



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 07:26 AM UTC

PDB ID : 7ALO / pdb_00007alo
Title : Structure of B*27:09/photoRL9
Authors : Loll, B.; Lan, H.; Freund, C.
Deposited on : 2020-10-07
Resolution : 1.80 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

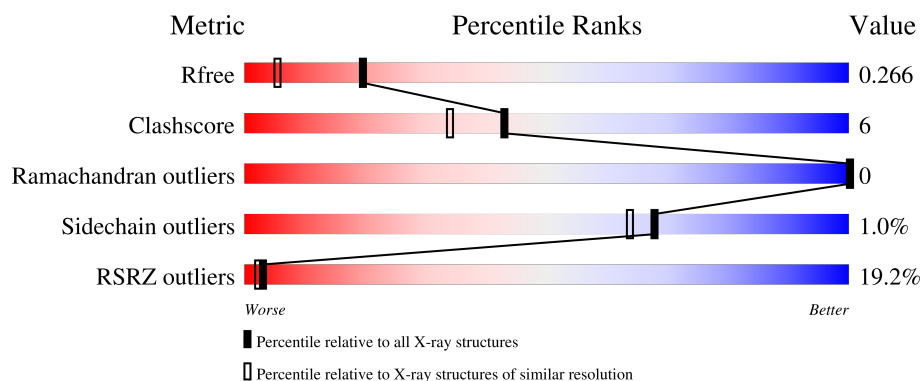
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.80 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	7662 (1.80-1.80)
Clashscore	190562	8479 (1.80-1.80)
Ramachandran outliers	187476	8391 (1.80-1.80)
Sidechain outliers	187428	8390 (1.80-1.80)
RSRZ outliers	180081	7663 (1.80-1.80)

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	292	
1	D	292	
2	B	100	
2	E	100	
3	C	9	

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Mol	Chain	Length	Quality of chain
3	F	9	44% 67% 22% 11%

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
4	GOL	E	103	-	-	X	-
6	1PE	B	104	-	-	X	-

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 7344 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 Lymphocyte antigen HLA-B27.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	276	Total	C	N	O	S	0	13	0
			2369	1469	436	457	7			
1	D	276	Total	C	N	O	S	0	14	0
			2374	1476	430	461	7			

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-14	MET	-	initiating methionine	UNP A0A2R7Z5J3
A	-13	ALA	-	expression tag	UNP A0A2R7Z5J3
A	-12	HIS	-	expression tag	UNP A0A2R7Z5J3
A	-11	HIS	-	expression tag	UNP A0A2R7Z5J3
A	-10	HIS	-	expression tag	UNP A0A2R7Z5J3
A	-9	HIS	-	expression tag	UNP A0A2R7Z5J3
A	-8	HIS	-	expression tag	UNP A0A2R7Z5J3
A	-7	HIS	-	expression tag	UNP A0A2R7Z5J3
A	-6	VAL	-	expression tag	UNP A0A2R7Z5J3
A	-5	ASP	-	expression tag	UNP A0A2R7Z5J3
A	-4	ASP	-	expression tag	UNP A0A2R7Z5J3
A	-3	ASP	-	expression tag	UNP A0A2R7Z5J3
A	-2	ASP	-	expression tag	UNP A0A2R7Z5J3
A	-1	LYS	-	expression tag	UNP A0A2R7Z5J3
A	0	ILE	-	expression tag	UNP A0A2R7Z5J3
D	-14	MET	-	initiating methionine	UNP A0A2R7Z5J3
D	-13	ALA	-	expression tag	UNP A0A2R7Z5J3
D	-12	HIS	-	expression tag	UNP A0A2R7Z5J3
D	-11	HIS	-	expression tag	UNP A0A2R7Z5J3
D	-10	HIS	-	expression tag	UNP A0A2R7Z5J3
D	-9	HIS	-	expression tag	UNP A0A2R7Z5J3
D	-8	HIS	-	expression tag	UNP A0A2R7Z5J3
D	-7	HIS	-	expression tag	UNP A0A2R7Z5J3
D	-6	VAL	-	expression tag	UNP A0A2R7Z5J3
D	-5	ASP	-	expression tag	UNP A0A2R7Z5J3

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-4	ASP	-	expression tag	UNP A0A2R7Z5J3
D	-3	ASP	-	expression tag	UNP A0A2R7Z5J3
D	-2	ASP	-	expression tag	UNP A0A2R7Z5J3
D	-1	LYS	-	expression tag	UNP A0A2R7Z5J3
D	0	ILE	-	expression tag	UNP A0A2R7Z5J3

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	99	Total	C	N	O	S	0	5	0
			876	555	152	166	3			
2	E	99	Total	C	N	O	S	0	4	0
			860	547	145	165	3			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	initiating methionine	UNP P61769
E	0	MET	-	initiating methionine	UNP P61769

- Molecule 3 is a protein called Vasoactive intestinal polypeptide receptor 1.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	9	Total	C	N	O	0	1	0
			113	73	27	13			
3	F	9	Total	C	N	O	0	0	0
			104	67	25	12			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	8	PRQ	HIS	conflict	UNP P32241
F	8	PRQ	HIS	conflict	UNP P32241

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



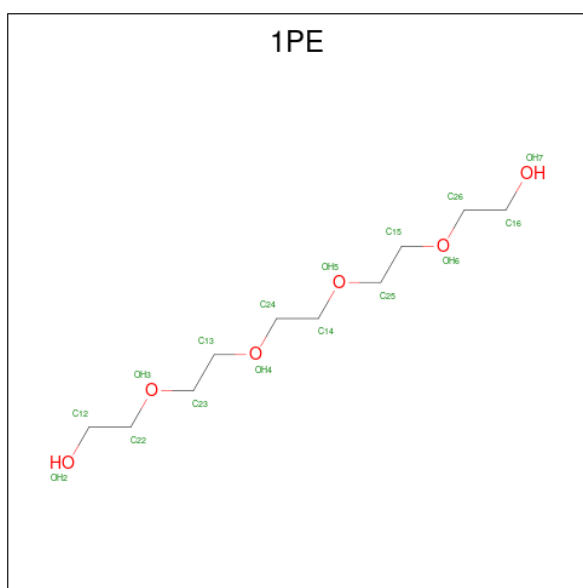
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	D	1	Total	C	O	0	0
			6	3	3		
4	D	1	Total	C	O	0	0
			6	3	3		
4	D	1	Total	C	O	0	0
			6	3	3		
4	D	1	Total	C	O	0	0
			6	3	3		
4	E	1	Total	C	O	0	0
			6	3	3		
4	E	1	Total	C	O	0	0
			6	3	3		
4	E	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: TRS) (formula: C₄H₁₂NO₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	N	O	0	0
			8	4	1	3		
5	D	1	Total	C	N	O	0	0
			8	4	1	3		

- Molecule 6 is PENTAETHYLENE GLYCOL (CCD ID: 1PE) (formula: C₁₀H₂₂O₆).



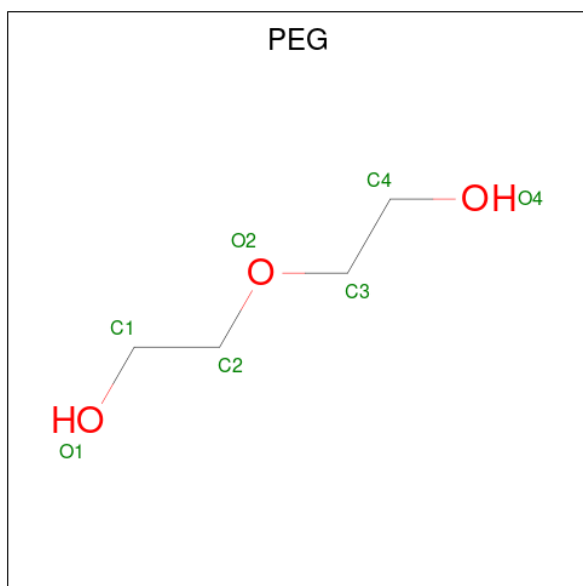
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	B	1	Total	C	O	0	0
			16	10	6		

- Molecule 7 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: C₆H₁₄O₄).



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

- Molecule 8 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	D	1	Total	C	O	0	0
			7	4	3		

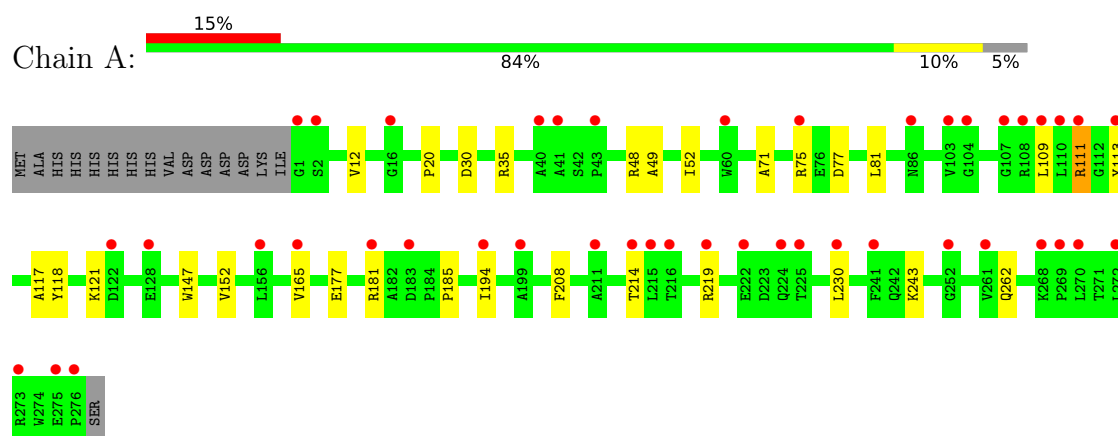
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	194	Total 194	O 194	0	16
9	B	72	Total 72	O 72	0	10
9	C	3	Total 3	O 3	0	0
9	D	183	Total 183	O 183	0	21
9	E	67	Total 67	O 67	0	10
9	F	8	Total 8	O 8	0	1

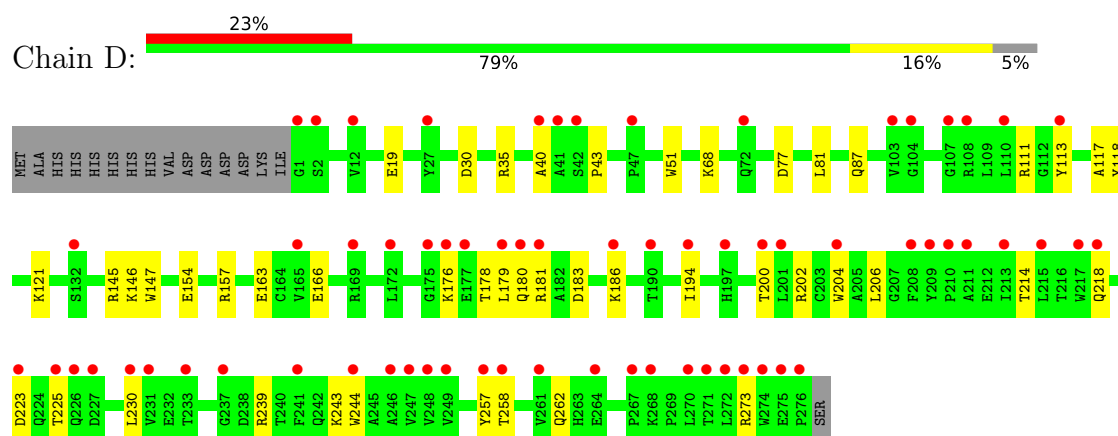
3 Residue-property plots [i](#)

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.

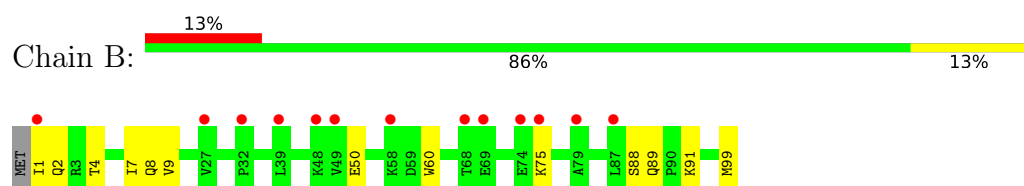
- Molecule 1: Lymphocyte antigen HLA-B27



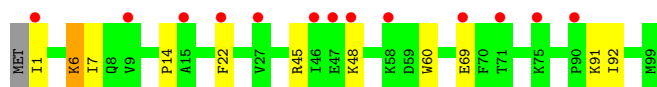
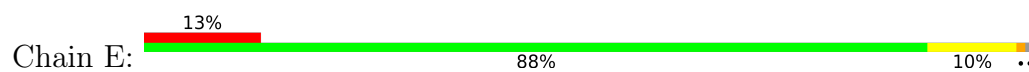
- Molecule 1: Lymphocyte antigen HLA-B27



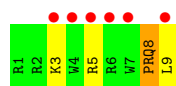
- Molecule 2: Beta-2-microglobulin



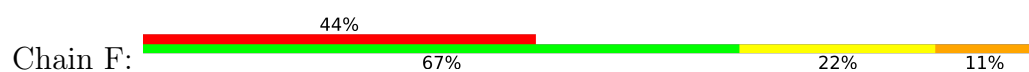
- Molecule 2: Beta-2-microglobulin



- Molecule 3: Vasoactive intestinal polypeptide receptor 1



- Molecule 3: Vasoactive intestinal polypeptide receptor 1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	45.20Å 69.61Å 82.54Å 80.24° 88.36° 89.88°	Depositor
Resolution (Å)	40.66 – 1.80 40.66 – 1.80	Depositor EDS
% Data completeness (in resolution range)	97.1 (40.66-1.80) 97.1 (40.66-1.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.98 (at 1.79Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660+SVN	Depositor
R, R_{free}	0.223 , 0.266 0.225 , 0.266	Depositor DCC
R_{free} test set	4453 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å ²)	25.5	Xtriage
Anisotropy	0.318	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 44.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.52$, $\langle L^2 \rangle = 0.36$	Xtriage
Estimated twinning fraction	0.129 for h,-k,-l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	7344	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.86% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PEG, GOL, 1PE, TRS, PRQ, PGE

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	0.26	0/2432	0.57	0/3306
1	D	0.24	0/2440	0.57	0/3320
2	B	0.23	0/899	0.64	0/1214
2	E	0.24	0/883	0.66	1/1193 (0.1%)
3	C	0.28	0/101	0.59	0/129
3	F	0.26	0/92	0.66	0/118
All	All	0.25	0/6847	0.59	1/9280 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	6	LYS	N-CA-C	-5.24	101.98	110.32

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	2369	0	2215	21	0
1	D	2374	0	2207	29	0
2	B	876	0	843	15	0
2	E	860	0	823	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	113	0	114	8	0
3	F	104	0	102	6	0
4	A	18	0	24	2	0
4	B	12	0	16	0	0
4	D	24	0	32	2	0
4	E	18	0	24	7	0
5	B	8	0	12	3	0
5	D	8	0	12	3	0
6	B	16	0	22	7	0
7	B	10	0	14	1	0
8	D	7	0	10	2	0
9	A	194	0	0	4	0
9	B	72	0	0	4	0
9	C	3	0	0	1	0
9	D	183	0	0	3	0
9	E	67	0	0	1	0
9	F	8	0	0	0	0
All	All	7344	0	6470	83	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 6.

All (83) 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)
2:E:7:ILE:H	4:E:103:GOL:H11	1.45	0.80
1:D:121:LYS:HE3	2:E:1:ILE:HG23	1.66	0.77
2:B:8:GLN:HG2	6:B:104:1PE:H251	1.67	0.75
2:E:45:ARG:HB2	4:E:102:GOL:H32	1.71	0.72
1:A:20:PRO:HD2	1:A:75:ARG:HD3	1.76	0.68
2:B:8:GLN:HA	6:B:104:1PE:H161	1.75	0.68
5:B:103:TRS:N	9:B:202:HOH:O	2.30	0.63
3:C:5:ARG:NH2	3:C:8:PRQ:HAH	2.14	0.63
2:B:99:MET:HE2	6:B:104:1PE:H262	1.81	0.62
3:F:5:ARG:NH2	3:F:8:PRQ:HAF	2.15	0.61
1:D:163:GLU:HA	1:D:166[B]:GLU:HG2	1.81	0.61
1:A:177[A]:GLU:OE1	1:A:177[A]:GLU:N	2.27	0.59
1:A:152:VAL:HG21	3:C:8:PRQ:HAG	1.84	0.59
1:A:147:TRP:NE1	3:C:8:PRQ:O	2.28	0.59
1:A:152:VAL:CG2	3:C:8:PRQ:HAG	2.32	0.59
9:D:480:HOH:O	3:F:8:PRQ:HAH	2.03	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:2:GLN:NE2	9:B:201:HOH:O	2.15	0.57
1:D:154:GLU:HG2	1:D:157:ARG:HH22	1.69	0.57
2:B:91:LYS:NZ	9:B:203:HOH:O	2.38	0.57
2:B:75:LYS:NZ	1:D:19[A]:GLU:OE2	2.35	0.56
1:D:230:LEU:HD22	1:D:243:LYS:HE3	1.86	0.56
2:B:88:SER:HB3	7:B:105:PGE:H3	1.88	0.56
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.41	0.55
5:B:103:TRS:O3	5:B:103:TRS:O1	2.23	0.55
1:D:51:TRP:CE2	1:D:179:LEU:HD11	2.41	0.55
1:D:77:ASP:HB3	3:F:9:LEU:HD12	1.90	0.54
1:D:117:ALA:HB2	2:E:60:TRP:CE2	2.42	0.53
1:A:214[A]:THR:OG1	1:A:262:GLN:HB2	2.08	0.53
1:D:202:ARG:HD2	1:D:244:TRP:CD2	2.44	0.53
1:A:30:ASP:HA	4:A:301:GOL:H2	1.89	0.52
1:A:71:ALA:O	1:A:75:ARG:HG3	2.10	0.52
1:A:81:LEU:HD13	1:A:118:TYR:CD1	2.44	0.52
2:E:22:PHE:CE2	2:E:69[B]:GLU:HG2	2.44	0.52
2:B:50:GLU:HG2	2:E:48:LYS:HD2	1.92	0.51
2:E:7:ILE:N	4:E:103:GOL:H11	2.19	0.51
1:D:214:THR:HB	1:D:262:GLN:HB2	1.93	0.51
2:E:7:ILE:H	4:E:103:GOL:C1	2.19	0.50
1:D:202:ARG:NH1	9:D:401:HOH:O	2.24	0.50
3:C:5:ARG:CZ	3:C:8:PRQ:HAH	2.42	0.49
2:E:91[A]:LYS:HD3	2:E:92:ILE:N	2.26	0.49
1:D:178:THR:HB	5:D:305:TRS:H11	1.94	0.48
2:E:14:PRO:O	9:E:201:HOH:O	2.20	0.48
3:C:3[A]:LYS:HD2	9:C:101:HOH:O	2.13	0.47
2:B:9:VAL:H	6:B:104:1PE:C16	2.27	0.47
1:A:111:ARG:HG2	1:A:113:TYR:CZ	2.50	0.46
1:D:111:ARG:HG2	1:D:113:TYR:CZ	2.50	0.46
2:E:91[B]:LYS:HE3	4:E:103:GOL:H32	1.97	0.46
1:D:223:ASP:HB3	1:D:225:THR:HG23	1.98	0.46
1:D:40:ALA:O	1:D:43:PRO:HD3	2.16	0.45
1:D:239:ARG:HB2	5:D:305:TRS:N	2.30	0.45
2:E:45:ARG:CB	4:E:102:GOL:H32	2.43	0.45
2:B:9:VAL:HG12	6:B:104:1PE:H162	1.97	0.45
8:D:306:PEG:H42	9:D:481:HOH:O	2.16	0.45
1:D:30:ASP:OD1	4:D:302:GOL:H12	2.17	0.45
1:D:145[B]:ARG:HD3	1:D:145[B]:ARG:HA	1.76	0.44
9:A:409:HOH:O	3:C:3[B]:LYS:NZ	2.43	0.44
4:A:302:GOL:O3	9:A:401:HOH:O	2.21	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:81:LEU:HD13	1:D:118:TYR:CD1	2.53	0.43
1:D:68:LYS:HB3	8:D:306:PEG:H21	1.99	0.43
1:D:146[B]:LYS:NZ	3:F:8:PRQ:OAC	2.49	0.43
1:A:48:ARG:HD3	1:A:48:ARG:HA	1.84	0.43
2:B:89:GLN:NE2	9:B:211:HOH:O	2.52	0.43
3:F:5:ARG:HH21	3:F:8:PRQ:HAF	1.81	0.43
1:A:109:LEU:HB2	1:A:165:VAL:HG21	2.01	0.43
2:B:7:ILE:HB	6:B:104:1PE:H121	2.00	0.43
1:D:87:GLN:HG2	4:D:303:GOL:H12	2.01	0.43
1:D:194:ILE:HD11	1:D:200:THR:OG1	2.19	0.43
1:D:176:LYS:HA	1:D:180:GLN:HG3	2.01	0.43
1:A:181:ARG:HG2	9:A:474:HOH:O	2.19	0.42
1:D:218:GLN:O	1:D:257:TYR:HA	2.19	0.42
1:D:147:TRP:CZ2	3:F:9:LEU:HD23	2.54	0.42
1:D:181:ARG:NH2	5:D:305:TRS:H12	2.35	0.42
2:E:6:LYS:HA	4:E:103:GOL:H11	2.02	0.42
1:A:49:ALA:O	1:A:52:ILE:HG22	2.21	0.41
1:D:258[B]:THR:HG22	1:D:273:ARG:HG2	2.02	0.41
2:B:9:VAL:H	6:B:104:1PE:H161	1.85	0.41
1:A:77:ASP:HB3	3:C:9:LEU:HD12	2.03	0.41
1:A:219[B]:ARG:HG2	9:A:520:HOH:O	2.19	0.41
1:A:230[B]:LEU:HD11	1:A:243:LYS:HE3	2.02	0.41
1:A:12:VAL:HB	5:B:103:TRS:H11	2.03	0.41
1:A:121:LYS:HE2	2:B:1:ILE:HB	2.02	0.40
1:A:185:PRO:HB3	1:A:208:PHE:HB3	2.02	0.40
1:D:204[B]:TRP:HE3	1:D:206:LEU:HD21	1.87	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	287/292 (98%)	278 (97%)	9 (3%)	0	100	100
1	D	288/292 (99%)	276 (96%)	12 (4%)	0	100	100
2	B	102/100 (102%)	102 (100%)	0	0	100	100
2	E	101/100 (101%)	98 (97%)	3 (3%)	0	100	100
3	C	7/9 (78%)	7 (100%)	0	0	100	100
3	F	6/9 (67%)	6 (100%)	0	0	100	100
All	All	791/802 (99%)	767 (97%)	24 (3%)	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	248/250 (99%)	245 (99%)	3 (1%)	63	57
1	D	249/250 (100%)	246 (99%)	3 (1%)	63	57
2	B	99/95 (104%)	97 (98%)	2 (2%)	48	38
2	E	98/95 (103%)	98 (100%)	0	100	100
3	C	9/8 (112%)	9 (100%)	0	100	100
3	F	8/8 (100%)	8 (100%)	0	100	100
All	All	711/706 (101%)	703 (99%)	8 (1%)	68	60

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	35	ARG
1	A	111	ARG
1	A	194	ILE
2	B	4[A]	THR
2	B	4[B]	THR
1	D	35	ARG
1	D	183	ASP

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Mol	Chain	Res	Type
1	D	186	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	54	GLN
1	A	180	GLN
1	A	188	HIS
2	B	13	HIS
2	B	51	HIS
2	E	13	HIS

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
3	PRQ	C	8	3	14,14,15	1.09	1 (7%)	13,18,20	2.52	7 (53%)
3	PRQ	F	8	3	14,14,15	1.09	1 (7%)	13,18,20	2.28	5 (38%)

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	PRQ	C	8	3	-	2/9/11/12	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PRQ	F	8	3	-	3/9/11/12	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	8	PRQ	OAC-NAN	-2.92	1.17	1.22
3	C	8	PRQ	OAC-NAN	-2.81	1.18	1.22

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	8	PRQ	CAL-CAK-CA	4.22	129.66	124.68
3	C	8	PRQ	CAI-CAL-CAK	-4.05	117.38	121.32
3	F	8	PRQ	CAH-CAK-CA	-3.87	111.60	120.51
3	C	8	PRQ	CAH-CAK-CA	-3.85	111.66	120.51
3	C	8	PRQ	O-C-CAJ	3.80	136.43	125.38
3	C	8	PRQ	CAH-CAK-CAL	2.99	120.18	117.08
3	C	8	PRQ	CAL-CAK-CA	2.94	128.15	124.68
3	F	8	PRQ	CAI-CAL-CAK	-2.72	118.68	121.32
3	C	8	PRQ	OAC-NAN-CAL	2.67	123.59	119.03
3	F	8	PRQ	CAK-CA-N	2.60	119.37	112.61
3	C	8	PRQ	CAG-CAF-CAH	-2.33	117.36	120.24
3	F	8	PRQ	OAC-NAN-CAL	2.24	122.86	119.03

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	8	PRQ	CAK-CA-CAJ-C
3	F	8	PRQ	CAK-CA-CAJ-C
3	C	8	PRQ	N-CA-CAK-CAH
3	F	8	PRQ	N-CA-CAK-CAH
3	F	8	PRQ	N-CA-CAK-CAL

There are no ring outliers.

2 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	8	PRQ	5	0
3	F	8	PRQ	4	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

17 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	$\# Z > 2$
4	GOL	A	302	-	5,5,5	0.93	0	5,5,5	1.07	0
4	GOL	A	303	-	5,5,5	0.93	0	5,5,5	1.04	0
4	GOL	E	103	-	5,5,5	0.75	0	5,5,5	1.37	1 (20%)
4	GOL	D	304	-	5,5,5	1.18	0	5,5,5	0.89	0
5	TRS	D	305	-	7,7,7	0.41	0	9,9,9	0.49	0
4	GOL	D	302	-	5,5,5	0.93	0	5,5,5	1.02	0
4	GOL	E	102	-	5,5,5	1.03	0	5,5,5	0.91	0
4	GOL	B	102	-	5,5,5	0.91	0	5,5,5	1.08	0
4	GOL	D	303	-	5,5,5	0.88	0	5,5,5	1.09	0
8	PEG	D	306	-	6,6,6	0.51	0	5,5,5	0.30	0
6	1PE	B	104	-	15,15,15	0.54	0	14,14,14	0.23	0
4	GOL	D	301	-	5,5,5	0.91	0	5,5,5	1.12	1 (20%)
4	GOL	E	101	-	5,5,5	0.92	0	5,5,5	1.10	0
5	TRS	B	103	-	7,7,7	0.37	0	9,9,9	0.43	0
7	PGE	B	105	-	9,9,9	0.53	0	8,8,8	0.30	0
4	GOL	B	101	-	5,5,5	0.95	0	5,5,5	1.12	1 (20%)
4	GOL	A	301	-	5,5,5	1.10	1 (20%)	5,5,5	1.03	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	GOL	A	302	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	A	303	-	-	2/4/4/4	-
4	GOL	E	103	-	-	0/4/4/4	-
4	GOL	D	304	-	-	0/4/4/4	-
5	TRS	D	305	-	-	5/9/9/9	-
4	GOL	D	302	-	-	1/4/4/4	-
4	GOL	E	102	-	-	2/4/4/4	-
4	GOL	B	102	-	-	4/4/4/4	-
4	GOL	D	303	-	-	0/4/4/4	-
8	PEG	D	306	-	-	3/4/4/4	-
6	1PE	B	104	-	-	10/13/13/13	-
4	GOL	D	301	-	-	3/4/4/4	-
4	GOL	E	101	-	-	0/4/4/4	-
5	TRS	B	103	-	-	6/9/9/9	-
7	PGE	B	105	-	-	4/7/7/7	-
4	GOL	B	101	-	-	1/4/4/4	-
4	GOL	A	301	-	-	0/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	301	GOL	O2-C2	-2.09	1.37	1.43

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	E	103	GOL	C3-C2-C1	-2.16	103.88	111.80
4	D	301	GOL	C3-C2-C1	-2.03	104.36	111.80
4	B	101	GOL	C3-C2-C1	-2.01	104.41	111.80

There are no chirality outliers.

All (43) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	302	GOL	C1-C2-C3-O3
4	D	301	GOL	C1-C2-C3-O3
4	E	102	GOL	O1-C1-C2-C3
5	B	103	TRS	N-C-C1-O1
5	B	103	TRS	N-C-C2-O2
6	B	104	1PE	C24-C14-OH5-C25

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Mol	Chain	Res	Type	Atoms
4	D	301	GOL	O2-C2-C3-O3
7	B	105	PGE	O3-C5-C6-O4
6	B	104	1PE	OH2-C12-C22-OH3
4	A	303	GOL	O1-C1-C2-C3
4	B	102	GOL	O1-C1-C2-C3
4	B	102	GOL	C1-C2-C3-O3
6	B	104	1PE	OH7-C16-C26-OH6
8	D	306	PEG	O2-C3-C4-O4
4	B	102	GOL	O1-C1-C2-O2
5	B	103	TRS	C3-C-C1-O1
5	B	103	TRS	C1-C-C2-O2
7	B	105	PGE	O1-C1-C2-O2
6	B	104	1PE	OH6-C15-C25-OH5
4	A	302	GOL	O2-C2-C3-O3
4	A	303	GOL	O1-C1-C2-O2
4	B	102	GOL	O2-C2-C3-O3
4	E	102	GOL	O1-C1-C2-O2
7	B	105	PGE	O2-C3-C4-O3
5	D	305	TRS	C2-C-C1-O1
5	D	305	TRS	C3-C-C1-O1
4	D	302	GOL	O2-C2-C3-O3
6	B	104	1PE	C12-C22-OH3-C23
8	D	306	PEG	C4-C3-O2-C2
6	B	104	1PE	C16-C26-OH6-C15
5	B	103	TRS	C2-C-C1-O1
5	D	305	TRS	C1-C-C3-O3
7	B	105	PGE	C1-C2-O2-C3
6	B	104	1PE	OH4-C13-C23-OH3
8	D	306	PEG	O1-C1-C2-O2
6	B	104	1PE	C23-C13-OH4-C24
5	D	305	TRS	N-C-C1-O1
5	D	305	TRS	N-C-C3-O3
4	D	301	GOL	O1-C1-C2-C3
4	B	101	GOL	O1-C1-C2-C3
5	B	103	TRS	C3-C-C2-O2
6	B	104	1PE	OH5-C14-C24-OH4
6	B	104	1PE	C14-C24-OH4-C13

There are no ring outliers.

11 monomers are involved in 27 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	302	GOL	1	0
4	E	103	GOL	5	0
5	D	305	TRS	3	0
4	D	302	GOL	1	0
4	E	102	GOL	2	0
4	D	303	GOL	1	0
8	D	306	PEG	2	0
6	B	104	1PE	7	0
5	B	103	TRS	3	0
7	B	105	PGE	1	0
4	A	301	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	276/292 (94%)	1.15	44 (15%) 5 4	10, 29, 53, 70	13 (4%)
1	D	276/292 (94%)	1.33	67 (24%) 2 1	13, 31, 62, 82	14 (5%)
2	B	99/100 (99%)	1.21	13 (13%) 7 6	15, 30, 47, 69	5 (5%)
2	E	99/100 (99%)	1.13	13 (13%) 7 6	13, 31, 48, 76	4 (4%)
3	C	8/9 (88%)	3.05	6 (75%) 0 0	16, 44, 59, 69	1 (12%)
3	F	8/9 (88%)	2.56	4 (50%) 0 0	25, 41, 57, 60	0
All	All	766/802 (95%)	1.26	147 (19%) 3 2	10, 30, 58, 82	37 (4%)

All (147) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	1	ILE	7.3
3	C	7	TRP	6.0
1	D	258[A]	THR	5.9
3	F	7	TRP	5.6
2	E	47	GLU	5.4
1	D	230	LEU	5.3
1	A	40	ALA	5.3
2	B	48	LYS	5.2
1	D	272	LEU	5.2
1	A	230[A]	LEU	5.1
1	D	40	ALA	4.7
1	D	113	TYR	4.7
1	A	194	ILE	4.6
1	A	225	THR	4.4
2	B	58[A]	LYS	4.3
1	A	270	LEU	4.2
1	A	103	VAL	4.2
3	C	3[A]	LYS	4.2
3	C	4	TRP	4.1

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Mol	Chain	Res	Type	RSRZ
1	A	128	GLU	4.0
1	D	41	ALA	4.0
3	F	4	TRP	3.9
2	E	27	VAL	3.9
2	B	1	ILE	3.9
3	C	9	LEU	3.8
2	E	48	LYS	3.8
1	D	244	TRP	3.8
1	D	276	PRO	3.7
1	D	225	THR	3.7
3	F	5	ARG	3.7
1	D	223	ASP	3.7
1	D	1	GLY	3.7
1	A	272	LEU	3.6
2	B	49	VAL	3.6
1	D	103	VAL	3.6
3	F	9	LEU	3.6
1	D	175	GLY	3.6
1	A	214[A]	THR	3.4
2	B	39	LEU	3.4
1	D	264[A]	GLU	3.3
2	E	9[A]	VAL	3.3
1	D	268	LYS	3.3
1	D	172	LEU	3.3
1	D	194	ILE	3.2
2	E	75	LYS	3.2
1	A	224	GLN	3.2
1	A	269	PRO	3.2
1	A	261	VAL	3.1
1	D	261	VAL	3.1
2	B	69[A]	GLU	3.1
3	C	5	ARG	3.1
2	B	74	GLU	3.1
1	A	109	LEU	3.0
1	A	113	TYR	3.0
1	D	204[A]	TRP	3.0
1	D	274	TRP	3.0
1	A	104	GLY	3.0
2	B	87	LEU	3.0
2	E	71	THR	3.0
1	A	43	PRO	3.0
2	B	79	ALA	2.9

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Mol	Chain	Res	Type	RSRZ
1	D	275	GLU	2.9
1	D	217	TRP	2.9
1	A	268	LYS	2.9
1	A	183	ASP	2.9
1	D	180	GLN	2.8
1	D	270	LEU	2.8
1	A	165	VAL	2.8
1	A	276	PRO	2.8
1	D	165	VAL	2.8
1	D	169	ARG	2.8
2	B	75	LYS	2.8
1	D	215	LEU	2.8
1	D	210[A]	PRO	2.8
1	D	211	ALA	2.7
1	D	177	GLU	2.7
1	D	247[A]	VAL	2.7
1	D	176	LYS	2.7
1	D	209	TYR	2.7
1	A	16	GLY	2.6
1	D	179	LEU	2.6
1	A	75	ARG	2.6
1	A	241	PHE	2.6
1	D	110	LEU	2.6
1	D	273	ARG	2.6
1	A	211	ALA	2.6
1	A	1	GLY	2.5
1	D	2	SER	2.5
1	A	107	GLY	2.5
1	D	241	PHE	2.5
1	D	226	GLN	2.5
1	A	215	LEU	2.4
1	D	201	LEU	2.4
1	D	246	ALA	2.4
1	D	248	VAL	2.4
3	C	6	ARG	2.4
1	A	252	GLY	2.4
1	D	257	TYR	2.3
1	A	216	THR	2.3
1	A	41	ALA	2.3
1	A	60	TRP	2.3
1	A	110	LEU	2.3
1	A	2	SER	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	271	THR	2.3
1	A	108	ARG	2.3
1	D	107	GLY	2.3
1	D	213	ILE	2.3
1	A	122	ASP	2.2
2	E	46	ILE	2.2
1	D	218	GLN	2.2
1	D	231	VAL	2.2
1	D	249	VAL	2.2
1	A	181	ARG	2.2
2	E	69[A]	GLU	2.2
2	B	27	VAL	2.2
1	D	233	THR	2.2
1	A	156	LEU	2.2
1	D	72	GLN	2.2
1	D	104	GLY	2.2
1	D	227	ASP	2.2
1	A	273[A]	ARG	2.2
1	D	47	PRO	2.2
2	E	22	PHE	2.1
1	D	27	TYR	2.1
1	D	181	ARG	2.1
1	D	267	PRO	2.1
1	D	12	VAL	2.1
1	D	186	LYS	2.1
1	D	108	ARG	2.1
1	A	222	GLU	2.1
1	A	275	GLU	2.1
1	D	190	THR	2.1
2	B	68	THR	2.1
1	A	111	ARG	2.1
1	D	208	PHE	2.0
1	D	42	SER	2.0
1	D	200	THR	2.0
1	D	237	GLY	2.0
1	A	86[A]	ASN	2.0
1	A	199	ALA	2.0
1	A	219[A]	ARG	2.0
2	E	15	ALA	2.0
2	E	58	LYS	2.0
1	D	132	SER	2.0
1	D	197	HIS	2.0

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Mol	Chain	Res	Type	RSRZ
2	B	32	PRO	2.0
2	E	90	PRO	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
3	PRQ	F	8	14/15	0.74	0.22	36,54,61,63	0
3	PRQ	C	8	14/15	0.77	0.21	37,51,69,78	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(Å ²)	Q<0.9
4	GOL	B	102	6/6	0.61	0.21	61,64,66,67	0
4	GOL	E	103	6/6	0.67	0.18	31,50,56,60	0
7	PGE	B	105	10/10	0.72	0.19	49,57,61,63	0
5	TRS	B	103	8/8	0.73	0.22	52,60,72,76	0
4	GOL	D	301	6/6	0.77	0.18	62,64,65,66	0
8	PEG	D	306	7/7	0.77	0.18	30,43,50,53	0
4	GOL	A	303	6/6	0.78	0.16	56,60,61,62	0
4	GOL	D	304	6/6	0.78	0.20	36,42,44,44	0
4	GOL	A	301	6/6	0.78	0.17	29,41,48,51	0
4	GOL	D	303	6/6	0.81	0.15	31,47,56,58	0
4	GOL	E	102	6/6	0.81	0.16	43,52,52,54	0
6	1PE	B	104	16/16	0.83	0.17	19,42,53,56	0
4	GOL	B	101	6/6	0.83	0.16	34,43,46,46	0
5	TRS	D	305	8/8	0.83	0.18	56,61,64,66	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	GOL	D	302	6/6	0.84	0.16	42,44,47,54	0
4	GOL	A	302	6/6	0.86	0.12	31,35,45,49	0
4	GOL	E	101	6/6	0.88	0.13	46,49,53,55	0

6.5 Other polymers [i](#)

There are no such residues in this entry.