



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 14, 2026 – 01:15 AM UTC

PDB ID : 3CMB / pdb_00003cmb
Title : Crystal structure of acetoacetate decarboxylase (YP_001047042.1) from Methanoculleus marisnigri JR1 at 1.60 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2008-03-21
Resolution : 1.60 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
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
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

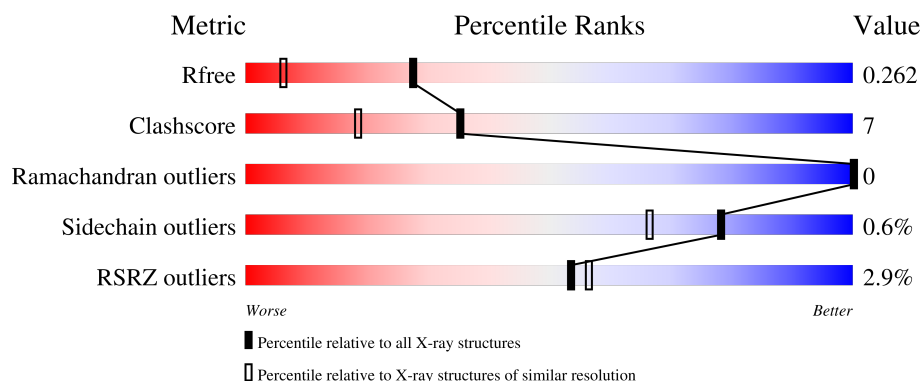
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.60 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	4673 (1.60-1.60)
Clashscore	190562	4931 (1.60-1.60)
Ramachandran outliers	187476	4831 (1.60-1.60)
Sidechain outliers	187428	4830 (1.60-1.60)
RSRZ outliers	180081	4672 (1.60-1.60)

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	283	 4% 84% 9% 6%
1	B	283	 2% 85% 8% 6%
1	C	283	 2% 85% 9% 6%
1	D	283	 3% 79% 15% 6%

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	P33	B	270	-	-	X	-
5	PEG	A	273	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 10029 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 Acetoacetate decarboxylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	265	Total	C	N	O	Se	0	8	0
			2114	1362	347	396	9			
1	B	266	Total	C	N	O	Se	0	9	0
			2142	1378	358	399	7			
1	C	266	Total	C	N	O	Se	0	4	0
			2121	1362	348	404	7			
1	D	265	Total	C	N	O	Se	0	6	0
			2119	1360	345	407	7			

There are 76 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	MSE	-	expression tag	UNP A3CUL0
A	-17	GLY	-	expression tag	UNP A3CUL0
A	-16	SER	-	expression tag	UNP A3CUL0
A	-15	ASP	-	expression tag	UNP A3CUL0
A	-14	LYS	-	expression tag	UNP A3CUL0
A	-13	ILE	-	expression tag	UNP A3CUL0
A	-12	HIS	-	expression tag	UNP A3CUL0
A	-11	HIS	-	expression tag	UNP A3CUL0
A	-10	HIS	-	expression tag	UNP A3CUL0
A	-9	HIS	-	expression tag	UNP A3CUL0
A	-8	HIS	-	expression tag	UNP A3CUL0
A	-7	HIS	-	expression tag	UNP A3CUL0
A	-6	GLU	-	expression tag	UNP A3CUL0
A	-5	ASN	-	expression tag	UNP A3CUL0
A	-4	LEU	-	expression tag	UNP A3CUL0
A	-3	TYR	-	expression tag	UNP A3CUL0
A	-2	PHE	-	expression tag	UNP A3CUL0
A	-1	GLN	-	expression tag	UNP A3CUL0
A	0	GLY	-	expression tag	UNP A3CUL0
B	-18	MSE	-	expression tag	UNP A3CUL0
B	-17	GLY	-	expression tag	UNP A3CUL0

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	SER	-	expression tag	UNP A3CUL0
B	-15	ASP	-	expression tag	UNP A3CUL0
B	-14	LYS	-	expression tag	UNP A3CUL0
B	-13	ILE	-	expression tag	UNP A3CUL0
B	-12	HIS	-	expression tag	UNP A3CUL0
B	-11	HIS	-	expression tag	UNP A3CUL0
B	-10	HIS	-	expression tag	UNP A3CUL0
B	-9	HIS	-	expression tag	UNP A3CUL0
B	-8	HIS	-	expression tag	UNP A3CUL0
B	-7	HIS	-	expression tag	UNP A3CUL0
B	-6	GLU	-	expression tag	UNP A3CUL0
B	-5	ASN	-	expression tag	UNP A3CUL0
B	-4	LEU	-	expression tag	UNP A3CUL0
B	-3	TYR	-	expression tag	UNP A3CUL0
B	-2	PHE	-	expression tag	UNP A3CUL0
B	-1	GLN	-	expression tag	UNP A3CUL0
B	0	GLY	-	expression tag	UNP A3CUL0
C	-18	MSE	-	expression tag	UNP A3CUL0
C	-17	GLY	-	expression tag	UNP A3CUL0
C	-16	SER	-	expression tag	UNP A3CUL0
C	-15	ASP	-	expression tag	UNP A3CUL0
C	-14	LYS	-	expression tag	UNP A3CUL0
C	-13	ILE	-	expression tag	UNP A3CUL0
C	-12	HIS	-	expression tag	UNP A3CUL0
C	-11	HIS	-	expression tag	UNP A3CUL0
C	-10	HIS	-	expression tag	UNP A3CUL0
C	-9	HIS	-	expression tag	UNP A3CUL0
C	-8	HIS	-	expression tag	UNP A3CUL0
C	-7	HIS	-	expression tag	UNP A3CUL0
C	-6	GLU	-	expression tag	UNP A3CUL0
C	-5	ASN	-	expression tag	UNP A3CUL0
C	-4	LEU	-	expression tag	UNP A3CUL0
C	-3	TYR	-	expression tag	UNP A3CUL0
C	-2	PHE	-	expression tag	UNP A3CUL0
C	-1	GLN	-	expression tag	UNP A3CUL0
C	0	GLY	-	expression tag	UNP A3CUL0
D	-18	MSE	-	expression tag	UNP A3CUL0
D	-17	GLY	-	expression tag	UNP A3CUL0
D	-16	SER	-	expression tag	UNP A3CUL0
D	-15	ASP	-	expression tag	UNP A3CUL0
D	-14	LYS	-	expression tag	UNP A3CUL0
D	-13	ILE	-	expression tag	UNP A3CUL0

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-12	HIS	-	expression tag	UNP A3CUL0
D	-11	HIS	-	expression tag	UNP A3CUL0
D	-10	HIS	-	expression tag	UNP A3CUL0
D	-9	HIS	-	expression tag	UNP A3CUL0
D	-8	HIS	-	expression tag	UNP A3CUL0
D	-7	HIS	-	expression tag	UNP A3CUL0
D	-6	GLU	-	expression tag	UNP A3CUL0
D	-5	ASN	-	expression tag	UNP A3CUL0
D	-4	LEU	-	expression tag	UNP A3CUL0
D	-3	TYR	-	expression tag	UNP A3CUL0
D	-2	PHE	-	expression tag	UNP A3CUL0
D	-1	GLN	-	expression tag	UNP A3CUL0
D	0	GLY	-	expression tag	UNP A3CUL0

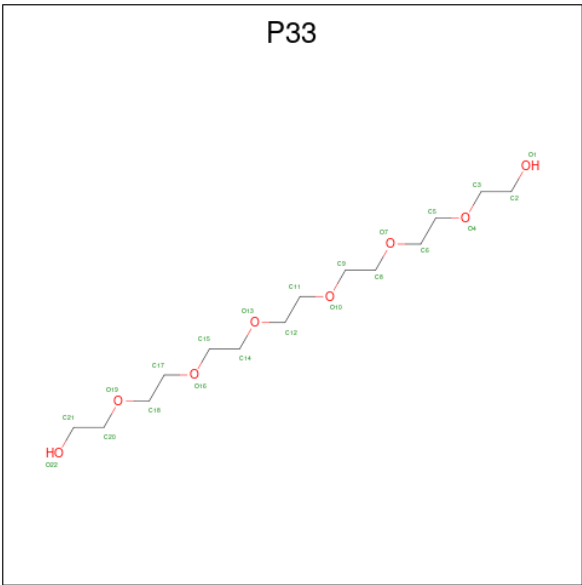
- Molecule 2 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	3	Total Na 3 3	0	0
2	B	5	Total Na 5 5	0	0
2	C	2	Total Na 2 2	0	0
2	D	2	Total Na 2 2	0	0

- Molecule 3 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

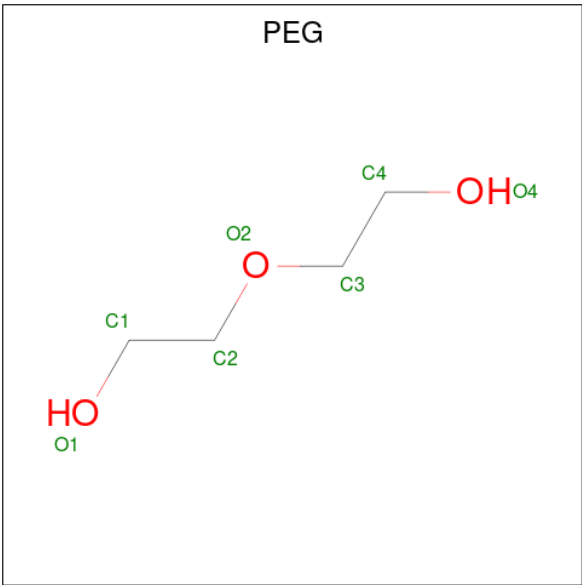
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Cl 1 1	0	0
3	C	1	Total Cl 1 1	0	0
3	D	2	Total Cl 2 2	0	0

- Molecule 4 is 3,6,9,12,15,18-HEXAOXAICOSANE-1,20-DIOL (CCD ID: P33) (formula: C₁₄H₃₀O₈).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			22	14	8		
4	B	1	Total	C	O	0	0
			22	14	8		

- Molecule 5 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: C₄H₁₀O₃).



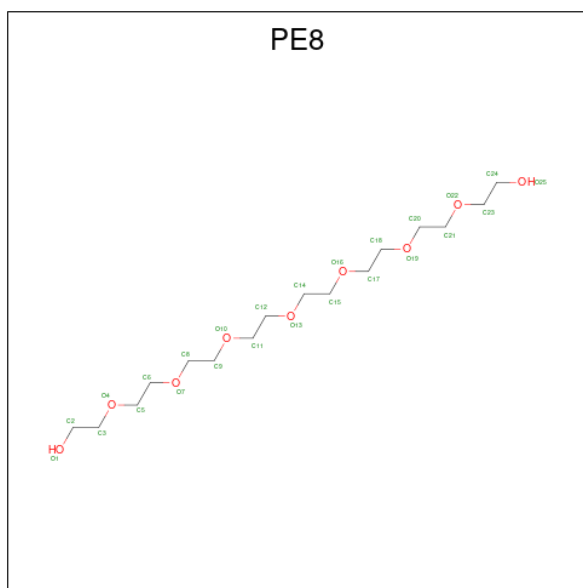
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			7	4	3		
5	A	1	Total	C	O	0	0
			7	4	3		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 7 4 3	0	0
5	A	1	Total C O 7 4 3	0	0
5	A	1	Total C O 7 4 3	0	0
5	B	1	Total C O 7 4 3	0	0
5	B	1	Total C O 7 4 3	0	0
5	C	1	Total C O 7 4 3	0	0
5	D	1	Total C O 7 4 3	0	0

- Molecule 6 is 3,6,9,12,15,18,21-HEPTAOXATRICOSANE-1,23-DIOL (CCD ID: PE8) (formula: $C_{16}H_{34}O_9$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	1	Total C O 25 16 9	0	0
6	D	1	Total C O 25 16 9	0	0

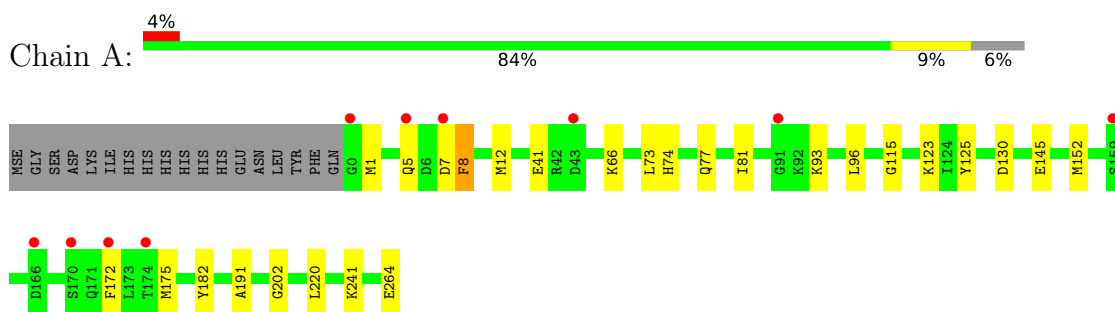
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	342	Total 342	O 342	0	0
7	B	339	Total 339	O 339	0	0
7	C	369	Total 369	O 369	0	0
7	D	310	Total 310	O 310	0	0

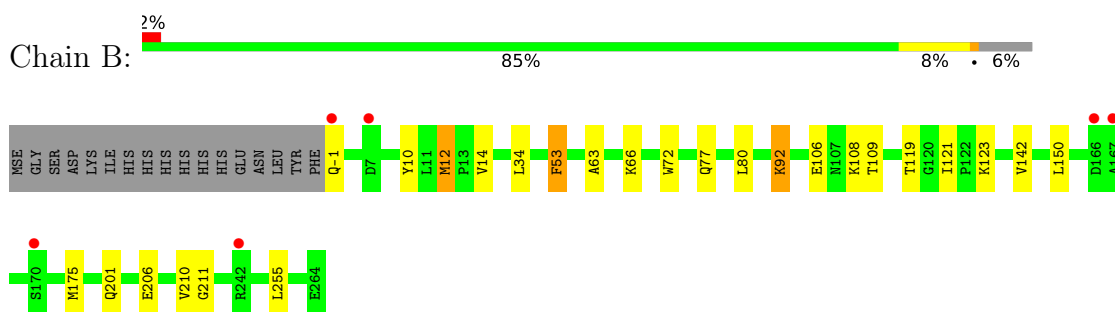
3 Residue-property plots [i](#)

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.

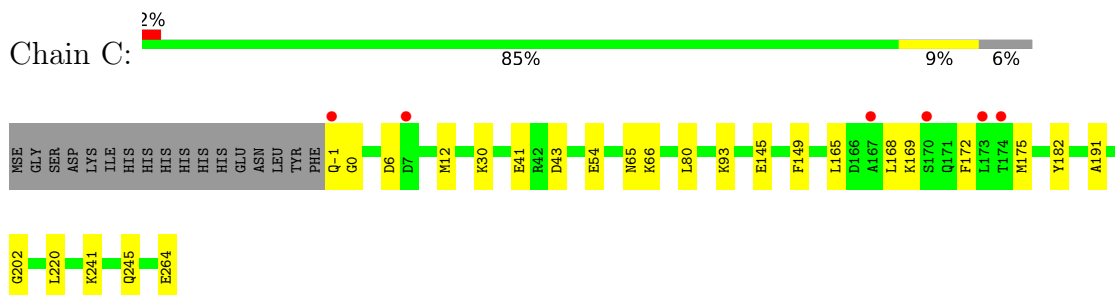
- Molecule 1: Acetoacetate decarboxylase



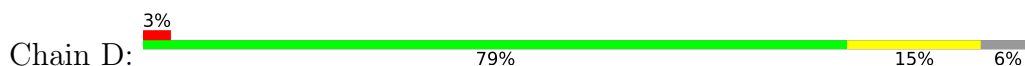
- Molecule 1: Acetoacetate decarboxylase

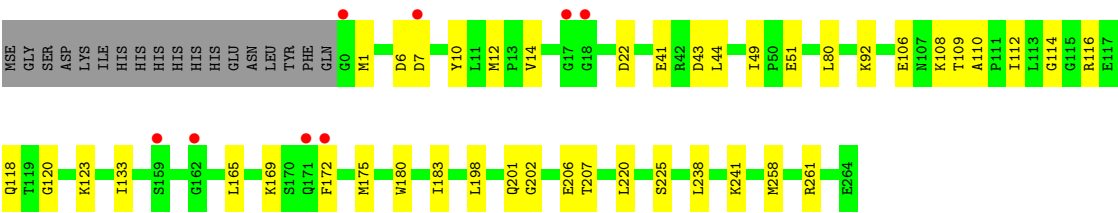


- Molecule 1: Acetoacetate decarboxylase



- Molecule 1: Acetoacetate decarboxylase





4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	129.34Å 136.71Å 168.12Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.39 – 1.60 29.39 – 1.60	Depositor EDS
% Data completeness (in resolution range)	93.8 (29.39-1.60) 93.7 (29.39-1.60)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.02 (at 1.60Å)	Xtrriage
Refinement program	REFMAC 5.4.0067, PHENIX	Depositor
R, R_{free}	0.228 , 0.259 0.233 , 0.262	Depositor DCC
R_{free} test set	9155 reflections (4.71%)	wwPDB-VP
Wilson B-factor (Å ²)	18.2	Xtrriage
Anisotropy	0.114	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 81.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	10029	wwPDB-VP
Average B, all atoms (Å ²)	22.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 69.21 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.8440e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: CL, PEG, P33, PE8, NA

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	1.00	0/2157	1.04	1/2919 (0.0%)
1	B	1.06	1/2196 (0.0%)	1.04	3/2970 (0.1%)
1	C	1.06	1/2165 (0.0%)	1.07	2/2931 (0.1%)
1	D	1.03	2/2163 (0.1%)	1.09	8/2931 (0.3%)
All	All	1.04	4/8681 (0.0%)	1.06	14/11751 (0.1%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	12	MSE	CG-SE	-7.96	1.71	1.95
1	B	53	PHE	C-O	-7.08	1.15	1.23
1	D	183	ILE	CA-CB	5.58	1.58	1.54
1	D	12	MSE	SE-CE	-5.14	1.80	1.95

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	6	ASP	N-CA-C	7.09	119.91	111.33
1	D	6	ASP	N-CA-C	6.54	118.41	111.28
1	D	133	ILE	N-CA-C	6.49	118.14	107.24
1	A	8	PHE	N-CA-C	6.34	120.03	109.95
1	B	12	MSE	CG-SE-CE	-5.66	86.48	98.92
1	B	109	THR	N-CA-C	5.61	117.47	111.36
1	D	112	ILE	N-CA-C	-5.59	105.27	110.53
1	D	92	LYS	N-CA-C	-5.47	106.10	112.89
1	D	238	LEU	CA-C-N	-5.29	114.31	119.76
1	D	238	LEU	C-N-CA	-5.29	114.31	119.76
1	D	110	ALA	CA-C-N	-5.12	114.39	119.56
1	D	110	ALA	C-N-CA	-5.12	114.39	119.56
1	B	92	LYS	N-CA-C	-5.07	106.61	112.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	30	LYS	N-CA-C	-5.00	103.07	110.48

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	2114	0	2067	45	0
1	B	2142	0	2102	20	0
1	C	2121	0	2074	22	0
1	D	2119	0	2050	34	0
2	A	3	0	0	0	0
2	B	5	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
3	A	1	0	0	1	0
3	C	1	0	0	0	0
3	D	2	0	0	0	0
4	A	22	0	30	1	0
4	B	22	0	30	9	0
5	A	35	0	50	9	0
5	B	14	0	20	0	0
5	C	7	0	10	0	0
5	D	7	0	10	0	0
6	C	25	0	34	6	0
6	D	25	0	34	8	0
7	A	342	0	0	4	0
7	B	339	0	0	3	0
7	C	369	0	0	8	0
7	D	310	0	0	7	0
All	All	10029	0	8511	127	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 7.

All (127) 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:A:81:ILE:HD12	1:A:152[B]:MSE:CE	1.65	1.25
1:A:12[B]:MSE:HE3	1:D:180:TRP:O	1.43	1.16
1:A:81:ILE:CD1	1:A:152[B]:MSE:HE1	1.79	1.12
1:A:81:ILE:CD1	1:A:152[B]:MSE:CE	2.28	1.10
1:A:81:ILE:HD12	1:A:152[B]:MSE:HE2	1.33	1.10
1:D:172:PHE:HA	1:D:175:MSE:HE3	1.08	1.06
5:A:273:PEG:H12	7:A:380:HOH:O	1.61	0.98
1:A:125:TYR:CD1	5:A:273:PEG:H21	1.99	0.98
1:A:81:ILE:HD12	1:A:152[B]:MSE:HE1	1.41	0.97
1:C:172:PHE:O	1:C:175:MSE:HE2	1.66	0.94
1:A:172:PHE:O	1:A:175:MSE:HE2	1.71	0.91
1:A:172:PHE:O	1:A:175:MSE:CE	2.19	0.91
1:A:12[B]:MSE:CE	1:D:180:TRP:O	2.25	0.84
1:C:168:LEU:C	1:C:168:LEU:HD23	2.03	0.82
1:D:172:PHE:HA	1:D:175:MSE:CE	2.03	0.81
1:C:93:LYS:NZ	1:C:264:GLU:OE2	2.16	0.78
6:D:269:PE8:H111	7:D:342:HOH:O	1.87	0.75
1:A:175:MSE:HE3	1:A:202[A]:GLY:HA2	1.71	0.73
1:A:81:ILE:HD13	1:A:152[B]:MSE:HE1	1.68	0.72
1:A:175:MSE:HE3	1:A:202[A]:GLY:CA	2.21	0.71
1:A:172:PHE:O	1:A:175:MSE:HE3	1.92	0.69
1:A:172:PHE:CA	1:A:175:MSE:HE2	2.21	0.69
1:A:93:LYS:HE3	1:A:264:GLU:OE1	1.94	0.67
1:A:172:PHE:C	1:A:175:MSE:HE2	2.20	0.67
1:A:93:LYS:CE	1:A:264:GLU:OE1	2.44	0.66
1:B:66[A]:LYS:NZ	1:B:77[A]:GLN:OE1	2.28	0.65
1:A:175:MSE:HE3	1:A:202[B]:GLY:CA	2.27	0.65
1:A:41:GLU:HG2	1:A:241:LYS:HE3	1.77	0.64
1:A:172:PHE:HA	1:A:175:MSE:HE2	1.80	0.64
1:B:201:GLN:HE22	4:B:270:P33:H111	1.62	0.64
6:C:268:PE8:H112	7:C:295:HOH:O	1.96	0.64
4:B:270:P33:H141	7:B:319:HOH:O	1.97	0.64
1:C:175:MSE:HE3	1:C:202:GLY:HA2	1.80	0.64
1:D:202:GLY:C	7:D:367:HOH:O	2.40	0.63
6:D:269:PE8:H202	7:D:302:HOH:O	1.99	0.63
6:D:269:PE8:H81	7:D:314:HOH:O	1.99	0.62
1:A:1:MSE:HE3	7:D:485:HOH:O	1.99	0.62
1:C:182:TYR:CE2	1:C:191:ALA:HB2	2.35	0.62
1:B:201:GLN:NE2	4:B:270:P33:H111	2.15	0.62
6:C:268:PE8:H202	7:C:337:HOH:O	1.99	0.61
1:A:175:MSE:HE3	1:A:202[B]:GLY:HA2	1.82	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:43[B]:ASP:OD1	1:D:44:LEU:N	2.35	0.60
1:A:41:GLU:HG2	1:A:241:LYS:CE	2.32	0.60
1:D:201:GLN:HE22	6:D:269:PE8:H171	1.68	0.58
1:B:119[B]:THR:HG22	1:B:121:ILE:HG12	1.84	0.58
1:B:108:LYS:HE2	1:C:145:GLU:OE2	2.03	0.58
1:D:106:GLU:OE1	1:D:123:LYS:HD2	2.03	0.58
1:B:106:GLU:OE1	1:B:123:LYS:HD3	2.04	0.57
1:A:220:LEU:HD23	7:A:366:HOH:O	2.04	0.57
1:C:168:LEU:HD23	1:C:168:LEU:O	2.05	0.57
1:B:106:GLU:CD	1:B:123:LYS:HD3	2.30	0.56
1:B:175:MSE:HE1	4:B:270:P33:H52	1.86	0.56
7:A:425:HOH:O	1:D:1:MSE:HE2	2.05	0.56
5:A:273:PEG:H11	1:D:109:THR:N	2.21	0.56
6:C:268:PE8:C11	7:C:295:HOH:O	2.54	0.55
1:C:93:LYS:HD3	1:C:264:GLU:HG3	1.89	0.54
1:D:41:GLU:OE2	1:D:241:LYS:HE3	2.08	0.53
1:A:125:TYR:CG	5:A:273:PEG:H21	2.42	0.53
1:A:12[B]:MSE:HE1	1:D:120:GLY:C	2.33	0.53
1:A:12[B]:MSE:HE1	1:D:120:GLY:HA2	1.91	0.53
1:D:206[A]:GLU:HG2	1:D:207:THR:HG23	1.90	0.53
1:C:66:LYS:NZ	7:C:418:HOH:O	2.41	0.52
1:C:66:LYS:CE	7:C:339:HOH:O	2.58	0.52
6:D:269:PE8:H142	7:D:310:HOH:O	2.10	0.52
5:A:273:PEG:H11	1:D:109:THR:H	1.75	0.52
1:A:1:MSE:CE	7:D:485:HOH:O	2.56	0.51
1:A:12[B]:MSE:HE1	1:D:120:GLY:CA	2.40	0.51
1:B:119[B]:THR:CG2	1:B:121:ILE:HG12	2.40	0.51
1:C:245[B]:GLN:HG3	7:C:387:HOH:O	2.10	0.51
1:A:182:TYR:CE2	1:A:191:ALA:HB2	2.46	0.50
1:B:142:VAL:HB	1:B:150:LEU:HB3	1.92	0.50
1:B:175:MSE:HE1	4:B:270:P33:C5	2.41	0.50
1:B:80:LEU:HB3	1:B:106:GLU:HG2	1.94	0.50
1:B:53:PHE:O	1:C:-1:GLN:HG3	2.13	0.49
1:A:175:MSE:SE	4:A:269:P33:H201	2.63	0.49
1:D:41:GLU:OE2	1:D:241:LYS:NZ	2.44	0.48
1:A:66[A]:LYS:NZ	1:A:77:GLN:OE1	2.40	0.48
1:A:73:LEU:O	1:A:74:HIS:C	2.56	0.48
1:D:175:MSE:SE	6:D:269:PE8:H231	2.64	0.48
1:D:7[B]:ASP:OD1	1:D:7[B]:ASP:N	2.47	0.48
1:A:130[A]:ASP:OD2	7:A:598:HOH:O	2.20	0.48
1:D:80:LEU:C	1:D:80:LEU:HD12	2.39	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:12[A]:MSE:HE1	1:D:116:ARG:HB3	1.96	0.47
1:D:201:GLN:HE22	6:D:269:PE8:C17	2.27	0.47
1:B:119[B]:THR:HG22	1:B:119[B]:THR:O	2.14	0.47
1:A:115:GLY:HA3	1:A:123:LYS:HD2	1.98	0.46
1:C:80:LEU:C	1:C:80:LEU:HD12	2.40	0.46
1:D:114:GLY:O	1:D:118:GLN:HB2	2.16	0.46
4:B:270:P33:H21	7:B:362:HOH:O	2.16	0.46
1:D:41:GLU:OE2	1:D:241:LYS:CE	2.62	0.46
1:D:22:ASP:O	1:D:258:MSE:HG3	2.17	0.45
1:D:198:LEU:HD23	1:D:261[B]:ARG:HE	1.82	0.45
1:A:7:ASP:CB	1:A:8:PHE:HD1	2.30	0.45
1:B:210:VAL:HG22	1:B:211:GLY:N	2.32	0.45
1:C:65:ASN:HB2	1:C:80:LEU:HG	1.98	0.44
6:C:268:PE8:H111	6:C:268:PE8:H81	1.67	0.44
1:C:168:LEU:C	1:C:168:LEU:CD2	2.79	0.44
1:C:41:GLU:OE2	1:C:241:LYS:HE2	2.18	0.44
1:C:-1:GLN:CG	1:C:0:GLY:N	2.81	0.43
6:C:268:PE8:H202	6:C:268:PE8:H172	1.54	0.43
4:B:270:P33:C2	7:B:362:HOH:O	2.67	0.43
1:C:165:LEU:HG	1:C:169:LYS:HE3	1.99	0.43
1:A:220:LEU:O	5:A:271:PEG:H22	2.19	0.43
1:D:220:LEU:HD13	1:D:225:SER:HB2	2.01	0.43
5:A:273:PEG:H12	5:A:273:PEG:H41	2.01	0.42
1:A:145:GLU:O	3:A:268:CL:CL	2.74	0.42
1:A:1:MSE:HB3	1:D:49:ILE:O	2.20	0.42
1:B:-1:GLN:OE1	1:C:54:GLU:HB2	2.20	0.42
6:C:268:PE8:H142	7:C:338:HOH:O	2.19	0.42
1:A:1:MSE:HB2	1:D:51:GLU:HG2	2.02	0.42
1:C:149:PHE:HB3	1:C:220:LEU:HD11	2.02	0.42
1:C:165:LEU:O	1:C:169:LYS:HG3	2.21	0.41
1:D:10:TYR:HB3	1:D:14:VAL:HG22	2.03	0.41
5:A:273:PEG:C2	1:D:109:THR:H	2.33	0.41
1:B:10:TYR:CG	1:B:14:VAL:HG13	2.56	0.41
1:D:165:LEU:HG	1:D:169:LYS:HE3	2.02	0.41
1:B:72:TRP:CZ2	4:B:270:P33:H202	2.56	0.41
1:B:201:GLN:HB2	1:B:255:LEU:HD22	2.03	0.41
1:D:10:TYR:CD1	1:D:14:VAL:HG13	2.55	0.41
4:B:270:P33:H52	4:B:270:P33:H21	1.81	0.41
1:A:93:LYS:NZ	1:A:264:GLU:OE1	2.53	0.41
1:A:81:ILE:HD11	1:A:152[B]:MSE:CE	2.40	0.40
5:A:273:PEG:H11	1:D:108:LYS:HA	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:43[B]:ASP:CG	7:C:425:HOH:O	2.64	0.40
6:D:269:PE8:H171	6:D:269:PE8:H142	1.91	0.40
1:A:73:LEU:HD23	1:A:73:LEU:HA	1.96	0.40
1:B:34:LEU:O	1:B:63:ALA:HA	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	271/283 (96%)	263 (97%)	8 (3%)	0	100	100
1	B	273/283 (96%)	266 (97%)	7 (3%)	0	100	100
1	C	268/283 (95%)	257 (96%)	11 (4%)	0	100	100
1	D	269/283 (95%)	261 (97%)	8 (3%)	0	100	100
All	All	1081/1132 (96%)	1047 (97%)	34 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	220/230 (96%)	218 (99%)	2 (1%)	70	55
1	B	225/230 (98%)	221 (98%)	4 (2%)	51	28

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	224/230 (97%)	224 (100%)	0	100	100
1	D	222/230 (96%)	222 (100%)	0	100	100
All	All	891/920 (97%)	885 (99%)	6 (1%)	78	63

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	GLN
1	A	96	LEU
1	B	12	MSE
1	B	92	LYS
1	B	206[A]	GLU
1	B	206[B]	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	171	GLN
1	A	245	GLN
1	B	201	GLN
1	C	65	ASN
1	C	79	ASN
1	D	77	GLN
1	D	79	ASN
1	D	171	GLN
1	D	201	GLN
1	D	245	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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 29 ligands modelled in this entry, 16 are monoatomic - leaving 13 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	$\# Z > 2$
5	PEG	A	271	-	6,6,6	0.49	0	5,5,5	0.55	0
5	PEG	A	270	-	6,6,6	0.36	0	5,5,5	0.61	0
5	PEG	D	270	-	6,6,6	0.36	0	5,5,5	0.36	0
6	PE8	C	268	-	24,24,24	0.55	0	23,23,23	0.77	1 (4%)
5	PEG	B	271	-	6,6,6	0.38	0	5,5,5	0.46	0
5	PEG	B	272	-	6,6,6	0.48	0	5,5,5	0.57	0
4	P33	A	269	-	21,21,21	0.56	0	20,20,20	0.52	0
5	PEG	A	272	-	6,6,6	0.39	0	5,5,5	0.28	0
5	PEG	A	273	2	6,6,6	0.56	0	5,5,5	0.66	0
6	PE8	D	269	-	24,24,24	0.51	0	23,23,23	0.71	0
4	P33	B	270	-	21,21,21	0.52	0	20,20,20	1.15	2 (10%)
5	PEG	A	274	-	6,6,6	0.41	0	5,5,5	0.29	0
5	PEG	C	269	-	6,6,6	0.44	0	5,5,5	0.58	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
5	PEG	A	271	-	-	2/4/4/4	-
5	PEG	A	270	-	-	1/4/4/4	-
5	PEG	D	270	-	-	3/4/4/4	-
6	PE8	C	268	-	-	14/22/22/22	-
5	PEG	B	271	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	PEG	B	272	-	-	3/4/4/4	-
4	P33	A	269	-	-	2/19/19/19	-
5	PEG	A	272	-	-	2/4/4/4	-
5	PEG	A	273	2	-	2/4/4/4	-
6	PE8	D	269	-	-	10/22/22/22	-
4	P33	B	270	-	-	8/19/19/19	-
5	PEG	A	274	-	-	3/4/4/4	-
5	PEG	C	269	-	-	1/4/4/4	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	270	P33	C12-O13-C14	-2.72	101.34	113.26
4	B	270	P33	O16-C15-C14	-2.29	99.90	110.35
6	C	268	PE8	O10-C9-C8	2.24	120.56	110.35

There are no chirality outliers.

All (53) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	C	268	PE8	C8-C9-O10-C11
6	C	268	PE8	C17-C18-O19-C20
4	A	269	P33	C6-C5-O4-C3
6	C	268	PE8	O4-C5-C6-O7
6	C	268	PE8	O7-C8-C9-O10
4	B	270	P33	C2-C3-O4-C5
4	B	270	P33	O10-C11-C12-O13
5	A	271	PEG	O2-C3-C4-O4
4	B	270	P33	O13-C14-C15-O16
5	A	271	PEG	O1-C1-C2-O2
5	B	271	PEG	O1-C1-C2-O2
4	B	270	P33	O7-C8-C9-O10
5	C	269	PEG	O1-C1-C2-O2
6	C	268	PE8	C20-C21-O22-C23
5	A	272	PEG	O2-C3-C4-O4
5	B	272	PEG	O2-C3-C4-O4
5	B	271	PEG	O2-C3-C4-O4
5	B	272	PEG	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
5	D	270	PEG	O1-C1-C2-O2
5	D	270	PEG	O2-C3-C4-O4
6	D	269	PE8	O22-C23-C24-O25
6	C	268	PE8	O13-C14-C15-O16
5	A	270	PEG	O1-C1-C2-O2
6	D	269	PE8	O7-C8-C9-O10
4	B	270	P33	O4-C5-C6-O7
5	A	274	PEG	O1-C1-C2-O2
6	D	269	PE8	C17-C18-O19-C20
5	A	274	PEG	C4-C3-O2-C2
4	B	270	P33	C8-C9-O10-C11
5	D	270	PEG	C4-C3-O2-C2
6	C	268	PE8	C6-C5-O4-C3
4	A	269	P33	O1-C2-C3-O4
6	D	269	PE8	O1-C2-C3-O4
6	D	269	PE8	O4-C5-C6-O7
6	C	268	PE8	O22-C23-C24-O25
5	A	272	PEG	O1-C1-C2-O2
6	C	268	PE8	O1-C2-C3-O4
5	A	273	PEG	O1-C1-C2-O2
6	D	269	PE8	C2-C3-O4-C5
6	C	268	PE8	O10-C11-C12-O13
6	C	268	PE8	O19-C20-C21-O22
6	C	268	PE8	C21-C20-O19-C18
6	D	269	PE8	C5-C6-O7-C8
5	B	272	PEG	C1-C2-O2-C3
6	D	269	PE8	O19-C20-C21-O22
4	B	270	P33	C14-C15-O16-C17
5	A	274	PEG	O2-C3-C4-O4
6	D	269	PE8	O16-C17-C18-O19
6	C	268	PE8	O16-C17-C18-O19
5	A	273	PEG	C1-C2-O2-C3
6	D	269	PE8	C15-C14-O13-C12
6	C	268	PE8	C12-C11-O10-C9
4	B	270	P33	C6-C5-O4-C3

There are no ring outliers.

6 monomers are involved in 33 short contacts:

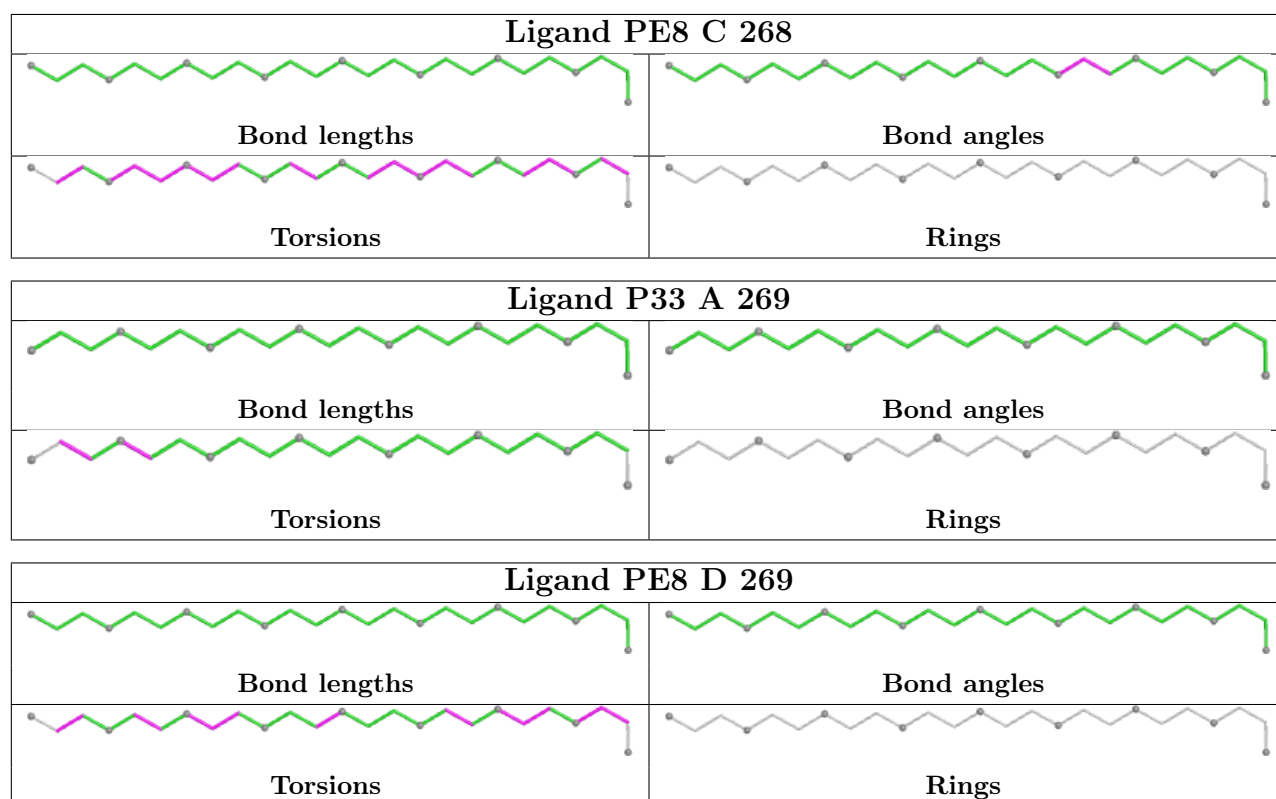
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	271	PEG	1	0
6	C	268	PE8	6	0

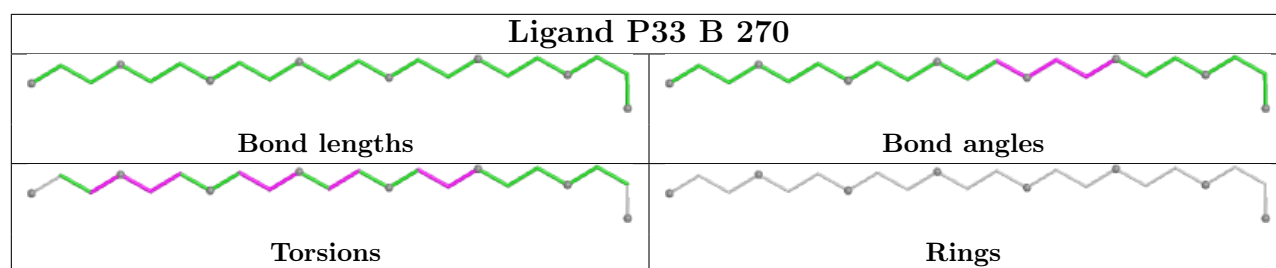
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	269	P33	1	0
5	A	273	PEG	8	0
6	D	269	PE8	8	0
4	B	270	P33	9	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





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	258/283 (91%)	0.57	10 (3%) 43 45	7, 20, 34, 42	6 (2%)
1	B	259/283 (91%)	0.36	6 (2%) 61 64	7, 18, 30, 40	8 (3%)
1	C	259/283 (91%)	0.34	6 (2%) 61 64	10, 18, 30, 41	4 (1%)
1	D	258/283 (91%)	0.54	8 (3%) 51 54	8, 20, 33, 41	6 (2%)
All	All	1034/1132 (91%)	0.45	30 (2%) 53 56	7, 19, 32, 42	24 (2%)

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	0	GLY	4.6
1	C	170	SER	3.3
1	D	172	PHE	3.2
1	C	167	ALA	3.0
1	A	7	ASP	2.9
1	A	91	GLY	2.8
1	A	0	GLY	2.6
1	C	173	LEU	2.6
1	A	174	THR	2.5
1	C	7	ASP	2.5
1	B	-1	GLN	2.5
1	D	171	GLN	2.4
1	C	174	THR	2.3
1	A	5	GLN	2.3
1	A	43[A]	ASP	2.2
1	D	18	GLY	2.2
1	A	170	SER	2.2
1	B	7	ASP	2.2
1	B	170	SER	2.2
1	D	17	GLY	2.2
1	D	162	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	159	SER	2.2
1	D	7[A]	ASP	2.1
1	A	159	SER	2.1
1	B	242	ARG	2.1
1	C	-1	GLN	2.1
1	B	166	ASP	2.0
1	A	172	PHE	2.0
1	A	166	ASP	2.0
1	B	167	ALA	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
5	PEG	D	270	7/7	0.75	0.23	52,53,54,58	0
5	PEG	A	271	7/7	0.82	0.17	37,42,47,48	0
5	PEG	C	269	7/7	0.82	0.19	47,52,57,58	0
5	PEG	A	270	7/7	0.82	0.14	42,44,53,55	0
5	PEG	A	273	7/7	0.85	0.14	21,28,39,41	0
5	PEG	A	274	7/7	0.86	0.15	42,49,54,54	0
4	P33	B	270	22/22	0.87	0.14	21,34,48,52	0
5	PEG	B	271	7/7	0.87	0.14	37,46,49,55	0
5	PEG	B	272	7/7	0.88	0.15	30,40,48,54	0
4	P33	A	269	22/22	0.89	0.11	23,29,43,46	0
6	PE8	C	268	25/25	0.90	0.12	20,32,40,42	0
6	PE8	D	269	25/25	0.90	0.11	18,30,41,44	0
5	PEG	A	272	7/7	0.91	0.16	36,44,50,50	0
2	NA	B	265	1/1	0.93	0.09	23,23,23,23	0

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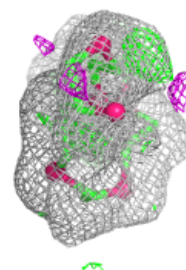
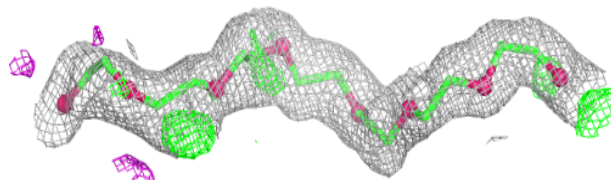
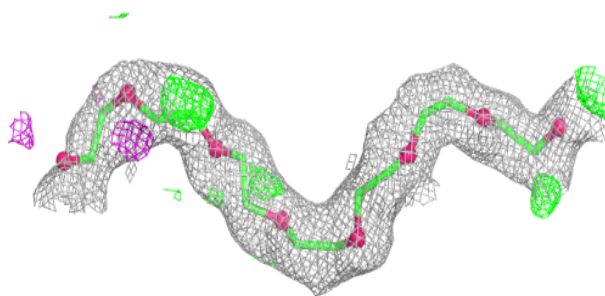
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	CL	A	268	1/1	0.95	0.27	29,29,29,29	0
2	NA	D	265	1/1	0.95	0.08	25,25,25,25	0
2	NA	B	268	1/1	0.96	0.05	21,21,21,21	0
3	CL	D	267	1/1	0.97	0.14	41,41,41,41	0
2	NA	A	265	1/1	0.97	0.07	18,18,18,18	0
3	CL	D	268	1/1	0.98	0.08	28,28,28,28	0
2	NA	B	269	1/1	0.98	0.21	21,21,21,21	0
2	NA	A	266	1/1	0.98	0.04	22,22,22,22	0
2	NA	D	266	1/1	0.98	0.04	23,23,23,23	0
2	NA	B	266	1/1	0.98	0.04	24,24,24,24	0
3	CL	C	267	1/1	0.98	0.08	27,27,27,27	0
2	NA	A	267	1/1	0.98	0.05	30,30,30,30	0
2	NA	C	266	1/1	0.99	0.04	26,26,26,26	0
2	NA	C	265	1/1	0.99	0.02	15,15,15,15	0
2	NA	B	267	1/1	1.00	0.03	20,20,20,20	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

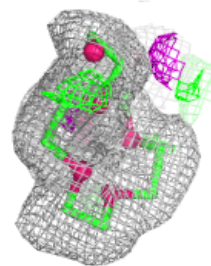
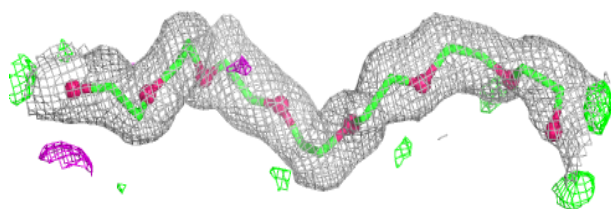
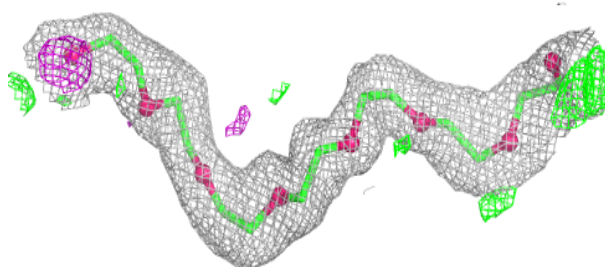
Electron density around P33 B 270:

2mF_o-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

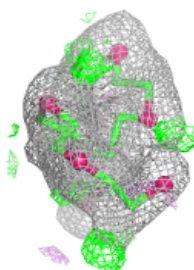
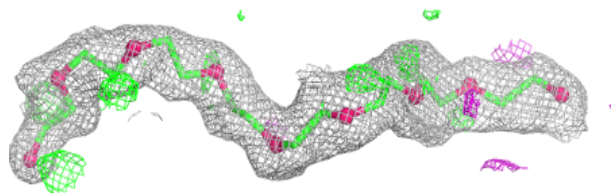
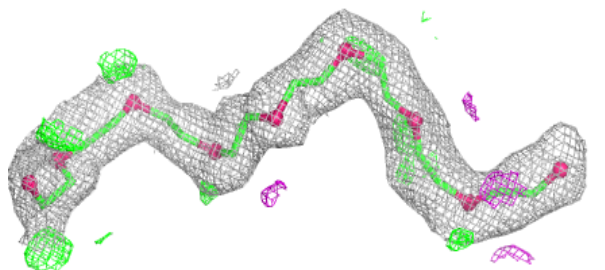


Electron density around P33 A 269:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

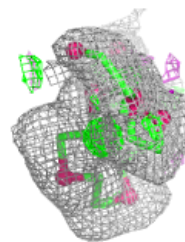
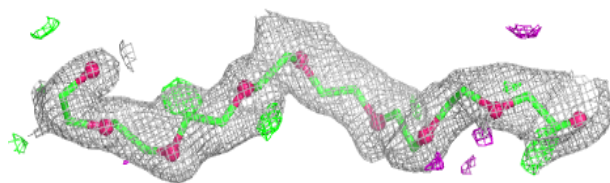
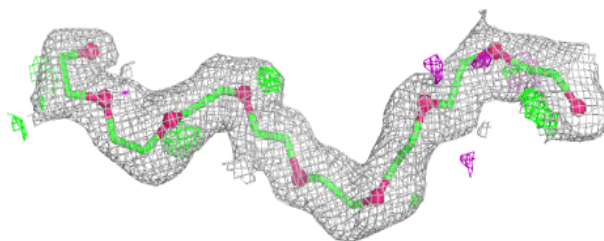
**Electron density around PE8 C 268:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around PE8 D 269:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers [i](#)

There are no such residues in this entry.