



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 14, 2020 – 06:10 pm BST

PDB ID : 4RKD  
Title : Psychrophilic aromatic amino acids aminotransferase from Psychrobacter sp.  
B6 cocrystalized with aspartic acid  
Authors : Bujacz, A.; Rutkiewicz-Krotewicz, M.; Bujacz, G.; Nowakowska-Sapota, K.;  
Turkiewicz, M.  
Deposited on : 2014-10-12  
Resolution : 2.76 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](mailto: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.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

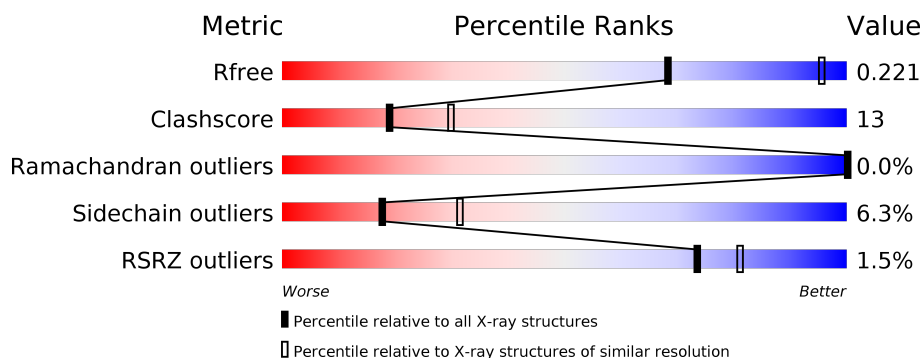
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.76 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))
$R_{free}$	130704	1235 (2.78-2.74)
Clashscore	141614	1277 (2.78-2.74)
Ramachandran outliers	138981	1257 (2.78-2.74)
Sidechain outliers	138945	1257 (2.78-2.74)
RSRZ outliers	127900	1207 (2.78-2.74)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	398	<div> <div>5%</div> <div> <div></div> <div>73%</div> <div>25%</div> </div> <div></div> </div>
1	B	398	<div> <div></div> <div> <div></div> <div>73%</div> <div>24%</div> </div> <div></div> </div>
1	C	398	<div> <div>%</div> <div> <div></div> <div>71%</div> <div>26%</div> </div> <div></div> </div>
1	D	398	<div> <div></div> <div> <div></div> <div>70%</div> <div>27%</div> </div> <div></div> </div>
1	E	398	<div> <div>2%</div> <div> <div></div> <div>70%</div> <div>29%</div> </div> <div></div> </div>
1	F	398	<div> <div>%</div> <div> <div></div> <div>76%</div> <div>21%</div> </div> <div></div> </div>

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Mol	Chain	Length	Quality of chain
1	G	398	
1	H	398	

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	KET	E	404[B]	-	-	X	-
6	PMP	D	401	-	-	X	-

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 25951 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 Aromatic amino acid aminotransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	398	Total	C	N	O	S	0	2	0
			3115	1981	520	592	22			
1	B	398	Total	C	N	O	S	0	5	0
			3137	1994	524	597	22			
1	C	398	Total	C	N	O	S	0	2	0
			3110	1977	516	595	22			
1	D	398	Total	C	N	O	S	0	0	0
			3101	1971	516	592	22			
1	E	398	Total	C	N	O	S	0	3	0
			3121	1985	520	594	22			
1	F	398	Total	C	N	O	S	0	3	0
			3118	1981	517	598	22			
1	G	398	Total	C	N	O	S	0	2	0
			3117	1981	522	592	22			
1	H	398	Total	C	N	O	S	0	2	0
			3113	1979	518	594	22			

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

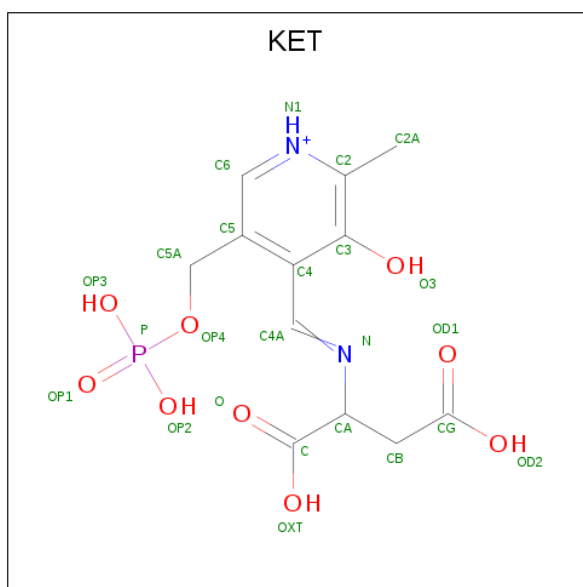
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	G	1	Total	Mg	0	0
			1	1		
2	A	1	Total	Mg	0	0
			1	1		
2	C	1	Total	Mg	0	0
			1	1		
2	E	1	Total	Mg	0	0
			1	1		

- Molecule 3 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: C<sub>8</sub>H<sub>10</sub>NO<sub>6</sub>P).



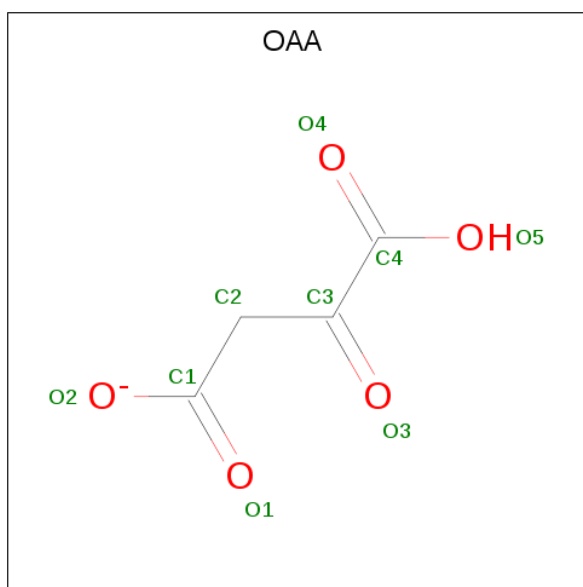
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	1
			15	8	1	5	1		
3	B	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
3	C	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
3	E	1	Total	C	N	O	P	0	1
			15	8	1	5	1		
3	F	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

- Molecule 4 is 2-[(3-HYDROXY-2-METHYL-5-PHOSPHONOOXYMETHYL-PYRIDIN-4-YLMETHYLENE)-AMINO]-SUCCINIC ACID (three-letter code: KET) (formula:  $C_{12}H_{16}N_2O_9P$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	1
			24	12	2	9	1		
4	E	1	Total	C	N	O	P	0	1
			24	12	2	9	1		
4	G	1	Total	C	N	O	P	0	0
			24	12	2	9	1		

- Molecule 5 is OXALOACETATE ION (three-letter code: OAA) (formula:  $C_4H_3O_5$ ).



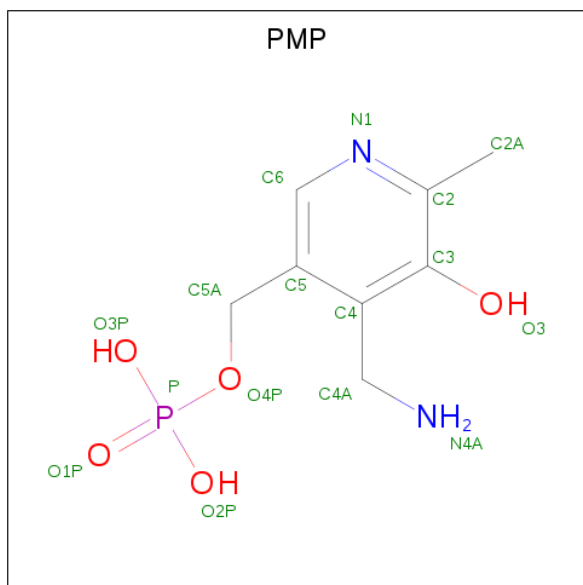
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	C	1	Total	C	O	0	0
			9	4	5		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	E	1	Total	C	O	0	0
			9	4	5		

- Molecule 6 is 4'-DEOXY-4'-AMINOPYRIDOXAL-5'-PHOSPHATE (three-letter code: PMP) (formula:  $C_8H_{13}N_2O_5P$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	D	1	Total	C	N	O	P	0	0
			16	8	2	5	1		
6	H	1	Total	C	N	O	P	0	0
			16	8	2	5	1		

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	102	Total	O	0	0
			102	102		
7	B	142	Total	O	0	0
			142	142		
7	C	83	Total	O	0	0
			83	83		
7	D	119	Total	O	0	0
			119	119		
7	E	84	Total	O	0	0
			84	84		
7	F	96	Total	O	0	0
			96	96		

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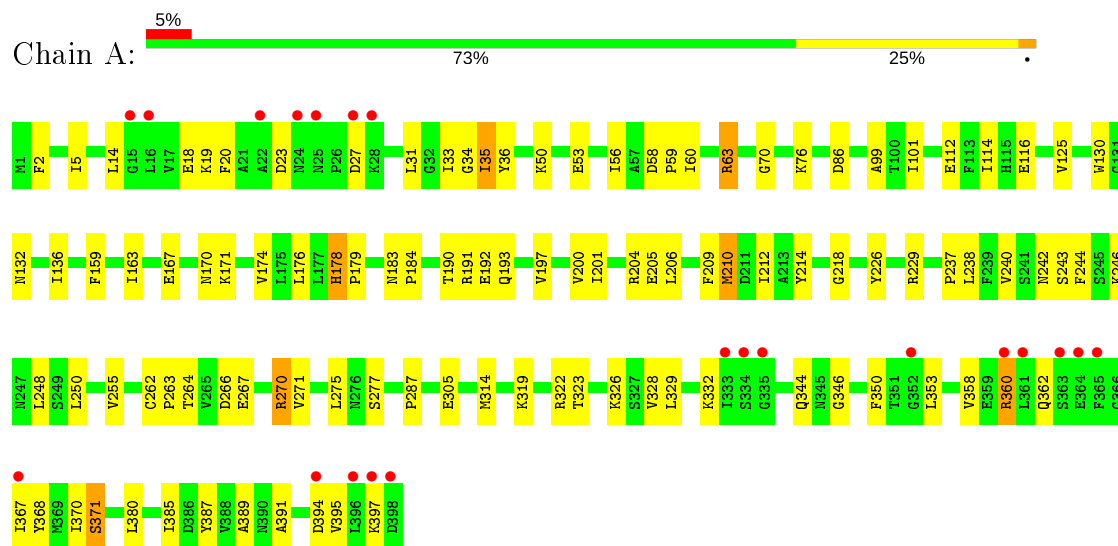
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	G	70	Total 70	O 70	0	0
7	H	122	Total 122	O 122	0	0



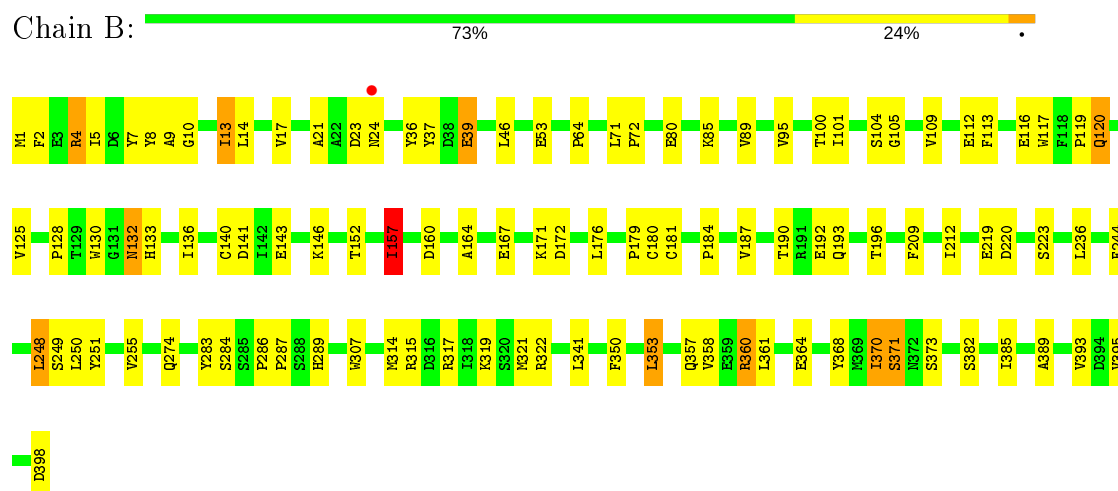
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA 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: Aromatic amino acid aminotransferase

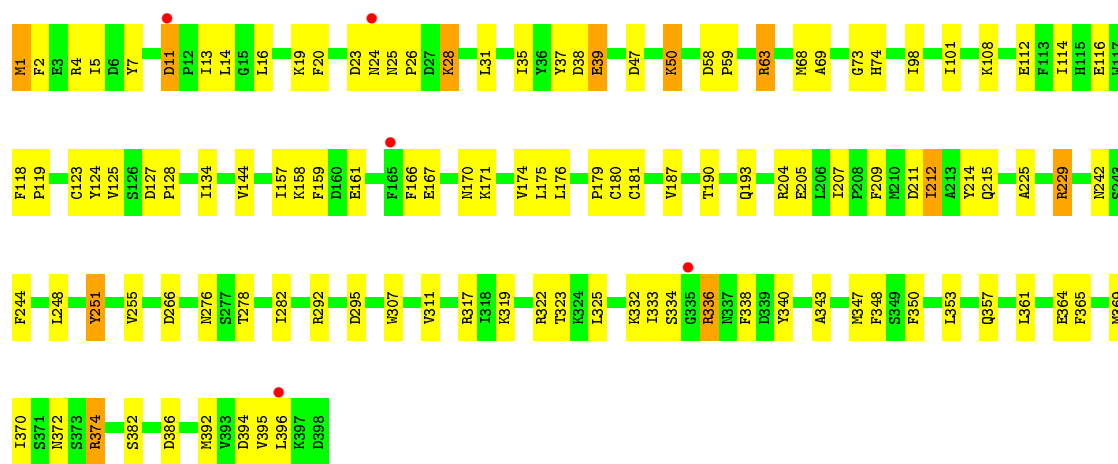


- Molecule 1: Aromatic amino acid aminotransferase



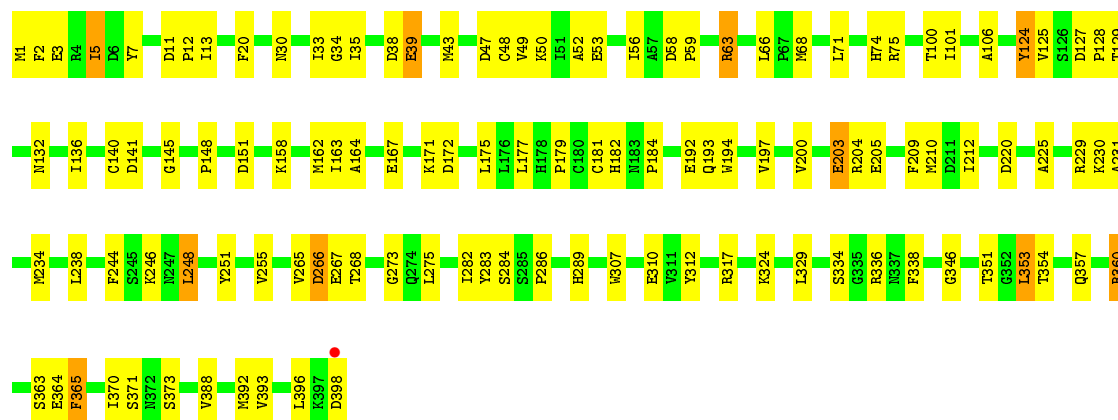
- Molecule 1: Aromatic amino acid aminotransferase





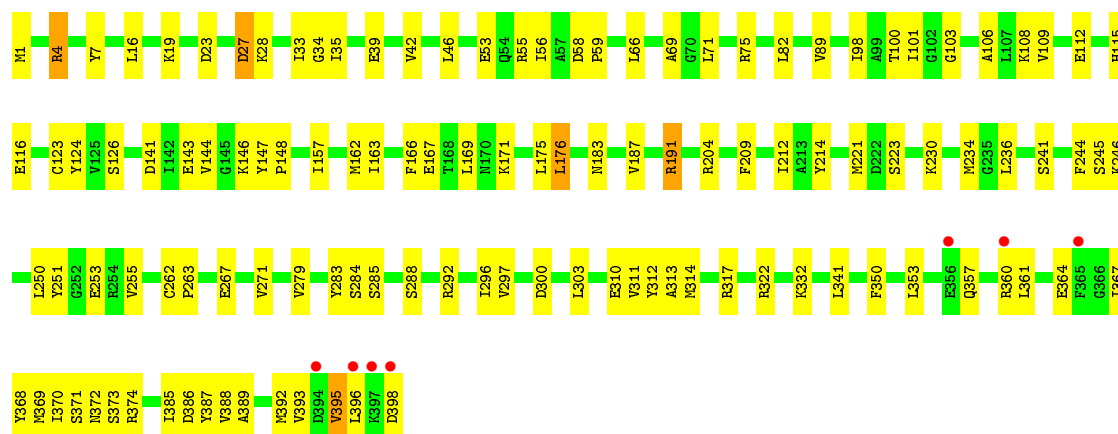
- Molecule 1: Aromatic amino acid aminotransferase

Chain D: 70% 27%

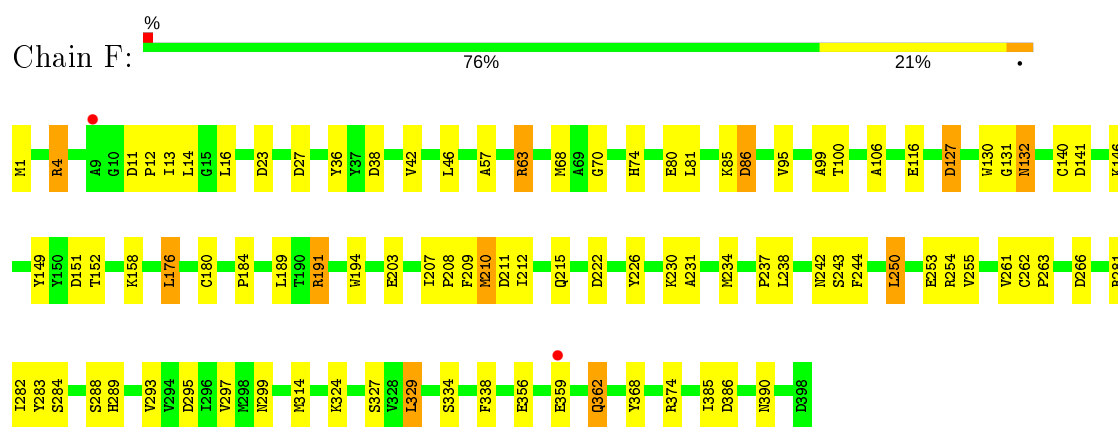


- Molecule 1: Aromatic amino acid aminotransferase

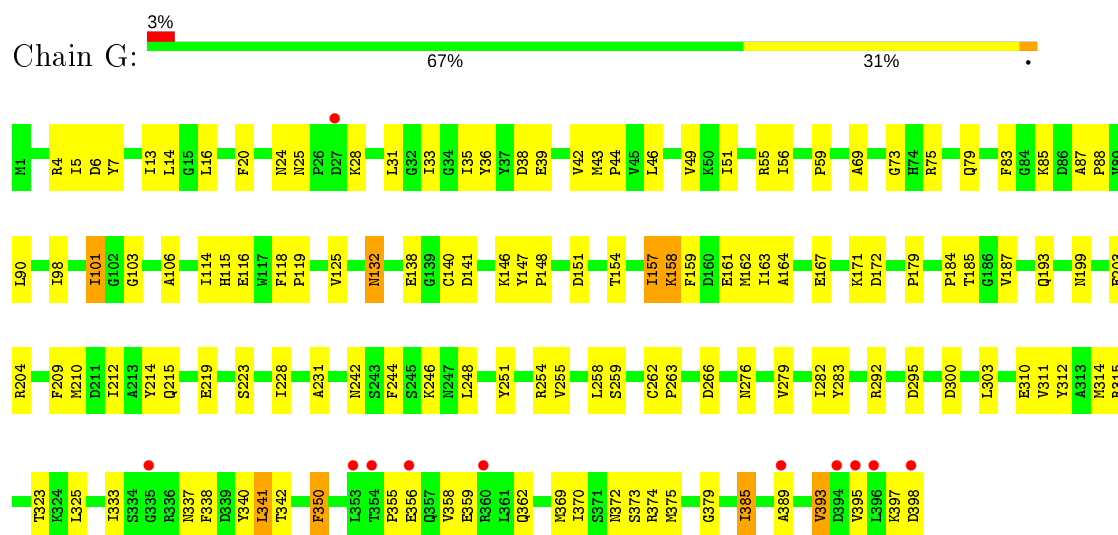
Chain E: 2% 70% 29%



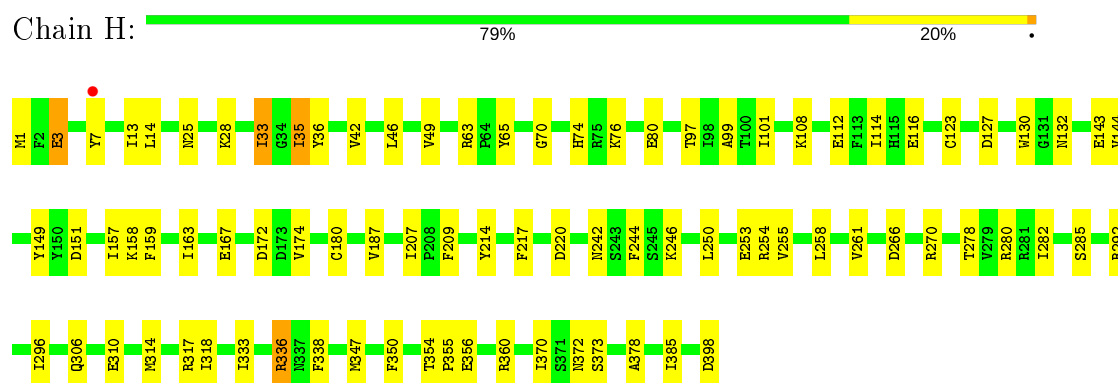
- Molecule 1: Aromatic amino acid aminotransferase



• Molecule 1: Aromatic amino acid aminotransferase



• Molecule 1: Aromatic amino acid aminotransferase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	92.25Å 103.23Å 165.78Å 90.00° 98.58° 90.00°	Depositor
Resolution (Å)	45.74 – 2.76 45.61 – 2.76	Depositor EDS
% Data completeness (in resolution range)	97.4 (45.74-2.76) 97.4 (45.61-2.76)	Depositor EDS
$R_{merge}$	0.13	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.48 (at 2.77Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, $R_{free}$	0.173 , 0.222 0.173 , 0.221	Depositor DCC
$R_{free}$ test set	3862 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	31.5	Xtriage
Anisotropy	0.094	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 38.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	25951	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 43.05 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.8670e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: MG, KET, PMP, OAA, PLP

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	0.84	0/3190	0.97	3/4321 (0.1%)
1	B	0.92	0/3218	1.01	2/4358 (0.0%)
1	C	0.82	0/3185	0.97	4/4316 (0.1%)
1	D	0.98	1/3170 (0.0%)	1.04	3/4296 (0.1%)
1	E	0.83	0/3199	0.93	0/4333
1	F	0.88	0/3193	1.02	8/4328 (0.2%)
1	G	0.78	0/3192	0.93	1/4324 (0.0%)
1	H	0.89	0/3185	0.99	1/4315 (0.0%)
All	All	0.87	1/25532 (0.0%)	0.98	22/34591 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	124	TYR	CE1-CZ	5.30	1.45	1.38

The worst 5 of 22 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	254	ARG	NE-CZ-NH1	5.86	123.23	120.30
1	C	322	ARG	NE-CZ-NH1	5.82	123.21	120.30
1	F	38	ASP	CB-CG-OD1	5.79	123.51	118.30
1	D	63	ARG	NE-CZ-NH1	5.76	123.18	120.30
1	A	270	ARG	NE-CZ-NH1	5.74	123.17	120.30

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	3115	0	3059	85	0
1	B	3137	0	3081	91	0
1	C	3110	0	3044	87	0
1	D	3101	0	3036	92	0
1	E	3121	0	3065	104	0
1	F	3118	0	3047	60	0
1	G	3117	0	3062	94	0
1	H	3113	0	3053	58	0
2	A	1	0	0	0	0
2	C	1	0	0	0	0
2	E	1	0	0	0	0
2	G	1	0	0	0	0
3	A	15	0	7	1	0
3	B	15	0	6	1	0
3	C	15	0	7	1	0
3	E	15	0	6	1	0
3	F	15	0	6	2	0
4	A	24	0	12	5	0
4	E	24	0	11	13	0
4	G	24	0	12	3	0
5	C	9	0	2	1	0
5	E	9	0	2	0	0
6	D	16	0	11	8	0
6	H	16	0	11	4	0
7	A	102	0	0	5	0
7	B	142	0	0	16	0
7	C	83	0	0	6	0
7	D	119	0	0	5	0
7	E	84	0	0	13	0
7	F	96	0	0	4	0
7	G	70	0	0	5	0
7	H	122	0	0	5	0
All	All	25951	0	24540	646	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 13.

The worst 5 of 646 close contacts within the same asymmetric unit are listed below, sorted by

their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:246:LYS:HE3	6:D:401:PMP:N4A	1.44	1.29
1:D:246:LYS:CE	6:D:401:PMP:HNA2	1.56	1.17
1:D:33:ILE:HG13	1:D:35:ILE:HG12	1.37	1.07
1:C:11:ASP:HB2	1:C:14:LEU:HB2	1.32	1.06
1:E:39:GLU:HG2	1:E:317:ARG:HD2	1.38	1.05

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	398/398 (100%)	377 (95%)	21 (5%)	0	100	100
1	B	401/398 (101%)	383 (96%)	18 (4%)	0	100	100
1	C	398/398 (100%)	374 (94%)	23 (6%)	1 (0%)	41	60
1	D	396/398 (100%)	377 (95%)	19 (5%)	0	100	100
1	E	399/398 (100%)	373 (94%)	26 (6%)	0	100	100
1	F	399/398 (100%)	380 (95%)	19 (5%)	0	100	100
1	G	398/398 (100%)	372 (94%)	26 (6%)	0	100	100
1	H	398/398 (100%)	371 (93%)	27 (7%)	0	100	100
All	All	3187/3184 (100%)	3007 (94%)	179 (6%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	333	ILE

### 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	339/337 (101%)	315 (93%)	24 (7%)	14	26
1	B	342/337 (102%)	322 (94%)	20 (6%)	20	35
1	C	339/337 (101%)	313 (92%)	26 (8%)	13	22
1	D	337/337 (100%)	319 (95%)	18 (5%)	22	38
1	E	340/337 (101%)	319 (94%)	21 (6%)	18	32
1	F	340/337 (101%)	319 (94%)	21 (6%)	18	32
1	G	339/337 (101%)	314 (93%)	25 (7%)	13	24
1	H	339/337 (101%)	321 (95%)	18 (5%)	22	38
All	All	2715/2696 (101%)	2542 (94%)	173 (6%)	18	31

5 of 173 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	203	GLU
1	E	176	LEU
1	H	42	VAL
1	D	266	ASP
1	D	398	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	120	GLN
1	E	345	ASN
1	H	24	ASN
1	E	304	HIS
1	F	24	ASN

### 5.3.3 RNA ⓘ

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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 16 ligands modelled in this entry, 4 are monoatomic - leaving 12 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
4	KET	A	403[B]	-	18,24,24	0.87	0	23,34,34	1.49	4 (17%)
3	PLP	C	402	1	15,15,16	4.14	4 (26%)	20,22,23	2.82	8 (40%)
5	OAA	C	403	-	2,8,8	0.07	0	2,10,10	4.98	1 (50%)
3	PLP	A	402[A]	1	15,15,16	3.49	3 (20%)	20,22,23	1.75	7 (35%)
3	PLP	B	401	1	15,15,16	3.41	3 (20%)	20,22,23	2.71	10 (50%)
4	KET	G	402	-	18,24,24	1.14	1 (5%)	23,34,34	3.68	7 (30%)
6	PMP	D	401	-	16,16,16	2.84	3 (18%)	21,23,23	1.78	4 (19%)
6	PMP	H	401	-	16,16,16	3.92	3 (18%)	21,23,23	1.91	6 (28%)
3	PLP	F	401	1	15,15,16	4.05	3 (20%)	20,22,23	2.23	5 (25%)
4	KET	E	404[B]	-	18,24,24	1.12	1 (5%)	23,34,34	4.10	6 (26%)
3	PLP	E	402[A]	1	15,15,16	3.35	4 (26%)	20,22,23	1.71	4 (20%)
5	OAA	E	403	-	2,8,8	1.11	0	2,10,10	2.14	1 (50%)

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
4	KET	A	403[B]	-	-	8/13/19/19	0/1/1/1
3	PLP	C	402	1	-	3/6/6/8	0/1/1/1
5	OAA	C	403	-	-	2/2/8/8	-
3	PLP	A	402[A]	1	-	2/6/6/8	0/1/1/1
3	PLP	B	401	1	-	3/6/6/8	0/1/1/1
4	KET	G	402	-	-	5/13/19/19	0/1/1/1
6	PMP	D	401	-	-	4/8/8/8	0/1/1/1
6	PMP	H	401	-	-	7/8/8/8	0/1/1/1
3	PLP	F	401	1	-	2/6/6/8	0/1/1/1
4	KET	E	404[B]	-	-	9/13/19/19	0/1/1/1
3	PLP	E	402[A]	1	-	5/6/6/8	0/1/1/1
5	OAA	E	403	-	-	1/2/8/8	-

The worst 5 of 25 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	H	401	PMP	C3-C2	12.12	1.53	1.40
3	F	401	PLP	C5-C4	11.96	1.53	1.40
3	B	401	PLP	C3-C2	10.81	1.51	1.40
3	C	402	PLP	C3-C2	10.18	1.51	1.40
3	C	402	PLP	C5-C4	9.53	1.51	1.40

The worst 5 of 63 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	E	404[B]	KET	CA-N-C4A	16.17	139.33	117.40
4	G	402	KET	CA-N-C4A	11.92	133.57	117.40
4	E	404[B]	KET	C4-C4A-N	8.62	142.16	123.01
4	G	402	KET	C4-C4A-N	-7.80	105.69	123.01
5	C	403	OAA	C1-C2-C3	-7.04	102.97	115.51

There are no chirality outliers.

5 of 51 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	H	401	PMP	C3-C4-C4A-N4A
6	H	401	PMP	C5-C4-C4A-N4A
6	H	401	PMP	C4-C5-C5A-O4P
6	H	401	PMP	C6-C5-C5A-O4P
6	H	401	PMP	C5A-O4P-P-O2P

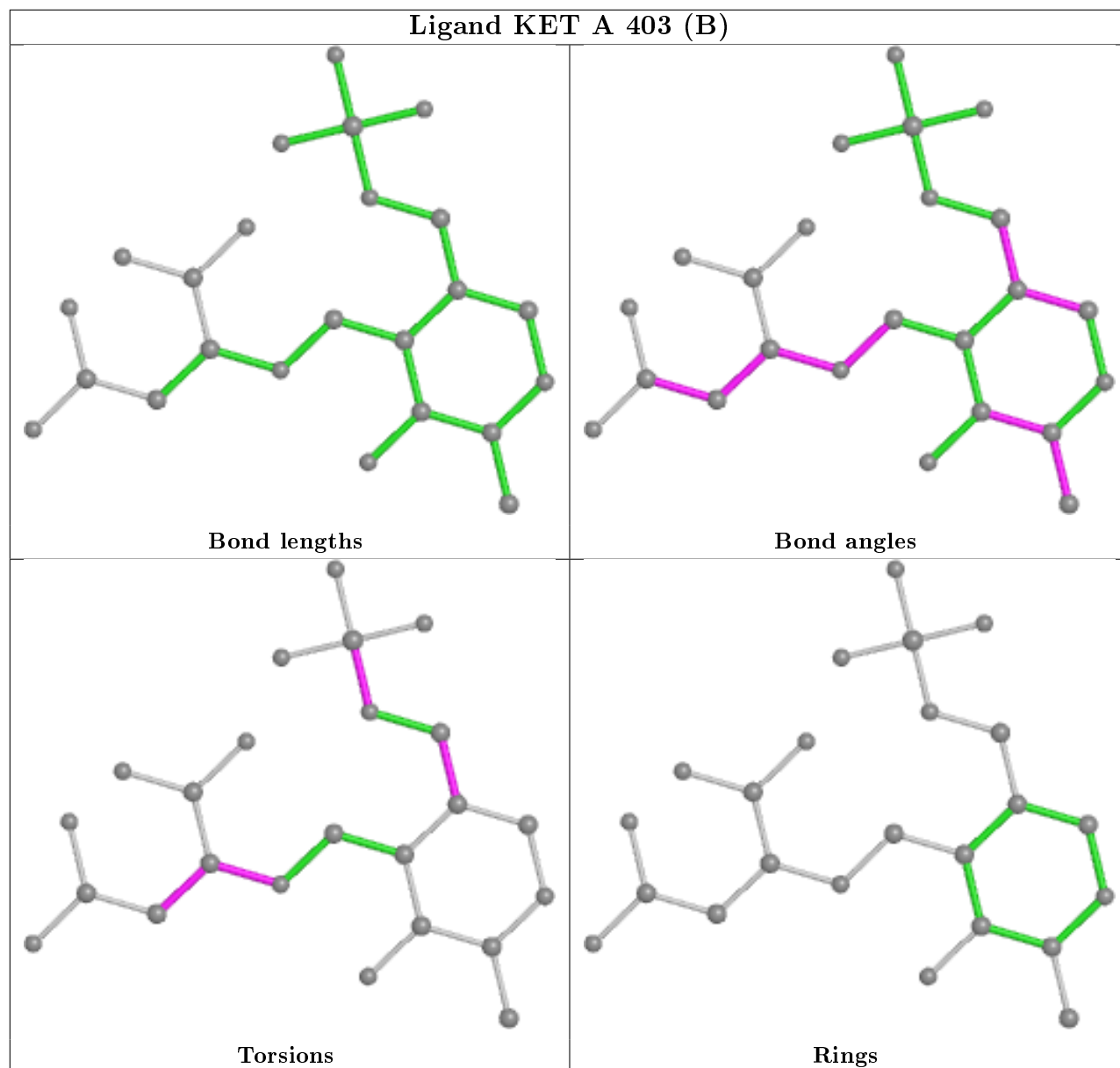
There are no ring outliers.

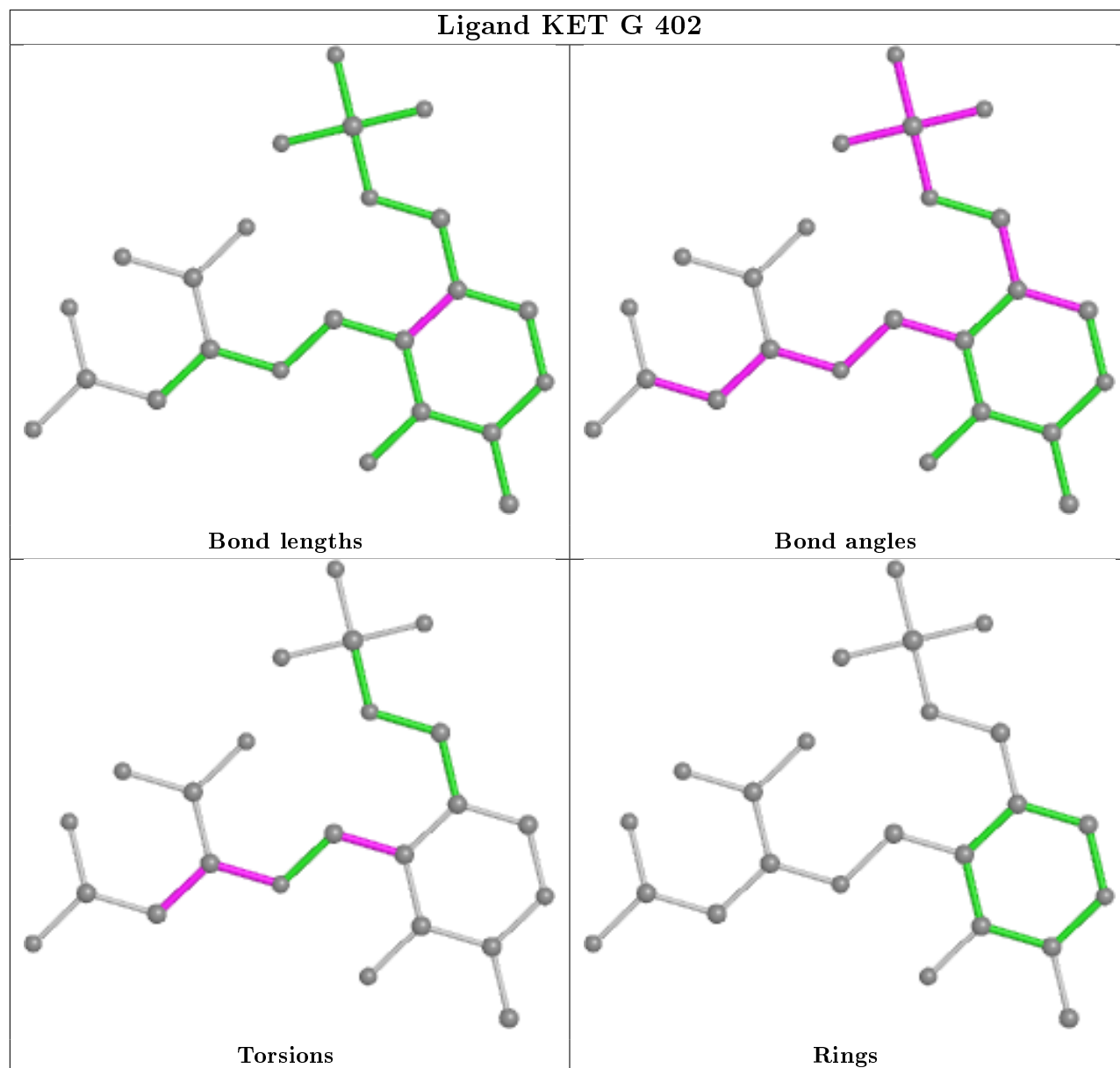
11 monomers are involved in 39 short contacts:

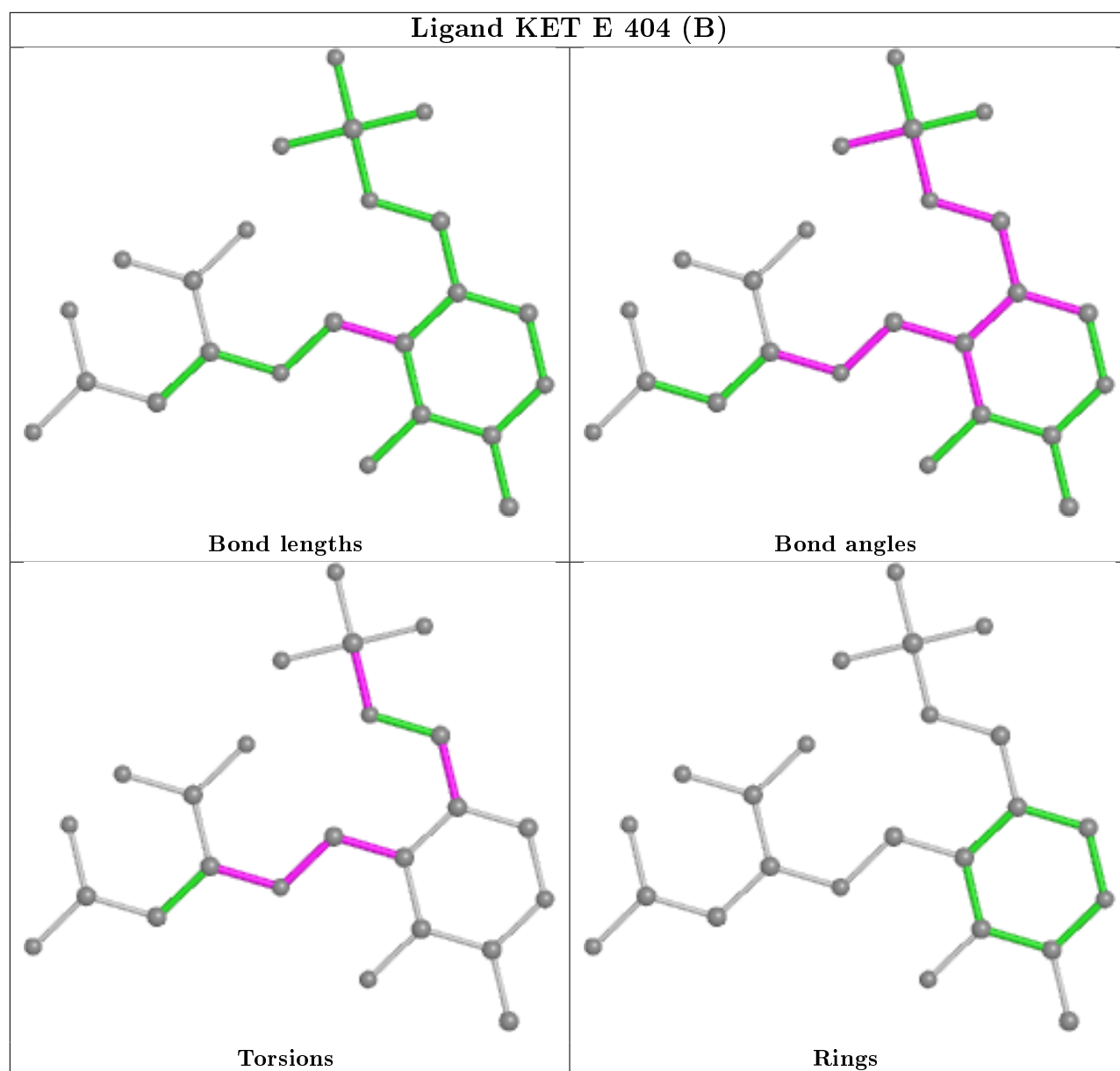
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	403[B]	KET	5	0
3	C	402	PLP	1	0
5	C	403	OAA	1	0
3	A	402[A]	PLP	1	0
3	B	401	PLP	1	0
4	G	402	KET	3	0
6	D	401	PMP	8	0
6	H	401	PMP	4	0
3	F	401	PLP	2	0
4	E	404[B]	KET	13	0
3	E	402[A]	PLP	1	0

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.

## Ligand KET A 403 (B)







## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

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

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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	398/398 (100%)	-0.23	21 (5%) 26 31	18, 36, 94, 128	0
1	B	398/398 (100%)	-0.48	1 (0%) 94 96	16, 31, 64, 114	0
1	C	398/398 (100%)	-0.21	5 (1%) 77 84	22, 42, 86, 130	0
1	D	398/398 (100%)	-0.56	1 (0%) 94 96	17, 29, 55, 99	0
1	E	398/398 (100%)	-0.36	7 (1%) 68 76	19, 37, 89, 123	0
1	F	398/398 (100%)	-0.47	2 (0%) 91 94	21, 34, 63, 94	0
1	G	398/398 (100%)	-0.29	11 (2%) 53 62	19, 45, 85, 112	0
1	H	398/398 (100%)	-0.52	1 (0%) 94 96	15, 31, 66, 93	0
All	All	3184/3184 (100%)	-0.39	49 (1%) 73 81	15, 35, 78, 130	0

The worst 5 of 49 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	398	ASP	4.4
1	A	16	LEU	4.2
1	A	24	ASN	4.2
1	A	335	GLY	4.2
1	C	335	GLY	3.9

### 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 carbohydrates 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, 95<sup>th</sup> 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.

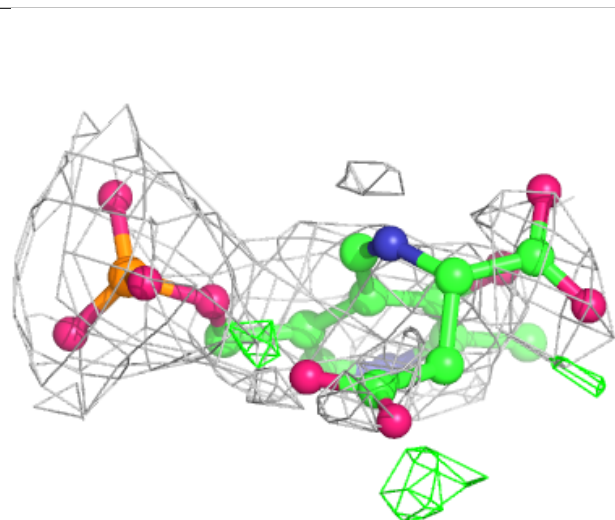
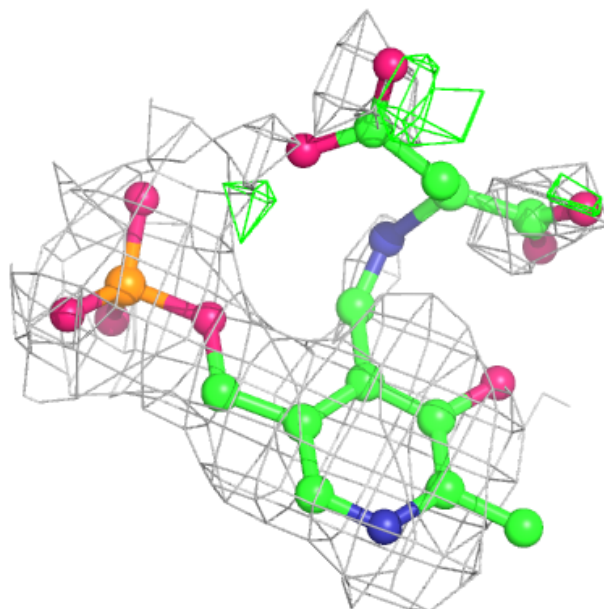
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
5	OAA	C	403	9/9	0.87	0.31	26,28,31,32	9
5	OAA	E	403	9/9	0.89	0.34	20,24,27,27	9
4	KET	E	404[B]	24/24	0.95	0.26	24,38,42,44	24
2	MG	A	401	1/1	0.97	0.04	15,15,15,15	0
2	MG	G	401	1/1	0.97	0.08	19,19,19,19	0
4	KET	A	403[B]	24/24	0.97	0.15	9,12,13,14	24
3	PLP	E	402[A]	15/16	0.97	0.21	30,61,71,71	15
2	MG	C	401	1/1	0.98	0.09	25,25,25,25	0
6	PMP	H	401	16/16	0.98	0.11	22,29,35,36	0
3	PLP	C	402	15/16	0.98	0.13	21,35,46,48	0
3	PLP	A	402[A]	15/16	0.98	0.12	34,39,43,50	15
4	KET	G	402	24/24	0.98	0.17	27,45,90,102	0
3	PLP	F	401	15/16	0.98	0.11	21,25,30,30	0
3	PLP	B	401	15/16	0.99	0.12	18,26,35,38	0
6	PMP	D	401	16/16	0.99	0.12	19,28,34,35	0
2	MG	E	401	1/1	0.99	0.09	13,13,13,13	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.



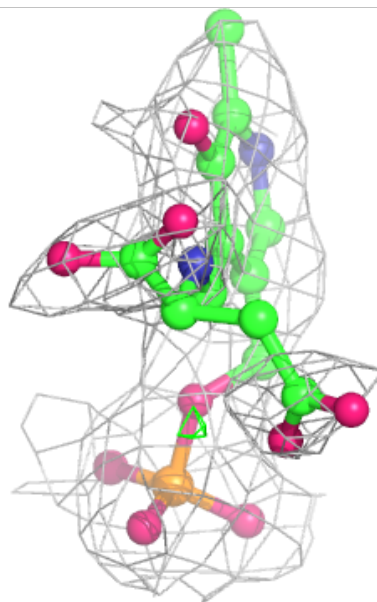
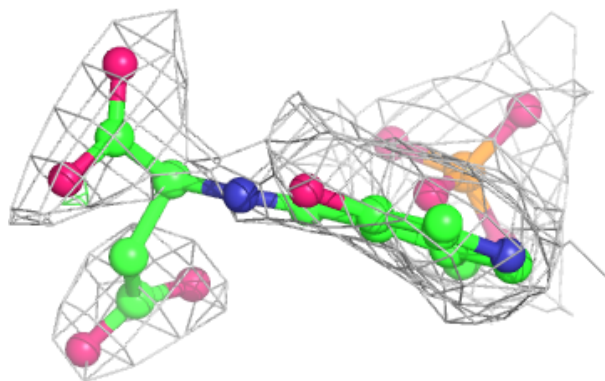
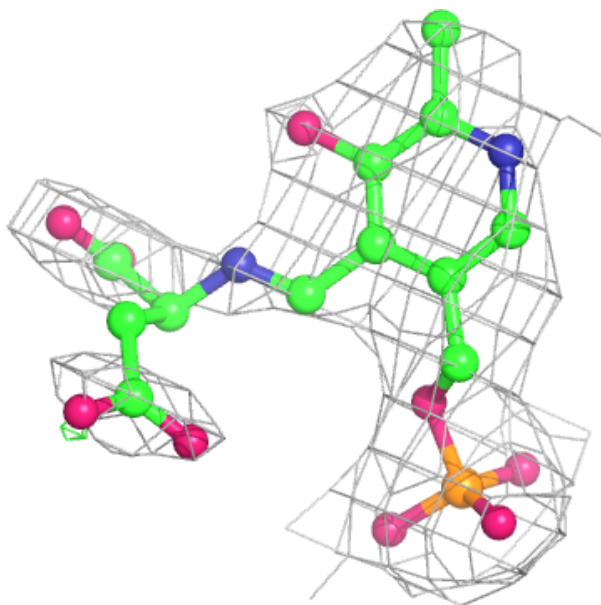
**Electron density around KET E 404 (B):**

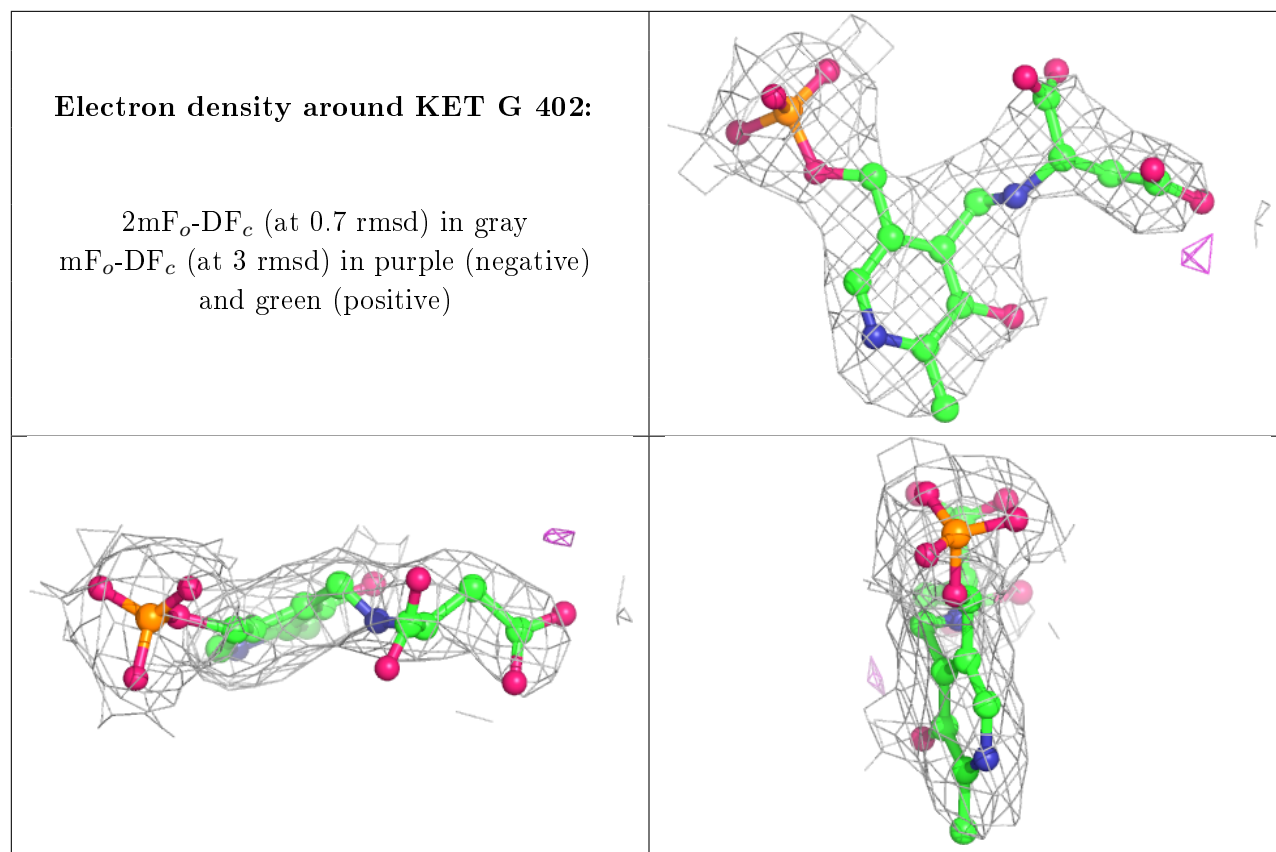
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around KET A 403 (B):**

$2mF_o-DF_c$  (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.