



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 6, 2026 – 11:28 AM UTC

PDB ID : 2CEA / pdb_00002cea
Title : CELL DIVISION PROTEIN FTSH
Authors : Bieniossek, C.; Baumann, U.
Deposited on : 2006-02-03
Resolution : 2.75 Å(reported)

This is a wwPDB X-ray Structure 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/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

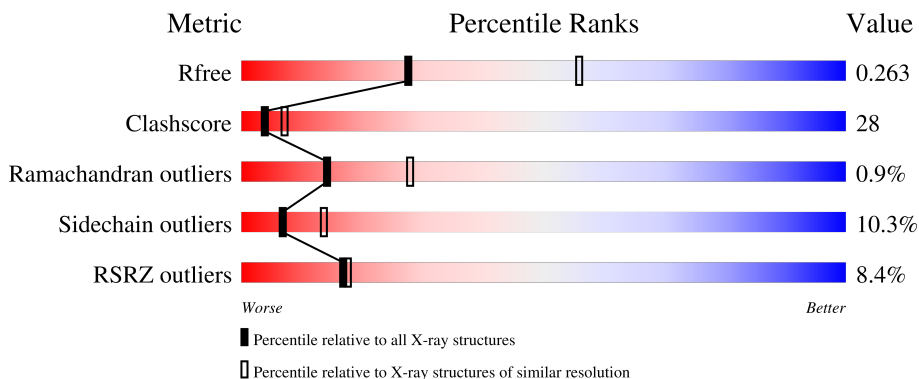
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION





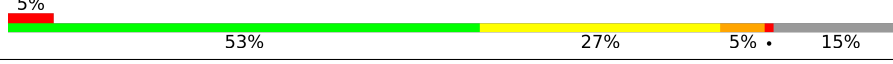
The reported resolution of this entry is 2.75 Å.

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	1009 (2.76-2.76)
Clashscore	190562	1044 (2.76-2.76)
Ramachandran outliers	187476	1024 (2.76-2.76)
Sidechain outliers	187428	1024 (2.76-2.76)
RSRZ outliers	180081	1009 (2.76-2.76)

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	476	
1	B	476	
1	C	476	
1	D	476	
1	E	476	

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Mol	Chain	Length	Quality of chain
1	F	476	

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	ADP	C	1608	-	-	X	-

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 19564 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 CELL DIVISION PROTEIN FTSH.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	407	3160	1996	559	595	10	0	0	1
1	B	411	3191	2017	560	604	10	0	0	0
1	C	421	3280	2076	573	621	10	0	0	0
1	D	413	3212	2032	562	608	10	0	0	0
1	E	406	3144	1986	557	591	10	0	0	1
1	F	412	3204	2024	564	606	10	0	0	0

There are 82 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	146	MET	-	expression tag	UNP Q9WZ49
A	611	ALA	-	expression tag	UNP Q9WZ49
A	612	ALA	-	expression tag	UNP Q9WZ49
A	613	ALA	-	expression tag	UNP Q9WZ49
A	614	LEU	-	expression tag	UNP Q9WZ49
A	615	GLU	-	expression tag	UNP Q9WZ49
A	616	HIS	-	expression tag	UNP Q9WZ49
A	617	HIS	-	expression tag	UNP Q9WZ49
A	618	HIS	-	expression tag	UNP Q9WZ49
A	619	HIS	-	expression tag	UNP Q9WZ49
A	620	HIS	-	expression tag	UNP Q9WZ49
A	621	HIS	-	expression tag	UNP Q9WZ49
A	410	LEU	LYS	engineered mutation	UNP Q9WZ49
A	415	ALA	LYS	engineered mutation	UNP Q9WZ49
B	146	MET	-	expression tag	UNP Q9WZ49
B	611	ALA	-	expression tag	UNP Q9WZ49
B	612	ALA	-	expression tag	UNP Q9WZ49

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Chain	Residue	Modelled	Actual	Comment	Reference
B	613	ALA	-	expression tag	UNP Q9WZ49
B	614	LEU	-	expression tag	UNP Q9WZ49
B	615	GLU	-	expression tag	UNP Q9WZ49
B	616	HIS	-	expression tag	UNP Q9WZ49
B	617	HIS	-	expression tag	UNP Q9WZ49
B	618	HIS	-	expression tag	UNP Q9WZ49
B	619	HIS	-	expression tag	UNP Q9WZ49
B	620	HIS	-	expression tag	UNP Q9WZ49
B	621	HIS	-	expression tag	UNP Q9WZ49
B	410	LEU	LYS	engineered mutation	UNP Q9WZ49
B	415	ALA	LYS	engineered mutation	UNP Q9WZ49
C	146	MET	-	expression tag	UNP Q9WZ49
C	611	ALA	-	expression tag	UNP Q9WZ49
C	612	ALA	-	expression tag	UNP Q9WZ49
C	613	ALA	-	expression tag	UNP Q9WZ49
C	614	LEU	-	expression tag	UNP Q9WZ49
C	615	GLU	-	expression tag	UNP Q9WZ49
C	616	HIS	-	expression tag	UNP Q9WZ49
C	617	HIS	-	expression tag	UNP Q9WZ49
C	618	HIS	-	expression tag	UNP Q9WZ49
C	619	HIS	-	expression tag	UNP Q9WZ49
C	620	HIS	-	expression tag	UNP Q9WZ49
C	621	HIS	-	expression tag	UNP Q9WZ49
C	410	LEU	LYS	engineered mutation	UNP Q9WZ49
C	415	ALA	LYS	engineered mutation	UNP Q9WZ49
D	146	MET	-	expression tag	UNP Q9WZ49
D	611	ALA	-	expression tag	UNP Q9WZ49
D	612	ALA	-	expression tag	UNP Q9WZ49
D	613	ALA	-	expression tag	UNP Q9WZ49
D	614	LEU	-	expression tag	UNP Q9WZ49
D	615	GLU	-	expression tag	UNP Q9WZ49
D	616	HIS	-	expression tag	UNP Q9WZ49
D	617	HIS	-	expression tag	UNP Q9WZ49
D	618	HIS	-	expression tag	UNP Q9WZ49
D	619	HIS	-	expression tag	UNP Q9WZ49
D	620	HIS	-	expression tag	UNP Q9WZ49
D	621	HIS	-	expression tag	UNP Q9WZ49
D	410	LEU	LYS	engineered mutation	UNP Q9WZ49
D	415	ALA	LYS	engineered mutation	UNP Q9WZ49
E	146	MET	-	expression tag	UNP Q9WZ49
E	611	ALA	-	expression tag	UNP Q9WZ49
E	612	ALA	-	expression tag	UNP Q9WZ49

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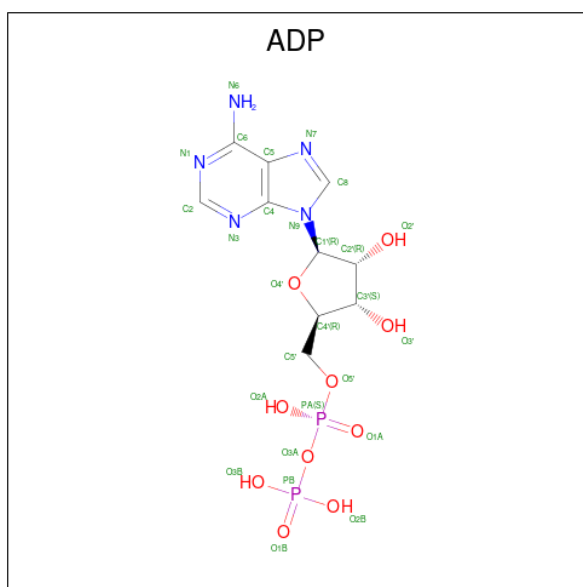
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Chain	Residue	Modelled	Actual	Comment	Reference
E	613	ALA	-	expression tag	UNP Q9WZ49
E	614	LEU	-	expression tag	UNP Q9WZ49
E	615	GLU	-	expression tag	UNP Q9WZ49
E	616	HIS	-	expression tag	UNP Q9WZ49
E	617	HIS	-	expression tag	UNP Q9WZ49
E	618	HIS	-	expression tag	UNP Q9WZ49
E	619	HIS	-	expression tag	UNP Q9WZ49
E	620	HIS	-	expression tag	UNP Q9WZ49
E	621	HIS	-	expression tag	UNP Q9WZ49
E	410	LEU	LYS	engineered mutation	UNP Q9WZ49
E	415	ALA	LYS	engineered mutation	UNP Q9WZ49
F	146	MET	-	expression tag	UNP Q9WZ49
F	611	ALA	-	expression tag	UNP Q9WZ49
F	612	ALA	-	expression tag	UNP Q9WZ49
F	613	ALA	-	expression tag	UNP Q9WZ49
F	614	LEU	-	expression tag	UNP Q9WZ49
F	615	GLU	-	expression tag	UNP Q9WZ49
F	616	HIS	-	expression tag	UNP Q9WZ49
F	617	HIS	-	expression tag	UNP Q9WZ49
F	618	HIS	-	expression tag	UNP Q9WZ49
F	619	HIS	-	expression tag	UNP Q9WZ49
F	620	HIS	-	expression tag	UNP Q9WZ49
F	621	HIS	-	expression tag	UNP Q9WZ49

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Zn 1 1	0	0
2	B	1	Total Zn 1 1	0	0
2	C	1	Total Zn 1 1	0	0
2	D	1	Total Zn 1 1	0	0
2	E	1	Total Zn 1 1	0	0
2	F	1	Total Zn 1 1	0	0

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: C₁₀H₁₅N₅O₁₀P₂).



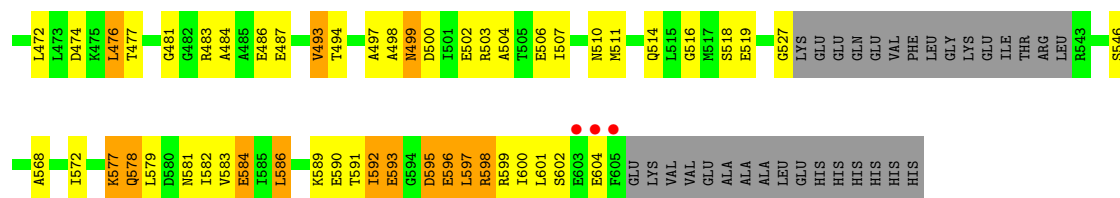
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	C	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	D	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	E	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	F	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	1	Total	Mg	0	0
			1	1		
4	B	1	Total	Mg	0	0
			1	1		
4	C	1	Total	Mg	0	0
			1	1		
4	D	1	Total	Mg	0	0
			1	1		
4	E	1	Total	Mg	0	0
			1	1		
4	F	1	Total	Mg	0	0
			1	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	46	Total O 46 46	0	0
5	B	35	Total O 35 35	0	0
5	C	26	Total O 26 26	0	0
5	D	34	Total O 34 34	0	0
5	E	34	Total O 34 34	0	0
5	F	24	Total O 24 24	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	165.32Å 165.32Å 234.75Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	25.00 – 2.75 25.00 – 2.75	Depositor EDS
% Data completeness (in resolution range)	100.0 (25.00-2.75) 97.4 (25.00-2.75)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.15 (at 2.75Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.216 , 0.262 0.215 , 0.263	Depositor DCC
R_{free} test set	1283 reflections (1.55%)	wwPDB-VP
Wilson B-factor (Å ²)	56.7	Xtrriage
Anisotropy	0.047	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 76.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	19564	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.25% 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 [i](#)

5.1 Standard geometry [i](#)

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

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	1.02	3/3202 (0.1%)	0.85	0/4314
1	B	0.96	2/3233 (0.1%)	0.84	3/4356 (0.1%)
1	C	0.77	0/3328	0.79	0/4488
1	D	0.89	0/3256	0.81	1/4388 (0.0%)
1	E	0.94	1/3185 (0.0%)	0.82	3/4291 (0.1%)
1	F	0.73	0/3248	0.77	2/4376 (0.0%)
All	All	0.89	6/19452 (0.0%)	0.81	9/26213 (0.0%)

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	602	SER	C-N	-6.96	1.23	1.33
1	A	602	SER	C-N	-6.77	1.23	1.33
1	B	572	ILE	CA-CB	-6.30	1.47	1.54
1	A	440	VAL	CA-CB	-6.03	1.47	1.54
1	B	434	VAL	CA-CB	-5.70	1.46	1.54

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	405	PRO	N-CA-CB	7.21	110.93	103.00
1	F	413	SER	CA-C-N	6.76	128.29	119.84
1	F	413	SER	C-N-CA	6.76	128.29	119.84
1	E	511	MET	N-CA-C	-5.64	105.13	111.28
1	E	592	ILE	N-CA-C	5.63	116.48	108.42

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3160	0	3240	128	0
1	B	3191	0	3261	150	0
1	C	3280	0	3346	207	0
1	D	3212	0	3283	128	0
1	E	3144	0	3231	181	0
1	F	3204	0	3270	316	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
3	A	27	0	12	1	0
3	B	27	0	12	7	0
3	C	27	0	12	10	0
3	D	27	0	12	6	0
3	E	27	0	12	7	0
3	F	27	0	12	5	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
5	A	46	0	0	5	0
5	B	35	0	0	13	0
5	C	26	0	0	9	0
5	D	34	0	0	11	0
5	E	34	0	0	6	0
5	F	24	0	0	10	0
All	All	19564	0	19703	1108	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 28.

The worst 5 of 1108 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:C:519:GLU:HA	5:C:2018:HOH:O	1.15	1.27
1:E:231:VAL:HG12	1:E:232:GLU:OE2	1.11	1.27
1:E:231:VAL:CG1	1:E:232:GLU:OE2	1.84	1.24
1:C:340:LEU:O	1:C:344:THR:HG22	1.38	1.20
1:C:594:GLY:N	5:C:2024:HOH:O	1.74	1.19

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	397/476 (83%)	379 (96%)	13 (3%)	5 (1%)	9	18
1	B	401/476 (84%)	378 (94%)	20 (5%)	3 (1%)	18	34
1	C	413/476 (87%)	393 (95%)	18 (4%)	2 (0%)	24	43
1	D	403/476 (85%)	383 (95%)	19 (5%)	1 (0%)	43	64
1	E	396/476 (83%)	376 (95%)	13 (3%)	7 (2%)	6	13
1	F	402/476 (84%)	372 (92%)	26 (6%)	4 (1%)	12	24
All	All	2412/2856 (84%)	2281 (95%)	109 (4%)	22 (1%)	14	28

5 of 22 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	465	TYR
1	A	602	SER
1	B	595	ASP
1	D	402	ILE
1	F	450	TYR

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	337/390 (86%)	303 (90%)	34 (10%)	7	14
1	B	339/390 (87%)	308 (91%)	31 (9%)	9	17
1	C	349/390 (90%)	309 (88%)	40 (12%)	5	10
1	D	342/390 (88%)	311 (91%)	31 (9%)	9	17
1	E	335/390 (86%)	302 (90%)	33 (10%)	7	15
1	F	340/390 (87%)	299 (88%)	41 (12%)	5	8
All	All	2042/2340 (87%)	1832 (90%)	210 (10%)	7	13

5 of 210 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	307	ASN
1	E	301	ILE
1	F	518	SER
1	D	333	MET
1	D	483	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 37 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	499	ASN
1	F	514	GLN
1	E	514	GLN
1	F	375	ASN
1	C	499	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 12 are monoatomic - leaving 6 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	ADP	B	1607	4	28,29,29	1.49	6 (21%)	43,45,45	1.86	10 (23%)
3	ADP	C	1608	4	28,29,29	1.40	5 (17%)	43,45,45	1.83	10 (23%)
3	ADP	F	1607	4	28,29,29	1.45	5 (17%)	43,45,45	1.91	9 (20%)
3	ADP	E	1604	4	28,29,29	1.32	5 (17%)	43,45,45	1.84	11 (25%)
3	ADP	D	1608	4	28,29,29	1.40	4 (14%)	43,45,45	1.82	9 (20%)
3	ADP	A	1604	4	28,29,29	1.38	4 (14%)	43,45,45	1.91	9 (20%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	B	1607	4	-	3/16/32/32	0/3/3/3
3	ADP	C	1608	4	-	3/16/32/32	0/3/3/3
3	ADP	F	1607	4	-	4/16/32/32	0/3/3/3
3	ADP	E	1604	4	-	2/16/32/32	0/3/3/3
3	ADP	D	1608	4	-	4/16/32/32	0/3/3/3
3	ADP	A	1604	4	-	3/16/32/32	0/3/3/3

The worst 5 of 29 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1604	ADP	C5-C4	4.25	1.46	1.39
3	C	1608	ADP	C5-C4	4.23	1.46	1.39
3	F	1607	ADP	C5-C4	4.12	1.46	1.39
3	E	1604	ADP	C5-C4	3.45	1.45	1.39
3	B	1607	ADP	C4-N9	-3.35	1.30	1.37

The worst 5 of 58 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	1607	ADP	C5-C4-N3	-5.93	118.55	126.72
3	C	1608	ADP	C5-C4-N3	-5.80	118.73	126.72
3	E	1604	ADP	C5-C4-N3	-5.76	118.79	126.72
3	A	1604	ADP	C5-C4-N3	-5.63	118.96	126.72
3	D	1608	ADP	C5-C4-N3	-5.32	119.39	126.72

There are no chirality outliers.

5 of 19 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1604	ADP	C5'-O5'-PA-O1A
3	A	1604	ADP	C5'-O5'-PA-O2A
3	A	1604	ADP	C5'-O5'-PA-O3A
3	D	1608	ADP	PA-O3A-PB-O3B
3	F	1607	ADP	C5'-O5'-PA-O1A

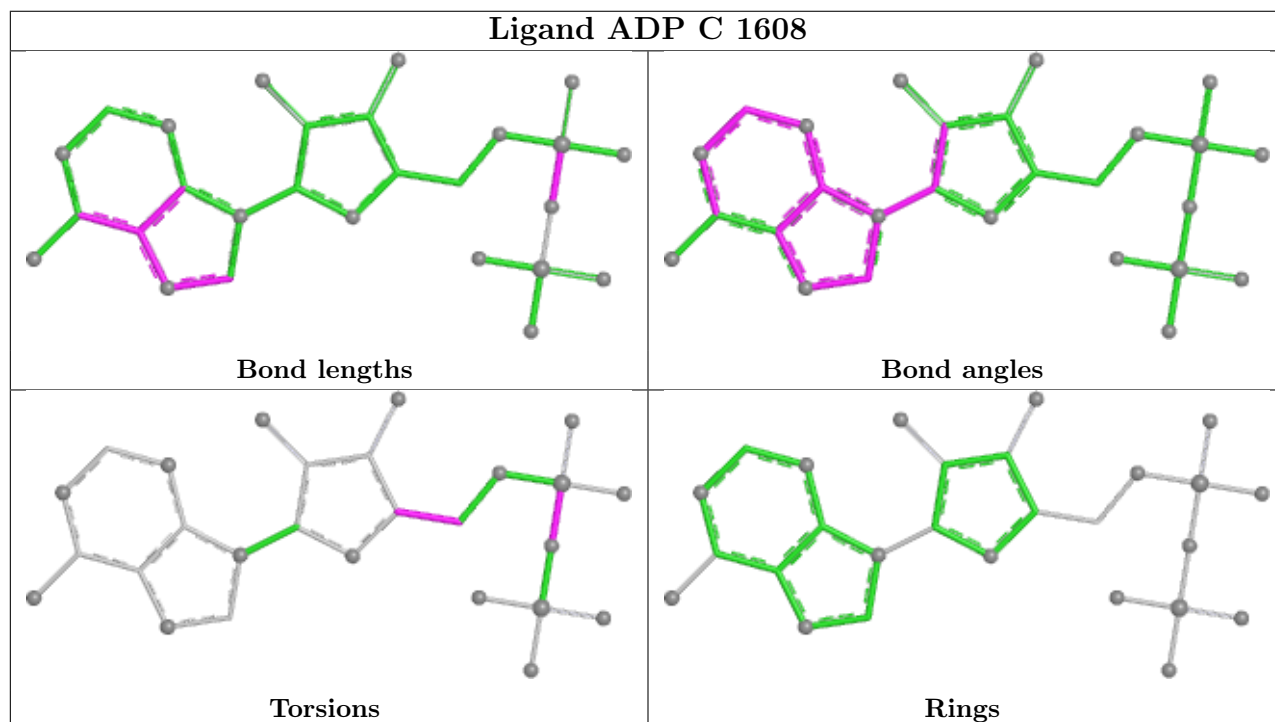
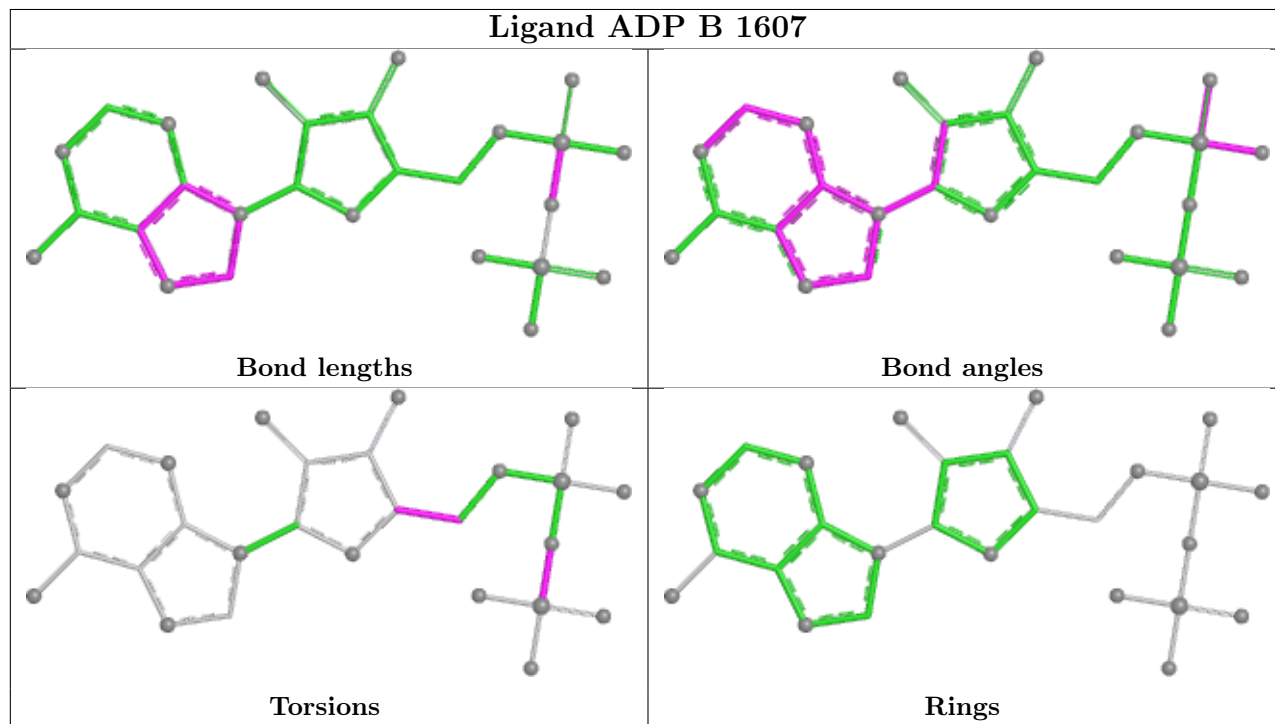
There are no ring outliers.

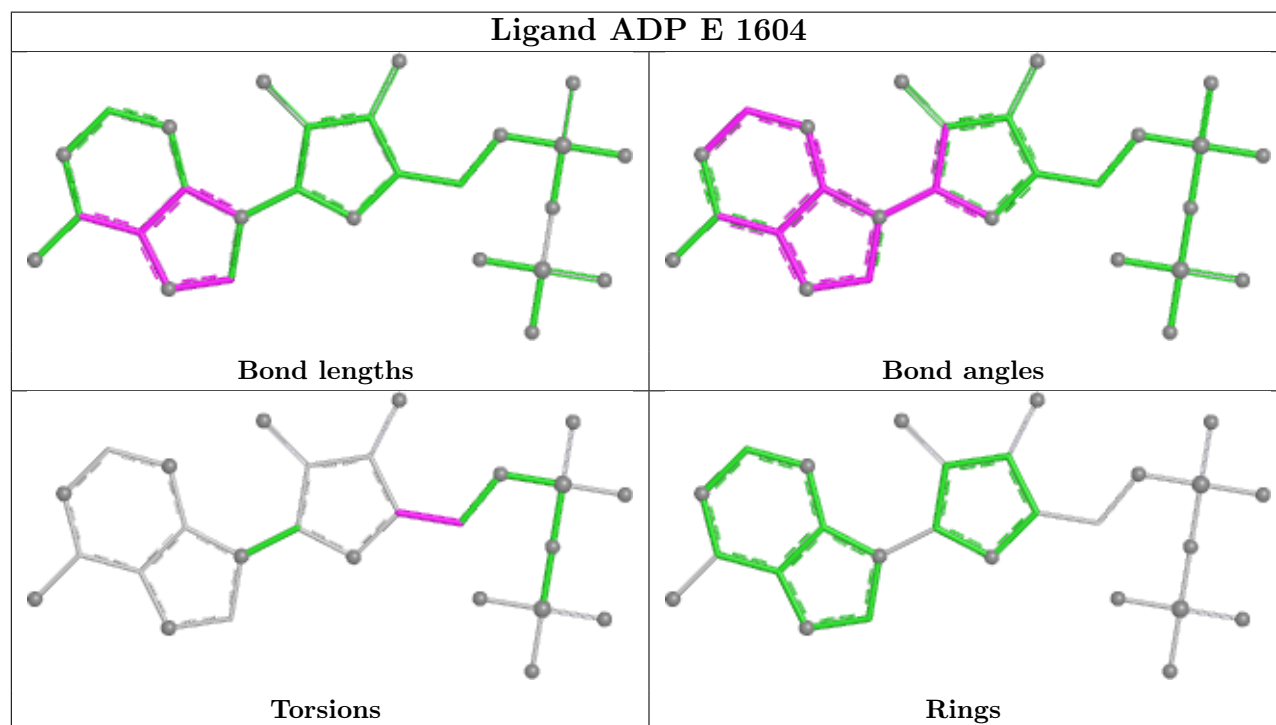
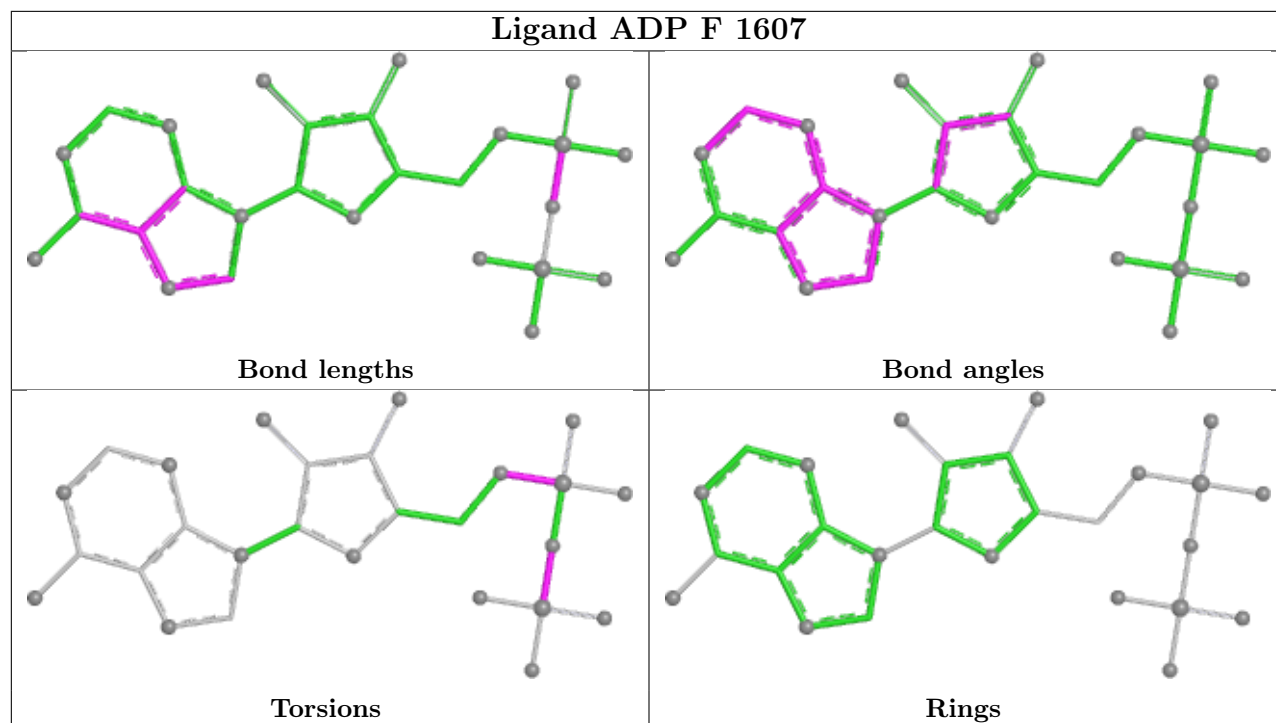
6 monomers are involved in 36 short contacts:

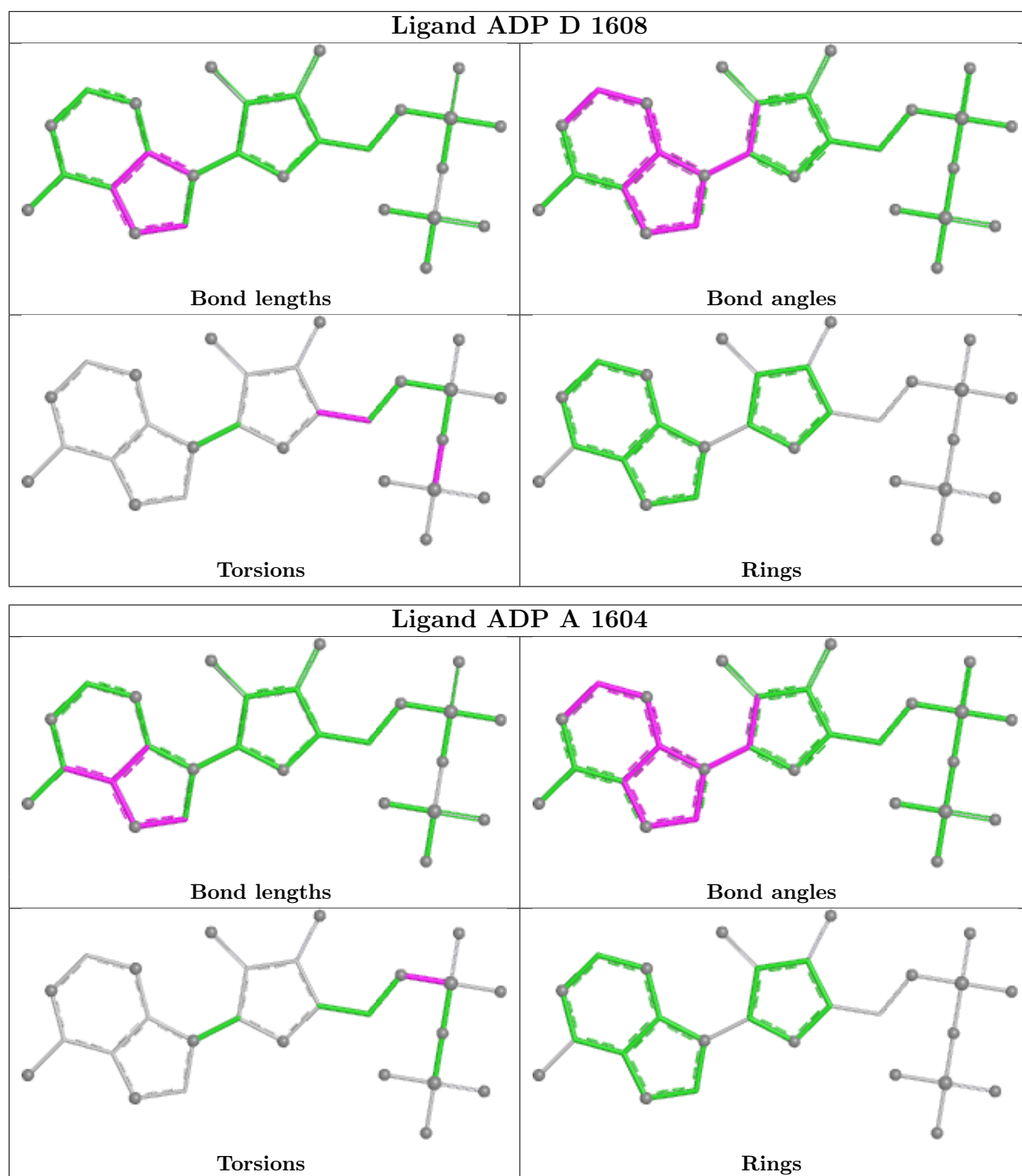
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	1607	ADP	7	0
3	C	1608	ADP	10	0
3	F	1607	ADP	5	0
3	E	1604	ADP	7	0
3	D	1608	ADP	6	0
3	A	1604	ADP	1	0

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

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(Å ²)	Q<0.9
1	A	407/476 (85%)	0.10	6 (1%) 72 71	35, 44, 54, 66	0
1	B	411/476 (86%)	0.24	16 (3%) 43 40	34, 44, 54, 74	0
1	C	421/476 (88%)	0.50	19 (4%) 38 37	36, 43, 57, 86	0
1	D	413/476 (86%)	0.58	36 (8%) 16 16	35, 44, 56, 78	0
1	E	406/476 (85%)	0.43	22 (5%) 31 31	35, 44, 55, 84	0
1	F	412/476 (86%)	1.39	109 (26%) 1 1	34, 43, 56, 90	0
All	All	2470/2856 (86%)	0.54	208 (8%) 17 17	34, 43, 55, 90	0

The worst 5 of 208 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	231	VAL	7.9
1	F	245	LEU	6.9
1	F	230	PHE	6.8
1	F	234	PHE	6.7
1	F	152	PRO	5.6

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

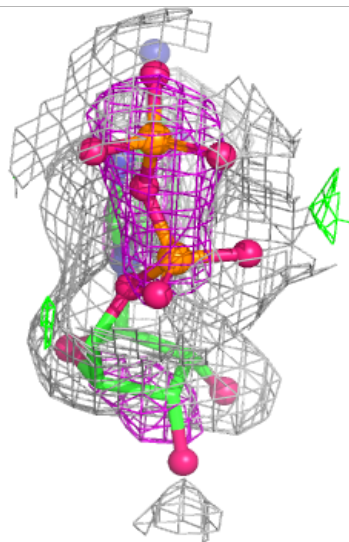
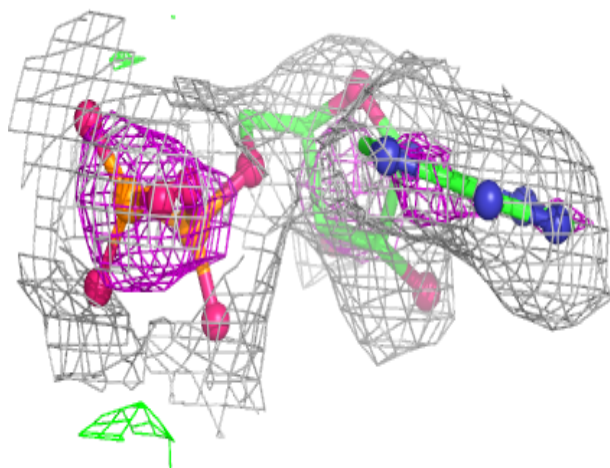
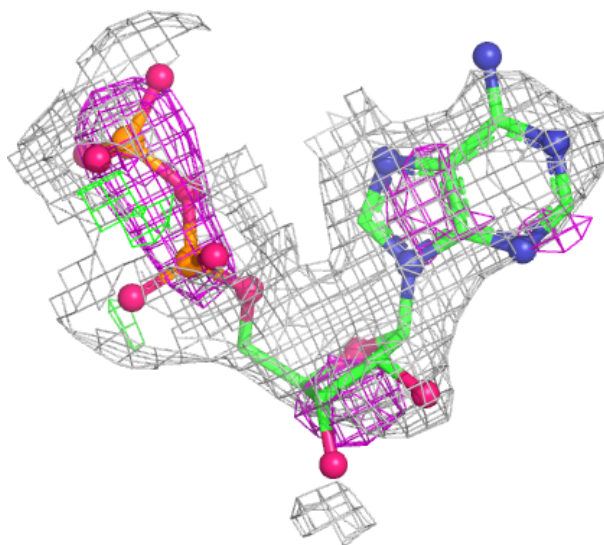
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	ADP	F	1607	27/27	0.73	0.12	72,79,80,81	0
4	MG	C	1609	1/1	0.80	0.10	60,60,60,60	0
3	ADP	C	1608	27/27	0.85	0.11	54,57,59,61	0
4	MG	A	1605	1/1	0.86	0.09	47,47,47,47	0
4	MG	B	1608	1/1	0.89	0.12	44,44,44,44	0
4	MG	F	1608	1/1	0.90	0.10	68,68,68,68	0
4	MG	E	1605	1/1	0.93	0.08	53,53,53,53	0
3	ADP	A	1604	27/27	0.93	0.10	32,34,39,41	0
3	ADP	E	1604	27/27	0.94	0.09	34,38,42,48	0
4	MG	D	1609	1/1	0.94	0.10	41,41,41,41	0
3	ADP	B	1607	27/27	0.95	0.09	20,26,33,37	0
3	ADP	D	1608	27/27	0.95	0.09	21,25,30,31	0
2	ZN	E	1603	1/1	0.97	0.17	63,63,63,63	0
2	ZN	D	1607	1/1	0.98	0.27	79,79,79,79	0
2	ZN	A	1603	1/1	0.98	0.18	63,63,63,63	0
2	ZN	B	1606	1/1	0.99	0.20	64,64,64,64	0
2	ZN	C	1607	1/1	0.99	0.20	60,60,60,60	0
2	ZN	F	1606	1/1	1.00	0.17	69,69,69,69	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.

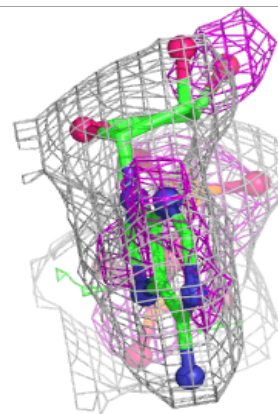
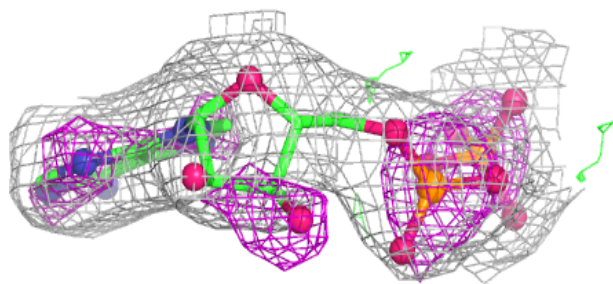
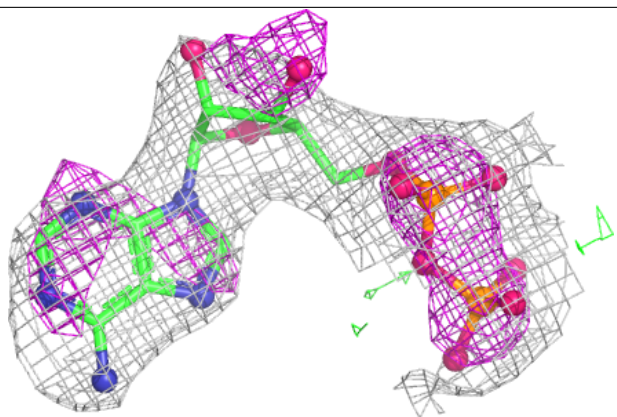
Electron density around ADP F 1607:

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



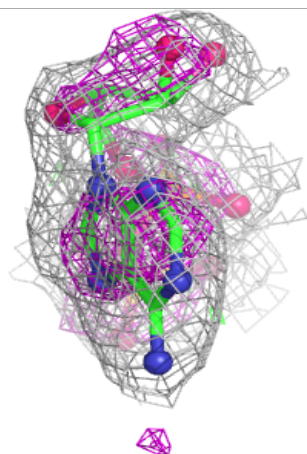
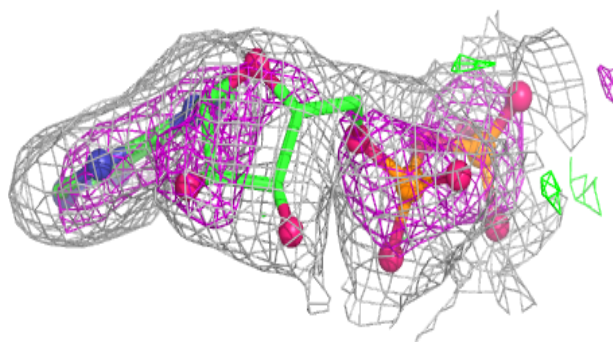
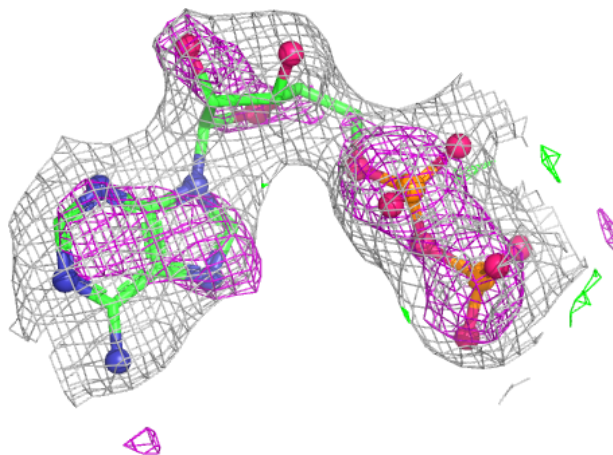
Electron density around ADP C 1608:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



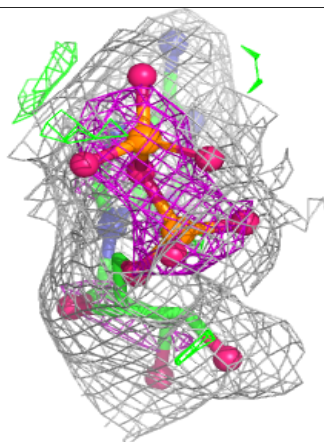
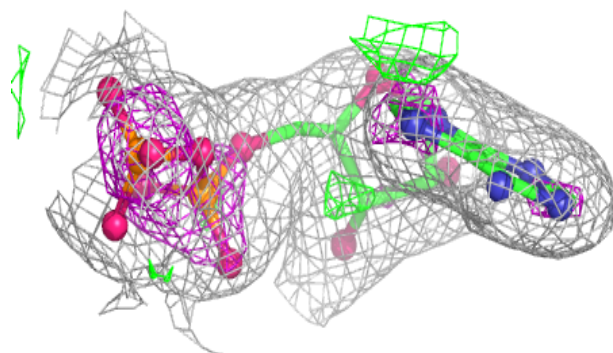
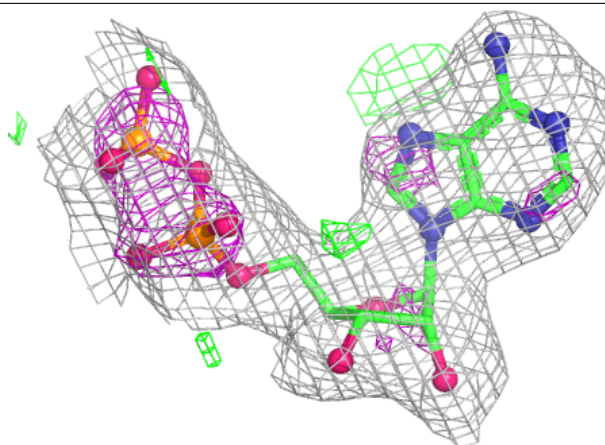
Electron density around ADP A 1604:

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

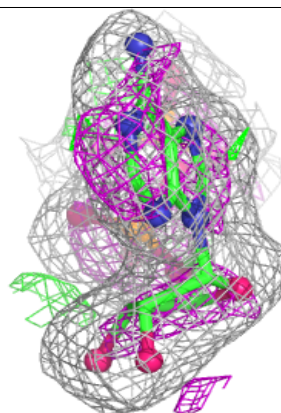
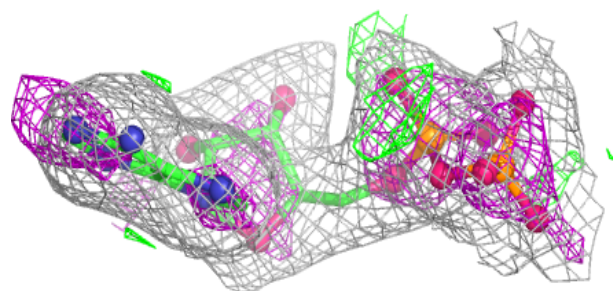
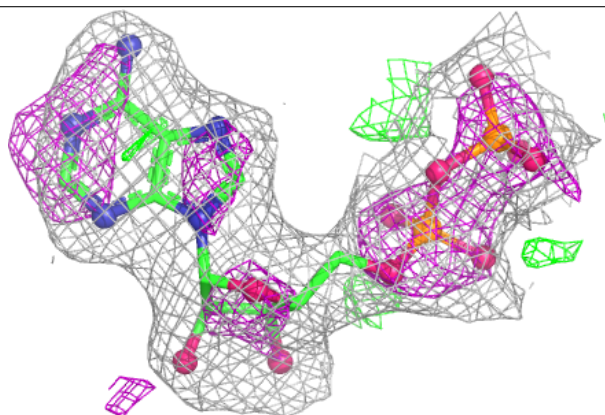


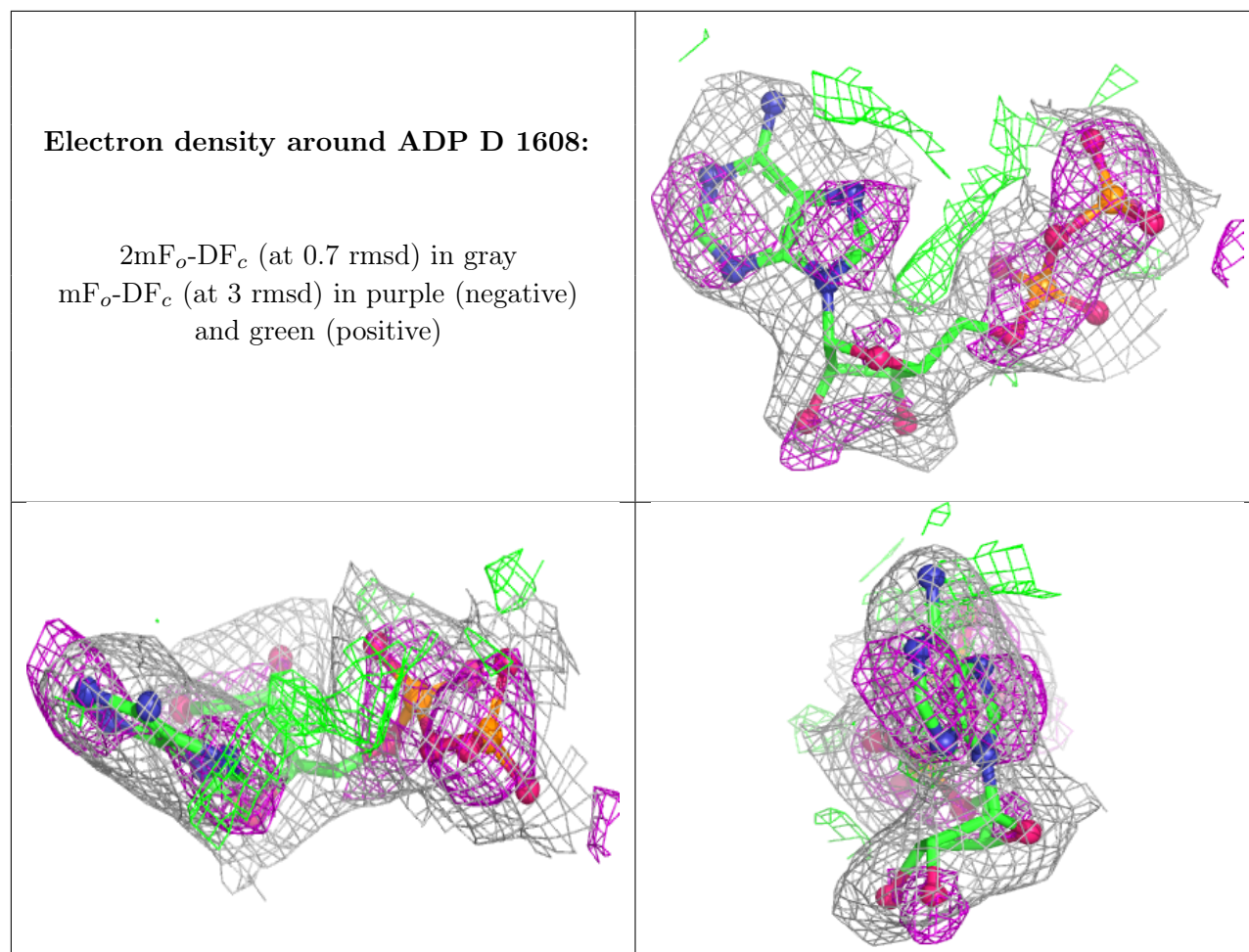
Electron density around ADP E 1604:

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

**Electron density around ADP B 1607:**

$2mF_o-DF_c$ (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.