



wwPDB EM Validation Summary Report ⓘ

Nov 19, 2022 – 05:42 PM EST

PDB ID : 7RLB
EMDB ID : EMD-24524
Title : Cryo-EM structure of human p97-A232E mutant bound to ADP
Authors : Caffrey, B.; Zhu, X.; Berezuk, A.; Tuttle, K.; Chittori, S.; Subramaniam, S.
Deposited on : 2021-07-23
Resolution : 3.30 Å (reported)

This is a wwPDB EM Validation Summary 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 : 0.0.1.dev43
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

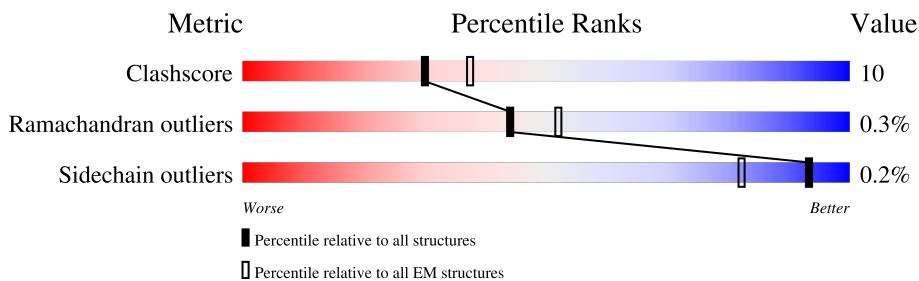
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.30 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	821	
1	B	821	
1	C	821	
1	D	821	
1	E	821	
1	F	821	

2 Entry composition i

There are 2 unique types of molecules in this entry. The entry contains 34884 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 Transitional endoplasmic reticulum ATPase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	735	5760	3625	1015	1090	30	0	0
1	B	735	5760	3625	1015	1090	30	0	0
1	C	735	5760	3625	1015	1090	30	0	0
1	D	735	5760	3625	1015	1090	30	0	0
1	E	735	5760	3625	1015	1090	30	0	0
1	F	735	5760	3625	1015	1090	30	0	0

There are 102 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-14	HIS	-	expression tag	UNP P55072
A	-13	HIS	-	expression tag	UNP P55072
A	-12	HIS	-	expression tag	UNP P55072
A	-11	HIS	-	expression tag	UNP P55072
A	-10	HIS	-	expression tag	UNP P55072
A	-9	HIS	-	expression tag	UNP P55072
A	-8	GLY	-	expression tag	UNP P55072
A	-7	THR	-	expression tag	UNP P55072
A	-6	SER	-	expression tag	UNP P55072
A	-5	GLU	-	expression tag	UNP P55072
A	-4	ASN	-	expression tag	UNP P55072
A	-3	LEU	-	expression tag	UNP P55072
A	-2	TYR	-	expression tag	UNP P55072
A	-1	PHE	-	expression tag	UNP P55072
A	0	GLN	-	expression tag	UNP P55072
A	1	GLY	-	expression tag	UNP P55072
A	232	GLU	ALA	engineered mutation	UNP P55072
B	-14	HIS	-	expression tag	UNP P55072

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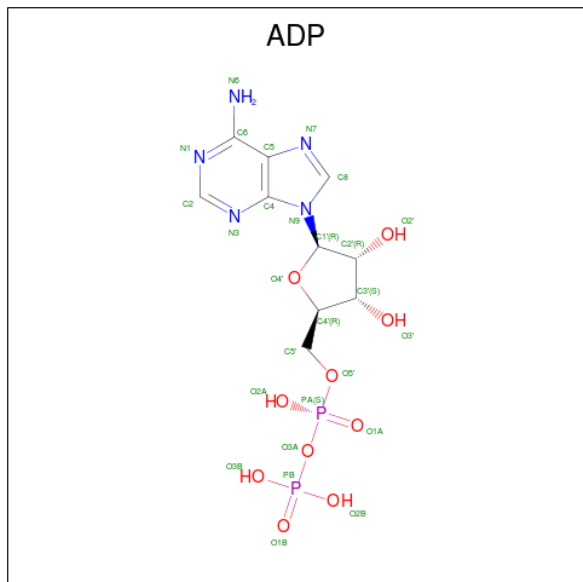
Chain	Residue	Modelled	Actual	Comment	Reference
B	-13	HIS	-	expression tag	UNP P55072
B	-12	HIS	-	expression tag	UNP P55072
B	-11	HIS	-	expression tag	UNP P55072
B	-10	HIS	-	expression tag	UNP P55072
B	-9	HIS	-	expression tag	UNP P55072
B	-8	GLY	-	expression tag	UNP P55072
B	-7	THR	-	expression tag	UNP P55072
B	-6	SER	-	expression tag	UNP P55072
B	-5	GLU	-	expression tag	UNP P55072
B	-4	ASN	-	expression tag	UNP P55072
B	-3	LEU	-	expression tag	UNP P55072
B	-2	TYR	-	expression tag	UNP P55072
B	-1	PHE	-	expression tag	UNP P55072
B	0	GLN	-	expression tag	UNP P55072
B	1	GLY	-	expression tag	UNP P55072
B	232	GLU	ALA	engineered mutation	UNP P55072
C	-14	HIS	-	expression tag	UNP P55072
C	-13	HIS	-	expression tag	UNP P55072
C	-12	HIS	-	expression tag	UNP P55072
C	-11	HIS	-	expression tag	UNP P55072
C	-10	HIS	-	expression tag	UNP P55072
C	-9	HIS	-	expression tag	UNP P55072
C	-8	GLY	-	expression tag	UNP P55072
C	-7	THR	-	expression tag	UNP P55072
C	-6	SER	-	expression tag	UNP P55072
C	-5	GLU	-	expression tag	UNP P55072
C	-4	ASN	-	expression tag	UNP P55072
C	-3	LEU	-	expression tag	UNP P55072
C	-2	TYR	-	expression tag	UNP P55072
C	-1	PHE	-	expression tag	UNP P55072
C	0	GLN	-	expression tag	UNP P55072
C	1	GLY	-	expression tag	UNP P55072
C	232	GLU	ALA	engineered mutation	UNP P55072
D	-14	HIS	-	expression tag	UNP P55072
D	-13	HIS	-	expression tag	UNP P55072
D	-12	HIS	-	expression tag	UNP P55072
D	-11	HIS	-	expression tag	UNP P55072
D	-10	HIS	-	expression tag	UNP P55072
D	-9	HIS	-	expression tag	UNP P55072
D	-8	GLY	-	expression tag	UNP P55072
D	-7	THR	-	expression tag	UNP P55072
D	-6	SER	-	expression tag	UNP P55072

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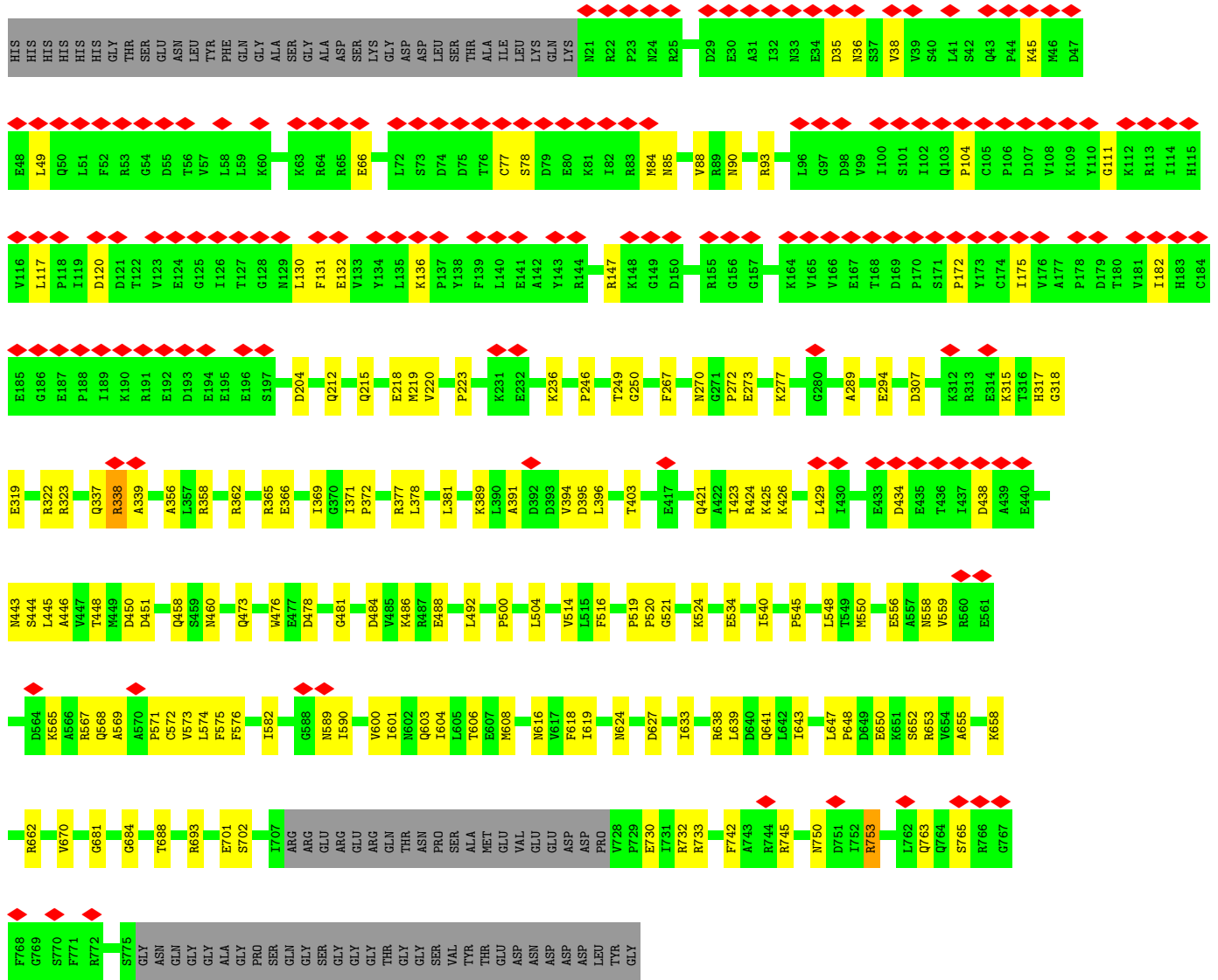
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Chain	Residue	Modelled	Actual	Comment	Reference
D	-5	GLU	-	expression tag	UNP P55072
D	-4	ASN	-	expression tag	UNP P55072
D	-3	LEU	-	expression tag	UNP P55072
D	-2	TYR	-	expression tag	UNP P55072
D	-1	PHE	-	expression tag	UNP P55072
D	0	GLN	-	expression tag	UNP P55072
D	1	GLY	-	expression tag	UNP P55072
D	232	GLU	ALA	engineered mutation	UNP P55072
E	-14	HIS	-	expression tag	UNP P55072
E	-13	HIS	-	expression tag	UNP P55072
E	-12	HIS	-	expression tag	UNP P55072
E	-11	HIS	-	expression tag	UNP P55072
E	-10	HIS	-	expression tag	UNP P55072
E	-9	HIS	-	expression tag	UNP P55072
E	-8	GLY	-	expression tag	UNP P55072
E	-7	THR	-	expression tag	UNP P55072
E	-6	SER	-	expression tag	UNP P55072
E	-5	GLU	-	expression tag	UNP P55072
E	-4	ASN	-	expression tag	UNP P55072
E	-3	LEU	-	expression tag	UNP P55072
E	-2	TYR	-	expression tag	UNP P55072
E	-1	PHE	-	expression tag	UNP P55072
E	0	GLN	-	expression tag	UNP P55072
E	1	GLY	-	expression tag	UNP P55072
E	232	GLU	ALA	engineered mutation	UNP P55072
F	-14	HIS	-	expression tag	UNP P55072
F	-13	HIS	-	expression tag	UNP P55072
F	-12	HIS	-	expression tag	UNP P55072
F	-11	HIS	-	expression tag	UNP P55072
F	-10	HIS	-	expression tag	UNP P55072
F	-9	HIS	-	expression tag	UNP P55072
F	-8	GLY	-	expression tag	UNP P55072
F	-7	THR	-	expression tag	UNP P55072
F	-6	SER	-	expression tag	UNP P55072
F	-5	GLU	-	expression tag	UNP P55072
F	-4	ASN	-	expression tag	UNP P55072
F	-3	LEU	-	expression tag	UNP P55072
F	-2	TYR	-	expression tag	UNP P55072
F	-1	PHE	-	expression tag	UNP P55072
F	0	GLN	-	expression tag	UNP P55072
F	1	GLY	-	expression tag	UNP P55072
F	232	GLU	ALA	engineered mutation	UNP P55072

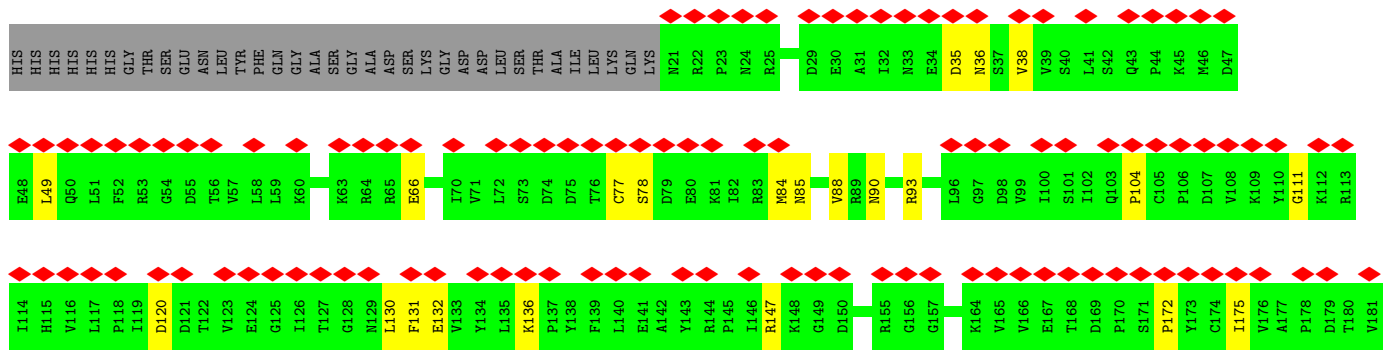
- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).

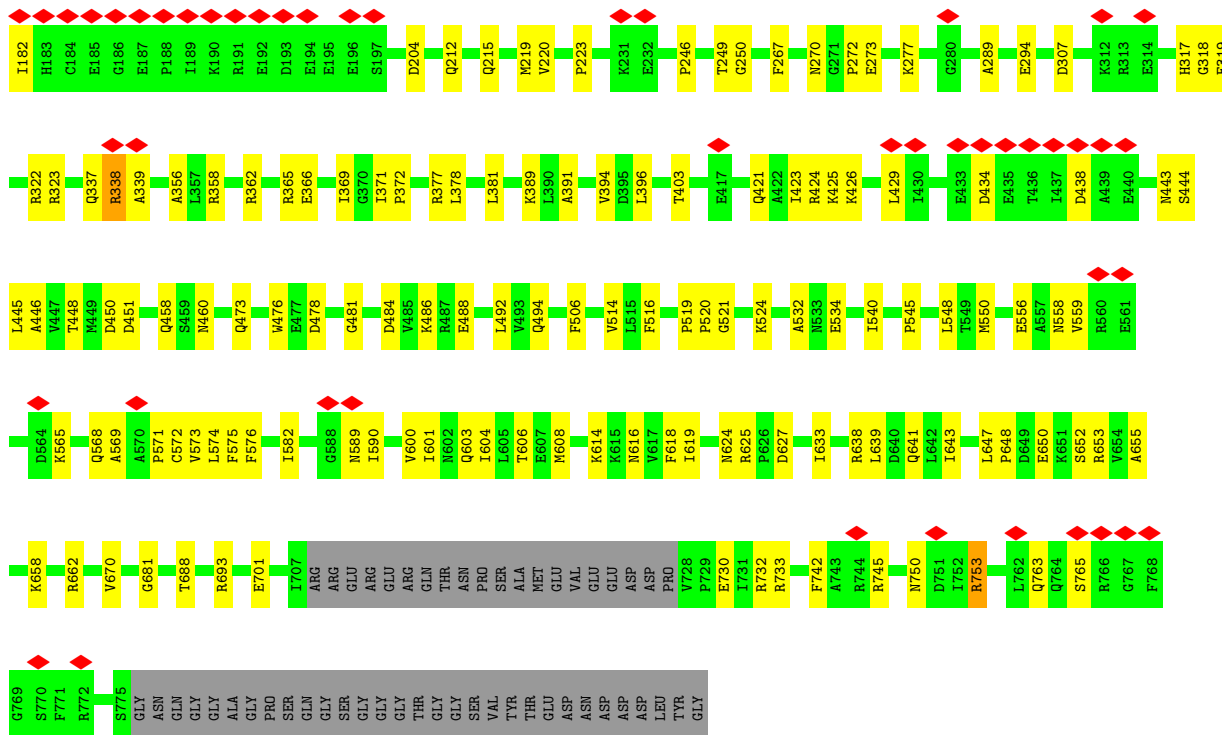


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
2	A	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	A	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	B	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	B	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	C	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	C	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	D	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	D	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	E	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	E	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	F	1	Total	C	N	O	P	0
			54	20	10	20	4	
2	F	1	Total	C	N	O	P	0
			54	20	10	20	4	

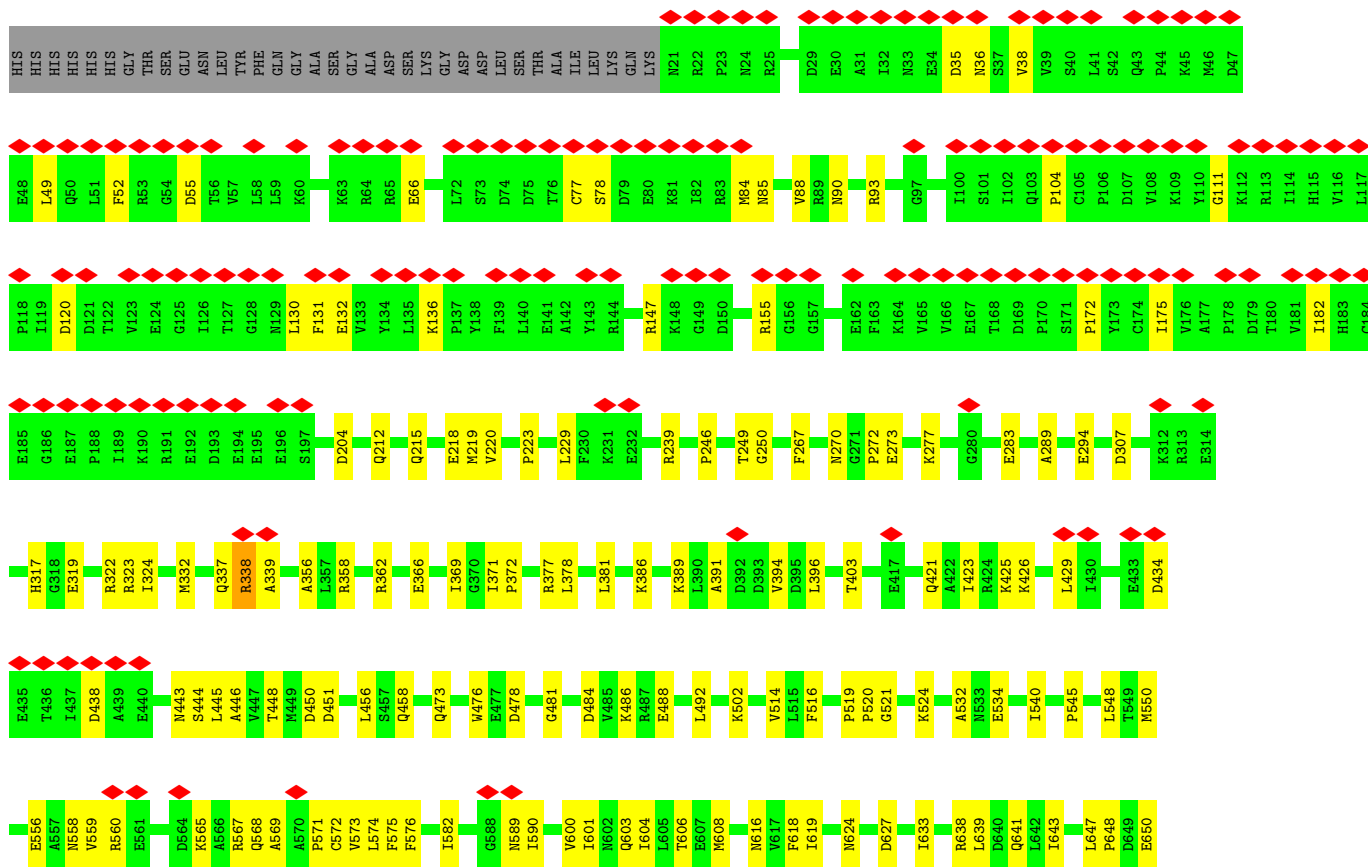


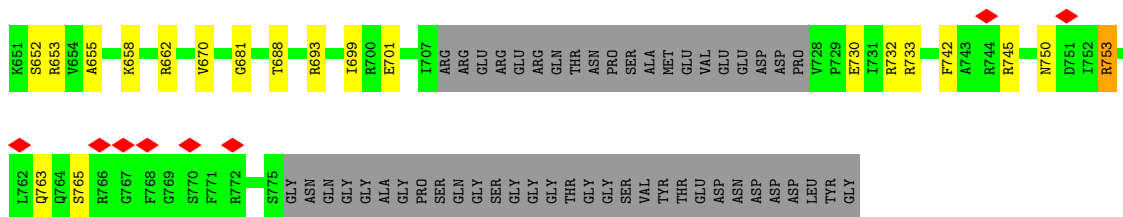
• Molecule 1: Transitional endoplasmic reticulum ATPase



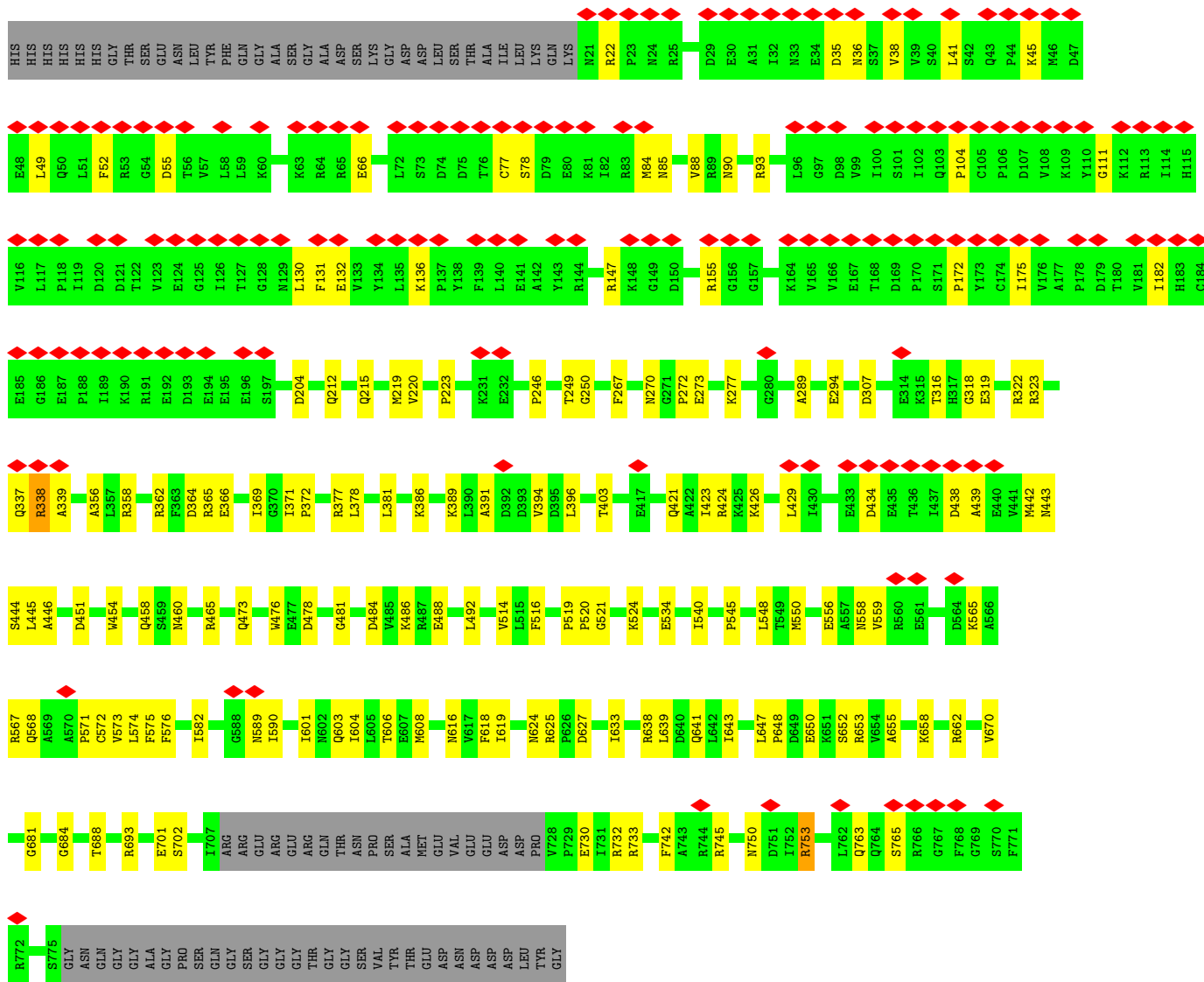


• Molecule 1: Transitional endoplasmic reticulum ATPase





• Molecule 1: Transitional endoplasmic reticulum ATPase



• Molecule 1: Transitional endoplasmic reticulum ATPase



HIS	HIS	HIS	HIS	HIS	HIS	GLY	THR	SER	GLU	ASN	LEU	TYR	PHE	GLN	GLY	ALA	SER	GLY	GLY	ALA	ASP	SER	LYS	LYS	GLY	ASP	ASP	LEU	SER	THR	THR	ALA	ALA	LEU	LYS	LYS	GLN	GLN	N1	R2	P3	N4	R5	D29	E30	A31	I32	N33	E34	D35	N36	S37	V38	V39	S40	L41	S42	Q43	P44	K45	M46	D47
E48	L49	Q50	L51	F52	R53	G54	D55	T56	V57	L58	L59	K60	K63	R64	R65	E66	L72	S73	D74	D75	T76	C77	S78	D79	E80	K81	I82	R83	M84	N85	V88	R89	N90	R93	L96	G97	I100	S101	I102	Q103	P104	C105	L106	S107	P108	V109	I110	G111	K112	R113	I114	H115	V116									
L117	P118	I119	D120	D121	T122	V123	E124	G125	I126	T127	G128	N129	L130	F131	E132	V133	Y134	L135	K136	P137	Y138	F139	L140	T141	A142	Y143	R144	R147	K148	G149	D150	R155	R156	G157	K164	V165	V166	E167	T168	D169	P170	S171	P172	Y173	C174	I175	V176	A177	P178	D179	T180	V181	I182	H183	C184	E185						
G186	E187	P188	I189	K190	R191	E192	D193	E194	E195	E196	S197	Q212	Q215	E218	M219	V220	P223	L229	F230	K231	E232	K236	R239	P246	T249	G250	F267	N270	G271	P272	E273	K277	G280	A289	E294	D307	K312	R313	E314	K315	T316	H317																				
G318	E319	R322	R323	Q337	R338	A339	A356	L357	R358	R362	R365	E366	I369	G370	I371	P372	R377	L378	L381	Q382	I383	K389	L390	A391	D392	V394	D395	L396	T403	E417	Q421	I423	K426	L429	I430	E433	E435	T436	I437	D438	A439																					
E440	M443	S444	L445	A446	D450	D451	Q458	S459	M460	Q473	M476	E477	D478	G481	D484	V485	K486	R487	E488	L492	K502	V514	L515	F516	P519	P520	G521	K524	E534	I540	P545	L548	T549	M550	E556	A557	N558	V559	R560	E561	D564																					
K566	A566	R567	Q568	P571	C572	V573	L574	F575	F576	I582	G588	N589	I590	I601	N602	G603	T604	L605	T606	N616	V617	F618	L619	N624	D627	I633	L639	D640	O641	L642	L643	L647	P648	D649	E650	R651	S652	R653	V654	A655	K656	R662	V670	G681																		
T688	R693	E701	L707	ARG	ARG	ARG	GLU	GLU	GLU	ARG	GLN	THR	THR	ASN	PRO	VAL	SER	TYR	THR	ALA	MET	GLU	GLU	ASN	ASN	VAL	GLU	GLU	ASP	ASP	LEU	ASP	PRO	V728	F729	E730	R732	R733	F742	A743	R744	R745	N750	D751	I752	R753	L762	Q763	Q764	S765	R766	G767	F768	G769	S770	F771	R772	S775	GLY	ASN	GLN	

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	14388	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.676	Depositor
Minimum map value	-0.246	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.022	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	332.0, 332.0, 332.0	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.0375, 1.0375, 1.0375	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ADP

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	0.25	0/5856	0.52	1/7906 (0.0%)
1	B	0.25	0/5856	0.52	1/7906 (0.0%)
1	C	0.25	0/5856	0.52	1/7906 (0.0%)
1	D	0.25	0/5856	0.52	1/7906 (0.0%)
1	E	0.25	0/5856	0.52	1/7906 (0.0%)
1	F	0.25	0/5856	0.52	1/7906 (0.0%)
All	All	0.25	0/35136	0.52	6/47436 (0.0%)

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	473	GLN	CA-CB-CG	5.17	124.78	113.40
1	F	473	GLN	CA-CB-CG	5.15	124.73	113.40
1	D	473	GLN	CA-CB-CG	5.15	124.73	113.40
1	A	473	GLN	CA-CB-CG	5.14	124.72	113.40
1	E	473	GLN	CA-CB-CG	5.14	124.72	113.40

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5760	0	5821	136	0
1	B	5760	0	5821	132	0
1	C	5760	0	5821	122	0
1	D	5760	0	5821	125	0
1	E	5760	0	5821	125	0
1	F	5760	0	5821	126	0
2	A	54	0	24	6	0
2	B	54	0	24	6	0
2	C	54	0	24	4	0
2	D	54	0	24	6	0
2	E	54	0	24	7	0
2	F	54	0	24	4	0
All	All	34884	0	35070	701	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.

The worst 5 of 701 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:84:MET:HE3	1:A:88:VAL:HG23	1.18	1.15
1:E:250:GLY:HA2	2:E:1001:ADP:O2A	1.46	1.15
1:C:84:MET:HE3	1:C:88:VAL:HG23	1.20	1.14
1:E:84:MET:CE	1:E:88:VAL:HG23	1.81	1.10
1:B:84:MET:HE3	1:B:88:VAL:HG23	1.22	1.10

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	731/821 (89%)	701 (96%)	28 (4%)	2 (0%)	41 71

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	731/821 (89%)	702 (96%)	27 (4%)	2 (0%)	41	71
1	C	731/821 (89%)	702 (96%)	27 (4%)	2 (0%)	41	71
1	D	731/821 (89%)	702 (96%)	27 (4%)	2 (0%)	41	71
1	E	731/821 (89%)	701 (96%)	28 (4%)	2 (0%)	41	71
1	F	731/821 (89%)	701 (96%)	28 (4%)	2 (0%)	41	71
All	All	4386/4926 (89%)	4209 (96%)	165 (4%)	12 (0%)	44	71

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	172	PRO
1	B	172	PRO
1	C	172	PRO
1	D	172	PRO
1	E	172	PRO

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	626/692 (90%)	624 (100%)	2 (0%)	92	96
1	B	626/692 (90%)	625 (100%)	1 (0%)	93	97
1	C	626/692 (90%)	625 (100%)	1 (0%)	93	97
1	D	626/692 (90%)	625 (100%)	1 (0%)	93	97
1	E	626/692 (90%)	625 (100%)	1 (0%)	93	97
1	F	626/692 (90%)	625 (100%)	1 (0%)	93	97
All	All	3756/4152 (90%)	3749 (100%)	7 (0%)	93	97

5 of 7 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	753	ARG

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Mol	Chain	Res	Type
1	D	753	ARG
1	F	753	ARG
1	E	753	ARG
1	B	753	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 13 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	384	HIS
1	C	458	GLN
1	F	317	HIS
1	D	458	GLN
1	E	384	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

12 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	ADP	A	1001	-	24,29,29	1.14	1 (4%)	29,45,45	1.65	5 (17%)
2	ADP	D	1001	-	24,29,29	1.14	1 (4%)	29,45,45	1.65	5 (17%)
2	ADP	E	1001	-	24,29,29	1.13	2 (8%)	29,45,45	1.63	5 (17%)
2	ADP	C	1001	-	24,29,29	1.15	2 (8%)	29,45,45	1.61	4 (13%)
2	ADP	E	1002	-	24,29,29	1.10	1 (4%)	29,45,45	1.37	4 (13%)
2	ADP	A	1002	-	24,29,29	1.10	1 (4%)	29,45,45	1.49	4 (13%)
2	ADP	D	1002	-	24,29,29	1.10	1 (4%)	29,45,45	1.49	4 (13%)
2	ADP	F	1001	-	24,29,29	1.15	2 (8%)	29,45,45	1.55	4 (13%)
2	ADP	F	1002	-	24,29,29	1.09	2 (8%)	29,45,45	1.55	3 (10%)
2	ADP	B	1002	-	24,29,29	1.10	1 (4%)	29,45,45	1.38	4 (13%)
2	ADP	C	1002	-	24,29,29	1.10	2 (8%)	29,45,45	1.55	3 (10%)
2	ADP	B	1001	-	24,29,29	1.13	2 (8%)	29,45,45	1.63	5 (17%)

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	ADP	A	1001	-	-	7/12/32/32	0/3/3/3
2	ADP	D	1001	-	-	7/12/32/32	0/3/3/3
2	ADP	E	1001	-	-	6/12/32/32	0/3/3/3
2	ADP	C	1001	-	-	6/12/32/32	0/3/3/3
2	ADP	E	1002	-	-	4/12/32/32	0/3/3/3
2	ADP	A	1002	-	-	4/12/32/32	0/3/3/3
2	ADP	D	1002	-	-	4/12/32/32	0/3/3/3
2	ADP	F	1001	-	-	4/12/32/32	0/3/3/3
2	ADP	F	1002	-	-	5/12/32/32	0/3/3/3
2	ADP	B	1002	-	-	4/12/32/32	0/3/3/3
2	ADP	C	1002	-	-	5/12/32/32	0/3/3/3
2	ADP	B	1001	-	-	6/12/32/32	0/3/3/3

The worst 5 of 18 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1001	ADP	C2'-C1'	-2.79	1.49	1.53
2	D	1001	ADP	C2'-C1'	-2.73	1.49	1.53

Continued on next page...

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1001	ADP	C2'-C1'	-2.73	1.49	1.53
2	E	1001	ADP	C2'-C1'	-2.70	1.49	1.53
2	F	1001	ADP	C2'-C1'	-2.60	1.49	1.53

The worst 5 of 50 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	1001	ADP	PA-O3A-PB	-5.24	114.86	132.83
2	A	1001	ADP	PA-O3A-PB	-5.23	114.86	132.83
2	C	1001	ADP	PA-O3A-PB	-5.14	115.19	132.83
2	B	1001	ADP	PA-O3A-PB	-5.03	115.57	132.83
2	E	1001	ADP	PA-O3A-PB	-5.02	115.58	132.83

There are no chirality outliers.

5 of 62 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1001	ADP	C5'-O5'-PA-O1A
2	A	1001	ADP	O4'-C4'-C5'-O5'
2	A	1002	ADP	C5'-O5'-PA-O3A
2	B	1001	ADP	C5'-O5'-PA-O1A
2	B	1001	ADP	O4'-C4'-C5'-O5'

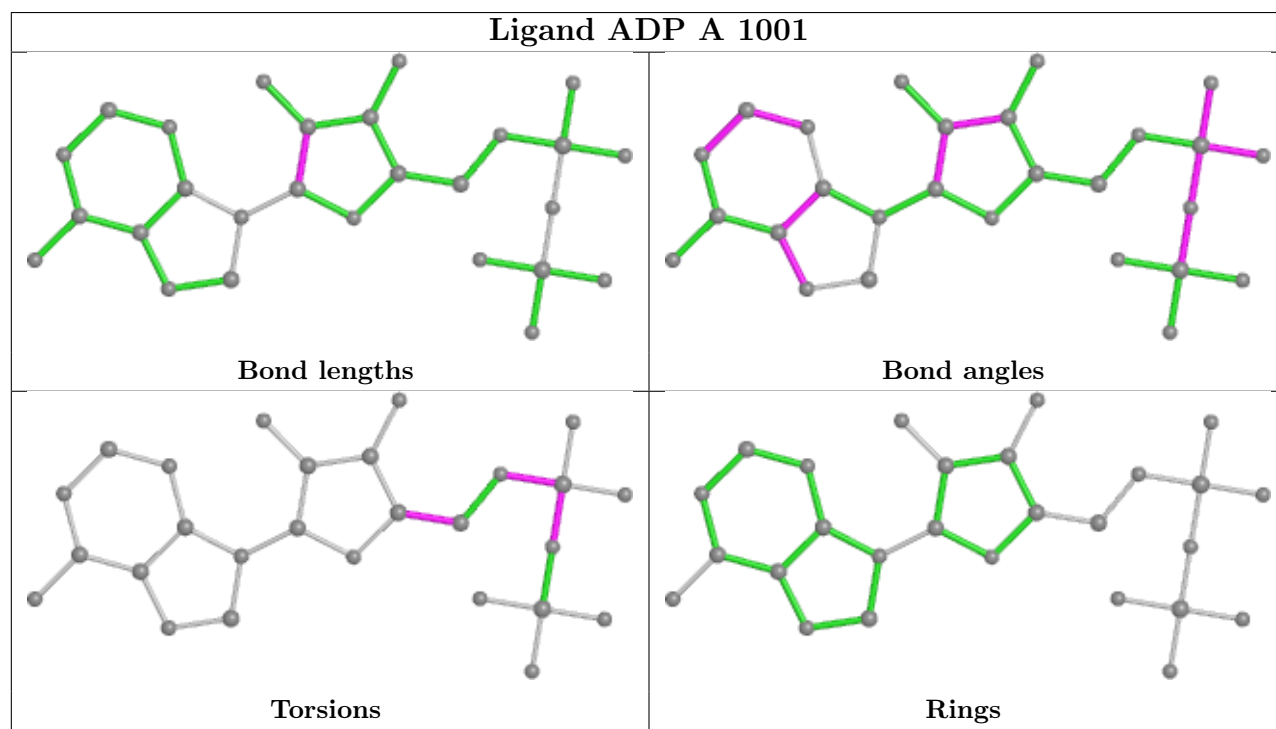
There are no ring outliers.

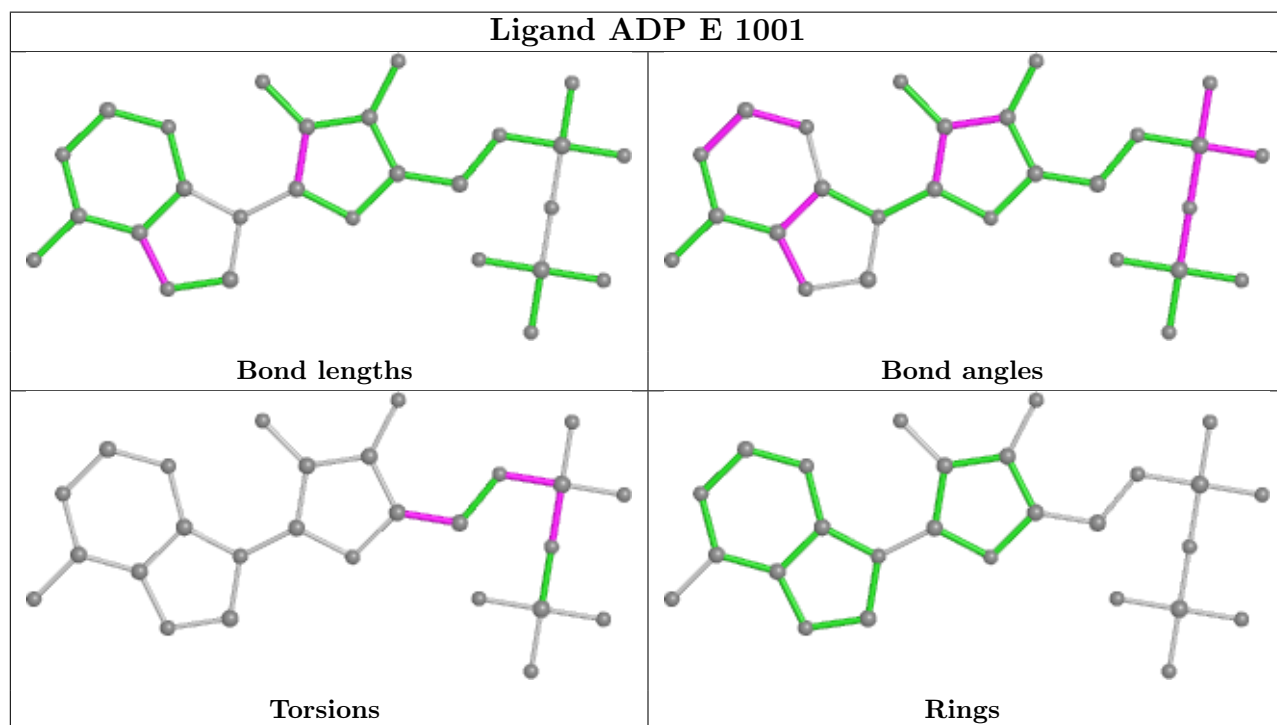
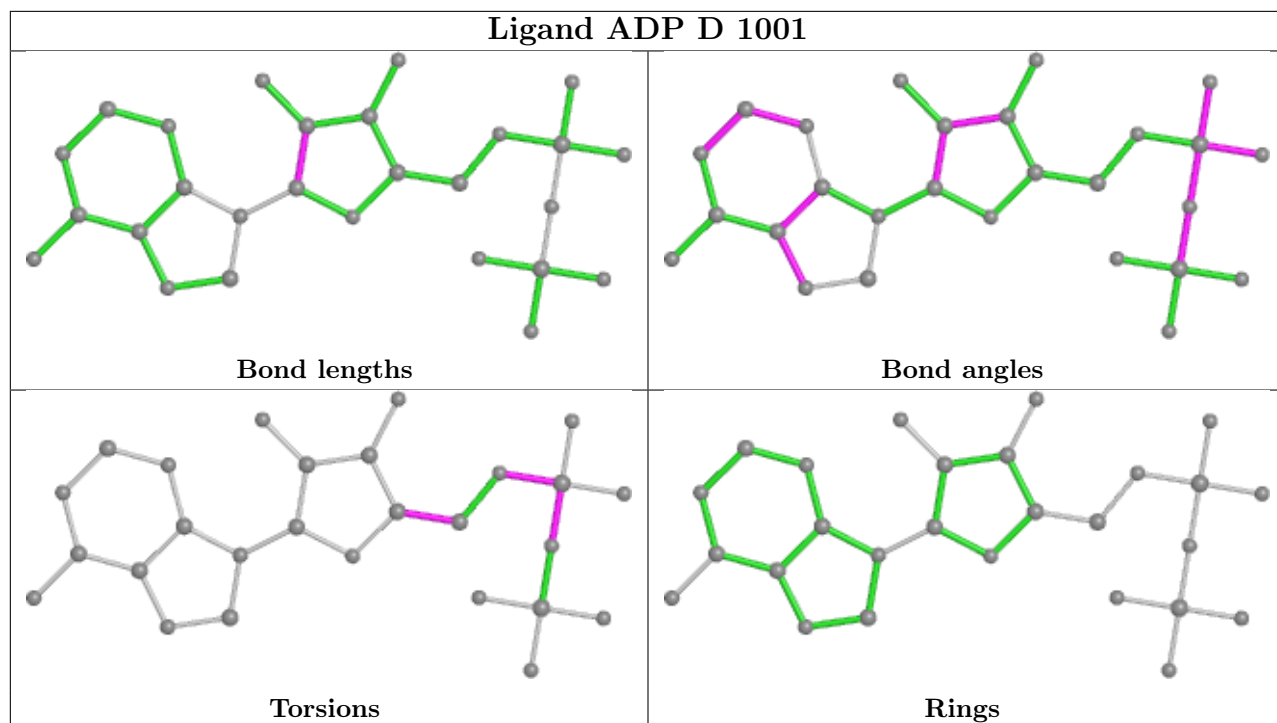
12 monomers are involved in 33 short contacts:

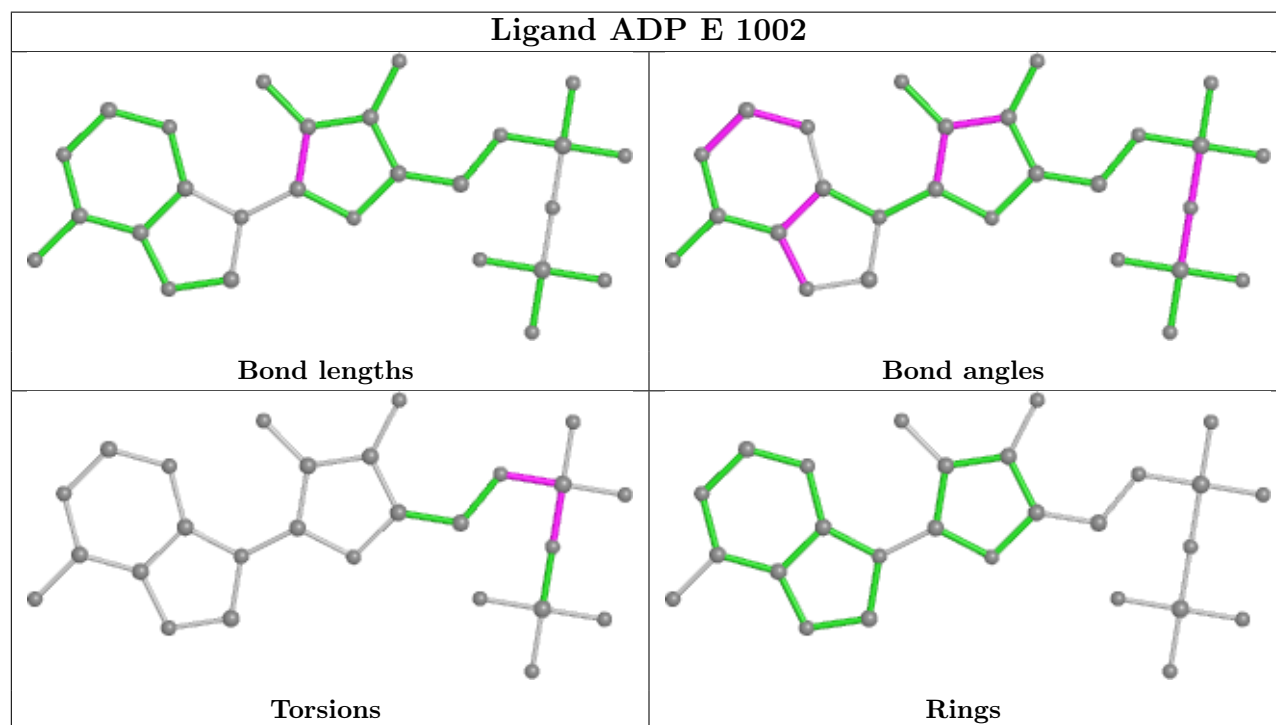
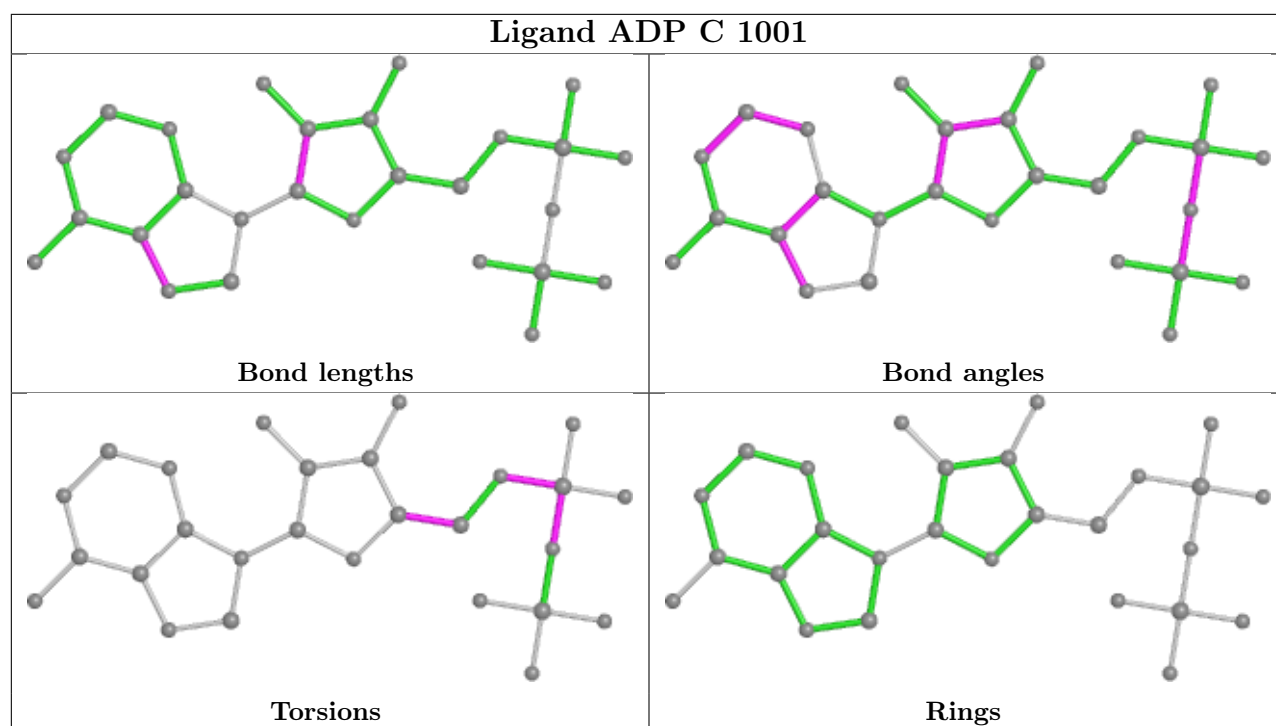
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1001	ADP	2	0
2	D	1001	ADP	2	0
2	E	1001	ADP	2	0
2	C	1001	ADP	1	0
2	E	1002	ADP	5	0
2	A	1002	ADP	4	0
2	D	1002	ADP	4	0
2	F	1001	ADP	1	0
2	F	1002	ADP	3	0
2	B	1002	ADP	4	0
2	C	1002	ADP	3	0
2	B	1001	ADP	2	0

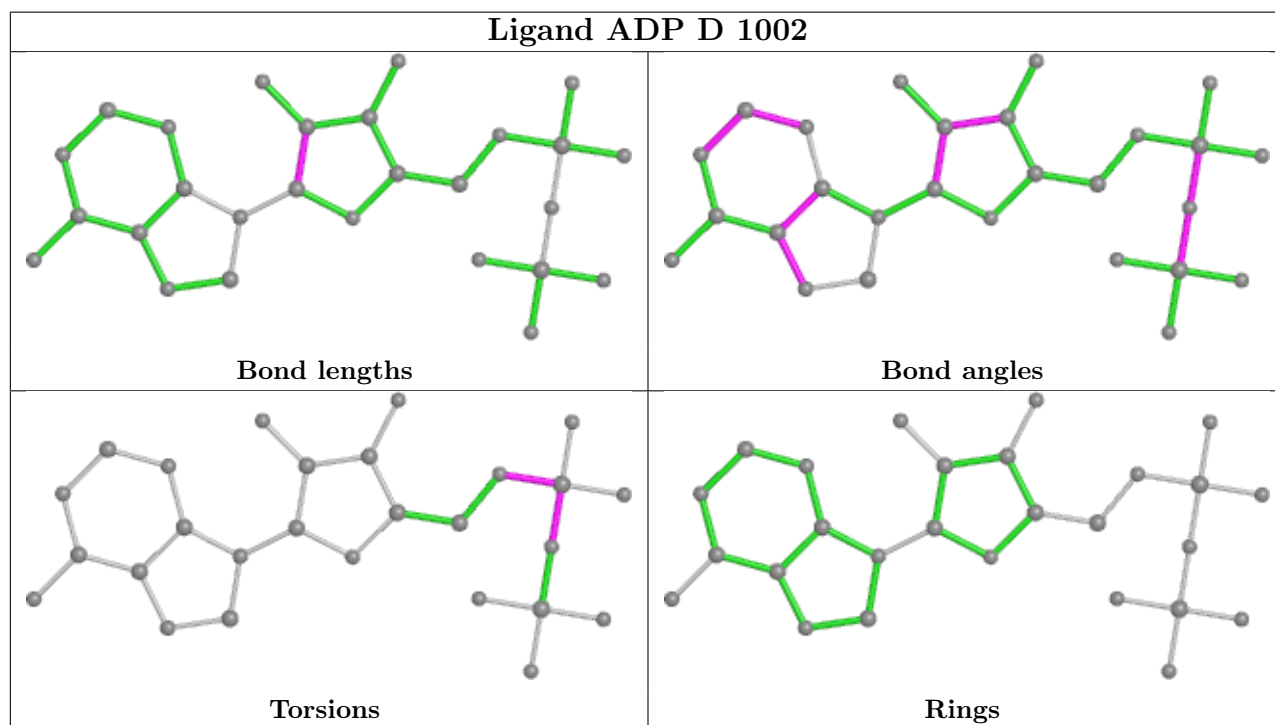
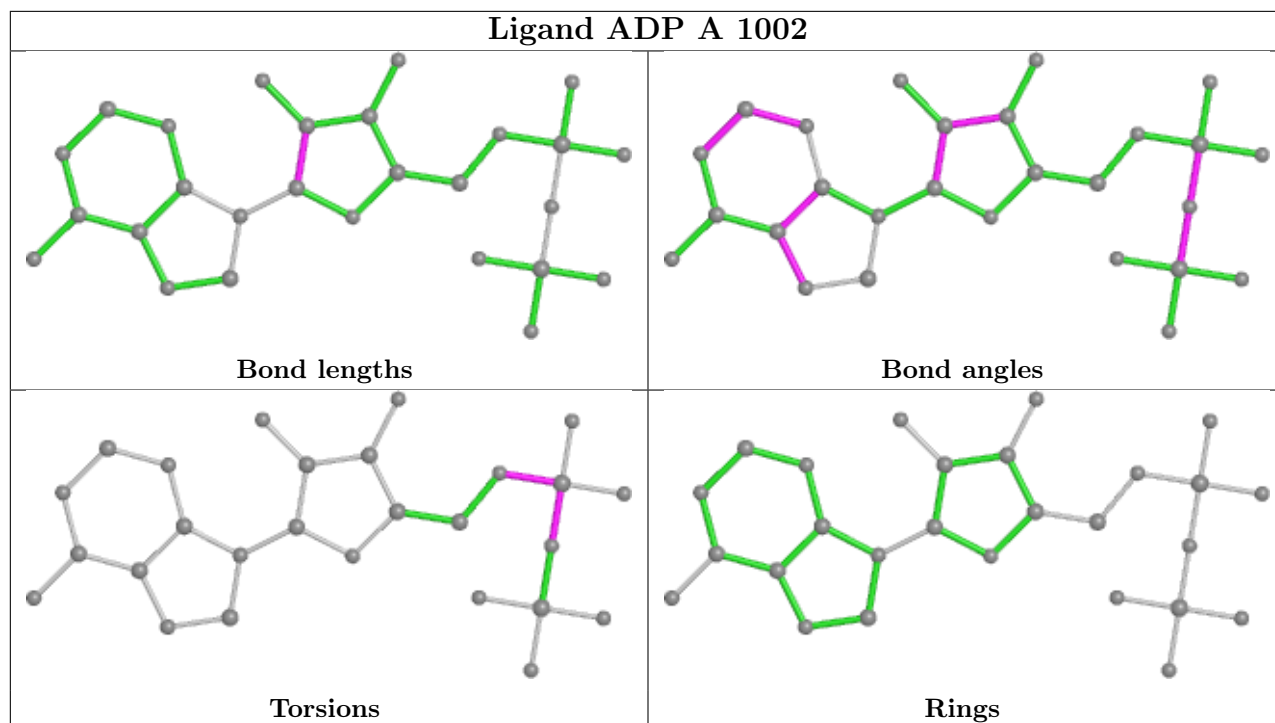
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

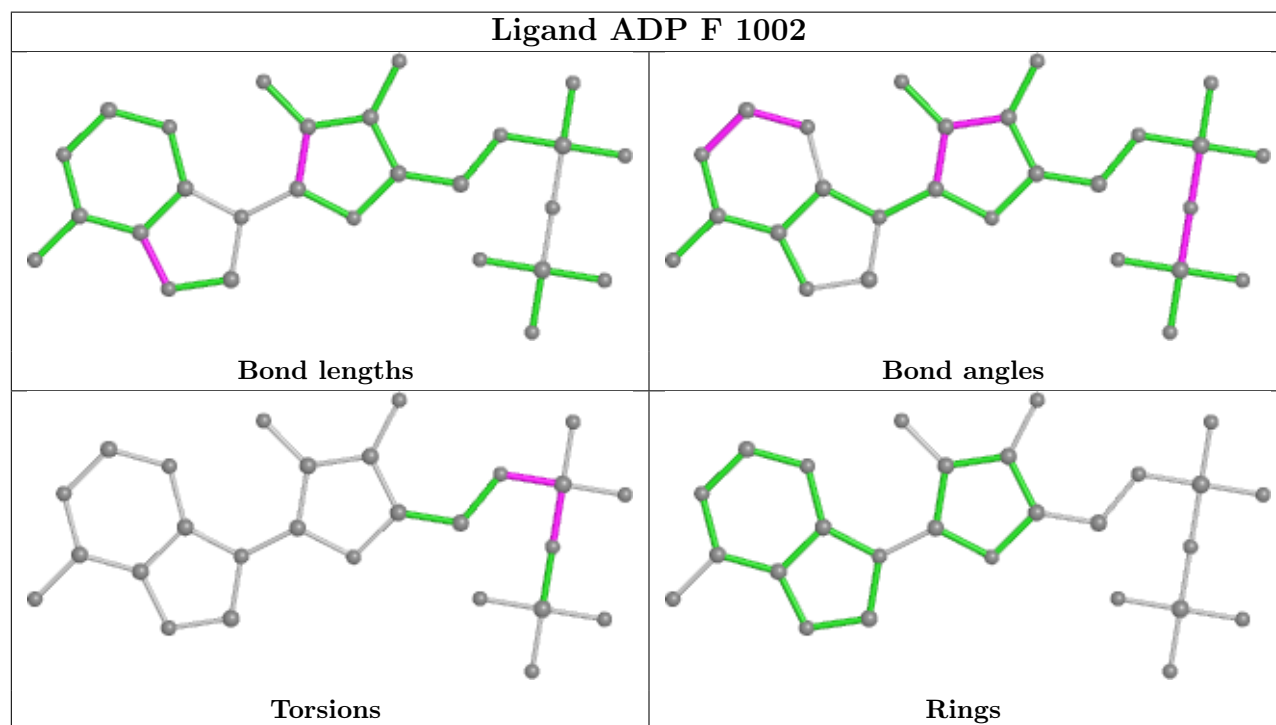
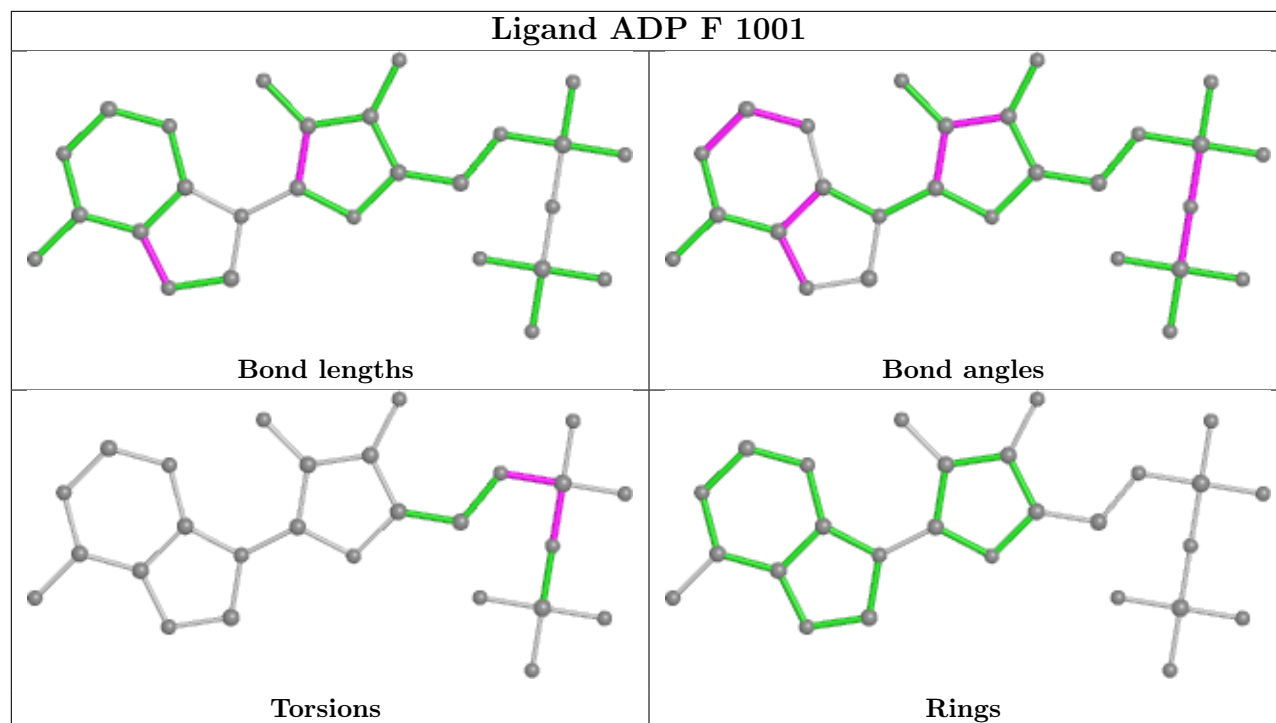
bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 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.

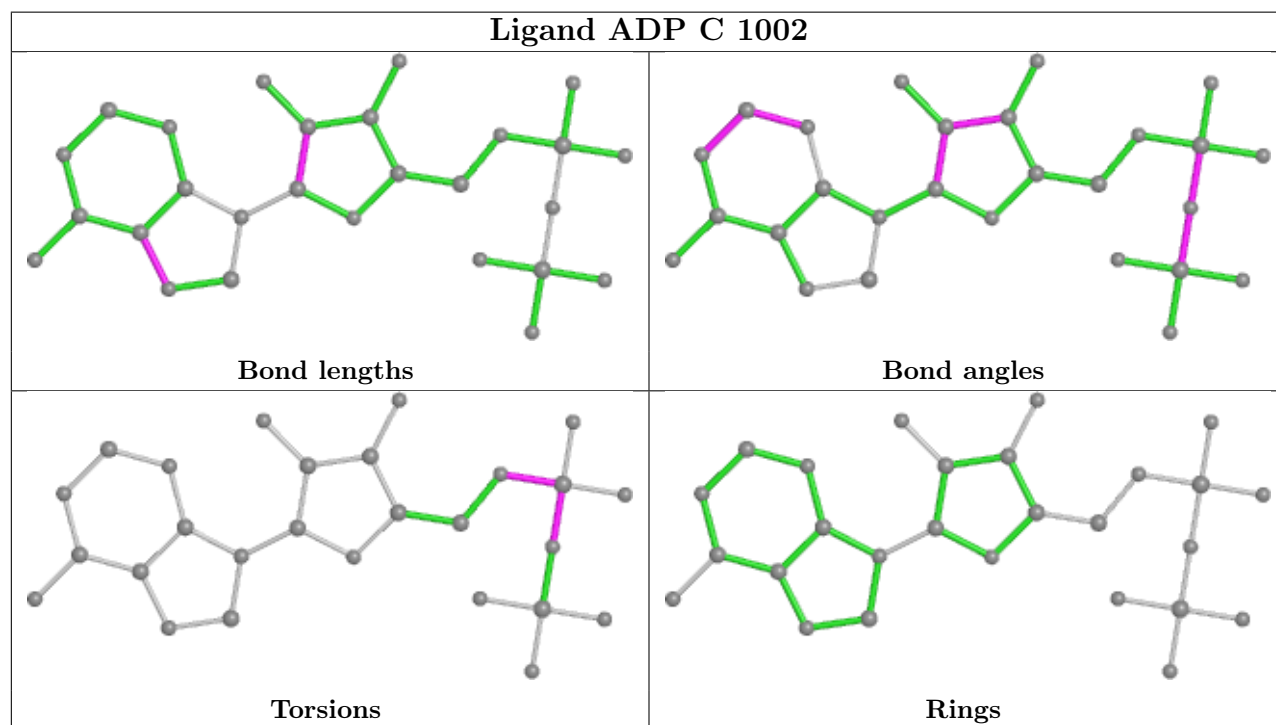
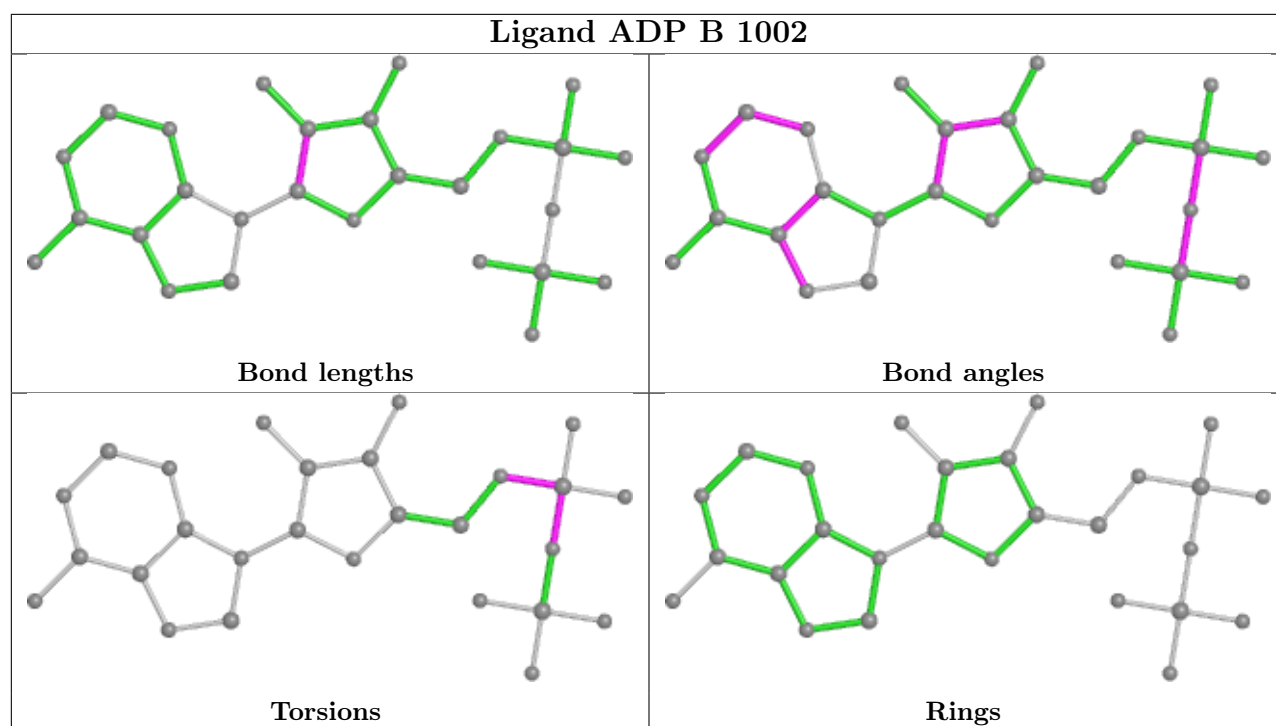


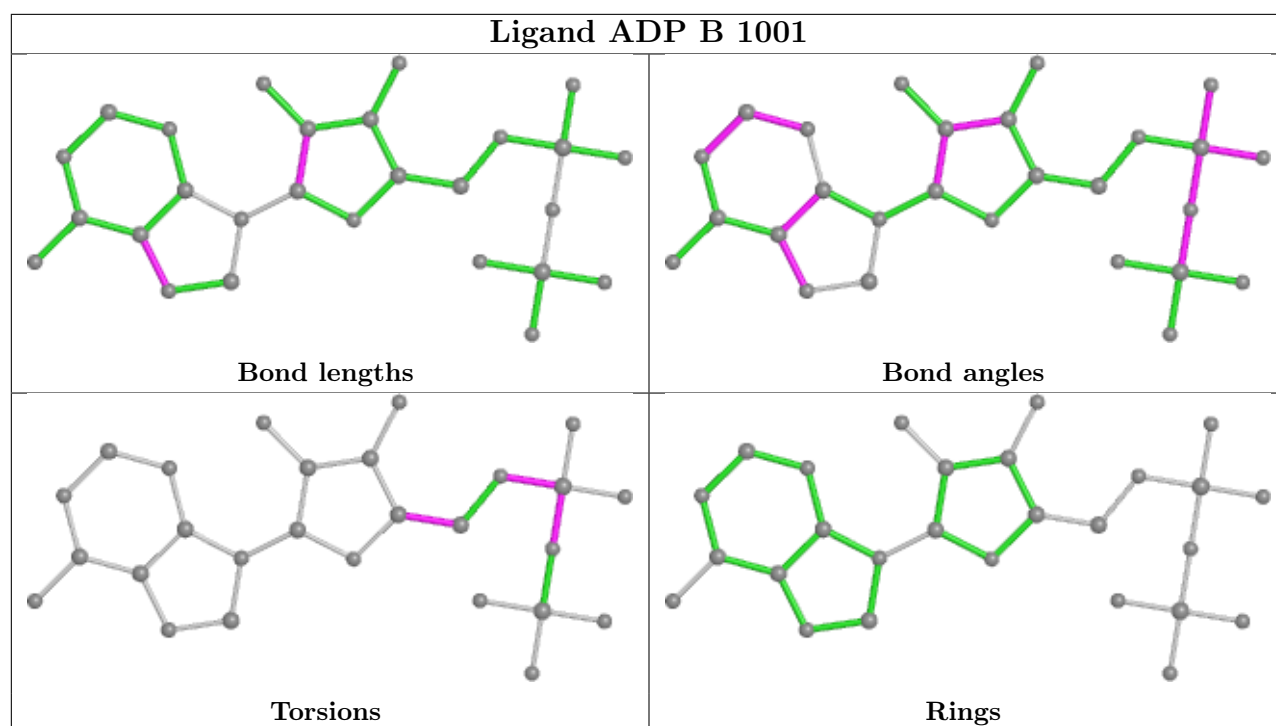












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

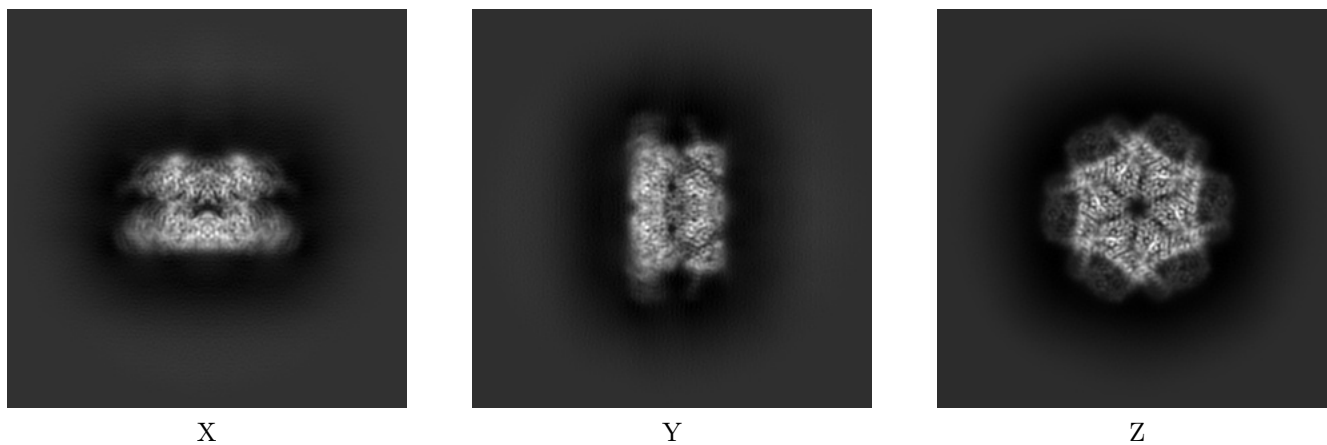
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-24524. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

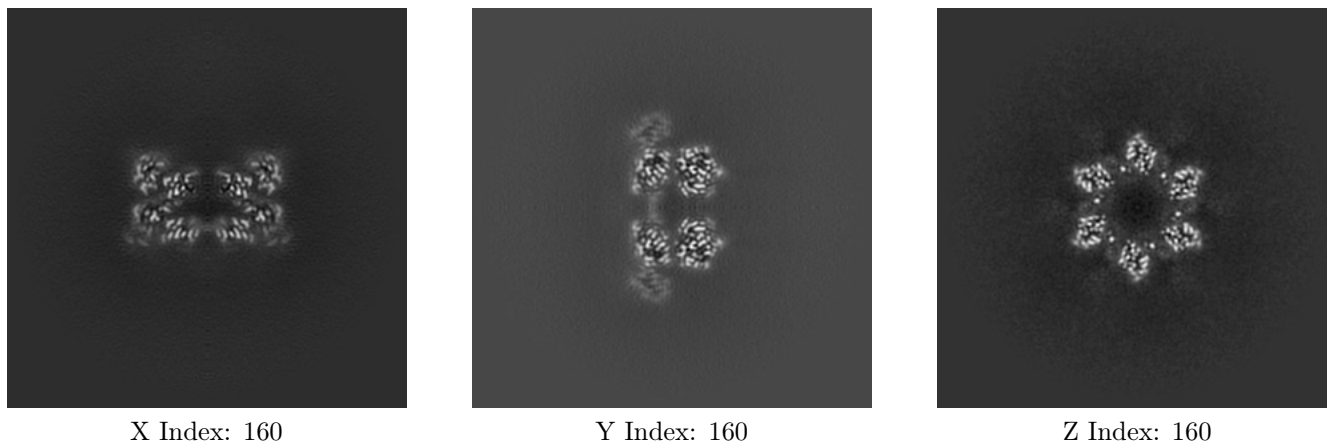
6.1.1 Primary map



The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

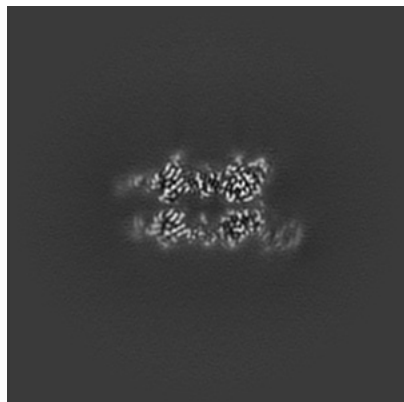
6.2.1 Primary map



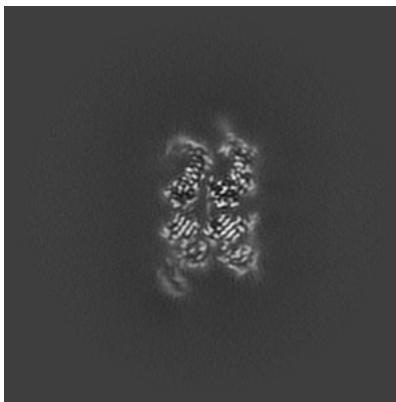
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

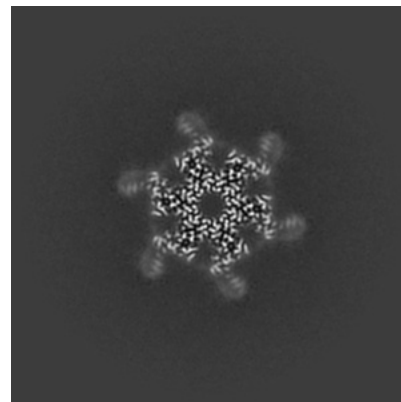
6.3.1 Primary map



X Index: 175



Y Index: 135

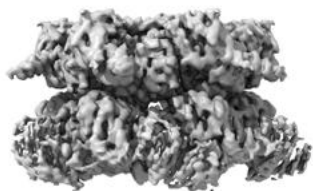


Z Index: 175

The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

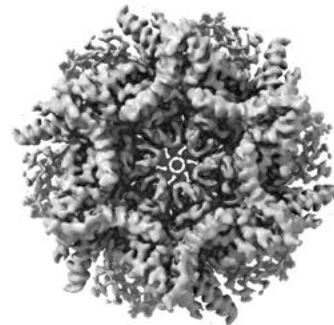
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

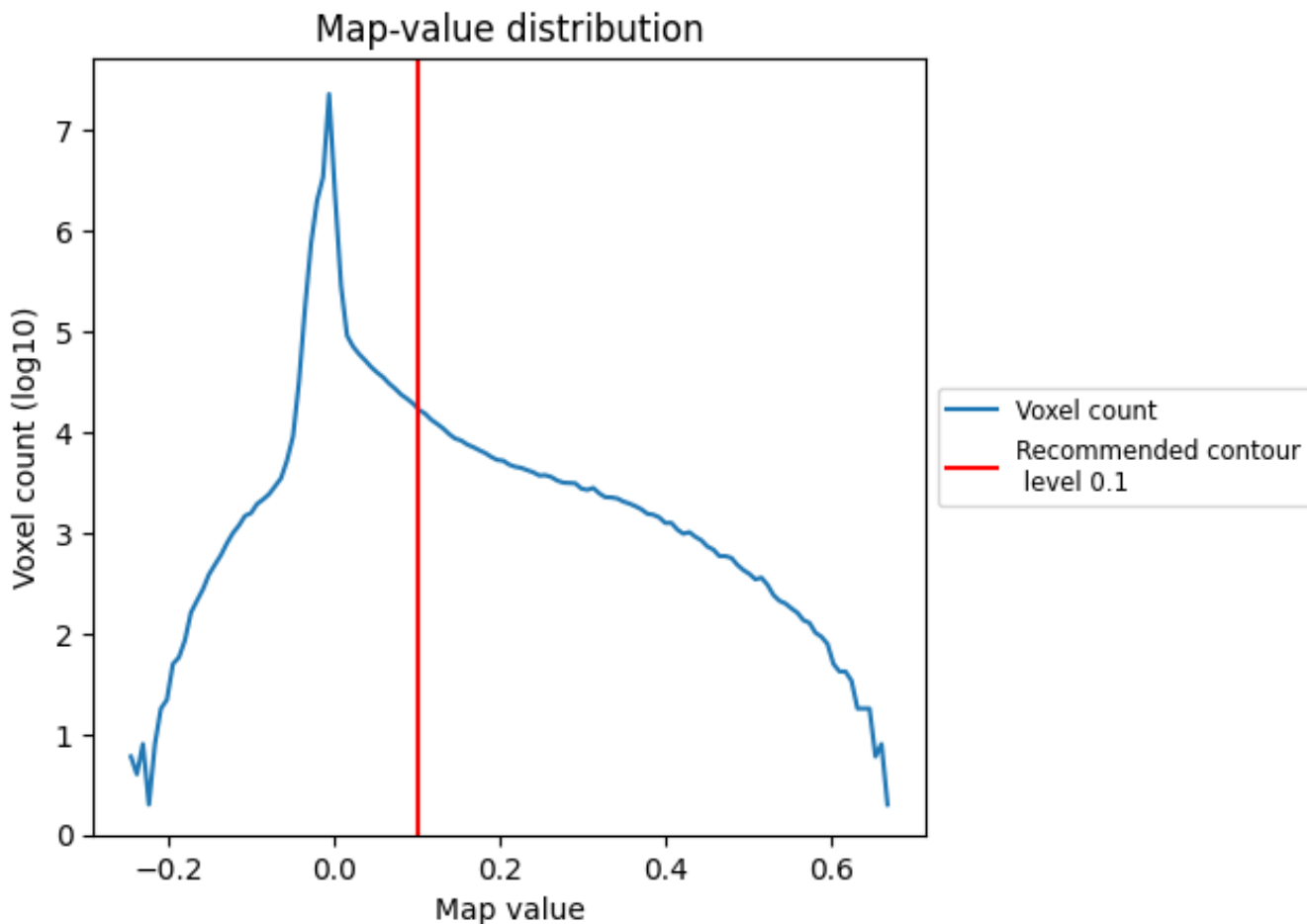
6.5 Mask visualisation

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

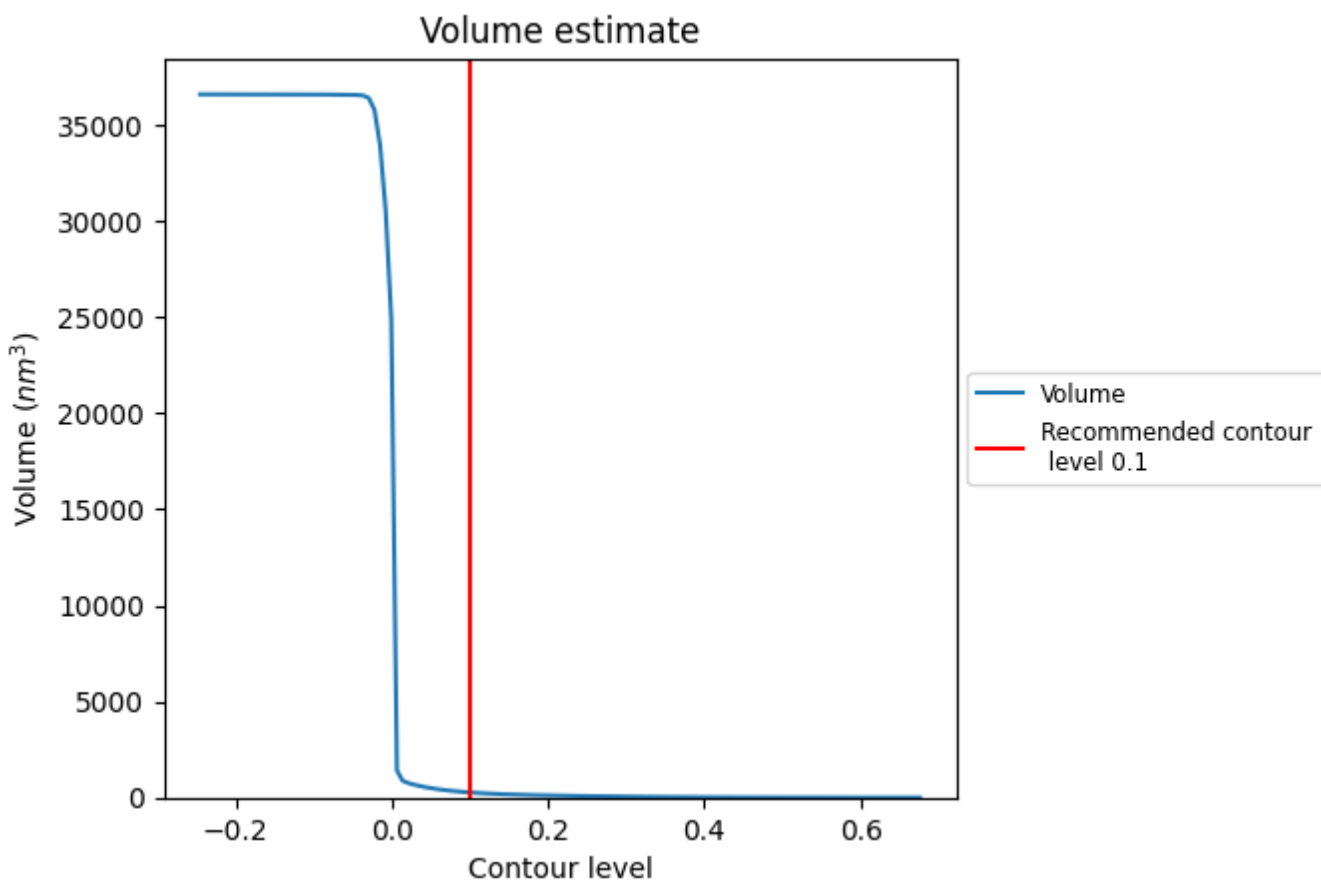
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

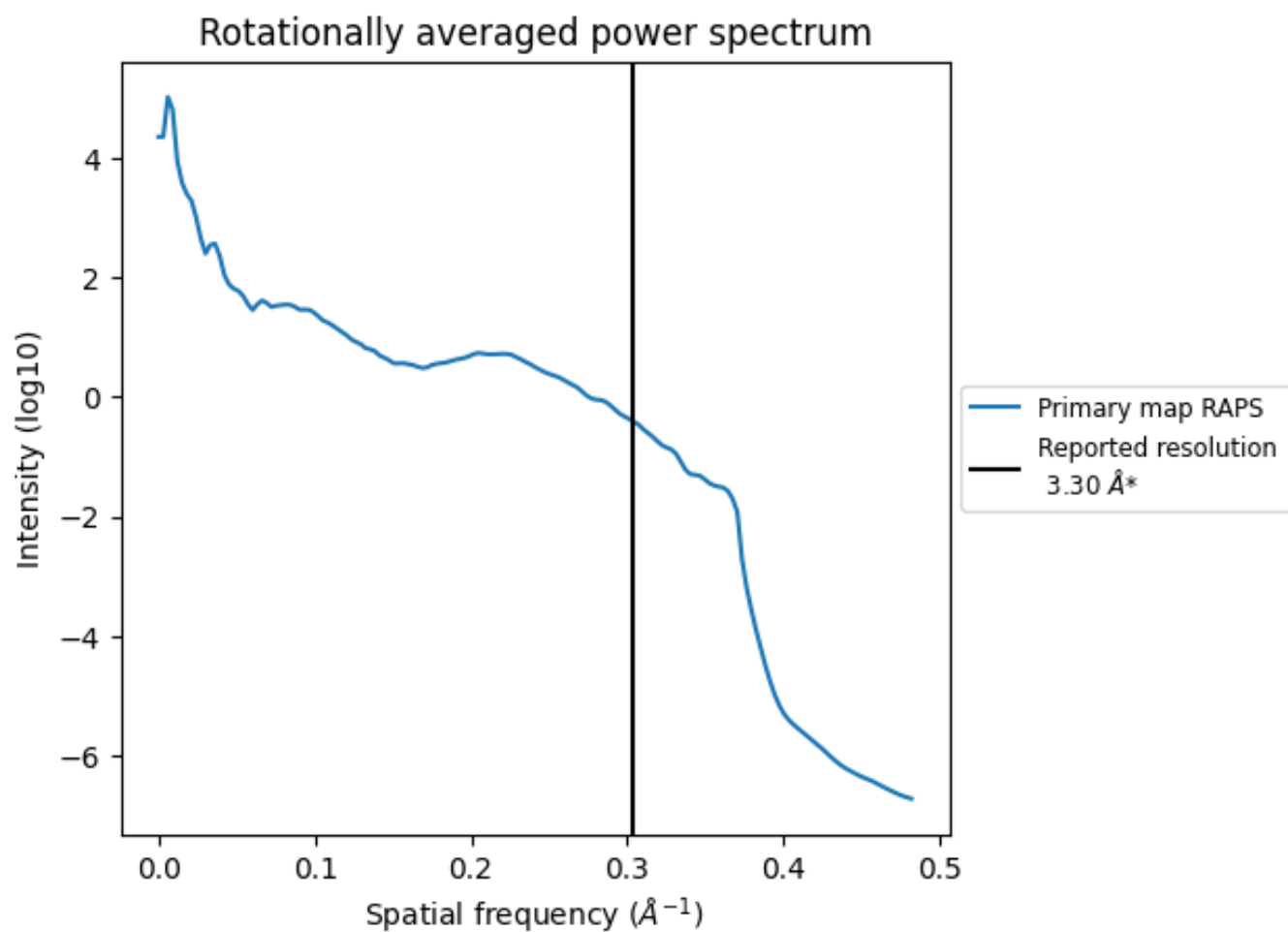
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 264 nm^3 ; this corresponds to an approximate mass of 238 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum [i](#)

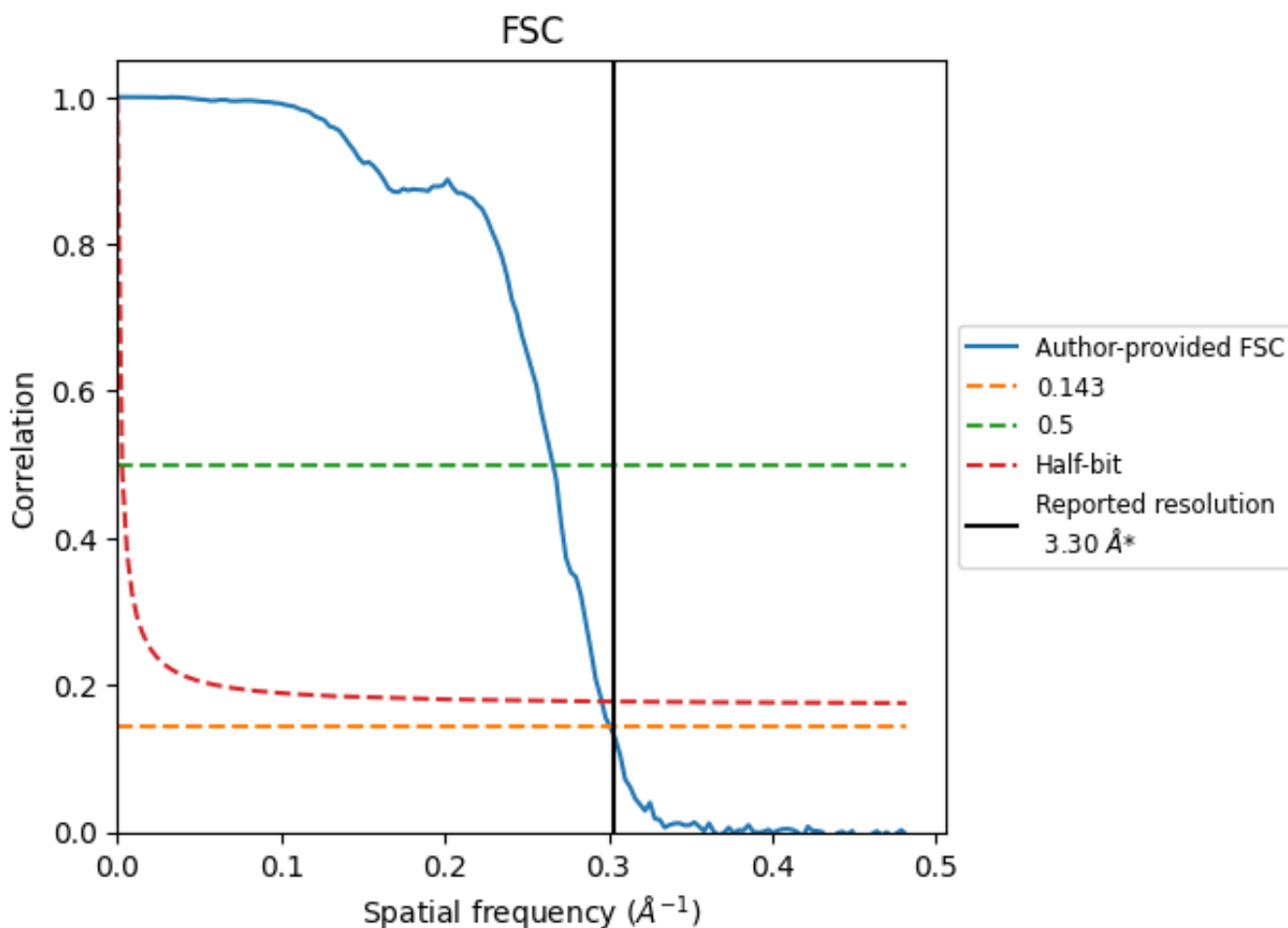


*Reported resolution corresponds to spatial frequency of 0.303\AA^{-1}

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8.2 Resolution estimates [i](#)

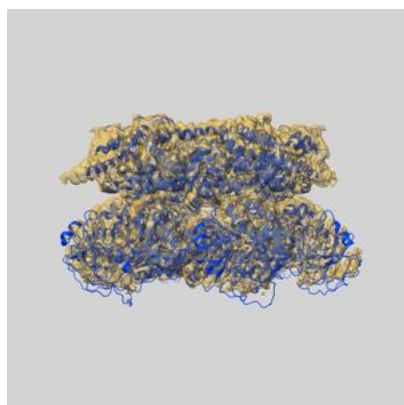
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.32	3.76	3.38
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

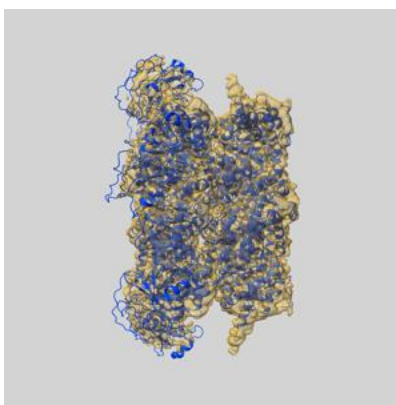
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-24524 and PDB model 7RLB. Per-residue inclusion information can be found in section 3 on page 7.

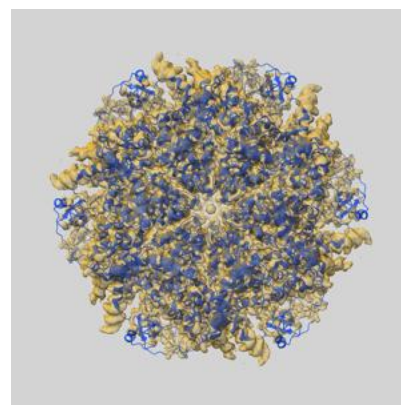
9.1 Map-model overlay [i](#)



X



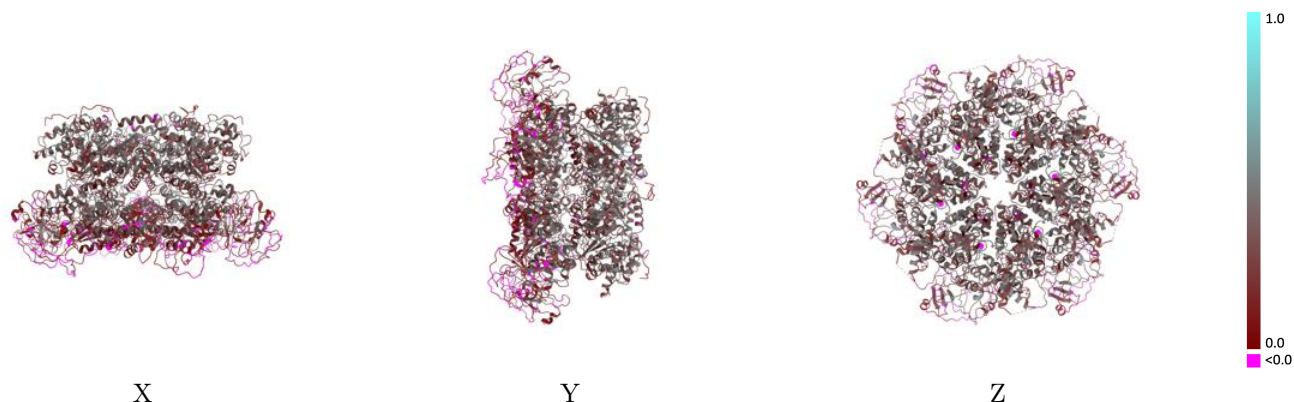
Y



Z

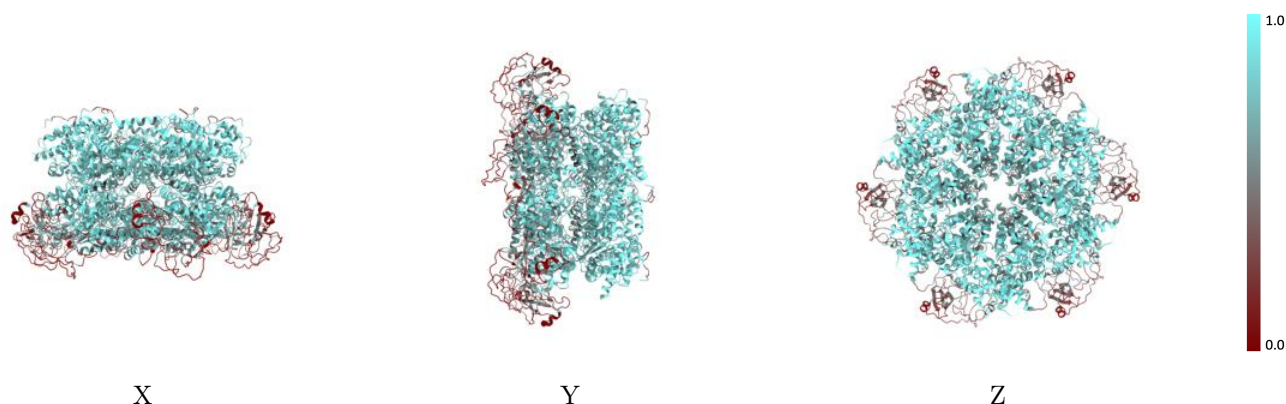
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



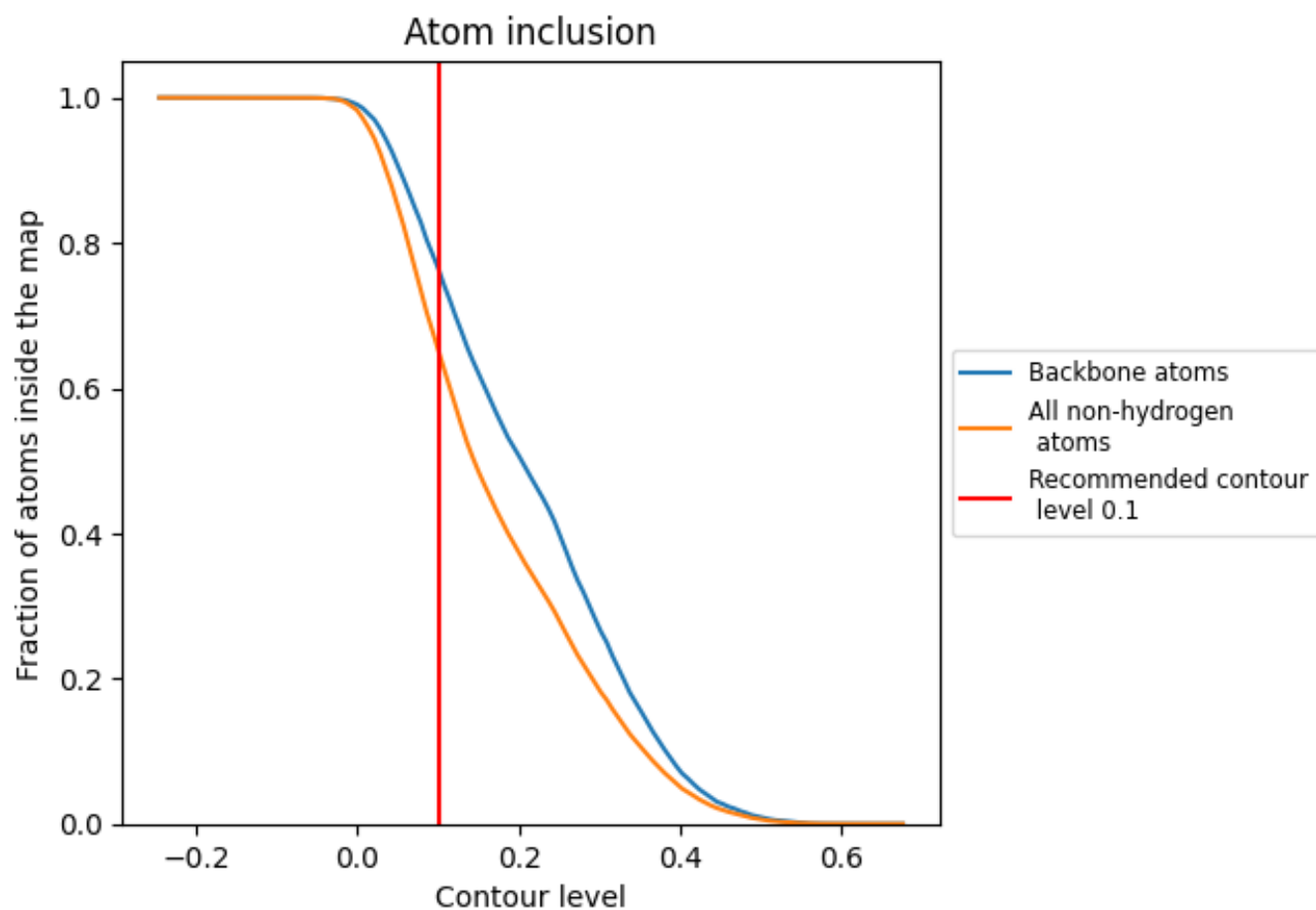
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.1).















9.4 Atom inclusion [i](#)



At the recommended contour level, 77% of all backbone atoms, 65% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6526	 0.2770
A	 0.6565	 0.2810
B	 0.6485	 0.2720
C	 0.6509	 0.2770
D	 0.6543	 0.2770
E	 0.6485	 0.2700
F	 0.6567	 0.2840

