



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 07:45 AM UTC

PDB ID : 9DAF / pdb_00009daf
Title : L-asparaginase II (EcA2-K12)
Authors : de Sa Ribeiro, F.; Costa, A.C.; Araujo, T.S.; Almeida, M.S.; Lima, L.M.T.R.
Deposited on : 2024-08-22
Resolution : 2.35 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

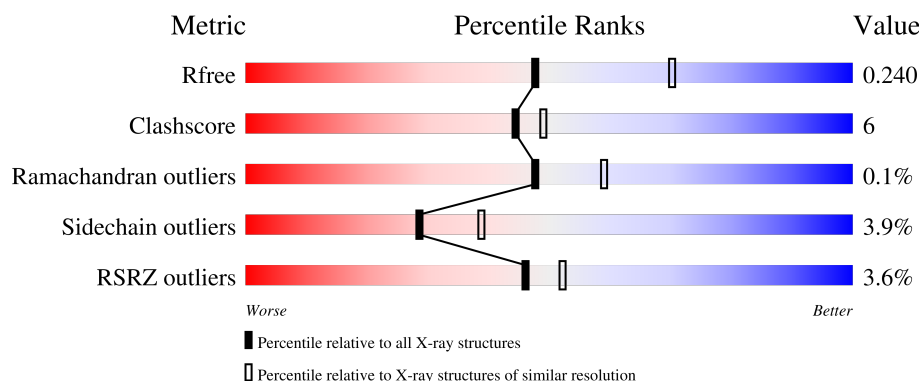
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.35 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	1596 (2.36-2.36)
Clashscore	190562	1663 (2.36-2.36)
Ramachandran outliers	187476	1646 (2.36-2.36)
Sidechain outliers	187428	1646 (2.36-2.36)
RSRZ outliers	180081	1598 (2.36-2.36)

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	326	<div> <div>4%</div> <div>86%</div> <div>13%</div> <div>.</div> </div>
1	B	326	<div> <div>2%</div> <div>79%</div> <div>20%</div> <div>.</div> </div>
1	C	326	<div> <div>4%</div> <div>82%</div> <div>15%</div> <div>..</div> </div>
1	D	326	<div> <div>4%</div> <div>87%</div> <div>11%</div> <div>.</div> </div>

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
4	PEG	B	403	-	-	X	-
4	PEG	C	402	-	-	X	-

2 Entry composition [i](#)

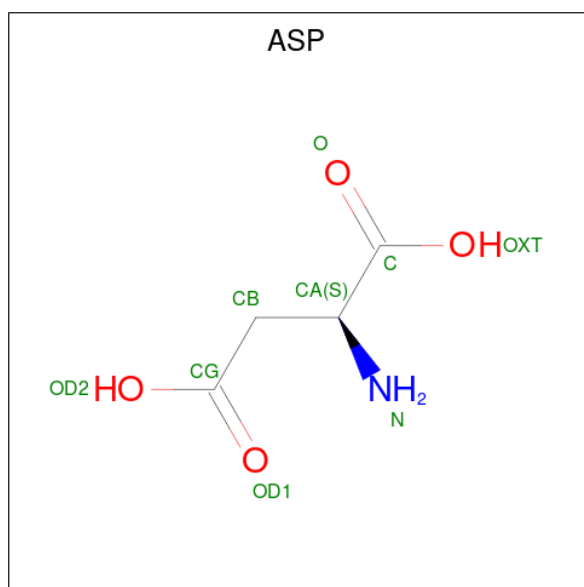
There are 5 unique types of molecules in this entry. The entry contains 10253 atoms, of which 0 are hydrogens and 0 are deuteriums.

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
			2431	1517	415	491	8			
1	B	326	Total	C	N	O	S	0	0	0
			2431	1517	415	491	8			
1	C	326	Total	C	N	O	S	0	0	0
			2431	1517	415	491	8			
1	D	326	Total	C	N	O	S	0	1	0
			2437	1522	416	491	8			

- Molecule 2 is ASPARTIC ACID (CCD ID: ASP) (formula: $C_4H_7NO_4$) (labeled as "Ligand of Interest" by depositor).



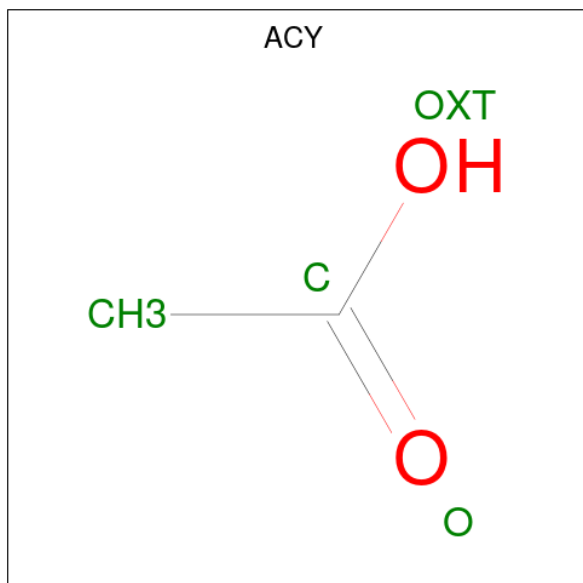
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			9	4	1	4		
2	B	1	Total	C	N	O	0	0
			9	4	1	4		

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

- Molecule 3 is ACETIC ACID (CCD ID: ACY) (formula: C₂H₄O₂) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 4 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: C₄H₁₀O₃) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	O	0	0
			7	4	3		
4	B	1	Total	C	O	0	0
			7	4	3		
4	C	1	Total	C	O	0	0
			7	4	3		

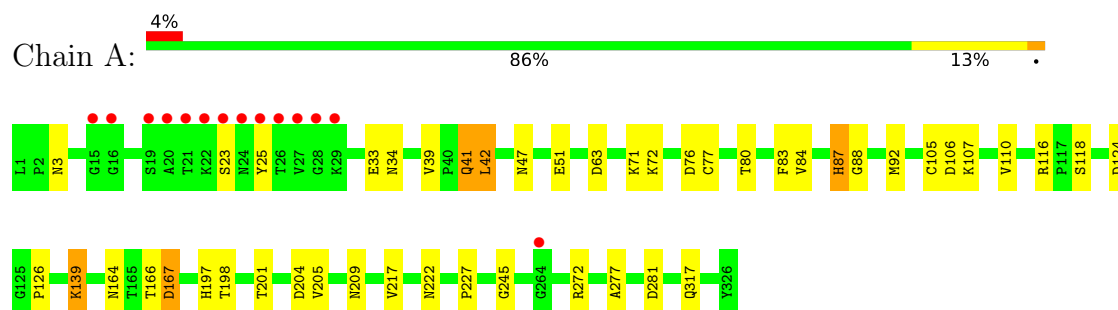
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	125	Total	O	0	0
			125	125		
5	B	87	Total	O	0	0
			87	87		
5	C	127	Total	O	0	0
			127	127		
5	D	123	Total	O	0	0
			123	123		

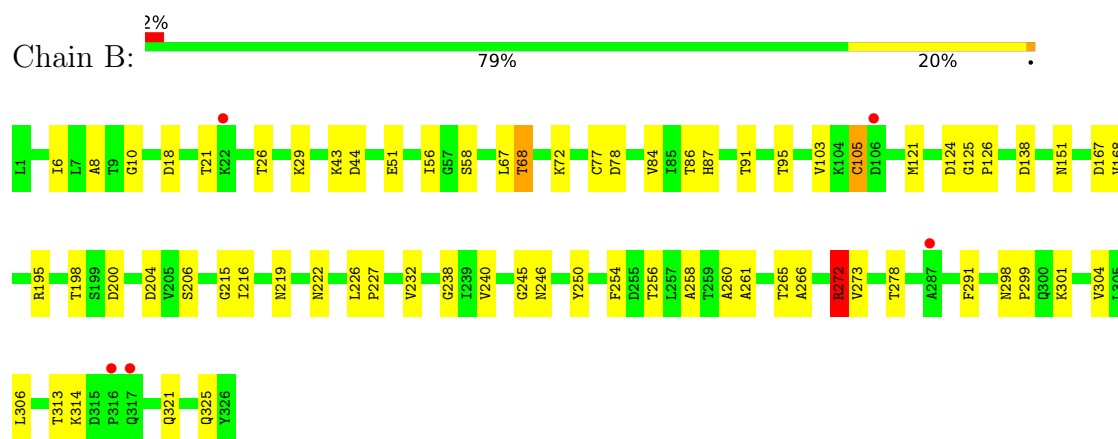
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

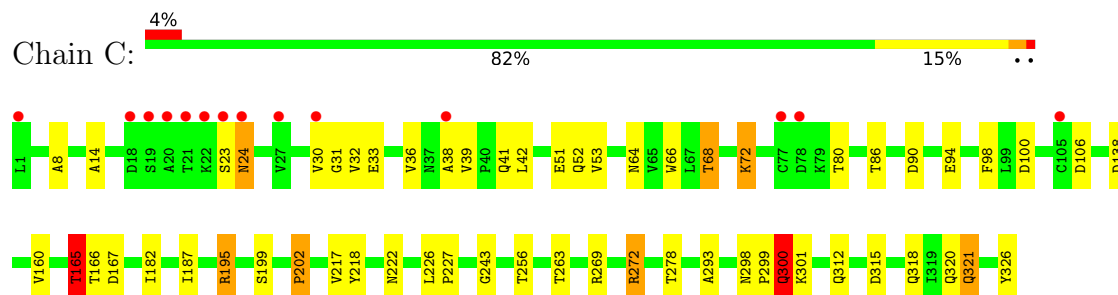
• Molecule 1: L-asparaginase 2



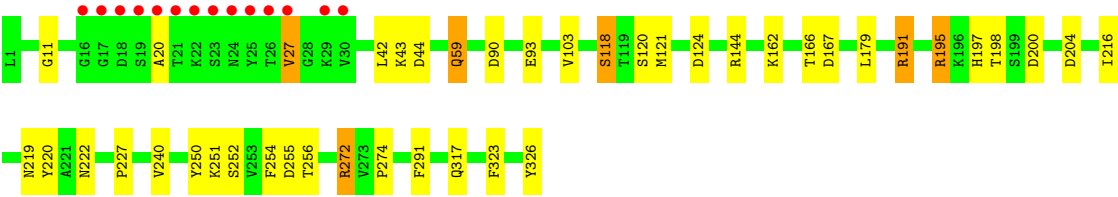
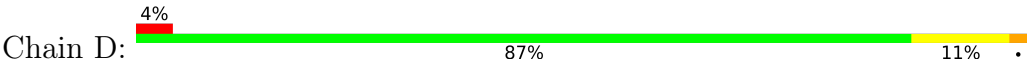
• Molecule 1: L-asparaginase 2



• Molecule 1: L-asparaginase 2



• Molecule 1: L-asparaginase 2



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	59.75Å 123.05Å 79.07Å 90.00° 108.98° 90.00°	Depositor
Resolution (Å)	47.51 – 2.35 47.51 – 2.35	Depositor EDS
% Data completeness (in resolution range)	99.9 (47.51-2.35) 99.9 (47.51-2.35)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.75 (at 2.34Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.173 , 0.249 (Not available) , 0.240	Depositor DCC
R_{free} test set	2249 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	17.5	Xtriage
Anisotropy	0.095	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 23.2	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	0.94	EDS
Total number of atoms	10253	wwPDB-VP
Average B, all atoms (Å ²)	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.19% 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: PEG, ACY

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	0.64	0/2468	1.16	6/3361 (0.2%)
1	B	0.61	0/2468	1.22	14/3361 (0.4%)
1	C	0.63	0/2468	1.21	12/3361 (0.4%)
1	D	0.63	0/2477	1.18	10/3372 (0.3%)
All	All	0.63	0/9881	1.19	42/13455 (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
1	C	0	3
1	D	0	3
All	All	0	7

There are no bond length outliers.

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	300	GLN	CB-CA-C	-9.63	94.31	110.68
1	B	167	ASP	CA-CB-CG	8.95	121.55	112.60
1	D	254	PHE	CA-CB-CG	7.67	121.47	113.80
1	C	165	THR	N-CA-CB	-7.56	98.99	110.33
1	B	124	ASP	CA-CB-CG	7.49	120.09	112.60
1	B	325	GLN	CB-CA-C	7.29	118.97	109.28
1	B	87	HIS	CA-CB-CG	7.27	121.07	113.80
1	B	291	PHE	CA-CB-CG	6.90	120.70	113.80
1	C	256	THR	CA-CB-OG1	-6.89	99.27	109.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	167	ASP	CA-CB-CG	6.81	119.41	112.60
1	D	200	ASP	CA-CB-CG	6.78	119.38	112.60
1	B	304	VAL	N-CA-CB	6.55	118.21	110.55
1	A	209	ASN	CA-CB-CG	-6.28	106.32	112.60
1	B	256	THR	CA-CB-OG1	-6.17	100.34	109.60
1	C	100	ASP	CA-CB-CG	6.00	118.60	112.60
1	A	63	ASP	CA-CB-CG	5.95	118.55	112.60
1	C	202	PRO	N-CA-C	5.82	120.73	114.68
1	D	274	PRO	N-CA-C	5.82	121.51	113.65
1	D	256	THR	CA-CB-OG1	-5.72	101.02	109.60
1	D	167	ASP	CA-CB-CG	5.68	118.28	112.60
1	B	272	ARG	NE-CZ-NH2	5.65	124.28	119.20
1	C	321	GLN	CB-CA-C	5.58	120.06	110.79
1	B	325	GLN	N-CA-CB	-5.56	102.40	111.18
1	D	44	ASP	CA-CB-CG	5.53	118.13	112.60
1	C	315	ASP	CA-CB-CG	5.47	118.07	112.60
1	D	272	ARG	NE-CZ-NH2	5.40	124.06	119.20
1	B	95	THR	CA-CB-OG1	5.39	117.68	109.60
1	C	24	ASN	CB-CA-C	5.37	118.88	110.19
1	D	124	ASP	CA-CB-CG	5.33	117.93	112.60
1	C	138	ASP	CA-CB-CG	5.32	117.92	112.60
1	A	124	ASP	CA-CB-CG	5.32	117.92	112.60
1	A	167	ASP	CA-CB-CG	5.29	117.89	112.60
1	D	291	PHE	CA-CB-CG	5.25	119.06	113.80
1	B	68	THR	CA-CB-OG1	-5.25	101.72	109.60
1	B	254	PHE	CA-CB-CG	5.25	119.05	113.80
1	D	204	ASP	CA-CB-CG	5.22	117.82	112.60
1	C	51	GLU	CB-CA-C	-5.16	100.36	109.70
1	C	72	LYS	CB-CA-C	-5.16	102.72	110.92
1	A	83	PHE	CA-CB-CG	5.14	118.94	113.80
1	A	87	HIS	CA-CB-CG	5.12	118.92	113.80
1	B	138	ASP	CA-CB-CG	5.04	117.64	112.60
1	B	44	ASP	CA-CB-CG	5.01	117.61	112.60

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	195	ARG	Sidechain
1	C	195	ARG	Sidechain
1	C	23	SER	Peptide
1	C	272	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	D	144	ARG	Sidechain
1	D	191	ARG	Sidechain
1	D	195	ARG	Sidechain

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	2431	0	2426	29	0
1	B	2431	0	2426	37	1
1	C	2431	0	2426	37	0
1	D	2437	0	2439	22	1
2	A	9	0	3	0	0
2	B	9	0	3	0	0
2	C	9	0	3	0	0
2	D	9	0	3	0	0
3	A	4	0	3	0	0
4	B	14	0	20	13	0
4	C	7	0	10	7	0
5	A	125	0	0	2	0
5	B	87	0	0	2	0
5	C	127	0	0	1	0
5	D	123	0	0	3	0
All	All	10253	0	9762	114	1

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 6.

All (114) 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:277:ALA:O	1:C:165:THR:HG21	1.68	0.92
1:A:77:CYS:HG	1:A:105:CYS:HG	1.16	0.88
4:B:403:PEG:H21	1:D:162:LYS:HB3	1.67	0.76
1:C:217:VAL:HA	4:C:402:PEG:H12	1.69	0.74
1:A:227:PRO:HB3	1:C:227:PRO:HB3	1.69	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:217:VAL:HB	4:C:402:PEG:H31	1.70	0.73
1:B:272:ARG:HD2	4:B:403:PEG:O2	1.90	0.71
1:A:87:HIS:HD2	1:A:88:GLY:O	1.73	0.70
1:C:165:THR:HG23	1:C:166:THR:HG23	1.74	0.69
1:A:51:GLU:OE1	1:A:72:LYS:NZ	2.23	0.68
1:A:272:ARG:NH2	1:C:300:GLN:HG3	2.10	0.66
1:A:197:HIS:HD2	1:A:198:THR:OG1	1.79	0.65
1:C:263:THR:HG22	1:C:263:THR:O	1.97	0.65
1:B:227:PRO:HB3	1:D:227:PRO:HB3	1.77	0.65
1:A:164:ASN:HD22	1:A:167:ASP:H	1.45	0.64
1:C:218:TYR:O	4:C:402:PEG:H41	1.97	0.64
1:B:77:CYS:HG	1:B:105:CYS:HG	1.33	0.62
1:B:273:VAL:HA	4:B:403:PEG:H41	1.81	0.61
1:C:293:ALA:H	1:C:320:GLN:HE22	1.49	0.61
1:B:219:ASN:HD22	1:B:250:TYR:H	1.47	0.60
1:B:313:THR:OG1	1:B:314:LYS:N	2.35	0.59
1:C:165:THR:CG2	1:C:166:THR:HG23	2.32	0.58
1:B:6:ILE:HA	1:B:84:VAL:O	2.03	0.58
1:B:51:GLU:OE1	1:B:72:LYS:NZ	2.36	0.57
1:B:261:ALA:HA	1:B:265:THR:O	2.05	0.57
1:A:87:HIS:HB3	1:A:92:MET:HE2	1.86	0.57
1:B:321:GLN:HA	1:B:321:GLN:OE1	2.03	0.57
1:B:8:ALA:HA	1:B:86:THR:OG1	2.04	0.57
1:C:227:PRO:HB2	4:C:402:PEG:H32	1.87	0.57
1:C:64:ASN:O	1:C:68:THR:HG23	2.06	0.56
1:A:3:ASN:HD22	1:A:47:ASN:HB2	1.70	0.56
1:A:277:ALA:O	1:C:165:THR:CG2	2.50	0.56
1:D:195:ARG:NH1	1:D:323:PHE:O	2.39	0.56
1:C:39:VAL:HG13	1:D:121:MET:HE1	1.88	0.56
1:A:272:ARG:NH2	1:C:300:GLN:CG	2.68	0.55
1:A:41:GLN:HE21	1:A:41:GLN:H	1.53	0.55
1:A:23:SER:O	1:A:25:TYR:HD1	1.90	0.55
1:A:116:ARG:NH1	4:B:402:PEG:O4	2.39	0.54
1:A:33:GLU:H	1:A:33:GLU:CD	2.16	0.54
1:A:139:LYS:HE3	1:A:139:LYS:H	1.72	0.54
1:B:245:GLY:H	4:B:403:PEG:C1	2.21	0.53
1:B:103:VAL:O	1:B:198:THR:HA	2.09	0.53
1:A:281:ASP:HA	5:A:602:HOH:O	2.09	0.52
1:D:197:HIS:HE1	5:D:516:HOH:O	1.92	0.52
1:C:41:GLN:OE1	1:C:41:GLN:N	2.44	0.51
1:C:106:ASP:OD1	1:C:199:SER:OG	2.26	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:273:VAL:HA	4:B:403:PEG:C4	2.40	0.51
1:B:258:ALA:HB3	5:B:532:HOH:O	2.09	0.51
4:B:403:PEG:H21	1:D:162:LYS:CB	2.40	0.50
1:A:197:HIS:HE1	5:A:582:HOH:O	1.93	0.50
1:D:59:GLN:H	1:D:59:GLN:HE21	1.59	0.50
1:C:202:PRO:HB2	1:C:312:GLN:HE22	1.76	0.50
1:A:76:ASP:O	1:A:77:CYS:C	2.55	0.50
1:A:39:VAL:O	1:A:42:LEU:HB2	2.11	0.49
1:A:80:THR:O	1:A:107:LYS:NZ	2.45	0.49
1:A:217:VAL:HA	4:C:402:PEG:H11	1.95	0.49
4:B:403:PEG:H22	1:D:93:GLU:OE2	2.13	0.49
1:B:21:THR:HG22	1:B:121:MET:CE	2.43	0.49
1:D:11:GLY:C	1:D:27:VAL:HG23	2.39	0.48
1:D:179:LEU:HA	1:D:191:ARG:HB2	1.95	0.48
1:A:3:ASN:ND2	1:A:47:ASN:HB2	2.28	0.48
1:A:71:LYS:HE2	1:A:205:VAL:O	2.14	0.48
1:B:273:VAL:CG2	4:B:403:PEG:H11	2.42	0.48
1:D:118:SER:HB2	5:D:547:HOH:O	2.14	0.47
1:C:68:THR:HG22	5:C:586:HOH:O	2.15	0.47
1:B:204:ASP:OD2	1:B:206:SER:OG	2.31	0.46
1:C:66:TRP:HB3	1:C:98:PHE:CE2	2.50	0.46
1:C:8:ALA:CB	1:C:32:VAL:HG13	2.45	0.46
1:C:160:VAL:O	1:C:301:LYS:HE3	2.15	0.46
1:B:219:ASN:ND2	1:B:250:TYR:H	2.14	0.46
1:C:31:GLY:HA2	1:C:52:GLN:OE1	2.16	0.46
1:B:204:ASP:CG	1:B:206:SER:HG	2.25	0.45
1:A:164:ASN:ND2	1:A:166:THR:H	2.14	0.45
1:B:10:GLY:HA3	1:B:56:ILE:O	2.17	0.45
1:B:67:LEU:O	1:B:68:THR:C	2.60	0.45
1:B:260:ALA:O	1:B:265:THR:HB	2.17	0.45
4:B:403:PEG:C2	1:D:93:GLU:OE2	2.65	0.45
1:B:216:ILE:HD12	1:D:220:TYR:CD1	2.51	0.44
1:C:269:ARG:O	1:C:278:THR:HG21	2.18	0.44
1:B:58:SER:HB2	1:B:91:THR:OG1	2.19	0.43
1:D:219:ASN:HD22	1:D:250:TYR:H	1.67	0.43
1:B:151:ASN:HB2	4:B:402:PEG:H12	2.00	0.43
1:C:8:ALA:HA	1:C:86:THR:OG1	2.19	0.43
1:D:103:VAL:O	1:D:198:THR:HA	2.19	0.43
1:D:251:LYS:HD3	1:D:255:ASP:OD2	2.19	0.42
1:B:301:LYS:HD2	5:B:540:HOH:O	2.18	0.42
1:C:226:LEU:N	1:C:227:PRO:CD	2.82	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:226:LEU:N	1:B:227:PRO:CD	2.82	0.42
1:D:20:ALA:HA	1:D:120:SER:HA	2.00	0.42
1:B:125:GLY:N	1:B:126:PRO:CD	2.82	0.42
1:A:84:VAL:HA	1:A:110:VAL:O	2.19	0.42
1:C:14:ALA:O	1:C:30:VAL:HG22	2.20	0.42
1:D:121:MET:HG2	5:D:615:HOH:O	2.19	0.42
1:C:243:GLY:O	1:C:272:ARG:HG2	2.20	0.42
1:D:216:ILE:HA	1:D:240:VAL:O	2.20	0.42
1:B:238:GLY:HA2	1:B:266:ALA:O	2.19	0.41
1:C:218:TYR:O	4:C:402:PEG:C4	2.67	0.41
1:B:246:ASN:OD1	1:B:278:THR:HA	2.21	0.41
1:C:33:GLU:O	1:C:36:VAL:HB	2.20	0.41
1:C:182:ILE:HG12	1:C:187:ILE:HG12	2.02	0.41
1:B:216:ILE:HA	1:B:240:VAL:O	2.20	0.41
1:B:245:GLY:HA3	1:D:90:ASP:OD1	2.20	0.41
1:A:39:VAL:HB	1:A:42:LEU:HD22	2.02	0.41
1:A:245:GLY:HA3	1:C:90:ASP:OD1	2.20	0.41
1:D:197:HIS:HD2	1:D:198:THR:OG1	2.04	0.41
1:C:94:GLU:HG2	1:C:300:GLN:HB3	2.02	0.41
1:C:36:VAL:C	1:C:38:ALA:H	2.29	0.41
1:C:298:ASN:HB2	1:C:299:PRO:HD2	2.02	0.41
1:B:168:VAL:O	4:B:402:PEG:H12	2.21	0.40
1:B:298:ASN:HB2	1:B:299:PRO:CD	2.51	0.40
1:C:202:PRO:HD3	1:C:326:TYR:OH	2.22	0.40
1:B:215:GLY:HA2	1:D:220:TYR:OH	2.22	0.40
1:B:272:ARG:HH21	4:B:403:PEG:C2	2.35	0.40
1:C:227:PRO:CB	4:C:402:PEG:H32	2.50	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:200:ASP:OD1	1:D:326:TYR:OH[1_455]	2.04	0.16

5.3 Torsion angles

5.3.1 Protein backbone

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

of similar resolution.

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	324/326 (99%)	311 (96%)	13 (4%)	0	100	100
1	B	324/326 (99%)	308 (95%)	15 (5%)	1 (0%)	36	43
1	C	324/326 (99%)	309 (95%)	15 (5%)	0	100	100
1	D	325/326 (100%)	314 (97%)	11 (3%)	0	100	100
All	All	1297/1304 (100%)	1242 (96%)	54 (4%)	1 (0%)	48	59

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	105	CYS

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	266/266 (100%)	255 (96%)	11 (4%)	27	36
1	B	266/266 (100%)	257 (97%)	9 (3%)	32	43
1	C	266/266 (100%)	254 (96%)	12 (4%)	24	32
1	D	267/266 (100%)	257 (96%)	10 (4%)	30	40
All	All	1065/1064 (100%)	1023 (96%)	42 (4%)	28	39

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	34	ASN
1	A	41	GLN
1	A	42	LEU
1	A	106	ASP
1	A	118	SER

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Mol	Chain	Res	Type
1	A	126	PRO
1	A	139	LYS
1	A	201	THR
1	A	204	ASP
1	A	222	ASN
1	A	317	GLN
1	B	18	ASP
1	B	26	THR
1	B	29	LYS
1	B	43	LYS
1	B	78	ASP
1	B	222	ASN
1	B	232	VAL
1	B	272	ARG
1	B	306	LEU
1	C	24	ASN
1	C	42	LEU
1	C	53	VAL
1	C	68	THR
1	C	72	LYS
1	C	80	THR
1	C	165	THR
1	C	195	ARG
1	C	222	ASN
1	C	300	GLN
1	C	318	GLN
1	C	321	GLN
1	D	27	VAL
1	D	42	LEU
1	D	43	LYS
1	D	59	GLN
1	D	118	SER
1	D	166	THR
1	D	222	ASN
1	D	252	SER
1	D	272	ARG
1	D	317	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (34) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3	ASN

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Mol	Chain	Res	Type
1	A	41	GLN
1	A	87	HIS
1	A	164	ASN
1	A	184	ASN
1	A	190	GLN
1	A	197	HIS
1	A	307	GLN
1	A	318	GLN
1	B	37	ASN
1	B	74	ASN
1	B	131	ASN
1	B	151	ASN
1	B	197	HIS
1	B	219	ASN
1	B	248	ASN
1	C	3	ASN
1	C	24	ASN
1	C	131	ASN
1	C	143	ASN
1	C	307	GLN
1	C	320	GLN
1	C	324	ASN
1	D	24	ASN
1	D	59	GLN
1	D	131	ASN
1	D	151	ASN
1	D	184	ASN
1	D	197	HIS
1	D	209	ASN
1	D	219	ASN
1	D	307	GLN
1	D	317	GLN
1	D	324	ASN

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](#)

8 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	ASP	A	401	-	7,8,8	1.04	0	6,10,10	1.19	0
3	ACY	A	402	-	3,3,3	0.98	0	3,3,3	0.91	0
2	ASP	B	401	-	7,8,8	1.32	1 (14%)	6,10,10	0.71	0
4	PEG	B	402	-	6,6,6	0.51	0	5,5,5	0.49	0
4	PEG	B	403	-	6,6,6	0.36	0	5,5,5	0.21	0
4	PEG	C	402	-	6,6,6	0.96	0	5,5,5	0.58	0
2	ASP	C	401	-	7,8,8	1.25	1 (14%)	6,10,10	0.73	0
2	ASP	D	401	-	7,8,8	0.95	0	6,10,10	0.91	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	ASP	A	401	-	-	4/8/8/8	-
2	ASP	B	401	-	-	4/8/8/8	-
4	PEG	B	402	-	-	4/4/4/4	-
4	PEG	B	403	-	-	3/4/4/4	-
4	PEG	C	402	-	-	3/4/4/4	-
2	ASP	C	401	-	-	2/8/8/8	-
2	ASP	D	401	-	-	2/8/8/8	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	401	ASP	OXT-C	-2.65	1.22	1.30
2	C	401	ASP	OXT-C	-2.50	1.22	1.30

There are no bond angle outliers.

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	ASP	O-C-CA-N
2	B	401	ASP	O-C-CA-N
2	C	401	ASP	O-C-CA-N
2	D	401	ASP	O-C-CA-N
4	B	402	PEG	C4-C3-O2-C2
2	B	401	ASP	OXT-C-CA-N
2	D	401	ASP	OXT-C-CA-N
2	A	401	ASP	OXT-C-CA-N
2	C	401	ASP	OXT-C-CA-N
4	B	403	PEG	O2-C3-C4-O4
4	B	402	PEG	O1-C1-C2-O2
4	B	402	PEG	O2-C3-C4-O4
4	C	402	PEG	O2-C3-C4-O4
4	B	402	PEG	C1-C2-O2-C3
2	B	401	ASP	O-C-CA-CB
4	B	403	PEG	C1-C2-O2-C3
2	A	401	ASP	O-C-CA-CB
2	A	401	ASP	OXT-C-CA-CB
4	B	403	PEG	C4-C3-O2-C2
2	B	401	ASP	OXT-C-CA-CB
4	C	402	PEG	C4-C3-O2-C2
4	C	402	PEG	O1-C1-C2-O2

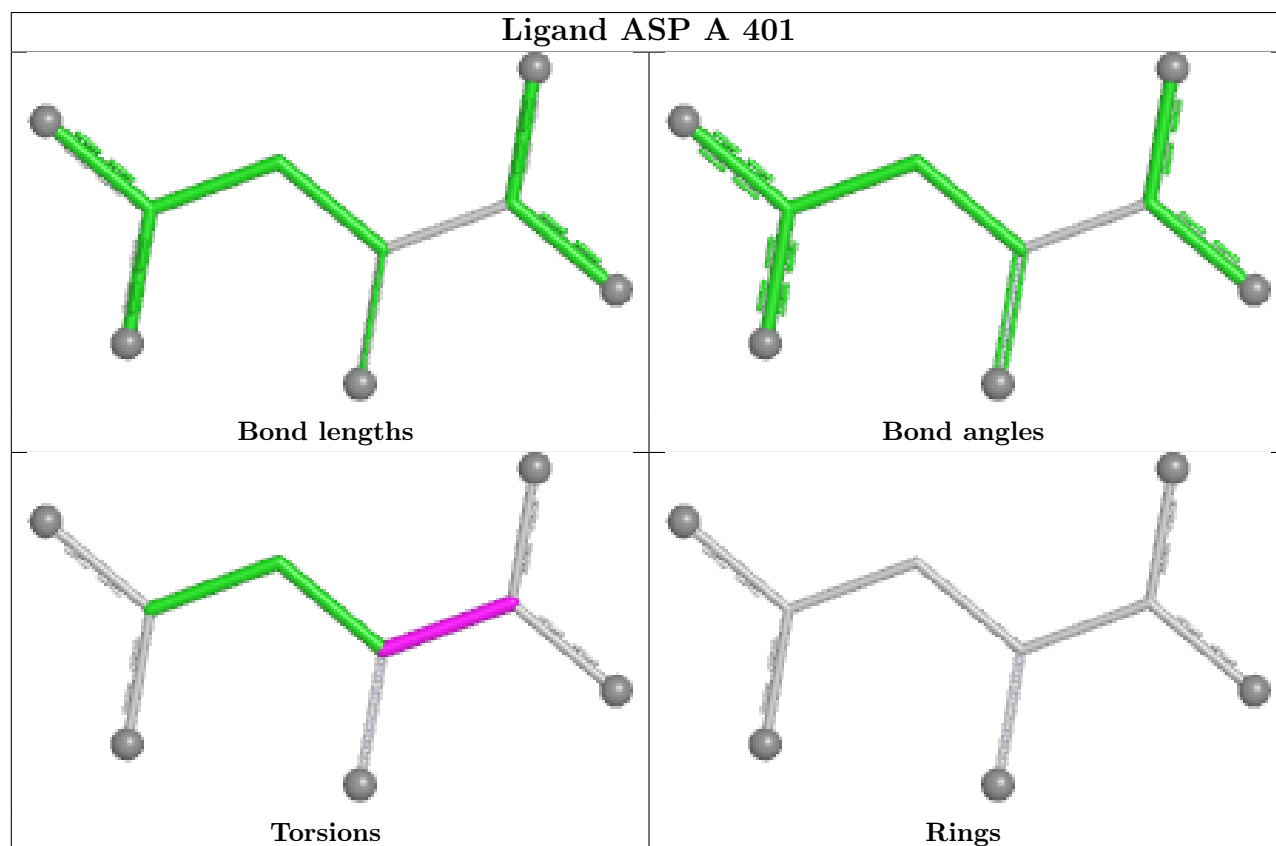
There are no ring outliers.

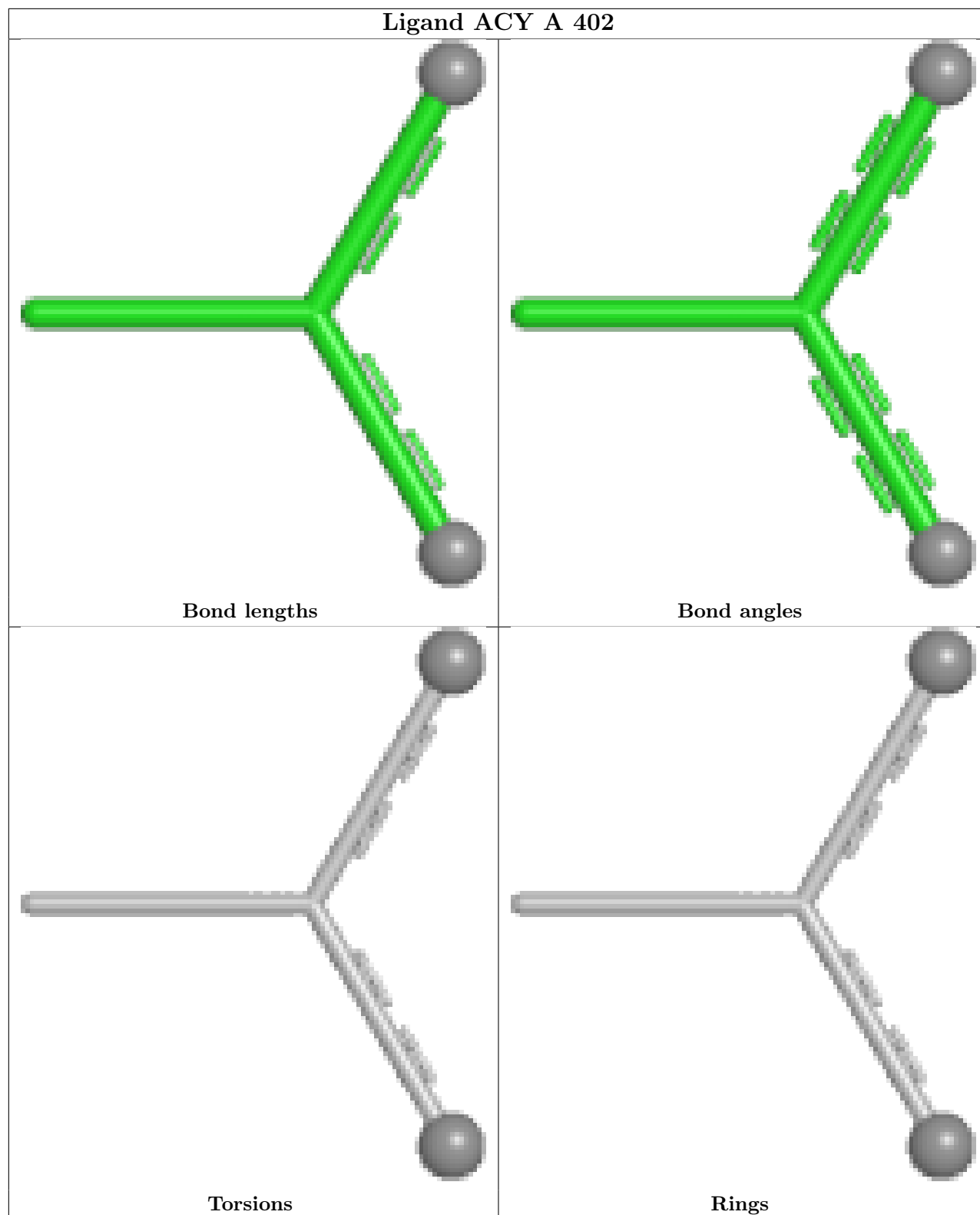
3 monomers are involved in 20 short contacts:

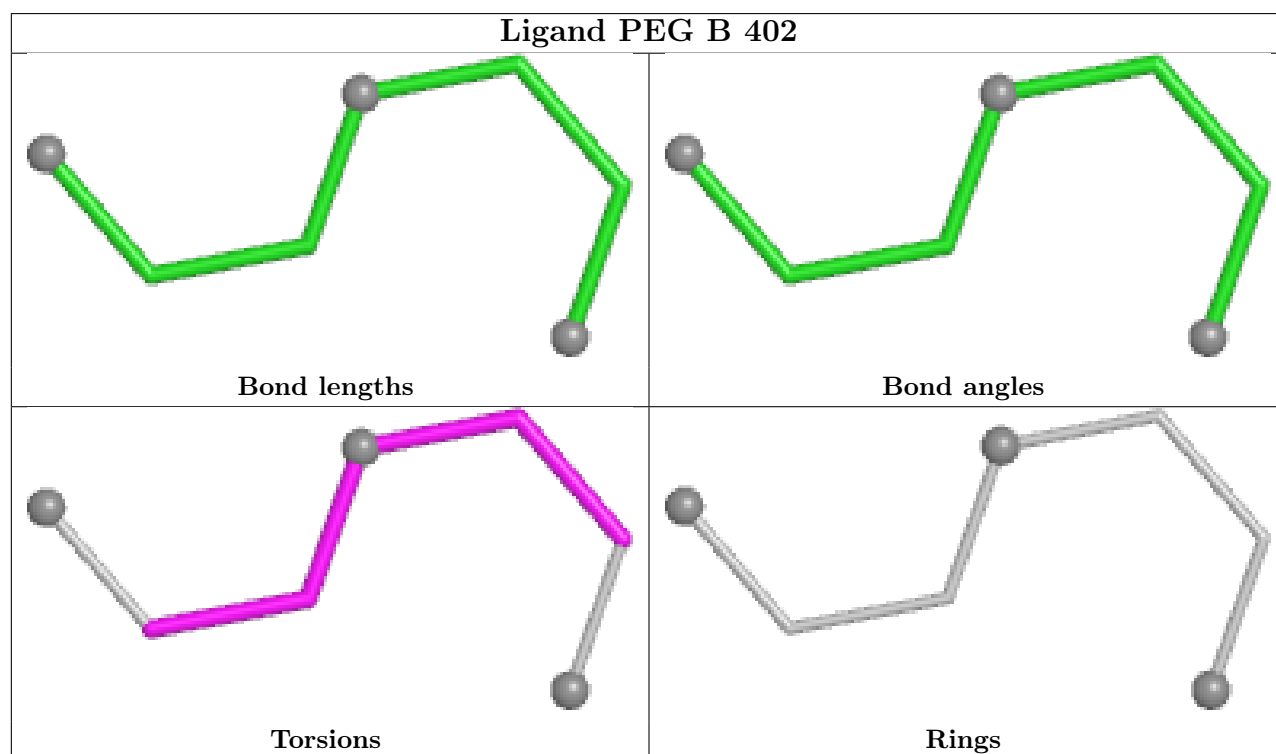
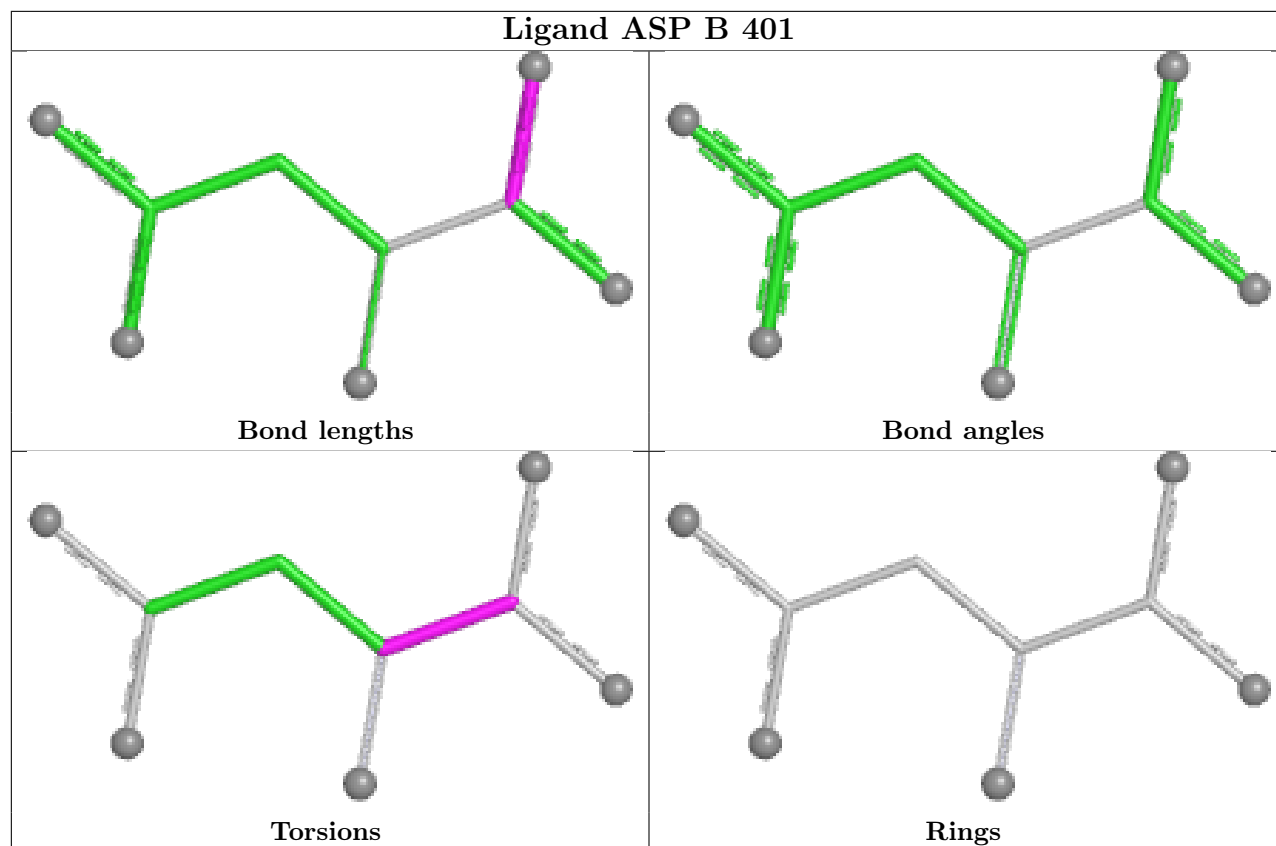
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	402	PEG	3	0
4	B	403	PEG	10	0
4	C	402	PEG	7	0

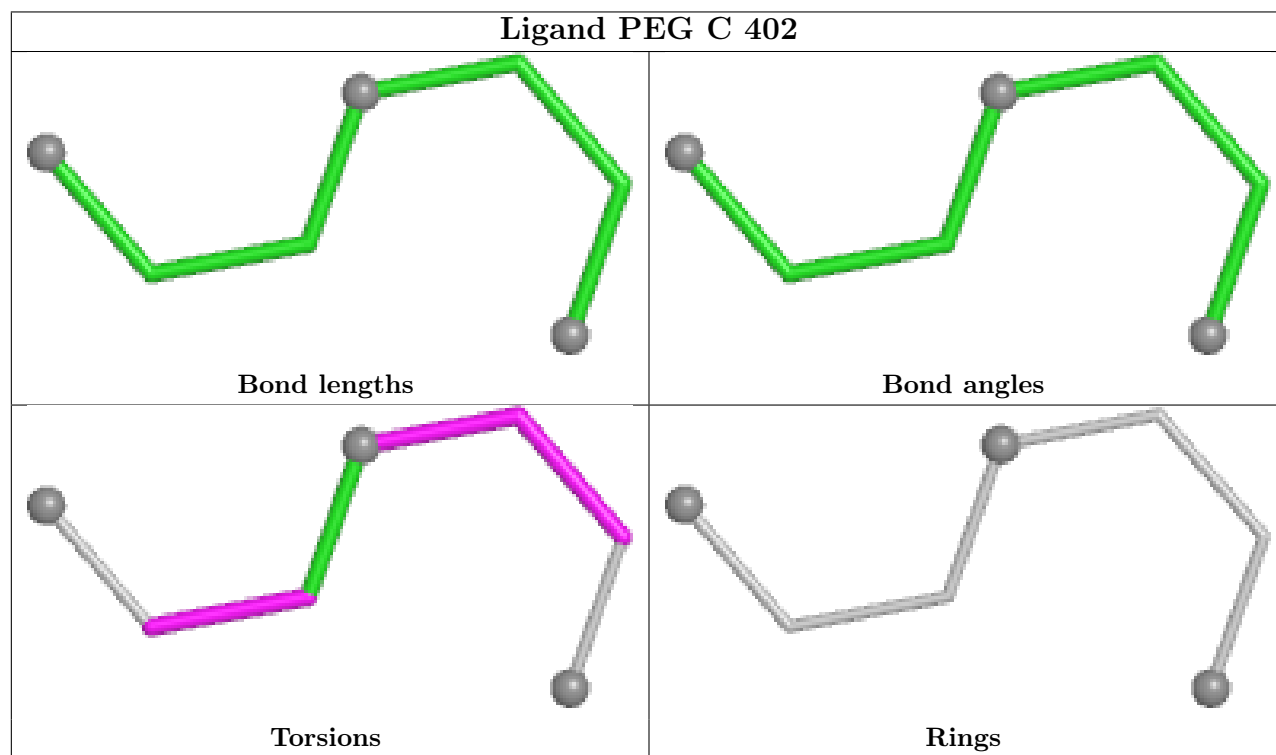
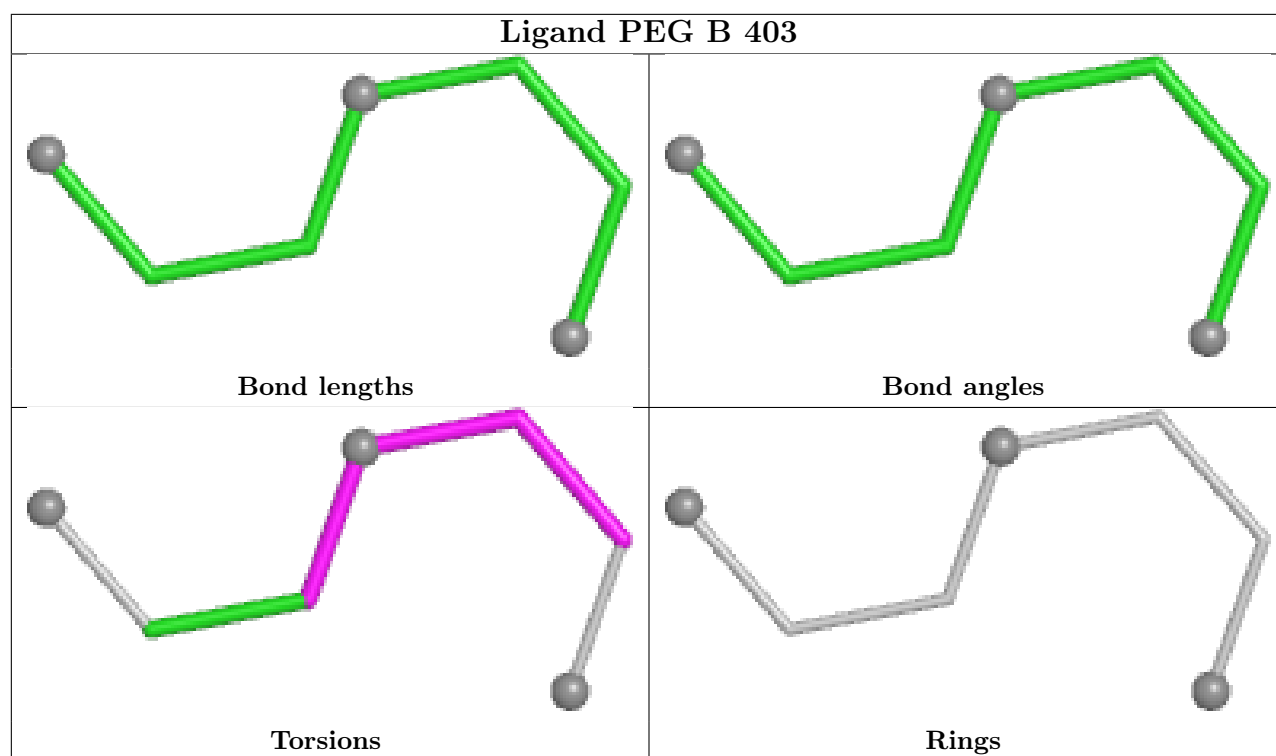
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

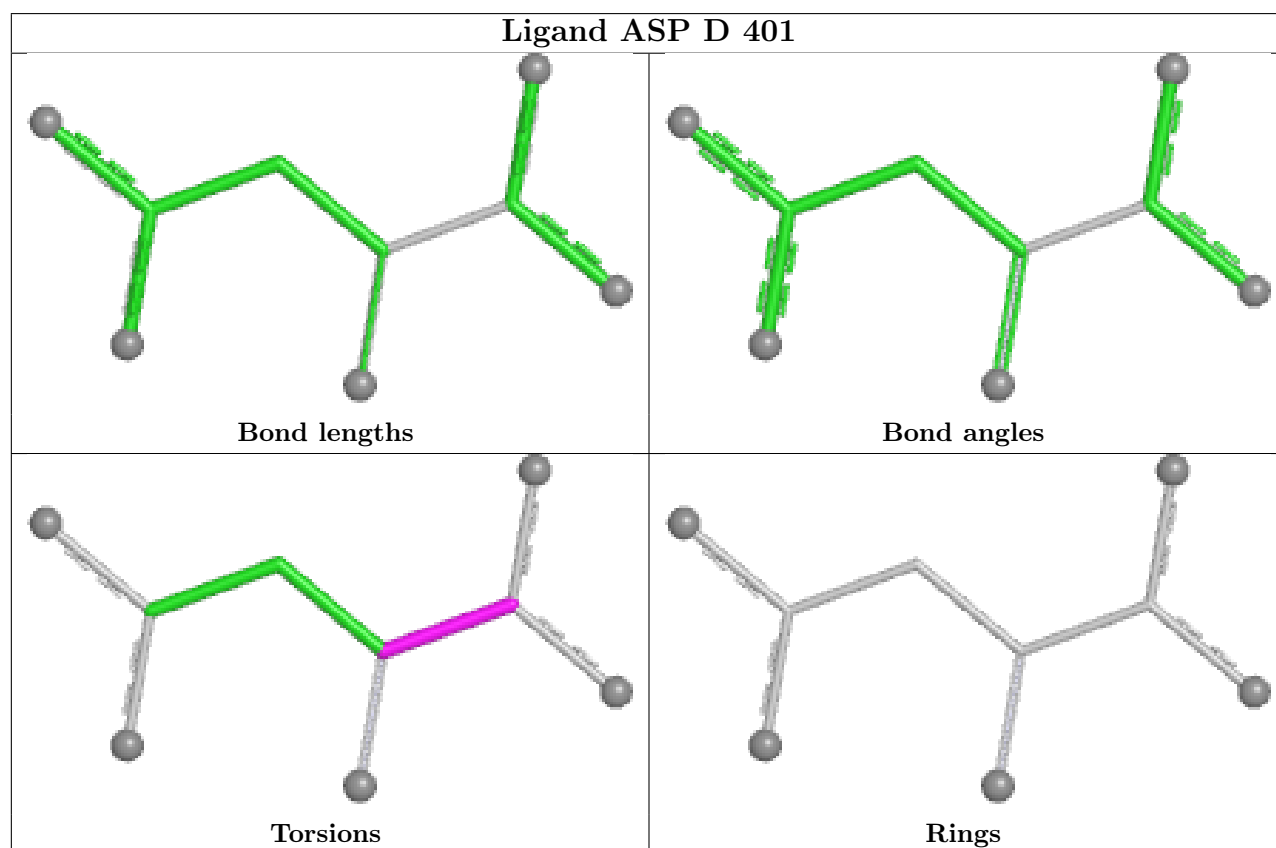
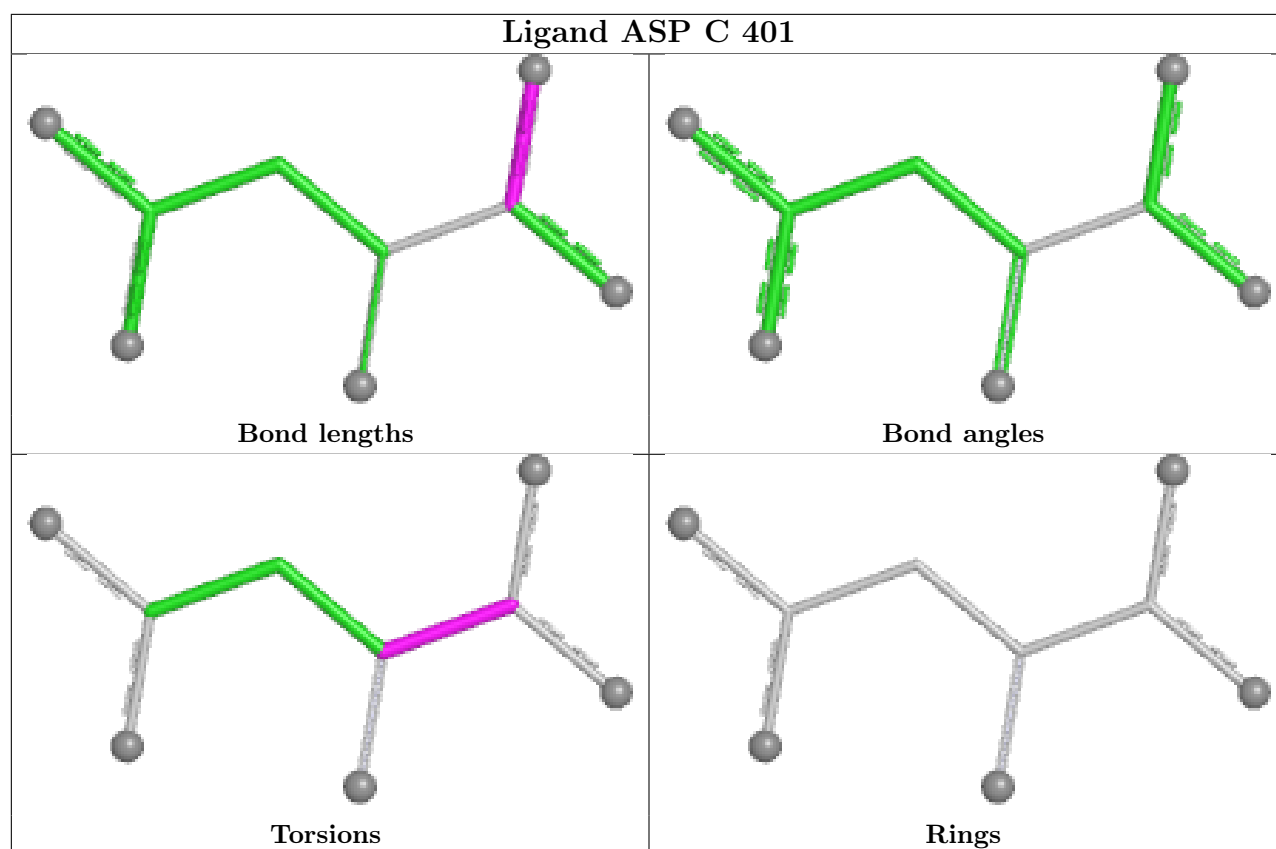
also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.











5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	326/326 (100%)	-0.22	14 (4%) 40 45	4, 14, 49, 116	0
1	B	326/326 (100%)	0.19	5 (1%) 72 77	10, 26, 47, 68	0
1	C	326/326 (100%)	0.02	14 (4%) 40 45	7, 20, 66, 116	0
1	D	326/326 (100%)	-0.11	14 (4%) 40 45	7, 17, 55, 113	1 (0%)
All	All	1304/1304 (100%)	-0.03	47 (3%) 46 52	4, 20, 55, 116	1 (0%)

All (47) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	17	GLY	4.5
1	D	20	ALA	4.5
1	D	25	TYR	4.2
1	A	21	THR	4.0
1	C	21	THR	3.9
1	C	23	SER	3.9
1	D	23	SER	3.9
1	A	26	THR	3.7
1	D	21	THR	3.7
1	A	20	ALA	3.7
1	D	19	SER	3.3
1	A	15	GLY	3.3
1	D	26	THR	3.3
1	A	28	GLY	3.2
1	C	20	ALA	3.2
1	A	25	TYR	3.2
1	C	22	LYS	3.1
1	D	16	GLY	3.1
1	C	19	SER	3.0
1	C	1	LEU	3.0
1	C	27	VAL	2.9

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Mol	Chain	Res	Type	RSRZ
1	A	29	LYS	2.7
1	D	30	VAL	2.6
1	B	22	LYS	2.6
1	C	24	ASN	2.5
1	D	24	ASN	2.5
1	D	18	ASP	2.5
1	A	27	VAL	2.4
1	C	18	ASP	2.4
1	B	106	ASP	2.4
1	D	29	LYS	2.3
1	A	23	SER	2.3
1	C	38	ALA	2.3
1	B	317	GLN	2.3
1	D	22	LYS	2.3
1	A	24	ASN	2.3
1	B	316	PRO	2.2
1	A	19	SER	2.2
1	C	30	VAL	2.2
1	C	78	ASP	2.2
1	B	287	ALA	2.2
1	A	264	GLY	2.1
1	A	22	LYS	2.1
1	C	105	CYS	2.1
1	A	16	GLY	2.1
1	D	27	VAL	2.1
1	C	77	CYS	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

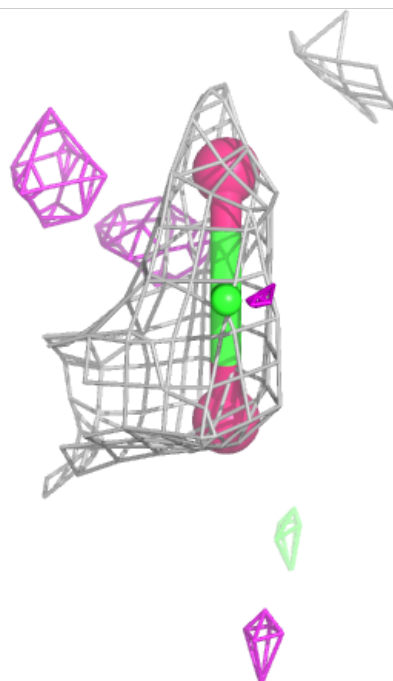
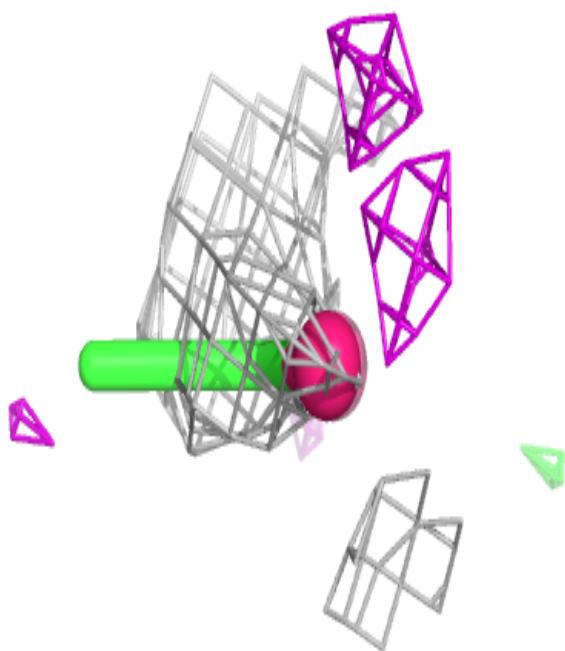
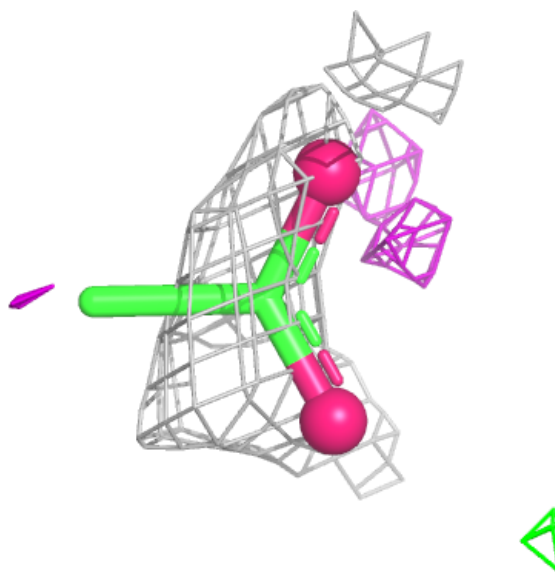
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	ACY	A	402	4/4	0.78	0.36	72,75,77,81	0
4	PEG	B	403	7/7	0.83	0.25	24,29,30,36	0
4	PEG	C	402	7/7	0.87	0.15	15,18,19,20	0
4	PEG	B	402	7/7	0.89	0.18	30,35,41,43	0
2	ASP	B	401	9/9	0.90	0.09	20,23,28,32	0
2	ASP	A	401	9/9	0.94	0.09	11,14,16,16	0
2	ASP	C	401	9/9	0.94	0.07	14,15,17,19	0
2	ASP	D	401	9/9	0.95	0.06	16,19,20,20	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.

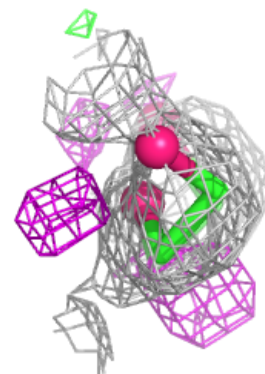
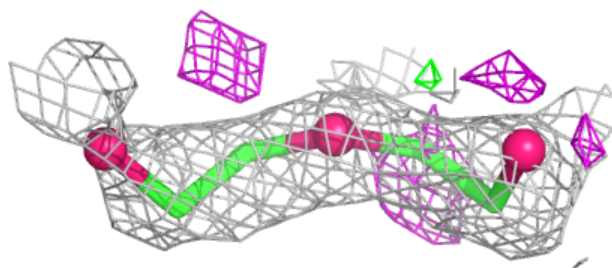
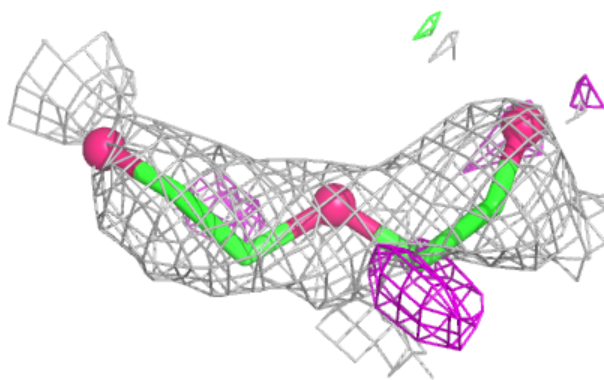
Electron density around ACY A 402:

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

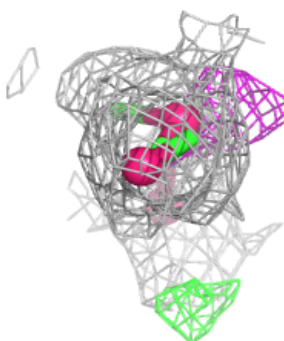
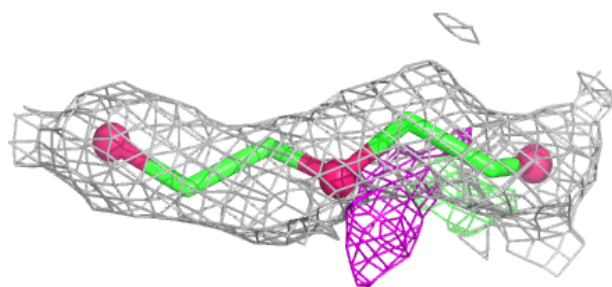
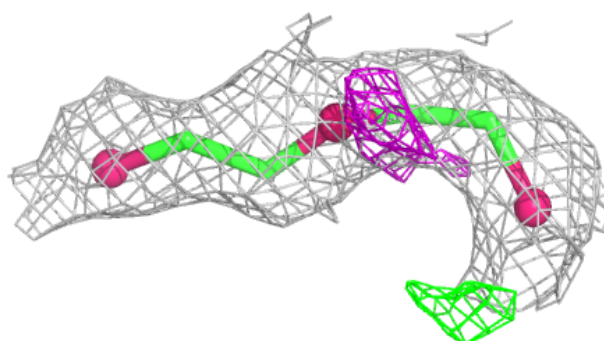


Electron density around PEG B 403:

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

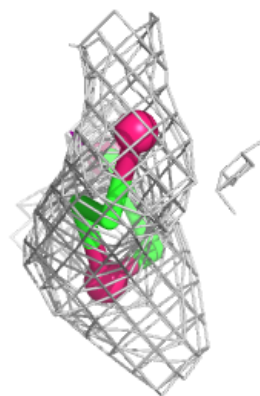
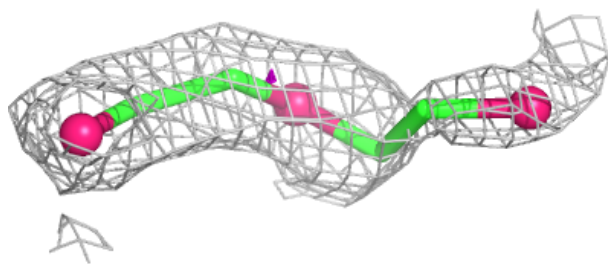
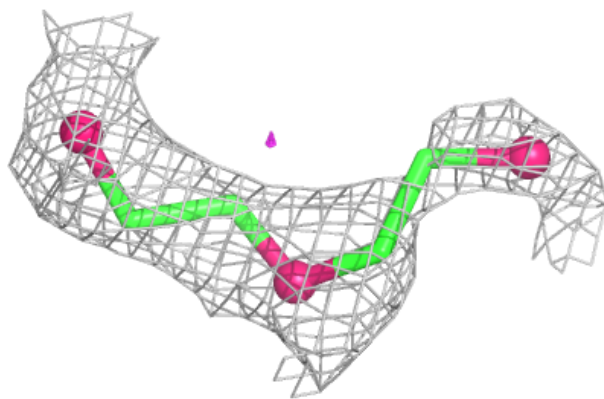
**Electron density around PEG C 402:**

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



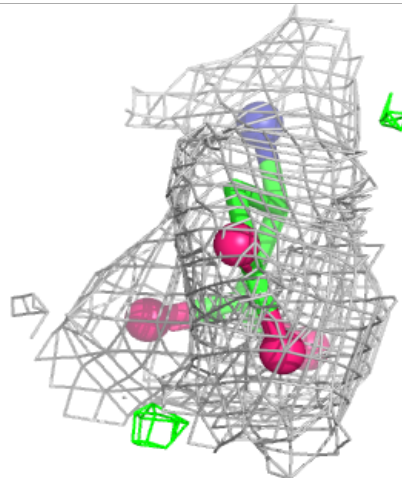
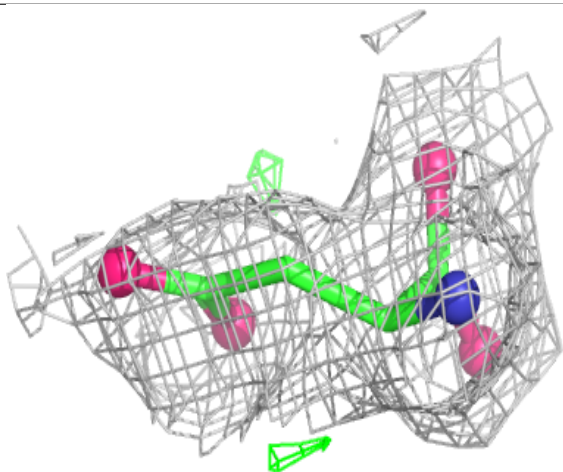
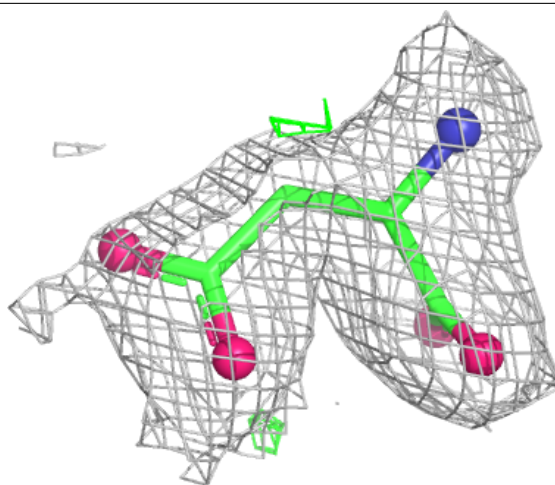
Electron density around PEG B 402:

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



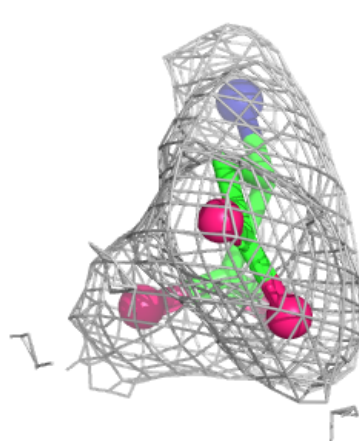
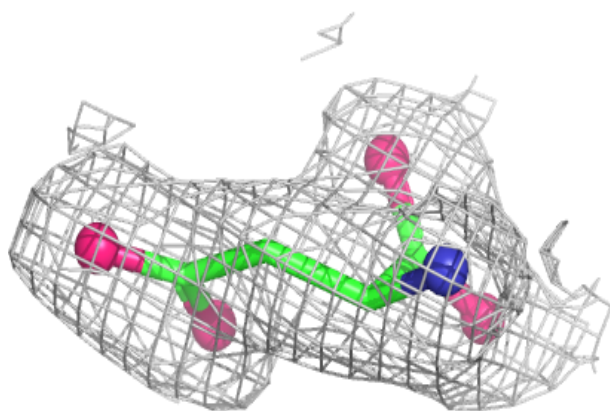
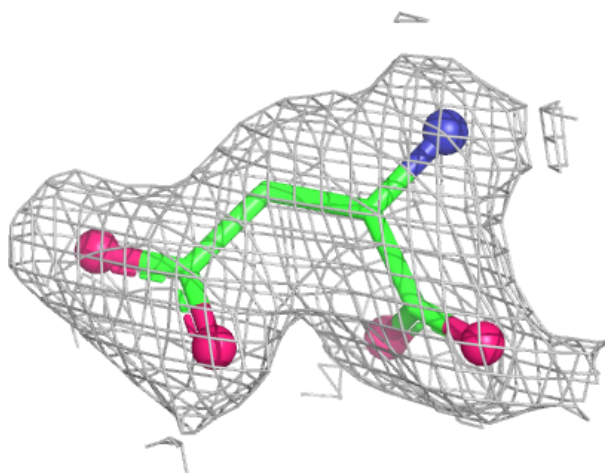
Electron density around ASP B 401:

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



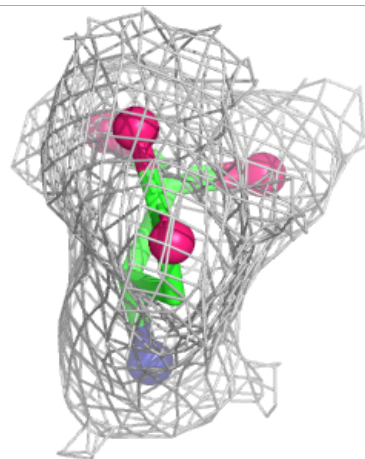
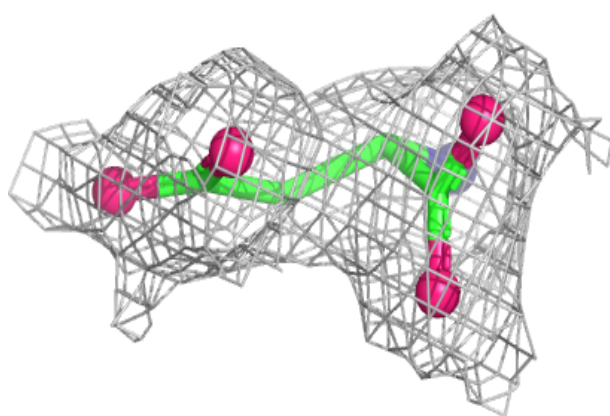
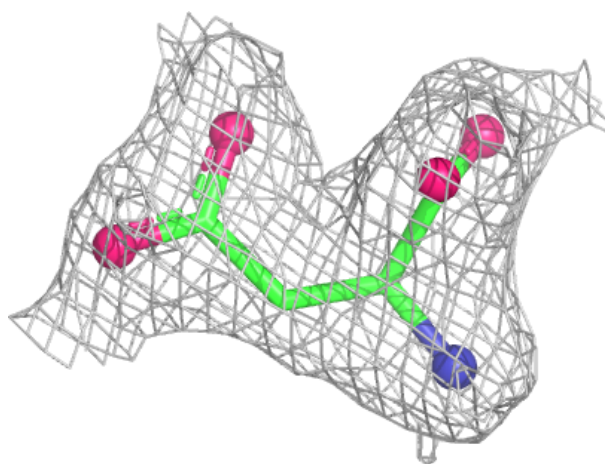
Electron density around ASP A 401:

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



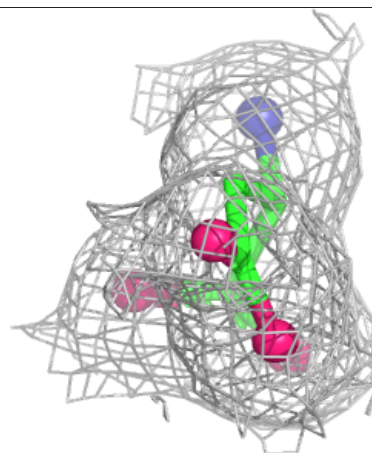
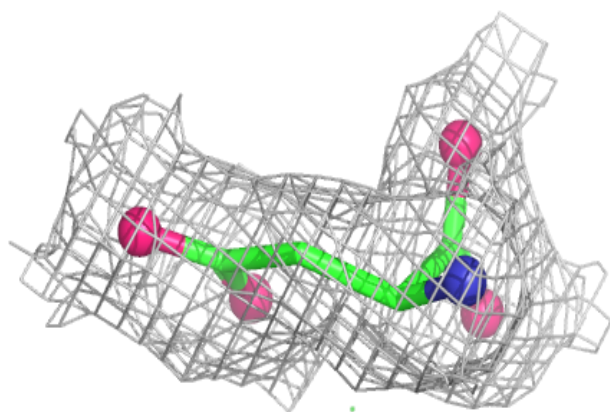
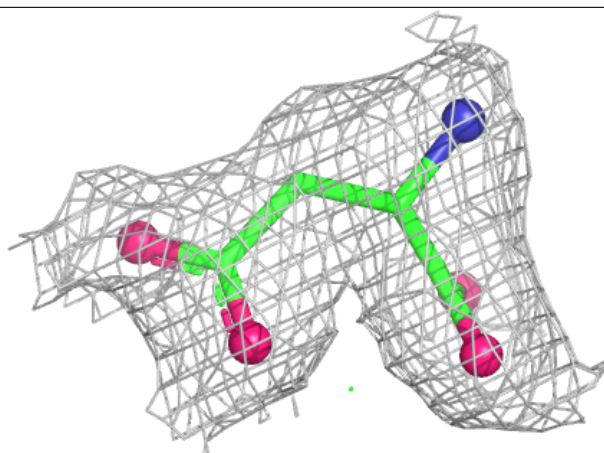
Electron density around ASP C 401:

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



Electron density around ASP D 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 [i](#)

There are no such residues in this entry.