



wwPDB X-ray Structure Validation Summary Report

Jul 26, 2023 – 01:26 AM EDT

PDB ID : 1A49
Title : BIS MG-ATP-K-OXALATE COMPLEX OF PYRUVATE KINASE
Authors : Larsen, T.M.; Benning, M.M.; Rayment, I.; Reed, G.H.
Deposited on : 1998-02-12
Resolution : 2.10 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.34

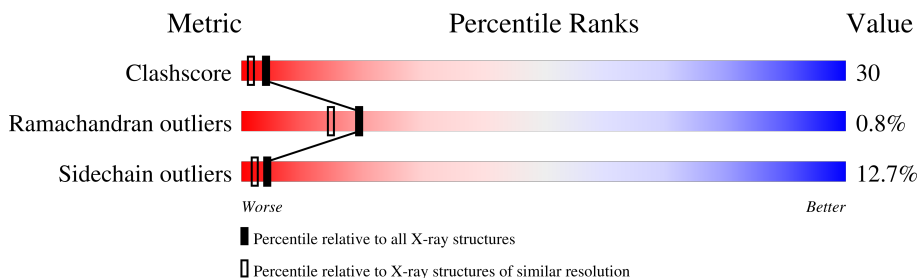
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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))
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)

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 $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	530	
1	B	530	
1	C	530	
1	D	530	
1	E	530	
1	F	530	
1	G	530	
1	H	530	

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	OXL	A	533	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 34001 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 PYRUVATE KINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	519	3978	2498	708	744	28	0	0	0
1	B	519	3978	2498	708	744	28	0	0	0
1	C	519	3978	2498	708	744	28	0	0	0
1	D	519	3978	2498	708	744	28	0	0	0
1	E	519	3978	2498	708	744	28	0	0	0
1	F	519	3978	2498	708	744	28	0	0	0
1	G	519	3978	2498	708	744	28	0	0	0
1	H	519	3978	2498	708	744	28	0	0	0

- Molecule 2 is POTASSIUM ION (three-letter code: K) (formula: K).

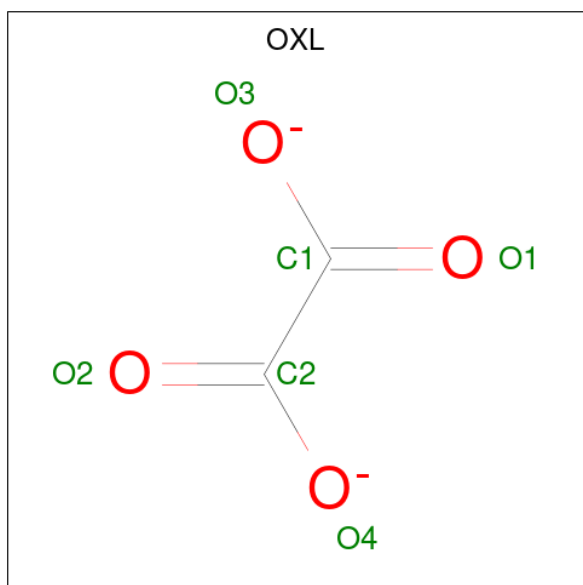
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total 1	K 1	0	0
2	B	1	Total 1	K 1	0	0
2	C	1	Total 1	K 1	0	0
2	D	1	Total 1	K 1	0	0
2	E	1	Total 1	K 1	0	0
2	F	1	Total 1	K 1	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	G	1	Total K 1 1	0	0
2	H	1	Total K 1 1	0	0

- Molecule 3 is OXALATE ION (three-letter code: OXL) (formula: C₂O₄).

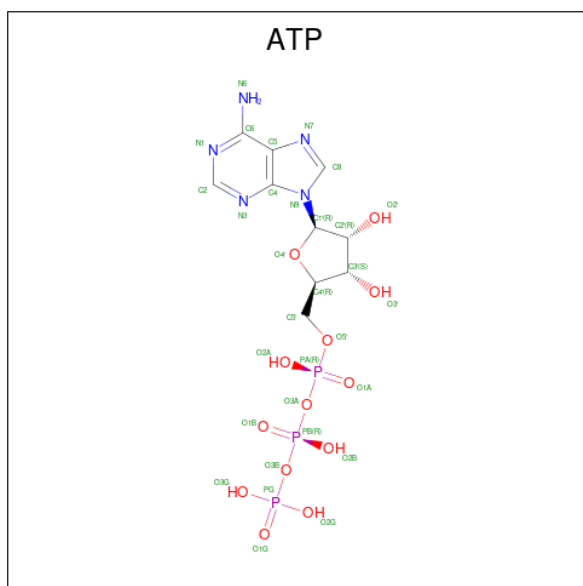


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 6 2 4	0	0
3	B	1	Total C O 6 2 4	0	0
3	C	1	Total C O 6 2 4	0	0
3	D	1	Total C O 6 2 4	0	0
3	E	1	Total C O 6 2 4	0	0
3	F	1	Total C O 6 2 4	0	0
3	G	1	Total C O 6 2 4	0	0
3	H	1	Total C O 6 2 4	0	0

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	2	Total Mg 2 2	0	0
4	B	1	Total Mg 1 1	0	0
4	C	2	Total Mg 2 2	0	0
4	D	2	Total Mg 2 2	0	0
4	E	2	Total Mg 2 2	0	0
4	F	2	Total Mg 2 2	0	0
4	G	2	Total Mg 2 2	0	0
4	H	1	Total Mg 1 1	0	0

- Molecule 5 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C N O P 31 10 5 13 3	0	0
5	C	1	Total C N O P 31 10 5 13 3	0	0
5	D	1	Total C N O P 31 10 5 13 3	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
5	E	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
5	F	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
5	G	1	Total	C	N	O	P	0	0
			31	10	5	13	3		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	195	Total	O	0	0
			195	195		
6	B	270	Total	O	0	0
			270	270		
6	C	178	Total	O	0	0
			178	178		
6	D	272	Total	O	0	0
			272	272		
6	E	279	Total	O	0	0
			279	279		
6	F	197	Total	O	0	0
			197	197		
6	G	228	Total	O	0	0
			228	228		
6	H	302	Total	O	0	0
			302	302		

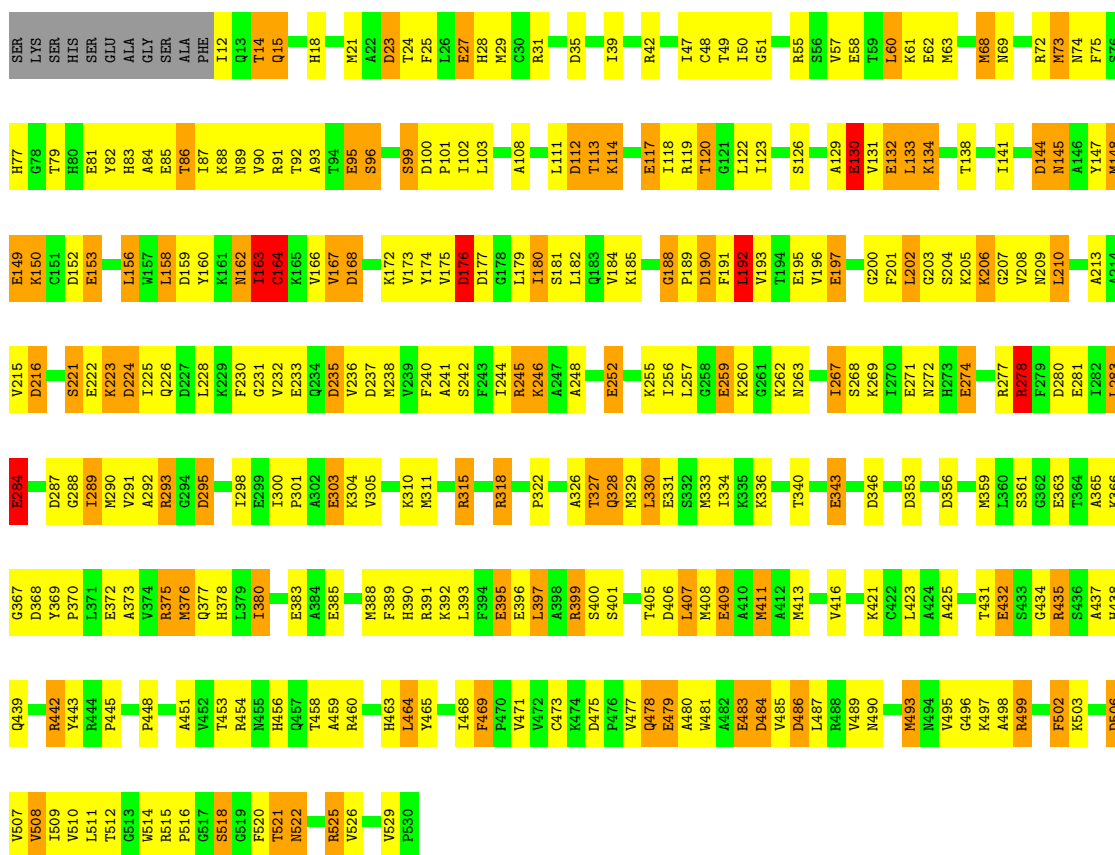
3 Residue-property plots [i](#)

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. 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. 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.

Note EDS was not executed.

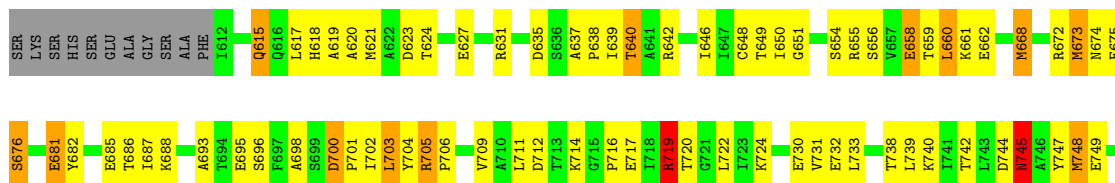
• Molecule 1: PYRUVATE KINASE

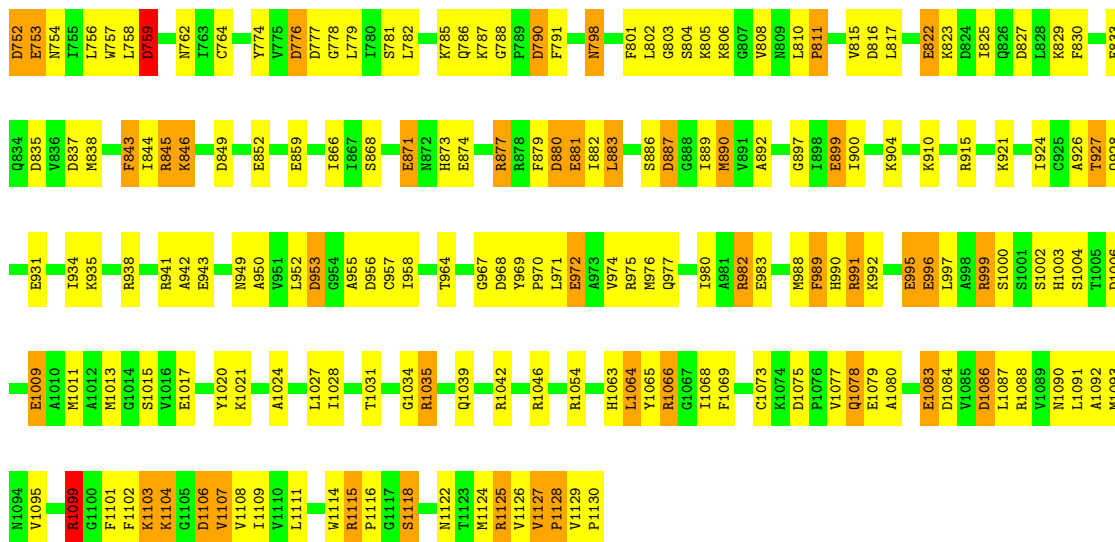
Chain A: 



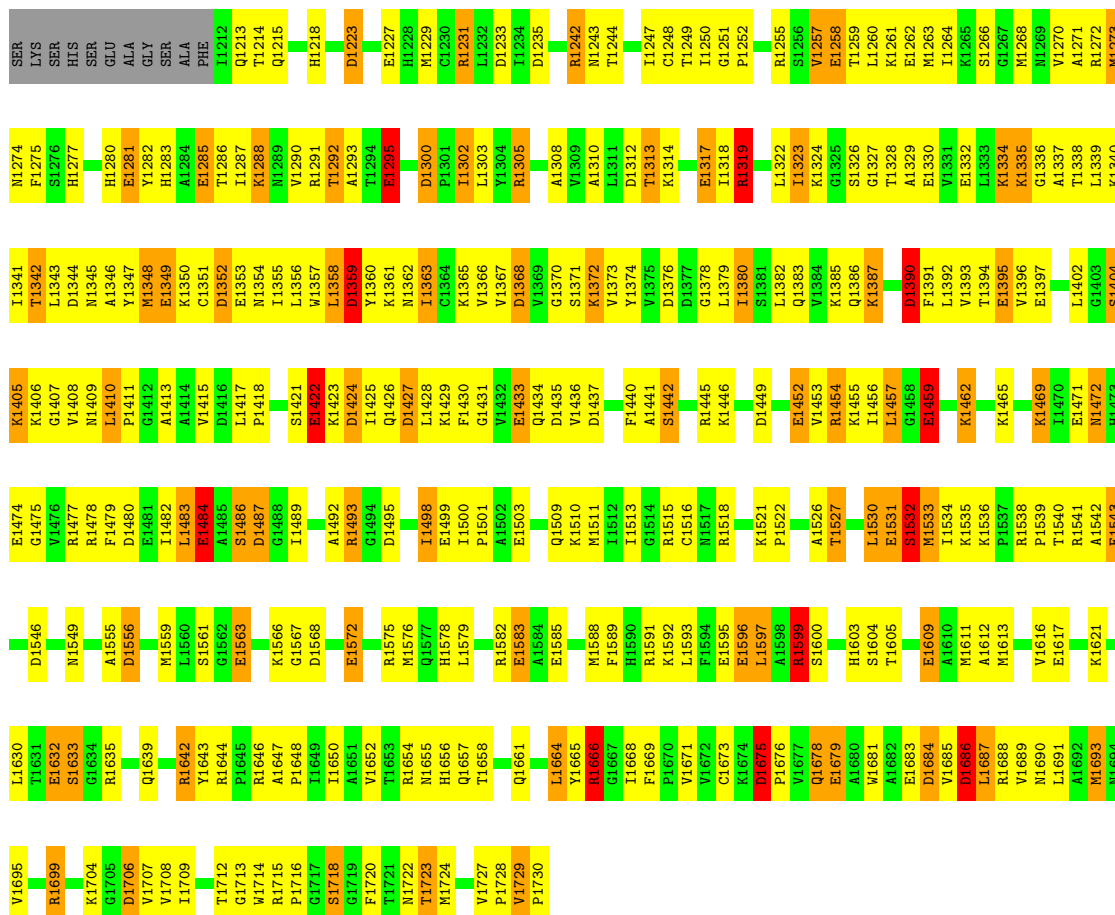
• Molecule 1: PYRUVATE KINASE

Chain B: 



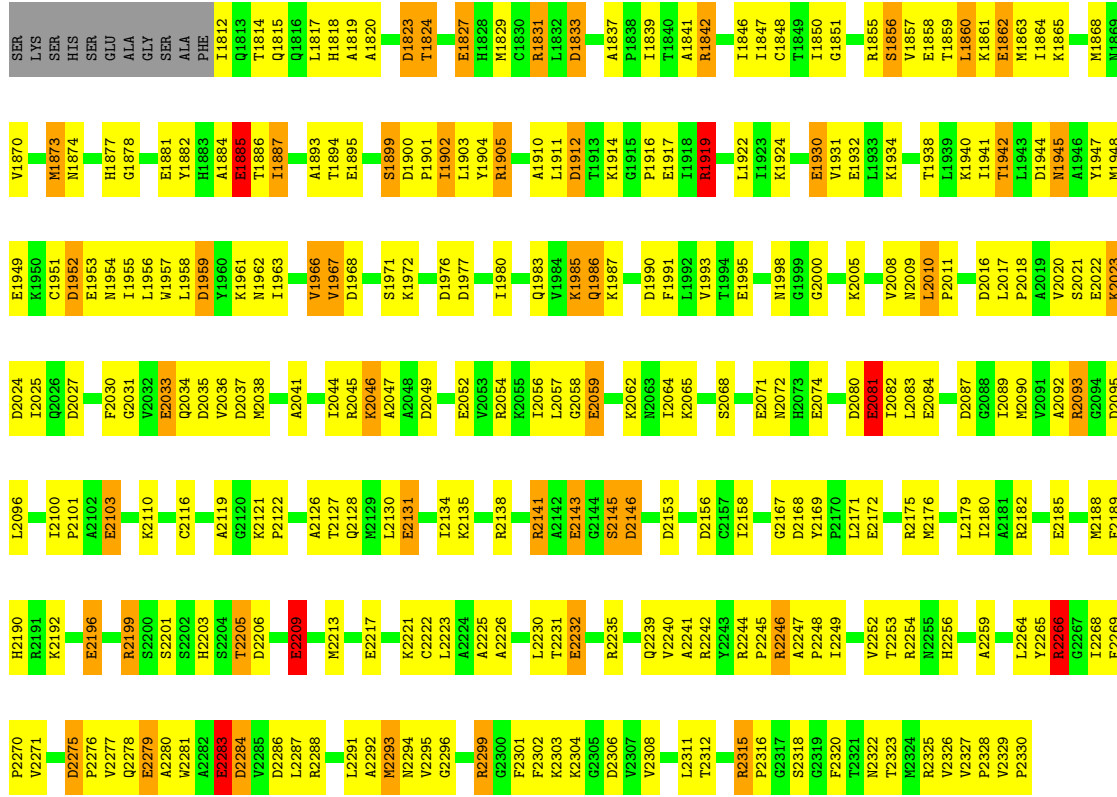


• Molecule 1: PYRUVATE KINASE

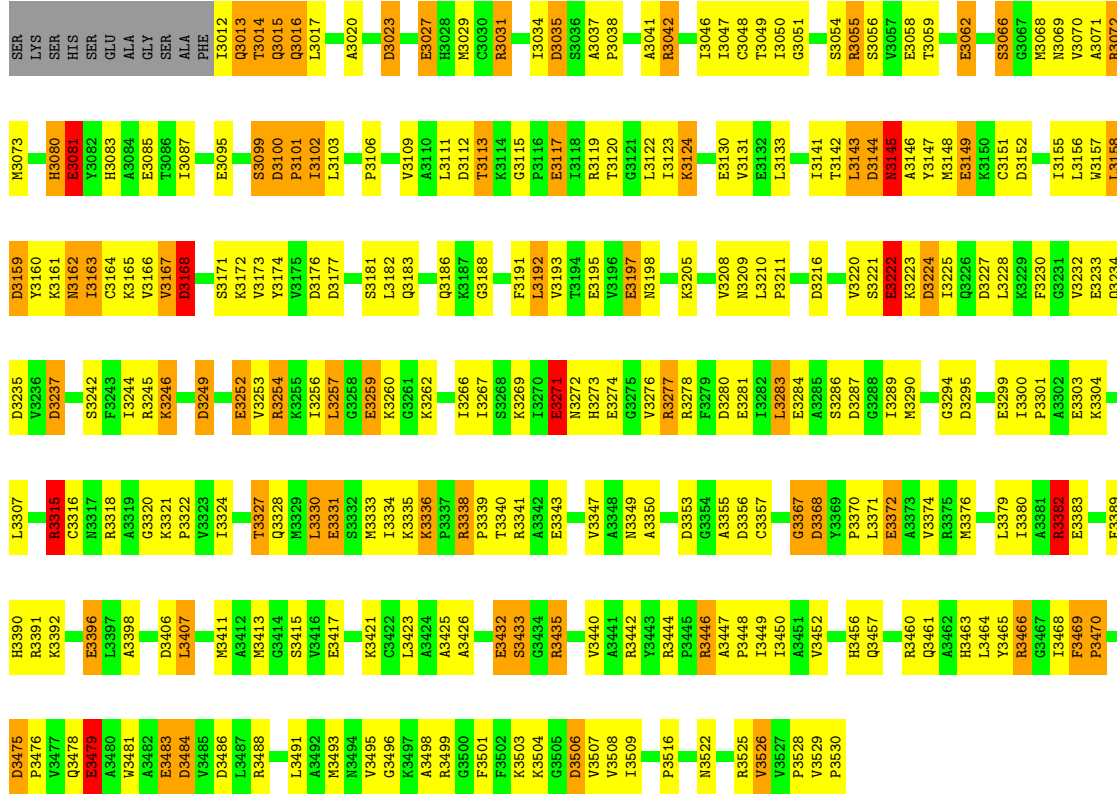


• Molecule 1: PYRUVATE KINASE





● Molecule 1: PYRUVATE KINASE



• Molecule 1: PYRUVATE KINASE

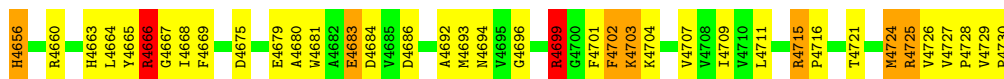


SER	LYS	SER	HIS	SER	GLU	ALA	SER	ALA	PHE	I3612	I3613	I3614	I3615	D3623	T3624	E3627	R3631	I3634	D3635	P3638	T3640	I36643	C3668	T3669	I36651	I36652	A3653	S3664	R3665	E3658	G3726	G3727	L3660	K3661	E3662	K3663	E3732	K3665	K3734	S3667	K3735	G3736	I3669	I3673	K3740	F3674	F3675	S3676	T3679													
H3680	E3681	H3682	H3683	A3814	K3750	E3685	T3686	I3687	K3688	N3689	K3690	R3691	E3695	S3696	F3697	A3698	S3699	F3700	P3701	I3702	L3703	Y3704	R3705	V3709	D3712	L3713	K3714	G3715	P3716	E3717	I3718	R3719	T3720	G3721	L3722	I3723	K3724	G3725	S3726	G3727	A3729	E3730	V3731	E3732	L3733	K3734	K3735	G3736	L3739	K3740	I3741	T3742	L3743	D3744	N3745							
A3746	Y3747	E3748	K3749	A3814	K3750	E3685	T3686	I3687	K3688	N3689	K3690	R3691	E3695	S3696	F3697	A3698	S3699	F3700	P3701	I3702	L3703	Y3704	R3705	V3709	D3712	L3713	K3714	G3715	P3716	E3717	I3718	R3719	T3720	G3721	L3722	I3723	K3724	G3725	S3726	G3727	A3729	E3730	V3731	E3732	L3733	K3734	K3735	G3736	L3739	K3740	I3741	T3742	L3743	D3744	N3745							
L3810	P3811	A3812	A3813	A3814	K3750	E3685	T3686	I3687	K3688	N3689	K3690	R3691	E3695	S3696	F3697	A3698	S3699	F3700	P3701	I3702	L3703	Y3704	R3705	V3709	D3712	L3713	K3714	G3715	P3716	E3717	I3718	R3719	T3720	G3721	L3722	I3723	K3724	G3725	S3726	G3727	A3729	E3730	V3731	E3732	L3733	K3734	K3735	G3736	L3739	K3740	I3741	T3742	L3743	D3744	N3745							
L3882	L3883	A3884	A3885	S3886	L3970	L3971	G3888	L3889	K3890	V3891	L3755	K3756	L3757	L3758	S3759	Y3760	K3761	L3762	L3763	C3764	K3765	V3766	V3767	D3768	V3769	K3772	V3773	Y3774	V3775	D3776	D3777	G3778	L3779	I3780	S3781	L3782	Q3783	Q3786	K3787	G3788	P3789	D3790	F3791	L3792	V3793	T3794	E3795	V3796	E3797	G3800	F3801	L3802	G3803	G3804	S3805	K3806	L3809					
L3882	L3883	A3884	A3885	S3886	L3970	L3971	G3888	L3889	K3890	V3891	L3755	K3756	L3757	L3758	S3759	Y3760	K3761	L3762	L3763	C3764	K3765	V3766	V3767	D3768	V3769	K3772	V3773	Y3774	V3775	D3776	D3777	G3778	L3779	I3780	S3781	L3782	Q3783	Q3786	K3787	G3788	P3789	D3790	F3791	L3792	V3793	T3794	E3795	V3796	E3797	G3800	F3801	L3802	G3803	G3804	S3805	K3806	L3809					
L3882	L3883	A3884	A3885	S3886	L3970	L3971	G3888	L3889	K3890	V3891	L3755	K3756	L3757	L3758	S3759	Y3760	K3761	L3762	L3763	C3764	K3765	V3766	V3767	D3768	V3769	K3772	V3773	Y3774	V3775	D3776	D3777	G3778	L3779	I3780	S3781	L3782	Q3783	Q3786	K3787	G3788	P3789	D3790	F3791	L3792	V3793	T3794	E3795	V3796	E3797	G3800	F3801	L3802	G3803	G3804	S3805	K3806	L3809					
K3966	G3967	D3968	Y3969	H4003	L3970	L3971	G3968	L3969	R3970	M3971	A3972	A3973	A3974	A3975	A3976	A3977	A3978	A3979	A3980	A3981	A3982	A3983	A3984	A3985	A3986	A3987	A3988	A3989	A3990	A3991	A3992	A3993	E3996	R3999	S4002	H4003	S4004	T4005	D4006	L4007	M4008	E4009	M4013	G4014	S4015	V4016	E4017	L4030	T4031	E4032	A4033	S4034	R4035	Q4039	R4042	Y4043	R4044	R4045	R4054	N4055	H4056	Q4057
T4058	Q4061	A4062	H4063	E4066	G4067	C4073	K4074	D4075	P4076	E4079	A4080	E4083	D4084	Y4086	L4087	R4088	M4083	M4094	G4096	R3999	S4002	H4003	S4004	T4005	D4006	L4007	M4008	E4009	M4013	G4014	S4015	V4016	E4017	L4030	T4031	E4032	A4033	S4034	R4035	Q4039	R4042	Y4043	R4044	R4045	R4054	N4055	H4056	Q4057														
T4058	Q4061	A4062	H4063	E4066	G4067	C4073	K4074	D4075	P4076	E4079	A4080	E4083	D4084	Y4086	L4087	R4088	M4083	M4094	G4096	R3999	S4002	H4003	S4004	T4005	D4006	L4007	M4008	E4009	M4013	G4014	S4015	V4016	E4017	L4030	T4031	E4032	A4033	S4034	R4035	Q4039	R4042	Y4043	R4044	R4045	R4054	N4055	H4056	Q4057														

• Molecule 1: PYRUVATE KINASE

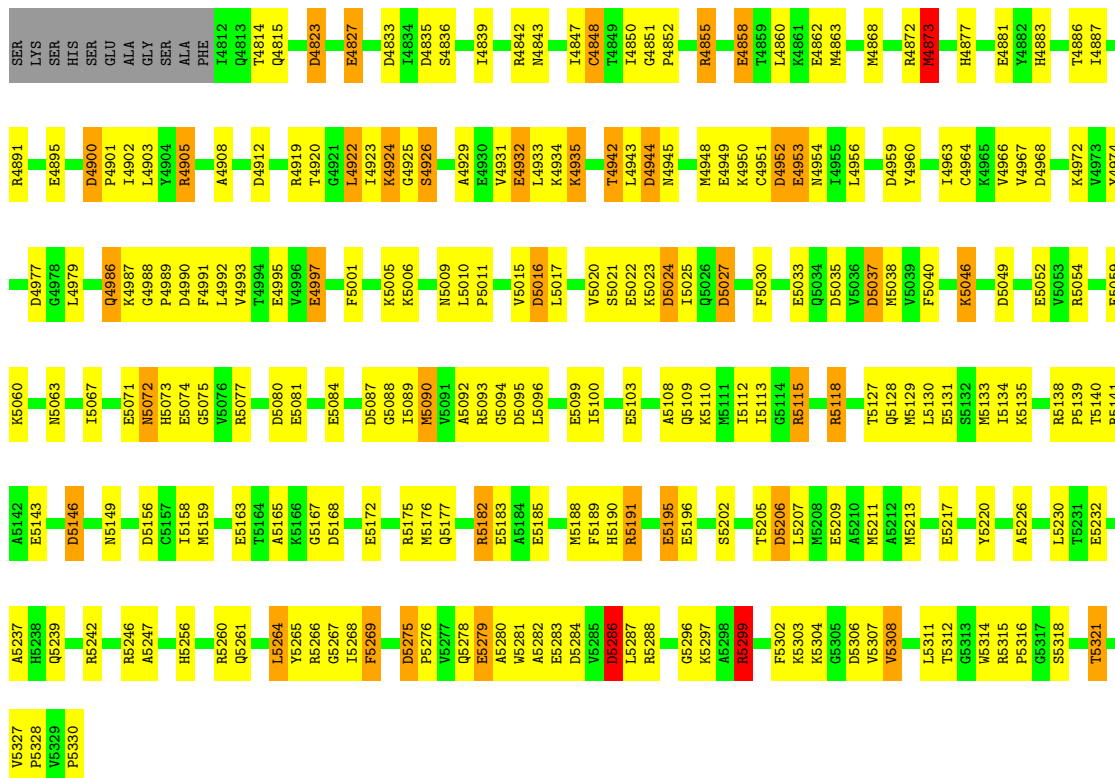


SER	LYS	SER	HIS	SER	GLU	ALA	GLY	SER	ALA	PHE	I4212	Q4215	Q4216	L4217	L4218	M4221	A4222	D4223	T4224	F4225	P4301	L4226	E4227	C4230	D4233	I4234	D4235	T4240	A4241	R4242	M4243	T4244	I4247	C4248	T4249	I4250	G4251	P4252	A4253	S4254	R4255	S4256	V4257	E4258	T4259	L4260	K4261	E4262	M4263	I4264	K4265	M4268	M4273		
M4274	F4275	S4276	H4280	H4281	E4282	E4285	L4286	Y4287	K4288	M4289	A4293	T4294	E4295	V4296	F4297	A4298	G4370	S4371	P4301	L4226	E4227	C4230	D4233	I4234	D4235	T4240	A4241	R4242	M4243	T4244	I4247	C4248	T4249	I4250	G4251	P4252	A4253	S4254	R4255	S4256	V4257	E4258	T4259	L4260	K4261	E4262	M4263	I4264	K4265	M4268	M4273				
M4274	F4275	S4276	H4280	H4281	E4282	E4285	L4286	Y4287	K4288	M4289	A4293	T4294	E4295	V4296	F4297	A4298	G4370	S4371	P4301	L4226	E4227	C4230	D4233	I4234	D4235	T4240	A4241	R4242	M4243	T4244	I4247	C4248	T4249	I4250	G4251	P4252	A4253	S4254	R4255	S4256	V4257	E4258	T4259	L4260	K4261	E4262	M4263	I4264	K4265	M4268	M4273				
E4349	K4350	C4351	D4352	E4353	M4354	M4357	L4358	K4359	Y4360	K4361	M4362	I4363	C4364	K4365	V4366	D4368	V4369	D4370	S4371	P4301	L4226	E4227	C4230	D4233	I4234	D4235	T4240	A4241	R4242	M4243	T4244	I4247	C4248	T4249	I4250	G4251	P4252	A4253	S4254	R4255	S4256	V4257	E4258	T4259	L4260	K4261	E4262	M4263	I4264	K4265	M4268	M4273			
P4411	G4412	A4413	D4416	L4417	P4418	E4422	K4423	D4424	K4425	I4426	Q4426	D4427	L4428	L4429	F4430	E4433	D4437	M4438	S4442	F4443	L4444	R4445	D4449	D4452	A4526	T4527	Q4528	S4529	L4530	R4538	P4539	T4540	E4543	G4544	S4545	D4546	L4552	L4553	G4554	A4555	D4556	M4559	L4560	L4561	L4562	L4563	K4566	G4567	C4568	Y4569	P4570	L4571	R4572	E4573	L4410
G4494	D4495	L4496	G4497	I4498	E4499	I4500	E4503	L4504	F4506	Q4509	K4510	M4511	L4512	L4513	I4514	G4515	R4516	M4517	K4521	P4522	V4523	A4526	T4527	Q4528	S4529	L4530	R4538	P4539	T4540	E4543	G4544	S4545	D4546	L4552	L4553	G4554	A4555	D4556	M4559	L4560	L4561	L4562	L4563	K4566	G4567	C4568	Y4569	P4570	L4571	R4572	E4573	L4410			
R4575	M4576	E4585	F4589	H4590	R4591	K4592	L4593	F4594	E4595	F4596	L4597	R4598	S4600	S4604	T4605	D4606	L4607	M4608	E4609	M4613	E4617	A4618	S4619	V4620	K4621	A4625	A4626	L4627	E4632	S4633	G4634	R4635	S4636	A4637	H4638	Q4639	V4640	A4641	R4642	R4643	R4644	P4645	R4646	A4647	P4648	I4649	V4652	T4653	R4654	E4657	L4410				



• Molecule 1: PYRUVATE KINASE

Chain H: 54% 36% 7% ..



4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	95.30Å 216.50Å 258.60Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.10	Depositor
% Data completeness (in resolution range)	87.0 (30.00-2.10)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	TNT 5D	Depositor
R, R_{free}	0.198 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	34001	wwPDB-VP
Average B, all atoms (Å ²)	40.0	wwPDB-VP

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: ATP, MG, OXL, K

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	1.36	35/4041 (0.9%)	1.29	48/5452 (0.9%)
1	B	1.38	29/4041 (0.7%)	1.31	58/5452 (1.1%)
1	C	1.30	36/4041 (0.9%)	1.34	63/5452 (1.2%)
1	D	1.38	35/4041 (0.9%)	1.30	57/5452 (1.0%)
1	E	1.37	32/4041 (0.8%)	1.32	52/5452 (1.0%)
1	F	1.31	31/4041 (0.8%)	1.32	64/5452 (1.2%)
1	G	1.34	30/4041 (0.7%)	1.30	50/5452 (0.9%)
1	H	1.36	27/4041 (0.7%)	1.31	63/5452 (1.2%)
All	All	1.35	255/32328 (0.8%)	1.31	455/43616 (1.0%)

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	1
1	H	1	0
All	All	1	2

The worst 5 of 255 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	G	4595	GLU	CD-OE1	11.92	1.38	1.25
1	B	681	GLU	CD-OE2	11.16	1.38	1.25
1	B	627	GLU	CD-OE2	10.56	1.37	1.25
1	A	27	GLU	CD-OE2	10.12	1.36	1.25
1	F	3797	GLU	CD-OE1	10.11	1.36	1.25

The worst 5 of 455 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	1919	ARG	NE-CZ-NH1	13.83	127.21	120.30
1	C	1666	ARG	NE-CZ-NH2	-12.50	114.05	120.30
1	F	4066	ARG	NE-CZ-NH1	11.78	126.19	120.30
1	B	1127	VAL	C-N-CD	-11.65	94.97	120.60
1	D	1919	ARG	NE-CZ-NH2	-11.52	114.54	120.30

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	H	5205	THR	CB

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	759	ASP	Mainchain
1	C	1599	ARG	Mainchain

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	3978	0	4055	326	2
1	B	3978	0	4056	216	1
1	C	3978	0	4055	321	3
1	D	3978	0	4055	251	5
1	E	3978	0	4056	221	14
1	F	3978	0	4055	240	2
1	G	3978	0	4055	276	2
1	H	3978	0	4055	187	18
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
2	G	1	0	0	0	0
2	H	1	0	0	0	0
3	A	6	0	0	2	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	6	0	0	0	0
3	C	6	0	0	1	0
3	D	6	0	0	0	0
3	E	6	0	0	0	0
3	F	6	0	0	1	0
3	G	6	0	0	1	0
3	H	6	0	0	1	0
4	A	2	0	0	0	0
4	B	1	0	0	0	0
4	C	2	0	0	0	0
4	D	2	0	0	0	0
4	E	2	0	0	0	0
4	F	2	0	0	0	0
4	G	2	0	0	0	0
4	H	1	0	0	0	0
5	A	31	0	12	3	0
5	C	31	0	12	3	0
5	D	31	0	12	1	0
5	E	31	0	12	0	0
5	F	31	0	12	0	0
5	G	31	0	12	1	0
6	A	195	0	0	11	0
6	B	270	0	0	17	0
6	C	178	0	0	11	0
6	D	272	0	0	21	0
6	E	279	0	0	15	0
6	F	197	0	0	9	0
6	G	228	0	0	7	0
6	H	302	0	0	12	3
All	All	34001	0	32514	1940	25

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 30.

The worst 5 of 1940 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:499:ARG:NH2	6:A:6596:HOH:O	1.57	1.36
1:C:1248:CYS:HB2	1:C:1268:MET:HE3	1.25	1.19
1:E:3142:THR:HG22	1:E:3144:ASP:H	1.05	1.10
1:H:5130:LEU:HD13	1:H:5133:MET:HE3	1.20	1.09

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:4665:TYR:HB2	1:G:4668:ILE:HD12	1.36	1.07

The worst 5 of 25 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:E:3149:GLU:OE1	1:H:4934:LYS:CE[3_655]	0.65	1.55
1:E:3149:GLU:CD	1:H:4934:LYS:NZ[3_655]	1.12	1.08
1:E:3081:GLU:OE1	1:H:4924:LYS:NZ[3_655]	1.15	1.05
1:E:3149:GLU:CD	1:H:4934:LYS:CE[3_655]	1.22	0.98
1:D:1924:LYS:NZ	1:H:4858:GLU:OE1[1_455]	1.29	0.91

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	517/530 (98%)	480 (93%)	33 (6%)	4 (1%)	19 15
1	B	517/530 (98%)	492 (95%)	20 (4%)	5 (1%)	15 11
1	C	517/530 (98%)	471 (91%)	41 (8%)	5 (1%)	15 11
1	D	517/530 (98%)	493 (95%)	21 (4%)	3 (1%)	25 21
1	E	517/530 (98%)	488 (94%)	24 (5%)	5 (1%)	15 11
1	F	517/530 (98%)	490 (95%)	23 (4%)	4 (1%)	19 15
1	G	517/530 (98%)	488 (94%)	25 (5%)	4 (1%)	19 15
1	H	517/530 (98%)	490 (95%)	24 (5%)	3 (1%)	25 21
All	All	4136/4240 (98%)	3892 (94%)	211 (5%)	33 (1%)	19 15

5 of 33 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	189	PRO
1	C	1533	MET
1	E	3506	ASP
1	F	3729	ALA
1	F	3789	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 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	426/434 (98%)	349 (82%)	77 (18%)	1	1
1	B	426/434 (98%)	379 (89%)	47 (11%)	6	3
1	C	426/434 (98%)	358 (84%)	68 (16%)	2	1
1	D	426/434 (98%)	384 (90%)	42 (10%)	8	5
1	E	426/434 (98%)	372 (87%)	54 (13%)	4	2
1	F	426/434 (98%)	373 (88%)	53 (12%)	4	2
1	G	426/434 (98%)	368 (86%)	58 (14%)	3	2
1	H	426/434 (98%)	391 (92%)	35 (8%)	11	8
All	All	3408/3472 (98%)	2974 (87%)	434 (13%)	4	2

5 of 434 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	2303	LYS
1	E	3504	LYS
1	H	4814	THR
1	E	3031	ARG
1	E	3167	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 109 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	2257	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	E	3463	HIS
1	H	4889	ASN
1	D	2294	ASN
1	E	3198	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 36 ligands modelled in this entry, 22 are monoatomic - leaving 14 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	OXL	A	533	4	5,5,5	1.33	1 (20%)	6,6,6	1.67	2 (33%)
5	ATP	G	4735	2,4	26,33,33	1.59	4 (15%)	31,52,52	1.32	3 (9%)
3	OXL	C	1733	4	5,5,5	1.84	2 (40%)	6,6,6	1.63	1 (16%)
3	OXL	E	3533	4	5,5,5	1.29	0	6,6,6	1.34	0
5	ATP	D	2335	2,4	26,33,33	1.73	6 (23%)	31,52,52	1.16	3 (9%)
3	OXL	B	1133	4	5,5,5	1.37	2 (40%)	6,6,6	1.38	0
5	ATP	F	4135	2,4	26,33,33	1.62	4 (15%)	31,52,52	1.04	3 (9%)
5	ATP	A	535	2,4	26,33,33	1.52	5 (19%)	31,52,52	1.27	2 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	ATP	C	1735	2,4	26,33,33	1.58	5 (19%)	31,52,52	1.21	3 (9%)
3	OXL	G	4733	4	5,5,5	1.30	0	6,6,6	1.35	0
3	OXL	D	2333	4	5,5,5	1.18	0	6,6,6	1.33	0
3	OXL	F	4133	4	5,5,5	1.27	0	6,6,6	1.33	0
3	OXL	H	5333	4	5,5,5	1.17	1 (20%)	6,6,6	1.28	0
5	ATP	E	3535	2,4	26,33,33	1.58	4 (15%)	31,52,52	1.05	2 (6%)

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	OXL	A	533	4	-	0/4/4/4	-
5	ATP	G	4735	2,4	-	3/18/38/38	0/3/3/3
3	OXL	C	1733	4	-	0/4/4/4	-
3	OXL	E	3533	4	-	0/4/4/4	-
5	ATP	D	2335	2,4	-	3/18/38/38	0/3/3/3
3	OXL	B	1133	4	-	0/4/4/4	-
5	ATP	F	4135	2,4	-	0/18/38/38	0/3/3/3
5	ATP	A	535	2,4	-	0/18/38/38	0/3/3/3
5	ATP	C	1735	2,4	-	5/18/38/38	0/3/3/3
3	OXL	G	4733	4	-	0/4/4/4	-
3	OXL	D	2333	4	-	0/4/4/4	-
3	OXL	F	4133	4	-	0/4/4/4	-
3	OXL	H	5333	4	-	0/4/4/4	-
5	ATP	E	3535	2,4	-	3/18/38/38	0/3/3/3

The worst 5 of 34 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	3535	ATP	PG-O3G	-4.88	1.36	1.54
5	D	2335	ATP	C2'-C1'	-4.81	1.46	1.53
5	D	2335	ATP	PG-O3G	-4.13	1.38	1.54
5	G	4735	ATP	PG-O3G	-4.06	1.39	1.54
5	F	4135	ATP	C2-N1	4.02	1.41	1.33

The worst 5 of 19 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	G	4735	ATP	C5-C6-N6	5.13	128.15	120.35

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	535	ATP	C5-C6-N6	4.13	126.62	120.35
5	C	1735	ATP	C5-C6-N6	3.71	125.98	120.35
5	D	2335	ATP	O3G-PG-O3B	3.26	115.58	104.64
3	C	1733	OXL	O4-C2-O2	2.88	130.20	123.61

There are no chirality outliers.

5 of 14 torsion outliers are listed below:

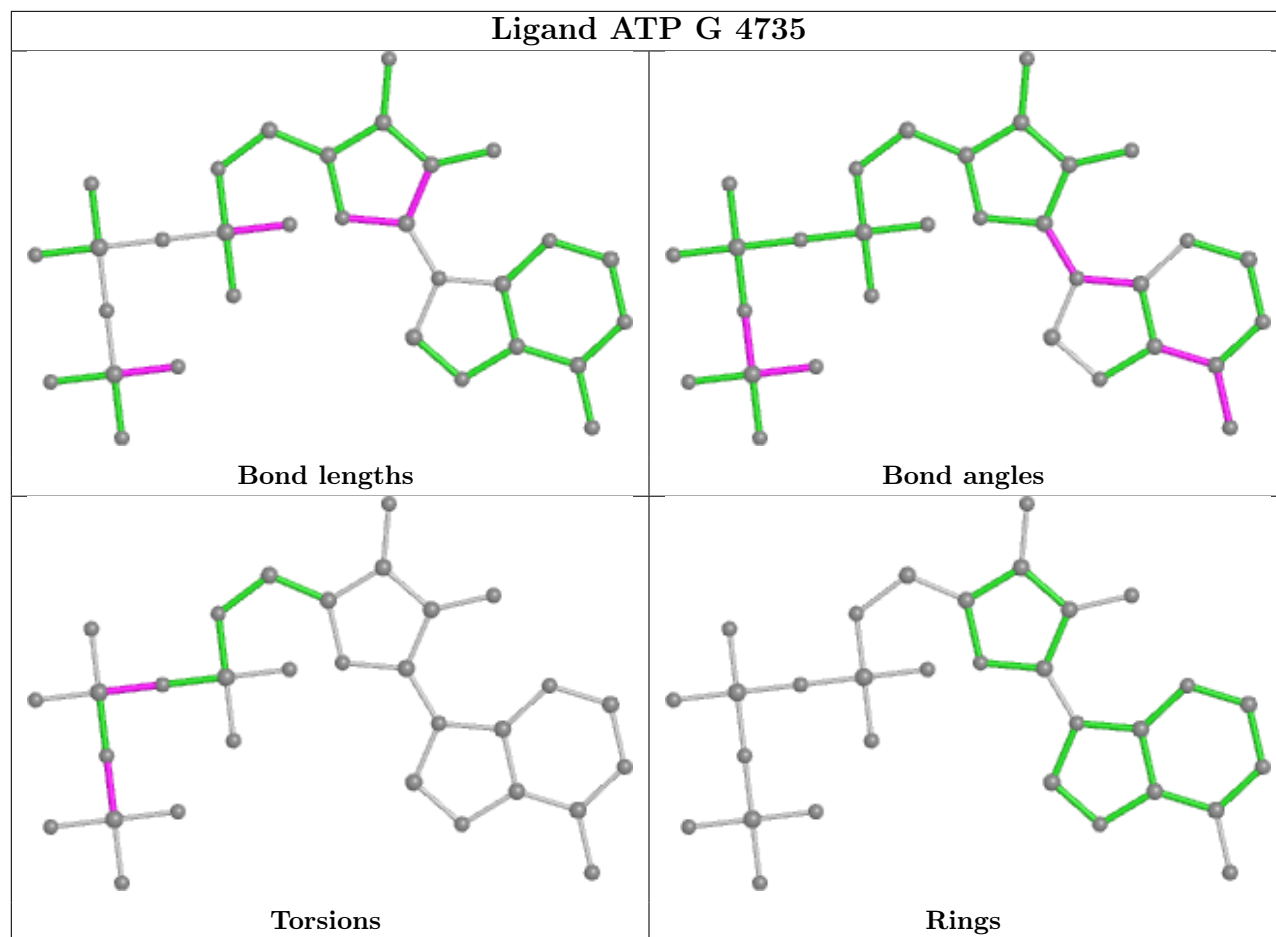
Mol	Chain	Res	Type	Atoms
5	E	3535	ATP	PB-O3B-PG-O3G
5	C	1735	ATP	PB-O3B-PG-O1G
5	E	3535	ATP	PB-O3A-PA-O1A
5	D	2335	ATP	PB-O3B-PG-O1G
5	C	1735	ATP	PA-O3A-PB-O1B

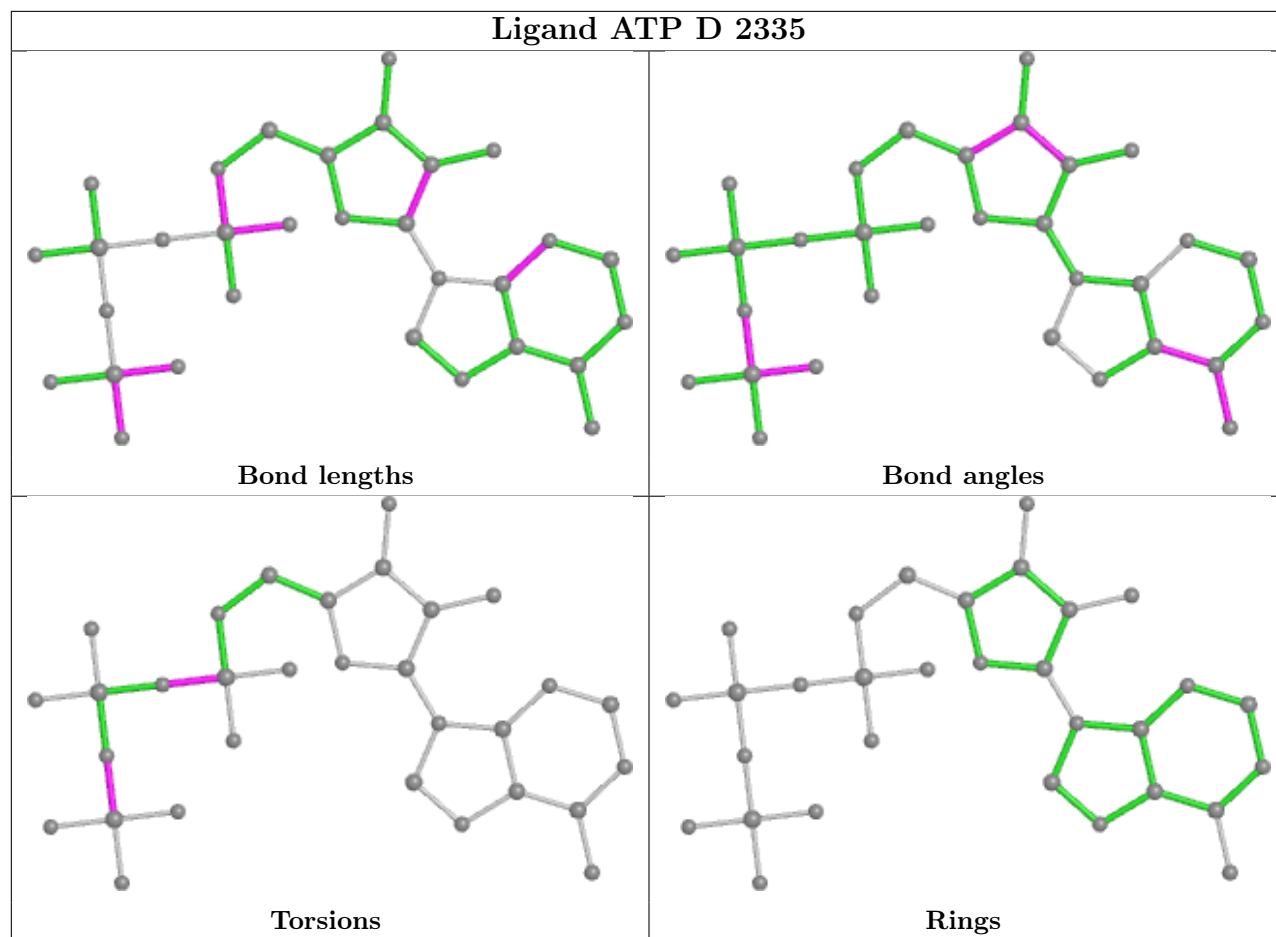
There are no ring outliers.

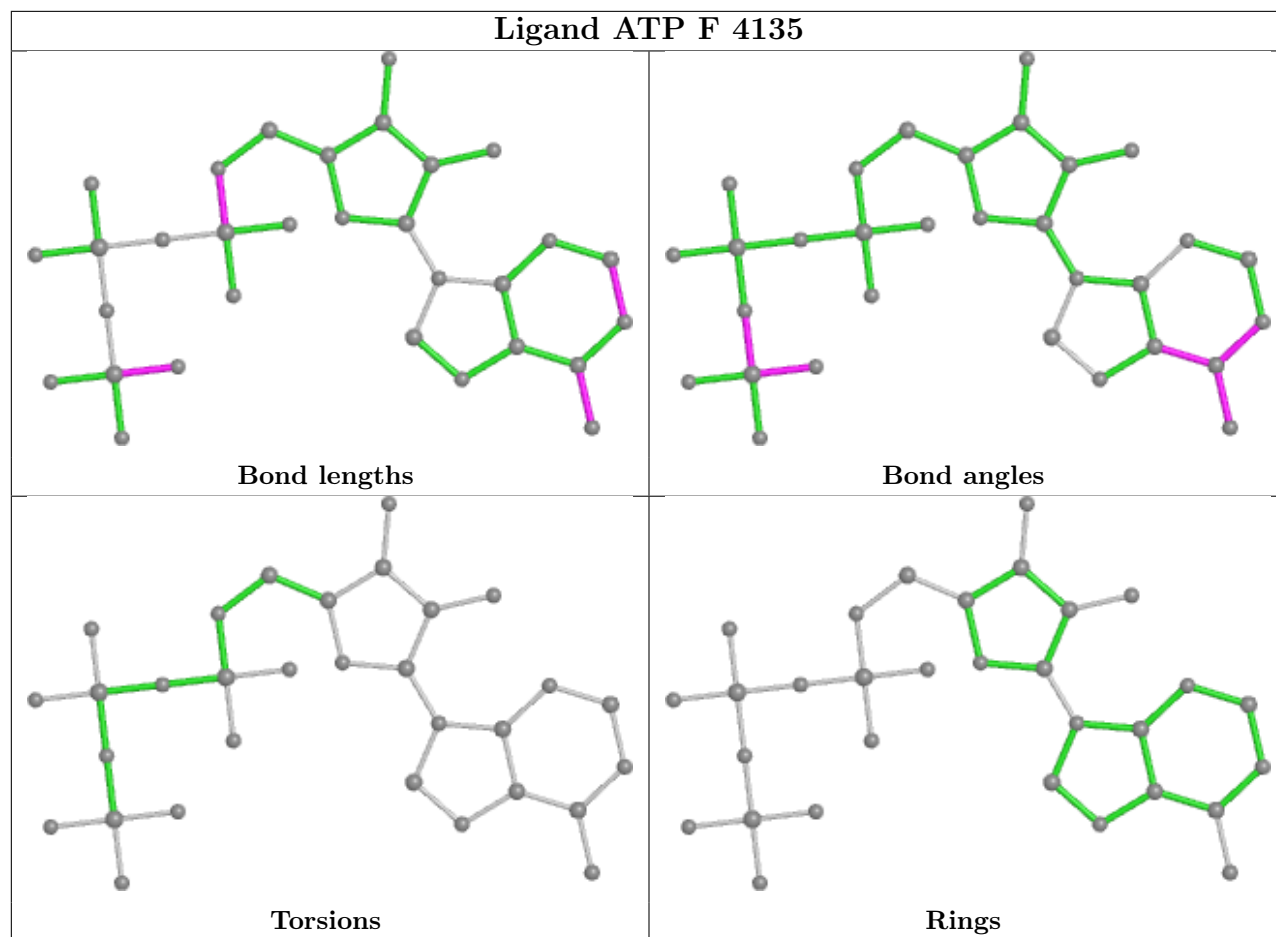
9 monomers are involved in 14 short contacts:

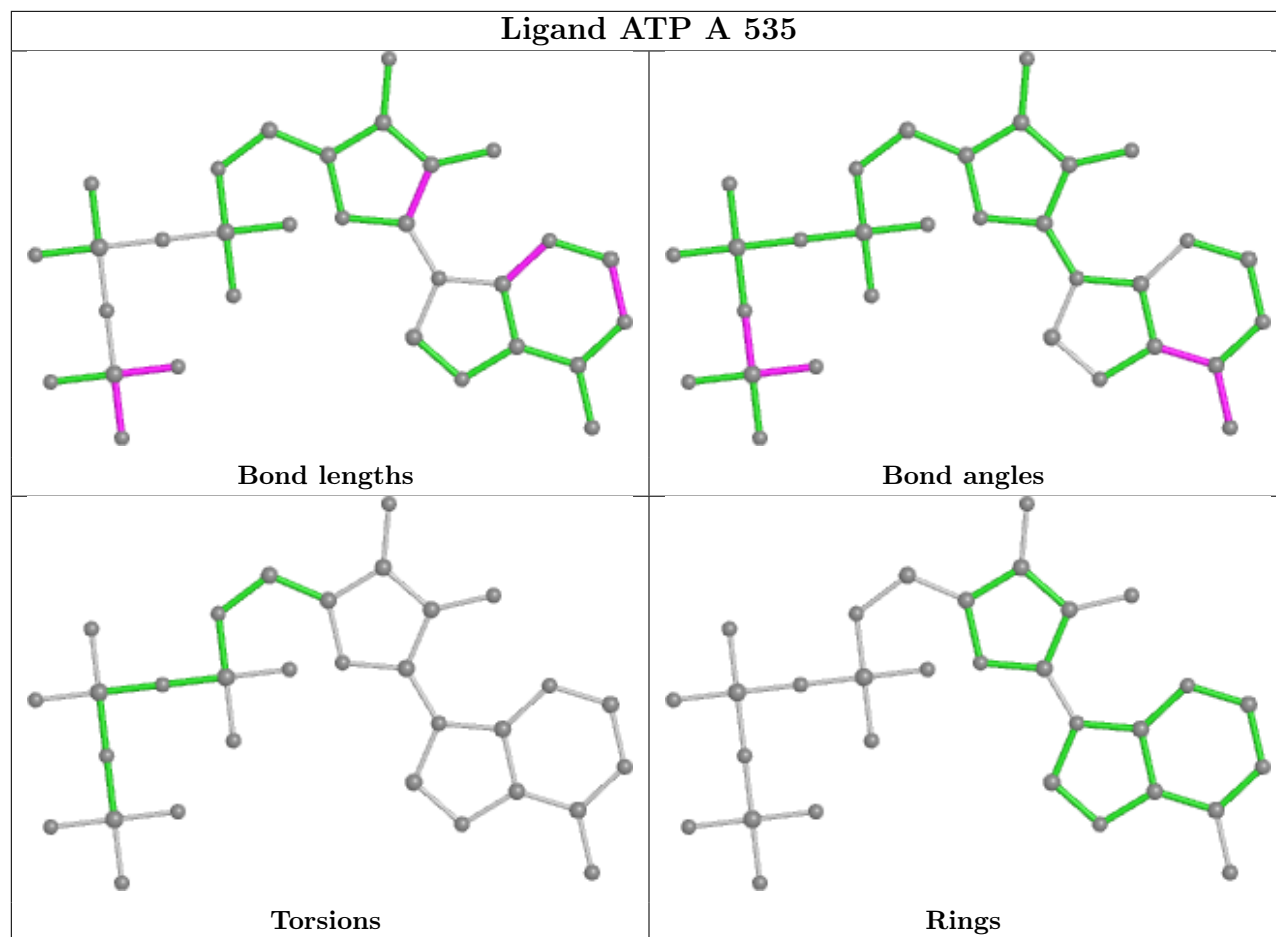
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	533	OXL	2	0
5	G	4735	ATP	1	0
3	C	1733	OXL	1	0
5	D	2335	ATP	1	0
5	A	535	ATP	3	0
5	C	1735	ATP	3	0
3	G	4733	OXL	1	0
3	F	4133	OXL	1	0
3	H	5333	OXL	1	0

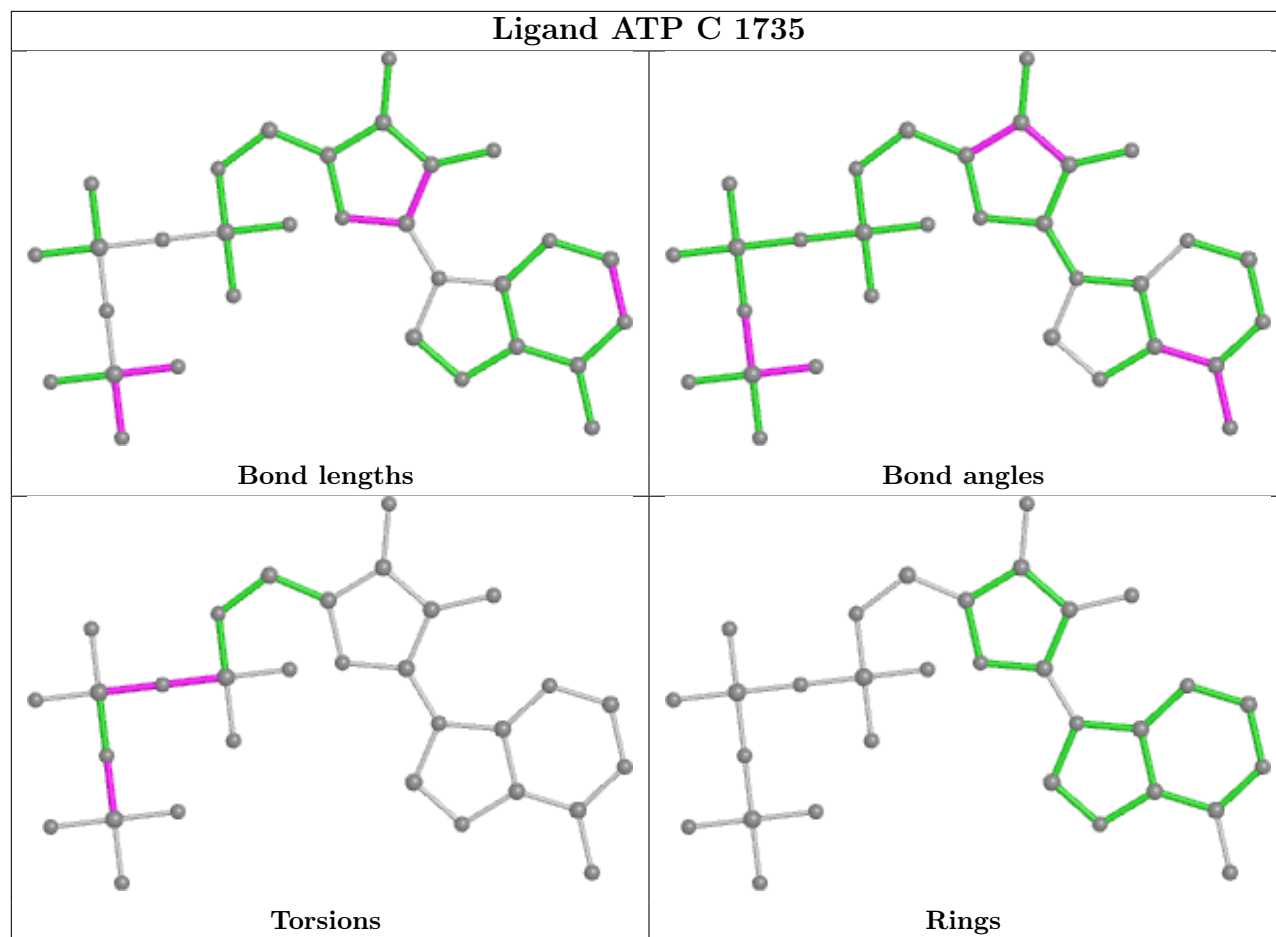
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

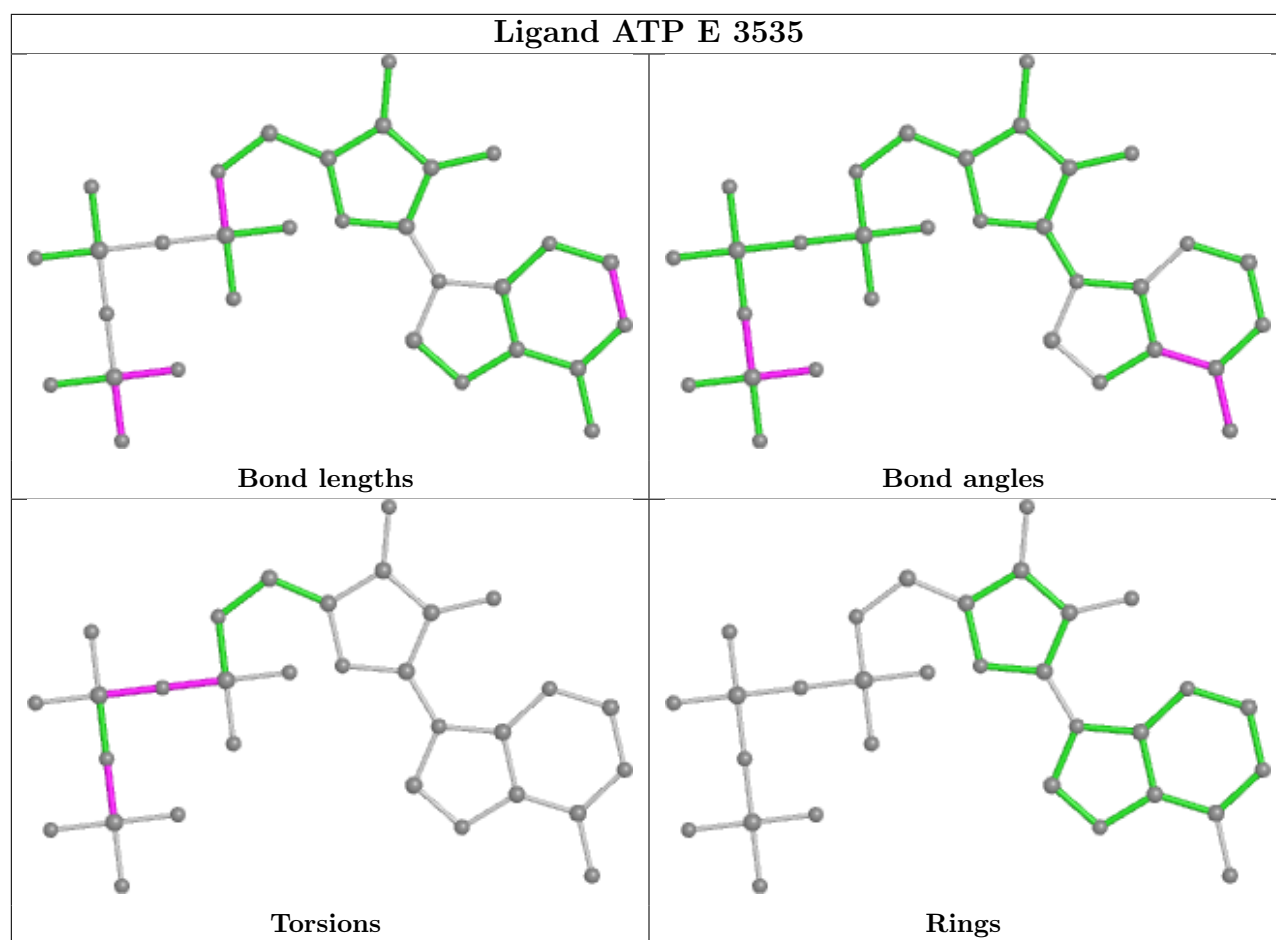












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.