



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 20, 2026 – 10:11 AM EDT

PDB ID : 35SZ / pdb_000035sz
Title : Structure of the Ntn hydrolase NcdG from nocardichelin biosynthesis
Authors : Fisk, M.B.; Gulick, A.M.
Deposited on : 2026-05-15
Resolution : 2.25 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	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

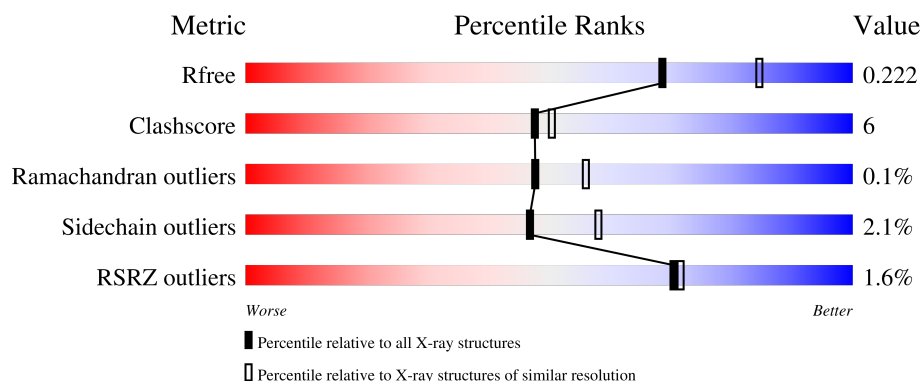
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.25 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	1898 (2.26-2.26)
Clashscore	190562	2005 (2.26-2.26)
Ramachandran outliers	187476	1965 (2.26-2.26)
Sidechain outliers	187428	1966 (2.26-2.26)
RSRZ outliers	180081	1898 (2.26-2.26)

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	195	80% 15% 5%
1	B	195	85% 11% 4%
2	C	576	83% 12% 5%
2	D	576	82% 13% 5%

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
3	PEG	C	807	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 12131 atoms, of which 176 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 Penicillin acylase family protein, alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	187	Total	C	N	O	S	0	0	0
			1462	927	265	266	4			
1	B	188	Total	C	N	O	S	0	0	0
			1469	932	266	267	4			

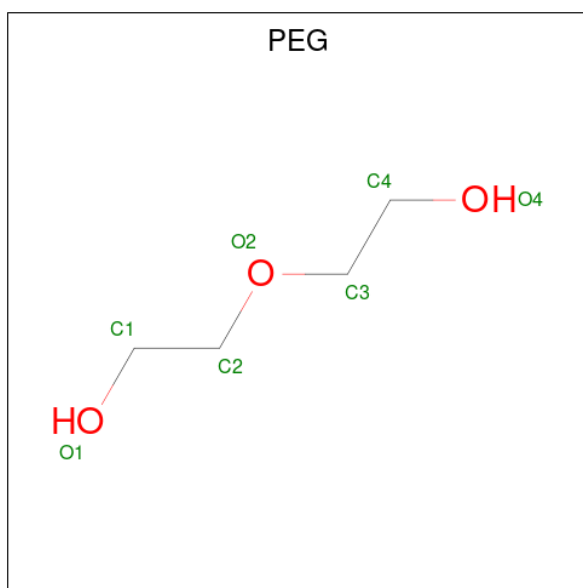
- Molecule 2 is a protein called Penicillin acylase family protein, beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	552	Total	C	N	O	S	0	0	0
			4135	2612	742	771	10			
2	D	552	Total	C	N	O	S	0	0	0
			4133	2611	740	772	10			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	783	LEU	-	expression tag	UNP A0ABW7TKF7
C	784	GLU	-	expression tag	UNP A0ABW7TKF7
C	785	HIS	-	expression tag	UNP A0ABW7TKF7
C	786	HIS	-	expression tag	UNP A0ABW7TKF7
C	787	HIS	-	expression tag	UNP A0ABW7TKF7
C	788	HIS	-	expression tag	UNP A0ABW7TKF7
C	789	HIS	-	expression tag	UNP A0ABW7TKF7
C	790	HIS	-	expression tag	UNP A0ABW7TKF7
D	783	LEU	-	expression tag	UNP A0ABW7TKF7
D	784	GLU	-	expression tag	UNP A0ABW7TKF7
D	785	HIS	-	expression tag	UNP A0ABW7TKF7
D	786	HIS	-	expression tag	UNP A0ABW7TKF7
D	787	HIS	-	expression tag	UNP A0ABW7TKF7
D	788	HIS	-	expression tag	UNP A0ABW7TKF7
D	789	HIS	-	expression tag	UNP A0ABW7TKF7
D	790	HIS	-	expression tag	UNP A0ABW7TKF7

- Molecule 3 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	H	O	0	0
			17	4	10	3		
3	C	1	Total	C	H	O	0	0
			17	4	10	3		
3	C	1	Total	C	H	O	0	0
			17	4	10	3		
3	C	1	Total	C	H	O	0	0
			17	4	10	3		
3	C	1	Total	C	H	O	0	0
			17	4	10	3		
3	D	1	Total	C	H	O	0	0
			17	4	10	3		
3	D	1	Total	C	H	O	0	0
			17	4	10	3		
3	D	1	Total	C	H	O	0	0
			17	4	10	3		

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	H	O	0	0
			14	3	8	3		
4	A	1	Total	C	H	O	0	0
			14	3	8	3		
4	C	1	Total	C	H	O	0	0
			14	3	8	3		
4	C	1	Total	C	H	O	0	0
			14	3	8	3		
4	C	1	Total	C	H	O	0	0
			14	3	8	3		
4	C	1	Total	C	H	O	0	0
			14	3	8	3		
4	B	1	Total	C	H	O	0	0
			14	3	8	3		
4	B	1	Total	C	H	O	0	0
			14	3	8	3		
4	D	1	Total	C	H	O	0	0
			14	3	8	3		
4	D	1	Total	C	H	O	0	0
			14	3	8	3		
4	D	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 5 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	D	2	Total 2	Mg 2	0	0

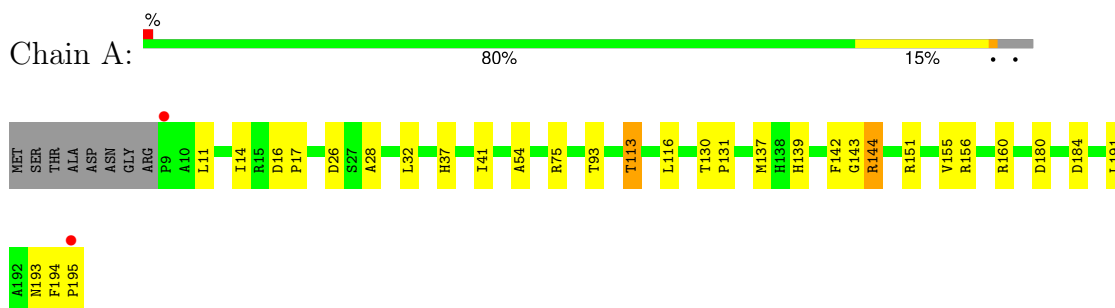
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	88	Total 88	O 88	0	0
6	C	245	Total 245	O 245	0	0
6	B	70	Total 70	O 70	0	0
6	D	223	Total 223	O 223	0	0

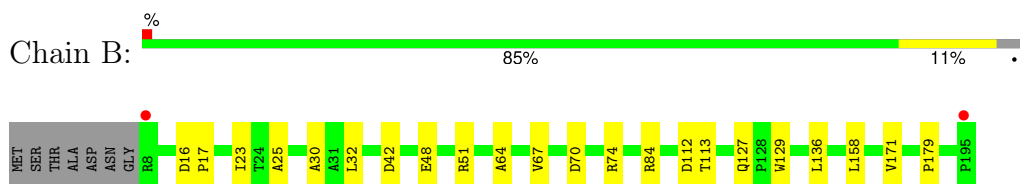
3 Residue-property plots [i](#)

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.

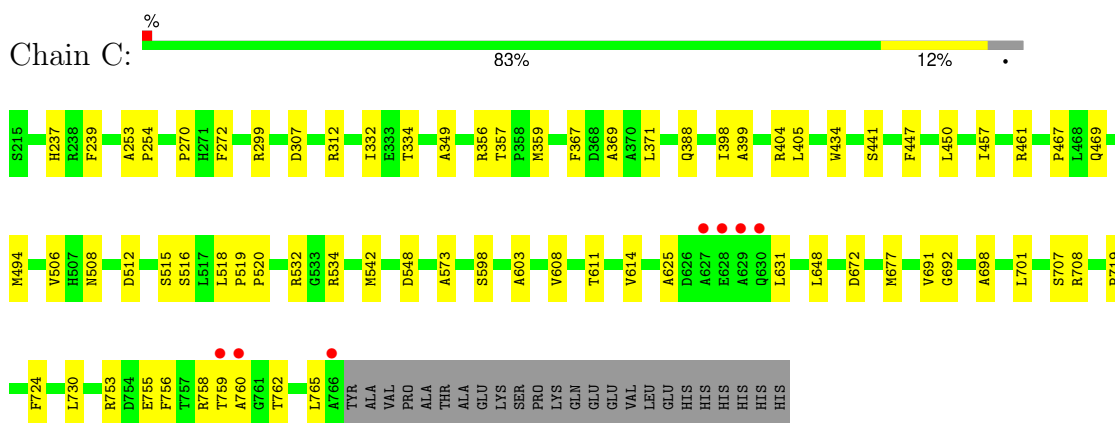
- Molecule 1: Penicillin acylase family protein, alpha chain



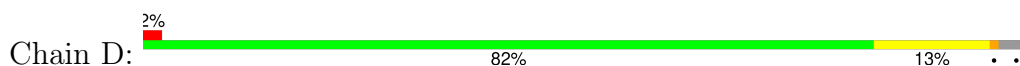
- Molecule 1: Penicillin acylase family protein, alpha chain

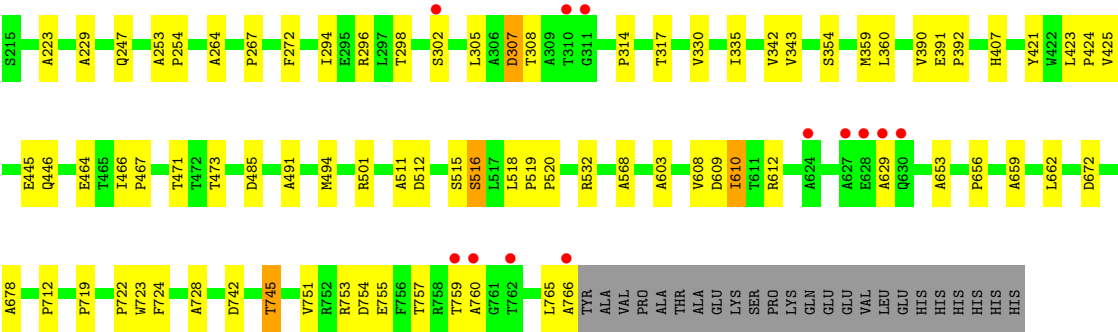


- Molecule 2: Penicillin acylase family protein, beta chain



- Molecule 2: Penicillin acylase family protein, beta chain





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	173.39Å 120.19Å 112.20Å 90.00° 120.20° 90.00°	Depositor
Resolution (Å)	42.96 – 2.25 42.96 – 2.25	Depositor EDS
% Data completeness (in resolution range)	100.0 (42.96-2.25) 100.0 (42.96-2.25)	Depositor EDS
R_{merge}	0.33	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.51 (at 2.24Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.180 , 0.222 0.181 , 0.222	Depositor DCC
R_{free} test set	4681 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å ²)	22.5	Xtriage
Anisotropy	0.210	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 39.4	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	0.95	EDS
Total number of atoms	12131	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.32% 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: MG, PEG, GOL

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	0/1501	0.48	0/2047
1	B	0.33	0/1509	0.48	0/2059
2	C	0.35	0/4246	0.51	0/5824
2	D	0.34	0/4244	0.50	0/5822
All	All	0.34	0/11500	0.50	0/15752

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	1462	0	1412	21	0
1	B	1469	0	1419	15	0
2	C	4135	0	3996	52	0
2	D	4133	0	3991	48	0
3	A	7	10	10	0	0
3	C	28	40	40	10	0
3	D	21	30	30	1	0
4	A	12	16	16	1	0
4	B	12	16	16	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	C	24	32	32	1	0
4	D	24	32	32	5	0
5	D	2	0	0	0	0
6	A	88	0	0	2	0
6	B	70	0	0	2	0
6	C	245	0	0	3	0
6	D	223	0	0	4	0
All	All	11955	176	10994	126	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 (126) 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:C:332:ILE:HG22	2:D:445:GLU:HG2	1.59	0.84
2:C:753:ARG:NH2	2:C:755:GLU:OE2	2.11	0.83
2:C:367:PHE:HA	3:C:807:PEG:H12	1.59	0.82
2:C:299:ARG:HG2	6:C:917:HOH:O	1.83	0.78
2:D:753:ARG:NH1	2:D:755:GLU:OE2	2.20	0.74
2:C:648:LEU:HD21	3:C:806:PEG:H12	1.71	0.72
2:C:369:ALA:N	3:C:807:PEG:H11	2.09	0.67
2:C:359:MET:HE1	3:C:807:PEG:H31	1.76	0.66
2:D:296:ARG:HB2	2:D:307:ASP:HB2	1.78	0.65
1:B:70:ASP:O	1:B:74:ARG:HG2	1.96	0.65
2:C:367:PHE:CA	3:C:807:PEG:H12	2.27	0.65
1:B:42:ASP:OD1	4:B:201:GOL:H31	1.99	0.63
1:A:14:ILE:HG12	2:C:753:ARG:HG3	1.81	0.62
2:C:603:ALA:HB1	2:C:608:VAL:HB	1.81	0.62
2:D:653:ALA:O	2:D:656:PRO:HD3	2.00	0.61
1:B:84:ARG:NH2	6:B:301:HOH:O	2.29	0.61
2:D:229:ALA:HB2	4:D:806:GOL:H11	1.83	0.61
1:A:143:GLY:O	1:A:144:ARG:HB2	2.00	0.61
2:D:423:LEU:HB3	2:D:424:PRO:HD2	1.83	0.61
2:C:512:ASP:O	2:C:516:SER:OG	2.19	0.60
2:C:369:ALA:HB3	3:C:807:PEG:C2	2.32	0.60
2:D:253:ALA:HB1	2:D:254:PRO:HD2	1.83	0.60
2:D:464:GLU:OE1	2:D:464:GLU:N	2.24	0.59
2:C:239:PHE:CD1	2:C:691:VAL:HG22	2.38	0.58
2:D:512:ASP:O	2:D:516:SER:HB3	2.03	0.58
2:C:461:ARG:HA	2:C:469:GLN:OE1	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:759:THR:OG1	2:D:760:ALA:N	2.36	0.56
1:A:93:THR:HG23	2:C:371:LEU:HD13	1.86	0.56
1:A:194:PHE:HB3	1:A:195:PRO:HD2	1.88	0.56
2:D:223:ALA:HB2	3:D:802:PEG:H42	1.88	0.55
2:C:759:THR:O	2:C:759:THR:HG23	2.06	0.55
1:B:127:GLN:OE1	1:B:127:GLN:HA	2.07	0.55
1:A:28:ALA:O	1:A:32:LEU:HD23	2.07	0.55
2:C:441:SER:HB3	2:C:467:PRO:O	2.08	0.54
2:C:534:ARG:NE	2:C:548:ASP:OD1	2.37	0.54
2:C:457:ILE:O	2:C:457:ILE:HG13	2.08	0.53
1:B:84:ARG:NE	6:B:301:HOH:O	2.33	0.53
2:C:707:SER:C	2:C:708:ARG:HG2	2.33	0.53
2:C:447:PHE:CD1	2:C:467:PRO:HG2	2.43	0.53
2:D:501:ARG:NH1	6:D:907:HOH:O	2.37	0.53
2:D:229:ALA:HB2	4:D:806:GOL:C1	2.40	0.52
2:D:294:ILE:HD12	2:D:425:VAL:C	2.35	0.52
1:B:179:PRO:HG2	2:D:473:THR:HG22	1.92	0.52
2:D:511:ALA:O	2:D:515:SER:HB3	2.09	0.52
2:D:423:LEU:HB3	2:D:424:PRO:CD	2.40	0.51
1:A:156:ARG:HD2	6:A:372:HOH:O	2.10	0.51
2:D:742:ASP:HB3	2:D:745:THR:HG23	1.93	0.51
1:B:64:ALA:HA	1:B:67:VAL:HG23	1.93	0.51
1:A:191:LEU:C	1:A:193:ASN:H	2.19	0.50
2:D:519:PRO:N	2:D:520:PRO:HD2	2.26	0.50
2:D:568:ALA:HB3	2:D:608:VAL:HG23	1.94	0.50
1:A:54:ALA:HB2	1:A:137:MET:HB2	1.93	0.50
1:B:84:ARG:NH2	2:D:360:LEU:O	2.43	0.50
2:C:388:GLN:NE2	2:C:388:GLN:HA	2.27	0.49
2:C:756:PHE:CZ	2:C:765:LEU:HD13	2.46	0.49
2:D:359:MET:HE1	4:D:807:GOL:H2	1.93	0.49
2:D:421:TYR:CE2	2:D:471:THR:HG22	2.48	0.49
2:C:719:PRO:HA	2:C:724:PHE:CG	2.48	0.49
1:B:127:GLN:HG3	1:B:129:TRP:CZ2	2.47	0.49
2:C:508:ASN:HB2	2:C:542:MET:HG2	1.94	0.49
2:D:305:LEU:HD23	2:D:314:PRO:HA	1.95	0.49
2:C:518:LEU:HB3	2:C:532:ARG:HG3	1.95	0.49
1:A:160:ARG:HD2	1:A:184:ASP:OD1	2.13	0.48
2:D:466:ILE:N	2:D:467:PRO:HD2	2.28	0.48
2:D:317:THR:HG22	2:D:335:ILE:HG12	1.96	0.48
1:A:75:ARG:HH22	2:D:445:GLU:CD	2.22	0.47
2:C:598:SER:HB3	3:C:803:PEG:H42	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:349:ALA:O	4:C:802:GOL:O1	2.32	0.47
2:C:573:ALA:HA	3:C:804:PEG:H41	1.97	0.47
4:D:806:GOL:H32	6:D:1104:HOH:O	2.15	0.47
2:D:446:GLN:NE2	6:D:915:HOH:O	2.47	0.46
1:B:32:LEU:HD12	2:D:267:PRO:HB2	1.97	0.46
2:D:754:ASP:HB3	2:D:765:LEU:HD21	1.98	0.46
1:B:136:LEU:HD21	2:D:359:MET:HG3	1.97	0.46
2:C:399:ALA:HA	2:C:404:ARG:O	2.15	0.46
2:D:757:THR:HG23	2:D:766:ALA:HB2	1.96	0.46
2:C:494:MET:HE3	2:C:494:MET:HB3	1.67	0.46
2:C:760:ALA:O	2:C:762:THR:HG23	2.15	0.46
1:A:37:HIS:O	1:A:41:ILE:HG12	2.16	0.45
1:B:48:GLU:O	1:B:51:ARG:HG3	2.16	0.45
2:C:332:ILE:HG22	2:D:445:GLU:CG	2.40	0.45
2:C:625:ALA:HB1	2:C:631:LEU:HD21	1.99	0.45
1:A:144:ARG:NH1	6:A:301:HOH:O	2.41	0.45
2:D:390:VAL:HG23	4:D:807:GOL:O2	2.17	0.45
1:A:75:ARG:HD3	6:C:987:HOH:O	2.15	0.45
1:A:113:THR:HG23	1:A:116:LEU:HD12	1.99	0.45
2:D:659:ALA:HA	2:D:662:LEU:HD12	1.98	0.45
1:A:180:ASP:OD1	4:A:202:GOL:H12	2.17	0.44
2:D:247:GLN:OE1	2:D:264:ALA:HA	2.16	0.44
2:D:610:ILE:HD13	2:D:610:ILE:HA	1.78	0.44
2:D:672:ASP:O	2:D:678:ALA:HA	2.17	0.44
2:C:253:ALA:HB1	2:C:254:PRO:HD2	1.98	0.44
2:D:391:GLU:HA	2:D:392:PRO:C	2.43	0.44
2:C:356:ARG:HG2	2:C:434:TRP:CH2	2.52	0.43
2:D:603:ALA:HB3	2:D:610:ILE:HG12	2.00	0.43
2:C:519:PRO:N	2:C:520:PRO:HD2	2.33	0.43
2:D:501:ARG:NH2	6:D:907:HOH:O	2.50	0.43
2:C:611:THR:O	2:C:614:VAL:HG12	2.18	0.43
2:C:398:ILE:O	2:C:405:LEU:HA	2.19	0.43
2:D:719:PRO:HA	2:D:724:PHE:CG	2.54	0.43
1:A:139:HIS:HA	1:A:142:PHE:HB3	2.01	0.43
2:C:519:PRO:N	2:C:520:PRO:CD	2.82	0.43
2:D:342:VAL:HA	2:D:354:SER:HA	2.00	0.43
1:A:26:ASP:OD2	2:C:758:ARG:NH2	2.51	0.42
2:D:609:ASP:OD2	2:D:612:ARG:HB2	2.20	0.42
2:D:712:PRO:O	2:D:728:ALA:HA	2.19	0.42
2:C:506:VAL:CG1	2:C:677:MET:HE2	2.49	0.42
2:C:270:PRO:HD2	6:C:1044:HOH:O	2.18	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:151:ARG:O	1:A:155:VAL:HG23	2.20	0.42
2:C:698:ALA:O	2:C:707:SER:HB3	2.20	0.41
2:C:730:LEU:HD12	2:C:730:LEU:N	2.35	0.41
1:A:75:ARG:HG2	2:C:334:THR:HG22	2.00	0.41
2:D:722:PRO:HG2	2:D:723:TRP:CZ3	2.55	0.41
2:C:307:ASP:OD1	2:C:312:ARG:HG2	2.20	0.41
2:C:450:LEU:HD12	2:C:450:LEU:HA	1.83	0.41
1:B:16:ASP:HB2	1:B:17:PRO:CD	2.51	0.41
1:B:25:ALA:HB1	1:B:30:ALA:HB3	2.03	0.41
1:B:112:ASP:H	4:B:202:GOL:H31	1.86	0.41
2:C:369:ALA:HB3	3:C:807:PEG:H21	2.03	0.41
2:C:369:ALA:H	3:C:807:PEG:H11	1.85	0.41
1:A:16:ASP:HB2	1:A:17:PRO:CD	2.51	0.41
2:D:518:LEU:HB3	2:D:532:ARG:CG	2.51	0.41
1:A:130:THR:N	1:A:131:PRO:CD	2.84	0.40
2:C:237:HIS:HA	2:C:692:GLY:O	2.21	0.40
2:C:542:MET:HG3	2:C:672:ASP:HB2	2.03	0.40
2:D:491:ALA:O	2:D:494:MET:HG2	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	185/195 (95%)	181 (98%)	3 (2%)	1 (0%)	24	24
1	B	186/195 (95%)	184 (99%)	2 (1%)	0	100	100
2	C	550/576 (96%)	532 (97%)	18 (3%)	0	100	100
2	D	550/576 (96%)	524 (95%)	25 (4%)	1 (0%)	43	50
All	All	1471/1542 (95%)	1421 (97%)	48 (3%)	2 (0%)	48	56

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	629	ALA
1	A	144	ARG

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	144/151 (95%)	142 (99%)	2 (1%)	59	70
1	B	145/151 (96%)	141 (97%)	4 (3%)	38	48
2	C	408/435 (94%)	404 (99%)	4 (1%)	68	77
2	D	408/435 (94%)	395 (97%)	13 (3%)	34	43
All	All	1105/1172 (94%)	1082 (98%)	23 (2%)	47	58

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	LEU
1	A	113	THR
2	C	272	PHE
2	C	357	THR
2	C	515	SER
2	C	701	LEU
1	B	23	ILE
1	B	113	THR
1	B	158	LEU
1	B	171	VAL
2	D	272	PHE
2	D	298	THR
2	D	302	SER
2	D	307	ASP
2	D	308	THR
2	D	330	VAL
2	D	343	VAL
2	D	407	HIS
2	D	485	ASP
2	D	516	SER

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Mol	Chain	Res	Type
2	D	610	ILE
2	D	745	THR
2	D	751	VAL

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

Mol	Chain	Res	Type
2	C	248	GLN
2	C	388	GLN
2	C	507	HIS
2	C	727	GLN
2	D	446	GLN
2	D	733	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 22 ligands modelled in this entry, 2 are monoatomic - leaving 20 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	GOL	C	808	-	5,5,5	0.12	0	5,5,5	0.36	0
3	PEG	D	803	-	6,6,6	0.52	0	5,5,5	0.24	0
3	PEG	C	804	-	6,6,6	0.55	0	5,5,5	0.84	0
4	GOL	B	201	-	5,5,5	0.10	0	5,5,5	0.36	0
4	GOL	D	806	-	5,5,5	0.15	0	5,5,5	0.33	0
4	GOL	A	203	-	5,5,5	0.14	0	5,5,5	0.57	0
4	GOL	B	202	-	5,5,5	0.11	0	5,5,5	0.27	0
3	PEG	C	806	-	6,6,6	0.50	0	5,5,5	0.21	0
3	PEG	D	805	-	6,6,6	0.56	0	5,5,5	0.42	0
3	PEG	C	807	-	6,6,6	0.58	0	5,5,5	0.60	0
3	PEG	A	201	-	6,6,6	0.54	0	5,5,5	0.21	0
3	PEG	C	803	-	6,6,6	0.57	0	5,5,5	0.47	0
4	GOL	D	807	-	5,5,5	0.13	0	5,5,5	0.50	0
4	GOL	C	801	-	5,5,5	0.12	0	5,5,5	0.34	0
3	PEG	D	802	-	6,6,6	0.51	0	5,5,5	0.16	0
4	GOL	C	805	-	5,5,5	0.10	0	5,5,5	0.22	0
4	GOL	D	801	-	5,5,5	0.10	0	5,5,5	0.26	0
4	GOL	C	802	-	5,5,5	0.10	0	5,5,5	0.26	0
4	GOL	D	804	-	5,5,5	0.10	0	5,5,5	0.24	0
4	GOL	A	202	-	5,5,5	0.07	0	5,5,5	0.48	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	C	808	-	-	0/4/4/4	-
3	PEG	D	803	-	-	3/4/4/4	-
3	PEG	C	804	-	-	1/4/4/4	-
4	GOL	B	201	-	-	0/4/4/4	-
4	GOL	D	806	-	-	2/4/4/4	-
4	GOL	A	203	-	-	0/4/4/4	-
4	GOL	B	202	-	-	2/4/4/4	-
3	PEG	C	806	-	-	1/4/4/4	-
3	PEG	D	805	-	-	2/4/4/4	-
3	PEG	C	807	-	-	2/4/4/4	-
3	PEG	A	201	-	-	3/4/4/4	-
3	PEG	C	803	-	-	2/4/4/4	-
4	GOL	D	807	-	-	2/4/4/4	-
4	GOL	C	801	-	-	0/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PEG	D	802	-	-	2/4/4/4	-
4	GOL	C	805	-	-	0/4/4/4	-
4	GOL	D	801	-	-	0/4/4/4	-
4	GOL	C	802	-	-	2/4/4/4	-
4	GOL	D	804	-	-	0/4/4/4	-
4	GOL	A	202	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	202	GOL	C1-C2-C3-O3
4	A	202	GOL	O2-C2-C3-O3
4	B	202	GOL	C1-C2-C3-O3
4	D	807	GOL	C1-C2-C3-O3
4	D	806	GOL	O1-C1-C2-O2
3	D	805	PEG	O1-C1-C2-O2
3	C	804	PEG	O1-C1-C2-O2
3	C	807	PEG	O1-C1-C2-O2
3	D	802	PEG	O2-C3-C4-O4
3	D	803	PEG	O2-C3-C4-O4
4	C	802	GOL	O1-C1-C2-C3
4	D	806	GOL	O1-C1-C2-C3
3	C	806	PEG	O1-C1-C2-O2
4	D	807	GOL	O2-C2-C3-O3
3	D	803	PEG	O1-C1-C2-O2
3	A	201	PEG	O2-C3-C4-O4
3	C	803	PEG	C1-C2-O2-C3
3	C	807	PEG	C4-C3-O2-C2
3	A	201	PEG	C4-C3-O2-C2
3	D	802	PEG	C4-C3-O2-C2
3	D	803	PEG	C4-C3-O2-C2
3	D	805	PEG	O2-C3-C4-O4
4	B	202	GOL	O2-C2-C3-O3
4	C	802	GOL	O1-C1-C2-O2
3	A	201	PEG	O1-C1-C2-O2
3	C	803	PEG	O1-C1-C2-O2

There are no ring outliers.

11 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	804	PEG	1	0
4	B	201	GOL	1	0
4	D	806	GOL	3	0
4	B	202	GOL	1	0
3	C	806	PEG	1	0
3	C	807	PEG	7	0
3	C	803	PEG	1	0
4	D	807	GOL	2	0
3	D	802	PEG	1	0
4	C	802	GOL	1	0
4	A	202	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	187/195 (95%)	-0.51	2 (1%) 78 79	14, 23, 38, 52	0
1	B	188/195 (96%)	-0.39	2 (1%) 78 79	17, 25, 44, 57	0
2	C	552/576 (95%)	-0.48	7 (1%) 75 76	14, 22, 40, 66	0
2	D	552/576 (95%)	-0.32	12 (2%) 62 63	13, 25, 46, 71	0
All	All	1479/1542 (95%)	-0.41	23 (1%) 70 71	13, 23, 44, 71	0

All (23) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	760	ALA	5.4
2	D	629	ALA	4.0
1	B	8	ARG	3.4
2	D	302	SER	3.4
1	A	195	PRO	3.3
1	B	195	PRO	3.3
2	C	629	ALA	2.9
2	D	627	ALA	2.8
1	A	9	PRO	2.7
2	D	759	THR	2.5
2	D	311	GLY	2.5
2	C	760	ALA	2.4
2	C	628	GLU	2.4
2	D	310	THR	2.4
2	C	759	THR	2.3
2	C	627	ALA	2.3
2	C	766	ALA	2.3
2	D	628	GLU	2.1
2	D	630	GLN	2.1
2	D	624	ALA	2.0
2	D	766	ALA	2.0

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Mol	Chain	Res	Type	RSRZ
2	C	630	GLN	2.0
2	D	762	THR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

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	A	202	6/6	0.67	0.17	41,55,59,66	0
3	PEG	C	804	7/7	0.75	0.20	40,49,53,55	0
4	GOL	D	804	6/6	0.76	0.16	39,47,56,66	0
3	PEG	C	803	7/7	0.77	0.20	34,47,56,56	0
4	GOL	D	806	6/6	0.82	0.19	35,42,49,50	0
3	PEG	D	803	7/7	0.84	0.14	39,47,63,63	0
4	GOL	B	202	6/6	0.84	0.19	37,47,58,61	0
4	GOL	A	203	6/6	0.85	0.14	46,55,62,62	0
3	PEG	C	807	7/7	0.85	0.16	19,26,32,36	0
5	MG	D	808	1/1	0.85	0.20	47,47,47,47	0
4	GOL	B	201	6/6	0.86	0.16	35,45,54,65	0
3	PEG	A	201	7/7	0.87	0.17	19,37,49,49	0
3	PEG	C	806	7/7	0.87	0.14	36,46,58,58	0
4	GOL	C	805	6/6	0.87	0.13	39,49,55,65	0
3	PEG	D	805	7/7	0.87	0.17	37,48,59,64	0
3	PEG	D	802	7/7	0.88	0.20	22,40,46,51	0
4	GOL	C	801	6/6	0.89	0.10	31,41,51,57	0
4	GOL	C	802	6/6	0.89	0.11	28,39,53,53	0
4	GOL	D	801	6/6	0.90	0.16	29,45,54,62	0
4	GOL	D	807	6/6	0.90	0.15	19,26,29,34	0
4	GOL	C	808	6/6	0.90	0.15	28,40,48,52	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	MG	D	809	1/1	0.95	0.05	33,33,33,33	0

6.5 Other polymers [i](#)

There are no such residues in this entry.