



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 06:28 PM UTC

PDB ID : 7AZC / pdb_00007azc
Title : DNA polymerase sliding clamp from Escherichia coli with peptide 22 bound
Authors : Monsarrat, C.; Compain, G.; Andre, C.; Martiel, I.; Engilberge, S.; Olieric, V.; Wolff, P.; Brillet, K.; Landolfo, M.; Silva da Veiga, C.; Wagner, J.; Guichard, G.; Burnouf, D.Y.
Deposited on : 2020-11-16
Resolution : 1.77 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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

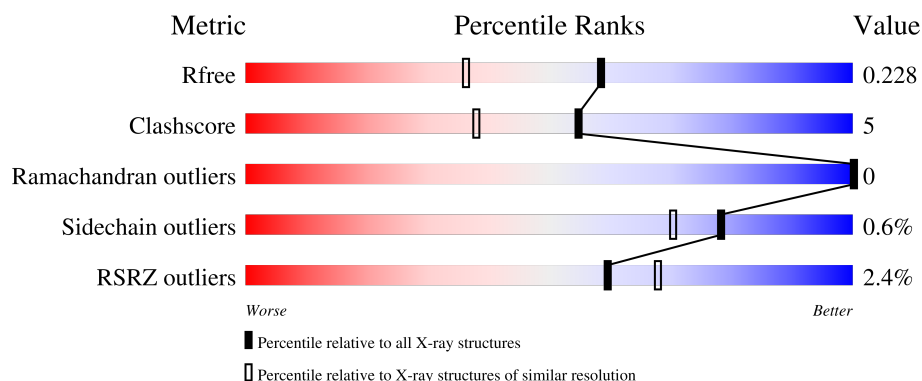
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

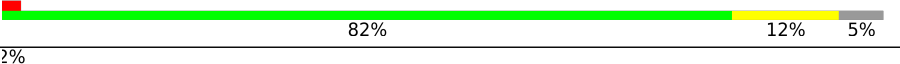
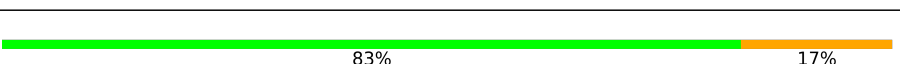
The reported resolution of this entry is 1.77 Å.

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}	180053	1365 (1.78-1.78)
Clashscore	190562	1395 (1.78-1.78)
Ramachandran outliers	187476	1382 (1.78-1.78)
Sidechain outliers	187428	1382 (1.78-1.78)
RSRZ outliers	180081	1365 (1.78-1.78)

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 $\leq 5\%$. 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	386	 2% 85% 10% 5%
1	B	386	 2% 82% 12% 5%
1	C	386	 2% 82% 12% 5%
1	D	386	 4% 86% 8% 6%
2	H	6	 83% 17%

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Mol	Chain	Length	Quality of chain
2	I	6	 67% 17% 17%
2	J	6	 83% 17%
2	K	6	 83% 17%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 13282 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 Beta sliding clamp.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	368	Total	C	N	O	S	0	6	0
			2899	1826	509	544	20			
1	B	365	Total	C	N	O	S	0	5	0
			2868	1806	502	541	19			
1	C	366	Total	C	N	O	S	0	7	0
			2888	1821	506	542	19			
1	D	364	Total	C	N	O	S	0	3	0
			2846	1790	502	535	19			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP A0A073FMV0
A	-18	GLY	-	expression tag	UNP A0A073FMV0
A	-17	SER	-	expression tag	UNP A0A073FMV0
A	-16	SER	-	expression tag	UNP A0A073FMV0
A	-15	HIS	-	expression tag	UNP A0A073FMV0
A	-14	HIS	-	expression tag	UNP A0A073FMV0
A	-13	HIS	-	expression tag	UNP A0A073FMV0
A	-12	HIS	-	expression tag	UNP A0A073FMV0
A	-11	HIS	-	expression tag	UNP A0A073FMV0
A	-10	HIS	-	expression tag	UNP A0A073FMV0
A	-9	SER	-	expression tag	UNP A0A073FMV0
A	-8	SER	-	expression tag	UNP A0A073FMV0
A	-7	GLY	-	expression tag	UNP A0A073FMV0
A	-6	LEU	-	expression tag	UNP A0A073FMV0
A	-5	VAL	-	expression tag	UNP A0A073FMV0
A	-4	PRO	-	expression tag	UNP A0A073FMV0
A	-3	ARG	-	expression tag	UNP A0A073FMV0
A	-2	GLY	-	expression tag	UNP A0A073FMV0
A	-1	SER	-	expression tag	UNP A0A073FMV0
A	0	HIS	-	expression tag	UNP A0A073FMV0
B	-19	MET	-	initiating methionine	UNP A0A073FMV0

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP A0A073FMV0
B	-17	SER	-	expression tag	UNP A0A073FMV0
B	-16	SER	-	expression tag	UNP A0A073FMV0
B	-15	HIS	-	expression tag	UNP A0A073FMV0
B	-14	HIS	-	expression tag	UNP A0A073FMV0
B	-13	HIS	-	expression tag	UNP A0A073FMV0
B	-12	HIS	-	expression tag	UNP A0A073FMV0
B	-11	HIS	-	expression tag	UNP A0A073FMV0
B	-10	HIS	-	expression tag	UNP A0A073FMV0
B	-9	SER	-	expression tag	UNP A0A073FMV0
B	-8	SER	-	expression tag	UNP A0A073FMV0
B	-7	GLY	-	expression tag	UNP A0A073FMV0
B	-6	LEU	-	expression tag	UNP A0A073FMV0
B	-5	VAL	-	expression tag	UNP A0A073FMV0
B	-4	PRO	-	expression tag	UNP A0A073FMV0
B	-3	ARG	-	expression tag	UNP A0A073FMV0
B	-2	GLY	-	expression tag	UNP A0A073FMV0
B	-1	SER	-	expression tag	UNP A0A073FMV0
B	0	HIS	-	expression tag	UNP A0A073FMV0
C	-19	MET	-	initiating methionine	UNP A0A073FMV0
C	-18	GLY	-	expression tag	UNP A0A073FMV0
C	-17	SER	-	expression tag	UNP A0A073FMV0
C	-16	SER	-	expression tag	UNP A0A073FMV0
C	-15	HIS	-	expression tag	UNP A0A073FMV0
C	-14	HIS	-	expression tag	UNP A0A073FMV0
C	-13	HIS	-	expression tag	UNP A0A073FMV0
C	-12	HIS	-	expression tag	UNP A0A073FMV0
C	-11	HIS	-	expression tag	UNP A0A073FMV0
C	-10	HIS	-	expression tag	UNP A0A073FMV0
C	-9	SER	-	expression tag	UNP A0A073FMV0
C	-8	SER	-	expression tag	UNP A0A073FMV0
C	-7	GLY	-	expression tag	UNP A0A073FMV0
C	-6	LEU	-	expression tag	UNP A0A073FMV0
C	-5	VAL	-	expression tag	UNP A0A073FMV0
C	-4	PRO	-	expression tag	UNP A0A073FMV0
C	-3	ARG	-	expression tag	UNP A0A073FMV0
C	-2	GLY	-	expression tag	UNP A0A073FMV0
C	-1	SER	-	expression tag	UNP A0A073FMV0
C	0	HIS	-	expression tag	UNP A0A073FMV0
D	-19	MET	-	initiating methionine	UNP A0A073FMV0
D	-18	GLY	-	expression tag	UNP A0A073FMV0
D	-17	SER	-	expression tag	UNP A0A073FMV0

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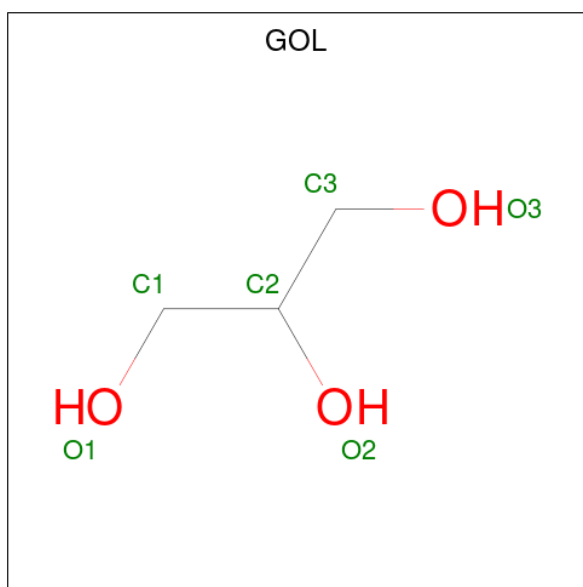
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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP A0A073FMV0
D	-15	HIS	-	expression tag	UNP A0A073FMV0
D	-14	HIS	-	expression tag	UNP A0A073FMV0
D	-13	HIS	-	expression tag	UNP A0A073FMV0
D	-12	HIS	-	expression tag	UNP A0A073FMV0
D	-11	HIS	-	expression tag	UNP A0A073FMV0
D	-10	HIS	-	expression tag	UNP A0A073FMV0
D	-9	SER	-	expression tag	UNP A0A073FMV0
D	-8	SER	-	expression tag	UNP A0A073FMV0
D	-7	GLY	-	expression tag	UNP A0A073FMV0
D	-6	LEU	-	expression tag	UNP A0A073FMV0
D	-5	VAL	-	expression tag	UNP A0A073FMV0
D	-4	PRO	-	expression tag	UNP A0A073FMV0
D	-3	ARG	-	expression tag	UNP A0A073FMV0
D	-2	GLY	-	expression tag	UNP A0A073FMV0
D	-1	SER	-	expression tag	UNP A0A073FMV0
D	0	HIS	-	expression tag	UNP A0A073FMV0

- Molecule 2 is a protein called Peptide 22.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	H	6	Total	C	N	O	0	0	0
			59	41	7	11			
2	I	6	Total	C	N	O	0	0	0
			59	41	7	11			
2	J	6	Total	C	N	O	0	0	0
			59	41	7	11			
2	K	6	Total	C	N	O	0	0	0
			59	41	7	11			

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



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

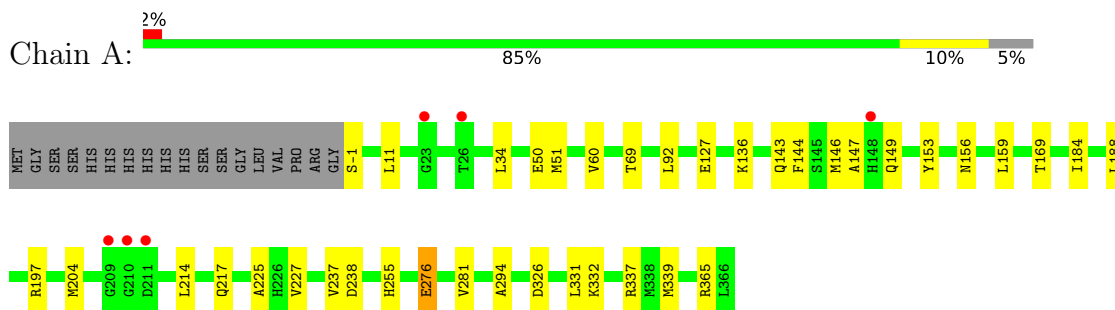
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	373	Total	O	0	8
			381	381		
4	B	366	Total	O	0	5
			371	371		
4	C	378	Total	O	0	6
			384	384		
4	D	341	Total	O	0	2
			343	343		
4	H	16	Total	O	0	0
			16	16		
4	I	12	Total	O	0	0
			12	12		
4	J	15	Total	O	0	1
			16	16		
4	K	10	Total	O	0	0
			10	10		

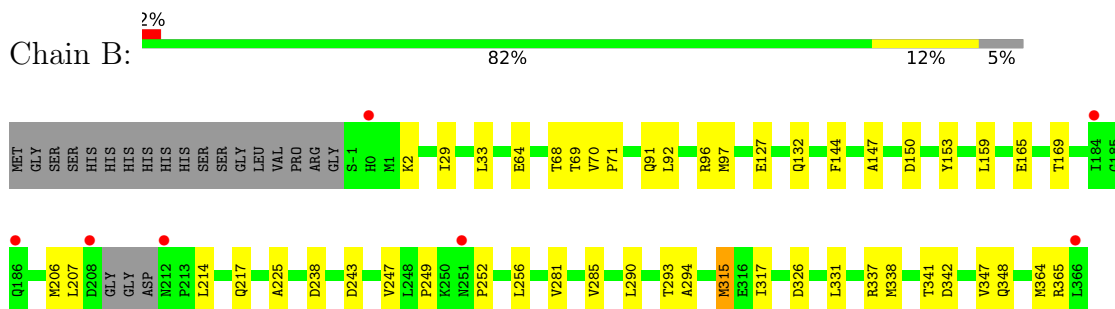
3 Residue-property plots [i](#)

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.

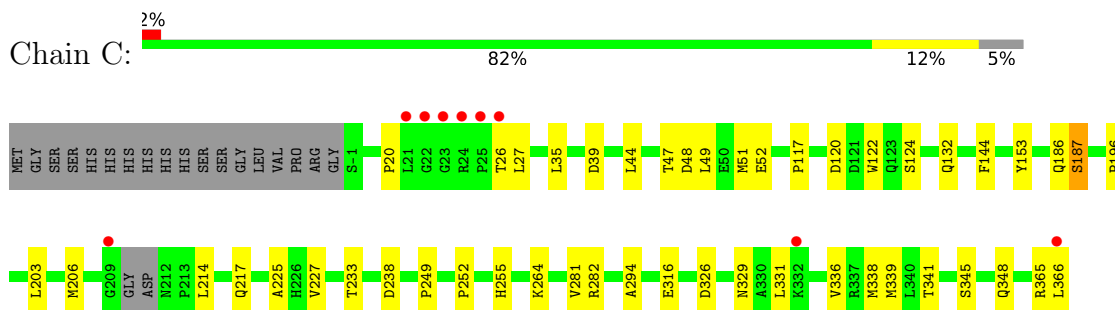
- Molecule 1: Beta sliding clamp



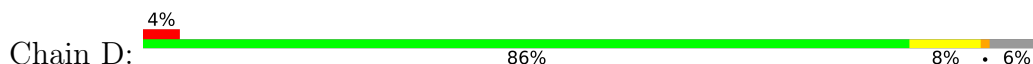
- Molecule 1: Beta sliding clamp

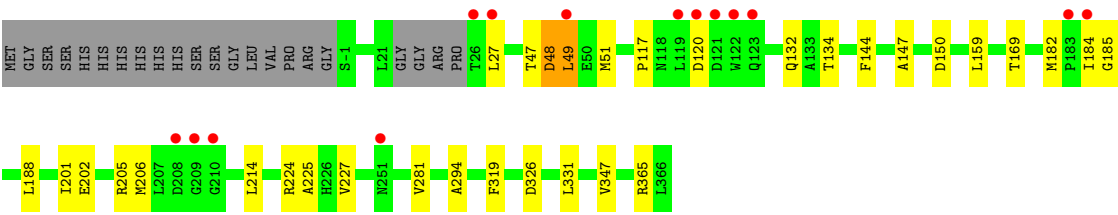


- Molecule 1: Beta sliding clamp

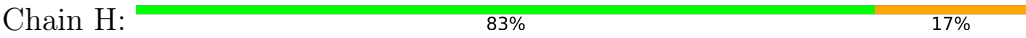


- Molecule 1: Beta sliding clamp

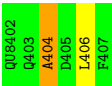




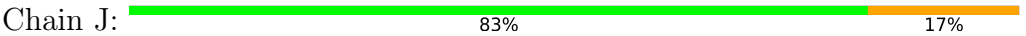
● Molecule 2: Peptide 22



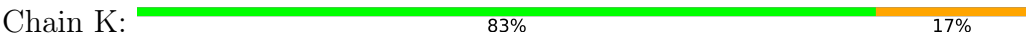
● Molecule 2: Peptide 22



● Molecule 2: Peptide 22



● Molecule 2: Peptide 22



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	73.81Å 76.78Å 79.81Å 70.90° 68.22° 89.14°	Depositor
Resolution (Å)	25.59 – 1.77 25.59 – 1.77	Depositor EDS
% Data completeness (in resolution range)	71.8 (25.59-1.77) 72.2 (25.59-1.77)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.17 (at 1.76Å)	Xtriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.173 , 0.220 0.179 , 0.228	Depositor DCC
R_{free} test set	5199 reflections (3.47%)	wwPDB-VP
Wilson B-factor (Å ²)	20.6	Xtriage
Anisotropy	0.027	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 58.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	13282	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.29% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: GOL, ALC, QU8

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	0.76	0/2968	0.94	1/4017 (0.0%)
1	B	0.76	1/2930 (0.0%)	0.96	2/3965 (0.1%)
1	C	0.77	1/2958 (0.0%)	0.94	1/4003 (0.0%)
1	D	0.75	0/2901	0.97	3/3923 (0.1%)
2	H	0.82	0/36	0.81	0/44
2	I	0.87	0/36	1.01	0/44
2	J	0.93	0/36	0.90	0/44
2	K	0.60	0/36	0.89	0/44
All	All	0.76	2/11901 (0.0%)	0.95	7/16084 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	315	MET	SD-CE	-7.41	1.61	1.79
1	C	338	MET	SD-CE	5.67	1.93	1.79

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	331	LEU	CA-C-N	-6.21	113.43	122.06
1	D	331	LEU	C-N-CA	-6.21	113.43	122.06
1	B	331	LEU	CA-C-N	-5.66	114.20	122.06
1	B	331	LEU	C-N-CA	-5.66	114.20	122.06
1	D	48	ASP	N-CA-C	-5.07	106.34	112.88
1	C	39	ASP	N-CA-C	5.04	118.28	111.17
1	A	11	LEU	N-CA-C	5.01	116.43	110.97

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	2899	0	2918	28	0
1	B	2868	0	2895	32	0
1	C	2888	0	2916	34	0
1	D	2846	0	2863	19	0
2	H	59	0	46	1	0
2	I	59	0	46	3	0
2	J	59	0	46	1	0
2	K	59	0	46	1	0
3	B	6	0	8	1	0
3	C	6	0	8	0	0
4	A	381	0	0	4	0
4	B	371	0	0	5	0
4	C	384	0	0	6	0
4	D	343	0	0	1	0
4	H	16	0	0	0	0
4	I	12	0	0	1	0
4	J	16	0	0	0	0
4	K	10	0	0	0	0
All	All	13282	0	11792	113	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 5.

All (113) 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:20:PRO:HG3	1:C:51:MET:HE2	1.57	0.86
1:A:255[A]:HIS:CE1	1:A:337:ARG:HH11	1.98	0.82
1:A:255[A]:HIS:CE1	1:A:337:ARG:NH1	2.50	0.80
1:C:252:PRO:HA	1:C:341:THR:HG22	1.64	0.79
1:C:233:THR:HG22	4:C:575:HOH:O	1.83	0.78
1:B:214:LEU:HD11	1:B:225:ALA:HB1	1.68	0.74
1:C:282:ARG:HG2	1:C:366:LEU:HD22	1.71	0.72
1:C:35:LEU:HD22	1:C:44[A]:LEU:HD23	1.72	0.72
1:D:214:LEU:HD11	1:D:225:ALA:HB1	1.71	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:201:ILE:O	1:D:205[A]:ARG:HG2	1.89	0.71
1:A:255[A]:HIS:HE1	1:A:337:ARG:NH1	1.89	0.69
1:A:214:LEU:HD11	1:A:225:ALA:HB1	1.75	0.68
1:C:47:THR:HG21	1:C:117:PRO:HG2	1.75	0.67
1:B:96:ARG:HG3	4:B:815:HOH:O	1.95	0.66
1:C:35:LEU:HD22	1:C:44[A]:LEU:CD2	2.26	0.66
1:B:252:PRO:HA	1:B:341:THR:HG22	1.78	0.64
1:C:196:PRO:HG2	4:C:628:HOH:O	1.97	0.64
1:A:184:ILE:HD11	1:A:188:LEU:HD11	1.79	0.63
1:C:214:LEU:HD11	1:C:225:ALA:HB1	1.83	0.60
1:D:51:MET:HE3	1:D:202:GLU:HG2	1.83	0.59
1:C:48:ASP:O	1:C:49:LEU:HB2	2.02	0.57
1:A:147:ALA:O	1:A:197:ARG:HD2	2.04	0.57
1:D:47:THR:HG21	1:D:117:PRO:HG2	1.87	0.57
1:A:255[B]:HIS:CE1	1:A:339:MET:HG2	2.40	0.56
1:B:338:MET:HE3	1:B:347:VAL:HG11	1.87	0.56
1:A:156:ASN:C	1:A:197:ARG:HG3	2.31	0.55
1:A:153[A]:TYR:CE2	1:A:238:ASP:O	2.60	0.55
1:A:-1:SER:HB3	1:A:92:LEU:CD1	2.36	0.55
1:B:243:ASP:H	3:B:401:GOL:C3	2.20	0.55
1:C:153[A]:TYR:CE2	1:C:238:ASP:O	2.60	0.55
1:B:64:GLU:HG3	4:B:681:HOH:O	2.07	0.54
1:B:315:MET:HE2	1:B:317:ILE:HB	1.90	0.54
1:A:143:GLN:HG3	1:A:146:MET:HE2	1.90	0.54
1:C:264:LYS:HD2	1:C:329:ASN:OD1	2.09	0.53
1:D:120:ASP:CB	1:D:224:ARG:HH22	2.22	0.52
1:A:136:LYS:HG3	1:A:204[B]:MET:HE1	1.90	0.52
1:B:256:LEU:HD12	1:B:285[B]:VAL:HG11	1.92	0.52
1:C:365:ARG:HB2	2:J:403:ALC:HZ3	1.91	0.52
1:B:256:LEU:HD12	1:B:285[A]:VAL:HG21	1.92	0.51
1:C:52:GLU:OE2	1:C:120:ASP:HB2	2.10	0.51
1:D:49:LEU:C	1:D:49:LEU:HD23	2.35	0.51
1:B:70:VAL:HG11	1:B:97:MET:SD	2.51	0.51
1:D:48:ASP:O	1:D:49:LEU:HD22	2.11	0.51
1:C:281:VAL:HG12	1:C:294:ALA:HB2	1.93	0.51
1:D:144:PHE:CD1	1:D:326:ASP:HB3	2.46	0.50
1:C:282:ARG:HG2	1:C:366:LEU:CD2	2.40	0.50
1:D:185:GLY:HA2	4:D:508:HOH:O	2.10	0.50
1:B:132:GLN:HB2	1:B:207:LEU:HD22	1.92	0.50
1:A:144:PHE:CD1	1:A:326:ASP:HB3	2.47	0.49
1:C:26:THR:HA	4:C:800:HOH:O	2.11	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:144:PHE:CD1	1:C:326:ASP:HB3	2.47	0.49
1:A:60:VAL:HG22	4:A:671:HOH:O	2.13	0.49
1:A:365:ARG:HB2	2:H:404:ALC:HZ3	1.95	0.49
1:B:247:VAL:HG13	2:I:406:LEU:HD22	1.93	0.49
1:B:285[B]:VAL:HG22	1:B:290:LEU:HD13	1.95	0.49
1:B:315:MET:HE1	1:B:342:ASP:C	2.38	0.49
1:D:134:THR:HG23	1:D:182:MET:HE2	1.95	0.49
1:C:153[B]:TYR:HE1	4:C:648:HOH:O	1.95	0.48
1:A:153[B]:TYR:CD2	1:A:237:VAL:HG13	2.48	0.48
4:A:860:HOH:O	1:D:27:LEU:HD21	2.13	0.47
1:C:316:GLU:HG2	1:C:366:LEU:HD13	1.96	0.47
1:B:337:ARG:NH1	4:B:503:HOH:O	2.48	0.46
1:A:276:GLU:H	1:A:276:GLU:CD	2.24	0.46
1:C:186:GLN:O	1:C:187:SER:C	2.59	0.46
1:A:159:LEU:O	1:A:169:THR:HA	2.16	0.46
1:A:331:LEU:O	1:A:332:LYS:C	2.59	0.45
1:A:127:GLU:HG2	1:A:217:GLN:HG2	1.98	0.45
1:C:341:THR:HG21	4:C:787:HOH:O	2.15	0.45
4:A:542:HOH:O	1:B:71:PRO:HG3	2.16	0.45
1:B:365:ARG:HG2	2:I:404:ALC:HZ3	1.99	0.45
1:D:184:ILE:HD11	1:D:188:LEU:HD11	1.98	0.45
1:A:153[B]:TYR:HD2	1:A:237:VAL:HG13	1.82	0.45
1:C:203:LEU:HD12	1:C:206:MET:HE2	1.99	0.45
1:A:50:GLU:HB2	4:A:783:HOH:O	2.17	0.45
1:B:68:THR:HG21	1:B:92:LEU:HD21	1.99	0.44
1:C:35:LEU:CD2	1:C:44[A]:LEU:HD23	2.46	0.44
1:B:364:MET:HE3	4:I:508:HOH:O	2.17	0.44
1:D:132:GLN:CD	1:D:227:VAL:HG21	2.42	0.44
1:A:51:MET:HE2	1:A:51:MET:HB3	1.85	0.44
1:B:293:THR:HG23	4:B:715:HOH:O	2.16	0.44
1:B:2:LYS:HG2	1:B:91:GLN:CB	2.48	0.44
4:B:720:HOH:O	1:C:27:LEU:HD12	2.17	0.43
1:D:159:LEU:O	1:D:169:THR:HA	2.18	0.43
1:A:281:VAL:HG12	1:A:294:ALA:HB2	2.01	0.43
1:D:319:PHE:HZ	1:D:347:VAL:HG13	1.84	0.43
1:D:365:ARG:HB2	2:K:405:ALC:HZ3	1.99	0.43
1:B:159:LEU:O	1:B:169:THR:HA	2.18	0.43
1:B:365:ARG:CG	2:I:404:ALC:HZ3	2.49	0.43
1:C:132:GLN:CD	1:C:227:VAL:HG21	2.42	0.43
1:C:124:SER:HB2	1:C:217:GLN:HB3	2.00	0.43
1:B:144:PHE:CD1	1:B:326:ASP:HB3	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:316:GLU:HG2	1:C:366:LEU:CD1	2.49	0.42
1:A:-1:SER:HB3	1:A:92:LEU:HD13	2.00	0.42
1:B:153:TYR:HE2	1:B:238:ASP:O	2.01	0.42
1:C:35:LEU:CD2	1:C:44[A]:LEU:CD2	2.97	0.42
1:A:214:LEU:HD13	1:A:227:VAL:CG2	2.50	0.42
1:C:331:LEU:HD13	1:C:336[A]:VAL:HG12	2.01	0.42
1:B:147:ALA:HB1	1:B:150:ASP:HB2	2.02	0.41
1:B:249:PRO:HD2	1:B:348:GLN:OE1	2.20	0.41
1:C:341:THR:OG1	1:C:345:SER:HB2	2.20	0.41
1:A:34:LEU:HA	1:A:69:THR:HG22	2.03	0.41
1:A:143:GLN:OE1	1:A:204[A]:MET:SD	2.79	0.41
1:B:281:VAL:HG12	1:B:294:ALA:HB2	2.02	0.41
1:B:127:GLU:HG2	1:B:217:GLN:HG2	2.02	0.41
1:D:281:VAL:HG12	1:D:294:ALA:HB2	2.03	0.41
1:B:33:LEU:O	1:B:69:THR:HA	2.21	0.40
1:C:255:HIS:CD2	1:C:339:MET:HG2	2.55	0.40
1:C:249:PRO:HD2	1:C:348:GLN:OE1	2.22	0.40
1:D:182:MET:HE3	1:D:182:MET:HB3	1.94	0.40
1:C:122:TRP:HB3	4:C:580:HOH:O	2.22	0.40
1:D:147:ALA:HB1	1:D:150:ASP:HB2	2.02	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	372/386 (96%)	360 (97%)	12 (3%)	0	100	100
1	B	366/386 (95%)	359 (98%)	7 (2%)	0	100	100
1	C	369/386 (96%)	362 (98%)	7 (2%)	0	100	100
1	D	363/386 (94%)	353 (97%)	10 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	H	3/6 (50%)	3 (100%)	0	0	100	100
2	I	3/6 (50%)	3 (100%)	0	0	100	100
2	J	3/6 (50%)	3 (100%)	0	0	100	100
2	K	3/6 (50%)	3 (100%)	0	0	100	100
All	All	1482/1568 (94%)	1446 (98%)	36 (2%)	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	320/330 (97%)	318 (99%)	2 (1%)	78	70
1	B	318/330 (96%)	316 (99%)	2 (1%)	78	70
1	C	320/330 (97%)	319 (100%)	1 (0%)	86	80
1	D	312/330 (94%)	310 (99%)	2 (1%)	78	70
2	H	4/4 (100%)	4 (100%)	0	100	100
2	I	4/4 (100%)	4 (100%)	0	100	100
2	J	4/4 (100%)	4 (100%)	0	100	100
2	K	4/4 (100%)	4 (100%)	0	100	100
All	All	1286/1336 (96%)	1279 (100%)	7 (0%)	78	73

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	149	GLN
1	A	276	GLU
1	B	29	ILE
1	B	206	MET
1	C	187	SER
1	D	49	LEU

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Mol	Chain	Res	Type
1	D	206	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	61	GLN
1	B	149	GLN
1	B	217	GLN
1	B	226	HIS
1	B	255	HIS
1	C	118	ASN
1	C	221	ASN
1	C	265	GLN
1	D	16	GLN
1	D	61	GLN
1	D	118	ASN
1	D	191	HIS
1	D	289	GLN
2	K	404	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

4 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
2	ALC	I	404	2	9,11,12	0.53	0	11,13,15	1.31	1 (9%)
2	ALC	K	405	2	9,11,12	0.49	0	11,13,15	1.18	1 (9%)
2	ALC	J	403	2	9,11,12	0.52	0	11,13,15	1.73	3 (27%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	ALC	H	404	2	9,11,12	0.54	0	11,13,15	1.08	1 (9%)

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
2	ALC	I	404	2	-	2/5/14/16	0/1/1/1
2	ALC	K	405	2	-	3/5/14/16	0/1/1/1
2	ALC	J	403	2	-	2/5/14/16	0/1/1/1
2	ALC	H	404	2	-	2/5/14/16	0/1/1/1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	J	403	ALC	CB-CA-C	-4.02	104.80	110.99
2	I	404	ALC	CB-CA-C	-3.29	105.92	110.99
2	J	403	ALC	CB-CG-CD2	2.97	118.63	111.71
2	K	405	ALC	CB-CA-C	-2.91	106.51	110.99
2	H	404	ALC	CB-CG-CD2	2.14	116.69	111.71
2	J	403	ALC	CG-CB-CA	2.09	117.33	114.52

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	H	404	ALC	CA-CB-CG-CD2
2	I	404	ALC	CA-CB-CG-CD2
2	J	403	ALC	CA-CB-CG-CD2
2	K	405	ALC	CA-CB-CG-CD2
2	H	404	ALC	CA-CB-CG-CD1
2	I	404	ALC	CA-CB-CG-CD1
2	J	403	ALC	CA-CB-CG-CD1
2	K	405	ALC	CA-CB-CG-CD1
2	K	405	ALC	N-CA-CB-CG

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	I	404	ALC	2	0
2	K	405	ALC	1	0
2	J	403	ALC	1	0
2	H	404	ALC	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	GOL	B	401	-	5,5,5	0.10	0	5,5,5	0.23	0
3	GOL	C	401	-	5,5,5	0.09	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	GOL	B	401	-	-	2/4/4/4	-
3	GOL	C	401	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	401	GOL	C1-C2-C3-O3
3	C	401	GOL	O1-C1-C2-C3
3	B	401	GOL	O2-C2-C3-O3
3	C	401	GOL	O1-C1-C2-O2

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	401	GOL	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	368/386 (95%)	-0.16	6 (1%) 70 77	10, 23, 51, 105	6 (1%)
1	B	365/386 (94%)	-0.09	7 (1%) 66 74	11, 25, 50, 87	5 (1%)
1	C	366/386 (94%)	-0.17	9 (2%) 58 66	9, 22, 49, 103	7 (1%)
1	D	364/386 (94%)	0.10	14 (3%) 44 50	12, 27, 57, 83	3 (0%)
2	H	4/6 (66%)	-0.82	0 100 100	13, 16, 16, 20	0
2	I	4/6 (66%)	-0.01	0 100 100	23, 23, 34, 36	0
2	J	4/6 (66%)	-0.72	0 100 100	14, 17, 20, 20	0
2	K	4/6 (66%)	-0.19	0 100 100	23, 26, 28, 31	0
All	All	1479/1568 (94%)	-0.09	36 (2%) 59 68	9, 24, 53, 105	21 (1%)

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	209	GLY	5.4
1	D	119	LEU	5.0
1	D	122	TRP	4.3
1	B	208	ASP	3.7
1	D	184	ILE	3.7
1	D	49	LEU	3.5
1	B	366	LEU	3.5
1	C	25	PRO	3.4
1	D	209	GLY	3.3
1	A	148[A]	HIS	3.3
1	D	26	THR	3.2
1	D	120	ASP	3.2
1	D	123	GLN	3.1
1	A	26	THR	3.1
1	D	121	ASP	2.9
1	C	23	GLY	2.9

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Mol	Chain	Res	Type	RSRZ
1	C	22	GLY	2.8
1	A	211	ASP	2.8
1	D	183	PRO	2.7
1	C	21	LEU	2.7
1	D	210	GLY	2.7
1	C	26	THR	2.6
1	B	251	ASN	2.6
1	C	24	ARG	2.5
1	C	332	LYS	2.5
1	A	209	GLY	2.4
1	A	210	GLY	2.4
1	D	208	ASP	2.4
1	B	186	GLN	2.3
1	B	212	ASN	2.3
1	B	184	ILE	2.3
1	D	27	LEU	2.2
1	B	0	HIS	2.2
1	A	23	GLY	2.1
1	C	366	LEU	2.1
1	D	251	ASN	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, 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	ALC	I	404	11/12	0.91	0.08	18,22,26,28	0
2	ALC	K	405	11/12	0.94	0.07	18,21,31,31	0
2	ALC	J	403	11/12	0.95	0.06	13,17,25,27	0
2	ALC	H	404	11/12	0.96	0.07	10,19,28,29	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides 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, 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($\text{\AA}^2$)	Q<0.9
3	GOL	B	401	6/6	0.86	0.12	40,42,45,46	6
3	GOL	C	401	6/6	0.87	0.14	55,55,59,60	0

6.5 Other polymers [i](#)

There are no such residues in this entry.