



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 01:53 PM UTC

PDB ID : 4HMA / pdb_00004hma
Title : Crystal structure of an MMP twin carboxylate based inhibitor LC20 in complex with the MMP-9 catalytic domain
Authors : Stura, E.A.; Antoni, C.; Vera, L.; Nuti, E.; Carafa, L.; Cassar-Lajeunesse, E.; Dive, V.; Rossello, A.
Deposited on : 2012-10-18
Resolution : 1.94 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

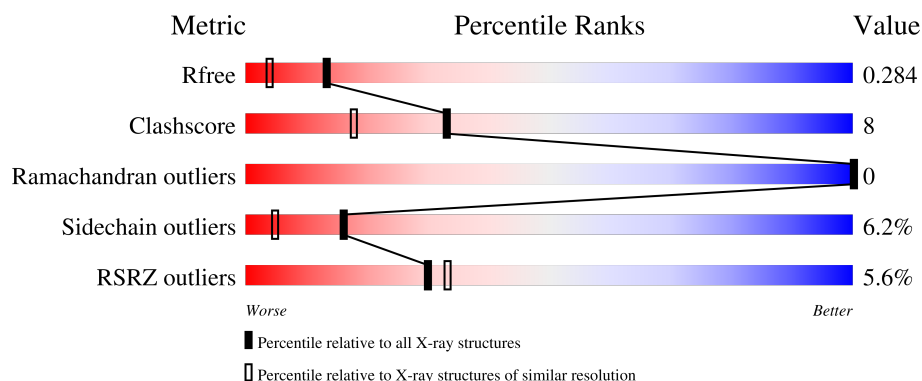
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.94 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	1452 (1.94-1.94)
Clashscore	190562	1494 (1.94-1.94)
Ramachandran outliers	187476	1479 (1.94-1.94)
Sidechain outliers	187428	1479 (1.94-1.94)
RSRZ outliers	180081	1453 (1.94-1.94)

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	160	<div> <div>8%</div> <div>80%</div> <div>18%</div> <div>.</div> </div>
1	B	160	<div> <div>4%</div> <div>79%</div> <div>19%</div> <div>.</div> </div>

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 3141 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 Matrix metalloproteinase-9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	160	Total	C	N	O	S	0	5	0
			1313	845	224	242	2			
1	B	160	Total	C	N	O	S	0	2	0
			1293	834	219	238	2			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	227	GLN	GLU	engineered mutation	UNP P14780
B	227	GLN	GLU	engineered mutation	UNP P14780

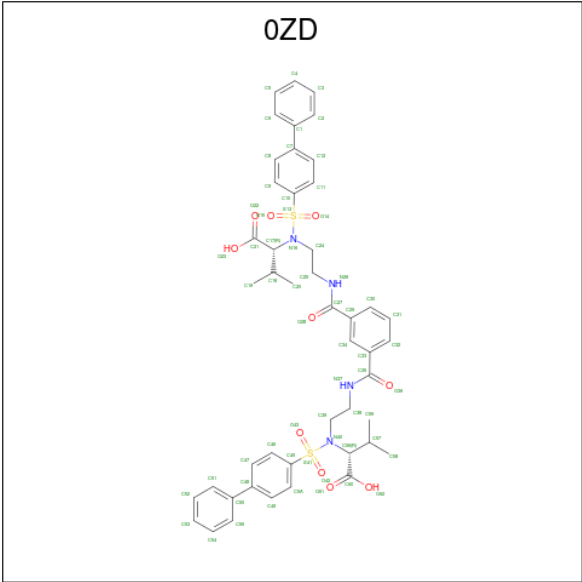
- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Zn	0	0
			2	2		
2	B	2	Total	Zn	0	0
			2	2		

- Molecule 3 is CALCIUM ION (CCD ID: CA) (formula: Ca).

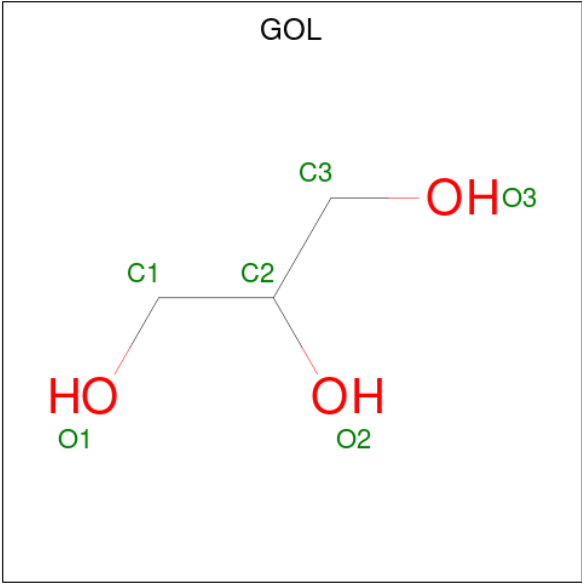
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	3	Total	Ca	0	0
			3	3		
3	B	3	Total	Ca	0	0
			3	3		

- Molecule 4 is N,N'-bis(2-[(biphenyl-4ylsulfonyl)[(2R)-1-hydroxy-3-methyl-1-oxobutan-2-yl]-amino]ethyl)benzene-1,3-dicarboxamide (CCD ID: 0ZD) (formula: C₄₆H₅₀N₄O₁₀S₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	S	0	0
			62	46	4	10	2		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



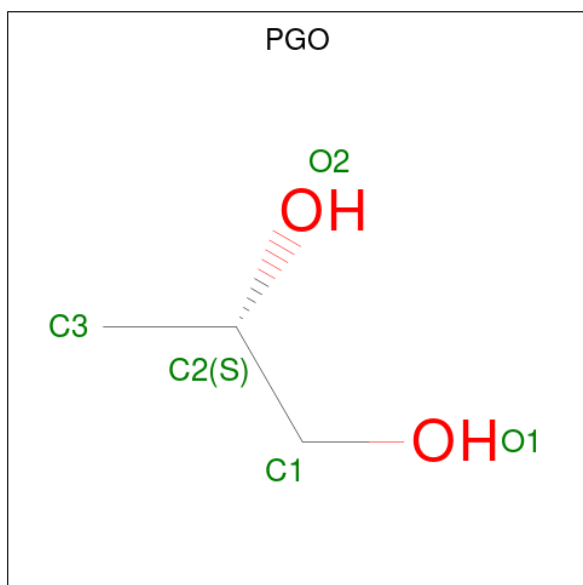
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		

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

- Molecule 6 is S-1,2-PROPANEDIOL (CCD ID: PGO) (formula: $C_3H_8O_2$).



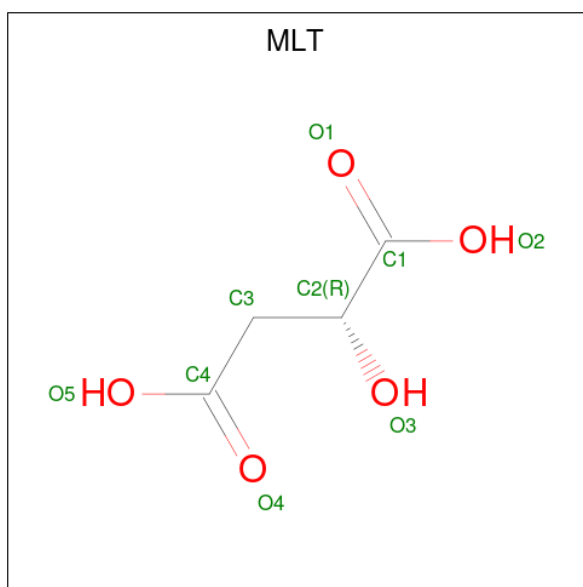
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			5	3	2		
6	A	1	Total	C	O	0	0
			5	3	2		
6	A	1	Total	C	O	0	0
			5	3	2		
6	B	1	Total	C	O	0	0
			5	3	2		
6	B	1	Total	C	O	0	0
			5	3	2		
6	B	1	Total	C	O	0	0
			5	3	2		

- Molecule 7 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



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

- Molecule 8 is D-MALATE (CCD ID: MLT) (formula: C₄H₆O₅).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	B	1	Total	C	O	0	0
			9	4	5		

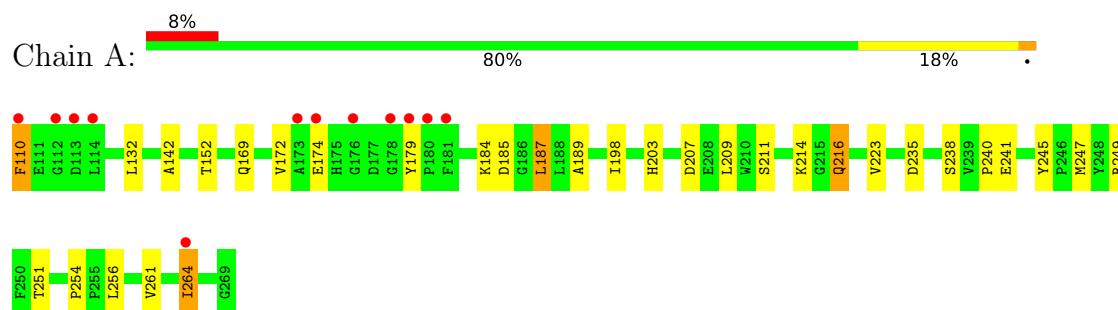
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	195	Total	O	0	0
			195	195		
9	B	150	Total	O	0	0
			150	150		

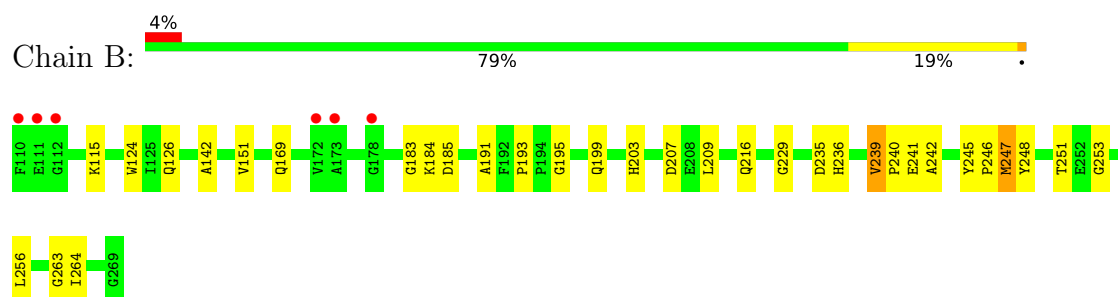
3 Residue-property plots

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: Matrix metalloproteinase-9



• Molecule 1: Matrix metalloproteinase-9



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	73.87Å 98.24Å 47.44Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.72 – 1.94 42.72 – 1.94	Depositor EDS
% Data completeness (in resolution range)	100.0 (42.72-1.94) 99.4 (42.72-1.94)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	0.15	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.32 (at 1.94Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.211 , 0.283 0.214 , 0.284	Depositor DCC
R_{free} test set	1301 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	27.4	Xtriage
Anisotropy	0.034	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 56.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	3141	wwPDB-VP
Average B, all atoms (Å ²)	32.0	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 57.70 % 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 2.2773e-05. 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: MLT, CA, PGO, 0ZD, GOL, PEG, ZN

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	1.19	6/1359 (0.4%)	1.12	2/1846 (0.1%)
1	B	1.25	4/1340 (0.3%)	1.11	3/1825 (0.2%)
All	All	1.22	10/2699 (0.4%)	1.11	5/3671 (0.1%)

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	152	THR	N-CA	5.99	1.50	1.46
1	A	189	ALA	CA-C	-5.68	1.45	1.52
1	A	142	ALA	CA-CB	5.62	1.62	1.53
1	A	198	ILE	N-CA	5.60	1.53	1.46
1	A	254	PRO	CA-C	5.56	1.57	1.52
1	B	151	VAL	CA-CB	5.43	1.61	1.54
1	B	142	ALA	CA-CB	5.40	1.61	1.53
1	B	242	ALA	CA-C	-5.34	1.45	1.52
1	B	191	ALA	CA-C	-5.30	1.46	1.52
1	A	198	ILE	CA-CB	5.18	1.60	1.54

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	242	ALA	N-CA-C	-5.53	102.30	110.48
1	B	229	GLY	N-CA-C	-5.30	106.07	112.49
1	A	179	TYR	CA-C-N	5.25	125.26	119.90
1	A	179	TYR	C-N-CA	5.25	125.26	119.90
1	B	239	VAL	CB-CA-C	-5.13	105.00	110.95

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	1313	0	1206	20	0
1	B	1293	0	1185	19	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	3	0	0	0	0
3	B	3	0	0	0	0
4	A	62	0	48	3	0
5	A	18	0	24	0	0
5	B	12	0	16	1	0
6	A	15	0	24	3	0
6	B	15	0	24	2	0
7	A	35	0	50	0	0
7	B	14	0	20	2	0
8	B	9	0	4	3	0
9	A	195	0	0	5	0
9	B	150	0	0	2	0
All	All	3141	0	2601	42	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 8.

All (42) 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:216[A]:GLN:H	1:A:216[A]:GLN:CD	1.74	0.92
4:A:306:OZD:H40	4:A:306:OZD:H32	1.65	0.77
1:A:241:GLU:HG3	9:A:539:HOH:O	1.88	0.73
1:B:241[B]:GLU:O	8:B:506:MLT:H31	1.90	0.72
1:A:172:VAL:HG21	9:A:529:HOH:O	1.93	0.68
1:A:216[B]:GLN:NE2	9:A:490:HOH:O	2.26	0.68
1:B:241[A]:GLU:O	8:B:506:MLT:H31	1.96	0.66
1:A:251:THR:HB	9:A:558:HOH:O	1.95	0.66
1:A:207:ASP:OD2	6:A:311:PGO:H31	1.97	0.63
1:B:240:PRO:HA	1:B:245:TYR:CD1	2.36	0.59
1:B:169:GLN:HG2	1:B:203:HIS:CD2	2.38	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:187:LEU:HD13	1:B:247:MET:SD	2.44	0.58
1:B:195:GLY:C	1:B:199:GLN:HB2	2.30	0.57
1:A:110:PHE:CD2	1:A:110:PHE:N	2.73	0.56
1:A:235:ASP:HB3	9:A:432:HOH:O	2.07	0.54
1:A:110:PHE:N	1:A:110:PHE:HD2	2.08	0.52
1:A:216[A]:GLN:CD	1:A:216[A]:GLN:N	2.57	0.51
5:B:508:GOL:C1	9:B:743:HOH:O	2.58	0.51
1:B:263:GLY:HA2	7:B:513:PEG:H21	1.94	0.49
6:B:510:PGO:H31	9:B:739:HOH:O	2.13	0.49
1:B:236:HIS:CD2	1:B:246:PRO:HB3	2.49	0.47
1:B:240:PRO:HA	1:B:245:TYR:CG	2.50	0.46
1:A:238[A]:SER:O	1:A:238[A]:SER:OG	2.32	0.46
1:B:251:THR:HG21	8:B:506:MLT:H2	1.96	0.46
1:A:169:GLN:HG3	1:A:203:HIS:CD2	2.51	0.46
4:A:306:OZD:H32	4:A:306:OZD:C19	2.34	0.46
1:A:223:VAL:HG22	4:A:306:OZD:H50	1.97	0.46
1:A:261:VAL:HA	1:A:264:ILE:HD11	1.97	0.46
1:B:124:TRP:CH2	1:B:126:GLN:HG3	2.52	0.45
1:A:240:PRO:HA	1:A:245:TYR:CD1	2.54	0.43
1:B:184:LYS:O	1:B:185:ASP:HB2	2.18	0.43
1:B:183:GLY:HA2	1:B:207:ASP:OD1	2.19	0.42
1:B:263:GLY:CA	7:B:513:PEG:H21	2.49	0.42
1:B:253:GLY:HA3	6:B:509:PGO:H2	2.01	0.42
1:A:184:LYS:O	1:A:185:ASP:HB2	2.20	0.42
1:B:264:ILE:HA	1:B:264:ILE:HD12	1.85	0.42
1:A:235:ASP:OD2	6:A:310:PGO:H2	2.20	0.41
1:B:239:VAL:HG12	1:B:241[B]:GLU:HG2	2.03	0.41
1:A:132:LEU:HD21	1:A:211:SER:HA	2.02	0.41
1:A:207:ASP:CG	6:A:311:PGO:H31	2.45	0.41
1:B:248:TYR:CD1	1:B:248:TYR:C	2.99	0.40
1:B:193:PRO:O	1:B:199:GLN:HB3	2.21	0.40

There are no symmetry-related clashes.

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	162/160 (101%)	155 (96%)	7 (4%)	0	100	100
1	B	160/160 (100%)	152 (95%)	8 (5%)	0	100	100
All	All	322/320 (101%)	307 (95%)	15 (5%)	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	132/128 (103%)	121 (92%)	11 (8%)	10	2
1	B	130/128 (102%)	123 (95%)	7 (5%)	20	7
All	All	262/256 (102%)	244 (93%)	18 (7%)	16	3

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	110	PHE
1	A	174	GLU
1	A	187	LEU
1	A	209	LEU
1	A	214	LYS
1	A	216[A]	GLN
1	A	216[B]	GLN
1	A	247	MET
1	A	249	ARG
1	A	256	LEU
1	A	264	ILE
1	B	115	LYS
1	B	209	LEU
1	B	216[A]	GLN
1	B	216[B]	GLN

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Mol	Chain	Res	Type
1	B	235	ASP
1	B	247	MET
1	B	256	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	126	GLN
1	B	199	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 30 ligands modelled in this entry, 10 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	$\# Z > 2$
5	GOL	A	307	-	5,5,5	0.55	0	5,5,5	0.61	0
7	PEG	B	512	-	6,6,6	0.65	0	5,5,5	0.37	0
7	PEG	A	314	-	6,6,6	0.54	0	5,5,5	0.54	0
5	GOL	A	308	-	5,5,5	0.37	0	5,5,5	0.91	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	PGO	A	311	-	4,4,4	0.87	0	4,4,4	0.71	0
7	PEG	A	316	-	6,6,6	0.60	0	5,5,5	0.29	0
7	PEG	A	317	-	6,6,6	0.51	0	5,5,5	0.36	0
6	PGO	A	312	-	4,4,4	0.81	0	4,4,4	0.51	0
6	PGO	B	510	-	4,4,4	0.65	0	4,4,4	0.69	0
7	PEG	A	313	-	6,6,6	0.60	0	5,5,5	0.51	0
5	GOL	B	507	-	5,5,5	0.49	0	5,5,5	0.75	0
7	PEG	B	513	-	6,6,6	0.62	0	5,5,5	0.74	0
5	GOL	A	309	-	5,5,5	0.41	0	5,5,5	0.83	0
8	MLT	B	506	-	8,8,8	0.95	0	10,10,10	1.94	4 (40%)
6	PGO	B	509	-	4,4,4	0.60	0	4,4,4	0.82	0
5	GOL	B	508	-	5,5,5	0.31	0	5,5,5	0.54	0
4	0ZD	A	306	2	64,66,66	1.90	5 (7%)	90,94,94	2.68	44 (48%)
7	PEG	A	315	-	6,6,6	0.67	0	5,5,5	0.35	0
6	PGO	A	310	-	4,4,4	0.80	0	4,4,4	1.11	1 (25%)
6	PGO	B	511	-	4,4,4	0.93	0	4,4,4	0.56	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	GOL	A	307	-	-	2/4/4/4	-
7	PEG	B	512	-	-	1/4/4/4	-
7	PEG	A	314	-	-	2/4/4/4	-
5	GOL	A	308	-	-	3/4/4/4	-
6	PGO	A	311	-	-	2/2/2/2	-
7	PEG	A	316	-	-	2/4/4/4	-
7	PEG	A	317	-	-	2/4/4/4	-
6	PGO	A	312	-	-	1/2/2/2	-
6	PGO	B	510	-	-	2/2/2/2	-
7	PEG	A	313	-	-	3/4/4/4	-
5	GOL	B	507	-	-	3/4/4/4	-
7	PEG	B	513	-	-	4/4/4/4	-
5	GOL	A	309	-	-	2/4/4/4	-
8	MLT	B	506	-	-	4/8/8/8	-
6	PGO	B	509	-	-	2/2/2/2	-
5	GOL	B	508	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	0ZD	A	306	2	-	5/76/76/76	0/5/5/5
7	PEG	A	315	-	-	4/4/4/4	-
6	PGO	A	310	-	-	2/2/2/2	-
6	PGO	B	511	-	-	2/2/2/2	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	306	0ZD	C45-S41	-9.37	1.63	1.76
4	A	306	0ZD	C10-S13	-7.52	1.66	1.76
4	A	306	0ZD	S13-N16	-4.24	1.57	1.63
4	A	306	0ZD	S41-N40	-3.26	1.58	1.63
4	A	306	0ZD	O42-S41	2.51	1.46	1.43

All (49) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	306	0ZD	O15-S13-O14	-9.68	104.48	119.59
4	A	306	0ZD	O14-S13-N16	5.64	116.83	106.97
4	A	306	0ZD	C8-C9-C10	5.50	124.79	119.44
4	A	306	0ZD	C57-C56-N40	5.15	121.59	112.83
4	A	306	0ZD	O23-C21-C17	4.81	119.88	111.92
4	A	306	0ZD	C29-C34-C33	-4.68	115.01	120.43
4	A	306	0ZD	O28-C27-C29	-4.40	112.17	120.90
4	A	306	0ZD	C29-C27-N26	4.40	126.26	117.12
4	A	306	0ZD	C38-N37-C35	-4.29	112.41	122.11
4	A	306	0ZD	C25-N26-C27	-3.95	113.17	122.11
4	A	306	0ZD	C3-C2-C1	-3.95	116.05	120.54
4	A	306	0ZD	C11-C10-C9	-3.63	115.74	120.47
4	A	306	0ZD	C30-C29-C34	3.61	123.42	119.25
4	A	306	0ZD	O42-S41-O43	-3.58	114.00	119.59
4	A	306	0ZD	C32-C33-C34	3.57	123.38	119.25
4	A	306	0ZD	C5-C6-C1	3.56	124.59	120.54
4	A	306	0ZD	C46-C45-S41	3.44	123.15	119.73
4	A	306	0ZD	O62-C60-C56	3.36	117.49	111.92
4	A	306	0ZD	C21-C17-N16	3.26	116.35	110.03
4	A	306	0ZD	O43-S41-C45	3.25	112.15	108.10
8	B	506	MLT	O5-C4-C3	3.23	124.05	114.00
4	A	306	0ZD	C17-N16-S13	3.19	124.89	118.39
4	A	306	0ZD	C18-C17-N16	3.09	118.08	112.83
4	A	306	0ZD	O36-C35-C33	-3.07	114.82	120.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	306	0ZD	C19-C18-C20	2.98	118.77	110.58
4	A	306	0ZD	C30-C31-C32	-2.93	116.48	120.24
4	A	306	0ZD	O42-S41-N40	-2.85	101.98	106.97
4	A	306	0ZD	C4-C5-C6	-2.82	116.75	120.24
4	A	306	0ZD	C24-C25-N26	-2.82	106.11	111.56
4	A	306	0ZD	O43-S41-N40	2.78	111.84	106.97
8	B	506	MLT	O2-C1-C2	2.76	118.57	112.74
4	A	306	0ZD	C33-C35-N37	2.68	122.68	117.12
4	A	306	0ZD	C9-C8-C7	-2.63	117.74	121.12
4	A	306	0ZD	O42-S41-C45	2.63	111.37	108.10
4	A	306	0ZD	C47-C46-C45	2.61	121.97	119.44
4	A	306	0ZD	O22-C21-C17	-2.57	119.73	123.45
8	B	506	MLT	O3-C2-C3	2.55	116.09	109.96
4	A	306	0ZD	C38-C39-N40	2.53	117.15	112.49
4	A	306	0ZD	C4-C3-C2	2.53	123.36	120.24
4	A	306	0ZD	C9-C10-S13	2.52	122.23	119.73
8	B	506	MLT	O4-C4-C3	-2.43	115.38	122.84
4	A	306	0ZD	C12-C11-C10	2.38	121.75	119.44
4	A	306	0ZD	C11-C10-S13	2.30	122.02	119.73
4	A	306	0ZD	C24-N16-S13	2.23	123.53	118.43
4	A	306	0ZD	C46-C47-C48	-2.20	118.30	121.12
4	A	306	0ZD	C19-C18-C17	2.09	116.13	110.77
4	A	306	0ZD	C59-C57-C56	2.06	116.06	110.77
4	A	306	0ZD	C46-C45-C5A	-2.03	117.81	120.47
6	A	310	PGO	O2-C2-C1	-2.00	105.18	114.99

There are no chirality outliers.

All (50) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	306	0ZD	C29-C27-N26-C25
5	B	507	GOL	C1-C2-C3-O3
6	A	310	PGO	O1-C1-C2-C3
6	A	310	PGO	O1-C1-C2-O2
6	A	311	PGO	O1-C1-C2-C3
6	B	509	PGO	O1-C1-C2-C3
6	B	509	PGO	O1-C1-C2-O2
6	B	510	PGO	O1-C1-C2-O2
6	B	511	PGO	O1-C1-C2-C3
6	B	511	PGO	O1-C1-C2-O2
4	A	306	0ZD	O28-C27-N26-C25
5	A	307	GOL	O1-C1-C2-O2

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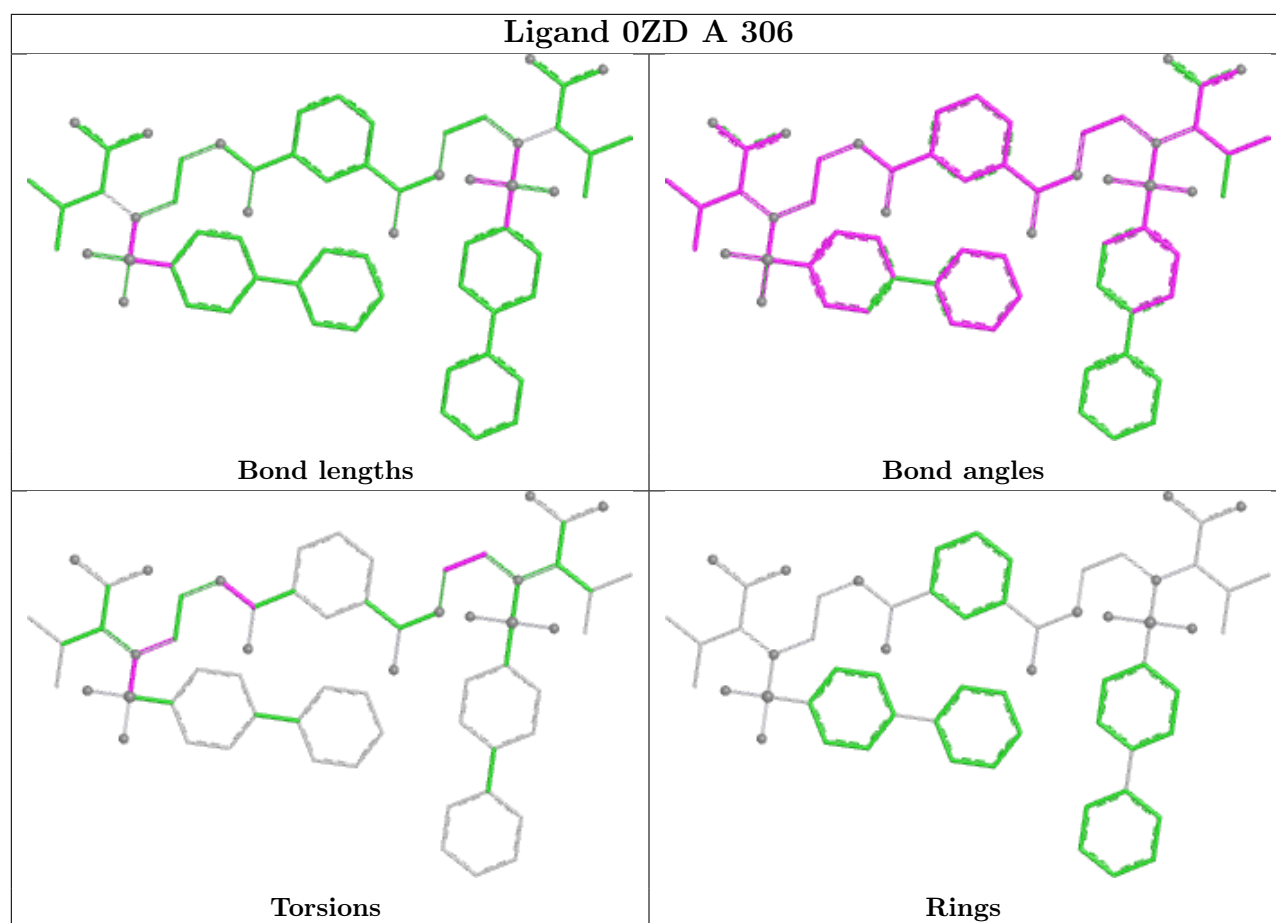
Mol	Chain	Res	Type	Atoms
7	A	313	PEG	O1-C1-C2-O2
7	A	315	PEG	O1-C1-C2-O2
7	A	314	PEG	O2-C3-C4-O4
7	A	316	PEG	O2-C3-C4-O4
5	A	307	GOL	O1-C1-C2-C3
5	A	308	GOL	C1-C2-C3-O3
5	B	507	GOL	O1-C1-C2-C3
5	B	508	GOL	O1-C1-C2-C3
7	A	317	PEG	O1-C1-C2-O2
5	B	507	GOL	O2-C2-C3-O3
5	A	308	GOL	O2-C2-C3-O3
5	B	508	GOL	O1-C1-C2-O2
6	A	311	PGO	O1-C1-C2-O2
8	B	506	MLT	O1-C1-C2-O3
7	A	316	PEG	O1-C1-C2-O2
7	A	313	PEG	O2-C3-C4-O4
6	A	312	PGO	O1-C1-C2-C3
6	B	510	PGO	O1-C1-C2-C3
5	A	309	GOL	C1-C2-C3-O3
7	A	314	PEG	C1-C2-O2-C3
7	B	513	PEG	C1-C2-O2-C3
7	A	317	PEG	C1-C2-O2-C3
7	A	315	PEG	C1-C2-O2-C3
4	A	306	0ZD	N37-C38-C39-N40
7	A	315	PEG	C4-C3-O2-C2
8	B	506	MLT	O2-C1-C2-O3
4	A	306	0ZD	C25-C24-N16-S13
7	B	513	PEG	C4-C3-O2-C2
5	A	309	GOL	O2-C2-C3-O3
4	A	306	0ZD	C24-N16-S13-O14
7	B	513	PEG	O1-C1-C2-O2
7	A	315	PEG	O2-C3-C4-O4
7	A	313	PEG	C1-C2-O2-C3
5	A	308	GOL	O1-C1-C2-C3
8	B	506	MLT	O1-C1-C2-C3
8	B	506	MLT	O2-C1-C2-C3
7	B	512	PEG	O1-C1-C2-O2
7	B	513	PEG	O2-C3-C4-O4

There are no ring outliers.

8 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	311	PGO	2	0
6	B	510	PGO	1	0
7	B	513	PEG	2	0
8	B	506	MLT	3	0
6	B	509	PGO	1	0
5	B	508	GOL	1	0
4	A	306	0ZD	3	0
6	A	310	PGO	1	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	160/160 (100%)	0.39	12 (7%) 20 23	9, 28, 49, 74	5 (3%)
1	B	160/160 (100%)	0.13	6 (3%) 44 49	15, 26, 44, 70	2 (1%)
All	All	320/320 (100%)	0.26	18 (5%) 30 33	9, 27, 47, 74	7 (2%)

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	110	PHE	4.2
1	A	112	GLY	3.5
1	B	110	PHE	3.5
1	A	173	ALA	3.1
1	B	112	GLY	3.1
1	A	178	GLY	2.8
1	A	176	GLY	2.8
1	A	174	GLU	2.7
1	A	179	TYR	2.6
1	A	264	ILE	2.4
1	A	114	LEU	2.4
1	A	181	PHE	2.4
1	A	180	PRO	2.3
1	B	178	GLY	2.2
1	B	173	ALA	2.2
1	B	111	GLU	2.1
1	B	172	VAL	2.1
1	A	113	ASP	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 ⓘ

There are no oligosaccharides in this entry.

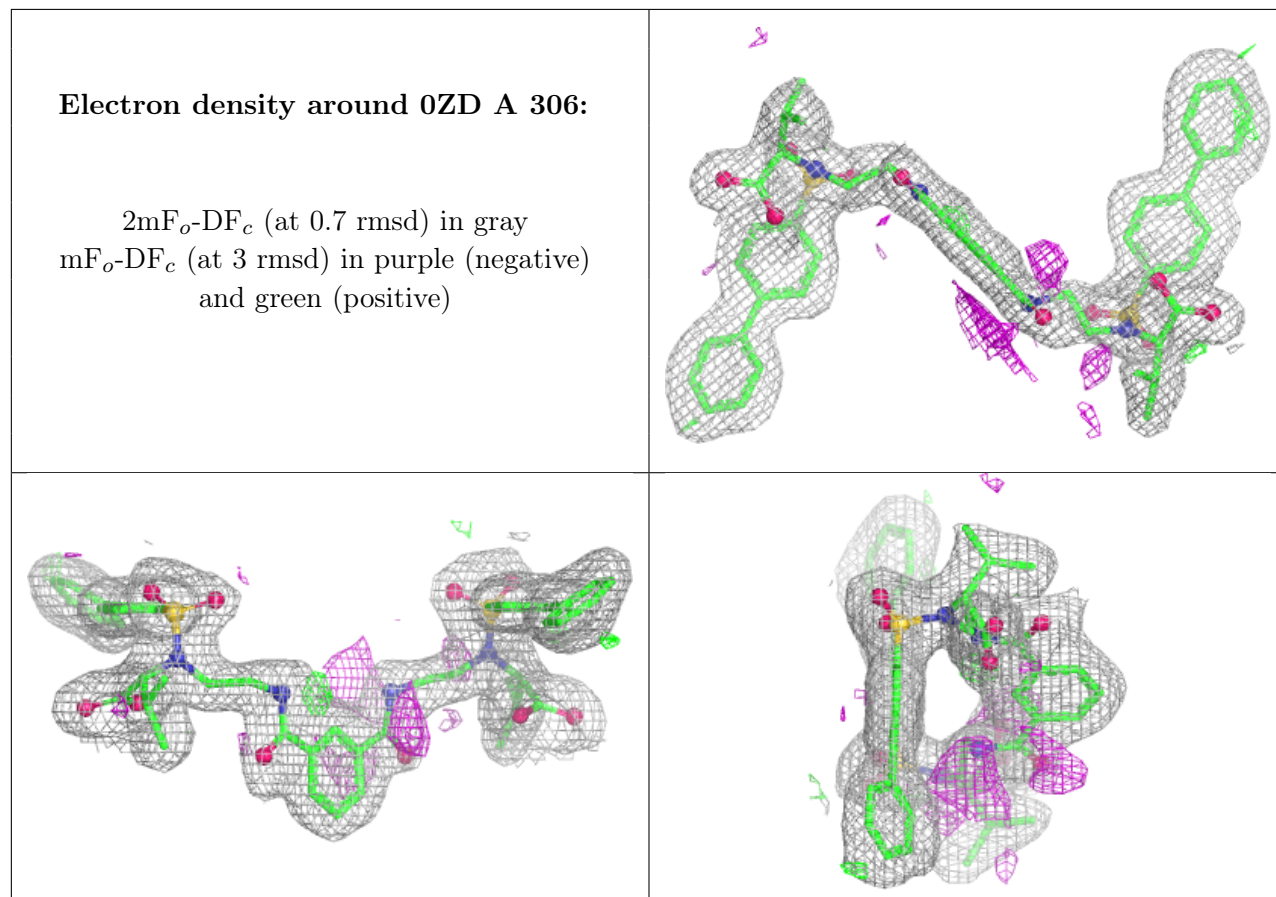
6.4 Ligands ⓘ

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(\AA^2)	Q<0.9
7	PEG	A	313	7/7	0.55	0.16	56,60,61,63	0
6	PGO	B	509	5/5	0.59	0.21	55,60,61,61	0
6	PGO	B	510	5/5	0.62	0.16	44,45,48,51	0
5	GOL	A	309	6/6	0.64	0.11	61,66,67,67	0
6	PGO	A	311	5/5	0.65	0.14	50,53,54,54	0
5	GOL	B	507	6/6	0.67	0.13	49,50,51,51	0
5	GOL	B	508	6/6	0.69	0.13	58,58,59,60	0
7	PEG	A	316	7/7	0.73	0.13	63,65,66,67	0
8	MLT	B	506	9/9	0.74	0.14	45,50,58,58	0
6	PGO	B	511	5/5	0.75	0.14	49,49,50,50	0
7	PEG	A	317	7/7	0.75	0.15	63,65,66,67	0
7	PEG	B	512	7/7	0.75	0.13	58,59,60,61	0
6	PGO	A	312	5/5	0.75	0.17	73,73,75,76	0
6	PGO	A	310	5/5	0.76	0.16	42,43,43,43	0
5	GOL	A	307	6/6	0.77	0.13	38,48,51,52	0
7	PEG	A	314	7/7	0.77	0.12	46,53,56,56	0
7	PEG	B	513	7/7	0.80	0.14	44,49,53,55	0
5	GOL	A	308	6/6	0.80	0.12	40,46,49,50	0
7	PEG	A	315	7/7	0.85	0.11	56,59,61,62	0
4	0ZD	A	306	62/62	0.94	0.08	16,24,30,34	0
3	CA	A	305	1/1	0.97	0.15	55,55,55,55	0
3	CA	B	505	1/1	0.97	0.11	55,55,55,55	0
3	CA	A	303	1/1	0.98	0.03	30,30,30,30	0
3	CA	A	304	1/1	0.98	0.06	34,34,34,34	0
2	ZN	A	302	1/1	0.99	0.02	32,32,32,32	0
3	CA	B	503	1/1	0.99	0.04	29,29,29,29	0
3	CA	B	504	1/1	0.99	0.03	29,29,29,29	0
2	ZN	B	502	1/1	0.99	0.03	31,31,31,31	0
2	ZN	B	501	1/1	1.00	0.03	21,21,21,21	0
2	ZN	A	301	1/1	1.00	0.01	22,22,22,22	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.



6.5 Other polymers [i](#)

There are no such residues in this entry.