



Full wwPDB EM Validation Report ⓘ

Jul 16, 2025 – 01:37 AM JST

PDB ID : 8ZKT / pdb_00008zkt
EMDB ID : EMD-60208
Title : Structure of Polycystin-1/Polycystin-2 complex with GOF mutations
Authors : Chen, M.Y.; Su, Q.; Shi, Y.G.
Deposited on : 2024-05-17
Resolution : 3.34 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

EMDB validation analysis : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0rc1
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

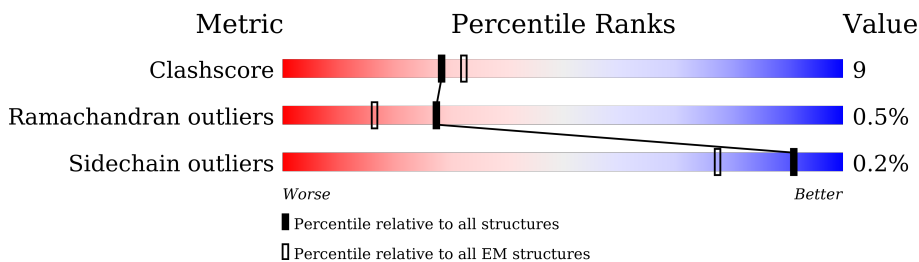
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.34 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)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	1261	
2	B	1007	
2	C	1007	
2	D	1007	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 17369 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Polycystin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	753	5586	3602	1020	947	17	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	3043	MET	-	initiating methionine	UNP P98161
A	3044	ASP	-	expression tag	UNP P98161
A	3045	TYR	-	expression tag	UNP P98161
A	3046	LYS	-	expression tag	UNP P98161
A	3047	ASP	-	expression tag	UNP P98161
A	3048	ASP	-	expression tag	UNP P98161
A	3049	ASP	-	expression tag	UNP P98161
A	3050	ASP	-	expression tag	UNP P98161
A	3051	LYS	-	expression tag	UNP P98161

- Molecule 2 is a protein called Polycystin-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	475	3924	2592	619	693	20	0	0
2	C	475	3923	2591	619	693	20	0	0
2	D	463	3810	2517	601	672	20	0	0

There are 117 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-38	MET	-	initiating methionine	UNP Q13563
B	-37	GLY	-	expression tag	UNP Q13563
B	-36	ALA	-	expression tag	UNP Q13563
B	-35	SER	-	expression tag	UNP Q13563

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-34	SER	-	expression tag	UNP Q13563
B	-33	ALA	-	expression tag	UNP Q13563
B	-32	TRP	-	expression tag	UNP Q13563
B	-31	SER	-	expression tag	UNP Q13563
B	-30	HIS	-	expression tag	UNP Q13563
B	-29	PRO	-	expression tag	UNP Q13563
B	-28	GLN	-	expression tag	UNP Q13563
B	-27	PHE	-	expression tag	UNP Q13563
B	-26	GLU	-	expression tag	UNP Q13563
B	-25	LYS	-	expression tag	UNP Q13563
B	-24	GLY	-	expression tag	UNP Q13563
B	-23	GLY	-	expression tag	UNP Q13563
B	-22	GLY	-	expression tag	UNP Q13563
B	-21	SER	-	expression tag	UNP Q13563
B	-20	GLY	-	expression tag	UNP Q13563
B	-19	GLY	-	expression tag	UNP Q13563
B	-18	GLY	-	expression tag	UNP Q13563
B	-17	SER	-	expression tag	UNP Q13563
B	-16	GLY	-	expression tag	UNP Q13563
B	-15	GLY	-	expression tag	UNP Q13563
B	-14	SER	-	expression tag	UNP Q13563
B	-13	ALA	-	expression tag	UNP Q13563
B	-12	TRP	-	expression tag	UNP Q13563
B	-11	SER	-	expression tag	UNP Q13563
B	-10	HIS	-	expression tag	UNP Q13563
B	-9	PRO	-	expression tag	UNP Q13563
B	-8	GLN	-	expression tag	UNP Q13563
B	-7	PHE	-	expression tag	UNP Q13563
B	-6	GLU	-	expression tag	UNP Q13563
B	-5	LYS	-	expression tag	UNP Q13563
B	-4	GLY	-	expression tag	UNP Q13563
B	-3	SER	-	linker	UNP Q13563
B	-2	ALA	-	linker	UNP Q13563
B	-1	ALA	-	linker	UNP Q13563
B	0	ALA	-	linker	UNP Q13563
C	-38	MET	-	initiating methionine	UNP Q13563
C	-37	GLY	-	expression tag	UNP Q13563
C	-36	ALA	-	expression tag	UNP Q13563
C	-35	SER	-	expression tag	UNP Q13563
C	-34	SER	-	expression tag	UNP Q13563
C	-33	ALA	-	expression tag	UNP Q13563
C	-32	TRP	-	expression tag	UNP Q13563

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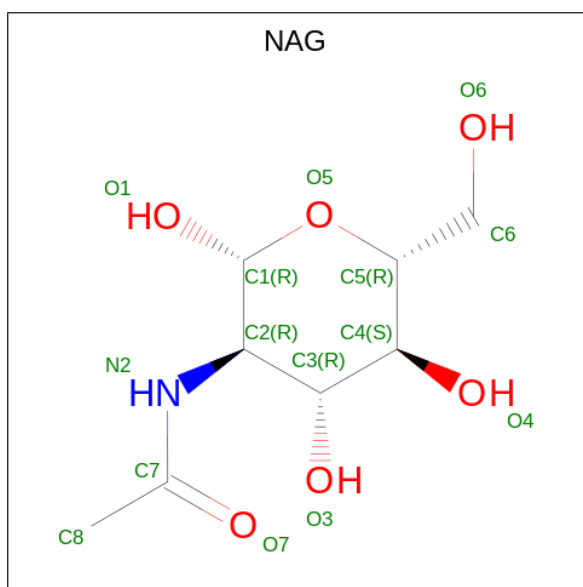
Chain	Residue	Modelled	Actual	Comment	Reference
C	-31	SER	-	expression tag	UNP Q13563
C	-30	HIS	-	expression tag	UNP Q13563
C	-29	PRO	-	expression tag	UNP Q13563
C	-28	GLN	-	expression tag	UNP Q13563
C	-27	PHE	-	expression tag	UNP Q13563
C	-26	GLU	-	expression tag	UNP Q13563
C	-25	LYS	-	expression tag	UNP Q13563
C	-24	GLY	-	expression tag	UNP Q13563
C	-23	GLY	-	expression tag	UNP Q13563
C	-22	GLY	-	expression tag	UNP Q13563
C	-21	SER	-	expression tag	UNP Q13563
C	-20	GLY	-	expression tag	UNP Q13563
C	-19	GLY	-	expression tag	UNP Q13563
C	-18	GLY	-	expression tag	UNP Q13563
C	-17	SER	-	expression tag	UNP Q13563
C	-16	GLY	-	expression tag	UNP Q13563
C	-15	GLY	-	expression tag	UNP Q13563
C	-14	SER	-	expression tag	UNP Q13563
C	-13	ALA	-	expression tag	UNP Q13563
C	-12	TRP	-	expression tag	UNP Q13563
C	-11	SER	-	expression tag	UNP Q13563
C	-10	HIS	-	expression tag	UNP Q13563
C	-9	PRO	-	expression tag	UNP Q13563
C	-8	GLN	-	expression tag	UNP Q13563
C	-7	PHE	-	expression tag	UNP Q13563
C	-6	GLU	-	expression tag	UNP Q13563
C	-5	LYS	-	expression tag	UNP Q13563
C	-4	GLY	-	expression tag	UNP Q13563
C	-3	SER	-	linker	UNP Q13563
C	-2	ALA	-	linker	UNP Q13563
C	-1	ALA	-	linker	UNP Q13563
C	0	ALA	-	linker	UNP Q13563
D	-38	MET	-	initiating methionine	UNP Q13563
D	-37	GLY	-	expression tag	UNP Q13563
D	-36	ALA	-	expression tag	UNP Q13563
D	-35	SER	-	expression tag	UNP Q13563
D	-34	SER	-	expression tag	UNP Q13563
D	-33	ALA	-	expression tag	UNP Q13563
D	-32	TRP	-	expression tag	UNP Q13563
D	-31	SER	-	expression tag	UNP Q13563
D	-30	HIS	-	expression tag	UNP Q13563
D	-29	PRO	-	expression tag	UNP Q13563

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-28	GLN	-	expression tag	UNP Q13563
D	-27	PHE	-	expression tag	UNP Q13563
D	-26	GLU	-	expression tag	UNP Q13563
D	-25	LYS	-	expression tag	UNP Q13563
D	-24	GLY	-	expression tag	UNP Q13563
D	-23	GLY	-	expression tag	UNP Q13563
D	-22	GLY	-	expression tag	UNP Q13563
D	-21	SER	-	expression tag	UNP Q13563
D	-20	GLY	-	expression tag	UNP Q13563
D	-19	GLY	-	expression tag	UNP Q13563
D	-18	GLY	-	expression tag	UNP Q13563
D	-17	SER	-	expression tag	UNP Q13563
D	-16	GLY	-	expression tag	UNP Q13563
D	-15	GLY	-	expression tag	UNP Q13563
D	-14	SER	-	expression tag	UNP Q13563
D	-13	ALA	-	expression tag	UNP Q13563
D	-12	TRP	-	expression tag	UNP Q13563
D	-11	SER	-	expression tag	UNP Q13563
D	-10	HIS	-	expression tag	UNP Q13563
D	-9	PRO	-	expression tag	UNP Q13563
D	-8	GLN	-	expression tag	UNP Q13563
D	-7	PHE	-	expression tag	UNP Q13563
D	-6	GLU	-	expression tag	UNP Q13563
D	-5	LYS	-	expression tag	UNP Q13563
D	-4	GLY	-	expression tag	UNP Q13563
D	-3	SER	-	linker	UNP Q13563
D	-2	ALA	-	linker	UNP Q13563
D	-1	ALA	-	linker	UNP Q13563
D	0	ALA	-	linker	UNP Q13563

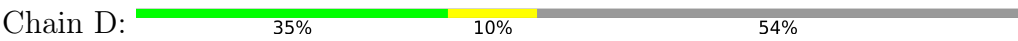
- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
3	B	1	Total	C	N	O	0
			14	8	1	5	
3	B	1	Total	C	N	O	0
			14	8	1	5	
3	B	1	Total	C	N	O	0
			14	8	1	5	
3	C	1	Total	C	N	O	0
			14	8	1	5	
3	C	1	Total	C	N	O	0
			14	8	1	5	
3	C	1	Total	C	N	O	0
			14	8	1	5	
3	D	1	Total	C	N	O	0
			14	8	1	5	
3	D	1	Total	C	N	O	0
			14	8	1	5	
3	D	1	Total	C	N	O	0
			14	8	1	5	

VAL	VAL	ARG	MET	GLY	GLU	GLU	ASP	LEU	ASP	THR	GLY	GLU	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GL
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● Molecule 2: Polycystin-2



MET	GLY	ALA	SER	ALA	TRP	SER	HIS	ASP	ASP	ASP	PHE	GLU	LYS	GLY	GLY	ALA	PHE	ALA	TRP	ALA	TRP	ALA	GLY	LEU	GLY	ASP	GLY	ASP	GLY	VAL	ASN	GLY	ASP	GLY	ASP	GLY	VAL	ASN	GLY	ASP	GLY	ASP	GLY	PRO	
ARG	ALA	PRO	GLN	PRO	GLY	ARG	MET	GLY	GLY	GLY	CYS	ALA	ALA	LYS	GLY	VAL	VAL	VAL	GLY	GLY	GLY	GLY	CYS	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY
CYS	SER	ARG	ALA	ALA	TRP	SER	ARG	ASP	ASN	PRO	PHE	GLU	LYS	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY
GLY	THR	ARG	LEU	MET	GLU	GLY	SER	SER	THR	ASN	ARG	GLU	LYS	TYR	L217	Y227	L234	N245	R251	L258	D259	P261	K264	K267	T268	N269	F270	L273	M276	K294	MET	GLN	PRO	SER	ASN	GLN	THR	GLU	ALA	ASP	ASN	ASN	ASN	ASN	ASN
ASN	L314	V318	R322	Q323	L324	R325	V326	R327	N328	G329	Q335	R338	D339	E340	T341	E343	D354	F358	G359	P360	R361	N362	A365	W366	T369	L374	Y386	Y392	L393	D394	L395	S396	R397	T398	E401	Q405	R420	F423	T424	D425	V428	Y429			
N430	A431	I433	N434	L435	F436	R440	L441	R442	V443	E444	I452	W455	L460	K461	L462	I463	A475	I478	V489	E488	L500	H501	W507	V520	I524	R528	T529	V532	E533	V534	L535	Q537	Q542	L551	Q555										
A563	V566	V569	K572	K575	R581	T582	Q613	L617	V618	F619	S627	E631	T635	I639	I640	E648	E651	R654	G657	F669	F670	N674	M675	F676	W698	GLU	LEU	SER	ASP	LEU	ILE	ARG	LYS	ASP	GLY	GLN	LYS	THR	GLU	LEU	HIS	GLU	LYS	GLU	
LEU	LYS	LYS	ASN	THR	VAL	ASP	ASP	ARG	GLN	GLY	GLY	LYS	ASN	PHE	GLU	ARG	ASP	GLY	LEU	GLY	THR	ASP	ALA	ALA	ILE	ILE	PHE	THR	LYS	TYR	ASP	GLY	GLN	ASP	GLY	GLN	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY

[illegible]

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	276741	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI POLARA 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

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: NAG

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	0.19	0/5716	0.43	0/7793
2	B	0.21	0/4028	0.39	0/5463
2	C	0.19	0/4027	0.34	0/5462
2	D	0.17	0/3910	0.38	0/5305
All	All	0.19	0/17681	0.39	0/24023

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	5586	0	5410	134	0
2	B	3924	0	3875	49	0
2	C	3923	0	3871	47	0
2	D	3810	0	3771	104	0
3	B	42	0	39	2	0
3	C	42	0	39	0	0
3	D	42	0	39	2	0
All	All	17369	0	17044	319	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 9.

All (319) 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:4045:ILE:O	1:A:4046:LEU:HG	1.15	1.32
1:A:3756:GLU:HB2	1:A:3845:ASN:O	1.36	1.25
1:A:4099:LEU:HD12	1:A:4099:LEU:O	1.28	1.24
2:D:397:ARG:HH21	2:D:542:GLN:CA	1.63	1.12
2:B:331:CYS:SG	2:B:344:CYS:CB	2.38	1.10
2:D:397:ARG:HH21	2:D:542:GLN:N	1.52	1.08
1:A:3797:TYR:HB2	1:A:3819:TYR:HE2	1.20	1.07
2:D:397:ARG:NE	2:D:542:GLN:HB3	1.70	1.07
2:B:331:CYS:SG	2:B:344:CYS:SG	1.06	1.04
1:A:4045:ILE:O	1:A:4046:LEU:CG	2.10	1.00
2:D:397:ARG:CZ	2:D:542:GLN:HB3	1.92	0.99
2:D:397:ARG:HE	2:D:542:GLN:HB3	1.26	0.99
2:D:397:ARG:HB2	2:D:542:GLN:OE1	1.62	0.98
1:A:3781:TYR:O	1:A:3793:GLY:O	1.82	0.98
1:A:3753:ARG:HD2	1:A:3846:ARG:CB	1.94	0.97
1:A:3754:LEU:HB3	1:A:3775:GLY:O	1.65	0.97
2:D:397:ARG:CB	2:D:542:GLN:OE1	2.13	0.97
1:A:4099:LEU:HD12	1:A:4101:LEU:HG	1.46	0.96
2:D:397:ARG:NH2	2:D:542:GLN:HB3	1.81	0.94
1:A:4099:LEU:O	1:A:4099:LEU:CD1	2.16	0.93
1:A:3750:ARG:NH2	1:A:3815:ASP:O	2.02	0.93
1:A:4042:GLN:O	1:A:4046:LEU:HD21	1.69	0.93
2:D:397:ARG:HH21	2:D:542:GLN:CB	1.82	0.92
1:A:3797:TYR:HB2	1:A:3819:TYR:CE2	2.05	0.91
2:D:397:ARG:NH2	2:D:542:GLN:N	2.19	0.89
1:A:3756:GLU:OE1	1:A:3845:ASN:HA	1.72	0.89
1:A:3806:TRP:CZ3	1:A:3815:ASP:OD1	2.25	0.89
1:A:3753:ARG:HD2	1:A:3846:ARG:HB2	1.53	0.88
1:A:4099:LEU:CD1	1:A:4101:LEU:HG	2.03	0.88
2:B:331:CYS:CB	2:B:344:CYS:HG	1.87	0.87
1:A:3806:TRP:CE3	1:A:3815:ASP:OD1	2.29	0.86
1:A:3753:ARG:HH11	1:A:3847:SER:H	1.23	0.83
1:A:3756:GLU:CB	1:A:3845:ASN:O	2.23	0.83
1:A:3797:TYR:CB	1:A:3819:TYR:HE2	1.92	0.82
1:A:4045:ILE:C	1:A:4046:LEU:HG	2.05	0.82
2:D:397:ARG:NH2	2:D:542:GLN:CA	2.42	0.81
2:D:397:ARG:HE	2:D:542:GLN:CB	1.95	0.78
1:A:4099:LEU:CD1	1:A:4101:LEU:CG	2.62	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3753:ARG:HD2	1:A:3846:ARG:HB3	1.67	0.76
2:D:318:VAL:HG21	2:D:395:LEU:O	1.87	0.75
1:A:3756:GLU:CD	1:A:3845:ASN:HA	2.12	0.75
2:D:397:ARG:NH2	2:D:542:GLN:H	1.82	0.75
1:A:3756:GLU:OE1	1:A:3845:ASN:CA	2.34	0.75
2:D:397:ARG:HH21	2:D:542:GLN:HB3	1.43	0.75
2:D:640:ILE:HA	2:D:669:PHE:HZ	1.51	0.74
2:C:574:PHE:HA	2:C:577:ILE:HG22	1.70	0.74
2:D:397:ARG:NH2	2:D:542:GLN:CB	2.47	0.74
1:A:3856:ARG:HB3	1:A:3865:ALA:HB3	1.70	0.74
1:A:3705:ILE:HD11	1:A:3856:ARG:HH11	1.52	0.73
2:B:331:CYS:CB	2:B:344:CYS:SG	2.71	0.73
1:A:4099:LEU:HD13	1:A:4101:LEU:HD21	1.70	0.73
2:D:358:PHE:HB2	2:D:366:TRP:HB3	1.72	0.72
2:D:397:ARG:HB3	2:D:542:GLN:OE1	1.86	0.72
1:A:3724:TRP:CD1	1:A:3838:GLN:HE22	2.09	0.71
1:A:3265:SER:OG	1:A:3280:ARG:NH1	2.24	0.70
2:D:401:GLU:O	2:D:405:GLN:NE2	2.24	0.70
1:A:3770:CYS:SG	1:A:3878:ARG:NH2	2.65	0.69
2:B:252:MET:HB3	2:B:310:PHE:HE2	1.56	0.69
2:D:314:LEU:N	2:D:430:ASN:OD1	2.27	0.68
2:D:318:VAL:HG23	2:D:396:SER:O	1.93	0.68
2:B:312:GLU:OE1	2:B:432:ASN:ND2	2.27	0.67
2:C:309:ILE:HB	2:C:313:ASN:HB2	1.76	0.67
2:D:234:LEU:HD21	2:D:566:VAL:HG22	1.77	0.66
1:A:3807:SER:O	1:A:3809:GLY:N	2.29	0.66
2:D:432:ASN:OD1	2:D:433:ILE:N	2.29	0.65
1:A:3794:THR:O	1:A:3796:ALA:N	2.27	0.65
2:B:434:ASN:HD21	2:B:463:ILE:HB	1.61	0.65
2:B:498:HIS:CE1	2:B:499:LYS:HE3	2.32	0.64
1:A:4099:LEU:HD11	1:A:4101:LEU:HD11	1.79	0.64
1:A:3755:GLN:O	1:A:3755:GLN:HG2	1.95	0.64
2:B:593:CYS:HB3	2:B:683:THR:HG21	1.80	0.63
1:A:4046:LEU:HD12	2:D:563:ALA:HB2	1.80	0.62
2:C:292:TYR:O	2:C:307:SER:OG	2.18	0.62
1:A:3290:LEU:HB3	1:A:3333:VAL:HG21	1.80	0.62
1:A:4099:LEU:HD22	2:D:676:PHE:CD2	2.34	0.62
2:D:358:PHE:O	2:D:361:ARG:NH2	2.32	0.62
1:A:3343:LEU:HD22	1:A:3558:ALA:HB2	1.82	0.61
2:B:228:LEU:O	2:B:232:ILE:HD12	2.00	0.61
2:D:397:ARG:HE	2:D:542:GLN:CG	2.14	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:429:TYR:HD1	2:D:436:PHE:HB3	1.64	0.60
2:B:343:GLU:OE2	2:B:417:ARG:NH2	2.35	0.60
2:D:318:VAL:CG2	2:D:395:LEU:O	2.49	0.60
1:A:4042:GLN:O	1:A:4046:LEU:CD2	2.46	0.59
1:A:3872:GLU:HB2	1:A:3880:LEU:HB3	1.84	0.59
1:A:3813:VAL:HG12	1:A:3813:VAL:O	2.02	0.59
1:A:3102:ASP:OD2	1:A:3269:ARG:NH2	2.36	0.59
2:B:460:LEU:HD23	2:B:462:LEU:HD21	1.84	0.59
2:D:327:ARG:HB2	2:D:354:ASP:HB3	1.84	0.58
2:D:259:ASP:HA	2:D:269:ASN:HD22	1.68	0.58
3:D:1003:NAG:H83	3:D:1003:NAG:H3	1.85	0.58
1:A:3752:VAL:O	1:A:3753:ARG:HB3	2.04	0.58
1:A:3756:GLU:OE1	1:A:3845:ASN:O	2.21	0.58
1:A:4099:LEU:CD1	1:A:4101:LEU:HD11	2.34	0.58
1:A:4099:LEU:HD11	1:A:4101:LEU:CD1	2.33	0.58
2:D:581:ARG:HG3	2:D:582:THR:HG23	1.86	0.58
1:A:3802:LEU:N	1:A:3802:LEU:HD12	2.19	0.57
1:A:4099:LEU:O	1:A:4101:LEU:HG	2.04	0.57
2:D:397:ARG:O	2:D:397:ARG:HG2	2.03	0.57
1:A:3275:PHE:HE1	1:A:3344:PHE:HB3	1.69	0.57
2:D:434:ASN:ND2	2:D:462:LEU:HB3	2.20	0.57
2:C:505:SER:OG	2:C:508:ASN:N	2.37	0.57
1:A:4029:VAL:HG11	1:A:4096:TRP:CZ3	2.39	0.56
2:D:245:ASN:HD21	2:D:433:ILE:HD13	1.70	0.56
2:D:396:SER:CB	2:D:401:GLU:HG3	2.35	0.56
3:B:1002:NAG:H3	3:B:1002:NAG:H83	1.88	0.56
2:D:528:ARG:NH1	2:D:555:GLN:OE1	2.39	0.56
1:A:3067:PRO:HB2	1:A:3069:PRO:HD3	1.88	0.56
1:A:3807:SER:OG	1:A:3814:TYR:HB2	2.04	0.56
1:A:3274:ARG:HD2	1:A:3348:ARG:HG3	1.88	0.56
1:A:3306:ALA:O	1:A:3307:TYR:HB2	2.07	0.55
2:C:313:ASN:HD22	2:C:430:ASN:HB2	1.71	0.55
1:A:3795:TRP:CZ3	1:A:3842:TRP:HD1	2.24	0.55
1:A:4099:LEU:CD1	1:A:4101:LEU:CD1	2.84	0.55
1:A:3269:ARG:HE	1:A:3277:ARG:HB2	1.71	0.55
2:D:227:TYR:OH	2:D:569:VAL:O	2.25	0.55
2:B:396:SER:OG	2:B:401:GLU:OE1	2.24	0.55
2:D:396:SER:HB3	2:D:401:GLU:HG3	1.87	0.55
1:A:3750:ARG:CZ	1:A:3815:ASP:O	2.55	0.55
2:D:670:PHE:O	2:D:674:ASN:ND2	2.40	0.55
2:B:370:SER:OG	2:B:373:ASP:OD1	2.25	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3799:ALA:O	1:A:3800:PRO:C	2.48	0.54
2:B:507:TRP:HB3	2:B:575:LYS:HD2	1.90	0.54
2:D:258:LEU:HA	2:D:270:PHE:HB3	1.90	0.54
2:B:574:PHE:HE1	2:C:603:MET:HB3	1.72	0.54
1:A:3724:TRP:CG	1:A:3838:GLN:HE22	2.24	0.54
1:A:3809:GLY:HA2	1:A:3870:ARG:CZ	2.38	0.54
2:B:342:LYS:HB3	2:B:343:GLU:OE1	2.08	0.54
2:C:434:ASN:ND2	2:C:463:ILE:O	2.41	0.54
2:D:534:VAL:O	2:D:537:GLN:NE2	2.37	0.54
2:D:365:ALA:HB2	2:D:393:LEU:HB2	1.90	0.53
2:D:322:ARG:HD2	2:D:374:LEU:HD13	1.91	0.53
1:A:3797:TYR:CB	1:A:3819:TYR:CE2	2.80	0.53
2:D:463:ILE:HD11	2:D:529:THR:HG23	1.91	0.53
2:C:313:ASN:ND2	2:C:430:ASN:HB2	2.24	0.53
1:A:3261:HIS:CE1	1:A:3263:TRP:HB2	2.44	0.53
2:B:423:PHE:CE2	2:B:442:LEU:HD13	2.44	0.53
2:D:227:TYR:CE1	2:D:572:LYS:HD3	2.44	0.53
2:D:492:ILE:HA	2:D:495:ILE:HG22	1.90	0.52
1:A:3605:PRO:HA	1:A:3608:VAL:HG12	1.91	0.52
2:D:386:TYR:OH	2:D:444:GLU:OE1	2.26	0.52
2:C:502:TYR:CZ	2:C:508:ASN:HB3	2.44	0.52
2:B:238:THR:HG21	2:B:566:VAL:HG21	1.92	0.52
2:C:593:CYS:HB3	2:C:683:THR:HG21	1.91	0.52
2:D:397:ARG:O	2:D:398:THR:HG23	2.09	0.52
1:A:3287:LEU:HD21	1:A:3337:TYR:CG	2.45	0.52
1:A:4106:LEU:HD13	2:B:675:MET:HG2	1.92	0.51
1:A:4114:ARG:HG3	1:A:4114:ARG:HH11	1.74	0.51
2:B:623:VAL:HG12	2:B:625:ASP:H	1.75	0.51
2:D:429:TYR:CD1	2:D:436:PHE:HB3	2.45	0.51
1:A:3732:LEU:HD12	1:A:3827:LEU:HD13	1.92	0.51
1:A:3780:ASP:HB3	1:A:3793:GLY:HA3	1.93	0.51
2:D:397:ARG:O	2:D:398:THR:CG2	2.59	0.51
1:A:3797:TYR:HA	1:A:3819:TYR:CD2	2.46	0.51
2:D:397:ARG:C	2:D:398:THR:HG23	2.36	0.51
2:C:570:TRP:NE1	2:D:613:GLN:HE22	2.09	0.50
1:A:4094:ARG:HG3	1:A:4096:TRP:H	1.76	0.50
2:C:443:VAL:HG13	2:C:451:VAL:HG13	1.94	0.50
2:D:436:PHE:HE1	2:D:460:LEU:HD12	1.75	0.50
2:B:468:THR:HA	2:B:471:PHE:HD2	1.77	0.50
2:C:639:ILE:HG12	2:C:644:ILE:HG22	1.94	0.50
2:D:267:LYS:O	2:D:267:LYS:NZ	2.45	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:383:ILE:HD11	2:C:452:ILE:HD12	1.94	0.50
2:D:261:PRO:HG3	2:D:267:LYS:HZ3	1.76	0.50
1:A:4099:LEU:HD13	1:A:4101:LEU:CD2	2.40	0.49
2:B:675:MET:O	2:B:679:ILE:HG13	2.12	0.49
1:A:3806:TRP:O	1:A:3814:TYR:O	2.30	0.49
1:A:3334:TYR:CZ	1:A:3338:LEU:HD21	2.47	0.49
2:D:498:HIS:HD2	2:D:499:LYS:HG3	1.77	0.49
2:C:258:LEU:HD23	2:C:271:LYS:HE2	1.93	0.49
1:A:3756:GLU:OE1	1:A:3845:ASN:C	2.55	0.49
2:C:243:SER:OG	2:C:244:SER:N	2.45	0.49
2:C:322:ARG:HD2	2:C:374:LEU:HD21	1.95	0.49
1:A:3875:ALA:HB3	1:A:3878:ARG:HG2	1.95	0.48
2:B:597:LEU:HD13	2:C:671:ILE:HD12	1.95	0.48
2:B:316:LEU:HD23	2:B:429:TYR:HB2	1.95	0.48
1:A:3719:ARG:HH21	1:A:3722:GLU:H	1.61	0.48
1:A:3752:VAL:O	1:A:3848:ARG:HB3	2.13	0.48
1:A:3922:TRP:CZ3	1:A:3929:ARG:HB3	2.48	0.48
2:D:326:VAL:HG13	2:D:420:ARG:HG3	1.94	0.48
2:D:335:GLN:OE1	2:D:338:ARG:NH1	2.46	0.48
2:D:428:VAL:HG23	2:D:429:TYR:N	2.29	0.47
1:A:3802:LEU:N	1:A:3802:LEU:CD1	2.77	0.47
2:C:253:MET:HE2	2:C:428:VAL:HG21	1.95	0.47
2:D:359:GLY:O	2:D:361:ARG:N	2.47	0.47
1:A:3748:ARG:NH2	1:A:3853:GLU:OE2	2.45	0.47
1:A:3804:GLY:O	1:A:3805:ALA:HB3	2.14	0.47
1:A:3805:ALA:O	1:A:3806:TRP:CG	2.68	0.47
2:B:316:LEU:HD12	2:B:546:PRO:HG3	1.96	0.47
2:D:499:LYS:C	2:D:501:HIS:H	2.23	0.47
1:A:3287:LEU:HD21	1:A:3337:TYR:CD1	2.49	0.47
2:B:688:LYS:NZ	2:C:686:GLU:OE1	2.46	0.47
2:C:635:THR:O	2:C:639:ILE:HG13	2.14	0.47
1:A:3308:SER:HA	1:A:3312:VAL:HG12	1.97	0.47
1:A:3762:PRO:HG2	1:A:3763:PRO:HD3	1.97	0.47
2:D:369:THR:HG21	2:D:392:TYR:HE1	1.80	0.47
1:A:3269:ARG:NE	1:A:3277:ARG:HB2	2.29	0.47
1:A:3719:ARG:HH22	1:A:3723:LEU:HD22	1.80	0.46
2:C:335:GLN:OE1	2:C:335:GLN:N	2.48	0.46
1:A:3783:VAL:HG12	1:A:3840:HIS:CE1	2.50	0.46
1:A:3847:SER:O	1:A:3873:PHE:HB2	2.15	0.46
2:B:328:ASN:OD1	2:B:329:GLY:N	2.48	0.46
2:D:264:LYS:HD3	2:D:264:LYS:HA	1.75	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:498:HIS:HE1	2:B:499:LYS:HE3	1.80	0.46
2:D:619:PHE:HZ	2:D:657:GLY:HA2	1.80	0.46
1:A:3753:ARG:HH11	1:A:3847:SER:N	2.00	0.46
1:A:4099:LEU:HD22	2:D:676:PHE:CE2	2.50	0.46
2:B:334:PRO:HG2	2:B:337:LEU:HD21	1.98	0.46
2:C:360:PRO:O	2:C:362:ASN:N	2.48	0.46
2:D:324:LEU:HD12	2:D:423:PHE:HE2	1.80	0.46
1:A:3752:VAL:HG21	1:A:3814:TYR:HD1	1.81	0.46
1:A:3753:ARG:CD	1:A:3846:ARG:HB2	2.37	0.46
1:A:4045:ILE:C	1:A:4046:LEU:CG	2.79	0.46
1:A:3187:ASP:HA	1:A:3222:GLU:HA	1.97	0.46
2:B:331:CYS:SG	2:B:344:CYS:HB2	2.47	0.46
1:A:3275:PHE:CE2	1:A:3280:ARG:HG2	2.51	0.46
2:C:238:THR:HA	2:C:241:MET:HG2	1.98	0.46
1:A:3724:TRP:CG	1:A:3838:GLN:NE2	2.85	0.45
2:C:464:ARG:HH22	2:C:528:ARG:HH12	1.64	0.45
2:C:491:GLU:OE2	2:C:502:TYR:OH	2.34	0.45
1:A:3596:PHE:HD2	1:A:3597:LEU:HD12	1.82	0.45
2:B:306:ARG:HD2	2:B:314:LEU:HD11	1.98	0.45
2:B:332:SER:O	2:B:332:SER:OG	2.31	0.45
1:A:3242:LEU:HD23	1:A:3242:LEU:H	1.82	0.45
2:B:337:LEU:HD23	2:B:337:LEU:H	1.81	0.45
1:A:3076:ILE:HD11	1:A:3899:LEU:HD22	1.99	0.45
1:A:3752:VAL:HG21	1:A:3814:TYR:CD1	2.52	0.45
2:C:499:LYS:C	2:C:501:HIS:H	2.25	0.45
1:A:3771:SER:O	1:A:3773:ALA:N	2.50	0.44
1:A:3805:ALA:O	1:A:3806:TRP:CD1	2.70	0.44
2:D:627:SER:OG	2:D:631:GLU:OE1	2.33	0.44
2:C:238:THR:HG23	2:D:617:LEU:HD21	1.98	0.44
2:D:258:LEU:HD21	2:D:455:TRP:CG	2.52	0.44
2:D:640:ILE:HA	2:D:669:PHE:CZ	2.40	0.44
1:A:3744:LEU:HB3	1:A:3855:THR:HG23	1.99	0.44
1:A:3814:TYR:CG	1:A:3851:PHE:HZ	2.35	0.44
2:D:425:ASP:OD1	2:D:440:ARG:HG3	2.17	0.44
2:B:634:PHE:CZ	2:C:658:PRO:HB3	2.51	0.44
1:A:3754:LEU:HB2	1:A:3777:SER:N	2.32	0.44
1:A:3797:TYR:CD2	1:A:3797:TYR:O	2.70	0.44
2:B:525:ASN:OD1	2:B:528:ARG:NH2	2.51	0.44
1:A:3741:SER:OG	1:A:3856:ARG:NE	2.48	0.44
1:A:3907:LEU:HD22	1:A:3945:THR:HG23	2.00	0.44
2:B:291:LEU:O	2:B:307:SER:OG	2.36	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:563:ALA:HB1	2:C:614:LEU:HD12	1.99	0.44
2:D:507:TRP:CG	2:D:575:LYS:HD3	2.53	0.43
1:A:3658:LYS:HE3	1:A:3658:LYS:HB2	1.88	0.43
2:C:431:ALA:HB2	2:D:341:ILE:HD13	1.99	0.43
2:C:505:SER:C	2:C:507:TRP:H	2.26	0.43
2:D:635:THR:O	2:D:639:ILE:HG13	2.18	0.43
2:D:528:ARG:O	2:D:532:VAL:HG23	2.18	0.43
2:C:221:LEU:O	2:C:225:VAL:HG23	2.18	0.43
1:A:3749:LEU:O	1:A:3820:VAL:HA	2.19	0.43
1:A:4099:LEU:CD1	1:A:4101:LEU:CD2	2.96	0.43
1:A:3275:PHE:HD2	1:A:3280:ARG:CZ	2.32	0.43
1:A:3701:LEU:O	1:A:3705:ILE:HG12	2.19	0.43
2:B:256:LEU:HD22	2:B:310:PHE:CE1	2.54	0.43
2:D:273:LEU:HD23	2:D:273:LEU:HA	1.84	0.43
2:C:567:PHE:O	2:C:571:ILE:HG12	2.19	0.42
1:A:3951:VAL:HG12	1:A:3987:ALA:HB2	2.02	0.42
2:B:665:VAL:O	2:B:669:PHE:HB2	2.20	0.42
2:D:358:PHE:HB3	2:D:359:GLY:H	1.70	0.42
2:D:434:ASN:HD22	2:D:462:LEU:HB3	1.83	0.42
2:D:572:LYS:O	2:D:572:LYS:HG2	2.18	0.42
2:D:640:ILE:HG12	2:D:669:PHE:HE1	1.83	0.42
2:D:475:ALA:HA	2:D:478:ILE:HG12	2.00	0.42
1:A:3754:LEU:H	1:A:3848:ARG:NH2	2.17	0.42
1:A:3800:PRO:HD3	1:A:3817:GLY:HA3	2.02	0.42
2:C:382:ILE:HA	2:D:654:ARG:HH22	1.84	0.42
2:D:245:ASN:ND2	2:D:433:ILE:HG21	2.34	0.42
2:D:328:ASN:OD1	2:D:329:GLY:N	2.53	0.42
1:A:4046:LEU:CD1	2:D:563:ALA:CB	2.97	0.42
2:B:328:ASN:OD1	2:B:343:GLU:HB2	2.20	0.42
2:B:577:ILE:HG13	2:B:577:ILE:O	2.19	0.42
1:A:3714:PHE:HA	1:A:3717:ILE:HG12	2.02	0.42
2:B:688:LYS:HD3	2:C:682:ASP:OD2	2.20	0.42
2:D:276:MET:HE3	2:D:276:MET:HB2	1.97	0.42
2:D:462:LEU:HD21	2:D:536:LEU:HD13	2.02	0.42
1:A:3728:ALA:HB2	1:A:3834:LEU:HD21	2.02	0.41
2:C:337:LEU:H	2:C:337:LEU:HD23	1.85	0.41
2:D:362:ASN:HB2	3:D:1003:NAG:H2	2.02	0.41
2:D:374:LEU:HD21	2:D:392:TYR:CD1	2.54	0.41
2:B:479:ILE:HG22	2:B:483:PHE:CE2	2.55	0.41
2:B:497:ILE:HG22	2:B:498:HIS:CD2	2.55	0.41
2:C:465:TYR:HE1	2:C:474:ALA:HB2	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:619:PHE:HB3	2:C:623:VAL:HG21	2.02	0.41
2:D:251:ARG:HG2	2:D:251:ARG:HH11	1.85	0.41
2:C:574:PHE:O	2:C:578:ASN:ND2	2.42	0.41
2:D:405:GLN:H	2:D:405:GLN:HG2	1.76	0.41
2:D:532:VAL:HG22	2:D:551:LEU:HD23	2.03	0.41
1:A:3727:MET:HE1	1:A:3749:LEU:HD21	2.02	0.41
2:C:291:LEU:HD21	2:C:319:PRO:HG3	2.01	0.41
2:D:444:GLU:CG	2:D:452:ILE:HB	2.50	0.41
2:D:489:VAL:O	2:D:492:ILE:HG22	2.21	0.41
1:A:3753:ARG:HB2	1:A:3846:ARG:HB3	2.03	0.41
2:B:309:ILE:HD12	2:B:428:VAL:HG11	2.02	0.41
2:C:322:ARG:HG3	2:C:392:TYR:HB3	2.01	0.41
2:D:648:GLU:HA	2:D:651:GLU:HB3	2.02	0.41
1:A:4023:LEU:HB3	1:A:4024:PRO:HD3	2.02	0.41
2:B:537:GLN:OE1	3:B:1001:NAG:O6	2.30	0.41
1:A:3283:CYS:O	1:A:3287:LEU:HD23	2.21	0.41
1:A:3794:THR:C	1:A:3796:ALA:N	2.77	0.41
1:A:4046:LEU:HD12	2:D:563:ALA:CB	2.48	0.41
2:B:324:LEU:HD12	2:B:423:PHE:HE1	1.86	0.41
2:D:434:ASN:OD1	2:D:435:LEU:N	2.50	0.41
2:D:520:VAL:O	2:D:524:ILE:HG12	2.21	0.41
2:B:595:LYS:H	2:B:595:LYS:HG3	1.69	0.41
2:C:623:VAL:C	2:C:625:ASP:H	2.29	0.41
2:D:328:ASN:OD1	2:D:343:GLU:HB2	2.21	0.41
2:D:423:PHE:CE1	2:D:442:LEU:HD12	2.57	0.41
2:C:619:PHE:HZ	2:C:657:GLY:HA2	1.85	0.40
2:D:338:ARG:C	2:D:340:GLU:H	2.29	0.40
1:A:3827:LEU:HD11	1:A:3831:ARG:HD3	2.04	0.40
1:A:3842:TRP:CE3	1:A:3843:LEU:HB2	2.56	0.40
1:A:4114:ARG:HG3	1:A:4114:ARG:NH1	2.36	0.40
1:A:3858:SER:O	1:A:3858:SER:OG	2.38	0.40
2:C:258:LEU:HD21	2:C:455:TRP:CG	2.56	0.40
1:A:3586:VAL:HG23	1:A:3902:LEU:HD22	2.02	0.40
2:C:276:MET:SD	2:C:415:LEU:HB3	2.62	0.40
2:C:641:LEU:HD22	2:D:669:PHE:HE2	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	741/1261 (59%)	644 (87%)	87 (12%)	10 (1%)	10	37
2	B	471/1007 (47%)	439 (93%)	32 (7%)	0	100	100
2	C	471/1007 (47%)	436 (93%)	35 (7%)	0	100	100
2	D	459/1007 (46%)	417 (91%)	41 (9%)	1 (0%)	44	72
All	All	2142/4282 (50%)	1936 (90%)	195 (9%)	11 (0%)	27	56

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3808	TRP
1	A	3772	ALA
1	A	3788	PRO
1	A	3794	THR
1	A	3795	TRP
1	A	3792	SER
1	A	4100	ARG
1	A	3754	LEU
2	D	396	SER
1	A	3793	GLY
1	A	3827	LEU

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 PDB entries followed by that with respect to all EM entries.

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	518/1041 (50%)	515 (99%)	3 (1%)	84	90
2	B	428/860 (50%)	428 (100%)	0	100	100
2	C	428/860 (50%)	428 (100%)	0	100	100
2	D	416/860 (48%)	416 (100%)	0	100	100
All	All	1790/3621 (49%)	1787 (100%)	3 (0%)	91	95

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3778	THR
1	A	3813	VAL
1	A	4046	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3751	GLN
1	A	3790	ASN
1	A	3962	GLN
2	B	412	ASN
2	B	434	ASN
2	B	498	HIS
2	B	547	ASN
2	B	653	ASN
2	C	313	ASN
2	C	323	GLN
2	C	379	HIS
2	C	645	ASN
2	D	557	GLN
2	D	559	ASN
2	D	613	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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](#)

9 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
3	NAG	D	1003	2	14,14,15	0.58	0	17,19,21	1.24	1 (5%)
3	NAG	B	1001	2	14,14,15	0.86	1 (7%)	17,19,21	1.29	1 (5%)
3	NAG	C	1002	2	14,14,15	0.89	1 (7%)	17,19,21	1.09	1 (5%)
3	NAG	D	1001	2	14,14,15	0.20	0	17,19,21	0.48	0
3	NAG	C	1001	2	14,14,15	0.32	0	17,19,21	0.53	0
3	NAG	B	1003	2	14,14,15	0.24	0	17,19,21	0.44	0
3	NAG	B	1002	2	14,14,15	0.42	0	17,19,21	1.28	2 (11%)
3	NAG	C	1003	2	14,14,15	0.19	0	17,19,21	0.45	0
3	NAG	D	1002	2	14,14,15	0.23	0	17,19,21	0.42	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	NAG	D	1003	2	-	3/6/23/26	0/1/1/1
3	NAG	B	1001	2	-	2/6/23/26	0/1/1/1
3	NAG	C	1002	2	-	3/6/23/26	0/1/1/1
3	NAG	D	1001	2	-	3/6/23/26	0/1/1/1
3	NAG	C	1001	2	-	4/6/23/26	0/1/1/1
3	NAG	B	1003	2	-	2/6/23/26	0/1/1/1
3	NAG	B	1002	2	-	5/6/23/26	0/1/1/1
3	NAG	C	1003	2	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	D	1002	2	-	2/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1001	NAG	O5-C1	3.12	1.48	1.43
3	C	1002	NAG	O5-C1	3.05	1.48	1.43

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1001	NAG	C1-O5-C5	5.10	119.10	112.19
3	B	1002	NAG	C2-N2-C7	4.31	129.04	122.90
3	D	1003	NAG	C2-N2-C7	4.29	129.01	122.90
3	C	1002	NAG	C1-O5-C5	4.22	117.91	112.19
3	B	1002	NAG	C1-C2-N2	2.06	114.00	110.49

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	1002	NAG	O5-C5-C6-O6
3	D	1002	NAG	C4-C5-C6-O6
3	B	1001	NAG	C4-C5-C6-O6
3	B	1002	NAG	C4-C5-C6-O6
3	B	1001	NAG	O5-C5-C6-O6
3	D	1002	NAG	O5-C5-C6-O6
3	B	1002	NAG	C8-C7-N2-C2
3	B	1002	NAG	O7-C7-N2-C2
3	B	1003	NAG	C8-C7-N2-C2
3	B	1003	NAG	O7-C7-N2-C2
3	C	1001	NAG	C8-C7-N2-C2
3	C	1001	NAG	O7-C7-N2-C2
3	C	1002	NAG	C8-C7-N2-C2
3	C	1002	NAG	O7-C7-N2-C2
3	D	1001	NAG	C8-C7-N2-C2
3	D	1001	NAG	O7-C7-N2-C2
3	D	1003	NAG	C8-C7-N2-C2
3	D	1003	NAG	O7-C7-N2-C2
3	C	1001	NAG	C4-C5-C6-O6
3	C	1001	NAG	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
3	C	1002	NAG	O5-C5-C6-O6
3	D	1001	NAG	O5-C5-C6-O6
3	B	1002	NAG	C3-C2-N2-C7
3	D	1003	NAG	C3-C2-N2-C7

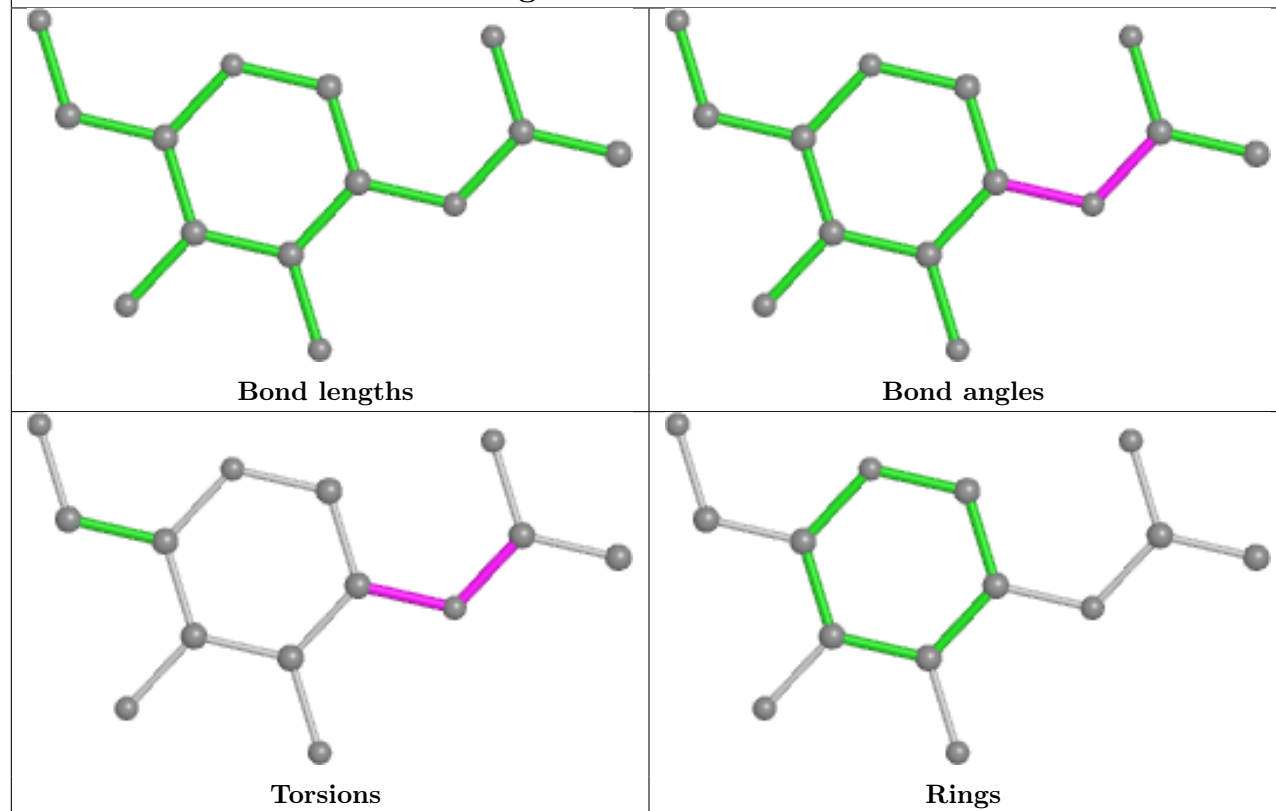
There are no ring outliers.

3 monomers are involved in 4 short contacts:

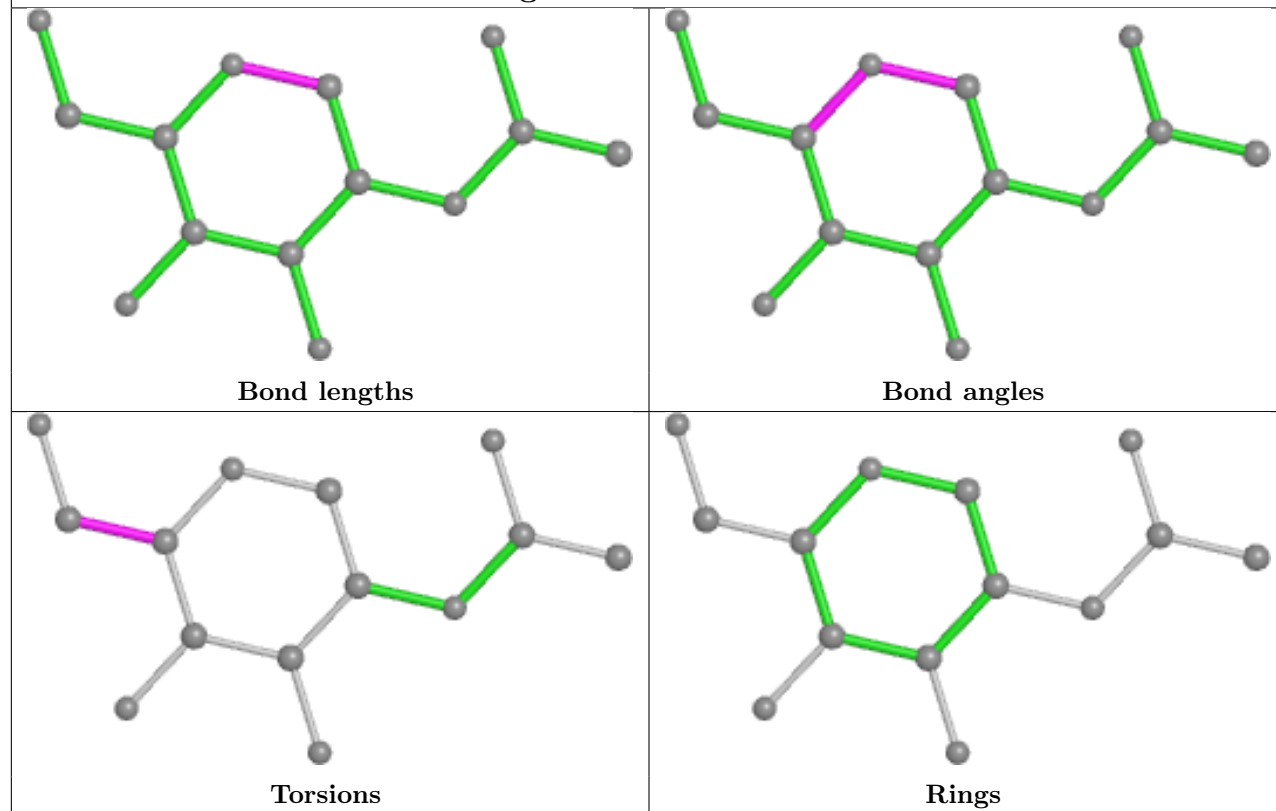
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	1003	NAG	2	0
3	B	1001	NAG	1	0
3	B	1002	NAG	1	0

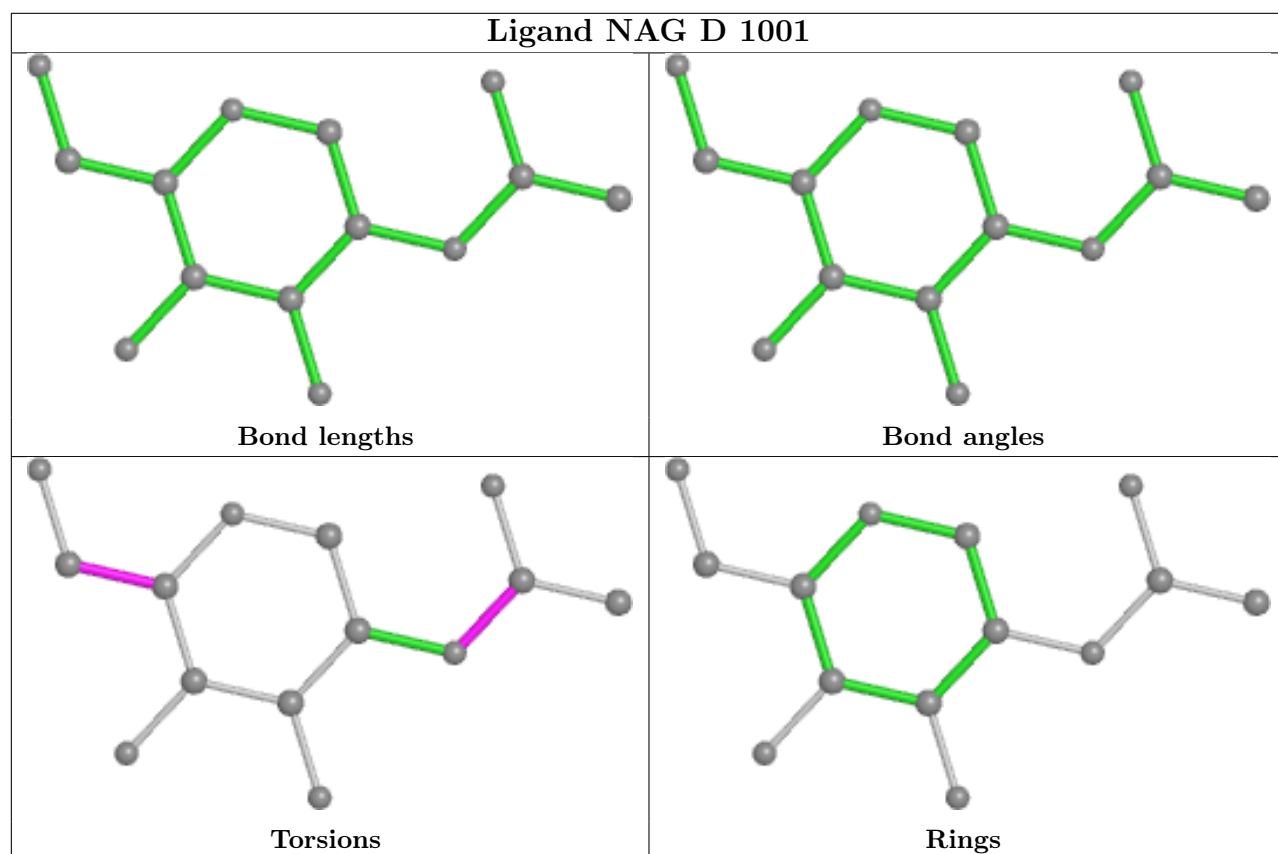
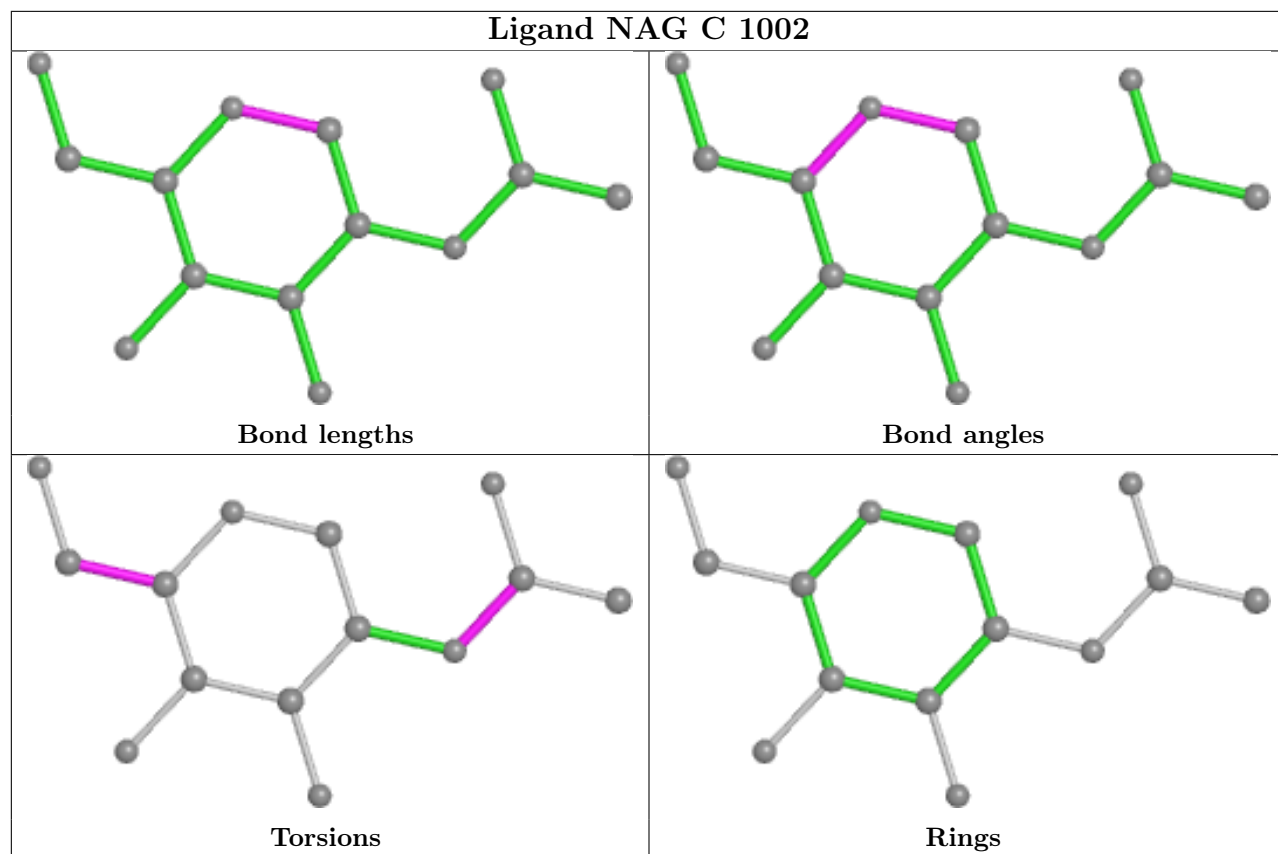
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

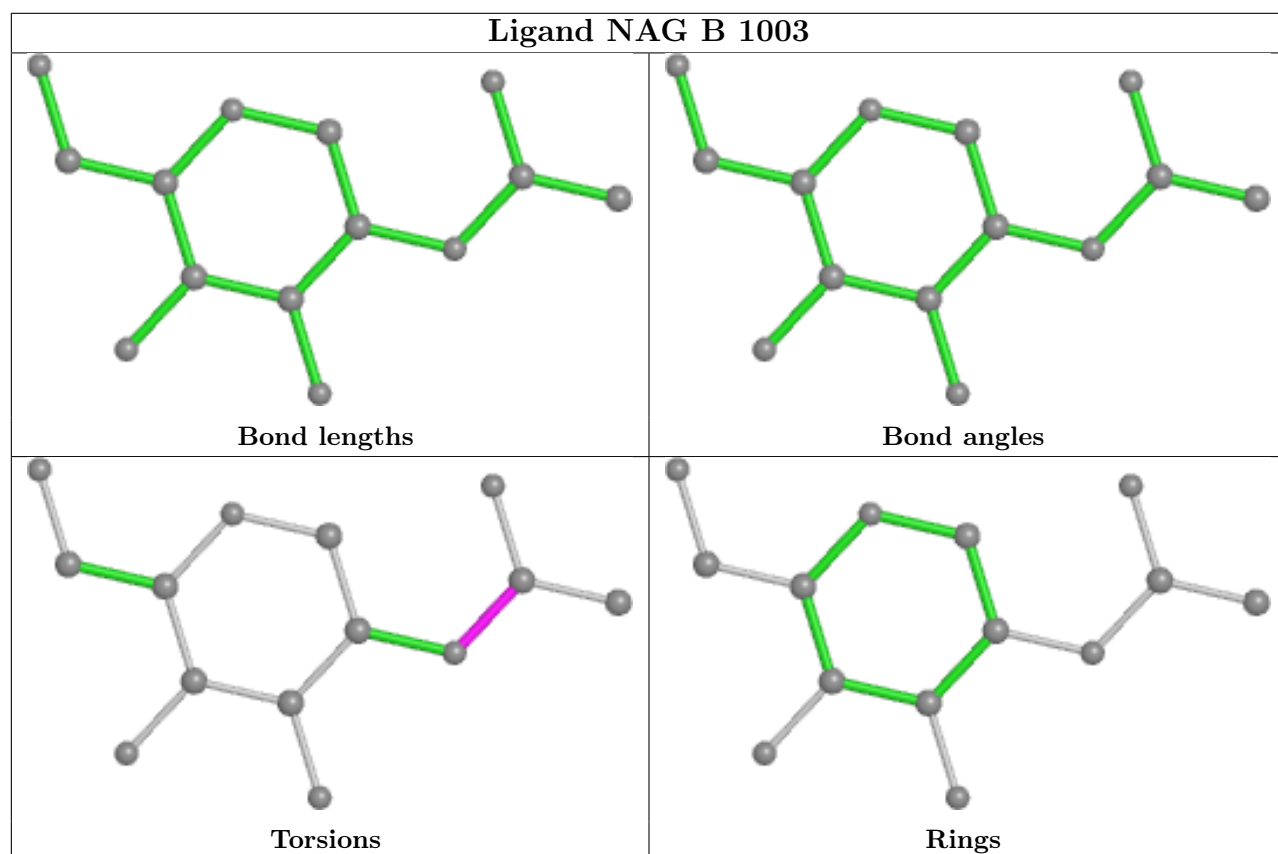
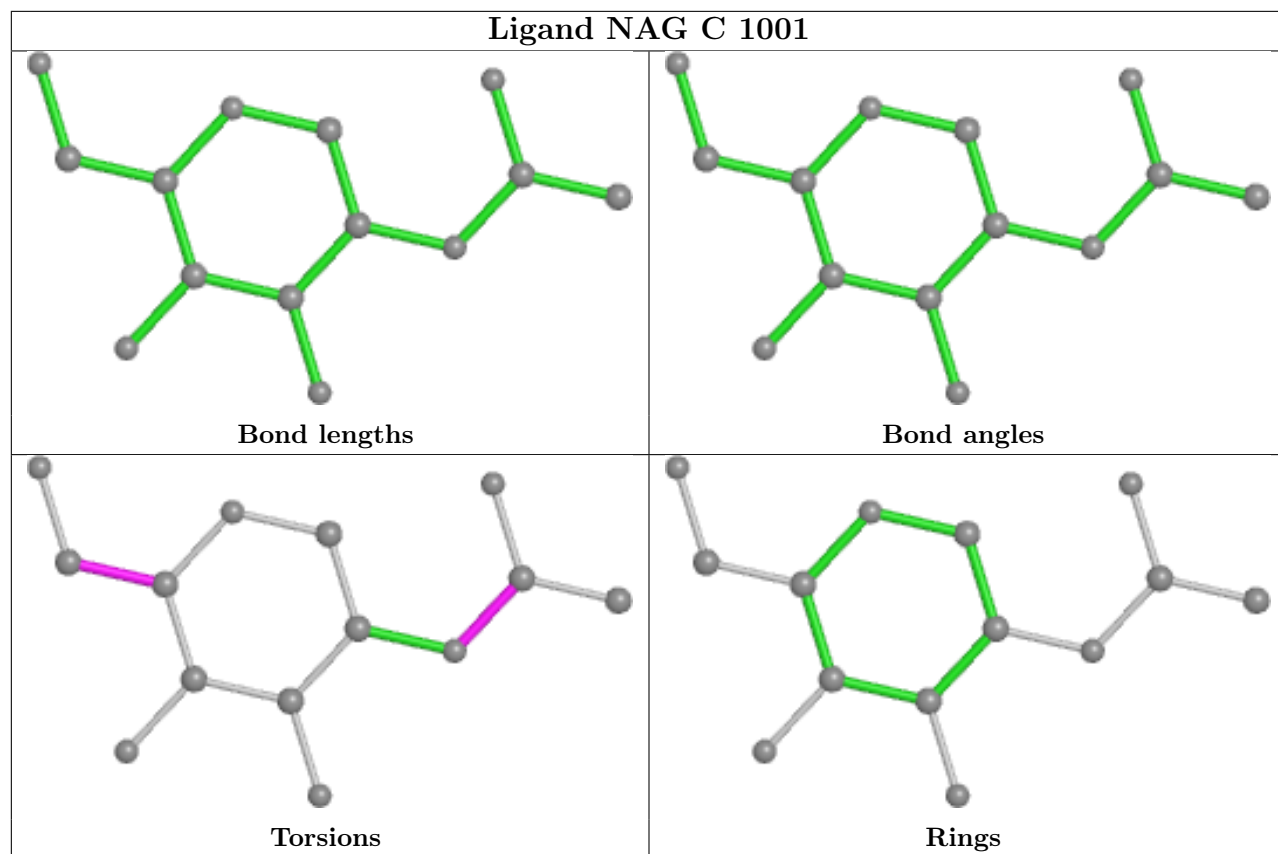
Ligand NAG D 1003

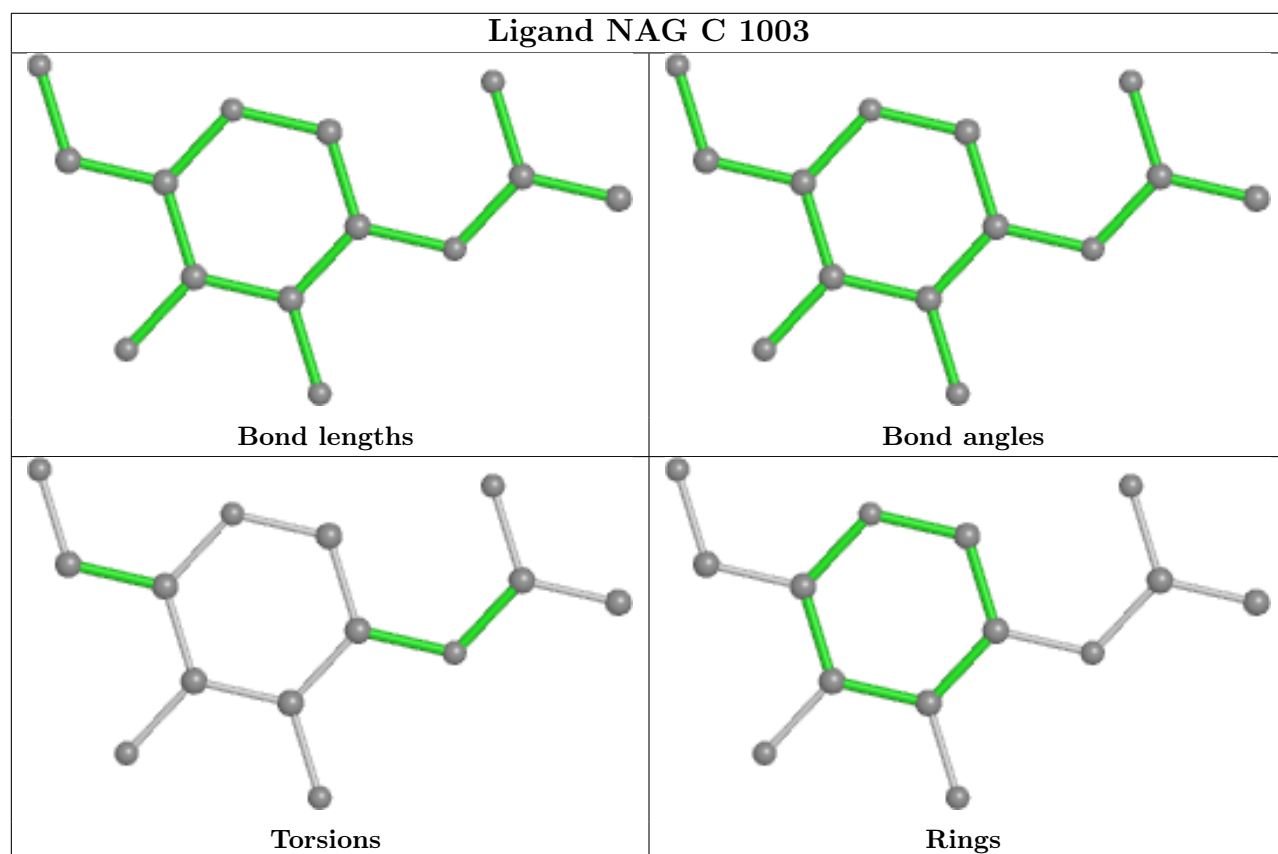
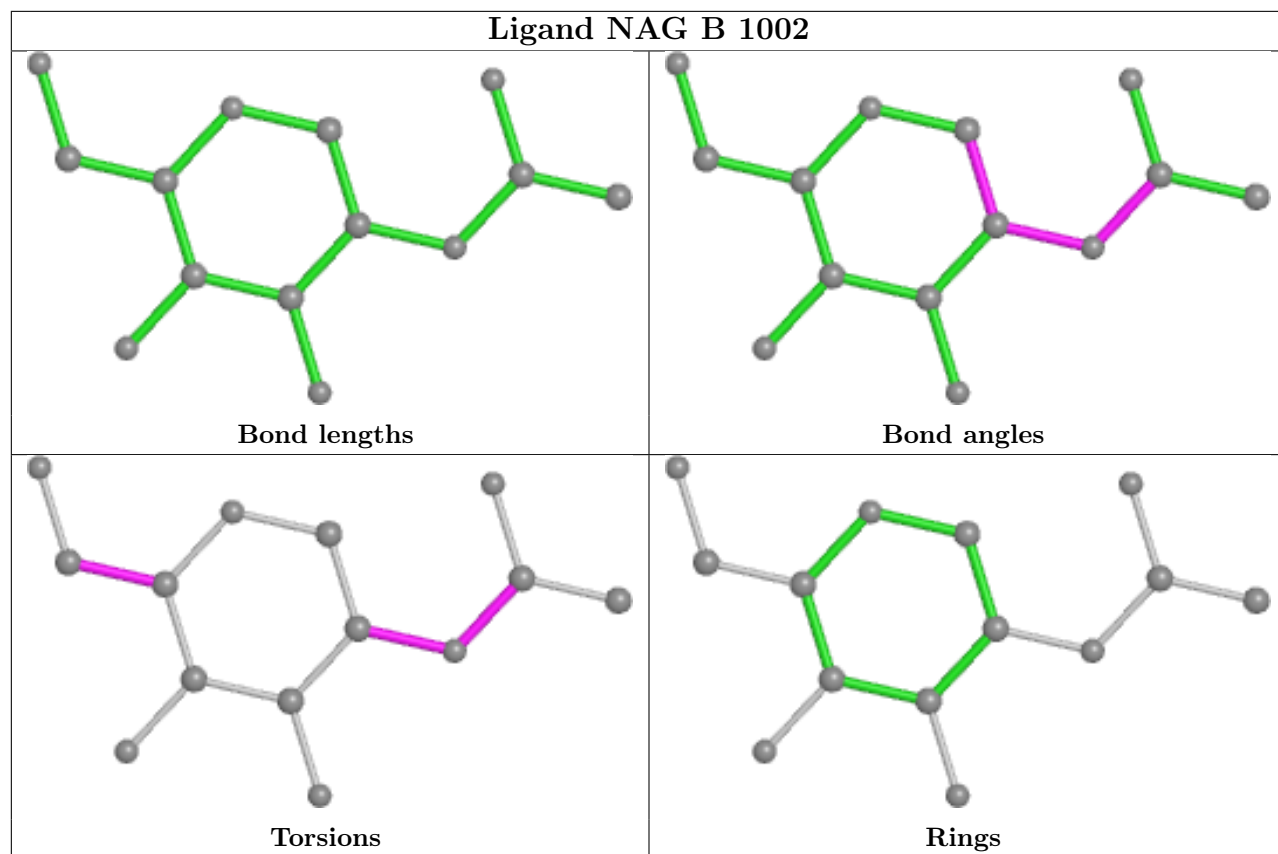


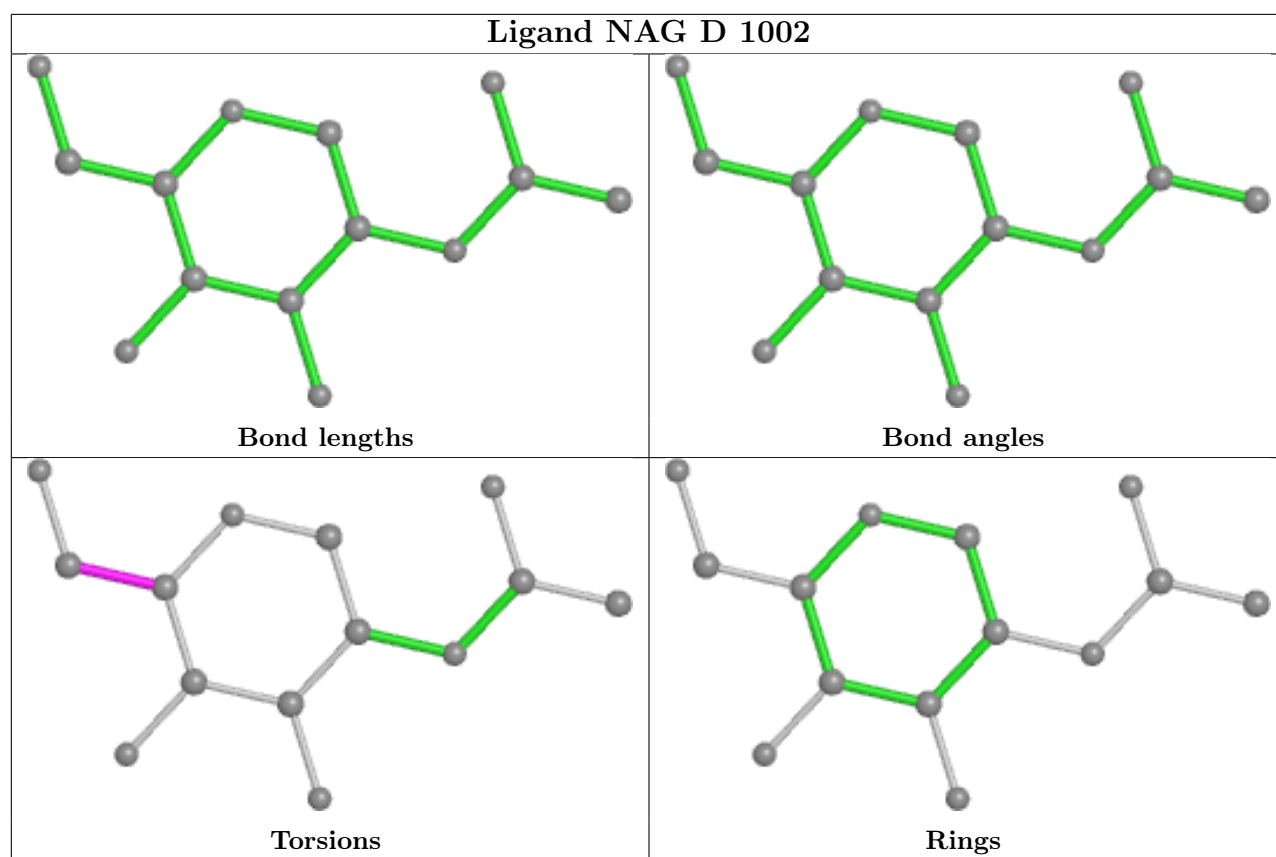
Ligand NAG B 1001











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.