



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 12:36 PM UTC

PDB ID : 1ONY / pdb_00001ony
Title : Oxalyl-Aryl-Amino Benzoic Acid inhibitors of PTP1B, compound 17
Authors : Liu, G.; Szczepankiewicz, B.G.; Pei, Z.; Janowich, D.A.; Xin, Z.; Hadjuk, P.J.; Abad-Zapatero, C.; Liang, H.; Hutchins, C.W.; Fesik, S.W.; Ballaron, S.J.; Stashko, M.A.; Lubben, T.; Mika, A.K.; Zinker, B.A.; Trevillyan, J.M.; Jirousek, M.R.
Deposited on : 2003-03-02
Resolution : 2.15 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

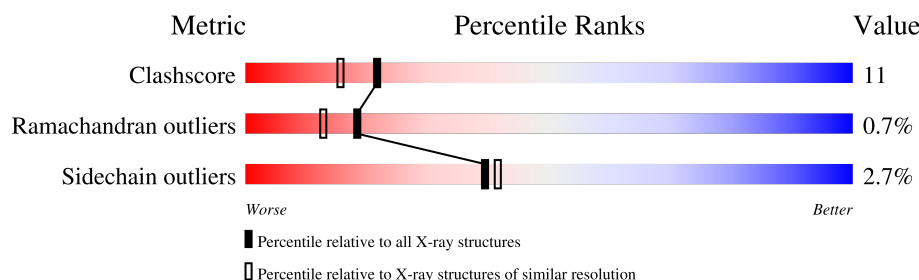
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.15 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))
Clashscore	190562	2159 (2.16-2.16)
Ramachandran outliers	187476	2134 (2.16-2.16)
Sidechain outliers	187428	2133 (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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	321	 69% 18% • 12%

2 Entry composition [i](#)

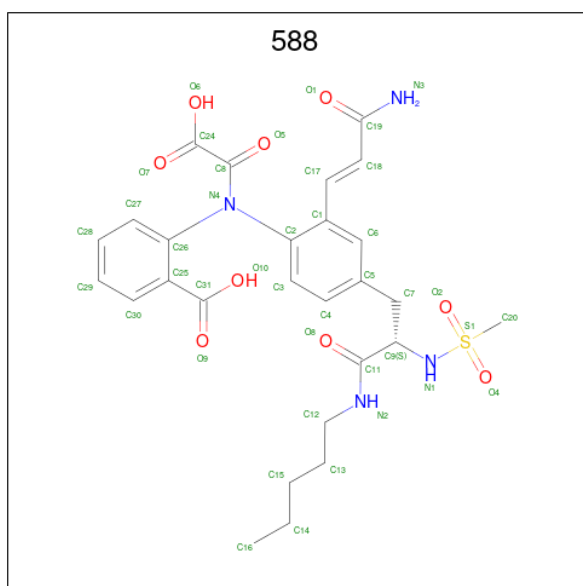
There are 3 unique types of molecules in this entry. The entry contains 2654 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Protein-tyrosine phosphatase, non-receptor type 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	283	2301	1460	398	427	16	0	0	1

- Molecule 2 is 2-{[2-(2-CARBAMOYL-VINYL)-4-(2-METHANESULFONYLAMINO-2-PENTYLCARBAMOYL-ETHYL)-PHENYL]-OXALYL-AMINO}-BENZOIC ACID (CCD ID: 588) (formula: C₂₇H₃₂N₄O₉S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
2	A	1	41	27	4	9	1	0	0

- Molecule 3 is water.

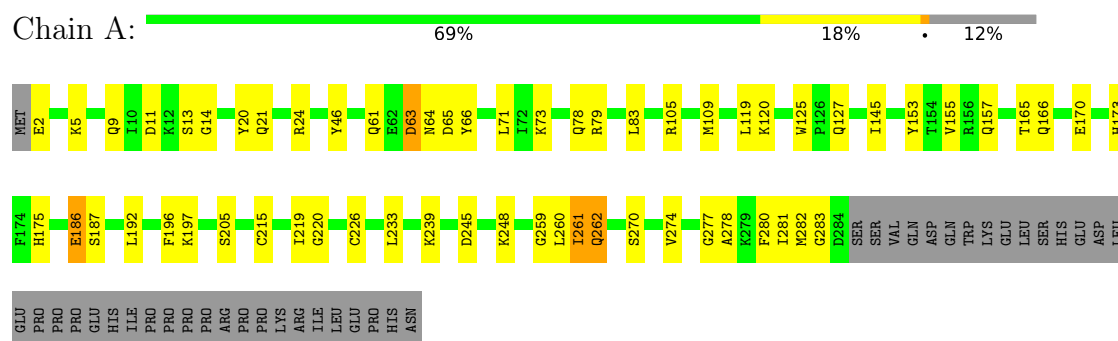
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	312	Total	O	0	0
			312	312		

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. 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. 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.

Note EDS was not executed.

- Molecule 1: Protein-tyrosine phosphatase, non-receptor type 1



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	89.02Å 89.02Å 105.35Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	17.44 – 2.15	Depositor
% Data completeness (in resolution range)	86.5 (17.44-2.15)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
Refinement program	CNX 2000	Depositor
R, R_{free}	0.194 , 0.220	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2654	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

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: 588

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	0.40	1/2353 (0.0%)	0.90	6/3171 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	283	GLY	C-N	-5.59	1.25	1.33

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	66	TYR	N-CA-C	6.51	120.90	109.96
1	A	259	GLY	N-CA-C	5.75	123.17	114.61
1	A	205	SER	CA-C-N	5.33	124.99	119.56
1	A	205	SER	C-N-CA	5.33	124.99	119.56
1	A	215	CYS	N-CA-C	-5.06	100.02	110.80
1	A	262	GLN	N-CA-C	5.02	119.41	113.28

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	2301	0	2276	50	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	41	0	30	3	0
3	A	312	0	0	9	0
All	All	2654	0	2306	50	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 11.

All (50) 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:109:MET:HE1	1:A:125:TRP:CH2	2.19	0.78
1:A:109:MET:HE3	1:A:175:HIS:CE1	2.21	0.74
1:A:109:MET:HE2	1:A:173:HIS:CE1	2.23	0.74
1:A:127:GLN:HG3	3:A:589:HOH:O	1.90	0.69
1:A:83:LEU:HD11	1:A:226:CYS:SG	2.33	0.69
1:A:262:GLN:HG3	2:A:322:588:H3	1.80	0.64
1:A:278:ALA:HA	1:A:281:ILE:HG22	1.79	0.64
1:A:278:ALA:O	1:A:282:MET:HB2	1.98	0.63
1:A:120:LYS:HD3	3:A:716:HOH:O	1.96	0.62
1:A:109:MET:HE3	1:A:175:HIS:CG	2.35	0.61
1:A:109:MET:HE3	1:A:175:HIS:ND1	2.18	0.59
1:A:153:TYR:HE1	1:A:155:VAL:HG23	1.67	0.59
1:A:153:TYR:HE1	1:A:155:VAL:CG2	2.16	0.58
1:A:153:TYR:CE1	1:A:155:VAL:HG23	2.38	0.58
1:A:277:GLY:O	1:A:281:ILE:HG22	2.05	0.57
1:A:61:GLN:HE21	1:A:64:ASN:H	1.55	0.55
1:A:186:GLU:H	1:A:186:GLU:CD	2.16	0.54
1:A:219:ILE:O	1:A:260:LEU:HA	2.08	0.53
1:A:145:ILE:HG22	3:A:628:HOH:O	2.08	0.53
1:A:192:LEU:O	1:A:196:PHE:HD1	1.91	0.52
1:A:260:LEU:O	1:A:261:ILE:HB	2.10	0.51
1:A:157:GLN:HB3	3:A:628:HOH:O	2.09	0.51
1:A:2:GLU:HG3	1:A:5:LYS:H	1.75	0.51
1:A:109:MET:HE3	1:A:175:HIS:CD2	2.45	0.51
1:A:109:MET:HE2	1:A:173:HIS:HE1	1.74	0.51
1:A:109:MET:CE	1:A:173:HIS:HE1	2.25	0.50
1:A:71:LEU:HG	1:A:73:LYS:HG3	1.94	0.49
1:A:220:GLY:HA3	2:A:322:588:O5	2.13	0.49
1:A:125:TRP:CD1	3:A:589:HOH:O	2.67	0.48
1:A:5:LYS:O	1:A:9:GLN:HG3	2.14	0.47
1:A:186:GLU:CD	1:A:186:GLU:N	2.73	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:109:MET:HE1	1:A:125:TRP:CZ3	2.48	0.47
1:A:20:TYR:CE2	1:A:24:ARG:HD2	2.50	0.46
1:A:248:LYS:HE2	3:A:521:HOH:O	2.15	0.46
1:A:61:GLN:HB2	3:A:781:HOH:O	2.16	0.46
1:A:105:ARG:HH12	1:A:170:GLU:CD	2.23	0.46
1:A:109:MET:CE	1:A:173:HIS:CE1	2.95	0.44
1:A:186:GLU:CD	1:A:187:SER:H	2.26	0.43
1:A:270:SER:O	1:A:274:VAL:HG23	2.18	0.43
1:A:165:THR:O	1:A:166:GLN:HB2	2.19	0.43
1:A:157:GLN:NE2	1:A:170:GLU:OE2	2.52	0.43
1:A:65:ASP:OD1	1:A:65:ASP:C	2.62	0.42
1:A:245:ASP:OD2	1:A:248:LYS:HB2	2.18	0.42
1:A:219:ILE:HG13	1:A:220:GLY:N	2.34	0.42
1:A:13:SER:O	1:A:14:GLY:C	2.63	0.42
1:A:233:LEU:HD12	3:A:572:HOH:O	2.20	0.41
1:A:61:GLN:HE21	1:A:63:ASP:HB3	1.85	0.41
1:A:197:LYS:HE3	3:A:600:HOH:O	2.20	0.40
1:A:280:PHE:CD1	1:A:280:PHE:C	2.99	0.40
1:A:46:TYR:CG	2:A:322:588:H71	2.56	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	281/321 (88%)	272 (97%)	7 (2%)	2 (1%)	18 13

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	63	ASP
1	A	261	ILE

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	255/294 (87%)	248 (97%)	7 (3%)	39	41

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	ASP
1	A	21	GLN
1	A	78	GLN
1	A	79	ARG
1	A	119	LEU
1	A	186	GLU
1	A	239	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	GLN
1	A	157	GLN
1	A	193	ASN
1	A	208	HIS

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

1 ligand is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	588	A	322	-	42,42,42	2.51	15 (35%)	54,58,58	1.86	13 (24%)

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	588	A	322	-	-	14/43/44/44	0/2/2/2

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	322	588	C18-C17	8.05	1.53	1.33
2	A	322	588	S1-N1	6.48	1.75	1.62
2	A	322	588	O7-C24	5.50	1.36	1.22
2	A	322	588	C25-C26	4.64	1.48	1.41
2	A	322	588	C27-C26	4.09	1.46	1.39
2	A	322	588	O6-C24	-3.88	1.20	1.30
2	A	322	588	C1-C17	3.02	1.52	1.47
2	A	322	588	C2-N4	-2.93	1.41	1.44
2	A	322	588	O10-C31	-2.76	1.22	1.30
2	A	322	588	C3-C2	2.68	1.43	1.39
2	A	322	588	C1-C2	2.32	1.45	1.41
2	A	322	588	C30-C25	2.21	1.43	1.39
2	A	322	588	C18-C19	2.13	1.55	1.49
2	A	322	588	C8-C24	2.06	1.56	1.53
2	A	322	588	C6-C5	2.01	1.42	1.39

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	322	588	C1-C17-C18	-5.64	115.84	126.91
2	A	322	588	C1-C2-N4	5.56	124.60	119.96
2	A	322	588	C17-C18-C19	-4.66	109.10	120.92
2	A	322	588	C26-N4-C8	4.27	122.03	117.40
2	A	322	588	O10-C31-C25	3.23	124.45	115.28
2	A	322	588	O10-C31-O9	-2.85	117.22	123.35
2	A	322	588	C9-N1-S1	-2.61	118.96	122.45
2	A	322	588	C2-C1-C17	2.51	122.53	120.30
2	A	322	588	O4-S1-N1	-2.48	103.76	107.29
2	A	322	588	C28-C27-C26	2.40	123.13	118.28
2	A	322	588	C27-C26-C25	-2.27	115.68	119.16
2	A	322	588	O2-S1-N1	-2.13	104.26	107.29
2	A	322	588	O4-S1-C20	2.06	111.52	108.26

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	322	588	O6-C24-C8-O5
2	A	322	588	C2-C1-C17-C18
2	A	322	588	C17-C18-C19-O1
2	A	322	588	C17-C18-C19-N3
2	A	322	588	C9-N1-S1-O4
2	A	322	588	C9-N1-S1-C20
2	A	322	588	C6-C1-C17-C18
2	A	322	588	C26-C25-C31-O9
2	A	322	588	C26-C25-C31-O10
2	A	322	588	C12-C13-C15-C14
2	A	322	588	C25-C26-N4-C8
2	A	322	588	C30-C25-C31-O10
2	A	322	588	C30-C25-C31-O9
2	A	322	588	C16-C14-C15-C13

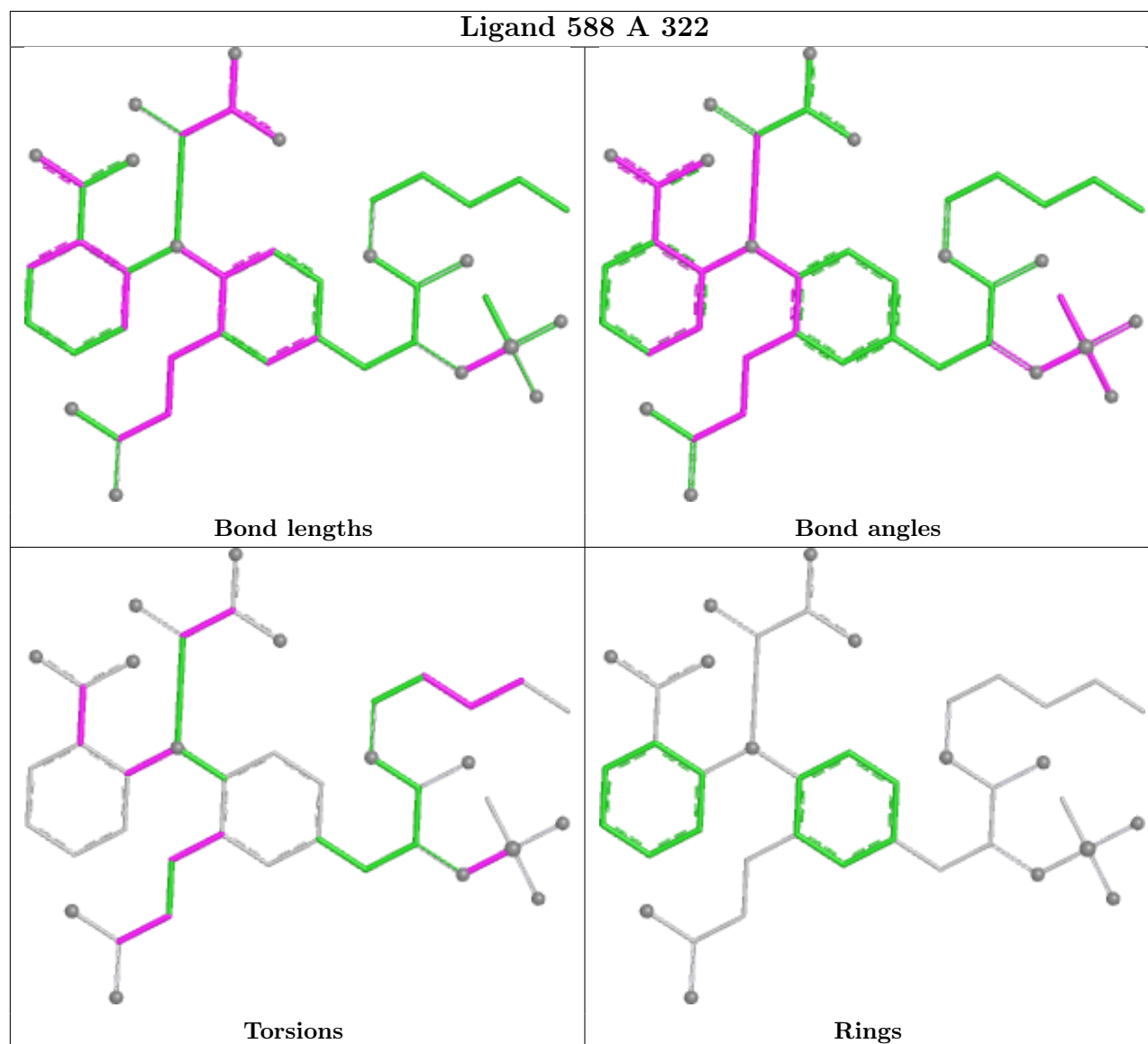
There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	322	588	3	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 ⓘ

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.