



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 12:52 PM UTC

PDB ID : 6V2B / pdb_00006v2b
Title : Complex of double mutant (T89V,K162T) of E. coli L-asparaginase II with L-Asn
Authors : Lubkowski, J.; Wlodawer, A.
Deposited on : 2019-11-22
Resolution : 2.05 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

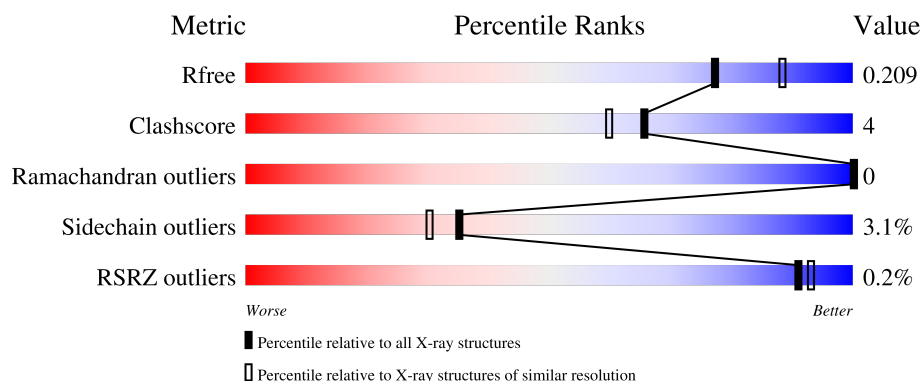
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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	2260 (2.04-2.04)
Clashscore	190562	2333 (2.04-2.04)
Ramachandran outliers	187476	2318 (2.04-2.04)
Sidechain outliers	187428	2318 (2.04-2.04)
RSRZ outliers	180081	2260 (2.04-2.04)

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	333	 83% 14% ..
1	B	333	 79% 14% 6%
1	C	333	 84% 13% ..
1	D	333	 85% 12% ..

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	CIT	D	402	-	X	-	-

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 10373 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 L-asparaginase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	326	Total	C	N	O	S	0	0	0
			2429	1516	414	491	8			
1	B	313	Total	C	N	O	S	0	0	1
			2339	1463	399	469	8			
1	C	326	Total	C	N	O	S	0	0	0
			2429	1516	414	491	8			
1	D	326	Total	C	N	O	S	0	0	0
			2422	1510	414	490	8			

There are 36 discrepancies between the modelled and reference sequences:

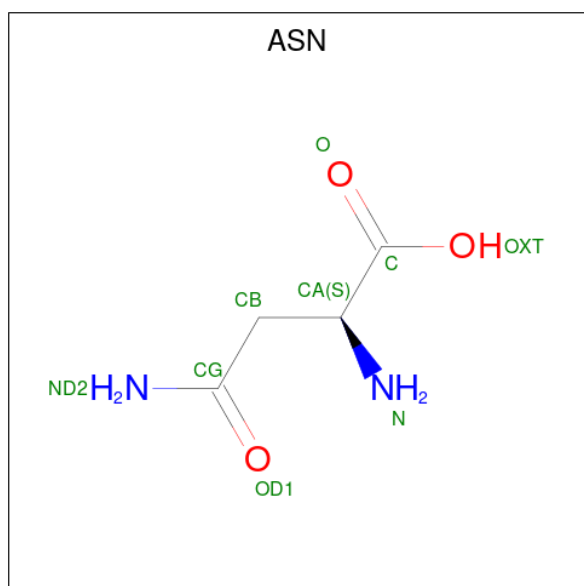
Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	MET	-	expression tag	UNP P00805
A	-5	HIS	-	expression tag	UNP P00805
A	-4	HIS	-	expression tag	UNP P00805
A	-3	HIS	-	expression tag	UNP P00805
A	-2	HIS	-	expression tag	UNP P00805
A	-1	HIS	-	expression tag	UNP P00805
A	0	HIS	-	expression tag	UNP P00805
A	89	VAL	THR	engineered mutation	UNP P00805
A	162	THR	LYS	engineered mutation	UNP P00805
B	-6	MET	-	expression tag	UNP P00805
B	-5	HIS	-	expression tag	UNP P00805
B	-4	HIS	-	expression tag	UNP P00805
B	-3	HIS	-	expression tag	UNP P00805
B	-2	HIS	-	expression tag	UNP P00805
B	-1	HIS	-	expression tag	UNP P00805
B	0	HIS	-	expression tag	UNP P00805
B	89	VAL	THR	engineered mutation	UNP P00805
B	162	THR	LYS	engineered mutation	UNP P00805
C	-6	MET	-	expression tag	UNP P00805
C	-5	HIS	-	expression tag	UNP P00805
C	-4	HIS	-	expression tag	UNP P00805

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-3	HIS	-	expression tag	UNP P00805
C	-2	HIS	-	expression tag	UNP P00805
C	-1	HIS	-	expression tag	UNP P00805
C	0	HIS	-	expression tag	UNP P00805
C	89	VAL	THR	engineered mutation	UNP P00805
C	162	THR	LYS	engineered mutation	UNP P00805
D	-6	MET	-	expression tag	UNP P00805
D	-5	HIS	-	expression tag	UNP P00805
D	-4	HIS	-	expression tag	UNP P00805
D	-3	HIS	-	expression tag	UNP P00805
D	-2	HIS	-	expression tag	UNP P00805
D	-1	HIS	-	expression tag	UNP P00805
D	0	HIS	-	expression tag	UNP P00805
D	89	VAL	THR	engineered mutation	UNP P00805
D	162	THR	LYS	engineered mutation	UNP P00805

- Molecule 2 is ASPARAGINE (CCD ID: ASN) (formula: $C_4H_8N_2O_3$) (labeled as "Ligand of Interest" by depositor).



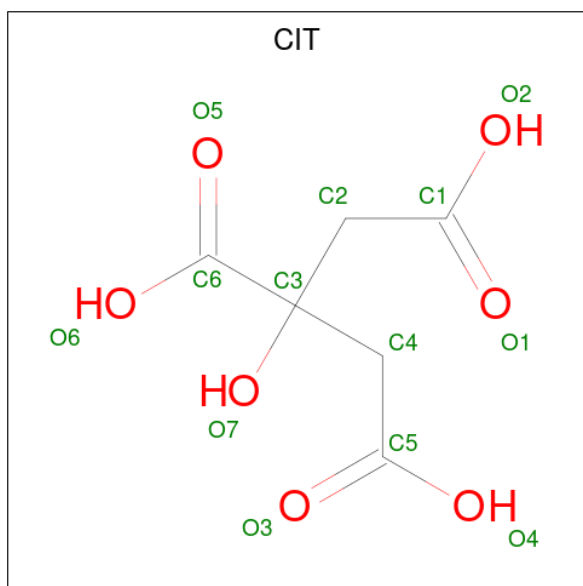
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			9	4	2	3		
2	B	1	Total	C	N	O	0	0
			9	4	2	3		
2	C	1	Total	C	N	O	0	0
			9	4	2	3		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	D	1	Total	C	N	O	0	0
			9	4	2	3		

- Molecule 3 is CITRIC ACID (CCD ID: CIT) (formula: $C_6H_8O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			13	6	7		
3	C	1	Total	C	O	0	0
			13	6	7		
3	D	1	Total	C	O	0	0
			13	6	7		

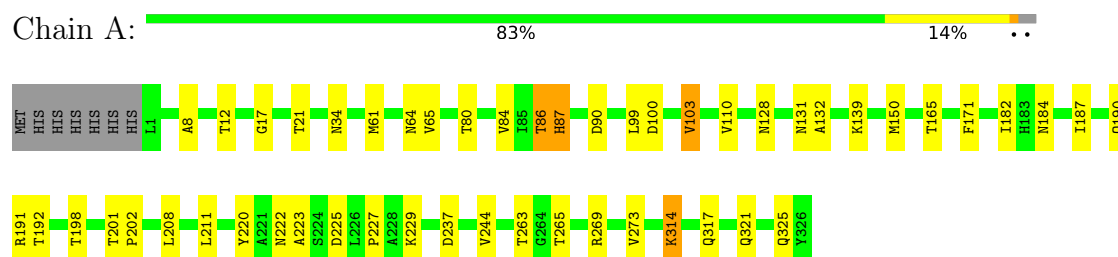
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	125	Total	O	0	0
			125	125		
4	B	113	Total	O	0	0
			113	113		
4	C	215	Total	O	0	0
			215	215		
4	D	226	Total	O	0	0
			226	226		

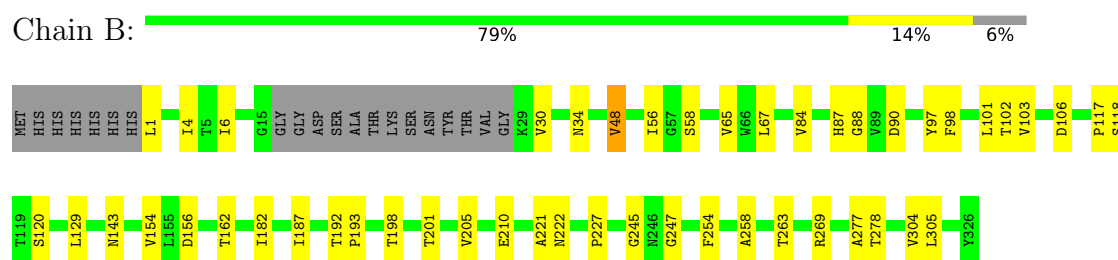
3 Residue-property plots

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.

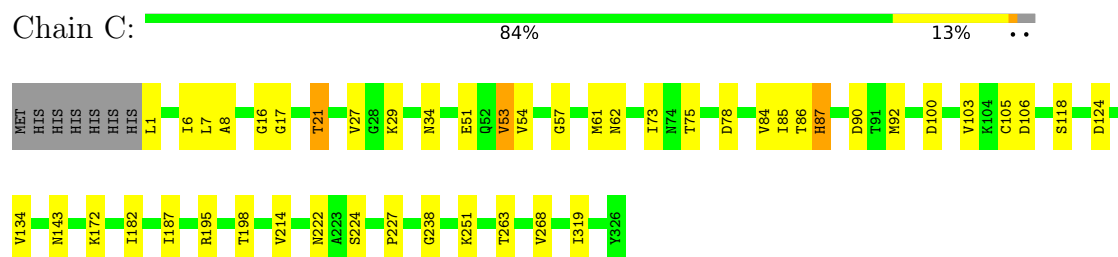
• Molecule 1: L-asparaginase 2



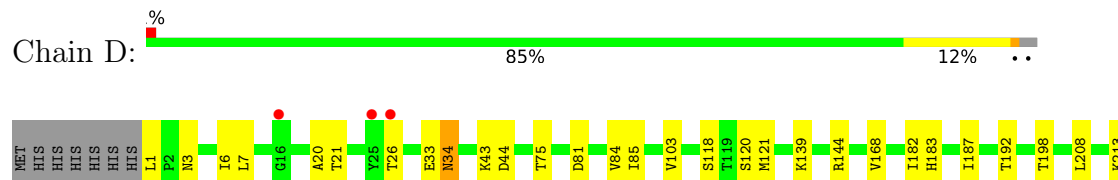
• Molecule 1: L-asparaginase 2

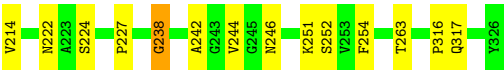


• Molecule 1: L-asparaginase 2



• Molecule 1: L-asparaginase 2





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	151.22Å 62.58Å 140.89Å 90.00° 117.67° 90.00°	Depositor
Resolution (Å)	26.55 – 2.05 26.55 – 2.05	Depositor EDS
% Data completeness (in resolution range)	93.3 (26.55-2.05) 93.3 (26.55-2.05)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.58 (at 2.04Å)	Xtriage
Refinement program	REFMAC 5.8.0253	Depositor
R, R_{free}	0.152 , 0.201 0.162 , 0.209	Depositor DCC
R_{free} test set	3396 reflections (4.62%)	wwPDB-VP
Wilson B-factor (Å ²)	26.4	Xtriage
Anisotropy	0.068	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 31.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	10373	wwPDB-VP
Average B, all atoms (Å ²)	30.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.29% 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: CIT

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	1.29	8/2466 (0.3%)	1.50	11/3360 (0.3%)
1	B	1.30	9/2374 (0.4%)	1.51	11/3235 (0.3%)
1	C	1.28	8/2466 (0.3%)	1.45	14/3360 (0.4%)
1	D	1.30	6/2458 (0.2%)	1.42	6/3349 (0.2%)
All	All	1.29	31/9764 (0.3%)	1.47	42/13304 (0.3%)

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	B	0	1

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	87	HIS	CE1-NE2	7.88	1.40	1.32
1	D	238	GLY	C-O	7.58	1.32	1.24
1	A	87	HIS	CE1-NE2	7.54	1.40	1.32
1	A	65	VAL	C-O	7.45	1.33	1.24
1	C	106	ASP	C-O	6.92	1.33	1.23
1	B	56	ILE	C-O	6.72	1.30	1.23
1	A	132	ALA	C-O	6.67	1.32	1.24
1	C	195	ARG	C-O	-6.52	1.16	1.23
1	C	268	VAL	C-O	6.44	1.31	1.24
1	A	269	ARG	C-O	6.39	1.31	1.24
1	A	128	ASN	C-O	6.35	1.31	1.24
1	D	168	VAL	C-O	-6.05	1.16	1.24
1	C	1	LEU	N-CA	6.03	1.57	1.46
1	A	80	THR	C-O	5.96	1.31	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	62	ASN	C-O	5.92	1.31	1.23
1	B	221	ALA	C-O	5.88	1.30	1.23
1	D	208	LEU	C-O	5.70	1.30	1.23
1	D	246	ASN	C-O	5.67	1.31	1.24
1	B	304	VAL	C-O	5.56	1.30	1.24
1	C	57	GLY	C-O	5.49	1.29	1.23
1	B	129	LEU	C-O	5.46	1.30	1.24
1	C	51	GLU	C-O	5.45	1.30	1.24
1	B	269	ARG	C-O	5.39	1.30	1.24
1	D	316	PRO	C-O	-5.35	1.18	1.24
1	D	144	ARG	C-O	5.34	1.31	1.24
1	B	245	GLY	C-O	5.30	1.31	1.24
1	B	65	VAL	C-O	5.15	1.29	1.24
1	B	154	VAL	C-O	5.10	1.29	1.24
1	B	156	ASP	C-O	5.06	1.30	1.23
1	A	265	THR	C-O	5.04	1.29	1.23
1	A	237	ASP	C-O	5.03	1.30	1.24

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	21	THR	CB-CA-C	7.49	122.49	109.15
1	B	87	HIS	CA-CB-CG	7.37	121.17	113.80
1	A	64	ASN	CA-CB-CG	-6.91	105.69	112.60
1	B	192	THR	CB-CA-C	6.69	119.23	109.20
1	D	183	HIS	CA-CB-CG	-6.67	107.13	113.80
1	B	162	THR	CB-CA-C	6.30	120.62	110.29
1	B	117	PRO	CA-C-N	6.28	128.69	120.28
1	B	117	PRO	C-N-CA	6.28	128.69	120.28
1	D	254	PHE	CA-CB-CG	6.06	119.86	113.80
1	C	134	VAL	N-CA-C	-6.06	104.61	110.42
1	C	124	ASP	CA-CB-CG	5.92	118.52	112.60
1	C	143	ASN	CA-CB-CG	-5.87	106.73	112.60
1	D	242	ALA	CA-C-N	5.87	127.16	120.53
1	D	242	ALA	C-N-CA	5.87	127.16	120.53
1	A	86	THR	CB-CA-C	5.75	119.22	109.84
1	A	17	GLY	CA-C-O	-5.62	116.36	121.47
1	B	305	LEU	CA-C-O	-5.54	114.67	120.55
1	A	273	VAL	CB-CA-C	5.49	116.82	110.89
1	C	105	CYS	CA-C-O	-5.45	114.48	120.69
1	C	17	GLY	CA-C-O	-5.42	115.77	121.57
1	C	21	THR	N-CA-CB	-5.41	102.80	110.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	263	THR	N-CA-C	-5.40	106.64	113.18
1	C	75	THR	CA-CB-OG1	-5.37	101.54	109.60
1	A	100	ASP	CA-CB-CG	5.31	117.91	112.60
1	B	162	THR	CA-CB-OG1	-5.29	101.66	109.60
1	A	131	ASN	CA-C-O	-5.28	114.14	120.10
1	B	254	PHE	CA-CB-CG	5.23	119.03	113.80
1	C	53	VAL	CA-C-O	-5.23	114.66	120.46
1	C	57	GLY	CA-C-O	-5.22	116.81	121.41
1	A	192	THR	CB-CA-C	5.21	117.00	109.45
1	B	193	PRO	CA-C-O	-5.21	115.09	121.03
1	A	325	GLN	CB-CG-CD	-5.18	103.79	112.60
1	A	165	THR	CA-C-O	-5.17	114.25	120.10
1	D	192	THR	CB-CA-C	5.14	117.40	108.91
1	C	54	VAL	CA-C-O	-5.12	116.62	121.64
1	C	319	ILE	N-CA-C	-5.11	105.56	110.72
1	A	87	HIS	CA-CB-CG	5.08	118.88	113.80
1	C	100	ASP	CA-CB-CG	5.06	117.66	112.60
1	D	75	THR	CA-CB-OG1	-5.05	102.02	109.60
1	A	90	ASP	CA-CB-CG	5.02	117.62	112.60
1	B	258	ALA	CA-C-N	5.01	126.95	120.44
1	B	258	ALA	C-N-CA	5.01	126.95	120.44

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	277	ALA	Peptide

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	2429	0	2420	19	0
1	B	2339	0	2337	23	0
1	C	2429	0	2420	18	0
1	D	2422	0	2413	19	0
2	A	9	0	5	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	9	0	5	0	0
2	C	9	0	5	0	0
2	D	9	0	5	0	0
3	A	13	0	5	0	0
3	C	13	0	5	1	0
3	D	13	0	5	1	0
4	A	125	0	0	4	0
4	B	113	0	0	3	0
4	C	215	0	0	2	0
4	D	226	0	0	5	0
All	All	10373	0	9625	73	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 (73) 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:D:34:ASN:HB2	4:D:702:HOH:O	1.37	1.22
1:D:34:ASN:HD22	1:D:34:ASN:C	1.85	0.83
1:C:78:ASP:HB2	4:C:641:HOH:O	1.78	0.83
1:A:321:GLN:HG2	4:A:623:HOH:O	1.80	0.81
3:C:402:CIT:O3	1:D:224:SER:OG	2.02	0.71
1:A:314:LYS:CE	4:A:551:HOH:O	2.41	0.68
1:A:99:LEU:O	1:A:103:VAL:HG13	1.93	0.68
1:B:30:VAL:CG1	1:B:34:ASN:HD22	2.09	0.65
1:A:314:LYS:HE2	4:A:551:HOH:O	1.97	0.65
1:C:251:LYS:HB3	4:D:693:HOH:O	1.97	0.63
1:B:30:VAL:HG13	1:B:34:ASN:HD22	1.63	0.63
1:D:263:THR:O	1:D:263:THR:HG22	2.02	0.59
1:D:103:VAL:O	1:D:198:THR:HA	2.05	0.57
1:B:263:THR:HG22	1:B:263:THR:O	2.05	0.56
1:D:21:THR:HG22	1:D:121:MET:CE	2.35	0.56
1:B:67:LEU:CD2	1:B:205:VAL:CG2	2.83	0.56
1:C:227:PRO:HB3	1:D:227:PRO:HB3	1.87	0.56
1:B:4:ILE:O	1:B:48:VAL:HA	2.08	0.54
1:A:103:VAL:O	1:A:198:THR:HA	2.08	0.54
1:B:247:GLY:HA3	1:B:278:THR:HG23	1.89	0.53
1:C:214:VAL:HA	1:C:238:GLY:O	2.08	0.53
1:C:172:LYS:NZ	4:C:508:HOH:O	2.40	0.53
1:B:182:ILE:HG12	1:B:187:ILE:HG12	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:118:SER:HB3	4:D:577:HOH:O	2.10	0.52
1:A:182:ILE:HG12	1:A:187:ILE:HG12	1.92	0.52
1:D:182:ILE:HG12	1:D:187:ILE:HG12	1.92	0.51
1:C:61:MET:HE3	1:C:87:HIS:NE2	2.25	0.51
1:A:61:MET:HE3	1:A:87:HIS:NE2	2.26	0.51
1:A:150:MET:HG3	1:A:171:PHE:CD2	2.46	0.50
1:C:90:ASP:HB3	1:D:244:VAL:HG23	1.94	0.50
1:B:58:SER:HB3	1:B:88:GLY:HA3	1.94	0.48
1:B:67:LEU:HD23	1:B:205:VAL:HG21	1.96	0.48
1:B:1:LEU:N	4:B:506:HOH:O	2.46	0.48
1:B:103:VAL:O	1:B:198:THR:HA	2.14	0.48
1:A:244:VAL:HG23	1:B:90:ASP:HB3	1.95	0.47
1:C:73:ILE:HD11	1:C:85:ILE:HD11	1.97	0.47
1:C:90:ASP:HB3	1:D:244:VAL:CG2	2.45	0.47
1:B:67:LEU:CD2	1:B:205:VAL:HG22	2.44	0.46
1:B:97:TYR:CZ	1:B:101:LEU:HD11	2.51	0.46
1:A:84:VAL:HA	1:A:110:VAL:O	2.16	0.45
1:A:244:VAL:CG2	1:B:90:ASP:HB3	2.46	0.45
1:D:21:THR:HG22	1:D:121:MET:HE1	1.97	0.45
1:B:48:VAL:HG13	4:B:504:HOH:O	2.15	0.45
1:C:224:SER:OG	3:D:402:CIT:O3	2.23	0.45
1:D:7:LEU:O	1:D:85:ILE:HA	2.17	0.45
1:A:8:ALA:HA	1:A:86:THR:OG1	2.17	0.45
1:B:67:LEU:HD23	1:B:205:VAL:CG2	2.47	0.45
1:B:6:ILE:HA	1:B:84:VAL:O	2.17	0.45
1:D:34:ASN:C	1:D:34:ASN:ND2	2.59	0.44
1:B:106:ASP:HB3	1:B:143:ASN:ND2	2.33	0.44
1:A:227:PRO:HB3	1:B:227:PRO:HB3	2.00	0.44
1:C:8:ALA:HA	1:C:86:THR:OG1	2.18	0.43
1:C:27:VAL:HG22	4:D:586:HOH:O	2.19	0.43
1:C:16:GLY:HA3	1:C:29:LYS:HD2	2.01	0.43
1:C:182:ILE:HG12	1:C:187:ILE:HG12	2.01	0.42
1:D:3:ASN:O	1:D:81:ASP:HB2	2.20	0.42
1:C:7:LEU:O	1:C:85:ILE:HA	2.19	0.42
1:C:103:VAL:O	1:C:198:THR:HA	2.19	0.42
1:A:12:THR:OG1	2:A:401:ASN:CG	2.62	0.42
1:D:214:VAL:HA	1:D:238:GLY:O	2.19	0.42
1:D:6:ILE:HA	1:D:84:VAL:O	2.20	0.42
1:A:184:ASN:O	1:A:184:ASN:CG	2.62	0.41
1:A:202:PRO:HB3	4:A:624:HOH:O	2.19	0.41
1:A:220:TYR:CE2	1:A:223:ALA:HA	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:20:ALA:HA	1:D:120:SER:HA	2.02	0.41
1:A:225:ASP:O	1:A:229:LYS:HG3	2.20	0.41
1:A:190:GLN:C	1:A:191:ARG:HG2	2.45	0.41
1:B:30:VAL:HG11	1:B:34:ASN:HD22	1.83	0.41
1:C:6:ILE:HA	1:C:84:VAL:O	2.21	0.40
1:C:16:GLY:CA	1:C:29:LYS:HD2	2.51	0.40
1:B:98:PHE:CZ	1:B:102:THR:HG21	2.57	0.40
1:B:120:SER:HB3	4:B:526:HOH:O	2.22	0.40
1:D:1:LEU:N	4:D:525:HOH:O	2.55	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	324/333 (97%)	317 (98%)	7 (2%)	0	100	100
1	B	309/333 (93%)	302 (98%)	7 (2%)	0	100	100
1	C	324/333 (97%)	318 (98%)	6 (2%)	0	100	100
1	D	324/333 (97%)	317 (98%)	7 (2%)	0	100	100
All	All	1281/1332 (96%)	1254 (98%)	27 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	266/273 (97%)	255 (96%)	11 (4%)	27	21
1	B	257/273 (94%)	252 (98%)	5 (2%)	50	50
1	C	266/273 (97%)	260 (98%)	6 (2%)	44	42
1	D	265/273 (97%)	254 (96%)	11 (4%)	26	20
All	All	1054/1092 (96%)	1021 (97%)	33 (3%)	35	30

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	21	THR
1	A	34	ASN
1	A	103	VAL
1	A	139	LYS
1	A	201	THR
1	A	208	LEU
1	A	211	LEU
1	A	222	ASN
1	A	263	THR
1	A	314	LYS
1	A	317	GLN
1	B	48	VAL
1	B	118	SER
1	B	201	THR
1	B	210	GLU
1	B	222	ASN
1	C	21	THR
1	C	34	ASN
1	C	53	VAL
1	C	92	MET
1	C	118	SER
1	C	222	ASN
1	D	26	THR
1	D	33	GLU
1	D	34	ASN
1	D	43	LYS
1	D	44	ASP
1	D	139	LYS
1	D	213	LYS
1	D	222	ASN
1	D	251	LYS
1	D	252	SER
1	D	317	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	183	HIS
1	A	190	GLN
1	A	312	GLN
1	A	321	GLN
1	B	34	ASN
1	B	37	ASN
1	B	64	ASN
1	B	131	ASN
1	B	143	ASN
1	B	151	ASN
1	B	183	HIS
1	B	318	GLN
1	C	24	ASN
1	C	34	ASN
1	C	183	HIS
1	C	318	GLN
1	D	24	ASN
1	D	34	ASN
1	D	131	ASN
1	D	151	ASN
1	D	184	ASN
1	D	248	ASN
1	D	317	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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

7 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	ASN	B	401	-	7,8,8	0.52	0	6,10,10	0.82	0
2	ASN	D	401	-	7,8,8	1.01	1 (14%)	6,10,10	0.50	0
3	CIT	D	402	-	12,12,12	1.44	2 (16%)	17,17,17	1.84	4 (23%)
2	ASN	C	401	-	7,8,8	0.62	0	6,10,10	0.51	0
3	CIT	A	402	-	12,12,12	1.81	3 (25%)	17,17,17	1.18	2 (11%)
3	CIT	C	402	-	12,12,12	1.97	1 (8%)	17,17,17	1.70	4 (23%)
2	ASN	A	401	-	7,8,8	0.87	0	6,10,10	0.45	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	ASN	B	401	-	-	2/8/8/8	-
2	ASN	D	401	-	-	4/8/8/8	-
3	CIT	D	402	-	-	14/16/16/16	-
2	ASN	C	401	-	-	2/8/8/8	-
3	CIT	A	402	-	-	7/16/16/16	-
3	CIT	C	402	-	-	7/16/16/16	-
2	ASN	A	401	-	-	4/8/8/8	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	402	CIT	C3-C6	5.90	1.59	1.53
3	A	402	CIT	C3-C6	4.38	1.58	1.53
3	D	402	CIT	C3-C6	2.90	1.56	1.53
2	D	401	ASN	OXT-C	-2.58	1.22	1.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	402	CIT	O3-C5	2.32	1.29	1.22
3	D	402	CIT	O1-C1	2.23	1.29	1.22
3	A	402	CIT	O1-C1	2.14	1.29	1.22

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	402	CIT	O6-C6-C3	3.71	120.27	113.14
3	D	402	CIT	O3-C5-C4	-3.69	112.49	122.95
3	C	402	CIT	O3-C5-C4	-3.67	112.56	122.95
3	D	402	CIT	O5-C6-C3	-3.35	115.60	122.09
3	C	402	CIT	O4-C5-C4	3.20	124.49	114.35
3	A	402	CIT	O6-C6-C3	3.08	119.05	113.14
3	D	402	CIT	O4-C5-C4	2.76	123.08	114.35
3	C	402	CIT	O6-C6-C3	2.55	118.02	113.14
3	C	402	CIT	O2-C1-C2	2.23	121.42	114.35
3	A	402	CIT	O5-C6-C3	-2.05	118.12	122.09

There are no chirality outliers.

All (40) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	ASN	O-C-CA-N
2	B	401	ASN	O-C-CA-N
2	C	401	ASN	O-C-CA-N
2	D	401	ASN	O-C-CA-N
3	A	402	CIT	C1-C2-C3-O7
3	A	402	CIT	C1-C2-C3-C4
3	A	402	CIT	C1-C2-C3-C6
3	A	402	CIT	C2-C3-C6-O5
3	A	402	CIT	C2-C3-C6-O6
3	A	402	CIT	O7-C3-C6-O5
3	A	402	CIT	O7-C3-C6-O6
3	C	402	CIT	O7-C3-C4-C5
3	C	402	CIT	C6-C3-C4-C5
3	D	402	CIT	C2-C3-C4-C5
3	D	402	CIT	O7-C3-C4-C5
3	D	402	CIT	C6-C3-C4-C5
3	D	402	CIT	C2-C3-C6-O6
2	A	401	ASN	OXT-C-CA-N
2	D	401	ASN	OXT-C-CA-N
3	C	402	CIT	C2-C3-C4-C5

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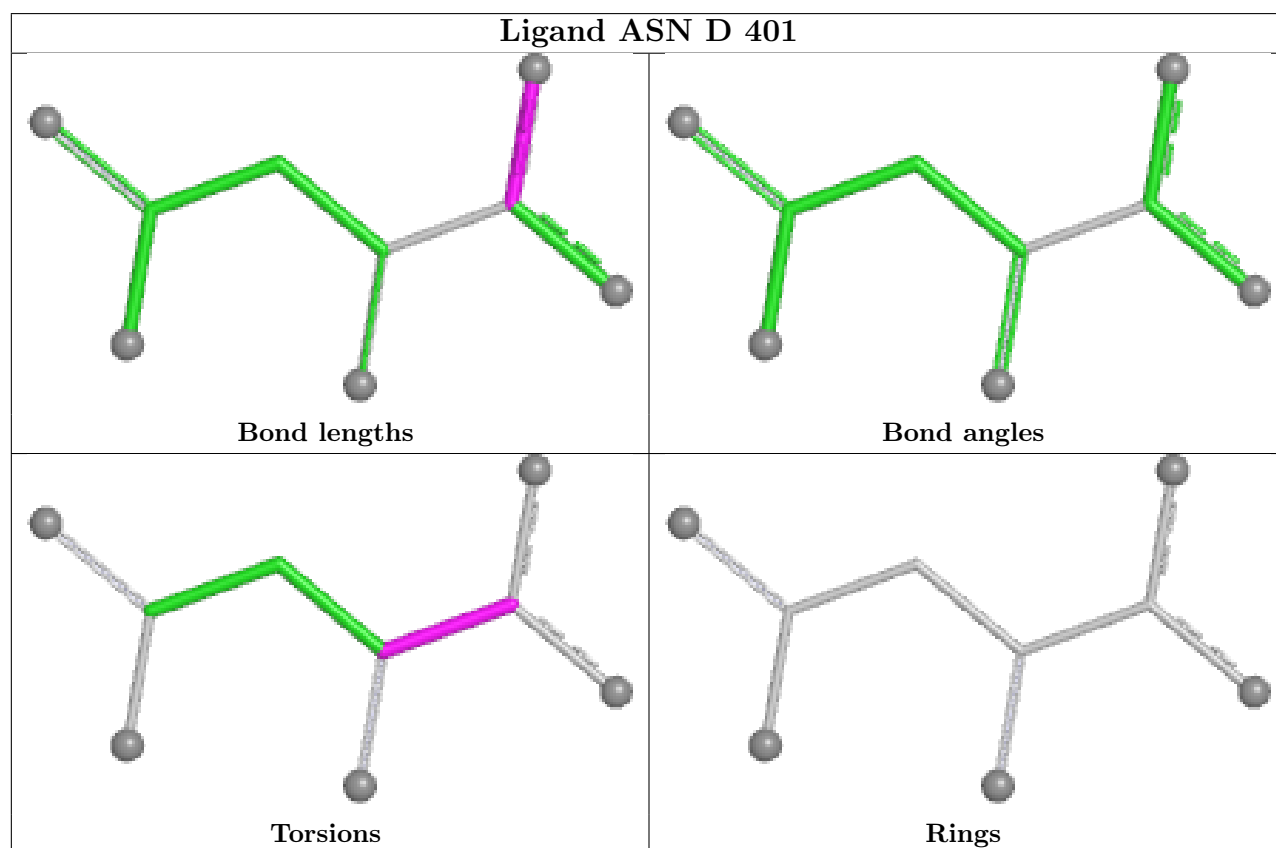
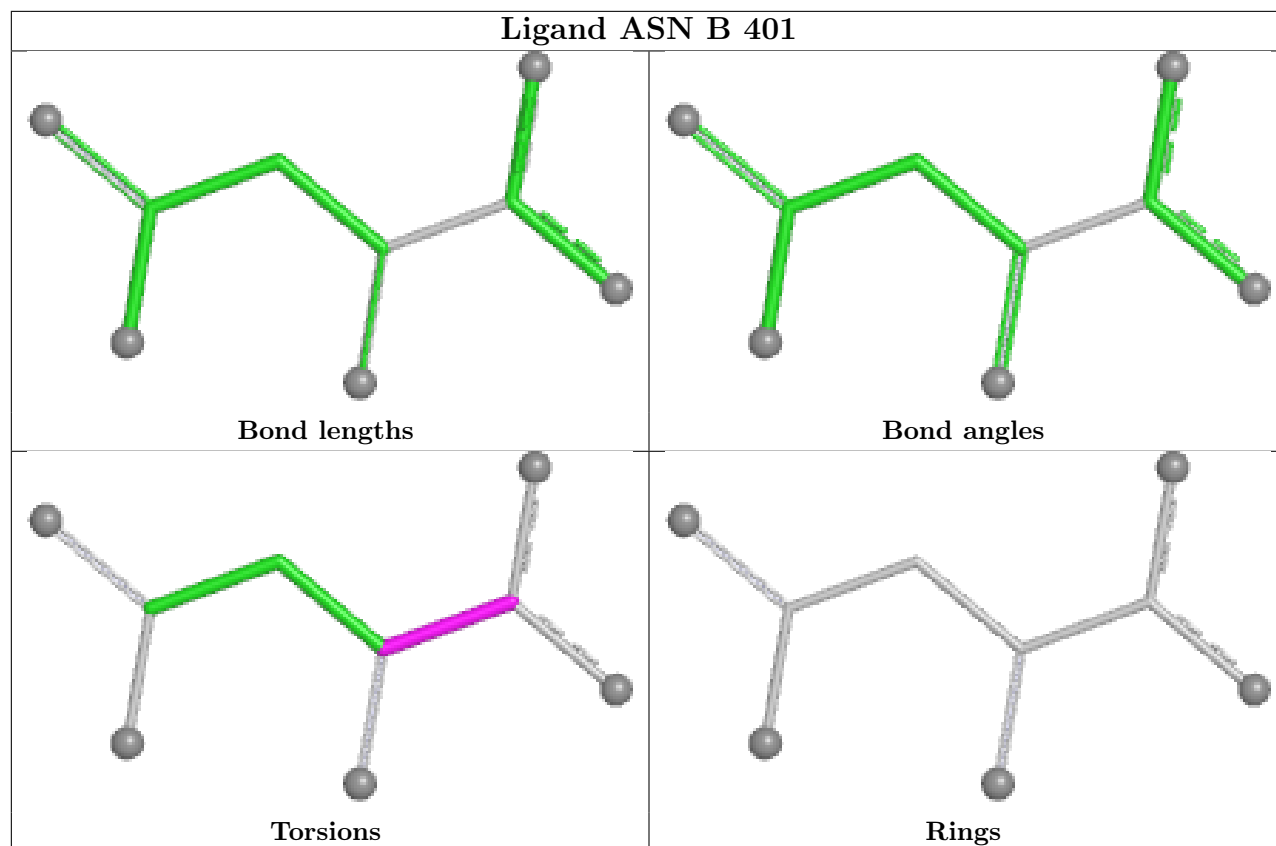
Mol	Chain	Res	Type	Atoms
2	C	401	ASN	OXT-C-CA-N
2	B	401	ASN	OXT-C-CA-N
3	D	402	CIT	C2-C3-C6-O5
3	D	402	CIT	C1-C2-C3-O7
3	D	402	CIT	C1-C2-C3-C6
3	D	402	CIT	C3-C4-C5-O4
3	C	402	CIT	O1-C1-C2-C3
3	D	402	CIT	C3-C4-C5-O3
3	C	402	CIT	O2-C1-C2-C3
3	D	402	CIT	C1-C2-C3-C4
3	D	402	CIT	C4-C3-C6-O6
2	A	401	ASN	O-C-CA-CB
2	A	401	ASN	OXT-C-CA-CB
2	D	401	ASN	OXT-C-CA-CB
3	D	402	CIT	O7-C3-C6-O6
2	D	401	ASN	O-C-CA-CB
3	D	402	CIT	C4-C3-C6-O5
3	C	402	CIT	C3-C4-C5-O3
3	D	402	CIT	O7-C3-C6-O5
3	C	402	CIT	C3-C4-C5-O4

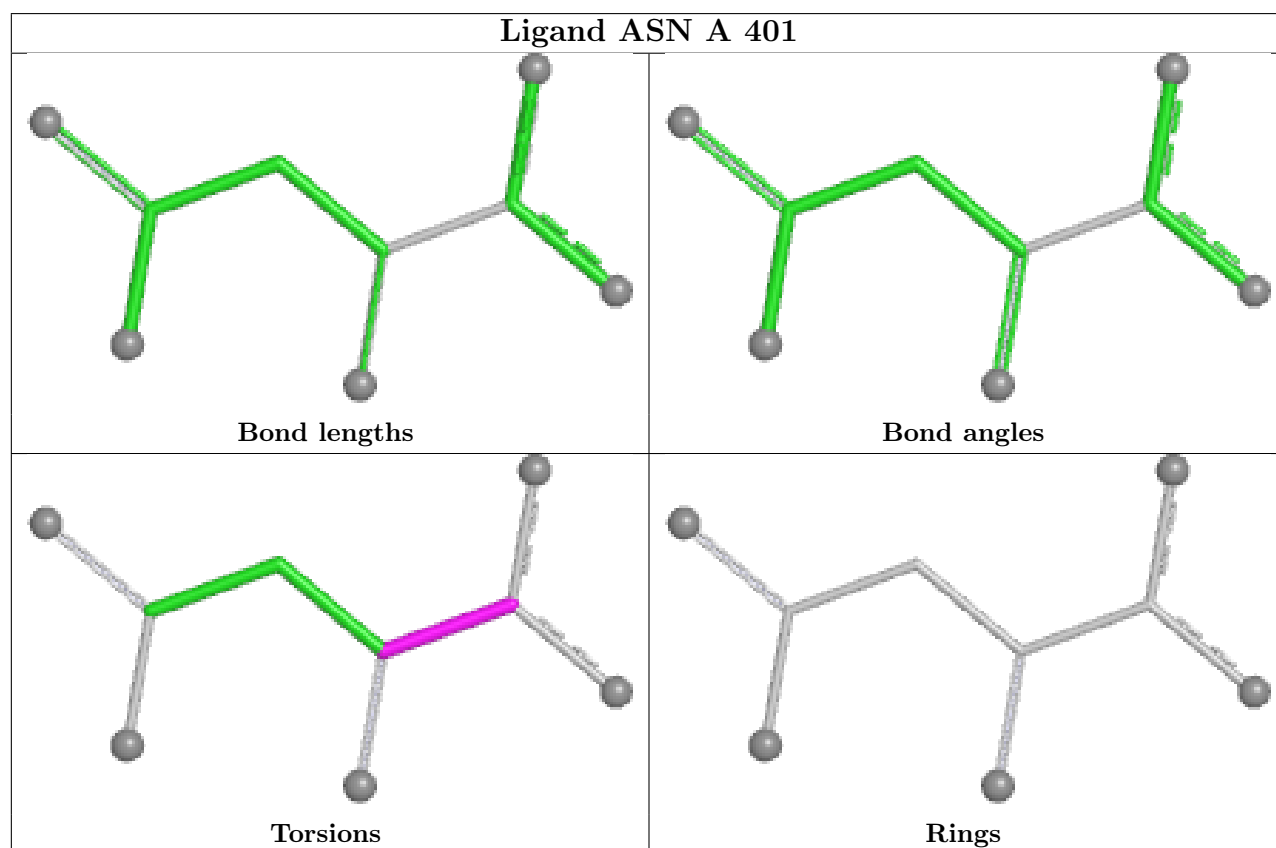
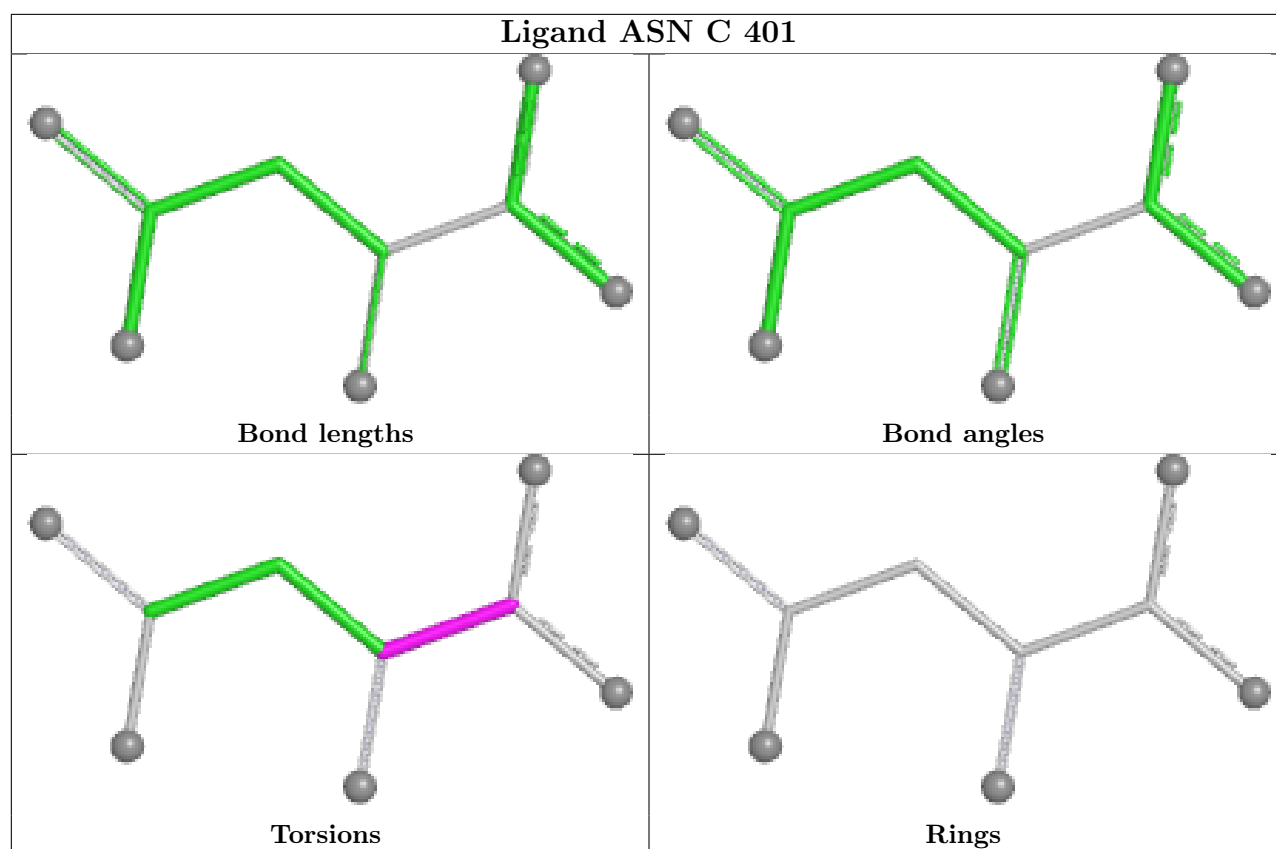
There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	402	CIT	1	0
3	C	402	CIT	1	0
2	A	401	ASN	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.





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å²)	Q<0.9	
1	A	326/333 (97%)	-0.37	0	100	100	21, 31, 53, 80	0
1	B	313/333 (93%)	-0.33	0	100	100	23, 33, 54, 86	0
1	C	326/333 (97%)	-0.65	0	100	100	16, 23, 39, 72	0
1	D	326/333 (97%)	-0.61	3 (0%)	81	83	15, 22, 49, 82	0
All	All	1291/1332 (96%)	-0.49	3 (0%)	91	93	15, 28, 50, 86	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	25	TYR	3.3
1	D	26	THR	3.2
1	D	16	GLY	2.5

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](#)

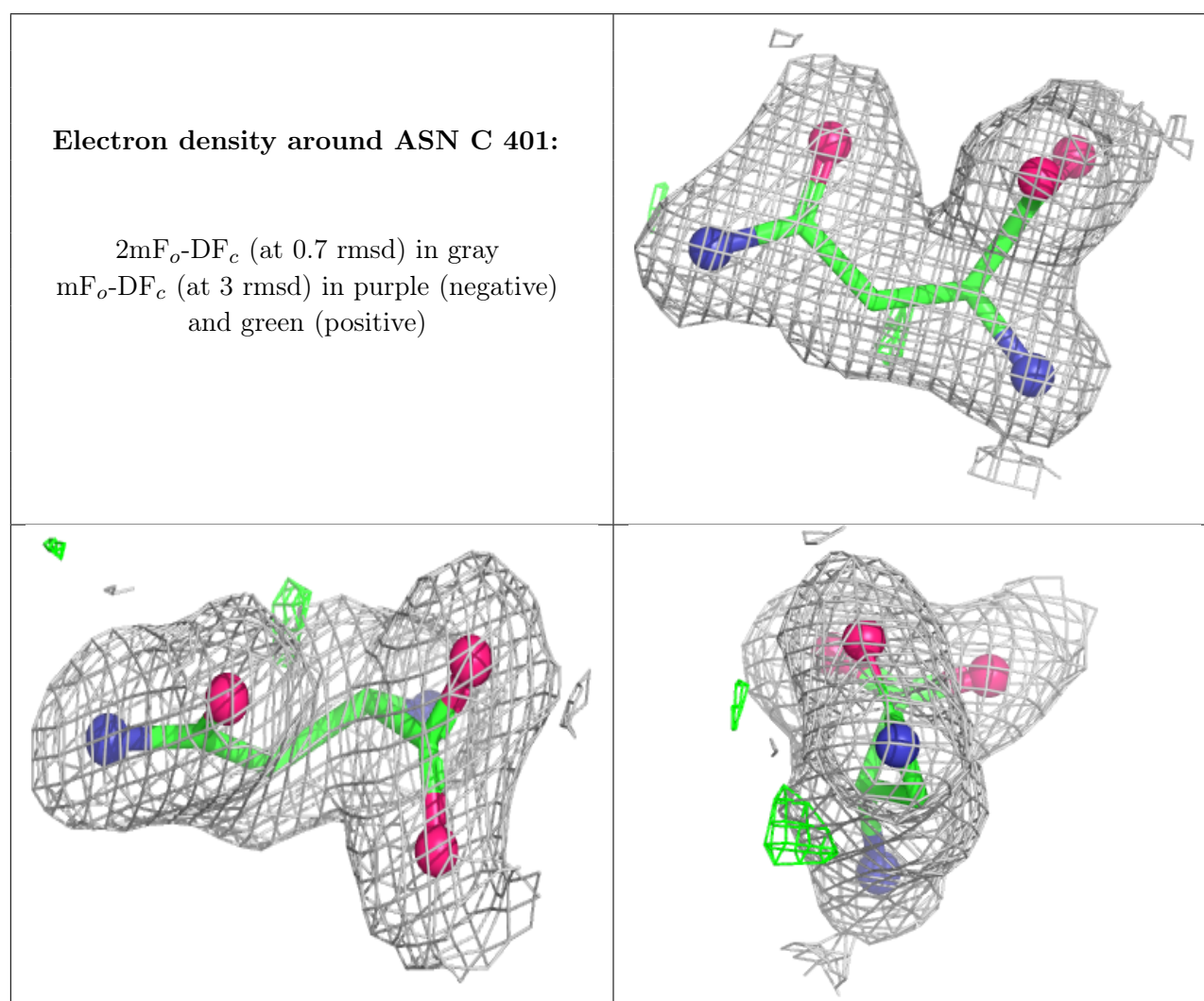
There are no oligosaccharides in this entry.

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.

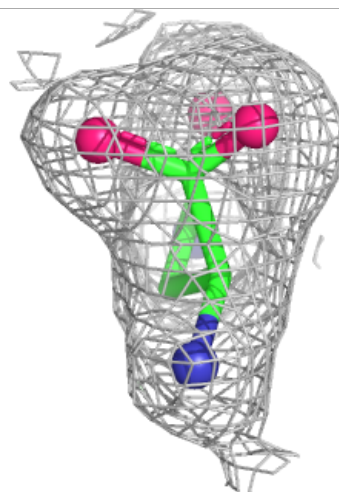
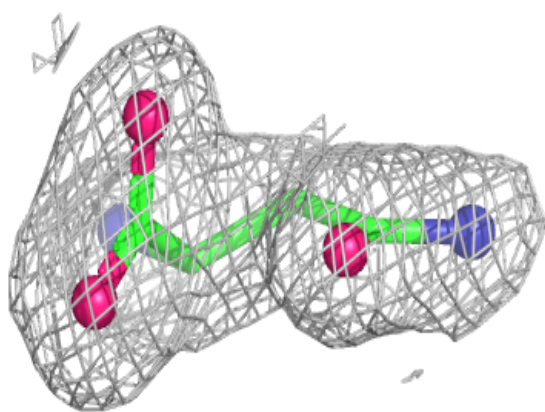
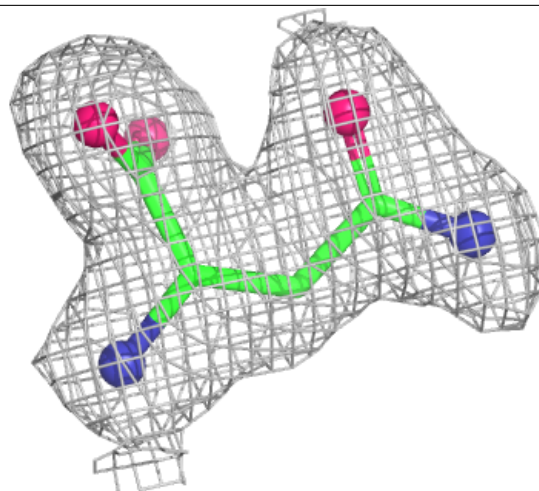
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	CIT	C	402	13/13	0.79	0.11	38,58,64,69	0
3	CIT	D	402	13/13	0.81	0.10	36,50,61,63	0
3	CIT	A	402	13/13	0.83	0.08	47,59,68,71	0
2	ASN	C	401	9/9	0.96	0.05	16,18,21,24	0
2	ASN	B	401	9/9	0.97	0.05	23,27,31,33	0
2	ASN	A	401	9/9	0.97	0.05	20,25,28,28	0
2	ASN	D	401	9/9	0.97	0.05	17,19,21,21	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.



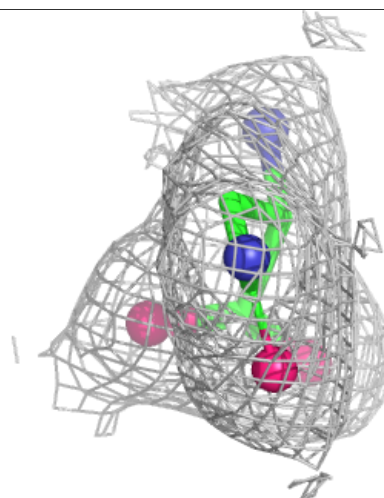
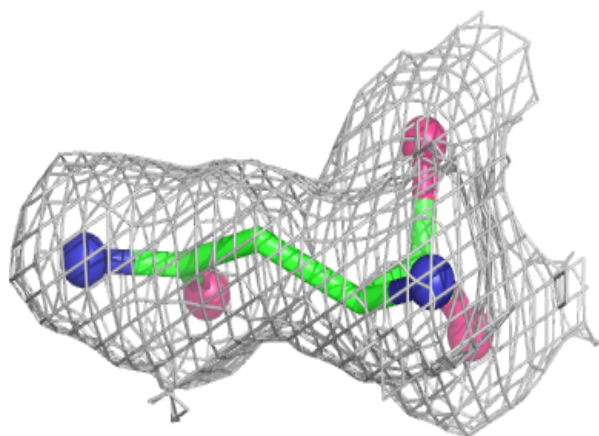
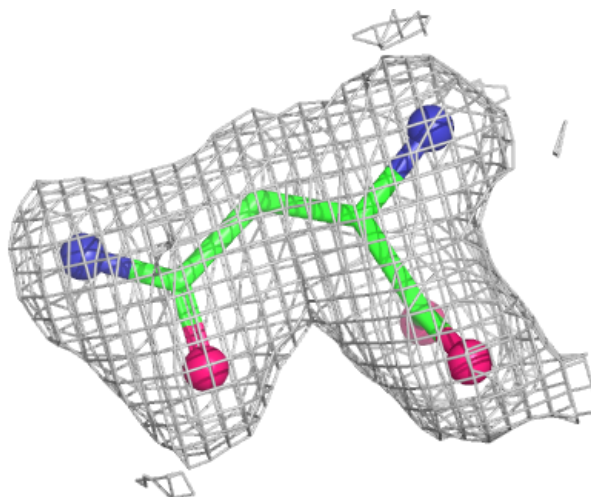
Electron density around ASN B 401:

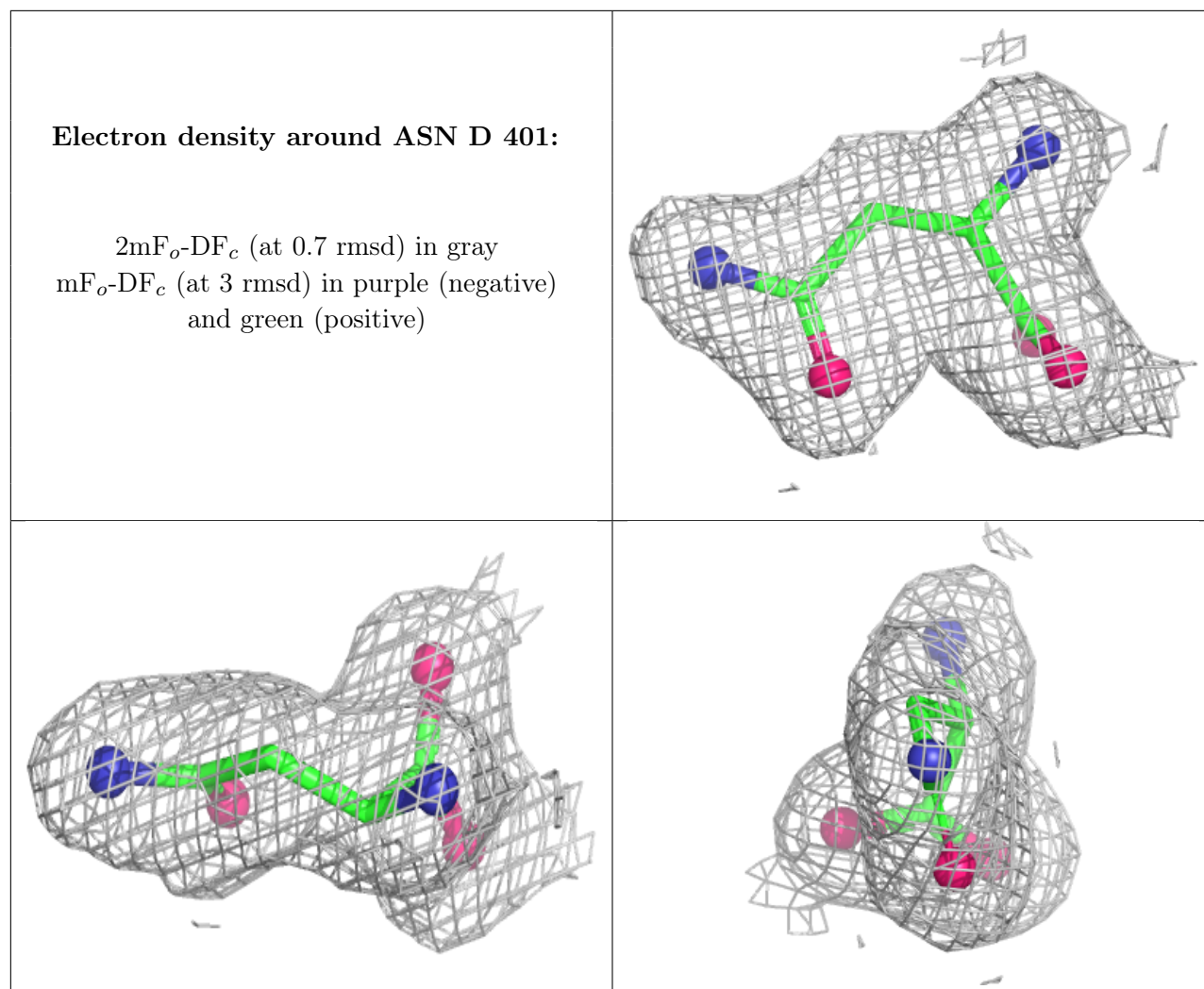
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around ASN 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)





6.5 Other polymers ⓘ

There are no such residues in this entry.