



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 04:32 PM UTC

PDB ID : 7E5V / pdb_00007e5v
Title : Crystal structure of Phm7 in complex with inhibitor
Authors : Fujiyama, K.; Kato, N.; Kinugasa, K.; Hino, T.; Takahashi, S.; Nagano, S.
Deposited on : 2021-02-20
Resolution : 1.61 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

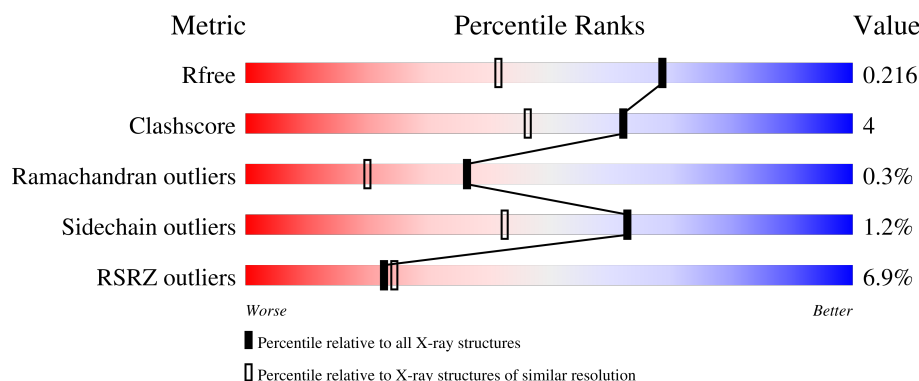
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.61 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	6728 (1.64-1.60)
Clashscore	190562	7023 (1.64-1.60)
Ramachandran outliers	187476	6898 (1.64-1.60)
Sidechain outliers	187428	6896 (1.64-1.60)
RSRZ outliers	180081	6727 (1.64-1.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	389	9% 86% 8% • •
1	B	389	6% 86% 9% •
1	C	389	5% 89% 5% • • •

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 9454 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.

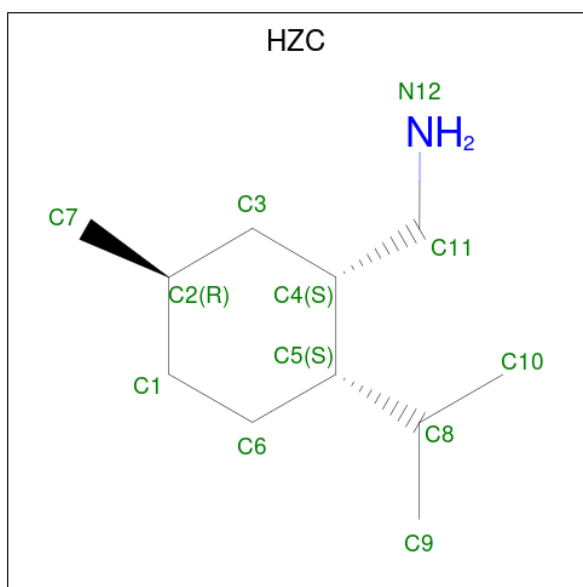
- Molecule 1 is a protein called Diels-Alderase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	372	Total	C	N	O	S	0	0	0
			2821	1790	473	550	8			
1	B	372	Total	C	N	O	S	0	0	0
			2821	1790	473	550	8			
1	C	372	Total	C	N	O	S	0	0	0
			2828	1796	474	550	8			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP A0A2Z5XAU0
A	-1	SER	-	expression tag	UNP A0A2Z5XAU0
A	0	HIS	-	expression tag	UNP A0A2Z5XAU0
B	-2	GLY	-	expression tag	UNP A0A2Z5XAU0
B	-1	SER	-	expression tag	UNP A0A2Z5XAU0
B	0	HIS	-	expression tag	UNP A0A2Z5XAU0
C	-2	GLY	-	expression tag	UNP A0A2Z5XAU0
C	-1	SER	-	expression tag	UNP A0A2Z5XAU0
C	0	HIS	-	expression tag	UNP A0A2Z5XAU0

- Molecule 2 is [(1S,2S,5R)-5-methyl-2-propan-2-yl-cyclohexyl]methanamine (CCD ID: HZC) (formula: C₁₁H₂₃N) (labeled as "Ligand of Interest" by depositor).



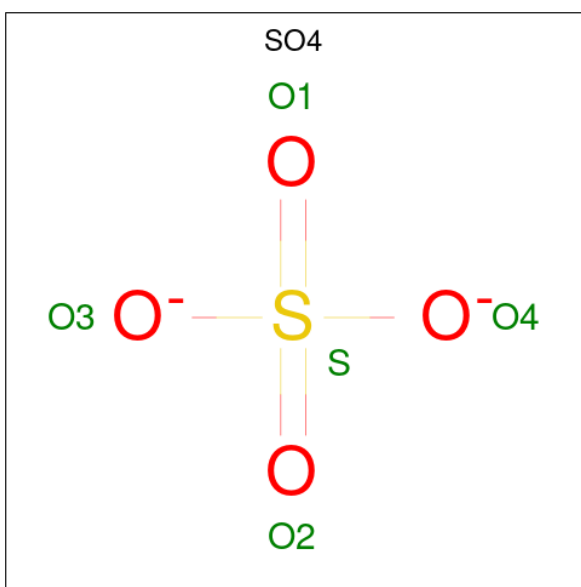
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	N	0	0
			12	11	1		
2	B	1	Total	C	N	0	0
			12	11	1		
2	B	1	Total	C	N	0	0
			12	11	1		
2	B	1	Total	C	N	0	0
			12	11	1		
2	C	1	Total	C	N	0	0
			12	11	1		
2	C	1	Total	C	N	0	0
			12	11	1		
2	C	1	Total	C	N	0	0
			12	11	1		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



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

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

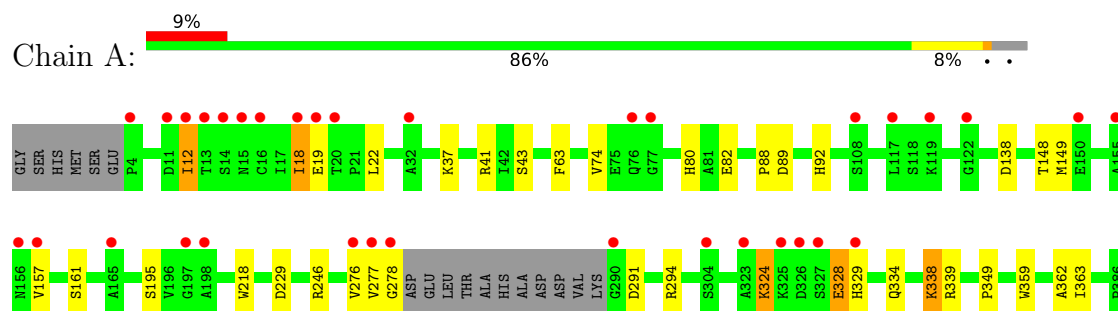
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	258	Total	O	0	0
			258	258		
5	B	273	Total	O	0	0
			273	273		
5	C	261	Total	O	0	0
			261	261		

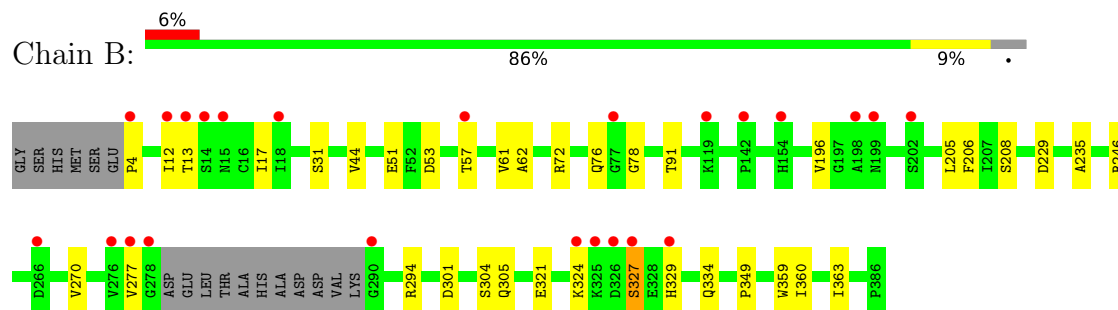
3 Residue-property plots [i](#)

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.

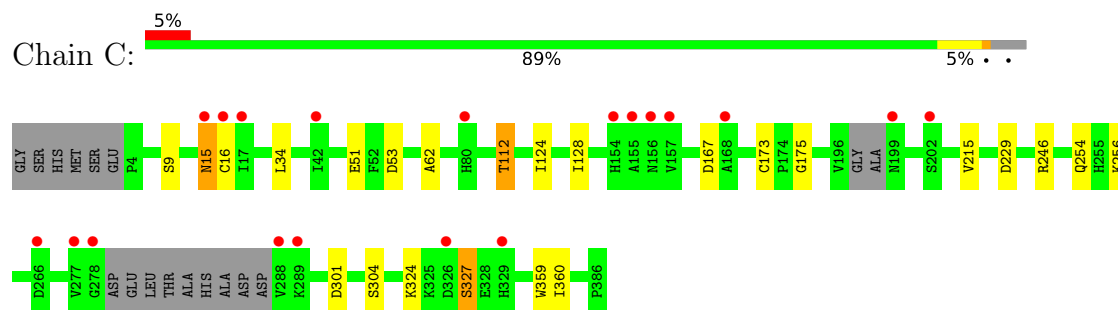
• Molecule 1: Diels-Alderase



• Molecule 1: Diels-Alderase



• Molecule 1: Diels-Alderase



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	91.05Å 149.88Å 99.27Å 90.00° 97.12° 90.00°	Depositor
Resolution (Å)	45.22 – 1.61 45.22 – 1.61	Depositor EDS
% Data completeness (in resolution range)	99.8 (45.22-1.61) 99.8 (45.22-1.61)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.52 (at 1.61Å)	Xtriage
Refinement program	REFMAC 5.8.0258, PHENIX 1.11.1	Depositor
R, R_{free}	0.183 , 0.211 0.192 , 0.216	Depositor DCC
R_{free} test set	8514 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	21.7	Xtriage
Anisotropy	0.009	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 38.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9454	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.88% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, HZC, GOL

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	1.10	0/2902	1.24	3/3951 (0.1%)
1	B	1.07	0/2902	1.20	2/3951 (0.1%)
1	C	1.06	1/2908 (0.0%)	1.22	6/3957 (0.2%)
All	All	1.07	1/8712 (0.0%)	1.22	11/11859 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	C	0	1
All	All	0	3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	124	ILE	C-O	5.08	1.29	1.24

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	229	ASP	CA-CB-CG	7.60	120.20	112.60
1	A	229	ASP	CA-CB-CG	7.15	119.75	112.60
1	B	229	ASP	CA-CB-CG	6.76	119.36	112.60
1	C	301	ASP	CA-CB-CG	5.90	118.50	112.60
1	C	112	THR	CA-C-N	5.51	125.40	121.65
1	C	112	THR	C-N-CA	5.51	125.40	121.65

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	80	HIS	CB-CA-C	5.32	118.41	109.48
1	C	167	ASP	N-CA-C	-5.24	105.57	111.28
1	A	89	ASP	CA-CB-CG	5.10	117.70	112.60
1	B	301	ASP	CA-CB-CG	5.09	117.69	112.60
1	C	173	CYS	CB-CA-C	5.03	116.89	110.76

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	359	TRP	Peptide
1	B	359	TRP	Peptide
1	C	359	TRP	Peptide

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	2821	0	2673	28	0
1	B	2821	0	2673	25	0
1	C	2828	0	2686	14	0
2	A	12	0	0	0	0
2	B	36	0	0	1	0
2	C	36	0	0	0	0
3	A	18	0	24	2	0
3	B	24	0	32	6	0
3	C	36	0	48	4	0
4	A	5	0	0	0	0
4	B	15	0	0	1	0
4	C	10	0	0	0	0
5	A	258	0	0	8	0
5	B	273	0	0	5	0
5	C	261	0	0	1	0
All	All	9454	0	8136	69	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 4.

All (69) 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:208:SER:H	3:B:405:GOL:H31	1.45	0.81
1:C:304:SER:H	3:C:408:GOL:H11	1.55	0.70
1:A:18:ILE:HD11	1:A:22:LEU:HD11	1.74	0.69
1:A:334:GLN:OE1	5:A:501:HOH:O	2.14	0.65
1:C:112:THR:HG22	5:C:680:HOH:O	1.98	0.64
1:A:19:GLU:HG3	5:A:531:HOH:O	1.97	0.63
1:B:4:PRO:N	5:B:501:HOH:O	2.32	0.62
1:B:270:VAL:O	1:B:324:LYS:CE	2.48	0.62
1:B:270:VAL:O	1:B:324:LYS:HE3	1.99	0.61
1:A:92:HIS:CD2	5:A:634:HOH:O	2.52	0.61
1:A:328:GLU:HG3	1:A:329:HIS:N	2.15	0.60
1:A:12:ILE:HD12	1:A:74:VAL:HG22	1.83	0.60
1:A:18:ILE:HD11	1:A:22:LEU:CD1	2.33	0.58
2:B:402:H2C:N12	5:B:502:HOH:O	2.32	0.57
1:C:254:GLN:OE1	1:C:256:LYS:NZ	2.37	0.57
1:B:327:SER:HB3	1:B:329:HIS:O	2.05	0.56
1:B:304:SER:H	3:B:404:GOL:H11	1.71	0.54
1:B:57:THR:HG23	3:B:405:GOL:O1	2.08	0.54
1:A:291:ASP:CG	1:A:324:LYS:HG3	2.33	0.53
1:B:62:ALA:HB2	1:B:360:ILE:HD11	1.92	0.51
1:A:138:ASP:OD1	1:A:148:THR:HG22	2.10	0.51
1:B:246:ARG:HD2	1:B:246:ARG:C	2.35	0.51
1:B:205:LEU:C	1:B:205:LEU:HD23	2.36	0.51
1:A:41:ARG:NH2	5:A:509:HOH:O	2.41	0.50
1:A:63:PHE:HD2	1:A:149:MET:CE	2.24	0.50
1:B:61:VAL:CG1	1:B:205:LEU:HD21	2.42	0.49
1:A:63:PHE:CD2	1:A:149:MET:CE	2.95	0.49
1:A:92:HIS:HD2	5:A:634:HOH:O	1.92	0.49
1:A:157:VAL:HG12	1:A:161:SER:OG	2.12	0.49
1:C:62:ALA:HB2	1:C:360:ILE:HD11	1.95	0.49
1:A:338:LYS:HG3	1:A:362:ALA:HB2	1.94	0.48
1:B:205:LEU:HD23	1:B:206:PHE:N	2.28	0.48
1:B:91:THR:HG21	1:B:196:VAL:HG12	1.95	0.48
1:C:324:LYS:HD3	1:C:327:SER:HB3	1.95	0.48
3:A:403:GOL:H32	1:B:72:ARG:HG2	1.96	0.48
1:A:246:ARG:HD2	1:A:246:ARG:C	2.38	0.47
1:A:277:VAL:O	1:A:278:GLY:C	2.58	0.47
1:A:22:LEU:HD11	1:A:41:ARG:HG3	1.96	0.47
1:A:349:PRO:HD3	5:A:614:HOH:O	2.15	0.47
3:A:403:GOL:H12	1:B:44:VAL:O	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:294:ARG:HD2	1:B:321:GLU:OE1	2.15	0.47
1:A:88:PRO:HA	1:A:339:ARG:HH22	1.80	0.46
3:B:410:GOL:C3	3:C:406:GOL:O1	2.65	0.45
1:A:63:PHE:CE2	1:A:149:MET:HE3	2.51	0.45
1:C:246:ARG:HD2	1:C:246:ARG:C	2.42	0.45
1:A:278:GLY:HA2	1:A:294:ARG:HG3	1.99	0.45
1:B:349:PRO:HD3	5:B:624:HOH:O	2.17	0.44
1:C:15:ASN:OD1	1:C:16:CYS:N	2.50	0.44
1:C:34:LEU:HD13	1:C:112:THR:HG21	2.00	0.44
1:C:112:THR:HG23	1:C:128:ILE:HB	1.99	0.44
1:C:324:LYS:HD3	1:C:327:SER:CB	2.48	0.43
1:B:208:SER:N	3:B:405:GOL:H31	2.24	0.43
1:B:305:GLN:NE2	5:B:508:HOH:O	2.51	0.43
1:B:12:ILE:HG21	1:B:78:GLY:HA2	2.01	0.43
1:C:51:GLU:OE2	1:C:53:ASP:OD2	2.37	0.43
1:A:37:LYS:HG3	1:A:218:TRP:CE2	2.54	0.43
1:B:51:GLU:OE2	1:B:53:ASP:OD2	2.38	0.42
1:B:31:SER:OG	4:B:409:SO4:O2	2.31	0.42
1:A:19:GLU:HB3	1:C:175:GLY:HA3	2.02	0.42
1:A:278:GLY:HA3	5:A:657:HOH:O	2.19	0.42
1:A:18:ILE:O	1:A:43:SER:HA	2.20	0.42
1:C:9:SER:H	3:C:407:GOL:C1	2.32	0.42
1:B:235:ALA:HB1	1:B:363:ILE:HD12	2.01	0.42
3:B:410:GOL:H32	3:C:406:GOL:O1	2.19	0.42
1:A:334:GLN:O	1:A:363:ILE:HA	2.20	0.41
1:A:329:HIS:HB3	5:A:558:HOH:O	2.21	0.41
1:B:334:GLN:O	1:B:363:ILE:HA	2.21	0.41
1:B:76:GLN:HG2	5:B:596:HOH:O	2.20	0.41
1:C:51:GLU:HB3	1:C:215:VAL:HB	2.03	0.41

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	368/389 (95%)	360 (98%)	7 (2%)	1 (0%)	36	20
1	B	368/389 (95%)	361 (98%)	7 (2%)	0	100	100
1	C	366/389 (94%)	358 (98%)	6 (2%)	2 (0%)	24	10
All	All	1102/1167 (94%)	1079 (98%)	20 (2%)	3 (0%)	36	20

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	12	ILE
1	C	15	ASN
1	C	327	SER

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	299/313 (96%)	292 (98%)	7 (2%)	44	20
1	B	299/313 (96%)	295 (99%)	4 (1%)	61	39
1	C	301/313 (96%)	301 (100%)	0	100	100
All	All	899/939 (96%)	888 (99%)	11 (1%)	63	43

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	ILE
1	A	82	GLU
1	A	195	SER
1	A	276	VAL
1	A	324	LYS
1	A	328	GLU
1	A	338	LYS
1	B	13	THR
1	B	17	ILE
1	B	277	VAL

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Mol	Chain	Res	Type
1	B	327	SER

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

Mol	Chain	Res	Type
1	A	23	GLN
1	A	58	ASN
1	A	92	HIS
1	A	107	ASN
1	A	334	GLN
1	B	84	ASN
1	C	84	ASN
1	C	156	ASN
1	C	162	ASN
1	C	171	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](#)

26 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
4	SO4	C	410	-	4,4,4	0.49	0	6,6,6	0.22	0
4	SO4	B	409	-	4,4,4	0.54	0	6,6,6	0.36	0
2	HZC	C	402	-	12,12,12	0.45	0	14,16,16	1.48	2 (14%)
4	SO4	B	408	-	4,4,4	0.56	0	6,6,6	0.40	0
3	GOL	A	403	-	5,5,5	0.08	0	5,5,5	0.26	0
2	HZC	A	401	-	12,12,12	0.54	0	14,16,16	1.61	4 (28%)
2	HZC	B	401	-	12,12,12	0.59	0	14,16,16	2.62	8 (57%)
3	GOL	B	404	-	5,5,5	0.13	0	5,5,5	0.44	0
2	HZC	B	402	-	12,12,12	0.27	0	14,16,16	1.63	3 (21%)
3	GOL	B	406	-	5,5,5	0.16	0	5,5,5	0.33	0
3	GOL	C	406	-	5,5,5	0.17	0	5,5,5	0.32	0
3	GOL	C	407	-	5,5,5	0.14	0	5,5,5	0.36	0
2	HZC	C	403	-	12,12,12	1.00	1 (8%)	14,16,16	1.15	2 (14%)
4	SO4	B	407	-	4,4,4	0.32	0	6,6,6	0.16	0
3	GOL	C	405	-	5,5,5	0.14	0	5,5,5	0.29	0
3	GOL	A	404	-	5,5,5	0.14	0	5,5,5	0.45	0
3	GOL	C	408	-	5,5,5	0.08	0	5,5,5	0.43	0
2	HZC	C	401	-	12,12,12	0.76	0	14,16,16	2.08	6 (42%)
3	GOL	C	404	-	5,5,5	0.12	0	5,5,5	0.35	0
3	GOL	A	402	-	5,5,5	0.34	0	5,5,5	1.49	1 (20%)
2	HZC	B	403	-	12,12,12	1.00	2 (16%)	14,16,16	1.37	2 (14%)
3	GOL	C	409	-	5,5,5	0.10	0	5,5,5	0.30	0
3	GOL	B	405	-	5,5,5	0.30	0	5,5,5	0.46	0
4	SO4	C	411	-	4,4,4	0.58	0	6,6,6	0.27	0
4	SO4	A	405	-	4,4,4	0.38	0	6,6,6	0.23	0
3	GOL	B	410	-	5,5,5	0.15	0	5,5,5	0.36	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	HZC	C	402	-	-	0/6/19/19	0/1/1/1
3	GOL	A	403	-	-	4/4/4/4	-
2	HZC	A	401	-	-	0/6/19/19	0/1/1/1
2	HZC	B	401	-	-	3/6/19/19	0/1/1/1
3	GOL	B	404	-	-	2/4/4/4	-
2	HZC	B	402	-	-	1/6/19/19	0/1/1/1
3	GOL	B	406	-	-	1/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	C	406	-	-	3/4/4/4	-
3	GOL	C	407	-	-	4/4/4/4	-
2	HZC	C	403	-	-	0/6/19/19	0/1/1/1
3	GOL	C	405	-	-	2/4/4/4	-
3	GOL	A	404	-	-	2/4/4/4	-
3	GOL	C	408	-	-	4/4/4/4	-
2	HZC	C	401	-	-	0/6/19/19	0/1/1/1
3	GOL	C	404	-	-	2/4/4/4	-
3	GOL	A	402	-	-	2/4/4/4	-
2	HZC	B	403	-	-	0/6/19/19	0/1/1/1
3	GOL	C	409	-	-	2/4/4/4	-
3	GOL	B	405	-	-	4/4/4/4	-
3	GOL	B	410	-	-	2/4/4/4	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	403	HZC	C11-C4	2.74	1.58	1.51
2	B	403	HZC	C6-C5	2.24	1.57	1.53
2	B	403	HZC	C11-C4	2.14	1.56	1.51

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	401	HZC	C11-C4-C5	4.66	123.81	113.88
2	C	401	HZC	C3-C4-C5	4.66	116.94	110.69
2	B	401	HZC	C3-C2-C1	4.45	116.21	109.42
2	B	401	HZC	C6-C1-C2	-3.86	105.99	111.96
2	A	401	HZC	C7-C2-C3	-3.14	105.96	111.17
2	B	402	HZC	C3-C2-C1	-3.06	104.75	109.42
2	B	403	HZC	C4-C3-C2	2.98	116.66	113.16
2	B	402	HZC	C6-C5-C8	-2.93	108.61	113.60
2	B	402	HZC	C9-C8-C10	-2.85	102.75	110.58
2	B	401	HZC	C6-C5-C4	2.81	114.55	109.99
2	B	401	HZC	C7-C2-C1	-2.76	106.05	112.08
3	A	402	GOL	O2-C2-C3	2.68	120.26	109.18
2	C	401	HZC	C7-C2-C1	-2.63	106.33	112.08
2	B	401	HZC	C3-C4-C11	-2.55	105.51	110.54
2	C	402	HZC	C7-C2-C1	-2.53	106.55	112.08
2	A	401	HZC	C6-C5-C8	-2.52	109.30	113.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	401	HZC	C1-C6-C5	-2.50	108.18	112.16
2	C	401	HZC	C10-C8-C5	-2.50	106.75	112.51
2	C	401	HZC	C1-C6-C5	-2.48	108.20	112.16
2	B	403	HZC	C9-C8-C5	-2.44	106.89	112.51
2	A	401	HZC	C3-C4-C11	-2.34	105.93	110.54
2	B	401	HZC	C7-C2-C3	-2.33	107.30	111.17
2	B	401	HZC	C3-C4-C5	2.30	113.77	110.69
2	C	402	HZC	C6-C5-C8	-2.28	109.72	113.60
2	C	403	HZC	C9-C8-C5	-2.22	107.39	112.51
2	C	403	HZC	C6-C5-C8	-2.14	109.96	113.60
2	C	401	HZC	C6-C5-C8	-2.07	110.08	113.60
2	C	401	HZC	C3-C4-C11	-2.02	106.57	110.54

There are no chirality outliers.

All (38) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	403	GOL	O1-C1-C2-C3
3	A	404	GOL	O1-C1-C2-C3
3	B	405	GOL	O1-C1-C2-O2
3	B	405	GOL	O1-C1-C2-C3
3	B	405	GOL	C1-C2-C3-O3
3	B	405	GOL	O2-C2-C3-O3
3	C	404	GOL	O1-C1-C2-O2
3	C	404	GOL	O1-C1-C2-C3
3	C	406	GOL	C1-C2-C3-O3
3	C	407	GOL	C1-C2-C3-O3
3	C	408	GOL	O1-C1-C2-C3
3	C	408	GOL	C1-C2-C3-O3
3	C	408	GOL	O2-C2-C3-O3
3	C	407	GOL	O2-C2-C3-O3
3	A	402	GOL	O1-C1-C2-C3
3	A	403	GOL	C1-C2-C3-O3
3	B	404	GOL	O1-C1-C2-C3
3	B	410	GOL	O1-C1-C2-C3
3	C	405	GOL	C1-C2-C3-O3
3	C	407	GOL	O1-C1-C2-C3
3	A	402	GOL	O1-C1-C2-O2
3	A	403	GOL	O1-C1-C2-O2
3	A	404	GOL	O1-C1-C2-O2
3	B	404	GOL	O1-C1-C2-O2
3	C	406	GOL	O2-C2-C3-O3

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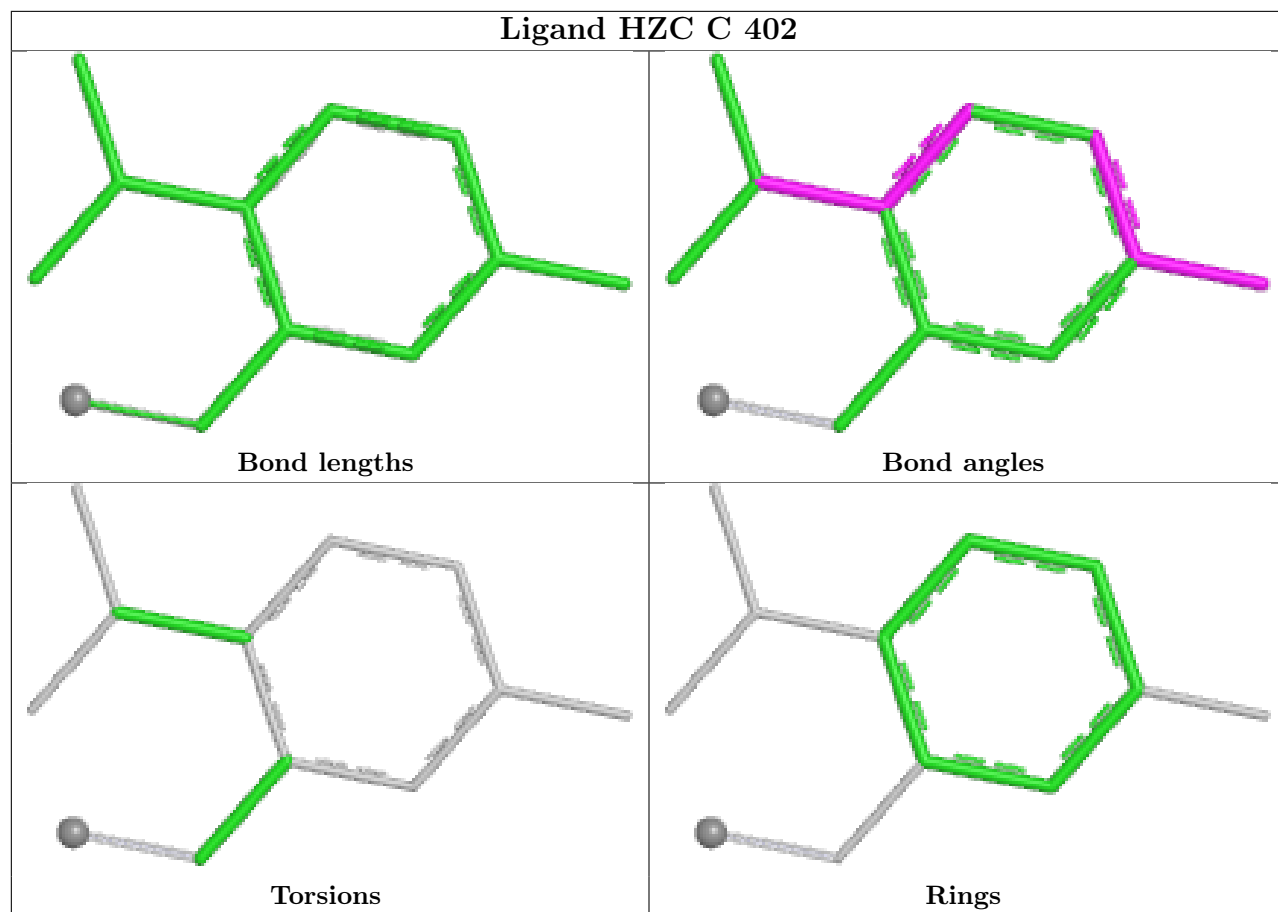
Mol	Chain	Res	Type	Atoms
3	C	407	GOL	O1-C1-C2-O2
3	C	405	GOL	O2-C2-C3-O3
3	A	403	GOL	O2-C2-C3-O3
3	B	406	GOL	O2-C2-C3-O3
3	C	406	GOL	O1-C1-C2-O2
3	C	409	GOL	O2-C2-C3-O3
2	B	401	HZC	C4-C5-C8-C10
3	B	410	GOL	O1-C1-C2-O2
3	C	408	GOL	O1-C1-C2-O2
3	C	409	GOL	O1-C1-C2-O2
2	B	402	HZC	C6-C5-C8-C10
2	B	401	HZC	C6-C5-C8-C10
2	B	401	HZC	C4-C5-C8-C9

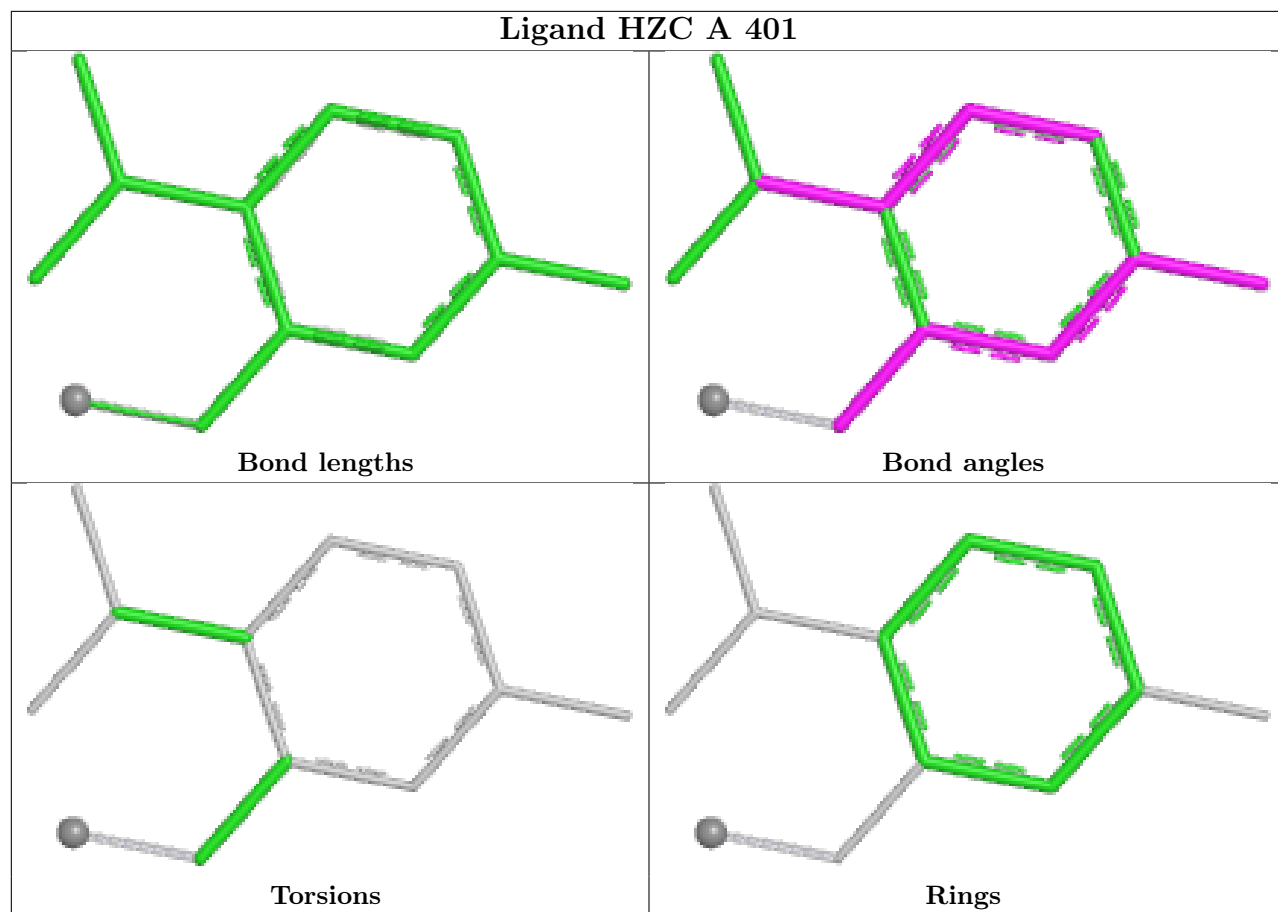
There are no ring outliers.

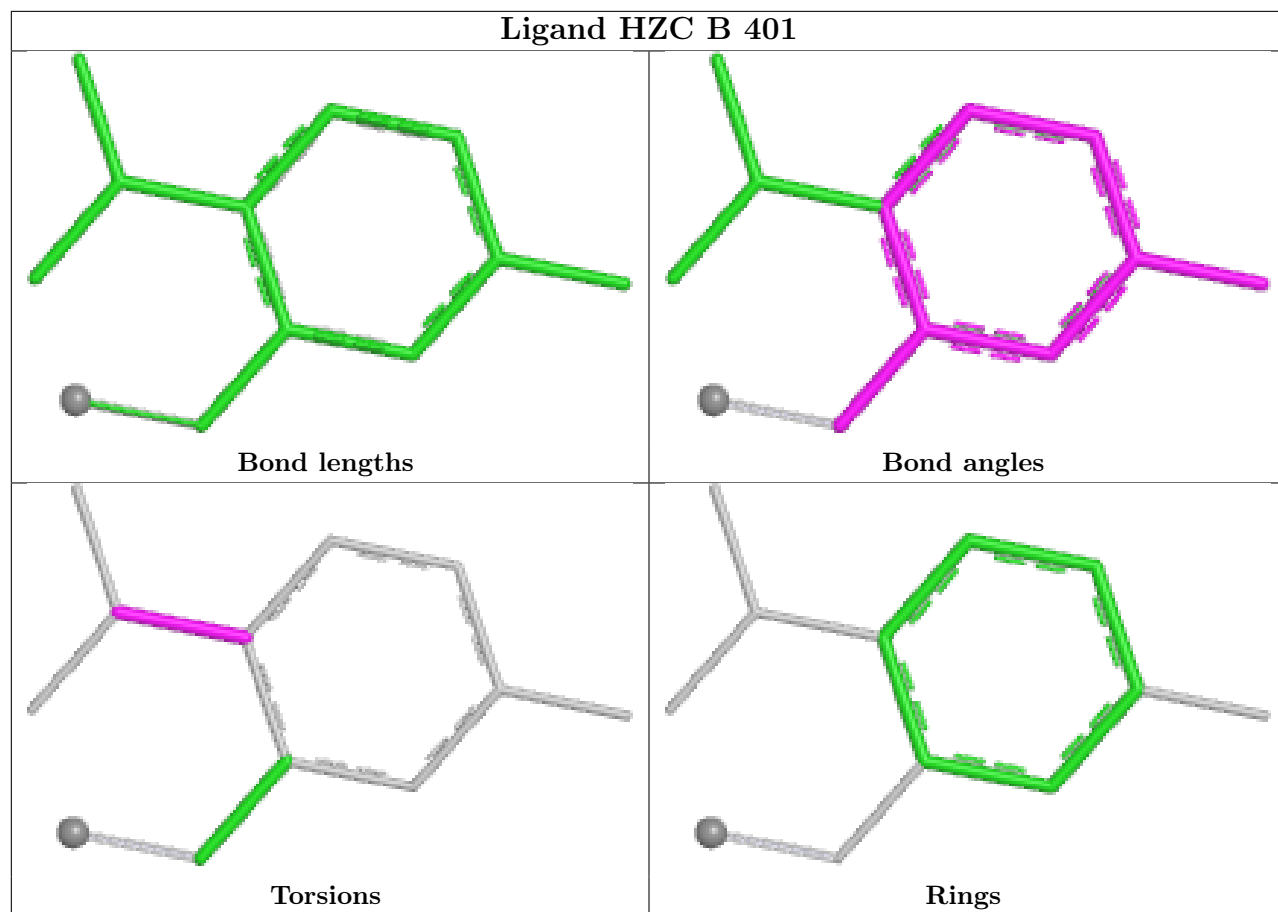
9 monomers are involved in 12 short contacts:

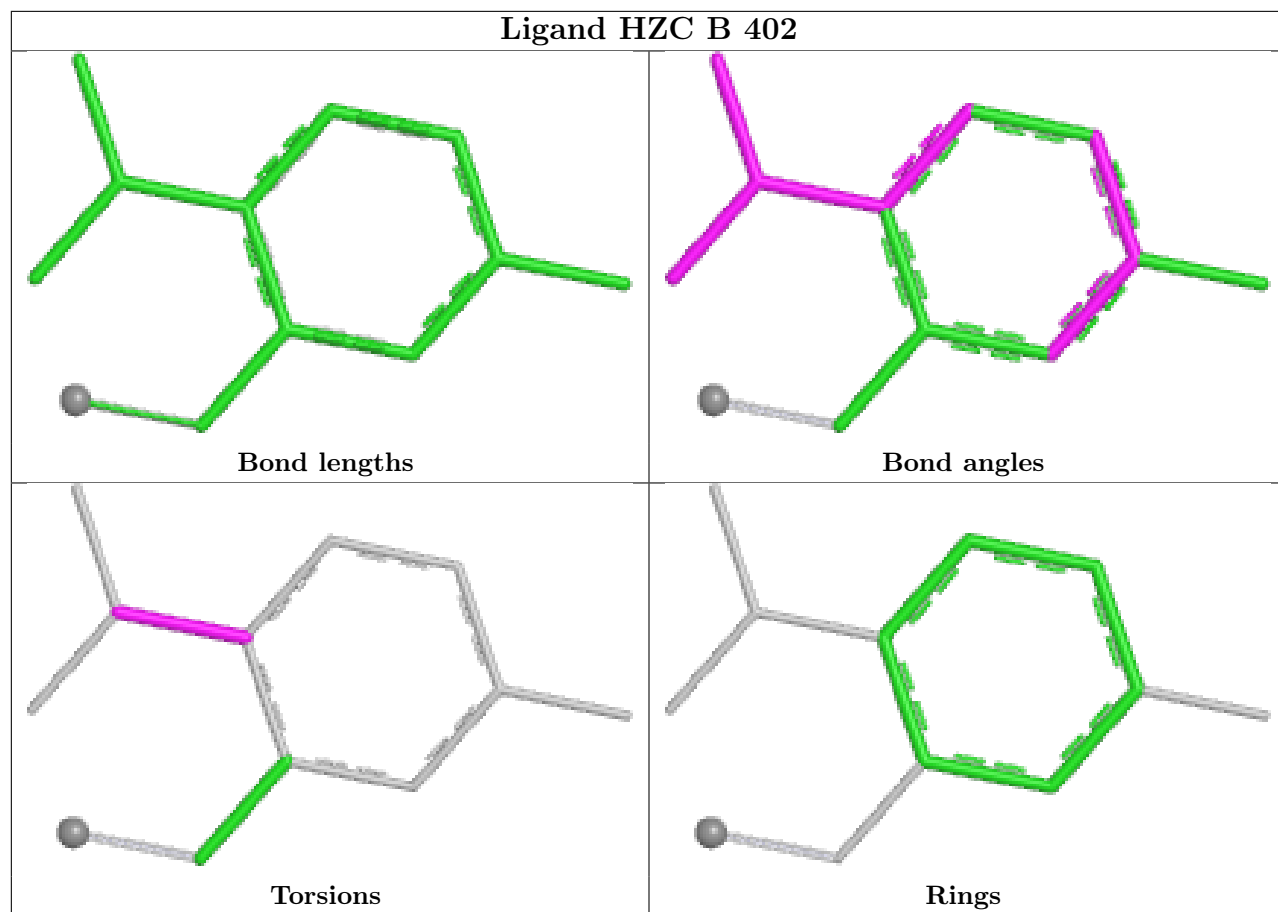
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	409	SO4	1	0
3	A	403	GOL	2	0
3	B	404	GOL	1	0
2	B	402	HZC	1	0
3	C	406	GOL	2	0
3	C	407	GOL	1	0
3	C	408	GOL	1	0
3	B	405	GOL	3	0
3	B	410	GOL	2	0

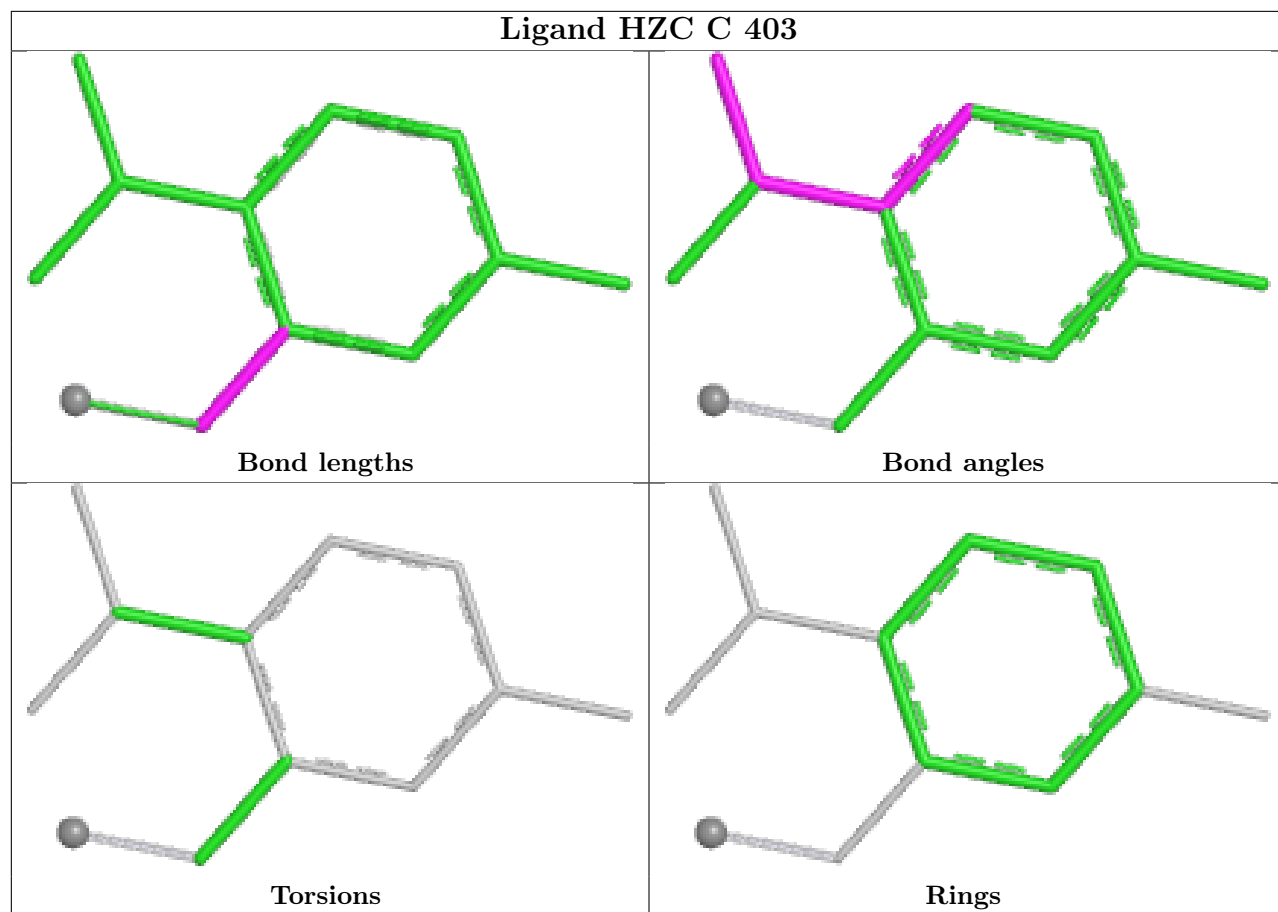
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

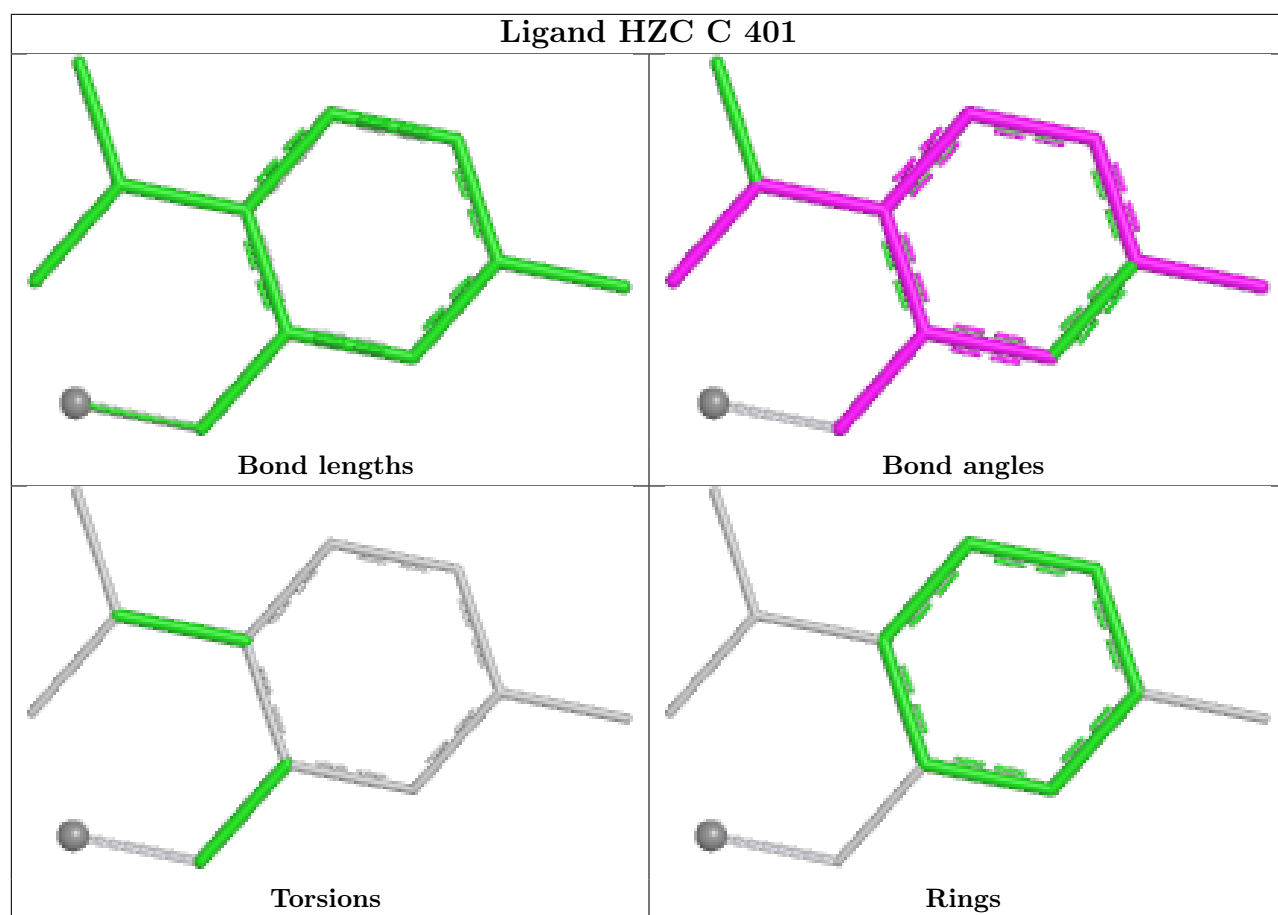


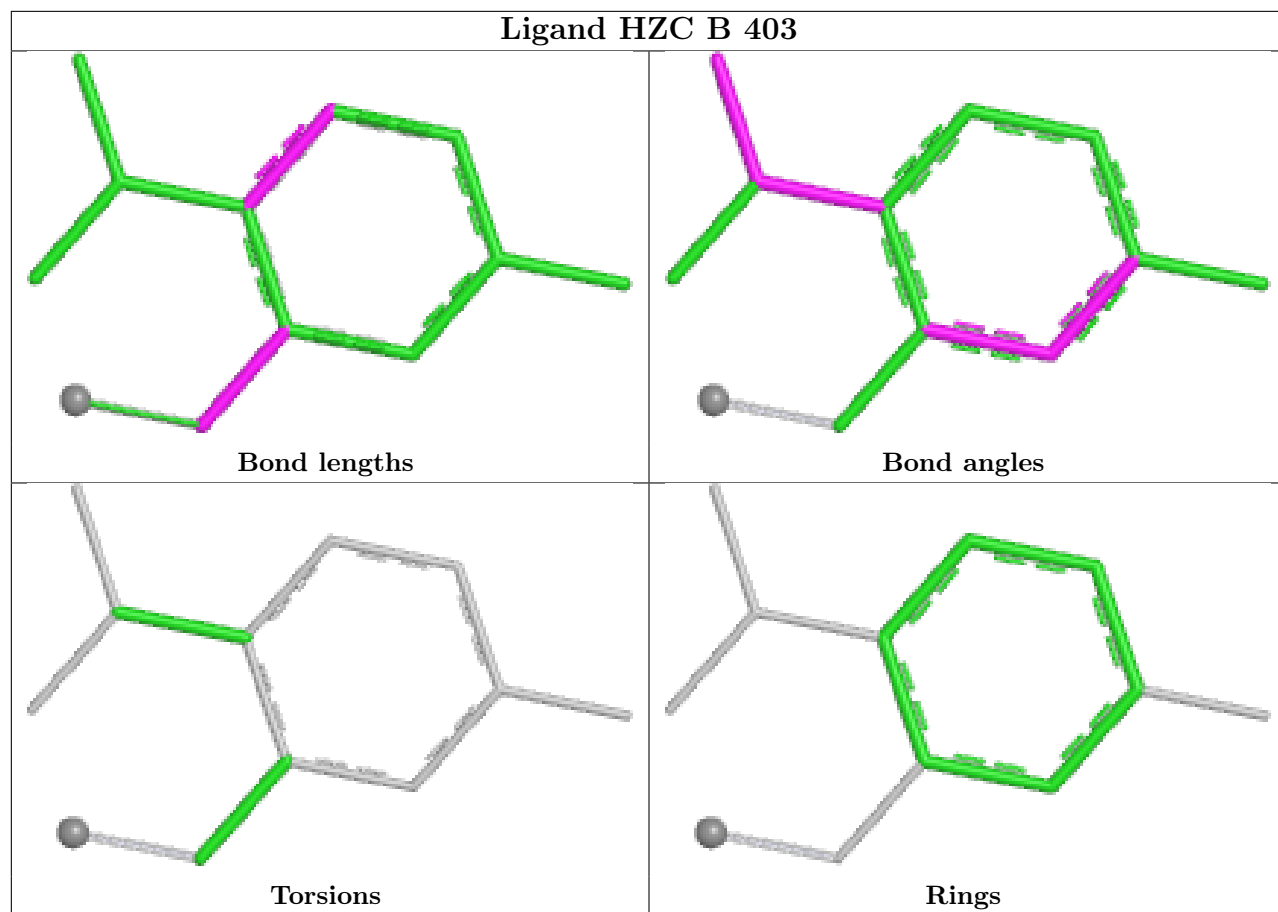












5.7 Other polymers [i](#)

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	372/389 (95%)	0.76	34 (9%) 15 15	14, 25, 55, 86	0
1	B	372/389 (95%)	0.50	24 (6%) 25 27	14, 22, 48, 89	0
1	C	372/389 (95%)	0.53	19 (5%) 33 36	14, 23, 48, 86	0
All	All	1116/1167 (95%)	0.59	77 (6%) 23 24	14, 24, 51, 89	0

All (77) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	288	VAL	6.3
1	B	278	GLY	5.2
1	A	12	ILE	5.2
1	A	4	PRO	5.1
1	C	329	HIS	4.9
1	A	277	VAL	4.7
1	C	155	ALA	4.6
1	B	277	VAL	4.5
1	B	327	SER	4.4
1	A	157	VAL	4.4
1	C	289	LYS	4.4
1	B	13	THR	4.3
1	A	156	ASN	4.1
1	A	15	ASN	4.1
1	A	13	THR	4.0
1	A	278	GLY	4.0
1	C	278	GLY	4.0
1	A	325	LYS	3.9
1	B	329	HIS	3.9
1	C	16	CYS	3.8
1	C	156	ASN	3.8
1	B	276	VAL	3.8
1	A	165	ALA	3.8

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Mol	Chain	Res	Type	RSRZ
1	A	329	HIS	3.6
1	A	16	CYS	3.6
1	B	4	PRO	3.6
1	A	276	VAL	3.6
1	A	198	ALA	3.4
1	B	18	ILE	3.4
1	A	327	SER	3.4
1	C	277	VAL	3.3
1	A	326	ASP	3.2
1	B	326	ASP	3.2
1	C	80	HIS	3.1
1	B	14	SER	3.1
1	B	325	LYS	3.1
1	A	290	GLY	3.1
1	A	11	ASP	3.1
1	A	108	SER	2.9
1	A	155	ALA	2.9
1	B	12	ILE	2.9
1	C	15	ASN	2.9
1	B	290	GLY	2.9
1	B	266	ASP	2.9
1	A	14	SER	2.8
1	A	304	SER	2.8
1	B	202	SER	2.8
1	C	154	HIS	2.7
1	C	202	SER	2.7
1	B	15	ASN	2.7
1	C	199	ASN	2.7
1	A	323	ALA	2.7
1	A	76	GLN	2.6
1	B	119	LYS	2.6
1	B	77	GLY	2.5
1	A	150	GLU	2.5
1	C	17	ILE	2.5
1	B	198	ALA	2.4
1	B	142	PRO	2.4
1	C	266	ASP	2.4
1	C	326	ASP	2.3
1	A	117	LEU	2.3
1	A	18	ILE	2.3
1	A	119	LYS	2.3
1	A	122	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	154	HIS	2.2
1	C	42	ILE	2.2
1	B	199	ASN	2.2
1	A	32	ALA	2.1
1	C	168	ALA	2.1
1	B	57	THR	2.1
1	A	20	THR	2.1
1	A	77	GLY	2.1
1	C	157	VAL	2.1
1	A	19	GLU	2.0
1	A	197	GLY	2.0
1	B	324	LYS	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	GOL	C	409	6/6	0.66	0.18	48,52,54,59	0
3	GOL	A	404	6/6	0.73	0.22	49,54,55,63	0
3	GOL	B	405	6/6	0.76	0.18	34,39,49,54	0
3	GOL	B	410	6/6	0.77	0.18	42,51,57,58	0
3	GOL	C	405	6/6	0.79	0.17	32,40,43,52	0
3	GOL	C	408	6/6	0.79	0.16	52,56,58,59	0
3	GOL	A	403	6/6	0.79	0.18	45,52,54,58	0
2	HZC	B	402	12/12	0.83	0.16	37,39,42,43	0
3	GOL	C	407	6/6	0.84	0.15	38,49,52,60	0
3	GOL	C	404	6/6	0.84	0.19	36,45,51,56	0
3	GOL	B	404	6/6	0.84	0.14	48,52,55,62	0

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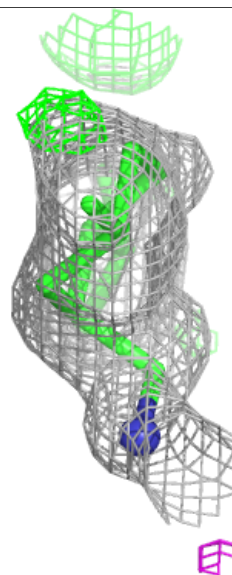
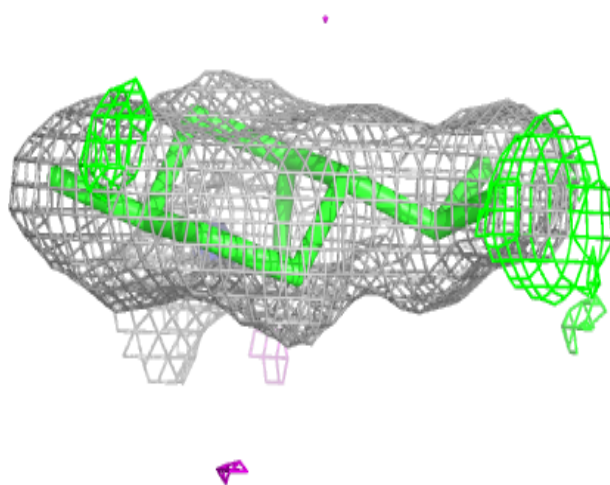
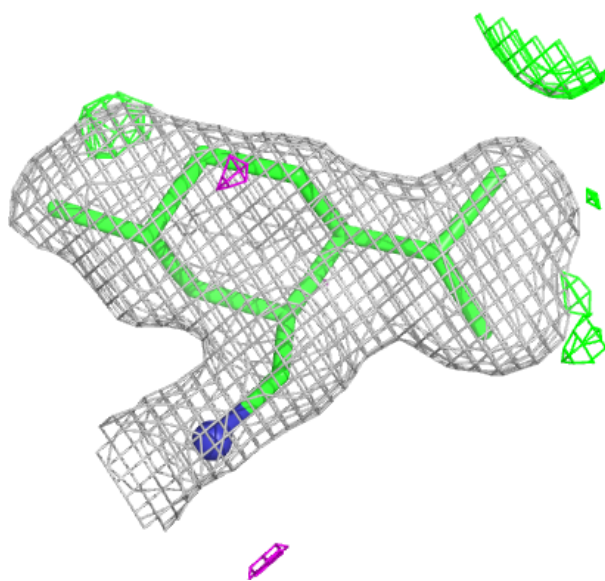
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	HZC	B	403	12/12	0.85	0.14	26,27,32,33	0
2	HZC	C	403	12/12	0.85	0.14	25,27,28,28	0
2	HZC	C	402	12/12	0.86	0.17	43,44,48,53	0
2	HZC	A	401	12/12	0.86	0.14	27,30,40,45	0
4	SO4	B	408	5/5	0.86	0.12	27,40,41,44	0
4	SO4	C	410	5/5	0.86	0.10	33,40,43,48	0
3	GOL	B	406	6/6	0.87	0.14	31,41,44,51	0
4	SO4	B	407	5/5	0.89	0.10	59,62,64,65	0
3	GOL	C	406	6/6	0.89	0.13	28,38,43,44	0
2	HZC	C	401	12/12	0.89	0.14	23,31,43,43	0
4	SO4	A	405	5/5	0.90	0.10	29,38,45,47	0
2	HZC	B	401	12/12	0.90	0.13	22,28,39,41	0
3	GOL	A	402	6/6	0.92	0.10	24,27,31,34	0
4	SO4	C	411	5/5	0.94	0.18	24,28,30,33	0
4	SO4	B	409	5/5	0.95	0.15	21,25,29,31	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.

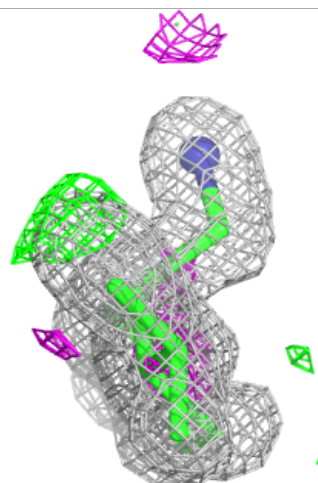
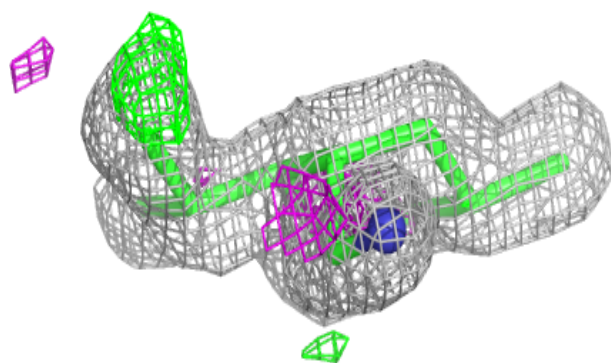
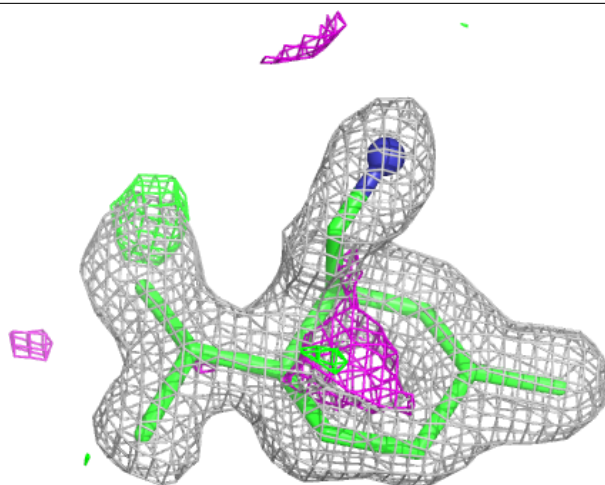
Electron density around HZC B 402:

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



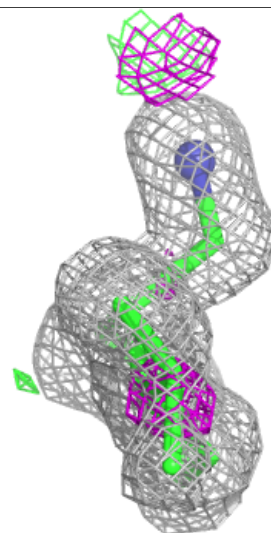
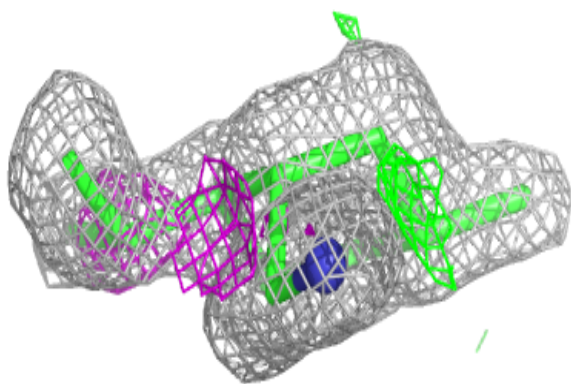
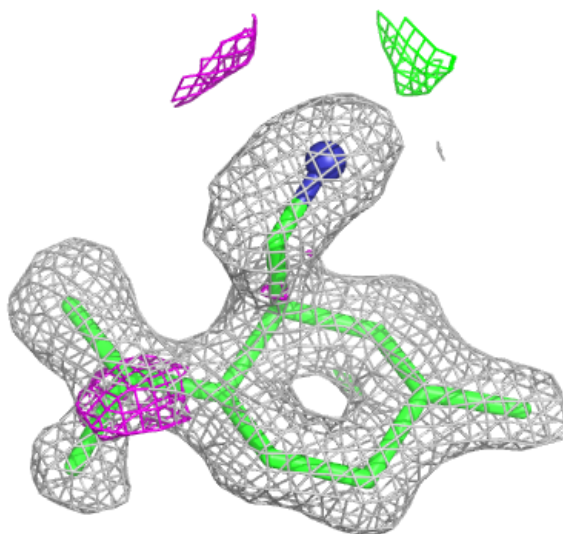
Electron density around HZC B 403:

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



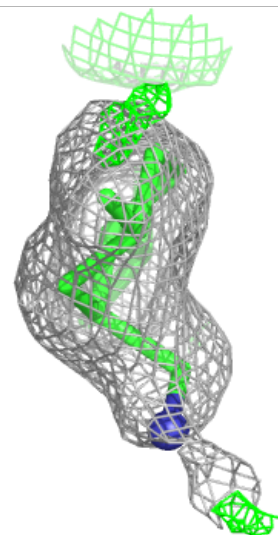
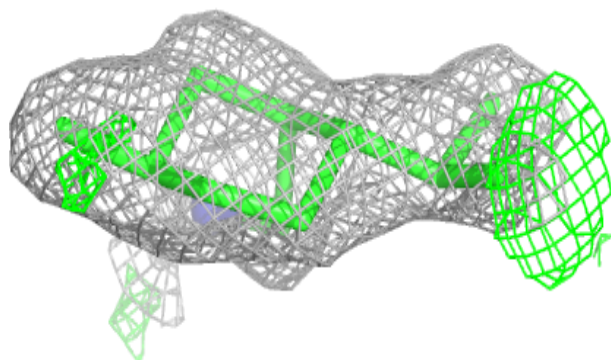
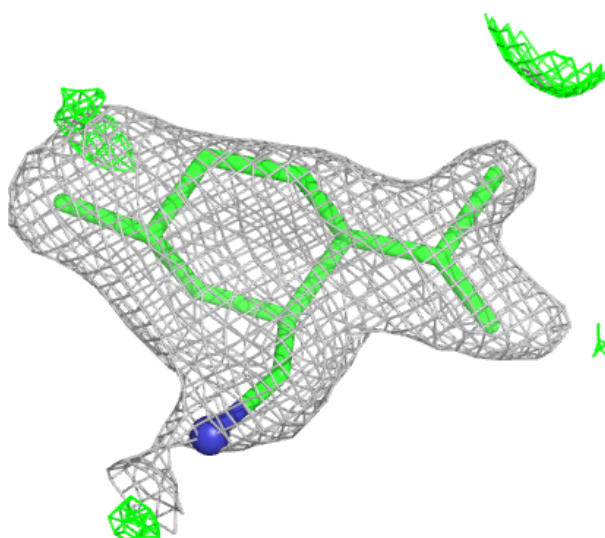
Electron density around HZC C 403:

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



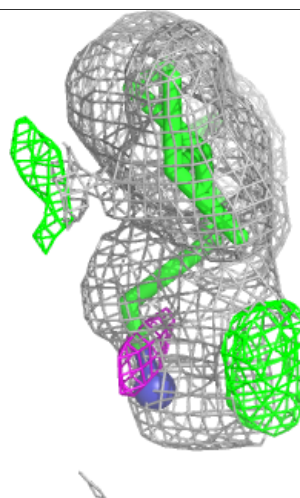
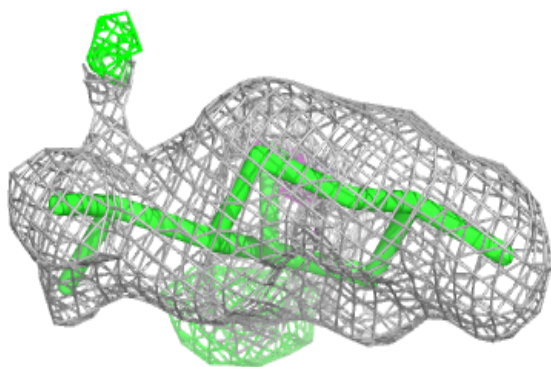
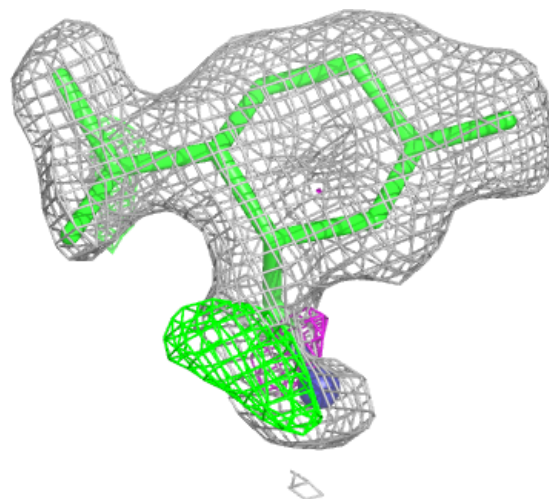
Electron density around HZC C 402:

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



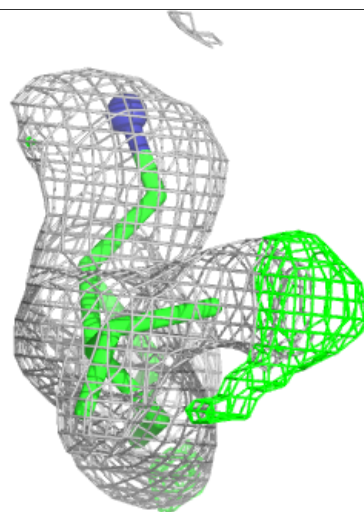
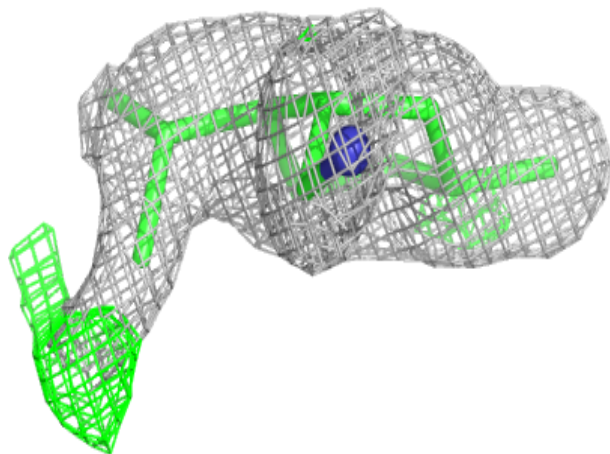
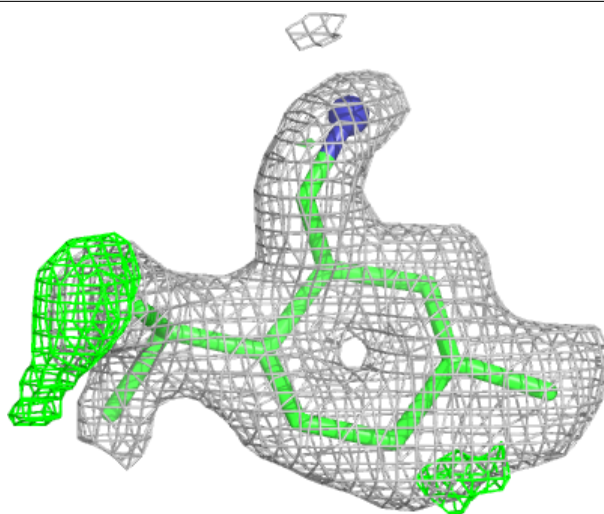
Electron density around HZC A 401:

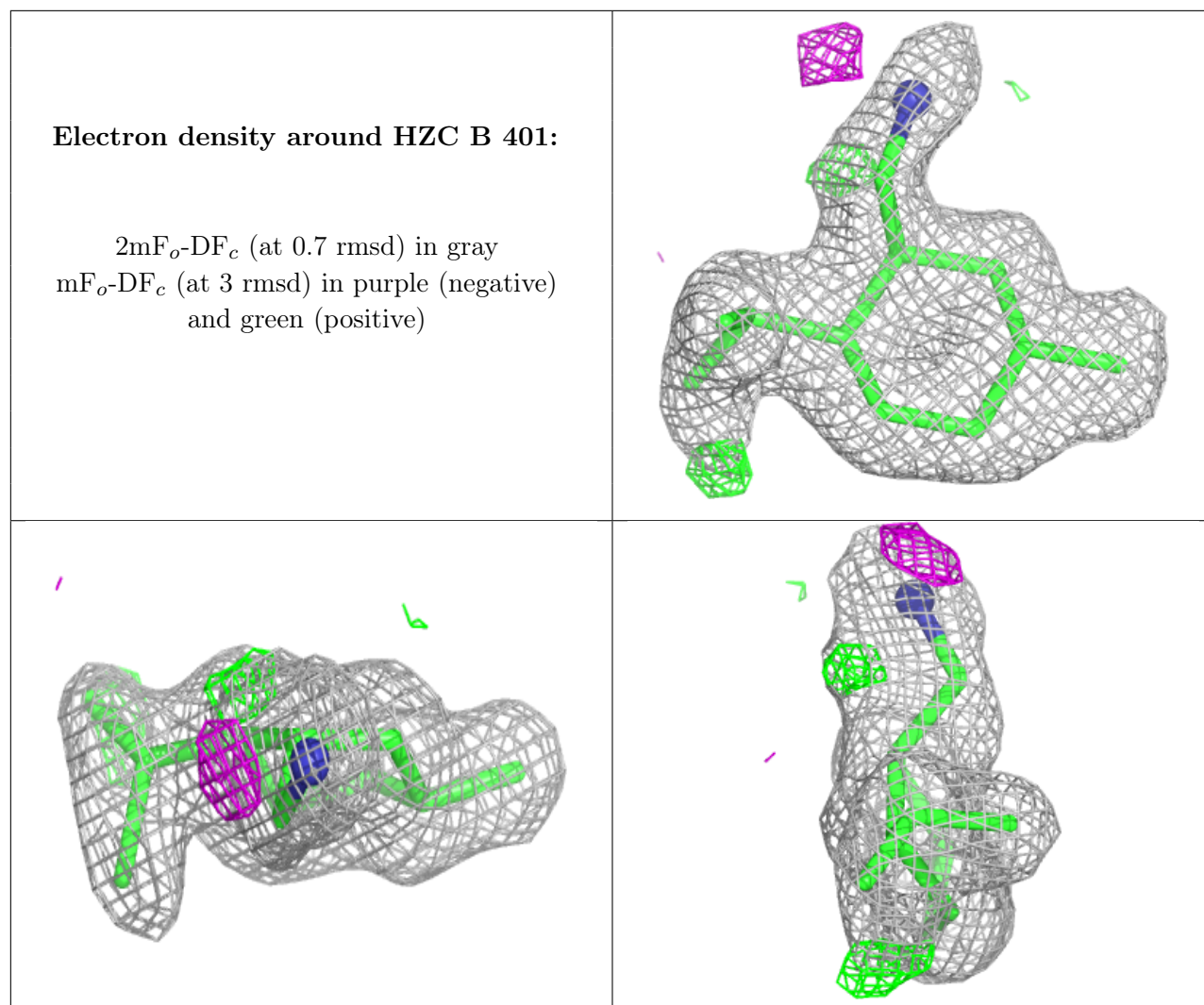
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HZC C 401:

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





6.5 Other polymers ⓘ

There are no such residues in this entry.