG:HD3	1.95	0.48
2:D:308:LEU:HB2	2:D:407:LEU:HD11	1.95	0.48
2:B:241:VAL:HG12	2:B:265:TRP:HB2	1.94	0.48
1:A:104:LEU:O	1:A:108:ASP:HB2	2.13	0.48
2:B:301:VAL:HG12	2:B:303:THR:H	1.78	0.48
1:A:278:ALA:HA	1:A:314:ILE:HD13	1.94	0.48
1:A:169:PHE:HB2	1:A:173:MET:HG2	1.95	0.48
1:C:344:LEU:HD11	1:C:383:VAL:HG12	1.96	0.48
1:C:169:PHE:HB2	1:C:173:MET:HG2	1.96	0.47
1:C:41:SER:HB3	1:C:46:ARG:HG2	1.95	0.47
2:D:141:GLU:HB2	2:D:153:VAL:HB	1.97	0.47
1:A:147:HIS:O	2:D:446:LYS:NZ	2.46	0.46
1:C:302:CSD:OD1	5:C:503:TOE:CA'	2.63	0.46
2:B:142:VAL:HB	2:D:140:ASP:HB2	1.97	0.46
1:C:41:SER:HB2	1:C:48:LEU:HD21	1.96	0.46
2:D:478:ASP:OD1	2:D:486:LYS:NZ	2.43	0.46
1:C:164:ILE:HB	1:C:242:PHE:HD1	1.81	0.46
1:C:166:PRO:HD3	1:C:243:THR:HB	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:168:ASN:ND2	5:C:503:TOE:O2'	2.49	0.45
1:A:474:GLY:O	2:B:263:ARG:NH2	2.48	0.45
1:A:478:ASP:OD1	1:A:486:LYS:NZ	2.48	0.45
1:A:242:PHE:HB3	1:A:266:LEU:HD23	1.99	0.45
1:C:385:PRO:HA	1:C:405:PRO:HB2	1.98	0.45
2:D:55:ASP:CG	2:D:56:LEU:H	2.20	0.45
2:D:312:ARG:NH1	2:D:413:GLU:HG3	2.29	0.44
2:B:278:ALA:HA	2:B:314:ILE:HD13	1.99	0.44
1:A:195:LYS:NZ	1:A:346:ASP:OD1	2.36	0.44
1:A:135:ILE:HG12	1:A:183:ALA:HB1	1.98	0.44
2:D:41:SER:HB3	2:D:46:ARG:HG2	1.99	0.44
1:C:93:LEU:HD12	1:C:210:ALA:HB2	2.00	0.44
2:B:314:ILE:HA	2:B:317:LYS:HE2	1.99	0.43
2:B:167:TRP:CD1	2:B:195:LYS:HD2	2.53	0.43
1:A:6:ARG:HD2	1:A:333:ASN:HD22	1.83	0.43
2:B:308:LEU:HB2	2:B:407:LEU:HD11	1.99	0.43
2:D:414:ASP:N	2:D:414:ASP:OD1	2.52	0.42
1:A:111:LYS:NZ	1:A:120:ASP:OD1	2.52	0.42
2:D:169:PHE:HB2	2:D:173:MET:HG2	2.02	0.42
2:D:104:LEU:O	2:D:108:ASP:HB2	2.20	0.41
1:C:141:GLU:HB2	1:C:153:VAL:HB	2.01	0.41
2:B:93:LEU:HD12	2:B:210:ALA:HB2	2.03	0.41
2:B:247:LYS:HE2	2:B:247:LYS:HB3	1.85	0.41
2:D:169:PHE:HB3	2:D:172:LEU:HB3	2.02	0.41
1:A:93:LEU:HD12	1:A:210:ALA:HB2	2.03	0.41
1:C:63:VAL:HG11	1:C:234:HIS:CE1	2.55	0.41
1:C:465:ALA:HA	1:C:466:PRO:HD2	1.95	0.41
2:D:67:ARG:NH2	2:D:238:ASP:OD2	2.49	0.41
1:A:412:PHE:CD2	1:A:418:ALA:HB2	2.55	0.41
1:C:347:THR:HA	1:C:381:THR:HG21	2.01	0.41
2:B:96:GLU:O	3:B:501:EDO:H22	2.21	0.41
1:C:315:LYS:HG3	1:C:411:GLU:HG2	2.02	0.41
1:C:109:MET:SD	1:C:111:LYS:HE3	2.61	0.40
1:C:280:ALA:HA	1:C:281:PRO:HD3	1.97	0.40

All (1) 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)
7:A:601:HOH:O	7:A:601:HOH:O[2_756]	2.17	0.03

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	495/497 (100%)	474 (96%)	20 (4%)	1 (0%)	47	60
1	C	493/497 (99%)	473 (96%)	19 (4%)	1 (0%)	47	60
2	B	494/497 (99%)	475 (96%)	18 (4%)	1 (0%)	47	60
2	D	494/497 (99%)	474 (96%)	19 (4%)	1 (0%)	47	60
All	All	1976/1988 (99%)	1896 (96%)	76 (4%)	4 (0%)	47	60

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	428	GLY
1	A	428	GLY
2	B	428	GLY
1	C	428	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	385/384 (100%)	382 (99%)	3 (1%)	81	88
1	C	383/384 (100%)	382 (100%)	1 (0%)	92	96
2	B	384/385 (100%)	383 (100%)	1 (0%)	92	96
2	D	384/385 (100%)	380 (99%)	4 (1%)	76	84
All	All	1536/1538 (100%)	1527 (99%)	9 (1%)	86	92

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	403	PHE
1	A	494	TRP
1	A	496	LYS
2	B	403	PHE
1	C	403	PHE
2	D	60	GLU
2	D	298	GLN
2	D	330	LYS
2	D	494	TRP

Sometimes 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	CSD	A	302	1	3,7,8	0.92	0	1,8,10	0.33	0
1	CSD	C	302	1	3,7,8	0.89	0	1,8,10	0.17	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	CSD	A	302	1	-	0/2/6/8	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	CSD	C	302	1	-	0/2/6/8	-

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.

1 monomer is involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	C	302	CSD	7	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 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	$\#\|Z\| > 2$
3	EDO	A	502	-	3,3,3	0.47	0	2,2,2	0.28	0
3	EDO	C	501	-	3,3,3	0.47	0	2,2,2	0.26	0
5	TOE	B	504	-	10,10,10	0.45	0	9,9,9	0.47	0
3	EDO	B	501	-	3,3,3	0.47	0	2,2,2	0.29	0
5	TOE	C	503	-	9,9,10	0.51	0	8,8,9	0.58	0
5	TOE	A	504	-	10,10,10	0.45	0	9,9,9	0.29	0
3	EDO	A	501	-	3,3,3	0.46	0	2,2,2	0.37	0
6	GOL	B	503	-	5,5,5	0.38	0	5,5,5	0.19	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	502	-	-	0/1/1/1	-
3	EDO	C	501	-	-	0/1/1/1	-
5	TOE	B	504	-	-	2/8/8/8	-
3	EDO	B	501	-	-	1/1/1/1	-
5	TOE	C	503	-	-	4/7/7/8	-
5	TOE	A	504	-	-	1/8/8/8	-
3	EDO	A	501	-	-	0/1/1/1	-
6	GOL	B	503	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	B	503	GOL	O1-C1-C2-C3
5	C	503	TOE	OC'-CD'-CE'-OF'
6	B	503	GOL	O1-C1-C2-O2
5	B	504	TOE	OF'-CG'-CH'-OI'
5	A	504	TOE	O2'-CA'-CB'-OC'
5	B	504	TOE	OC'-CD'-CE'-OF'
5	C	503	TOE	OF'-CG'-CH'-OI'
5	C	503	TOE	CE'-CD'-OC'-CB'
5	C	503	TOE	CA'-CB'-OC'-CD'
3	B	501	EDO	O1-C1-C2-O2

There are no ring outliers.

3 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	502	EDO	2	0
3	B	501	EDO	2	0
5	C	503	TOE	8	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	496/497 (99%)	-0.33	1 (0%)	95	97	17, 29, 41, 57	0
1	C	494/497 (99%)	0.01	9 (1%)	68	74	22, 37, 53, 75	0
2	B	495/497 (99%)	-0.21	1 (0%)	95	97	19, 30, 49, 60	0
2	D	495/497 (99%)	0.25	19 (3%)	40	47	19, 45, 68, 84	0
All	All	1980/1988 (99%)	-0.07	30 (1%)	73	79	17, 34, 58, 84	0

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	48	LEU	3.8
1	C	3	THR	3.4
1	C	4	LEU	3.2
2	D	350	MET	3.1
2	D	375	LEU	3.0
2	D	381	THR	2.9
2	D	422	ALA	2.7
1	C	9	TRP	2.7
1	C	7	ALA	2.7
1	A	15	ASP	2.6
2	D	380	GLY	2.6
1	C	14	LYS	2.5
2	D	377	GLU	2.5
2	D	393	ASN	2.4
1	C	15	ASP	2.4
2	D	374	THR	2.4
2	D	318	PHE	2.3
2	D	14	LYS	2.2
2	D	342	GLY	2.2
2	D	366	LYS	2.2
1	C	10	GLU	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	8	ASP	2.1
2	D	15	ASP	2.1
2	D	29	SER	2.1
2	B	327	LYS	2.1
1	C	6	ARG	2.1
2	D	384	GLU	2.1
2	D	17	LYS	2.0
2	D	4	LEU	2.0
2	D	316	ASP	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (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
1	CSD	C	302	8/9	0.90	0.19	45,50,65,66	0
1	CSD	A	302	8/9	0.91	0.16	27,33,50,63	0

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
6	GOL	B	503	6/6	0.67	0.43	32,40,49,51	0
5	TOE	B	504	11/11	0.78	0.25	51,55,61,69	0
5	TOE	C	503	10/11	0.80	0.23	49,54,63,67	0
4	K	D	501	1/1	0.83	0.09	58,58,58,58	0
5	TOE	A	504	11/11	0.85	0.22	44,51,58,59	0
3	EDO	A	501	4/4	0.87	0.31	38,41,46,50	0
3	EDO	B	501	4/4	0.88	0.23	34,42,45,45	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	EDO	A	502	4/4	0.88	0.23	26,33,35,41	0
3	EDO	C	501	4/4	0.90	0.21	38,41,44,44	0
4	K	C	502	1/1	0.93	0.06	48,48,48,48	0
4	K	A	503	1/1	0.98	0.14	32,32,32,32	0
4	K	B	502	1/1	0.99	0.06	29,29,29,29	0

6.5 Other polymers (i)

There are no such residues in this entry.