Full wwPDB X-ray Structure Validation Report (i)

Oct 15, 2026 – 06:07 pm BST

PDB ID	:	29SW / pdb_000029sw
Title	:	Crystal structure of carbonic anhydrase XII with 3-(benzylsulfonyl)phenyl sulfamate
Authors	:	Paketuryte-Latve, V.; Smirnov, A.; Manakova, E.N.; Grazulis, S.
Deposited on	:	2026-04-07
Resolution	:	1.40 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 (i) 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 (i)) were used in the production of this report:

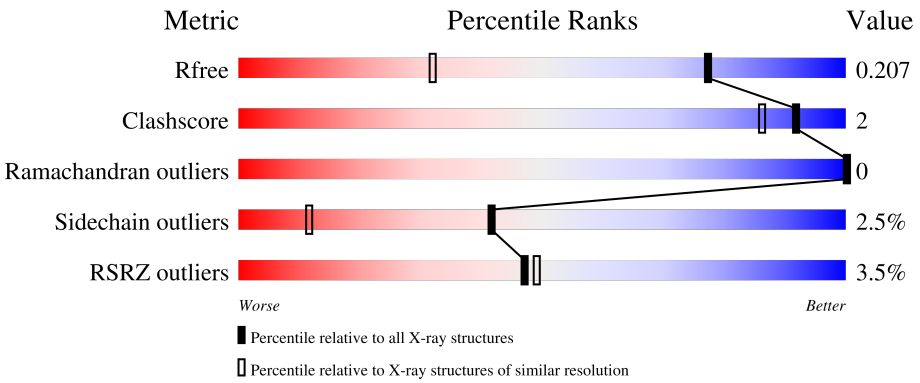
MolProbity	:	4-5-2 with Phenix2.2
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.2
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.40 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	2563 (1.40-1.40)
Clashscore	190562	2660 (1.40-1.40)
Ramachandran outliers	187476	2611 (1.40-1.40)
Sidechain outliers	187428	2610 (1.40-1.40)
RSRZ outliers	180081	2561 (1.40-1.40)

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 <=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	263	3% 94% 5% ••
1	B	263	2% 96% ••
1	C	263	8% 93% 6% ••
1	D	263	% 96% ••

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 9196 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 Carbonic anhydrase 12.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	260	2085	1324	354	400	7	0	1	0
1	B	261	2101	1336	356	401	8	0	3	0
1	C	261	2096	1334	356	399	7	0	1	0
1	D	261	2124	1349	362	406	7	0	3	0

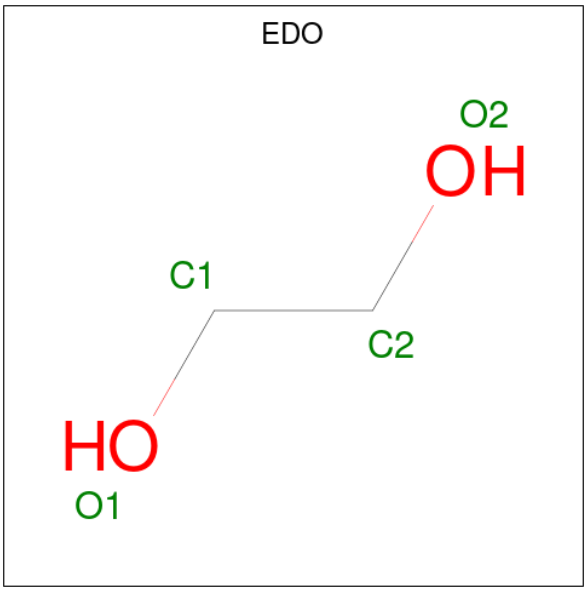
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP O43570
B	1	MET	-	initiating methionine	UNP O43570
C	1	MET	-	initiating methionine	UNP O43570
D	1	MET	-	initiating methionine	UNP O43570

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

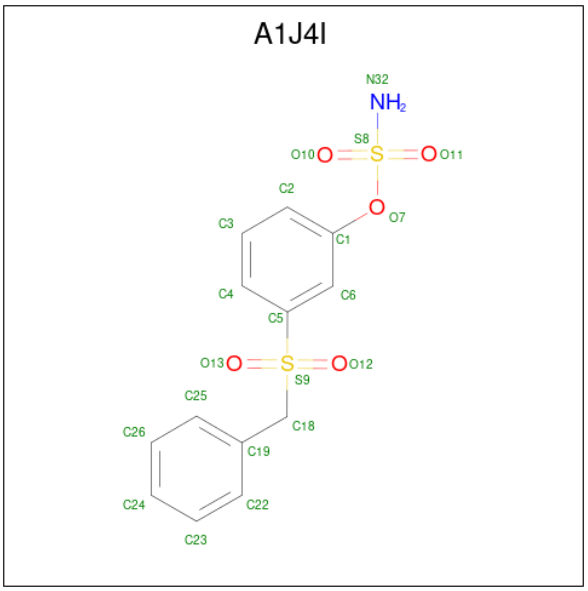
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
2	A	1	1	1	0	0
2	B	1	1	1	0	0
2	C	1	1	1	0	0
2	D	1	1	1	0	0

- Molecule 3 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



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

- Molecule 4 is [3-(phenylmethyl)sulfonylphenyl] sulfamate (CCD ID: A1J4I) (formula: $C_{13}H_{13}NO_5S_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
4	A	1	21	13	1	5	2	0	0
			Total	C	N	O	S		
4	B	1	21	13	1	5	2	0	0
			Total	C	N	O	S		
4	C	1	21	13	1	5	2	0	0
			Total	C	N	O	S		
4	D	1	21	13	1	5	2	0	0

- Molecule 5 is water.

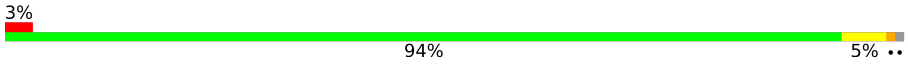
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	157	157	157	0	0
			Total	O		
5	B	173	173	173	0	0
			Total	O		
5	C	135	135	135	0	0
			Total	O		
5	D	213	213	213	0	0

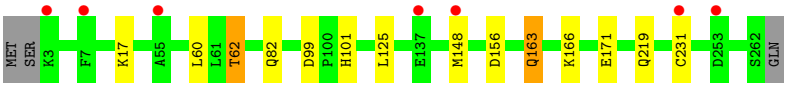
3 Residue-property plots (i)

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: Carbonic anhydrase 12

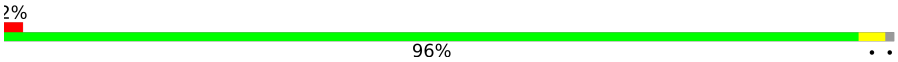
Chain A:

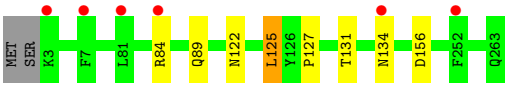




- Molecule 1: Carbonic anhydrase 12

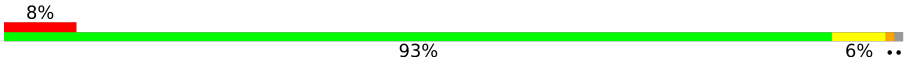
Chain B:





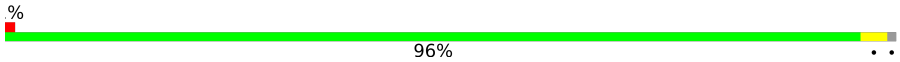
- Molecule 1: Carbonic anhydrase 12

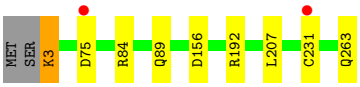
Chain C:



- Molecule 1: Carbonic anhydrase 12

Chain D:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	77.68Å 74.33Å 91.80Å 90.00° 108.65° 90.00°	Depositor
Resolution (Å)	43.53 – 1.40 43.53 – 1.40	Depositor EDS
% Data completeness (in resolution range)	99.1 (43.53-1.40) 99.1 (43.53-1.40)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.81 (at 1.40Å)	Xtriage
Refinement program	REFMAC 5.8.0430	Depositor
R, R_{free}	0.165 , 0.204 0.174 , 0.207	Depositor DCC
R_{free} test set	19033 reflections (9.79%)	wwPDB-VP
Wilson B-factor (Å^2)	19.2	Xtriage
Anisotropy	0.178	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 42.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.98	EDS
Total number of atoms	9196	wwPDB-VP
Average B, all atoms (Å^2)	25.0	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 63.09 % 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 1.0204e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: EDO, A1J4I, 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	0.66	0/2147	1.07	0/2926
1	B	0.72	0/2164	1.11	0/2949
1	C	0.67	0/2159	1.08	0/2941
1	D	0.72	0/2187	1.08	0/2977
All	All	0.69	0/8657	1.08	0/11793

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	2085	0	1968	8	0
1	B	2101	0	1975	3	0
1	C	2096	0	1984	12	0
1	D	2124	0	2011	2	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	4	0	6	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	8	0	12	0	0
3	C	4	0	6	0	0
3	D	8	0	12	0	0
4	A	21	0	0	0	0
4	B	21	0	0	1	0
4	C	21	0	0	0	0
4	D	21	0	0	0	0
5	A	157	0	0	2	0
5	B	173	0	0	0	0
5	C	135	0	0	1	0
5	D	213	0	0	1	0
All	All	9196	0	7974	26	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 2.

All (26) 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:62:THR:HG23	5:A:480:HOH:O	1.88	0.72
1:C:148:MET:HE2	1:C:219:GLN:HB3	1.74	0.69
1:C:53:LEU:HD11	1:C:179:ILE:HD11	1.81	0.62
1:A:62:THR:HB	1:A:171:GLU:HG2	1.83	0.61
1:D:3:LYS:N	5:D:401:HOH:O	2.34	0.60
1:C:212:ARG:HH11	1:C:213:ASN:HD21	1.50	0.59
1:C:148:MET:CE	1:C:219:GLN:HB3	2.36	0.54
1:C:148:MET:HE2	1:C:219:GLN:HA	1.92	0.51
1:A:148:MET:SD	1:A:219:GLN:HB2	2.51	0.51
1:A:163:GLN:HE21	1:A:163:GLN:H	1.59	0.49
1:C:161:HIS:HE1	5:C:476:HOH:O	1.96	0.49
1:C:61:LEU:HG	1:C:174:VAL:HG21	1.95	0.48
1:A:163:GLN:HE21	1:A:163:GLN:N	2.12	0.47
1:C:167:TYR:CD1	1:C:234:MET:HA	2.50	0.47
1:C:167:TYR:CG	1:C:234:MET:HA	2.52	0.45
1:A:60:LEU:HD11	1:A:171:GLU:HB3	1.99	0.45
1:C:72:LEU:HD22	1:C:179:ILE:CD1	2.48	0.44
1:B:122:ASN:HD21	1:B:125:LEU:HD22	1.83	0.44
1:A:99:ASP:OD1	1:A:101:HIS:HD2	2.02	0.43
1:A:17:LYS:HD3	5:A:540:HOH:O	2.18	0.42
1:B:134:ASN:OD1	1:B:134:ASN:N	2.49	0.42
1:D:192:ARG:HD2	1:D:207:LEU:HD11	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:127:PRO:HD2	1:B:131:THR:HG21	2.03	0.41
1:C:148:MET:HE2	1:C:219:GLN:CB	2.46	0.41
4:B:304:A1J4I:C6	4:B:304:A1J4I:N32	2.84	0.41
1:C:52:ASN:HA	1:C:178:ASN:HA	2.03	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	259/263 (98%)	253 (98%)	6 (2%)	0	100	100
1	B	262/263 (100%)	258 (98%)	4 (2%)	0	100	100
1	C	260/263 (99%)	255 (98%)	5 (2%)	0	100	100
1	D	262/263 (100%)	254 (97%)	8 (3%)	0	100	100
All	All	1043/1052 (99%)	1020 (98%)	23 (2%)	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	231/235 (98%)	224 (97%)	7 (3%)	36	8
1	B	231/235 (98%)	226 (98%)	5 (2%)	45	14

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	C	232/235 (99%)	227 (98%)	5 (2%)	45 14
1	D	236/235 (100%)	228 (97%)	8 (3%)	32 6
All	All	930/940 (99%)	905 (97%)	25 (3%)	42 10

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	62	THR
1	A	82	GLN
1	A	125	LEU
1	A	156	ASP
1	A	163	GLN
1	A	166	LYS
1	A	231	CYS
1	B	84	ARG
1	B	89[A]	GLN
1	B	89[B]	GLN
1	B	125	LEU
1	B	156	ASP
1	C	57	LYS
1	C	61	LEU
1	C	156	ASP
1	C	219	GLN
1	C	238	SER
1	D	3	LYS
1	D	75	ASP
1	D	84	ARG
1	D	89[A]	GLN
1	D	89[B]	GLN
1	D	156	ASP
1	D	231	CYS
1	D	263	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	13	ASN
1	A	33	HIS
1	A	38	GLN
1	A	82	GLN

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Mol	Chain	Res	Type
1	A	111	HIS
1	A	163	GLN
1	B	101	HIS
1	B	110	GLN
1	B	203	ASN
1	B	213	ASN
1	B	219	GLN
1	B	250	GLN
1	C	13	ASN
1	C	82	GLN
1	C	213	ASN
1	C	250	GLN
1	C	263	GLN
1	D	13	ASN
1	D	38	GLN
1	D	49	GLN
1	D	58	GLN
1	D	101	HIS
1	D	213	ASN
1	D	250	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 14 ligands modelled in this entry, 4 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	$\#\|Z\| > 2$
3	EDO	A	302	-	3,3,3	0.29	0	2,2,2	0.34	0
4	A1J4I	D	304	2	22,22,22	3.40	8 (36%)	31,32,32	2.59	7 (22%)
4	A1J4I	C	303	2	22,22,22	4.76	9 (40%)	31,32,32	3.61	7 (22%)
3	EDO	B	303	-	3,3,3	0.30	0	2,2,2	0.74	0
3	EDO	C	302	-	3,3,3	0.13	0	2,2,2	0.22	0
4	A1J4I	A	303	2	22,22,22	4.33	8 (36%)	31,32,32	2.86	6 (19%)
3	EDO	B	302	-	3,3,3	0.42	0	2,2,2	0.62	0
3	EDO	D	303	-	3,3,3	0.26	0	2,2,2	0.10	0
4	A1J4I	B	304	-	22,22,22	4.87	5 (22%)	31,32,32	3.22	7 (22%)
3	EDO	D	302	-	3,3,3	0.36	0	2,2,2	0.60	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
3	EDO	A	302	-	-	1/1/1/1	-
4	A1J4I	D	304	2	-	0/16/16/16	0/2/2/2
4	A1J4I	C	303	2	-	0/16/16/16	0/2/2/2
3	EDO	B	303	-	-	0/1/1/1	-
3	EDO	C	302	-	-	1/1/1/1	-
4	A1J4I	A	303	2	-	0/16/16/16	0/2/2/2
3	EDO	B	302	-	-	1/1/1/1	-
3	EDO	D	303	-	-	0/1/1/1	-
4	A1J4I	B	304	-	-	0/16/16/16	0/2/2/2
3	EDO	D	302	-	-	1/1/1/1	-

All (30) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	304	A1J4I	S8-N32	19.50	1.79	1.58
4	C	303	A1J4I	S8-N32	11.17	1.70	1.58
4	A	303	A1J4I	O10-S8	9.92	1.50	1.42
4	A	303	A1J4I	S8-N32	9.79	1.69	1.58
4	C	303	A1J4I	O11-S8	9.26	1.49	1.42
4	C	303	A1J4I	O10-S8	8.76	1.49	1.42
4	B	304	A1J4I	O13-S9	8.73	1.57	1.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	303	A1J4I	O12-S9	7.94	1.55	1.44
4	A	303	A1J4I	O11-S8	7.94	1.48	1.42
4	A	303	A1J4I	O12-S9	7.58	1.55	1.44
4	D	304	A1J4I	O13-S9	7.55	1.55	1.44
4	A	303	A1J4I	O13-S9	7.24	1.54	1.44
4	C	303	A1J4I	O13-S9	7.04	1.54	1.44
4	C	303	A1J4I	O7-S8	6.92	1.69	1.61
4	D	304	A1J4I	O11-S8	6.89	1.48	1.42
4	D	304	A1J4I	O12-S9	6.70	1.54	1.44
4	D	304	A1J4I	O7-C1	-4.73	1.34	1.42
4	D	304	A1J4I	O10-S8	4.71	1.46	1.42
4	B	304	A1J4I	O12-S9	4.70	1.51	1.44
4	C	303	A1J4I	O7-C1	-4.17	1.35	1.42
4	D	304	A1J4I	S8-N32	3.93	1.63	1.58
4	B	304	A1J4I	O7-C1	-3.87	1.36	1.42
4	D	304	A1J4I	O7-S8	3.85	1.65	1.61
4	D	304	A1J4I	C18-S9	3.13	1.83	1.79
4	A	303	A1J4I	O7-C1	-3.05	1.37	1.42
4	B	304	A1J4I	C5-S9	2.75	1.81	1.76
4	A	303	A1J4I	C5-S9	2.56	1.81	1.76
4	C	303	A1J4I	C25-C19	2.32	1.43	1.38
4	A	303	A1J4I	C4-C5	2.19	1.42	1.38
4	C	303	A1J4I	C5-S9	2.13	1.80	1.76

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	C	303	A1J4I	O12-S9-O13	-13.87	102.22	118.44
4	B	304	A1J4I	O10-S8-N32	11.82	127.00	109.14
4	C	303	A1J4I	C18-S9-C5	11.68	118.26	103.99
4	D	304	A1J4I	O12-S9-O13	-10.10	106.63	118.44
4	A	303	A1J4I	O12-S9-O13	-9.77	107.02	118.44
4	B	304	A1J4I	O12-S9-O13	-7.89	109.22	118.44
4	A	303	A1J4I	O11-S8-N32	7.59	120.61	109.14
4	B	304	A1J4I	O11-S8-N32	-6.36	99.52	109.14
4	A	303	A1J4I	O10-S8-O11	-5.95	114.34	119.97
4	B	304	A1J4I	C18-S9-C5	5.91	111.21	103.99
4	C	303	A1J4I	O10-S8-O11	-5.48	114.78	119.97
4	D	304	A1J4I	C18-S9-C5	5.30	110.47	103.99
4	A	303	A1J4I	C18-S9-C5	4.94	110.02	103.99
4	D	304	A1J4I	C4-C5-S9	3.82	123.67	119.49
4	D	304	A1J4I	O10-S8-N32	3.65	114.64	109.14

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	D	304	A1J4I	C6-C5-S9	-3.36	115.54	118.95
4	A	303	A1J4I	O12-S9-C18	3.34	112.73	108.41
4	D	304	A1J4I	O10-S8-O11	-3.09	117.05	119.97
4	C	303	A1J4I	C4-C5-S9	3.07	122.84	119.49
4	D	304	A1J4I	O12-S9-C18	3.06	112.37	108.41
4	C	303	A1J4I	O13-S9-C5	2.99	111.41	108.36
4	A	303	A1J4I	C18-C19-C22	2.56	123.74	120.54
4	C	303	A1J4I	O12-S9-C5	-2.44	105.89	108.36
4	B	304	A1J4I	C3-C4-C5	2.33	121.37	118.95
4	B	304	A1J4I	O12-S9-C18	2.29	111.38	108.41
4	C	303	A1J4I	C19-C18-S9	-2.25	106.43	112.02
4	B	304	A1J4I	O7-S8-O10	-2.10	98.89	105.27

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	302	EDO	O1-C1-C2-O2
3	C	302	EDO	O1-C1-C2-O2
3	D	302	EDO	O1-C1-C2-O2
3	A	302	EDO	O1-C1-C2-O2

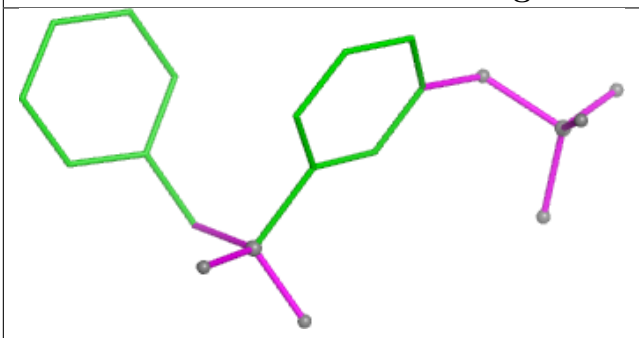
There are no ring outliers.

1 monomer is involved in 1 short contact:

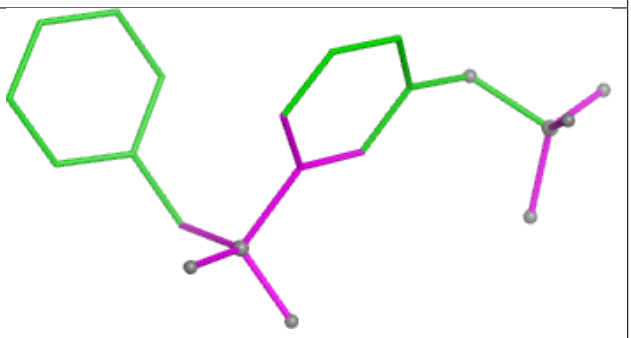
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	304	A1J4I	1	0

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 then 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.

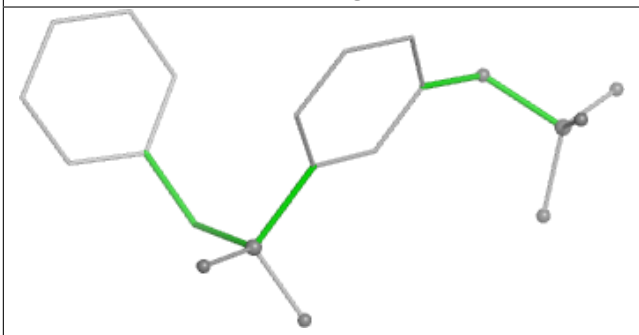
Ligand A1J4I D 304



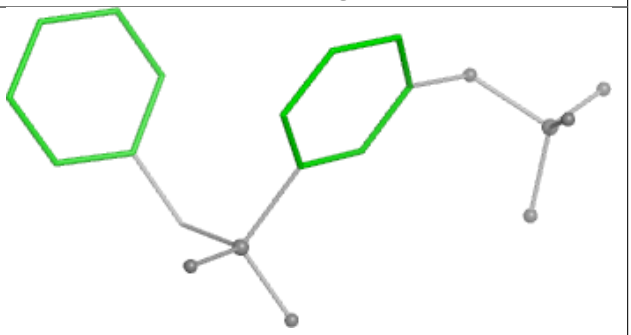
Bond lengths



Bond angles

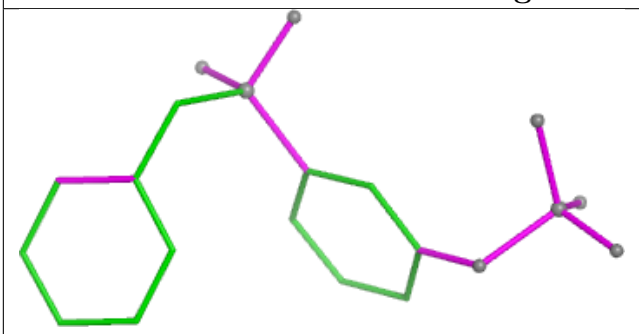


Torsions

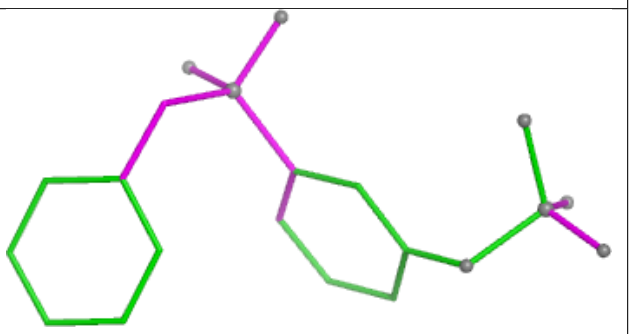


Rings

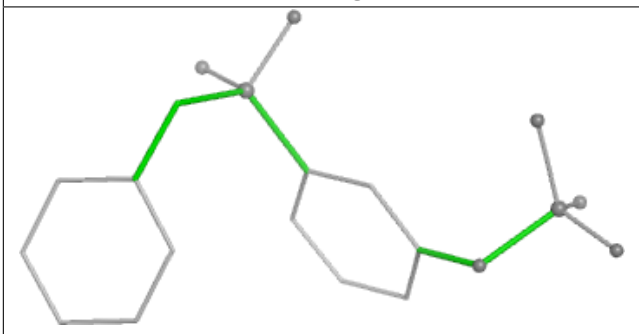
Ligand A1J4I C 303



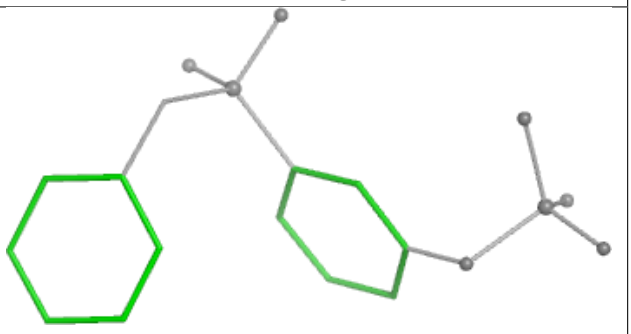
Bond lengths



Bond angles

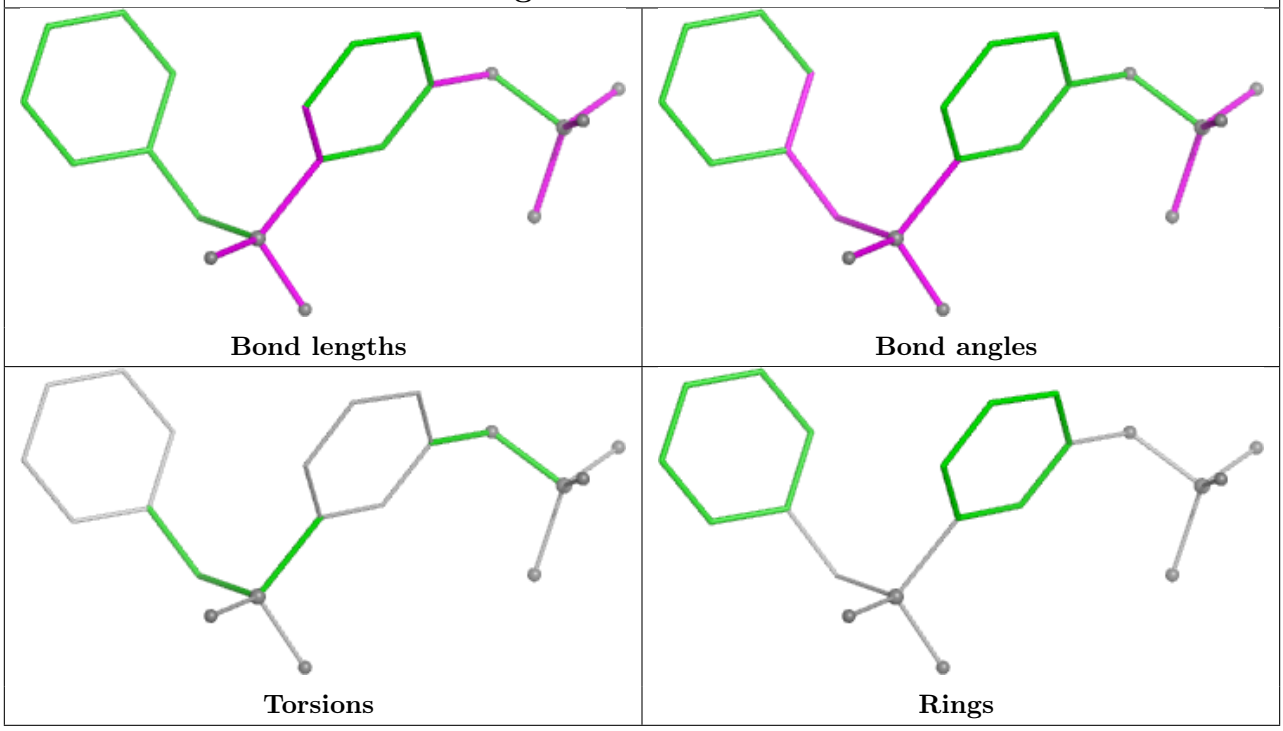


Torsions

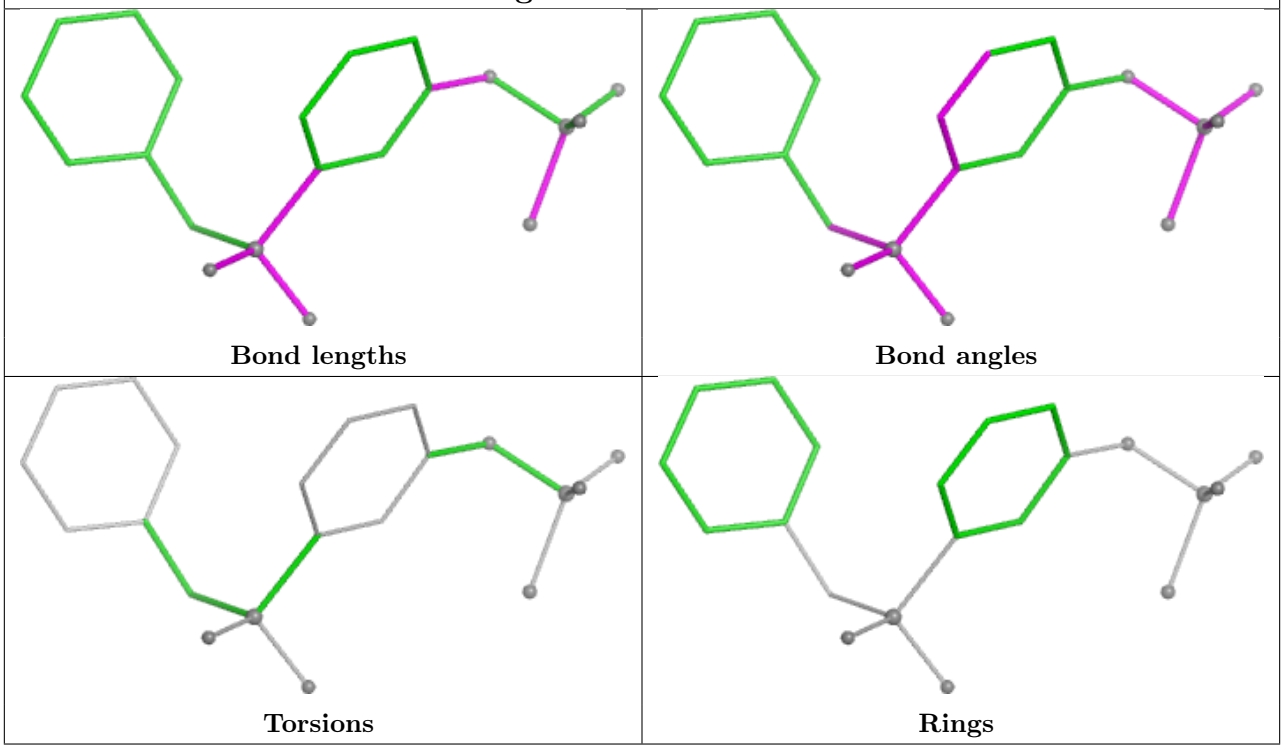


Rings

Ligand A1J4I A 303



Ligand A1J4I B 304



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	260/263 (98%)	0.08	7 (2%)	56	58	12, 24, 41, 65	1 (0%)
1	B	261/263 (99%)	0.04	6 (2%)	61	63	8, 19, 38, 69	3 (1%)
1	C	261/263 (99%)	0.48	22 (8%)	17	17	9, 29, 52, 102	1 (0%)
1	D	261/263 (99%)	-0.18	2 (0%)	82	85	8, 20, 35, 65	3 (1%)
All	All	1043/1052 (99%)	0.11	37 (3%)	47	49	8, 22, 45, 102	8 (0%)

All (37) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	57	LYS	6.5
1	C	176	GLY	6.1
1	C	58	GLN	5.0
1	C	55	ALA	5.0
1	C	230	TYR	4.5
1	C	56	ASN	4.0
1	C	54	SER	3.8
1	C	175	PRO	3.7
1	B	252	PHE	3.7
1	A	231	CYS	3.5
1	D	231	CYS	3.5
1	B	84	ARG	3.4
1	A	137	GLU	3.4
1	B	3	LYS	3.3
1	C	59	PHE	3.3
1	C	173	PHE	3.1
1	B	81	LEU	2.9
1	B	7	PHE	2.8
1	A	3	LYS	2.8
1	C	177	PHE	2.8
1	C	253	ASP	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	7	PHE	2.7
1	C	7	PHE	2.5
1	C	81	LEU	2.5
1	C	8	GLY	2.4
1	C	231	CYS	2.3
1	C	174	VAL	2.3
1	D	75	ASP	2.3
1	C	172	ALA	2.3
1	C	41	ALA	2.2
1	A	55	ALA	2.2
1	C	151	PHE	2.1
1	C	167	TYR	2.1
1	A	253	ASP	2.1
1	A	148	MET	2.0
1	B	134	ASN	2.0
1	C	229	LEU	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
3	EDO	D	302	4/4	0.85	0.12	32,34,36,37	0
3	EDO	C	302	4/4	0.89	0.13	47,49,52,58	0
3	EDO	B	302	4/4	0.91	0.10	31,31,37,45	0
3	EDO	D	303	4/4	0.91	0.10	24,24,25,26	0
3	EDO	B	303	4/4	0.93	0.10	34,35,36,38	0
4	A1J4I	C	303	21/21	0.94	0.12	23,31,38,39	0
3	EDO	A	302	4/4	0.95	0.09	28,34,41,46	0

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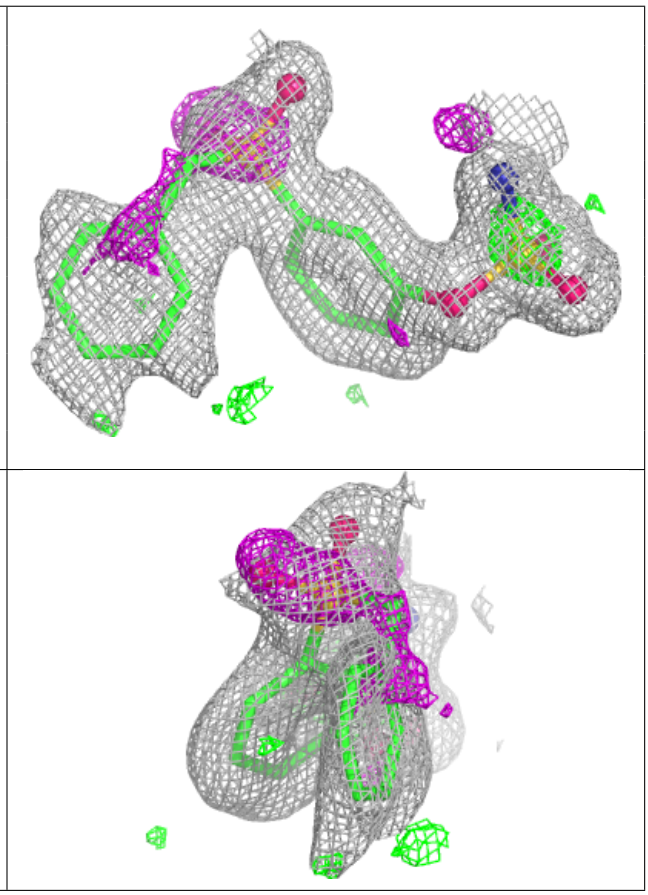
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	A1J4I	B	304	21/21	0.97	0.10	16,23,42,47	0
4	A1J4I	A	303	21/21	0.97	0.09	17,26,43,45	0
4	A1J4I	D	304	21/21	0.98	0.07	15,24,44,47	0
2	ZN	A	301	1/1	0.99	0.02	15,15,15,15	0
2	ZN	C	301	1/1	1.00	0.01	16,16,16,16	0
2	ZN	D	301	1/1	1.00	0.02	12,12,12,12	0
2	ZN	B	301	1/1	1.00	0.02	13,13,13,13	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.

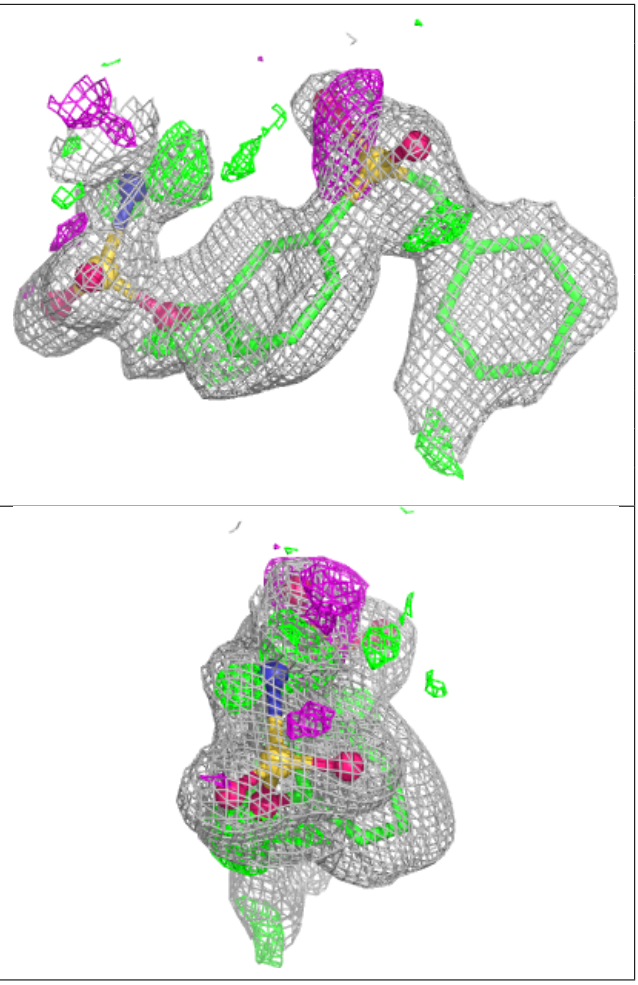
Electron density around A1J4I C 303:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)



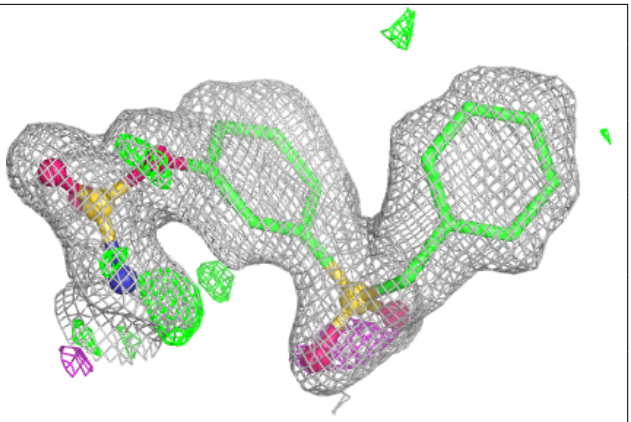
Electron density around A1J4I B 304:

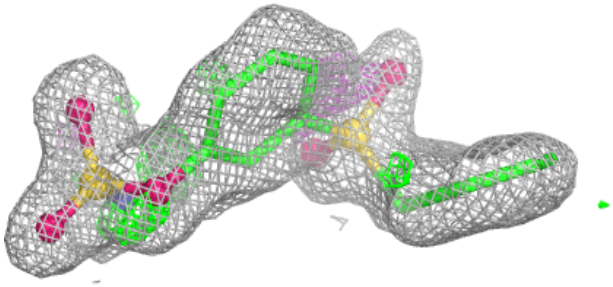
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

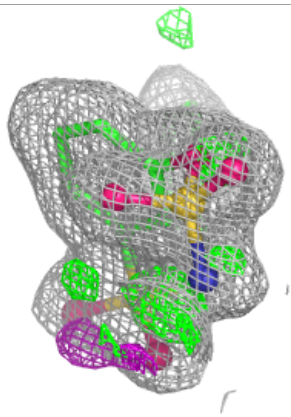


Electron density around A1J4I A 303:

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

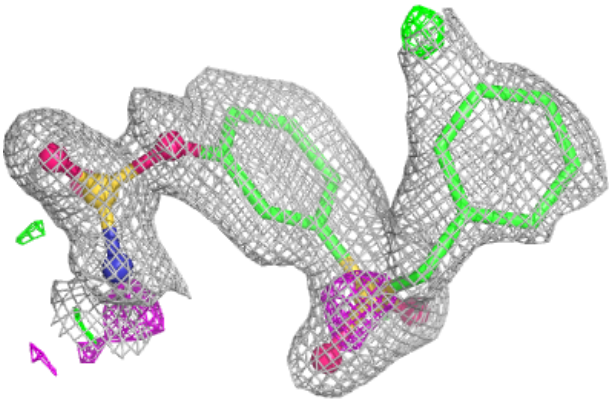


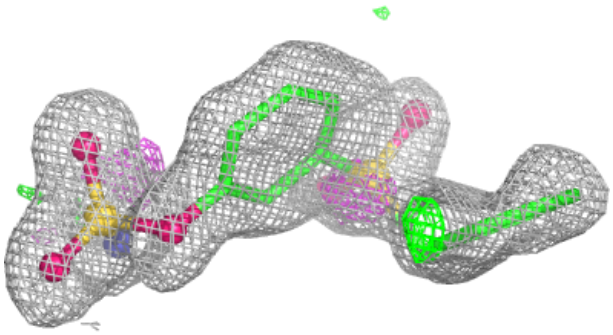


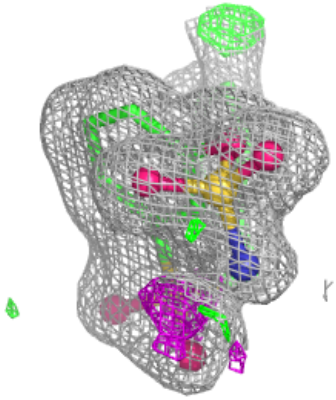


Electron density around A1J4I D 304:

$2mF_o$-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.