



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 2, 2025 – 02:09 am GMT

PDB ID : 5TBI / pdb_00005tbi
Title : Crystal structure of mouse CARM1 in complex with inhibitor LH1427
Authors : Cura, V.; Marechal, N.; Troffer-Charlier, N.; Halby, L.; Arimondo, P.; Bonnefond, L.; Cavarelli, J.
Deposited on : 2016-09-12
Resolution : 2.29 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 : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 2.0
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
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) : 2.46

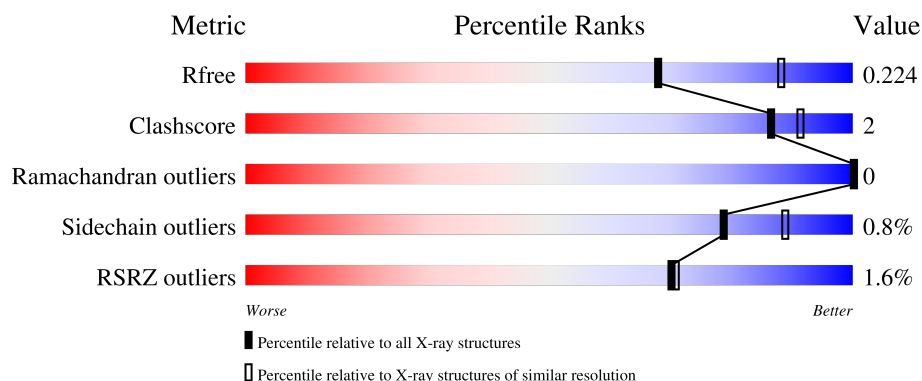
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.29 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}	164625	5963 (2.30-2.30)
Clashscore	180529	6698 (2.30-2.30)
Ramachandran outliers	177936	6640 (2.30-2.30)
Sidechain outliers	177891	6640 (2.30-2.30)
RSRZ outliers	164620	5963 (2.30-2.30)

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	361	% 92% 5%
1	B	361	2% 89% 6% 5%
1	C	361	% 89% 6% 5%
1	D	361	3% 89% 5% 6%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 22805 atoms, of which 11007 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 Histone-arginine methyltransferase CARM1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	343	Total	C	H	N	O	S	0	0	0
			5450	1776	2699	454	507	14			
1	B	343	Total	C	H	N	O	S	0	0	0
			5460	1778	2705	457	506	14			
1	C	343	Total	C	H	N	O	S	0	0	0
			5450	1776	2699	454	507	14			
1	D	341	Total	C	H	N	O	S	0	0	0
			5416	1763	2684	452	503	14			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	127	GLY	-	expression tag	UNP Q9WVG6
A	128	HIS	-	expression tag	UNP Q9WVG6
A	129	MET	-	expression tag	UNP Q9WVG6
B	127	GLY	-	expression tag	UNP Q9WVG6
B	128	HIS	-	expression tag	UNP Q9WVG6
B	129	MET	-	expression tag	UNP Q9WVG6
C	127	GLY	-	expression tag	UNP Q9WVG6
C	128	HIS	-	expression tag	UNP Q9WVG6
C	129	MET	-	expression tag	UNP Q9WVG6
D	127	GLY	-	expression tag	UNP Q9WVG6
D	128	HIS	-	expression tag	UNP Q9WVG6
D	129	MET	-	expression tag	UNP Q9WVG6

- Molecule 2 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



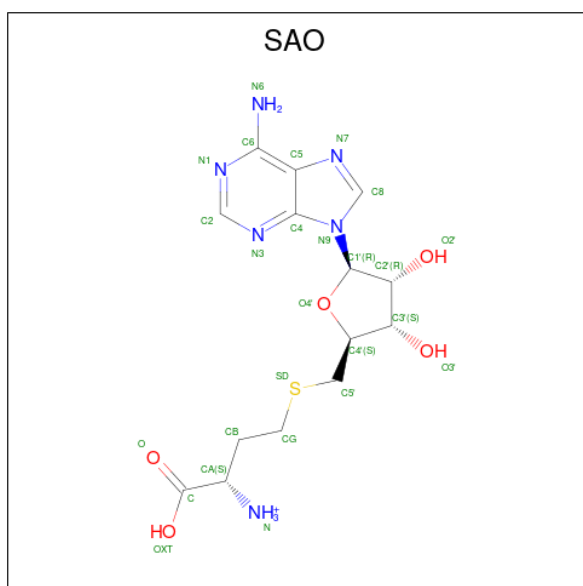
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	H	O	0	0
			10	2	6	2		
2	A	1	Total	C	H	O	0	0
			10	2	6	2		
2	A	1	Total	C	H	O	0	0
			10	2	6	2		
2	A	1	Total	C	H	O	0	0
			10	2	6	2		
2	A	1	Total	C	H	O	0	0
			10	2	6	2		
2	A	1	Total	C	O		0	0
			4	2	2			
2	B	1	Total	C	H	O	0	0
			10	2	6	2		
2	B	1	Total	C	H	O	0	0
			10	2	6	2		
2	C	1	Total	C	H	O	0	0
			10	2	6	2		
2	C	1	Total	C	H	O	0	0
			10	2	6	2		
2	C	1	Total	C	H	O	0	0
			10	2	6	2		
2	C	1	Total	C	H	O	0	0
			10	2	6	2		
2	C	1	Total	C	H	O	0	0
			10	2	6	2		

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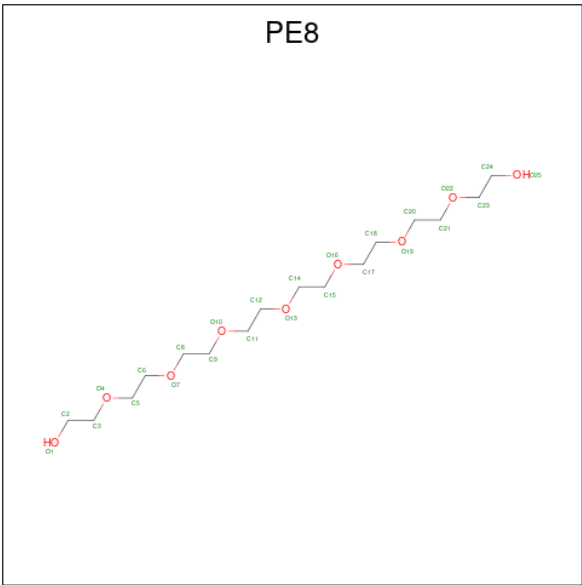
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	D	1	Total	C	H	O	0	0
			10	2	6	2		
2	D	1	Total	C	H	O	0	0
			10	2	6	2		
2	D	1	Total	C	H	O	0	0
			10	2	6	2		

- Molecule 3 is 5'-S-[(3S)-3-azaniumyl-3-carboxypropyl]-5'-thioadenosine (CCD ID: SAO) (formula: C₁₄H₂₁N₆O₅S).



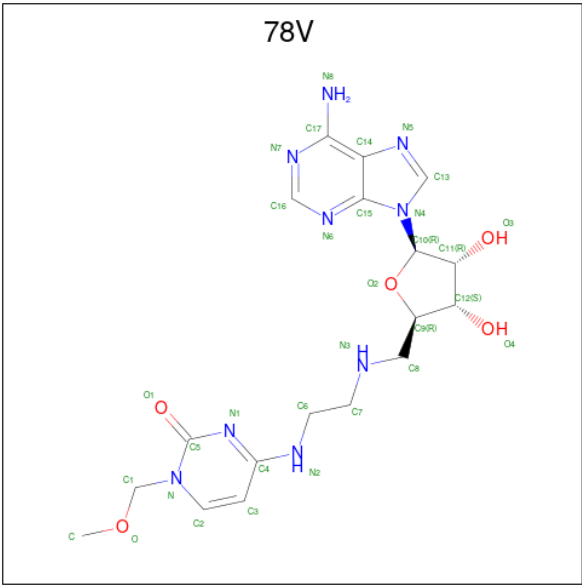
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	H	N	O	S	0	0
			46	14	20	6	5	1		
3	C	1	Total	C	H	N	O	S	0	0
			46	14	20	6	5	1		

- Molecule 4 is 3,6,9,12,15,18,21-HEPTAOXATRICOSANE-1,23-DIOL (CCD ID: PE8) (formula: C₁₆H₃₄O₉).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	B	1	Total	C	H	O	0	0
			59	16	34	9		

- Molecule 5 is 4-[2-[[[(2 {R},3 {S},4 {R},5 {R})-5-(6-aminopurin-9-yl)-3,4-bis(oxidanyl)oxolan-2-yl]methylamino]ethylamino]-1-(methoxymethyl)pyrimidin-2-one (CCD ID: 78V) (formula: C₁₈H₂₅N₉O₅).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	B	1	Total	C	H	N	O	0	0
			57	18	25	9	5		
5	D	1	Total	C	H	N	O	0	0
			57	18	25	9	5		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	178	Total 178	O 178	0	0
6	B	150	Total 150	O 150	0	0
6	C	156	Total 156	O 156	0	0
6	D	116	Total 116	O 116	0	0

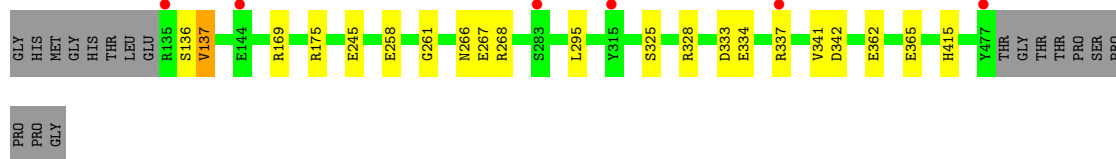
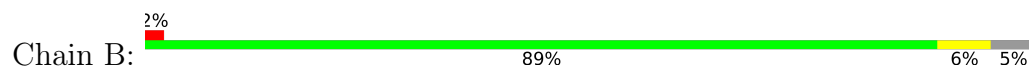
3 Residue-property plots [i](#)

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.

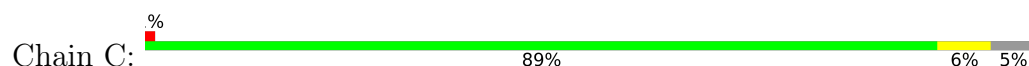
- Molecule 1: Histone-arginine methyltransferase CARM1



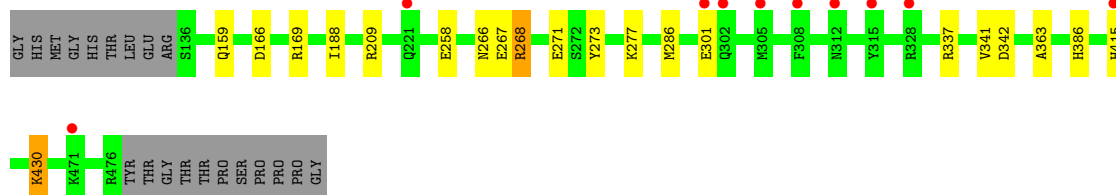
- Molecule 1: Histone-arginine methyltransferase CARM1



- Molecule 1: Histone-arginine methyltransferase CARM1



- Molecule 1: Histone-arginine methyltransferase CARM1



4 Data and refinement statistics

Property	Value	Source
Space group	P 2 ₁ 2 ₁ 2	Depositor
Cell constants a, b, c, α , β , γ	74.49Å 98.03Å 205.73Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.54 – 2.29 45.54 – 2.29	Depositor EDS
% Data completeness (in resolution range)	99.3 (45.54-2.29) 99.3 (45.54-2.29)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.50 (at 2.29Å)	Xtriage
Refinement program	PHENIX dev_1951	Depositor
R, R_{free}	0.198 , 0.228 0.192 , 0.224	Depositor DCC
R_{free} test set	3379 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	31.9	Xtriage
Anisotropy	0.266	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.43 , 48.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	22805	wwPDB-VP
Average B, all atoms (Å ²)	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 33.88 % 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 7.4524e-04. 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SAO, 78V, PE8, EDO

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.31	0/2821	0.65	0/3823
1	B	0.33	0/2825	0.64	0/3827
1	C	0.32	0/2821	0.67	0/3823
1	D	0.31	0/2801	0.64	0/3795
All	All	0.32	0/11268	0.65	0/15268

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	2751	2699	2699	7	0
1	B	2755	2705	2705	14	0
1	C	2751	2699	2699	12	0
1	D	2732	2684	2683	13	0
2	A	24	30	36	0	1
2	B	8	12	12	0	0
2	C	24	36	36	0	0
2	D	12	18	18	0	0
3	A	26	20	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	26	20	0	0	0
4	B	25	34	34	2	0
5	B	32	25	0	3	0
5	D	32	25	0	0	0
6	A	178	0	0	2	0
6	B	150	0	0	2	0
6	C	156	0	0	2	0
6	D	116	0	0	2	0
All	All	11798	11007	10922	45	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (45) 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:B:362:GLU:OE2	6:B:601:HOH:O	2.07	0.73
1:D:301:GLU:OE1	1:D:386:HIS:NE2	2.25	0.69
1:C:136:SER:N	6:C:605:HOH:O	2.31	0.63
1:A:224:GLU:OE1	1:A:228:LYS:NZ	2.31	0.63
1:C:221:GLN:N	1:C:221:GLN:OE1	2.32	0.62
1:B:415:HIS:NE2	5:B:504:78V:O1	2.34	0.60
1:B:333:ASP:O	1:B:337:ARG:HG3	2.04	0.57
1:B:325:SER:O	1:B:328:ARG:HG2	2.05	0.56
1:D:166:ASP:OD2	1:D:415:HIS:ND1	2.39	0.55
1:C:469:ASP:OD1	6:C:601:HOH:O	2.18	0.54
1:B:136:SER:HB3	4:B:501:PE8:H151	1.90	0.53
1:B:169:ARG:HD3	1:B:415:HIS:HE1	1.74	0.52
1:D:188:ILE:HD11	1:D:209:ARG:NH2	2.26	0.51
1:B:175:ARG:NH1	6:B:609:HOH:O	2.43	0.51
1:D:277:LYS:HD3	1:D:286:MET:SD	2.51	0.50
1:D:169:ARG:HD3	1:D:415:HIS:HE1	1.77	0.50
1:D:159:GLN:NE2	6:D:607:HOH:O	2.45	0.49
1:D:277:LYS:NZ	1:D:363:ALA:O	2.40	0.48
1:B:266:ASN:O	1:B:267:GLU:HB2	2.14	0.47
1:D:337:ARG:NH2	6:D:609:HOH:O	2.47	0.47
1:A:281:LYS:NZ	6:A:608:HOH:O	2.44	0.47
1:C:266:ASN:O	1:C:267:GLU:HB2	2.15	0.47
1:C:290:ILE:HG12	1:C:395:ALA:HB3	1.97	0.47
1:D:266:ASN:O	1:D:267:GLU:HB2	2.15	0.47
1:A:341:VAL:O	1:A:342:ASP:HB3	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:266:ASN:O	1:A:267:GLU:HB2	2.15	0.46
1:B:261:GLY:HA2	5:B:504:78V:C3	2.46	0.46
1:B:245:GLU:HA	4:B:501:PE8:H111	1.98	0.45
1:B:341:VAL:O	1:B:342:ASP:HB3	2.16	0.44
1:C:341:VAL:O	1:C:342:ASP:HB3	2.16	0.44
1:B:334:GLU:HA	1:B:337:ARG:HD3	2.00	0.44
1:C:259:PRO:HG2	1:C:270:LEU:HD23	1.98	0.44
1:A:167:TYR:CE2	1:D:430:LYS:HG3	2.53	0.44
1:B:137:VAL:HG21	1:B:365:GLU:OE2	2.18	0.43
1:C:140:GLU:O	1:C:445:LYS:HE3	2.17	0.43
1:D:268:ARG:HD2	1:D:271:GLU:OE2	2.19	0.43
1:D:341:VAL:O	1:D:342:ASP:HB3	2.19	0.43
1:D:273:TYR:CZ	1:D:286:MET:HE2	2.53	0.43
1:C:424:GLN:HG3	1:C:465:SER:O	2.19	0.42
1:C:314:TRP:O	1:C:325:SER:HA	2.20	0.42
1:A:221:GLN:OE1	1:A:221:GLN:N	2.53	0.42
1:B:415:HIS:HD2	5:B:504:78V:C1	2.33	0.42
1:C:263:MET:O	1:C:264:LEU:HB3	2.21	0.41
1:A:262:TYR:OH	6:A:601:HOH:O	2.22	0.41
1:C:370:ARG:NH2	1:C:372:GLU:OE1	2.46	0.41

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:506:EDO:C1	2:A:506:EDO:O1[2_765]	1.40	0.80

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	341/361 (94%)	331 (97%)	10 (3%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	341/361 (94%)	331 (97%)	10 (3%)	0	100	100
1	C	341/361 (94%)	331 (97%)	10 (3%)	0	100	100
1	D	339/361 (94%)	327 (96%)	12 (4%)	0	100	100
All	All	1362/1444 (94%)	1320 (97%)	42 (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	299/313 (96%)	297 (99%)	2 (1%)	81	90
1	B	299/313 (96%)	295 (99%)	4 (1%)	65	79
1	C	299/313 (96%)	298 (100%)	1 (0%)	91	96
1	D	297/313 (95%)	294 (99%)	3 (1%)	73	85
All	All	1194/1252 (95%)	1184 (99%)	10 (1%)	79	89

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	248	LEU
1	A	258	GLU
1	B	137	VAL
1	B	258	GLU
1	B	268	ARG
1	B	295	LEU
1	C	258	GLU
1	D	258	GLU
1	D	268	ARG
1	D	430	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	162	ASN
1	A	181	HIS
1	A	472	ASN
1	B	149	GLN
1	B	165	GLN
1	B	221	GLN
1	B	251	GLN
1	B	302	GLN
1	B	312	ASN
1	C	165	GLN
1	C	181	HIS
1	D	159	GLN
1	D	266	ASN
1	D	302	GLN
1	D	378	HIS
1	D	381	HIS

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

22 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
2	EDO	A	501	-	3,3,3	0.46	0	2,2,2	0.39	0
2	EDO	C	502	-	3,3,3	0.47	0	2,2,2	0.48	0
2	EDO	A	505	-	3,3,3	0.47	0	2,2,2	0.45	0
2	EDO	D	503	-	3,3,3	0.49	0	2,2,2	0.45	0
3	SAO	A	507	-	24,28,28	0.68	0	25,40,40	1.05	2 (8%)
5	78V	B	504	-	31,35,35	0.51	0	30,49,49	0.67	1 (3%)
2	EDO	C	505	-	3,3,3	0.47	0	2,2,2	0.50	0
2	EDO	A	503	-	3,3,3	0.46	0	2,2,2	0.48	0
2	EDO	A	506	-	3,3,3	0.47	0	2,2,2	0.48	0
3	SAO	C	507	-	24,28,28	0.68	0	25,40,40	1.08	2 (8%)
2	EDO	C	506	-	3,3,3	0.44	0	2,2,2	0.41	0
4	PE8	B	501	-	24,24,24	0.54	0	23,23,23	0.42	0
2	EDO	B	503	-	3,3,3	0.46	0	2,2,2	0.49	0
2	EDO	B	502	-	3,3,3	0.47	0	2,2,2	0.48	0
2	EDO	C	504	-	3,3,3	0.48	0	2,2,2	0.47	0
2	EDO	C	501	-	3,3,3	0.47	0	2,2,2	0.54	0
2	EDO	C	503	-	3,3,3	0.48	0	2,2,2	0.48	0
2	EDO	A	502	-	3,3,3	0.48	0	2,2,2	0.47	0
2	EDO	D	502	-	3,3,3	0.47	0	2,2,2	0.43	0
5	78V	D	504	-	31,35,35	0.51	0	30,49,49	0.57	1 (3%)
2	EDO	A	504	-	3,3,3	0.48	0	2,2,2	0.47	0
2	EDO	D	501	-	3,3,3	0.47	0	2,2,2	0.52	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
2	EDO	A	501	-	-	1/1/1/1	-
2	EDO	C	502	-	-	1/1/1/1	-
2	EDO	A	505	-	-	1/1/1/1	-
2	EDO	D	503	-	-	0/1/1/1	-
3	SAO	A	507	-	-	0/11/31/31	0/3/3/3
5	78V	B	504	-	-	7/10/31/31	0/4/4/4
2	EDO	C	505	-	-	0/1/1/1	-
2	EDO	A	503	-	-	1/1/1/1	-
2	EDO	A	506	-	-	1/1/1/1	-
3	SAO	C	507	-	-	0/11/31/31	0/3/3/3
2	EDO	C	506	-	-	0/1/1/1	-
4	PE8	B	501	-	-	10/22/22/22	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	EDO	B	503	-	-	0/1/1/1	-
2	EDO	B	502	-	-	0/1/1/1	-
2	EDO	C	504	-	-	1/1/1/1	-
2	EDO	C	501	-	-	1/1/1/1	-
2	EDO	C	503	-	-	1/1/1/1	-
2	EDO	A	502	-	-	1/1/1/1	-
2	EDO	D	502	-	-	1/1/1/1	-
5	78V	D	504	-	-	8/10/31/31	0/4/4/4
2	EDO	A	504	-	-	1/1/1/1	-
2	EDO	D	501	-	-	1/1/1/1	-

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	507	SAO	CB-CG-SD	-3.35	105.79	113.31
3	A	507	SAO	CB-CG-SD	-3.23	106.07	113.31
3	C	507	SAO	C5-C6-N6	2.29	123.84	120.35
3	A	507	SAO	C5-C6-N6	2.26	123.78	120.35
5	D	504	78V	C14-C17-N8	2.24	123.75	120.35
5	B	504	78V	C14-C17-N8	2.23	123.74	120.35

There are no chirality outliers.

All (37) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	504	78V	O-C1-N-C5
5	B	504	78V	O-C1-N-C2
5	B	504	78V	C9-C8-N3-C7
5	B	504	78V	N3-C8-C9-O2
5	B	504	78V	N3-C8-C9-C12
5	D	504	78V	O-C1-N-C5
5	D	504	78V	O-C1-N-C2
5	D	504	78V	N3-C8-C9-O2
5	D	504	78V	N3-C8-C9-C12
5	D	504	78V	N2-C6-C7-N3
4	B	501	PE8	O10-C11-C12-O13
4	B	501	PE8	O19-C20-C21-O22
5	B	504	78V	N2-C6-C7-N3
2	A	501	EDO	O1-C1-C2-O2
2	A	504	EDO	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
2	A	505	EDO	O1-C1-C2-O2
2	C	501	EDO	O1-C1-C2-O2
2	C	502	EDO	O1-C1-C2-O2
2	C	504	EDO	O1-C1-C2-O2
2	D	501	EDO	O1-C1-C2-O2
5	B	504	78V	C6-C7-N3-C8
2	A	502	EDO	O1-C1-C2-O2
2	C	503	EDO	O1-C1-C2-O2
4	B	501	PE8	O4-C5-C6-O7
5	D	504	78V	C9-C8-N3-C7
4	B	501	PE8	C2-C3-O4-C5
4	B	501	PE8	C12-C11-O10-C9
4	B	501	PE8	C20-C21-O22-C23
5	D	504	78V	C6-C7-N3-C8
4	B	501	PE8	C5-C6-O7-C8
2	A	503	EDO	O1-C1-C2-O2
5	D	504	78V	N-C1-O-C
2	A	506	EDO	O1-C1-C2-O2
2	D	502	EDO	O1-C1-C2-O2
4	B	501	PE8	C8-C9-O10-C11
4	B	501	PE8	O22-C23-C24-O25
4	B	501	PE8	O7-C8-C9-O10

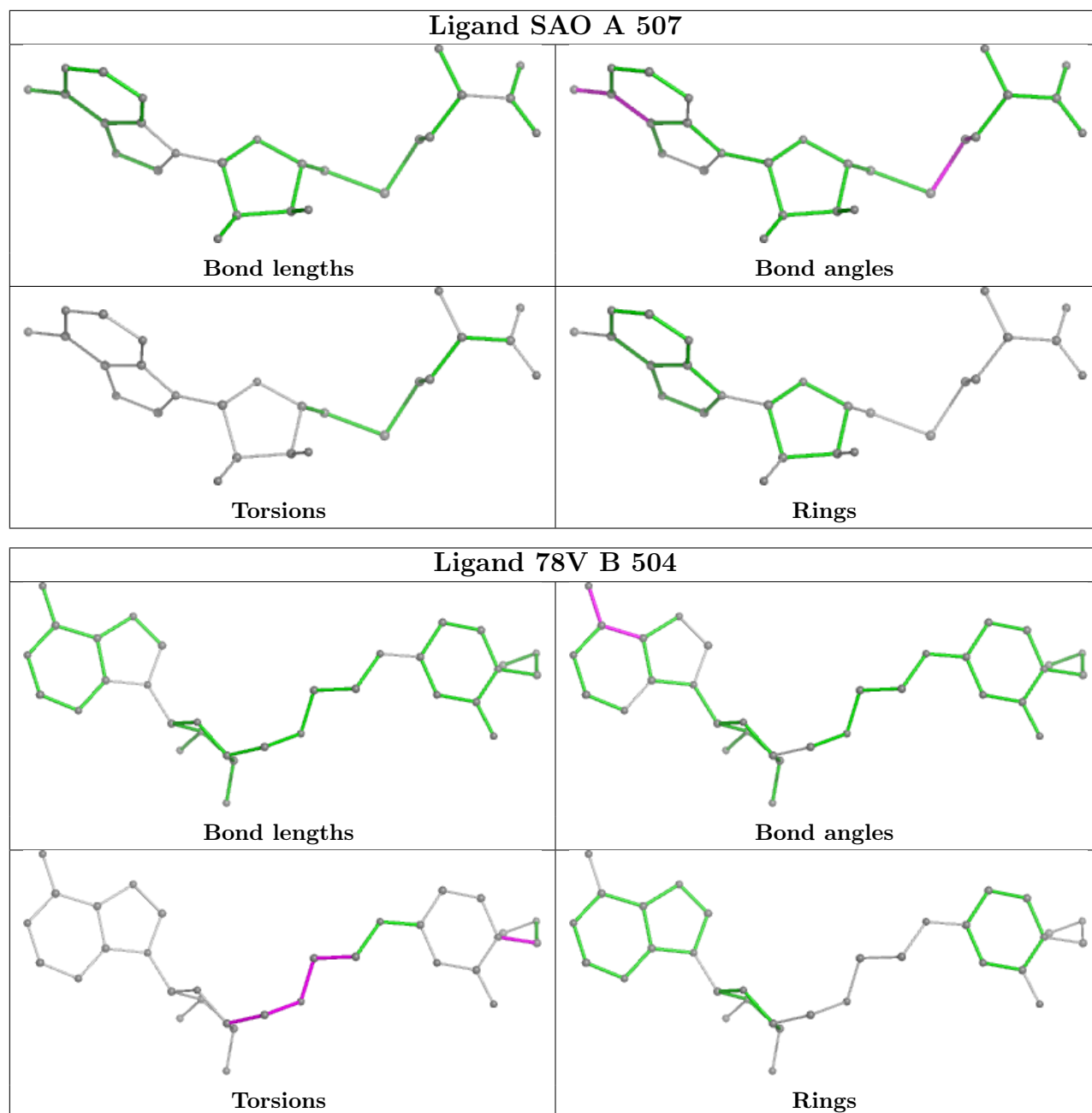
There are no ring outliers.

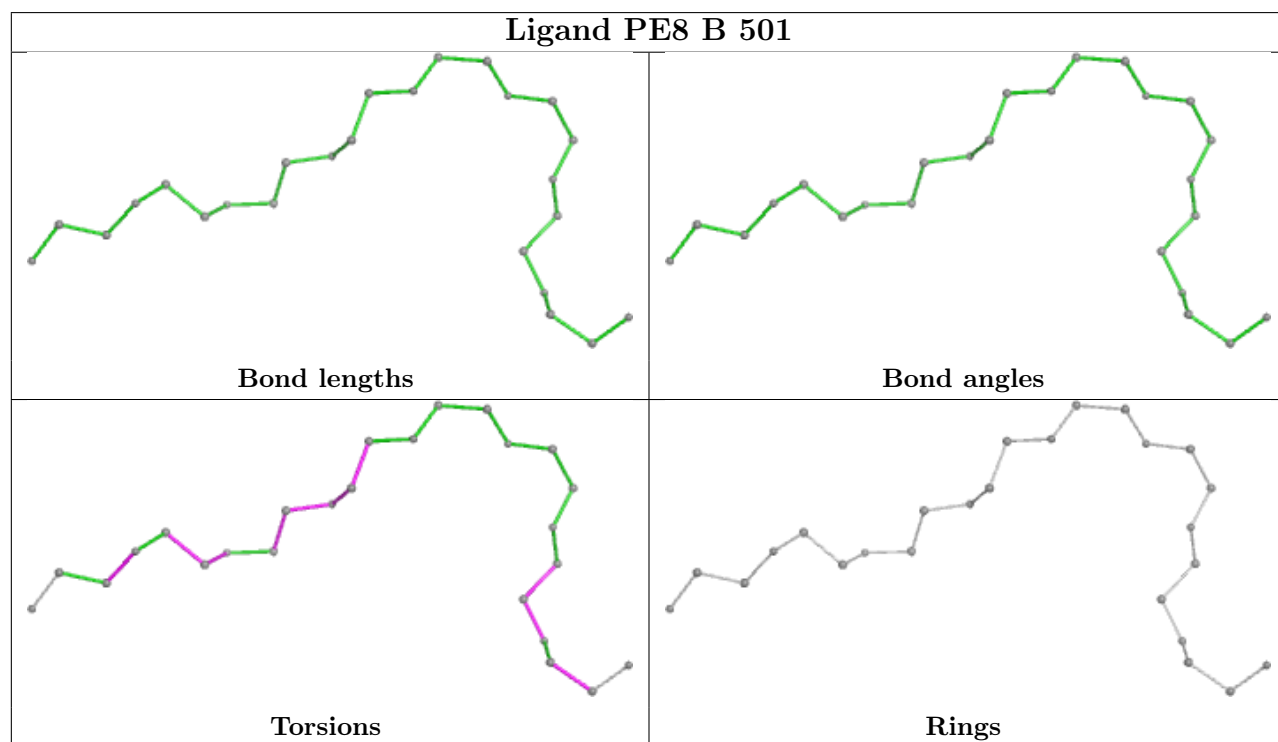
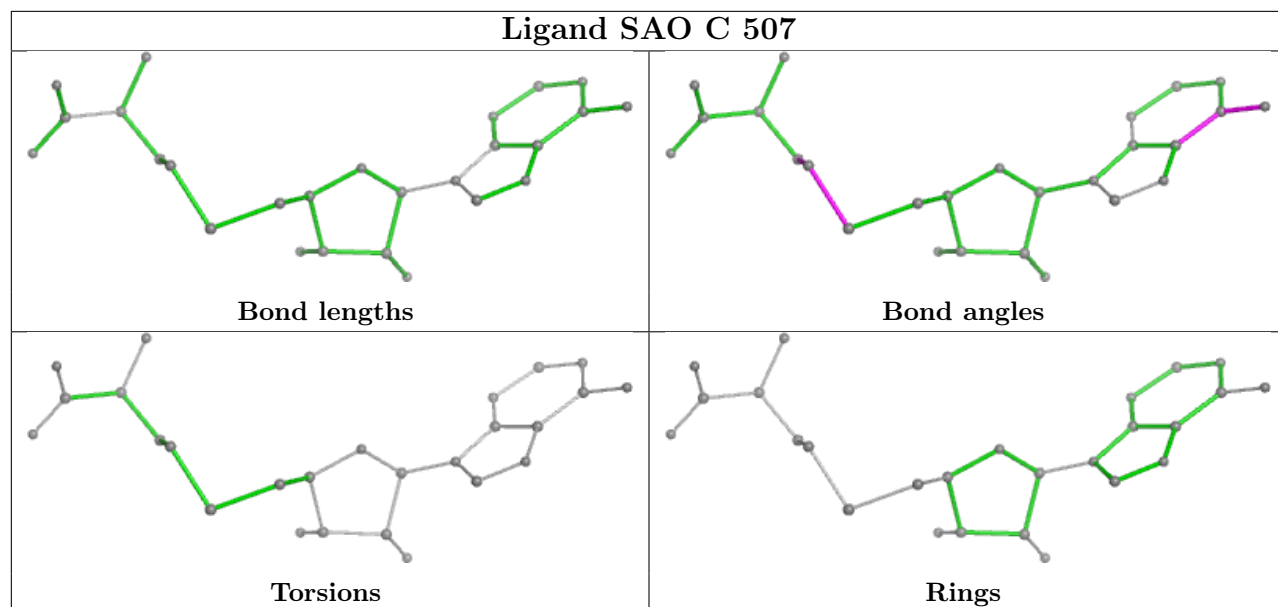
3 monomers are involved in 6 short contacts:

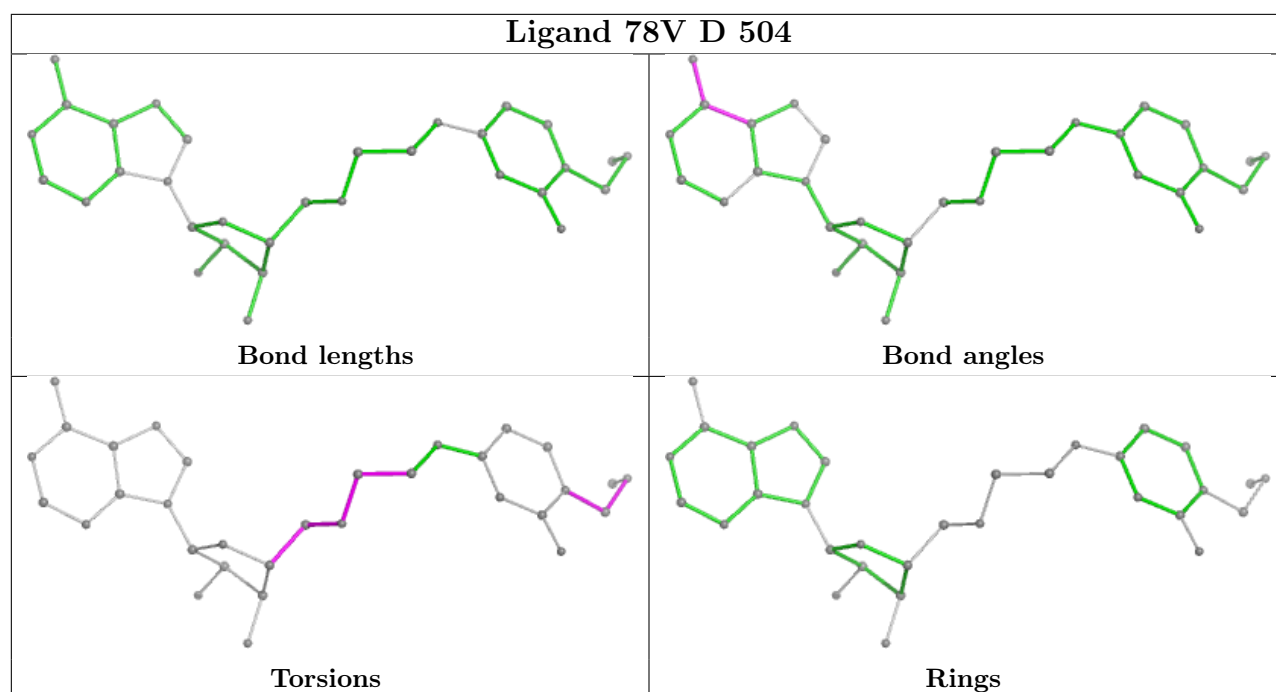
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	504	78V	3	0
2	A	506	EDO	0	1
4	B	501	PE8	2	0

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	343/361 (95%)	-0.34	3 (0%) 81 81	20, 32, 50, 74	0
1	B	343/361 (95%)	-0.17	6 (1%) 69 69	20, 36, 59, 88	0
1	C	343/361 (95%)	-0.07	3 (0%) 81 81	28, 40, 64, 79	0
1	D	341/361 (94%)	-0.02	10 (2%) 54 55	26, 42, 61, 76	0
All	All	1370/1444 (94%)	-0.15	22 (1%) 70 71	20, 38, 60, 88	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	478	THR	4.3
1	A	478	THR	3.8
1	B	477	TYR	3.1
1	D	315	TYR	2.9
1	B	283	SER	2.8
1	B	315	TYR	2.8
1	C	477	TYR	2.8
1	D	308	PHE	2.7
1	C	221	GLN	2.6
1	D	312	ASN	2.5
1	B	144	GLU	2.5
1	B	337	ARG	2.5
1	A	144	GLU	2.4
1	B	135	ARG	2.4
1	D	471	LYS	2.4
1	D	301	GLU	2.3
1	A	283	SER	2.2
1	D	415	HIS	2.2
1	D	221	GLN	2.1
1	D	302	GLN	2.1
1	D	328	ARG	2.0
1	D	305	MET	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](#)

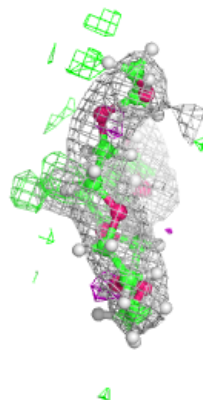
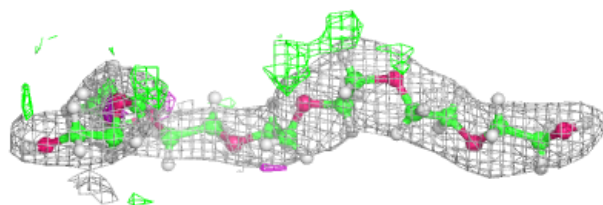
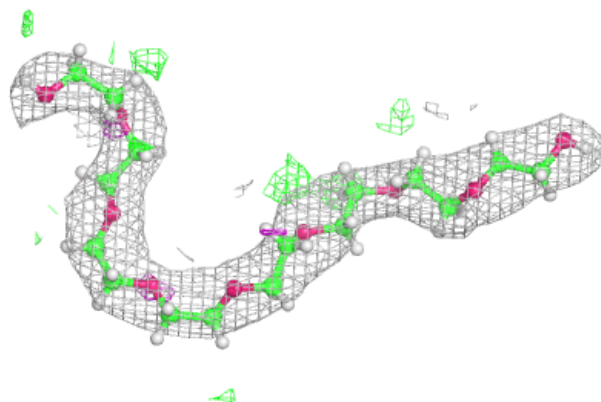
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	EDO	C	506	4/4	0.58	0.19	54,65,66,66	0
2	EDO	C	505	4/4	0.74	0.15	44,53,55,56	0
2	EDO	A	502	4/4	0.79	0.13	43,52,52,53	0
4	PE8	B	501	25/25	0.80	0.14	38,50,62,62	0
2	EDO	D	501	4/4	0.81	0.16	51,62,63,63	0
2	EDO	A	506	4/4	0.82	0.16	38,40,42,46	0
2	EDO	A	503	4/4	0.83	0.11	44,52,53,56	0
2	EDO	A	501	4/4	0.83	0.13	44,53,57,58	0
2	EDO	C	503	4/4	0.84	0.12	47,56,60,62	0
5	78V	B	504	32/32	0.84	0.13	27,40,49,50	0
2	EDO	D	502	4/4	0.85	0.12	49,59,61,63	0
5	78V	D	504	32/32	0.85	0.13	35,44,54,55	0
2	EDO	C	501	4/4	0.86	0.14	46,55,56,56	0
2	EDO	C	504	4/4	0.86	0.12	47,57,57,57	0
2	EDO	C	502	4/4	0.86	0.12	40,48,50,50	0
2	EDO	D	503	4/4	0.87	0.10	41,50,51,52	0
2	EDO	A	504	4/4	0.87	0.10	36,43,46,47	0
2	EDO	B	502	4/4	0.89	0.11	43,52,53,54	0
2	EDO	A	505	4/4	0.92	0.08	33,39,40,42	0
2	EDO	B	503	4/4	0.92	0.09	33,39,40,44	0
3	SAO	C	507	26/26	0.94	0.07	30,38,46,47	0
3	SAO	A	507	26/26	0.94	0.08	24,31,40,42	0

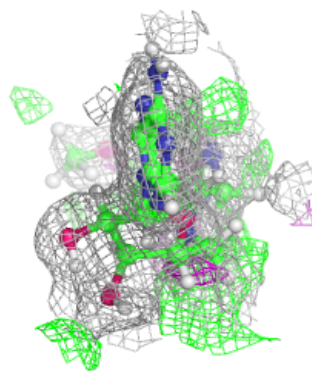
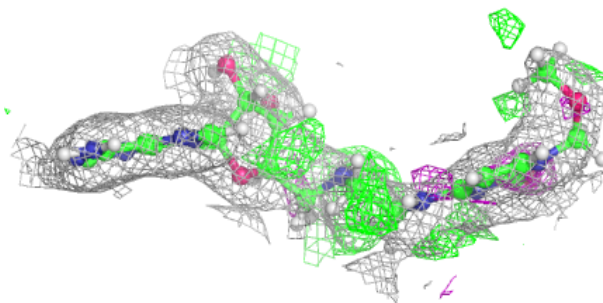
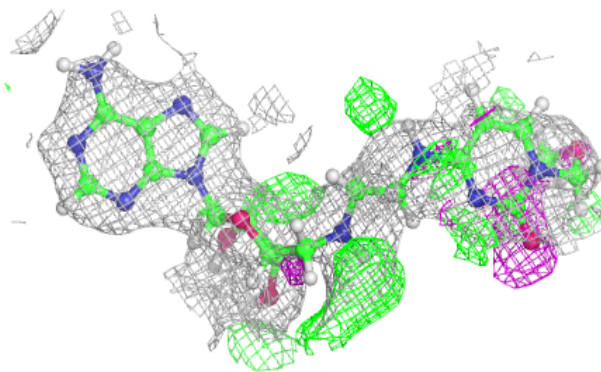
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around PE8 B 501:

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

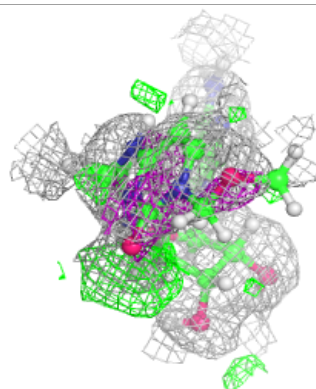
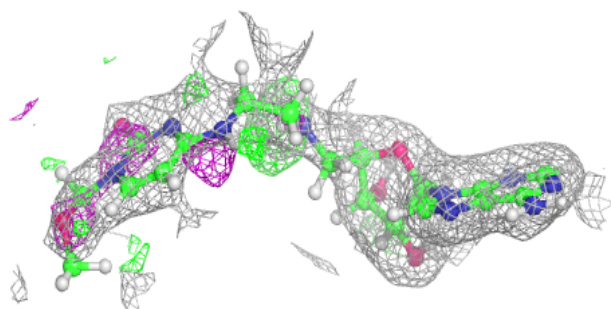
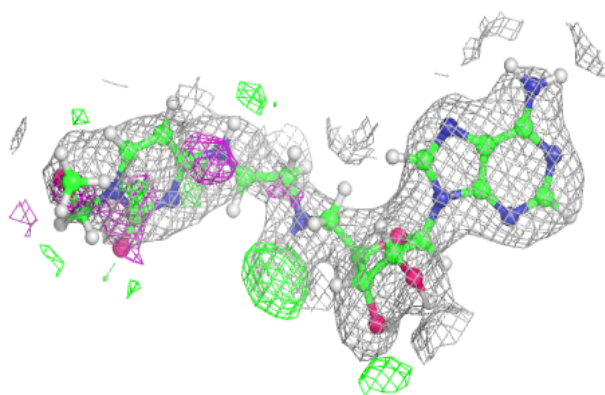
**Electron density around 78V B 504:**

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

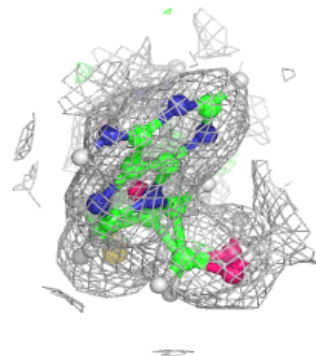
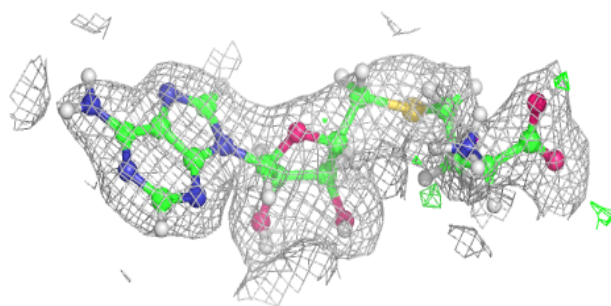
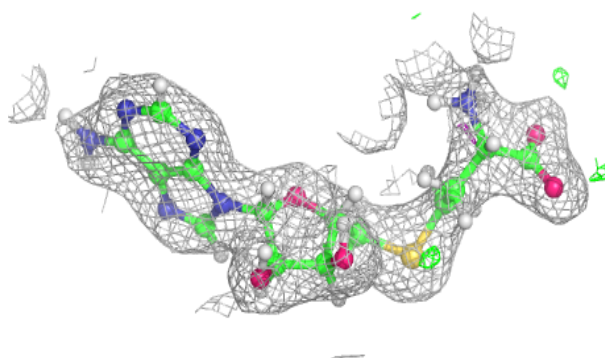


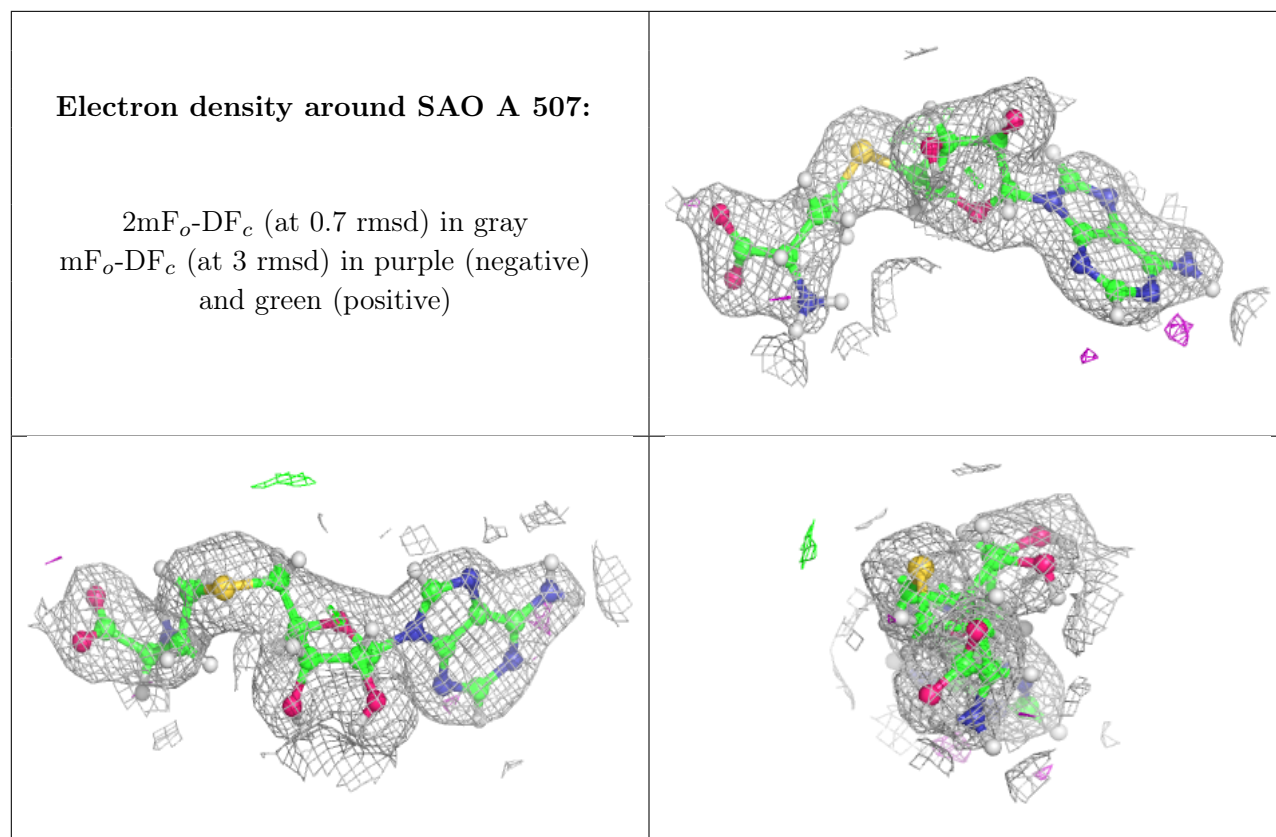
Electron density around 78V D 504:

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

**Electron density around SAO C 507:**

$2mF_o-DF_c$ (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.