



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 11:28 AM UTC

PDB ID : 4H49 / pdb_00004h49
Title : Crystal structure of the catalytic domain of MMP-12 in complex with a twin inhibitor.
Authors : Antoni, C.; Stura, E.A.; Vera, L.; Nuti, E.; Carafa, L.; Cassar-Lajeunesse, E.; Dive, V.; Rossello, A.
Deposited on : 2012-09-17
Resolution : 2.16 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)
Xtrriage (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

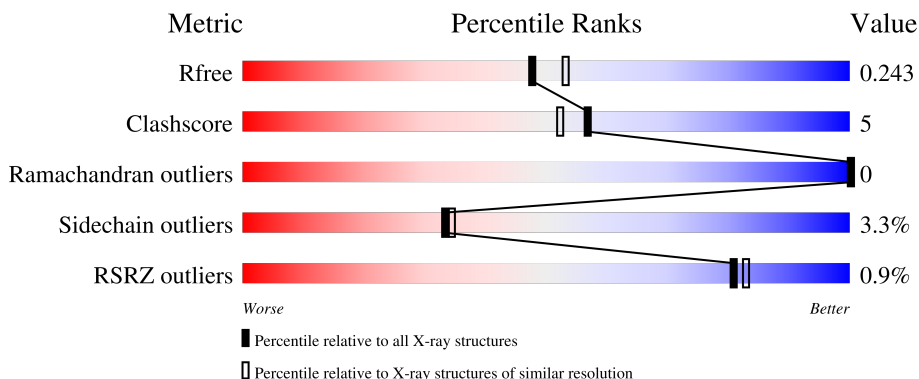
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.16 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	2057 (2.16-2.16)
Clashscore	190562	2159 (2.16-2.16)
Ramachandran outliers	187476	2134 (2.16-2.16)
Sidechain outliers	187428	2133 (2.16-2.16)
RSRZ outliers	180081	2059 (2.16-2.16)

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	159	85% 14% .
1	B	159	89% 9% .
1	C	159	89% 8% ..
1	D	159	96% ..

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 5509 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 Macrophage metalloelastase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	159	1257	800	221	232	4	0	1	0
1	B	159	1246	794	217	231	4	0	0	0
1	C	156	1263	804	222	234	3	0	4	0
1	D	159	1273	809	223	237	4	0	3	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	105	MET	-	expression tag	UNP P39900
A	171	ASP	PHE	engineered mutation	UNP P39900
B	105	MET	-	expression tag	UNP P39900
B	171	ASP	PHE	engineered mutation	UNP P39900
C	105	MET	-	expression tag	UNP P39900
C	171	ASP	PHE	engineered mutation	UNP P39900
D	105	MET	-	expression tag	UNP P39900
D	171	ASP	PHE	engineered mutation	UNP P39900

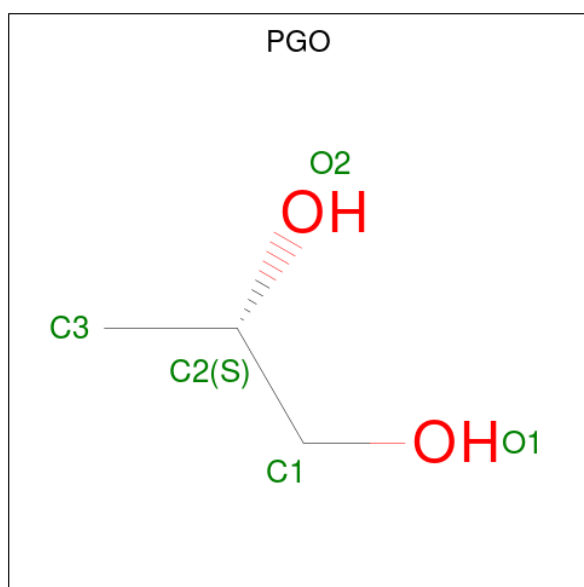
- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

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

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

- Molecule 4 is S-1,2-PROPANEDIOL (CCD ID: PGO) (formula: C₃H₈O₂).



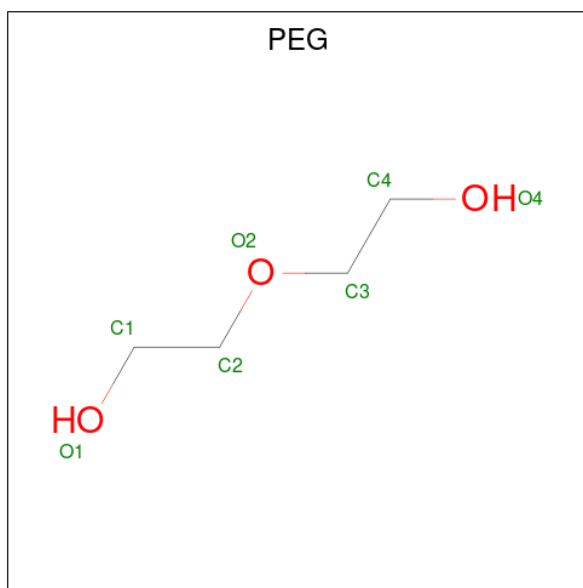
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 5 3 2	0	0
4	A	1	Total C O 5 3 2	0	0

- Molecule 5 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C₂H₆OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	S		
5	A	1	4	2	1	1	0	0

- Molecule 6 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



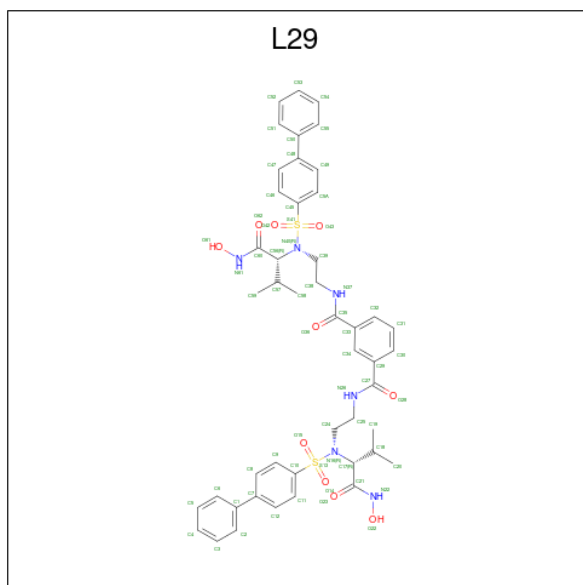
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
6	A	1	7	4	3	0	0
6	B	1	7	4	3	0	0
6	C	1	7	4	3	0	0

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

- Molecule 7 is N,N'-bis(2-((biphenyl-4-ylsulfonyl)[(2R)-1-(hydroxyamino)-3-methyl-1-oxobutan-2-yl]amino)ethyl)benzene-1,3-dicarboxamide (non-preferred name) (CCD ID: L29) (formula: C₄₆H₅₂N₆O₁₀S₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
7	B	1	Total	C	N	O	S	0	0
			64	46	6	10	2		
7	C	1	Total	C	N	O	S	0	0
			64	46	6	10	2		

- Molecule 8 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



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

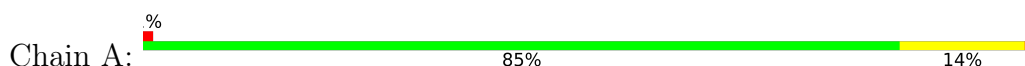
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	62	Total	O	0	0
			62	62		
9	B	63	Total	O	0	0
			63	63		
9	C	64	Total	O	0	0
			64	64		
9	D	85	Total	O	0	0
			85	85		

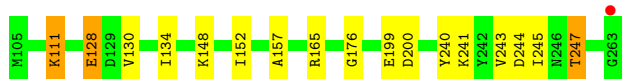
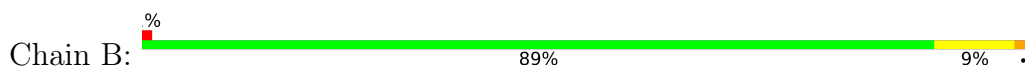
3 Residue-property plots [i](#)

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: Macrophage metalloelastase



- Molecule 1: Macrophage metalloelastase



- Molecule 1: Macrophage metalloelastase



- Molecule 1: Macrophage metalloelastase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	47.44Å 106.49Å 65.88Å 90.00° 94.96° 90.00°	Depositor
Resolution (Å)	47.26 – 2.16 47.26 – 2.16	Depositor EDS
% Data completeness (in resolution range)	99.2 (47.26-2.16) 99.6 (47.26-2.16)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.81 (at 2.16Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.8_1069)	Depositor
R, R_{free}	0.167 , 0.241 0.170 , 0.243	Depositor DCC
R_{free} test set	1741 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	30.2	Xtrriage
Anisotropy	0.508	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 38.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	5509	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.34% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, DMS, PEG, ZN, PGO, L29, CA

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	0.50	0/1294	0.77	0/1752
1	B	0.47	0/1283	0.77	0/1738
1	C	0.47	0/1300	0.73	0/1759
1	D	0.46	0/1310	0.76	0/1774
All	All	0.48	0/5187	0.76	0/7023

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	1257	0	1188	18	0
1	B	1246	0	1176	12	0
1	C	1263	0	1190	9	0
1	D	1273	0	1199	8	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
3	A	3	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	3	0	0	0	0
3	C	3	0	0	0	0
3	D	3	0	0	0	0
4	A	10	0	16	2	0
5	A	4	0	6	3	0
6	A	7	0	10	1	0
6	B	7	0	10	2	0
6	C	7	0	10	0	0
6	D	7	0	10	2	0
7	B	64	0	51	2	0
7	C	64	0	50	0	0
8	B	6	0	8	1	0
9	A	62	0	0	1	0
9	B	63	0	0	1	0
9	C	64	0	0	1	0
9	D	85	0	0	0	0
All	All	5509	0	4924	47	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 5.

All (47) 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:D:110:ARG:H	6:D:306:PEG:H42	1.52	0.75
1:D:117[B]:ARG:HH12	1:D:154:THR:HA	1.58	0.69
1:D:119:ASN:HB2	1:D:160:LEU:HD12	1.76	0.67
1:A:127:ARG:HH22	4:A:309:PGO:H12	1.62	0.65
1:A:128:GLU:H	1:A:128:GLU:CD	2.09	0.61
1:C:144:VAL:HG11	1:C:255:ILE:HD12	1.85	0.59
1:A:120:ASN:HB2	6:A:308:PEG:H22	1.85	0.58
1:A:117:ARG:NH2	1:A:155:GLY:O	2.39	0.56
1:B:128:GLU:HG3	1:C:135:ARG:HD2	1.88	0.55
1:C:125:MET:HE3	1:C:205:THR:HG22	1.87	0.54
1:D:110:ARG:H	6:D:306:PEG:C4	2.19	0.53
1:B:128:GLU:HB2	1:C:135:ARG:CZ	2.40	0.51
1:B:240:TYR:HD2	6:B:607:PEG:H12	1.75	0.51
1:A:156:MET:HE3	1:A:156:MET:HA	1.93	0.50
1:A:132:TYR:O	1:A:136:LYS:HG2	2.11	0.50
1:C:110:ARG:HH22	1:C:188:GLY:HA2	1.76	0.50
1:A:165[B]:ARG:O	5:A:307:DMS:H12	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:111:LYS:HD3	1:B:111:LYS:H	1.79	0.48
7:B:601:L29:H28	9:B:731:HOH:O	2.12	0.48
1:A:165[A]:ARG:O	5:A:307:DMS:H12	2.14	0.47
1:B:241:LYS:H	8:B:608:GOL:H32	1.80	0.47
1:A:125:MET:HE3	1:A:205:THR:HG22	1.98	0.45
1:A:165[A]:ARG:NH2	9:A:449:HOH:O	2.49	0.44
1:B:165:ARG:HB3	1:B:199:GLU:HB3	1.99	0.44
1:B:244:ASP:HB3	1:B:247:THR:HG23	2.00	0.44
1:A:198:ASP:HB3	1:A:201:GLU:HG2	2.00	0.43
1:A:175:ASP:O	1:B:241:LYS:HE2	2.19	0.43
1:C:251:SER:O	1:C:255:ILE:HG12	2.19	0.43
1:A:213:PHE:HD2	1:A:245:ILE:HD12	1.83	0.43
1:A:178:GLY:HA3	6:B:607:PEG:H31	2.00	0.43
1:C:156:MET:HE2	1:C:156:MET:HB3	1.88	0.43
1:D:117[A]:ARG:NH2	1:D:160:LEU:HD11	2.34	0.43
1:A:126:ASN:HB3	1:A:128:GLU:OE2	2.20	0.42
1:D:117[B]:ARG:HH12	1:D:154:THR:CA	2.27	0.42
1:B:128:GLU:H	1:B:128:GLU:HG2	1.45	0.42
1:C:127:ARG:NH1	9:C:418:HOH:O	2.30	0.42
1:D:128:GLU:CD	1:D:128:GLU:H	2.27	0.42
1:A:136:LYS:HA	1:A:136:LYS:HD2	1.87	0.42
4:A:306:PGO:C2	5:A:307:DMS:H13	2.51	0.41
1:C:160:LEU:HD12	1:C:160:LEU:HA	1.92	0.41
1:B:176:GLY:HA2	1:B:200:ASP:OD2	2.20	0.41
1:A:172:HIS:O	1:A:183:HIS:HE1	2.04	0.41
1:B:152:ILE:HD11	1:B:157:ALA:HB2	2.02	0.41
1:B:130:VAL:O	1:B:134:ILE:HG12	2.21	0.41
7:B:601:L29:H17	7:B:601:L29:H22	2.03	0.41
1:A:213:PHE:CD2	1:A:245:ILE:HG23	2.56	0.40
1:D:117[A]:ARG:HH21	1:D:160:LEU:HD21	1.86	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	158/159 (99%)	154 (98%)	4 (2%)	0	100	100
1	B	157/159 (99%)	151 (96%)	6 (4%)	0	100	100
1	C	158/159 (99%)	151 (96%)	7 (4%)	0	100	100
1	D	160/159 (101%)	155 (97%)	5 (3%)	0	100	100
All	All	633/636 (100%)	611 (96%)	22 (4%)	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	129/128 (101%)	124 (96%)	5 (4%)	28	28
1	B	128/128 (100%)	122 (95%)	6 (5%)	23	21
1	C	130/128 (102%)	126 (97%)	4 (3%)	35	37
1	D	131/128 (102%)	129 (98%)	2 (2%)	57	64
All	All	518/512 (101%)	501 (97%)	17 (3%)	33	34

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	105	MET
1	A	117	ARG
1	A	150	SER
1	A	152	ILE
1	A	233	LYS
1	B	111	LYS
1	B	128	GLU
1	B	148	LYS
1	B	243	VAL
1	B	245	ILE

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Mol	Chain	Res	Type
1	B	247	THR
1	C	110	ARG
1	C	154	THR
1	C	245	ILE
1	C	249	ARG
1	D	128	GLU
1	D	160	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	119	ASN
1	C	120	ASN
1	C	139	GLN
1	D	120	ASN
1	D	126	ASN

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, 20 are monoatomic - leaving 10 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	PGO	A	306	-	4,4,4	0.74	0	4,4,4	0.54	0
7	L29	B	601	2	64,68,68	6.18	34 (53%)	90,96,96	2.22	25 (27%)
8	GOL	B	608	-	5,5,5	0.40	0	5,5,5	0.33	0
5	DMS	A	307	-	3,3,3	0.53	0	3,3,3	0.88	0
4	PGO	A	309	-	4,4,4	0.65	0	4,4,4	0.79	0
6	PEG	D	306	-	6,6,6	0.53	0	5,5,5	0.18	0
6	PEG	A	308	-	6,6,6	0.56	0	5,5,5	0.60	0
6	PEG	C	307	-	6,6,6	0.51	0	5,5,5	0.24	0
7	L29	C	306	2	64,68,68	6.19	34 (53%)	90,96,96	2.05	20 (22%)
6	PEG	B	607	-	6,6,6	0.59	0	5,5,5	0.35	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	PGO	A	306	-	-	0/2/2/2	-
7	L29	B	601	2	-	10/80/80/80	0/5/5/5
8	GOL	B	608	-	-	2/4/4/4	-
4	PGO	A	309	-	-	0/2/2/2	-
6	PEG	D	306	-	-	0/4/4/4	-
6	PEG	A	308	-	-	2/4/4/4	-
6	PEG	C	307	-	-	2/4/4/4	-
7	L29	C	306	2	-	6/80/80/80	0/5/5/5
6	PEG	B	607	-	-	3/4/4/4	-

All (68) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	B	601	L29	O43-S41	21.18	1.66	1.43
7	C	306	L29	O15-S13	20.67	1.65	1.43
7	C	306	L29	O43-S41	20.25	1.65	1.43
7	B	601	L29	O15-S13	20.12	1.65	1.43
7	B	601	L29	O42-S41	19.45	1.64	1.43
7	C	306	L29	O42-S41	19.44	1.64	1.43
7	C	306	L29	O14-S13	18.95	1.63	1.43
7	B	601	L29	O14-S13	18.62	1.63	1.43
7	B	601	L29	C34-C29	10.32	1.54	1.39
7	C	306	L29	C34-C29	9.89	1.54	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	B	601	L29	C5A-C45	8.82	1.52	1.38
7	C	306	L29	C5A-C45	8.68	1.52	1.38
7	B	601	L29	C3-C2	7.81	1.52	1.38
7	C	306	L29	C3-C2	7.79	1.52	1.38
7	B	601	L29	C31-C32	7.45	1.51	1.38
7	C	306	L29	C31-C32	7.34	1.51	1.38
7	B	601	L29	C31-C30	7.26	1.51	1.38
7	C	306	L29	C31-C30	6.93	1.50	1.38
7	C	306	L29	C8-C7	6.82	1.53	1.39
7	C	306	L29	C27-N26	6.72	1.48	1.33
7	C	306	L29	C10-S13	6.53	1.85	1.76
7	B	601	L29	C8-C7	6.53	1.52	1.39
7	C	306	L29	C11-C10	6.18	1.48	1.38
7	B	601	L29	C27-N26	6.17	1.47	1.33
7	C	306	L29	C12-C11	6.05	1.48	1.38
7	B	601	L29	C35-N37	6.04	1.47	1.33
7	C	306	L29	C47-C46	5.93	1.48	1.38
7	B	601	L29	C47-C46	5.92	1.48	1.38
7	B	601	L29	S13-N16	-5.82	1.54	1.63
7	C	306	L29	C35-N37	5.82	1.46	1.33
7	C	306	L29	S41-N40	5.77	1.71	1.63
7	C	306	L29	S13-N16	-5.70	1.54	1.63
7	B	601	L29	C11-C10	5.58	1.47	1.38
7	B	601	L29	C45-S41	5.49	1.83	1.76
7	B	601	L29	C12-C11	5.31	1.47	1.38
7	B	601	L29	C10-S13	5.30	1.83	1.76
7	B	601	L29	S41-N40	4.73	1.70	1.63
7	C	306	L29	C45-S41	4.55	1.82	1.76
7	B	601	L29	C34-C33	4.33	1.46	1.39
7	C	306	L29	C5-C6	4.33	1.46	1.38
7	B	601	L29	C5-C6	4.25	1.46	1.38
7	C	306	L29	C47-C48	4.18	1.47	1.39
7	B	601	L29	C47-C48	3.99	1.47	1.39
7	B	601	L29	C9-C10	3.91	1.45	1.38
7	C	306	L29	C9-C10	3.73	1.44	1.38
7	B	601	L29	C55-C50	3.67	1.46	1.39
7	B	601	L29	C52-C51	3.66	1.45	1.38
7	C	306	L29	C34-C33	3.62	1.44	1.39
7	C	306	L29	C55-C50	3.59	1.46	1.39
7	C	306	L29	C5A-C49	3.27	1.44	1.38
7	C	306	L29	O23-C21	-3.11	1.17	1.23
7	B	601	L29	C5A-C49	3.08	1.43	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	C	306	L29	C52-C51	3.06	1.44	1.38
7	B	601	L29	O23-C21	-2.86	1.17	1.23
7	C	306	L29	C9-C8	2.81	1.43	1.38
7	B	601	L29	C49-C48	2.67	1.44	1.39
7	C	306	L29	C1-C7	2.53	1.55	1.49
7	C	306	L29	C53-C52	2.40	1.43	1.38
7	B	601	L29	C1-C7	2.29	1.54	1.49
7	B	601	L29	C30-C29	-2.28	1.36	1.39
7	B	601	L29	C50-C48	2.26	1.54	1.49
7	C	306	L29	C51-C50	-2.24	1.35	1.39
7	B	601	L29	C9-C8	2.23	1.42	1.38
7	C	306	L29	C49-C48	2.23	1.43	1.39
7	C	306	L29	O62-C60	-2.19	1.19	1.23
7	C	306	L29	C30-C29	-2.17	1.36	1.39
7	B	601	L29	O62-C60	-2.16	1.19	1.23
7	B	601	L29	C53-C52	2.05	1.42	1.38

All (45) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	601	L29	O14-S13-C10	-9.67	96.08	108.10
7	C	306	L29	O14-S13-C10	-9.67	96.08	108.10
7	B	601	L29	O15-S13-C10	-9.19	96.67	108.10
7	C	306	L29	O15-S13-C10	-6.23	100.36	108.10
7	C	306	L29	C45-S41-N40	5.74	117.37	107.36
7	C	306	L29	O15-S13-N16	4.92	115.58	106.97
7	C	306	L29	O14-S13-N16	4.46	114.78	106.97
7	B	601	L29	O42-S41-O43	-4.28	112.91	119.59
7	B	601	L29	O15-S13-N16	4.14	114.21	106.97
7	B	601	L29	C45-S41-N40	4.01	114.36	107.36
7	B	601	L29	C56-N40-S41	-3.70	110.86	118.39
7	B	601	L29	O14-S13-N16	3.63	113.31	106.97
7	C	306	L29	C39-N40-S41	-3.50	110.42	118.43
7	B	601	L29	C39-N40-S41	-3.20	111.11	118.43
7	C	306	L29	O42-S41-O43	-3.14	114.69	119.59
7	B	601	L29	C32-C33-C34	2.83	122.52	119.25
7	B	601	L29	C38-C39-N40	-2.77	107.39	112.49
7	C	306	L29	C32-C33-C34	2.73	122.41	119.25
7	C	306	L29	C25-N26-C27	-2.64	116.13	122.11
7	B	601	L29	C57-C56-C60	2.53	115.41	111.88
7	B	601	L29	C8-C7-C12	2.50	122.15	117.68
7	B	601	L29	C60-C56-N40	2.46	116.19	109.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	601	L29	O14-S13-O15	2.46	123.42	119.59
7	C	306	L29	C49-C48-C47	2.44	122.05	117.68
7	B	601	L29	C39-C38-N37	2.38	116.15	111.56
7	B	601	L29	C6-C1-C2	2.36	121.90	117.68
7	B	601	L29	C38-N37-C35	-2.33	116.83	122.11
7	C	306	L29	C30-C29-C34	2.32	121.93	119.25
7	C	306	L29	C6-C1-C7	-2.31	117.27	121.25
7	C	306	L29	C38-N37-C35	-2.28	116.94	122.11
7	B	601	L29	O42-S41-C45	-2.27	105.28	108.10
7	C	306	L29	C33-C34-C29	-2.25	117.82	120.43
7	B	601	L29	C33-C34-C29	-2.22	117.86	120.43
7	C	306	L29	C47-C48-C50	-2.21	117.45	121.25
7	C	306	L29	O42-S41-C45	-2.18	105.39	108.10
7	C	306	L29	C56-N40-S41	-2.16	113.99	118.39
7	B	601	L29	C55-C50-C48	-2.15	117.54	121.25
7	B	601	L29	C3-C2-C1	-2.14	118.11	120.54
7	B	601	L29	C49-C48-C47	2.11	121.45	117.68
7	C	306	L29	C9-C10-S13	-2.10	117.65	119.73
7	C	306	L29	C17-C21-N22	2.10	119.48	115.50
7	C	306	L29	C51-C50-C48	-2.09	117.65	121.25
7	B	601	L29	C8-C7-C1	-2.03	117.74	121.25
7	B	601	L29	C19-C18-C17	2.01	115.92	110.77
7	B	601	L29	C30-C29-C34	2.00	121.57	119.25

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	B	601	L29	N40-C56-C57-C58
7	B	601	L29	N40-C56-C57-C59
7	B	601	L29	C60-C56-C57-C58
7	B	601	L29	C60-C56-C57-C59
8	B	608	GOL	O1-C1-C2-C3
6	A	308	PEG	O2-C3-C4-O4
6	B	607	PEG	O1-C1-C2-O2
7	B	601	L29	C39-N40-S41-O42
7	C	306	L29	C39-N40-S41-O42
7	C	306	L29	C21-C17-C18-C19
7	C	306	L29	C60-C56-C57-C58
8	B	608	GOL	O1-C1-C2-O2
6	B	607	PEG	C4-C3-O2-C2
6	A	308	PEG	C4-C3-O2-C2

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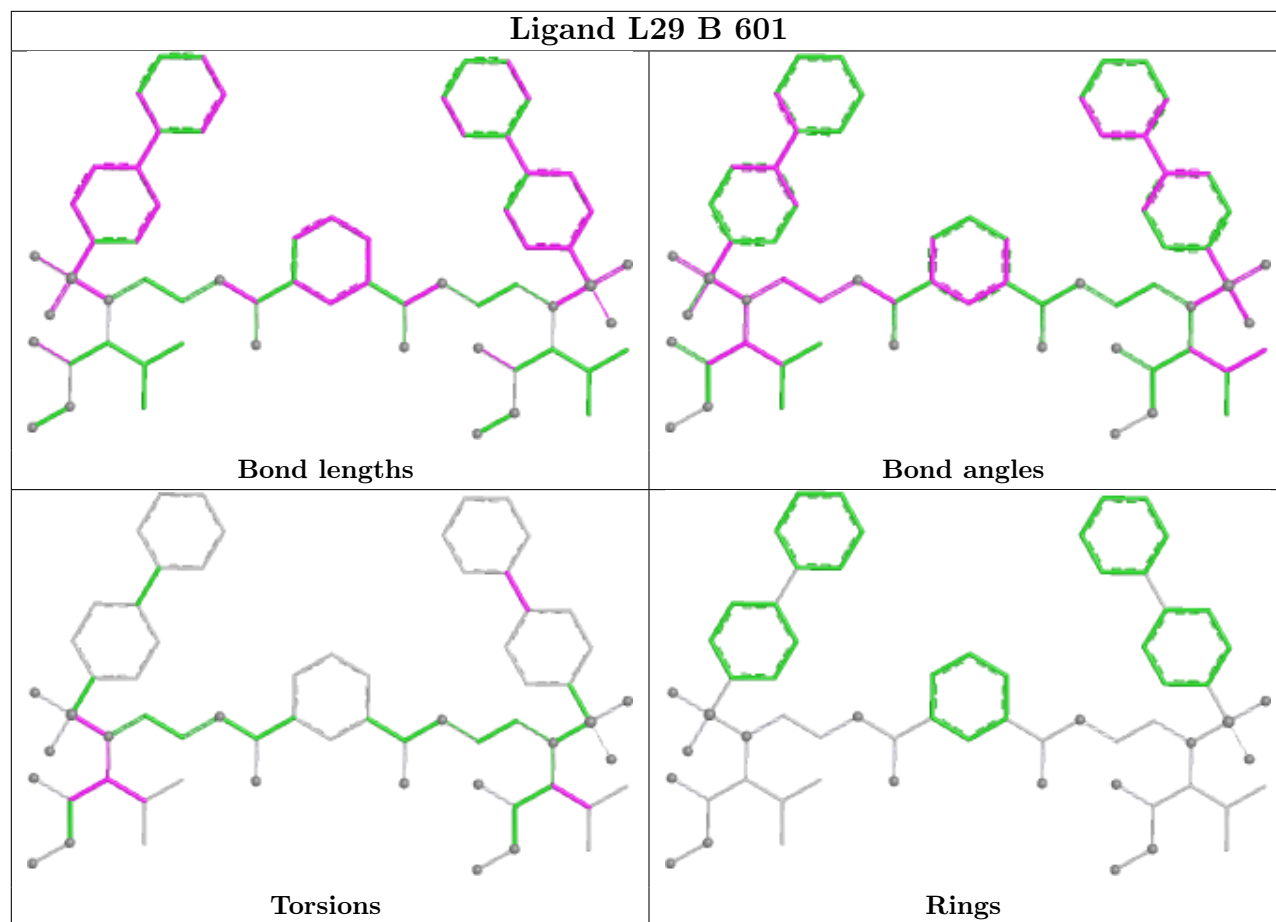
Mol	Chain	Res	Type	Atoms
6	C	307	PEG	O1-C1-C2-O2
6	C	307	PEG	C4-C3-O2-C2
7	C	306	L29	C56-C60-N61-O61
7	B	601	L29	C6-C1-C7-C8
6	B	607	PEG	O2-C3-C4-O4
7	B	601	L29	C57-C56-C60-N61
7	C	306	L29	C6-C1-C7-C8
7	B	601	L29	C21-C17-C18-C19
7	B	601	L29	C57-C56-N40-C39
7	B	601	L29	C6-C1-C7-C12
7	C	306	L29	C47-C48-C50-C51

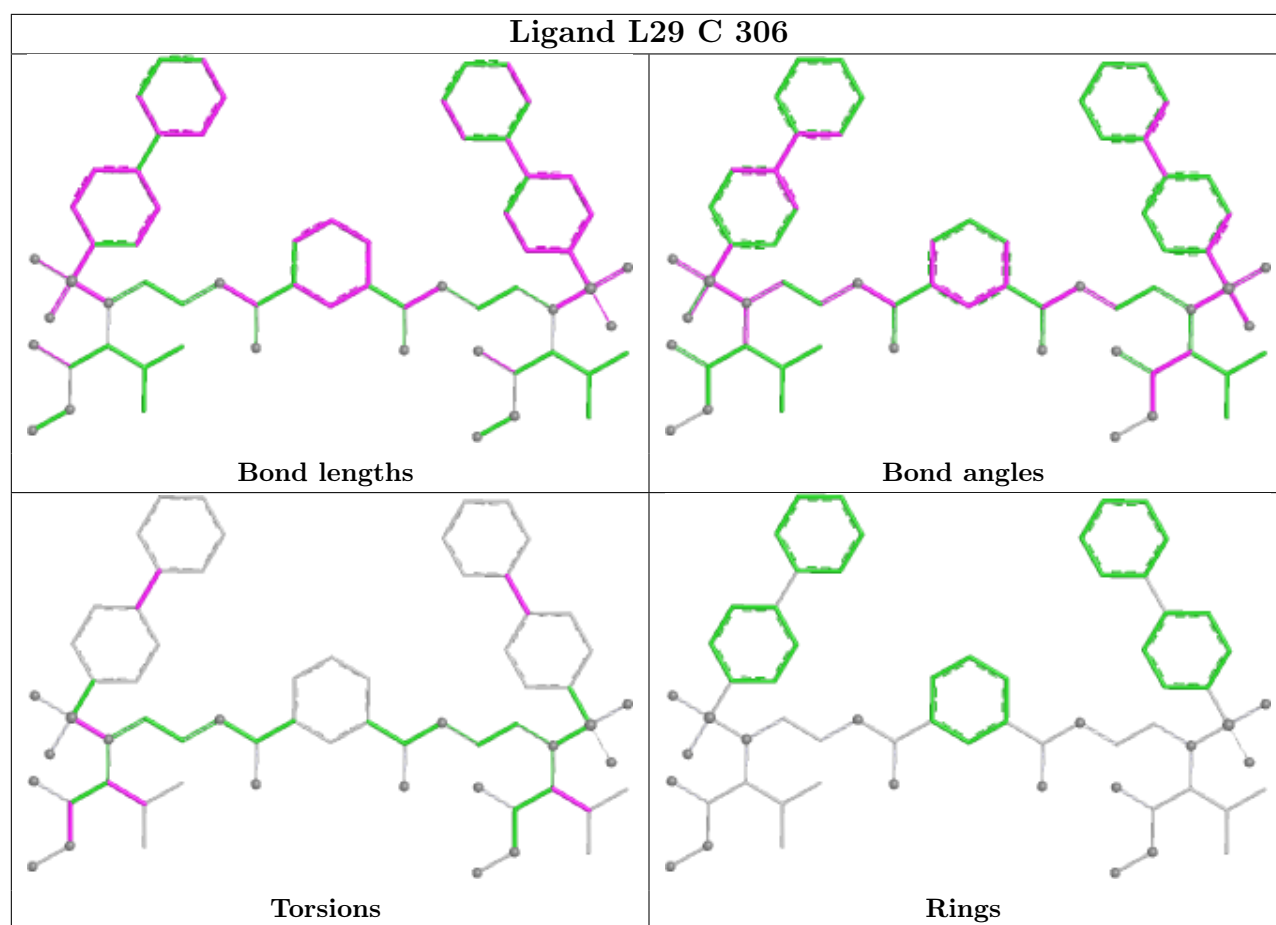
There are no ring outliers.

8 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	306	PGO	1	0
7	B	601	L29	2	0
8	B	608	GOL	1	0
5	A	307	DMS	3	0
4	A	309	PGO	1	0
6	D	306	PEG	2	0
6	A	308	PEG	1	0
6	B	607	PEG	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 [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	159/159 (100%)	-0.48	1 (0%) 85 87	9, 18, 38, 50	2 (1%)
1	B	159/159 (100%)	-0.36	1 (0%) 85 87	10, 23, 42, 64	0
1	C	156/159 (98%)	-0.39	2 (1%) 75 78	10, 22, 40, 47	4 (2%)
1	D	159/159 (100%)	-0.36	2 (1%) 75 78	9, 22, 40, 63	5 (3%)
All	All	633/636 (99%)	-0.40	6 (0%) 81 83	9, 21, 40, 64	11 (1%)

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	263	GLY	3.5
1	A	105	MET	3.4
1	C	206[A]	HIS	3.4
1	C	263	GLY	3.0
1	D	263	GLY	2.2
1	D	154	THR	2.1

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

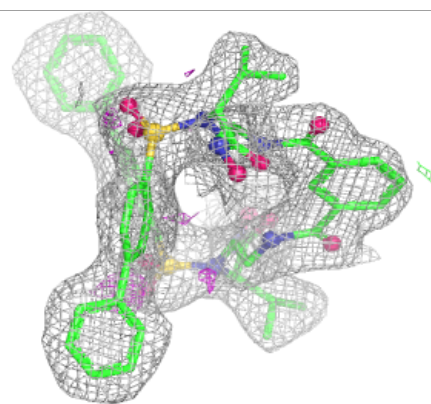
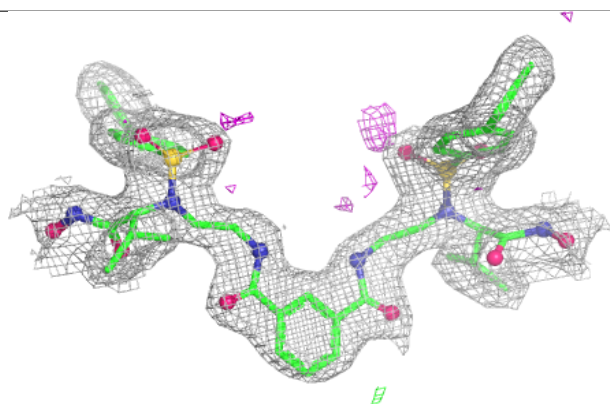
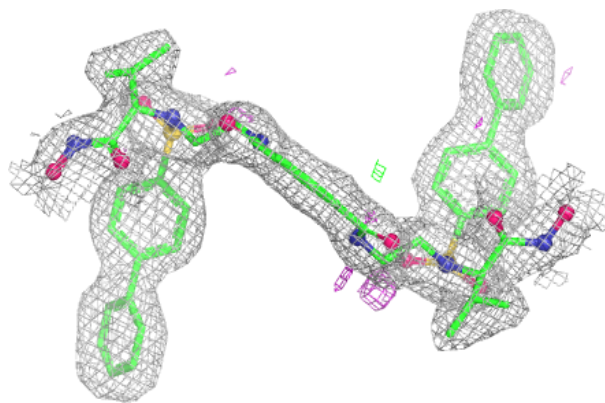
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	PGO	A	306	5/5	0.80	0.12	32,34,38,39	0
6	PEG	D	306	7/7	0.80	0.14	29,41,50,55	0
6	PEG	C	307	7/7	0.81	0.15	28,33,40,50	0
8	GOL	B	608	6/6	0.81	0.13	33,37,40,50	0
6	PEG	B	607	7/7	0.82	0.18	20,33,43,45	0
6	PEG	A	308	7/7	0.82	0.20	26,28,40,49	0
4	PGO	A	309	5/5	0.92	0.09	32,37,38,43	0
5	DMS	A	307	4/4	0.95	0.10	31,33,33,34	0
3	CA	C	304	1/1	0.96	0.04	28,28,28,28	0
3	CA	B	604	1/1	0.96	0.03	31,31,31,31	0
3	CA	C	303	1/1	0.96	0.05	27,27,27,27	0
3	CA	B	605	1/1	0.97	0.04	31,31,31,31	0
3	CA	B	606	1/1	0.97	0.03	26,26,26,26	0
3	CA	D	303	1/1	0.97	0.04	26,26,26,26	0
7	L29	B	601	64/64	0.97	0.05	8,16,22,28	0
7	L29	C	306	64/64	0.97	0.05	8,16,23,27	0
3	CA	D	305	1/1	0.97	0.03	23,23,23,23	0
3	CA	A	304	1/1	0.98	0.02	17,17,17,17	0
3	CA	C	305	1/1	0.99	0.01	19,19,19,19	0
2	ZN	C	301	1/1	0.99	0.02	16,16,16,16	0
3	CA	D	304	1/1	0.99	0.02	26,26,26,26	0
2	ZN	D	302	1/1	0.99	0.02	24,24,24,24	0
3	CA	A	303	1/1	0.99	0.02	19,19,19,19	0
2	ZN	B	603	1/1	0.99	0.02	26,26,26,26	0
3	CA	A	305	1/1	0.99	0.01	14,14,14,14	0
2	ZN	C	302	1/1	1.00	0.01	21,21,21,21	0
2	ZN	D	301	1/1	1.00	0.01	17,17,17,17	0
2	ZN	B	602	1/1	1.00	0.01	16,16,16,16	0
2	ZN	A	301	1/1	1.00	0.01	14,14,14,14	0
2	ZN	A	302	1/1	1.00	0.02	14,14,14,14	0

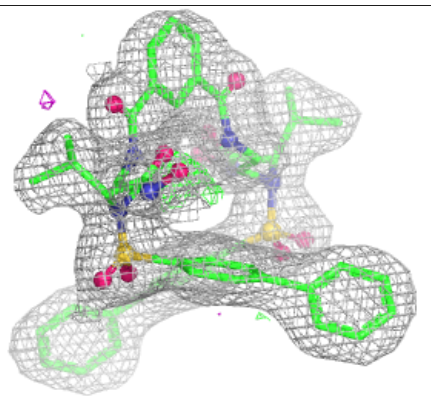
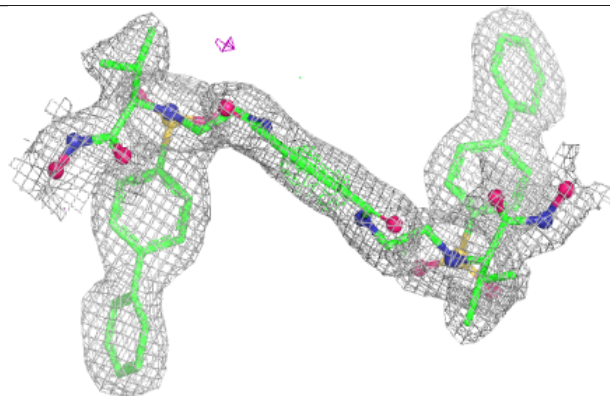
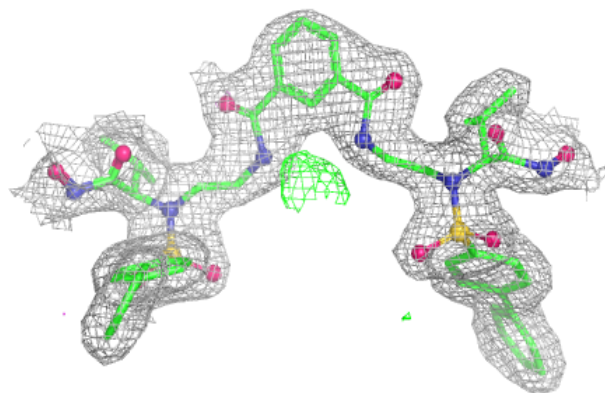
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around L29 B 601:

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

**Electron density around L29 C 306:**

$2mF_o-DF_c$ (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.