



Full wwPDB EM Validation Report ⓘ

Jul 8, 2025 – 02:36 PM JST

PDB ID : 8K13 / pdb_00008k13
EMDB ID : EMD-36785
Title : SID1 transmembrane family member 1
Authors : Guo, H.; Qi, C.; Lu, Y.; Yang, H.; Zhu, Y.; Sun, F.; Ji, X.
Deposited on : 2023-07-10
Resolution : 3.33 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

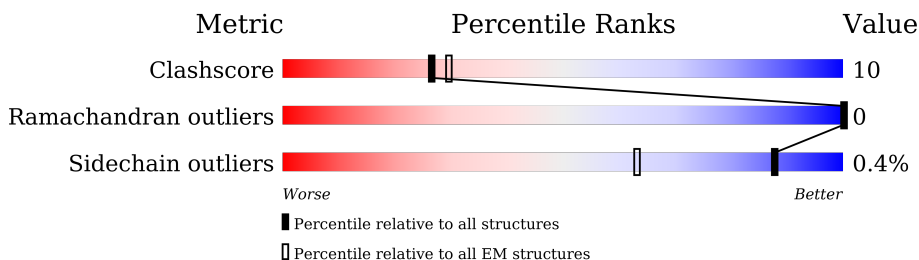
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.33 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	803	
1	B	803	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 9078 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 SID1 transmembrane family member 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	559	Total	C	N	O	S	0	0
			4497	2978	709	783	27		
1	B	559	Total	C	N	O	S	0	0
			4497	2978	709	783	27		

There are 164 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	4	MET	-	initiating methionine	UNP Q9NXL6
A	5	LYS	-	expression tag	UNP Q9NXL6
A	6	ALA	-	expression tag	UNP Q9NXL6
A	7	ASN	-	expression tag	UNP Q9NXL6
A	8	LEU	-	expression tag	UNP Q9NXL6
A	9	LEU	-	expression tag	UNP Q9NXL6
A	10	VAL	-	expression tag	UNP Q9NXL6
A	11	LEU	-	expression tag	UNP Q9NXL6
A	12	LEU	-	expression tag	UNP Q9NXL6
A	13	CYS	-	expression tag	UNP Q9NXL6
A	14	ALA	-	expression tag	UNP Q9NXL6
A	15	LEU	-	expression tag	UNP Q9NXL6
A	16	ALA	-	expression tag	UNP Q9NXL6
A	17	ALA	-	expression tag	UNP Q9NXL6
A	18	ALA	-	expression tag	UNP Q9NXL6
A	19	ASP	-	expression tag	UNP Q9NXL6
A	20	ALA	-	expression tag	UNP Q9NXL6
A	?	-	GLY	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	ASN	deletion	UNP Q9NXL6
A	?	-	TYR	deletion	UNP Q9NXL6
A	?	-	GLY	deletion	UNP Q9NXL6
A	?	-	THR	deletion	UNP Q9NXL6
A	?	-	ILE	deletion	UNP Q9NXL6
A	?	-	ASP	deletion	UNP Q9NXL6
A	?	-	GLU	deletion	UNP Q9NXL6

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	PRO	deletion	UNP Q9NXL6
A	?	-	GLY	deletion	UNP Q9NXL6
A	?	-	ARG	deletion	UNP Q9NXL6
A	?	-	GLN	deletion	UNP Q9NXL6
A	?	-	MET	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	ASP	deletion	UNP Q9NXL6
A	?	-	GLY	deletion	UNP Q9NXL6
A	?	-	GLY	deletion	UNP Q9NXL6
A	?	-	PRO	deletion	UNP Q9NXL6
A	?	-	PRO	deletion	UNP Q9NXL6
A	?	-	GLY	deletion	UNP Q9NXL6
A	?	-	GLN	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	ASP	deletion	UNP Q9NXL6
A	?	-	THR	deletion	UNP Q9NXL6
A	?	-	ASP	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	VAL	deletion	UNP Q9NXL6
A	?	-	GLU	deletion	UNP Q9NXL6
A	?	-	GLU	deletion	UNP Q9NXL6
A	?	-	SER	deletion	UNP Q9NXL6
A	?	-	ASP	deletion	UNP Q9NXL6
A	?	-	PHE	deletion	UNP Q9NXL6
A	?	-	ASP	deletion	UNP Q9NXL6
A	?	-	THR	deletion	UNP Q9NXL6
A	?	-	MET	deletion	UNP Q9NXL6
A	828	ASP	-	expression tag	UNP Q9NXL6
A	829	TYR	-	expression tag	UNP Q9NXL6
A	830	LYS	-	expression tag	UNP Q9NXL6
A	831	ASP	-	expression tag	UNP Q9NXL6
A	832	HIS	-	expression tag	UNP Q9NXL6
A	833	ASP	-	expression tag	UNP Q9NXL6
A	834	GLY	-	expression tag	UNP Q9NXL6
A	835	ASP	-	expression tag	UNP Q9NXL6

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Chain	Residue	Modelled	Actual	Comment	Reference
A	836	TYR	-	expression tag	UNP Q9NXL6
A	837	LYS	-	expression tag	UNP Q9NXL6
A	838	ASP	-	expression tag	UNP Q9NXL6
A	839	HIS	-	expression tag	UNP Q9NXL6
A	840	ASP	-	expression tag	UNP Q9NXL6
A	841	ILE	-	expression tag	UNP Q9NXL6
A	842	ASP	-	expression tag	UNP Q9NXL6
A	843	TYR	-	expression tag	UNP Q9NXL6
A	844	LYS	-	expression tag	UNP Q9NXL6
A	845	ASP	-	expression tag	UNP Q9NXL6
A	846	ASP	-	expression tag	UNP Q9NXL6
A	847	ASP	-	expression tag	UNP Q9NXL6
A	848	ASP	-	expression tag	UNP Q9NXL6
A	849	LYS	-	expression tag	UNP Q9NXL6
B	4	MET	-	initiating methionine	UNP Q9NXL6
B	5	LYS	-	expression tag	UNP Q9NXL6
B	6	ALA	-	expression tag	UNP Q9NXL6
B	7	ASN	-	expression tag	UNP Q9NXL6
B	8	LEU	-	expression tag	UNP Q9NXL6
B	9	LEU	-	expression tag	UNP Q9NXL6
B	10	VAL	-	expression tag	UNP Q9NXL6
B	11	LEU	-	expression tag	UNP Q9NXL6
B	12	LEU	-	expression tag	UNP Q9NXL6
B	13	CYS	-	expression tag	UNP Q9NXL6
B	14	ALA	-	expression tag	UNP Q9NXL6
B	15	LEU	-	expression tag	UNP Q9NXL6
B	16	ALA	-	expression tag	UNP Q9NXL6
B	17	ALA	-	expression tag	UNP Q9NXL6
B	18	ALA	-	expression tag	UNP Q9NXL6
B	19	ASP	-	expression tag	UNP Q9NXL6
B	20	ALA	-	expression tag	UNP Q9NXL6
B	?	-	GLY	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	ASN	deletion	UNP Q9NXL6
B	?	-	TYR	deletion	UNP Q9NXL6
B	?	-	GLY	deletion	UNP Q9NXL6
B	?	-	THR	deletion	UNP Q9NXL6
B	?	-	ILE	deletion	UNP Q9NXL6
B	?	-	ASP	deletion	UNP Q9NXL6
B	?	-	GLU	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6

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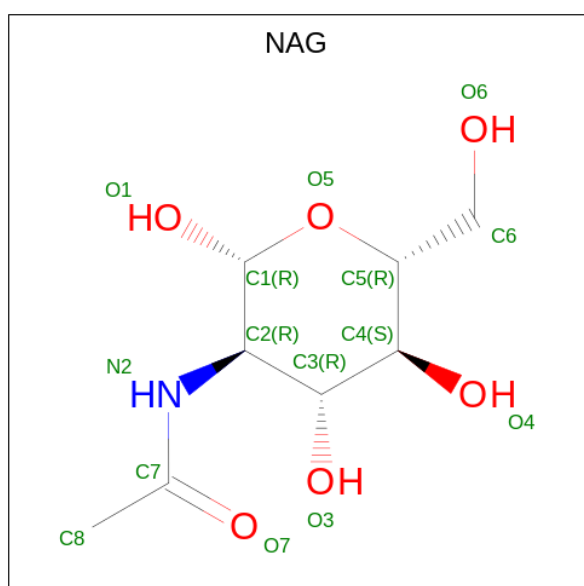
Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	PRO	deletion	UNP Q9NXL6
B	?	-	GLY	deletion	UNP Q9NXL6
B	?	-	ARG	deletion	UNP Q9NXL6
B	?	-	GLN	deletion	UNP Q9NXL6
B	?	-	MET	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	ASP	deletion	UNP Q9NXL6
B	?	-	GLY	deletion	UNP Q9NXL6
B	?	-	GLY	deletion	UNP Q9NXL6
B	?	-	PRO	deletion	UNP Q9NXL6
B	?	-	PRO	deletion	UNP Q9NXL6
B	?	-	GLY	deletion	UNP Q9NXL6
B	?	-	GLN	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	ASP	deletion	UNP Q9NXL6
B	?	-	THR	deletion	UNP Q9NXL6
B	?	-	ASP	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	VAL	deletion	UNP Q9NXL6
B	?	-	GLU	deletion	UNP Q9NXL6
B	?	-	GLU	deletion	UNP Q9NXL6
B	?	-	SER	deletion	UNP Q9NXL6
B	?	-	ASP	deletion	UNP Q9NXL6
B	?	-	PHE	deletion	UNP Q9NXL6
B	?	-	ASP	deletion	UNP Q9NXL6
B	?	-	THR	deletion	UNP Q9NXL6
B	?	-	MET	deletion	UNP Q9NXL6
B	828	ASP	-	expression tag	UNP Q9NXL6
B	829	TYR	-	expression tag	UNP Q9NXL6
B	830	LYS	-	expression tag	UNP Q9NXL6
B	831	ASP	-	expression tag	UNP Q9NXL6
B	832	HIS	-	expression tag	UNP Q9NXL6
B	833	ASP	-	expression tag	UNP Q9NXL6
B	834	GLY	-	expression tag	UNP Q9NXL6
B	835	ASP	-	expression tag	UNP Q9NXL6
B	836	TYR	-	expression tag	UNP Q9NXL6
B	837	LYS	-	expression tag	UNP Q9NXL6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	838	ASP	-	expression tag	UNP Q9NXL6
B	839	HIS	-	expression tag	UNP Q9NXL6
B	840	ASP	-	expression tag	UNP Q9NXL6
B	841	ILE	-	expression tag	UNP Q9NXL6
B	842	ASP	-	expression tag	UNP Q9NXL6
B	843	TYR	-	expression tag	UNP Q9NXL6
B	844	LYS	-	expression tag	UNP Q9NXL6
B	845	ASP	-	expression tag	UNP Q9NXL6
B	846	ASP	-	expression tag	UNP Q9NXL6
B	847	ASP	-	expression tag	UNP Q9NXL6
B	848	ASP	-	expression tag	UNP Q9NXL6
B	849	LYS	-	expression tag	UNP Q9NXL6

- Molecule 2 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
2	A	1	Total	C	N	O	0
			14	8	1	5	
2	A	1	Total	C	N	O	0
			14	8	1	5	
2	A	1	Total	C	N	O	0
			14	8	1	5	
2	B	1	Total	C	N	O	0
			14	8	1	5	
2	B	1	Total	C	N	O	0
			14	8	1	5	

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

L784	PHE	ILE	Y481	SER	Q218	V85
F788	TYR	ASN	N482	GLY	N219	V96
D789	THR	ALA	F483	ASN	I220	V97
D790	ASP	SER	L484	MET	M221	R98
H791	CYS	ALA	C485	VAL	Y225	Q99
D792	ILE	TYR	A486	ALA	Q100	Q100
I793	GLN	SER	H487	SER		
L797	GLN	ALA		HIS	V103	V103
	CYS	TYR		PRO	L104	L104
	GLN	ILE		ILE	S105	S105
	GLN	ALA	F495	ALA	W106	W106
	ARG	SER	N496	ALA	Q107	Q107
	PRO	PHE	N497	ALA	W108	W108
T800	LEU	ALA		SER	V108	V108
A801	TYR	VAL	N501	THR		
F806	M681	VAL	L506	PRO	Q117	Q117
L809		VAL	L507	GLU	E124	E124
LEU	W695	ILE	G508	ASP	W125	W125
THR	Y712	VAL	F511	ILE	S126	S126
LEU		THR		GLU	Q127	Q127
ASP	I716	VAL	R524	SER	T128	T128
ASP	Y724	GLY	ALA	ASP	L129	L129
ASP	L725	VAL	LEU	LYS	Q142	Q142
ASP	A726	VAL	GLU	ASN		
ASP	F727	PHE	ALA	ILE	I145	I145
VAL		GLY	LYS	ARG	F146	F146
VAL	I728	ASN	ILE	THR	V147	V147
ARG	I729	ASP	ILE	LYS	D148	D148
ARG	I730	VAL	PHE	MET	V149	V149
ASP	M731	TRP	ALA	PHE		
GLN	S736	F638	VAL	LEU	M152	M152
ILE	GLU		GLU	TYR	A153	A153
PRO	LYS	F632	TYR	LEU	P154	P154
VAL	VAL		GLY	SER		
PHE	VAL	V637	ILE	ASP	Y159	Y159
LEU	LEU			LEU		
ASP	PRO		P539	LEU	L162	L162
PRO	VAL	S644	M553	SER		
LYS		THR		ARG	Q170	Q170
ASP	F743	GLN	L558	LYS	L171	L171
HIS		ILE	S559	ASP		
ASP	C746	TYR	V564	ARG	S182	S182
GLY		TYR	D574	ARG	P183	P183
ASP	A749	MET		ILE	S184	S184
ASP	T750	GLY		VAL	Q185	Q185
TYR		ARG		SER	P186	P186
LYS	M753	PHE	L584	LYS	Q187	Q187
ASP	W754	LYS	C585	LYS	Y188	Y188
HIS		ILE	M586	LYS	F189	F189
ASP	L765	ASP	LEU	SER	L190	L190
ASP		LEU	LYS	ILE	Y191	Y191
TYR	T771	GLY	LEU	ASP		
LYS	F772	ILE	TYR	GLY	K195	K195
ASP	A773	PHE	TYR	SER		
ASP	E774	ARG	GLN	PHE	E207	E207
ASP	S775	ARG	THR	GLY		
ASP	R776	ALA	ARG	SER	P211	P211
LYS		ALA	HIS	ASN	V217	V217
	M779	ALA	PRO	ASP		
	I783	MET	VAL	GLY		

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	149089	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	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

5.1 Standard geometry

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	0.18	0/4620	0.36	0/6284
1	B	0.15	0/4620	0.31	0/6284
All	All	0.17	0/9240	0.34	0/12568

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

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	4497	0	4444	92	0
1	B	4497	0	4444	89	0
2	A	42	0	39	0	0
2	B	42	0	39	0	0
All	All	9078	0	8966	176	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 10.

All (176) 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:558:LEU:HD21	1:A:574:ASP:HA	1.57	0.86
1:B:239:SER:O	1:B:776:ARG:NH1	2.21	0.73
1:A:239:SER:O	1:A:776:ARG:NH1	2.21	0.73
1:B:129:LEU:HD12	1:B:145:ILE:HD13	1.70	0.73
1:A:129:LEU:HD12	1:A:145:ILE:HD13	1.71	0.70
1:A:97:VAL:HG12	1:A:147:VAL:HG22	1.74	0.70
1:B:97:VAL:HG12	1:B:147:VAL:HG22	1.75	0.69
1:A:784:LEU:HB3	1:A:788:PHE:HB2	1.77	0.67
1:B:558:LEU:HD21	1:B:574:ASP:HA	1.79	0.65
1:A:217:VAL:HG22	1:A:260:VAL:HG22	1.78	0.65
1:A:51:VAL:HG22	1:A:162:LEU:HB2	1.78	0.64
1:B:784:LEU:HB3	1:B:788:PHE:HB2	1.80	0.63
1:B:51:VAL:HG22	1:B:162:LEU:HB2	1.79	0.63
1:A:644:SER:HG	1:A:724:TYR:HH	1.46	0.62
1:B:96:VAL:HG23	1:B:105:SER:HB3	1.82	0.62
1:A:58:LEU:HD11	1:A:154:PRO:HA	1.82	0.61
1:A:99:GLN:HE22	1:A:130:CYS:HB3	1.66	0.61
1:A:190:LEU:HD13	1:A:220:ILE:HD11	1.83	0.60
1:B:207:GLU:O	1:B:242:LYS:NZ	2.34	0.59
1:B:217:VAL:HG22	1:B:260:VAL:HG22	1.84	0.59
1:A:727:PHE:O	1:A:731:MET:HG2	2.03	0.59
1:A:207:GLU:O	1:A:242:LYS:NZ	2.35	0.59
1:B:79:ARG:NH2	1:B:186:PRO:O	2.36	0.58
1:A:96:VAL:HG23	1:A:105:SER:HB3	1.86	0.58
1:A:275:PHE:HE1	1:A:283:GLN:HE22	1.52	0.58
1:B:501:ASN:OD1	1:B:559:SER:OG	2.22	0.58
1:B:266:PRO:O	1:B:289:ARG:NH2	2.37	0.57
1:B:275:PHE:HE1	1:B:283:GLN:HE22	1.52	0.57
1:A:456:ALA:O	1:A:460:ILE:HG12	2.05	0.57
1:A:94:LEU:HD13	1:B:103:VAL:HG23	1.86	0.56
1:A:632:PHE:HZ	1:A:712:TYR:CE2	2.24	0.56
1:B:67:ASN:HD21	1:B:142:GLN:HG3	1.70	0.56
1:A:266:PRO:O	1:A:289:ARG:NH2	2.39	0.55
1:B:190:LEU:HD13	1:B:220:ILE:HD11	1.88	0.55
1:B:152:MET:HE3	1:B:152:MET:HA	1.89	0.55
1:A:56:VAL:O	1:A:156:GLY:CA	2.55	0.55
1:B:753:MET:N	1:B:753:MET:SD	2.80	0.55
1:A:482:ASN:HB2	1:A:765:LEU:HD13	1.90	0.54
1:A:128:THR:HB	1:A:188:TYR:CE1	2.42	0.54
1:B:481:TYR:OH	1:B:564:VAL:O	2.24	0.54
1:B:75:VAL:HG21	1:B:190:LEU:HD23	1.88	0.54
1:B:482:ASN:HB2	1:B:765:LEU:HD13	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:783:ILE:HG22	1:A:789:ASP:HA	1.90	0.54
1:A:686:LEU:HD22	1:A:727:PHE:HE2	1.73	0.54
1:A:75:VAL:HG21	1:A:190:LEU:HD23	1.90	0.53
1:B:128:THR:HB	1:B:188:TYR:CE1	2.43	0.53
1:B:456:ALA:O	1:B:460:ILE:HG12	2.08	0.53
1:A:67:ASN:HD21	1:A:142:GLN:HG3	1.72	0.53
1:B:508:GLY:C	1:B:553:MET:HE1	2.34	0.53
1:A:56:VAL:O	1:A:156:GLY:HA2	2.09	0.53
1:B:783:ILE:HG22	1:B:789:ASP:HA	1.91	0.53
1:A:693:VAL:O	1:A:696:SER:OG	2.23	0.53
1:B:496:ASN:ND2	1:B:497:ASN:OD1	2.42	0.52
1:A:496:ASN:ND2	1:A:497:ASN:OD1	2.41	0.52
1:A:508:GLY:C	1:A:553:MET:HE1	2.35	0.52
1:B:241:THR:HG23	1:B:773:ALA:HB1	1.91	0.52
1:A:712:TYR:CE2	1:A:716:ILE:HD11	2.45	0.52
1:A:753:MET:SD	1:A:753:MET:N	2.81	0.51
1:A:182:SER:HB3	1:A:185:GLN:HB2	1.91	0.51
1:B:211:PRO:HB3	1:B:289:ARG:NE	2.26	0.51
1:A:79:ARG:NH1	1:A:187:GLN:OE1	2.37	0.51
1:B:730:ILE:HG13	1:B:731:MET:SD	2.50	0.51
1:B:321:TYR:HE2	1:B:506:LEU:HD22	1.75	0.51
1:A:241:THR:HG23	1:A:773:ALA:HB1	1.92	0.50
1:B:182:SER:HB3	1:B:185:GLN:HB2	1.93	0.50
1:A:190:LEU:HD11	1:A:257:GLN:HB2	1.93	0.50
1:A:312:PHE:O	1:A:316:ILE:HG23	2.11	0.50
1:A:124:GLU:O	1:A:184:SER:OG	2.23	0.50
1:A:103:VAL:HG23	1:B:94:LEU:HD13	1.93	0.50
1:B:58:LEU:H	1:B:58:LEU:HD12	1.76	0.49
1:A:79:ARG:NH2	1:A:186:PRO:O	2.46	0.49
1:B:47:ASP:OD1	1:B:52:TYR:OH	2.22	0.49
1:A:219:ASN:ND2	1:A:221:MET:HG2	2.28	0.49
1:B:79:ARG:NH1	1:B:187:GLN:OE1	2.32	0.49
1:A:116:TYR:O	1:A:117:GLN:HG2	2.13	0.49
1:A:726:ALA:O	1:A:730:ILE:HG12	2.13	0.48
1:A:149:VAL:HG11	1:A:159:TYR:CZ	2.48	0.48
1:B:771:THR:OG1	1:B:774:GLU:OE1	2.31	0.48
1:B:790:ASP:HA	1:B:793:ILE:HD12	1.95	0.48
1:A:211:PRO:HB3	1:A:289:ARG:NE	2.27	0.48
1:B:637:VAL:HG13	1:B:695:TRP:HE1	1.79	0.48
1:A:749:ALA:O	1:A:753:MET:HG2	2.14	0.48
1:B:632:PHE:HZ	1:B:712:TYR:CE2	2.31	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:761:PHE:HB2	1:A:794:TRP:CE3	2.49	0.48
1:A:255:GLY:O	1:A:257:GLN:HG2	2.14	0.47
1:B:776:ARG:HG2	1:B:779:ASN:HD21	1.79	0.47
1:A:644:SER:OG	1:A:724:TYR:OH	2.24	0.47
1:A:301:ILE:HB	1:A:305:VAL:HG11	1.96	0.47
1:B:255:GLY:O	1:B:257:GLN:HG2	2.14	0.47
1:A:765:LEU:HD21	1:A:791:HIS:HB2	1.97	0.47
1:A:771:THR:OG1	1:A:774:GLU:OE1	2.32	0.47
1:B:765:LEU:HD21	1:B:791:HIS:HB2	1.97	0.47
1:B:712:TYR:CE2	1:B:716:ILE:HD11	2.49	0.47
1:A:456:ALA:O	1:A:459:VAL:HG22	2.15	0.47
1:B:225:TYR:O	1:B:231:VAL:HG23	2.15	0.47
1:B:219:ASN:ND2	1:B:221:MET:HG2	2.30	0.46
1:A:506:LEU:HD23	1:A:506:LEU:HA	1.76	0.46
1:B:245:ALA:HB3	1:B:483:PHE:HB3	1.96	0.46
1:B:58:LEU:HD11	1:B:154:PRO:HA	1.98	0.46
1:B:511:PHE:CZ	1:B:806:PHE:HB3	2.50	0.46
1:B:644:SER:OG	1:B:724:TYR:OH	2.23	0.46
1:B:195:LYS:HB3	1:B:195:LYS:HE2	1.71	0.46
1:A:152:MET:SD	1:B:100:GLN:HA	2.56	0.45
1:A:311:LEU:O	1:A:315:PHE:HB2	2.16	0.45
1:A:47:ASP:OD1	1:A:52:TYR:OH	2.22	0.45
1:B:727:PHE:O	1:B:731:MET:HG2	2.15	0.45
1:A:203:LYS:HD3	1:A:484:LEU:HD22	1.98	0.45
1:B:124:GLU:O	1:B:184:SER:OG	2.21	0.45
1:A:225:TYR:O	1:A:231:VAL:HG23	2.17	0.45
1:A:484:LEU:HD13	1:A:781:GLU:HG2	1.98	0.45
1:A:637:VAL:HG13	1:A:695:TRP:HE1	1.81	0.45
1:B:725:LEU:HD12	1:B:725:LEU:HA	1.80	0.45
1:B:98:ARG:HB3	1:B:146:PHE:HB2	1.98	0.45
1:B:456:ALA:O	1:B:459:VAL:HG22	2.16	0.45
1:A:171:LEU:HD12	1:A:297:ILE:HD11	1.99	0.44
1:A:693:VAL:O	1:A:697:PHE:HD2	2.00	0.44
1:A:725:LEU:HD12	1:A:725:LEU:HA	1.83	0.44
1:B:302:LYS:HA	1:B:302:LYS:HD3	1.73	0.44
1:B:487:HIS:O	1:B:495:PHE:N	2.44	0.44
1:A:107:GLN:N	1:A:107:GLN:OE1	2.48	0.44
1:A:225:TYR:HD1	1:A:230:ASN:HD21	1.61	0.44
1:B:632:PHE:HZ	1:B:712:TYR:CD2	2.35	0.44
1:A:97:VAL:HG21	1:A:129:LEU:HD21	2.00	0.44
1:A:504:HIS:ND1	1:A:799:ALA:HB2	2.33	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:225:TYR:HD1	1:B:230:ASN:HD21	1.64	0.43
1:A:746:CYS:O	1:A:750:THR:OG1	2.35	0.43
1:A:730:ILE:HG13	1:A:731:MET:SD	2.59	0.43
1:B:726:ALA:HA	1:B:729:ILE:HD12	2.00	0.43
1:A:47:ASP:OD1	1:A:47:ASP:N	2.51	0.43
1:A:254:PRO:HG3	1:B:117:GLN:NE2	2.34	0.43
1:A:90:ASN:O	1:B:100:GLN:NE2	2.51	0.43
1:B:47:ASP:OD1	1:B:47:ASP:N	2.51	0.43
1:A:202:ILE:O	1:A:245:ALA:HA	2.18	0.43
1:B:126:SER:O	1:B:186:PRO:HD2	2.19	0.43
1:B:149:VAL:HG11	1:B:159:TYR:CZ	2.54	0.43
1:B:171:LEU:HD12	1:B:297:ILE:HD11	2.00	0.43
1:A:191:TYR:HD2	1:A:258:PHE:CZ	2.36	0.42
1:A:195:LYS:HB3	1:A:195:LYS:HE2	1.71	0.42
1:B:286:ASN:HD21	1:B:289:ARG:NH1	2.17	0.42
1:B:506:LEU:HD23	1:B:506:LEU:HA	1.84	0.42
1:B:283:GLN:OE1	1:B:285:TRP:NE1	2.37	0.42
1:B:681:MET:HA	1:B:681:MET:HE2	2.02	0.42
1:B:765:LEU:HD21	1:B:791:HIS:H	1.83	0.42
1:A:507:LEU:HD23	1:A:507:LEU:HA	1.87	0.42
1:B:311:LEU:HD23	1:B:311:LEU:HA	1.87	0.42
1:B:746:CYS:O	1:B:750:THR:OG1	2.38	0.42
1:A:228:ASP:OD1	1:A:228:ASP:N	2.53	0.42
1:A:684:MET:N	1:A:684:MET:SD	2.93	0.42
1:B:191:TYR:HD2	1:B:258:PHE:CZ	2.38	0.42
1:B:469:VAL:O	1:B:473:THR:OG1	2.22	0.42
1:B:797:LEU:HA	1:B:800:THR:HG22	2.02	0.42
1:A:776:ARG:HG2	1:A:779:ASN:HD21	1.84	0.42
1:B:584:LEU:HD12	1:B:584:LEU:HA	1.85	0.42
1:B:749:ALA:O	1:B:753:MET:HE2	2.20	0.41
1:B:107:GLN:OE1	1:B:107:GLN:N	2.50	0.41
1:B:220:ILE:HD12	1:B:257:GLN:HG3	2.03	0.41
1:B:754:TRP:CE2	1:B:801:ALA:HB1	2.54	0.41
1:A:481:TYR:OH	1:A:564:VAL:O	2.32	0.41
1:A:152:MET:HB3	1:A:152:MET:HE2	1.79	0.41
1:A:797:LEU:HD13	1:A:797:LEU:HA	1.87	0.41
1:A:83:ASN:HD22	1:A:124:GLU:CD	2.29	0.41
1:A:686:LEU:HD22	1:A:727:PHE:CE2	2.54	0.41
1:B:83:ASN:HD22	1:B:124:GLU:CD	2.28	0.41
1:B:448:ILE:HD12	1:B:448:ILE:HA	1.98	0.41
1:B:104:LEU:HD12	1:B:104:LEU:HA	1.87	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:170:GLN:HA	1:B:190:LEU:O	2.21	0.40
1:A:191:TYR:HE2	1:A:200:VAL:HG11	1.86	0.40
1:A:79:ARG:HD2	1:A:79:ARG:HA	1.82	0.40
1:A:178:HIS:CE1	1:A:294:GLU:HB2	2.57	0.40
1:B:731:MET:SD	1:B:731:MET:N	2.95	0.40
1:A:58:LEU:H	1:A:58:LEU:HD12	1.86	0.40
1:A:514:ILE:HG13	1:A:515:VAL:N	2.37	0.40
1:B:84:SER:HB3	1:B:108:VAL:HG12	2.03	0.40
1:A:683:ARG:O	1:A:686:LEU:HG	2.22	0.40
1:A:711:SER:HB2	1:A:761:PHE:HZ	1.86	0.40
1:B:485:CYS:SG	1:B:789:ASP:HB3	2.61	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 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	547/803 (68%)	534 (98%)	13 (2%)	0	100	100
1	B	547/803 (68%)	536 (98%)	11 (2%)	0	100	100
All	All	1094/1606 (68%)	1070 (98%)	24 (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 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	495/712 (70%)	492 (99%)	3 (1%)	84	90
1	B	495/712 (70%)	494 (100%)	1 (0%)	92	95
All	All	990/1424 (70%)	986 (100%)	4 (0%)	88	93

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	155	LEU
1	A	722	LEU
1	A	797	LEU
1	B	128	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	99	GLN
1	A	113	GLN
1	A	185	GLN
1	A	230	ASN
1	A	471	ASN
1	B	99	GLN
1	B	113	GLN
1	B	117	GLN
1	B	185	GLN
1	B	230	ASN
1	B	471	ASN
1	B	487	HIS

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

6 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	$\# Z > 2$
2	NAG	B	901	1	14,14,15	0.24	0	17,19,21	0.53	0
2	NAG	B	903	1	14,14,15	0.24	0	17,19,21	0.46	0
2	NAG	A	902	1	14,14,15	0.24	0	17,19,21	0.42	0
2	NAG	A	901	1	14,14,15	0.25	0	17,19,21	0.53	0
2	NAG	B	902	1	14,14,15	0.23	0	17,19,21	0.44	0
2	NAG	A	903	1	14,14,15	0.22	0	17,19,21	0.48	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	NAG	B	901	1	-	2/6/23/26	0/1/1/1
2	NAG	B	903	1	-	2/6/23/26	0/1/1/1
2	NAG	A	902	1	-	2/6/23/26	0/1/1/1
2	NAG	A	901	1	-	2/6/23/26	0/1/1/1
2	NAG	B	902	1	-	2/6/23/26	0/1/1/1
2	NAG	A	903	1	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	901	NAG	O5-C5-C6-O6
2	B	901	NAG	O5-C5-C6-O6

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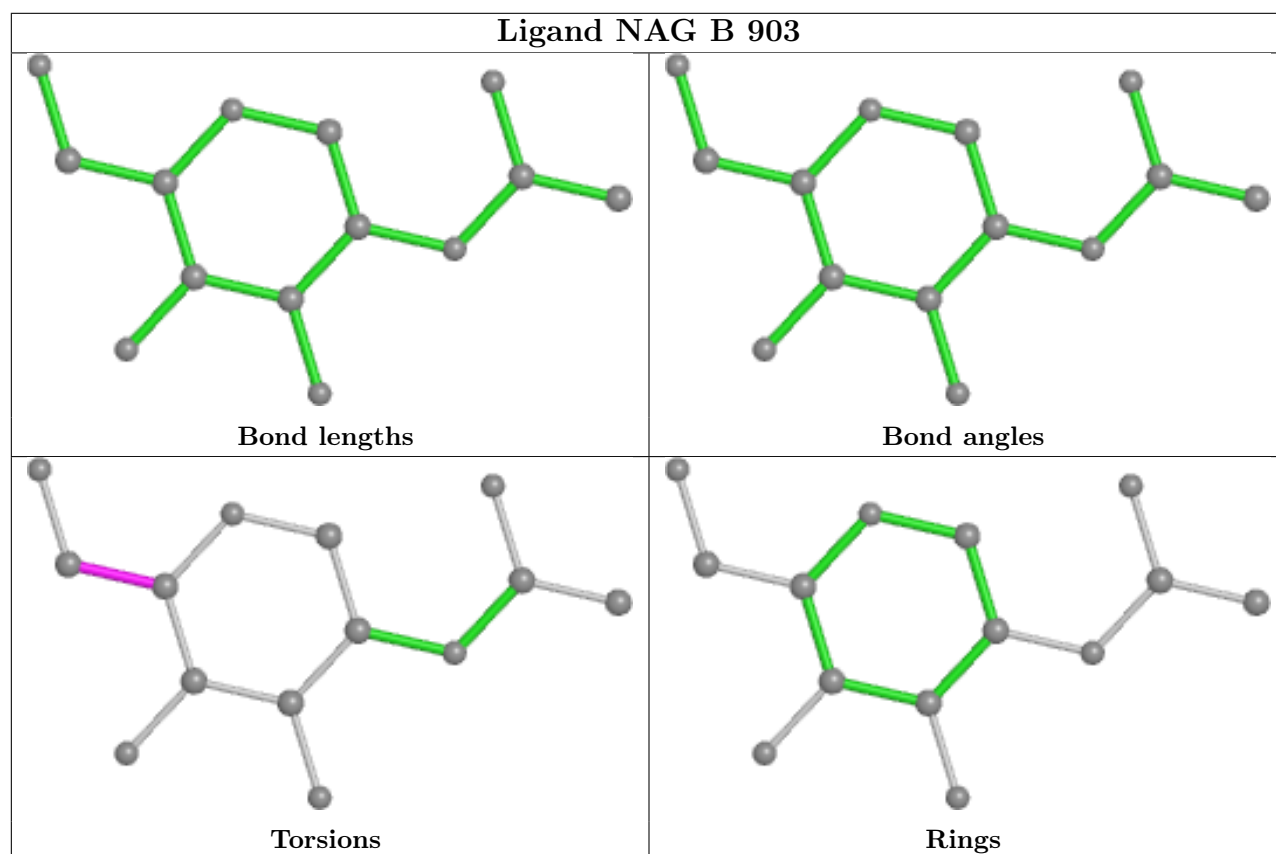
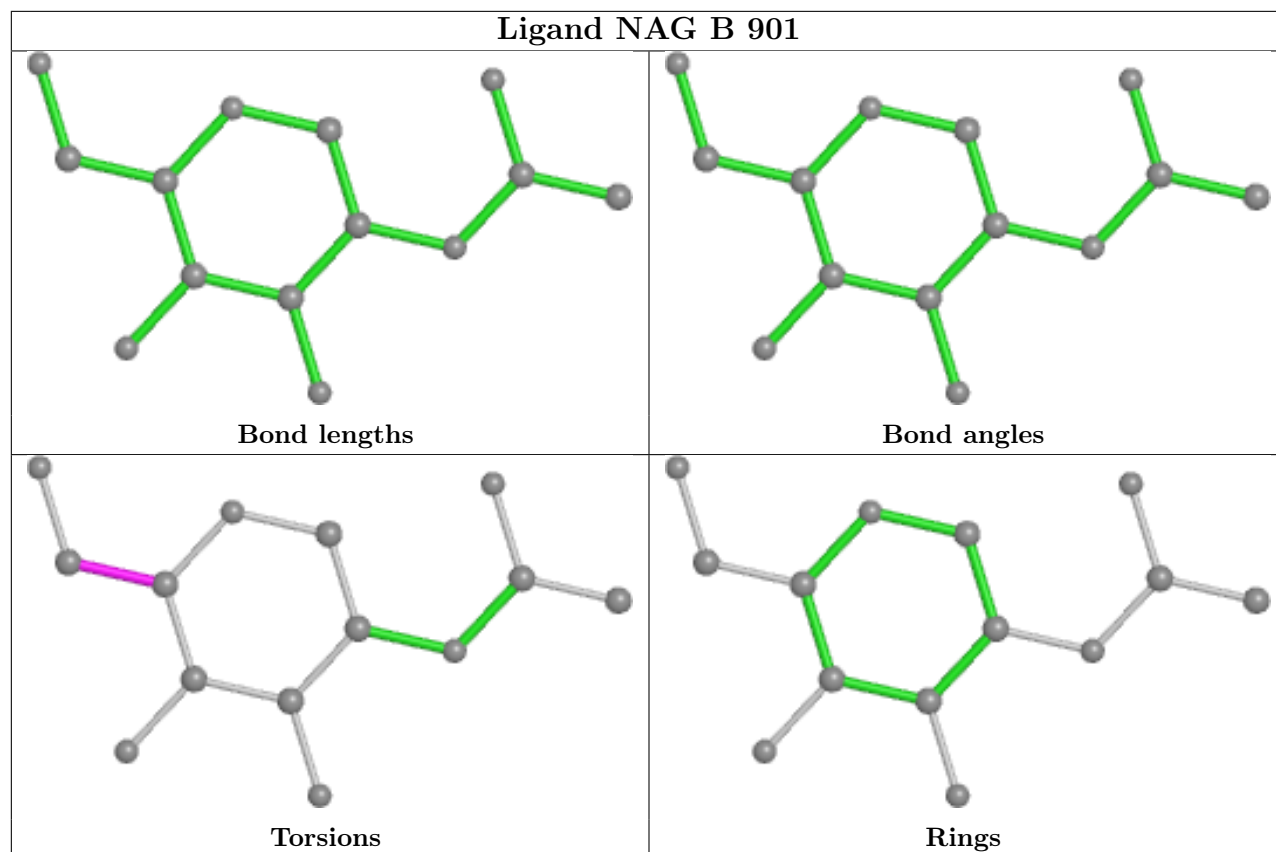
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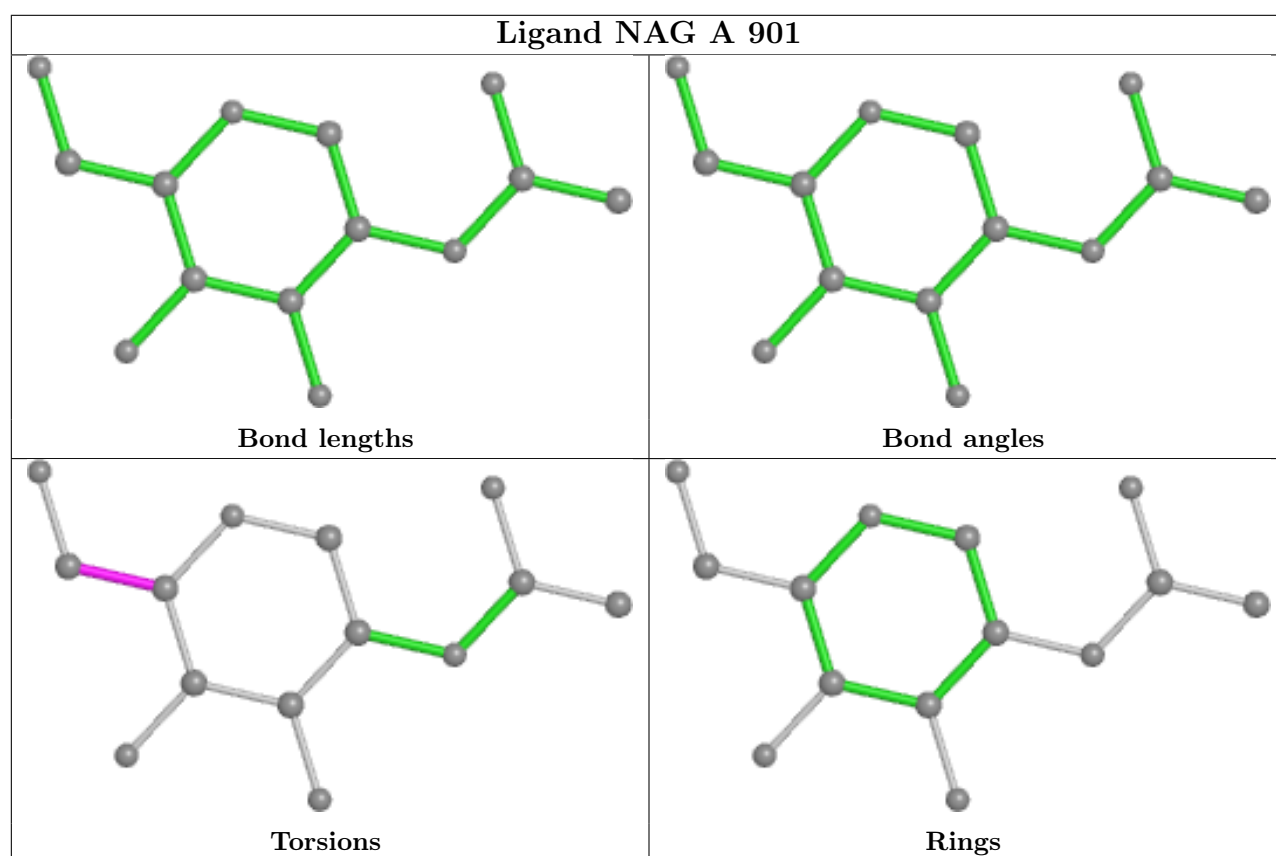
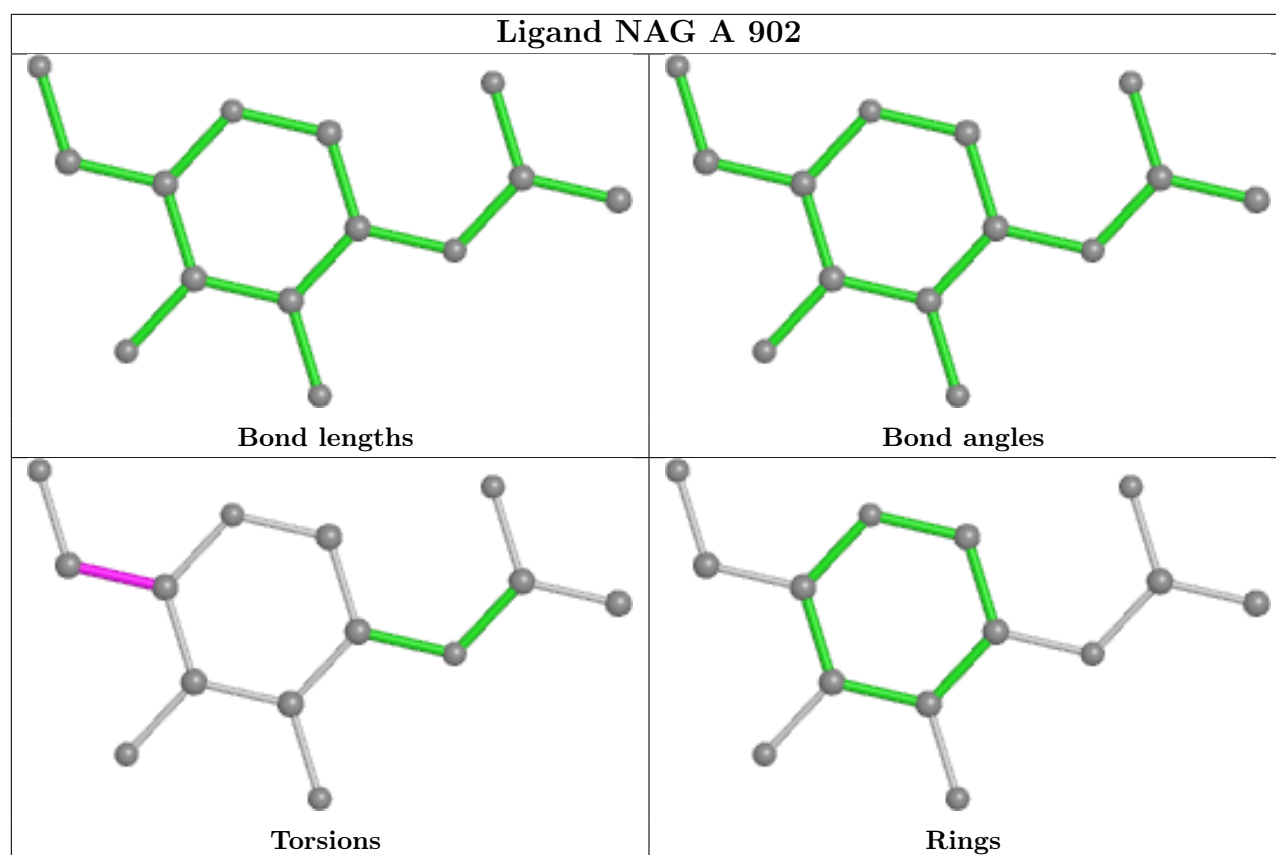
Mol	Chain	Res	Type	Atoms
2	B	902	NAG	O5-C5-C6-O6
2	A	902	NAG	O5-C5-C6-O6
2	A	901	NAG	C4-C5-C6-O6
2	B	901	NAG	C4-C5-C6-O6
2	A	902	NAG	C4-C5-C6-O6
2	B	902	NAG	C4-C5-C6-O6
2	B	903	NAG	O5-C5-C6-O6
2	A	903	NAG	O5-C5-C6-O6
2	B	903	NAG	C4-C5-C6-O6
2	A	903	NAG	C4-C5-C6-O6

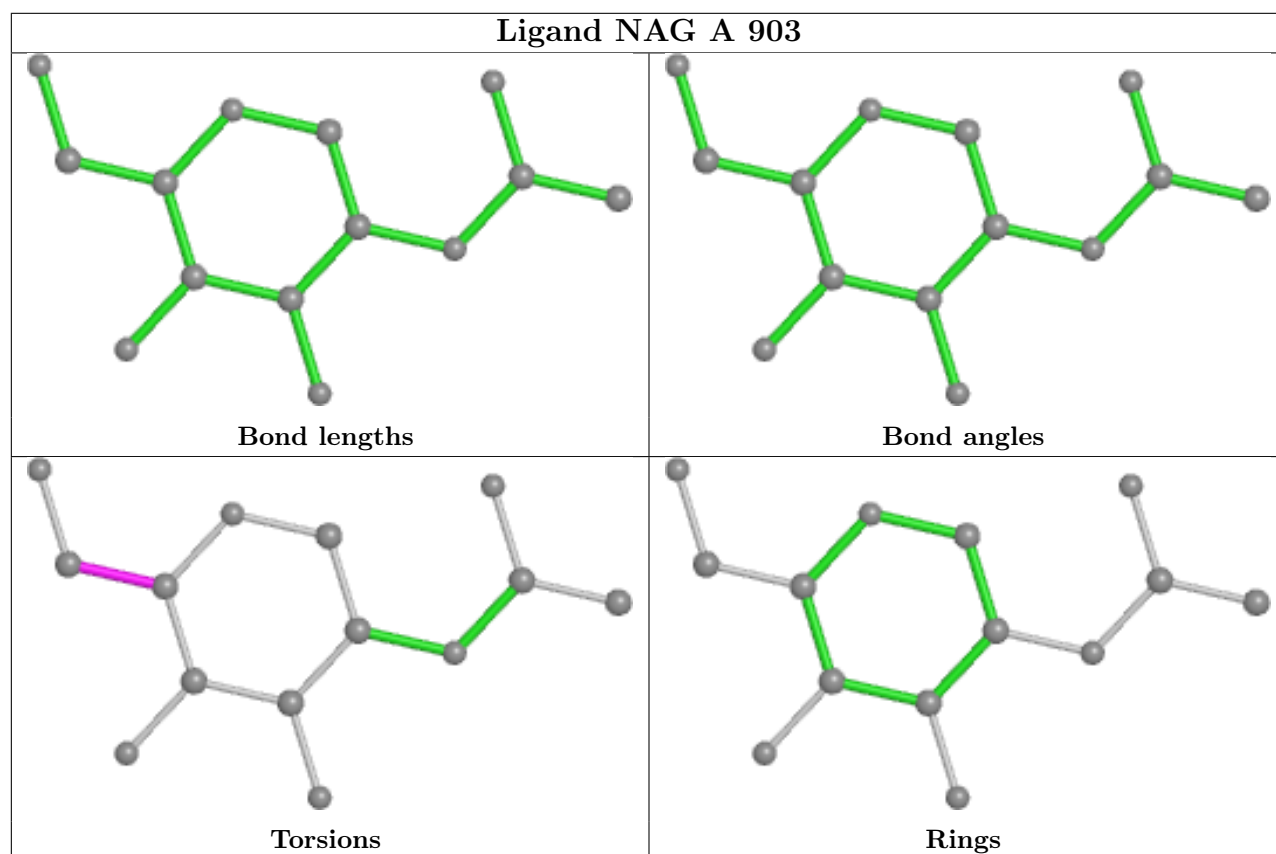
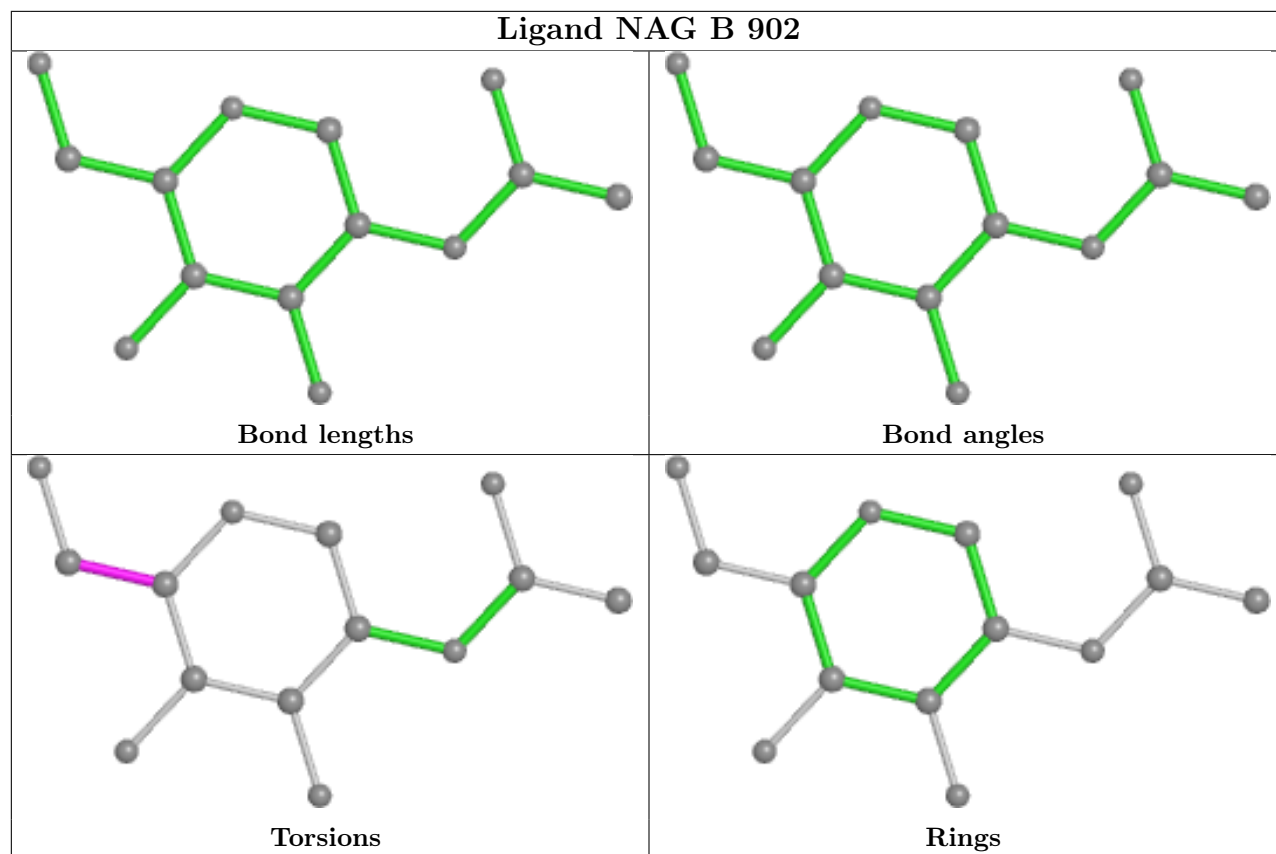
There are no ring outliers.

No monomer is involved in short contacts.

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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.