Full wwPDB X-ray Structure Validation Report ⓘ

Jun 15, 2024 – 07:23 PM EDT

PDB ID	:	2PBZ
Title	:	Crystal structure of an IMP biosynthesis protein PurP from Thermococcus kodakaraensis
Authors	:	Agarwal, R.; Burley, S.K.; Swaminathan, S.; New York SGX Research Center for Structural Genomics (NYSGXRC)
Deposited on	:	2007-03-29
Resolution	:	2.50 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

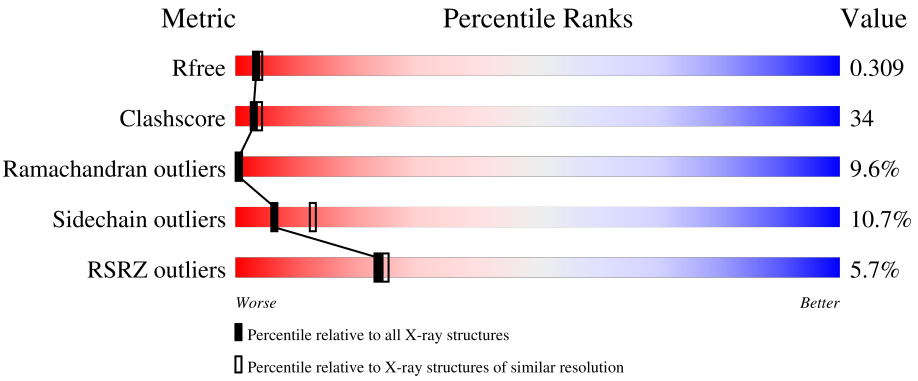
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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 <=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	320	5% 42% 40% 8% • 8%
1	B	320	2% 43% 38% 8% • 8%
1	C	320	8% 44% 38% 8% • 8%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 7416 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 Hypothetical protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	293	Total	C	N	O	Se	0	0	0
			2361	1526	401	431	3			
1	B	293	Total	C	N	O	Se	0	0	0
			2361	1526	401	431	3			
1	C	293	Total	C	N	O	Se	0	0	0
			2361	1526	401	431	3			

There are 42 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MSE	-	cloning artifact	UNP Q5JD28
A	2	SER	-	cloning artifact	UNP Q5JD28
A	3	LEU	-	cloning artifact	UNP Q5JD28
A	54	MSE	MET	modified residue	UNP Q5JD28
A	238	MSE	MET	modified residue	UNP Q5JD28
A	290	MSE	MET	modified residue	UNP Q5JD28
A	313	GLU	-	cloning artifact	UNP Q5JD28
A	314	GLY	-	cloning artifact	UNP Q5JD28
A	315	HIS	-	cloning artifact	UNP Q5JD28
A	316	HIS	-	cloning artifact	UNP Q5JD28
A	317	HIS	-	cloning artifact	UNP Q5JD28
A	318	HIS	-	cloning artifact	UNP Q5JD28
A	319	HIS	-	cloning artifact	UNP Q5JD28
A	320	HIS	-	cloning artifact	UNP Q5JD28
B	1	MSE	-	cloning artifact	UNP Q5JD28
B	2	SER	-	cloning artifact	UNP Q5JD28
B	3	LEU	-	cloning artifact	UNP Q5JD28
B	54	MSE	MET	modified residue	UNP Q5JD28
B	238	MSE	MET	modified residue	UNP Q5JD28
B	290	MSE	MET	modified residue	UNP Q5JD28
B	313	GLU	-	cloning artifact	UNP Q5JD28
B	314	GLY	-	cloning artifact	UNP Q5JD28
B	315	HIS	-	cloning artifact	UNP Q5JD28

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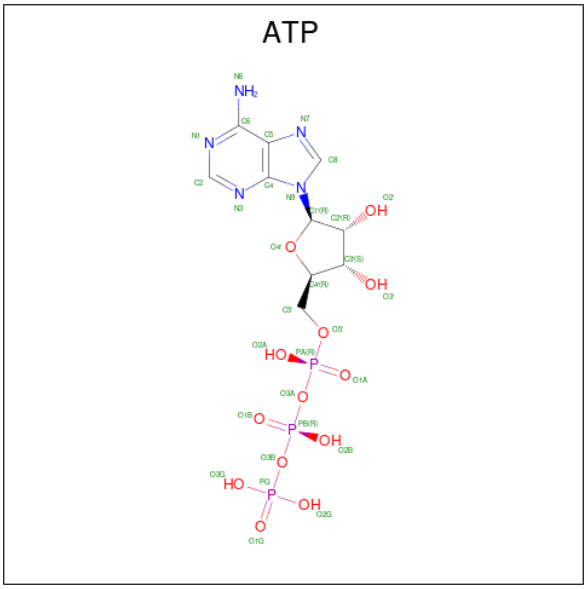
Chain	Residue	Modelled	Actual	Comment	Reference
B	316	HIS	-	cloning artifact	UNP Q5JD28
B	317	HIS	-	cloning artifact	UNP Q5JD28
B	318	HIS	-	cloning artifact	UNP Q5JD28
B	319	HIS	-	cloning artifact	UNP Q5JD28
B	320	HIS	-	cloning artifact	UNP Q5JD28
C	1	MSE	-	cloning artifact	UNP Q5JD28
C	2	SER	-	cloning artifact	UNP Q5JD28
C	3	LEU	-	cloning artifact	UNP Q5JD28
C	54	MSE	MET	modified residue	UNP Q5JD28
C	238	MSE	MET	modified residue	UNP Q5JD28
C	290	MSE	MET	modified residue	UNP Q5JD28
C	313	GLU	-	cloning artifact	UNP Q5JD28
C	314	GLY	-	cloning artifact	UNP Q5JD28
C	315	HIS	-	cloning artifact	UNP Q5JD28
C	316	HIS	-	cloning artifact	UNP Q5JD28
C	317	HIS	-	cloning artifact	UNP Q5JD28
C	318	HIS	-	cloning artifact	UNP Q5JD28
C	319	HIS	-	cloning artifact	UNP Q5JD28
C	320	HIS	-	cloning artifact	UNP Q5JD28

- Molecule 2 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



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

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

- Molecule 3 is water.

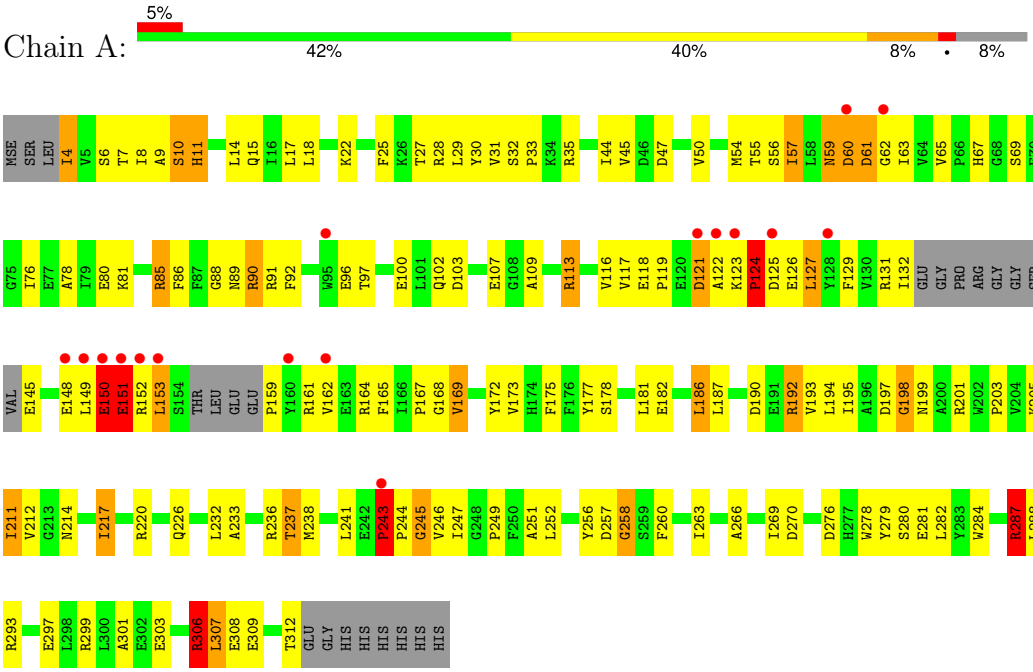
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	80	Total	O	0	0
			80	80		
3	B	85	Total	O	0	0
			85	85		
3	C	75	Total	O	0	0
			75	75		

3 Residue-property plots (i)

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

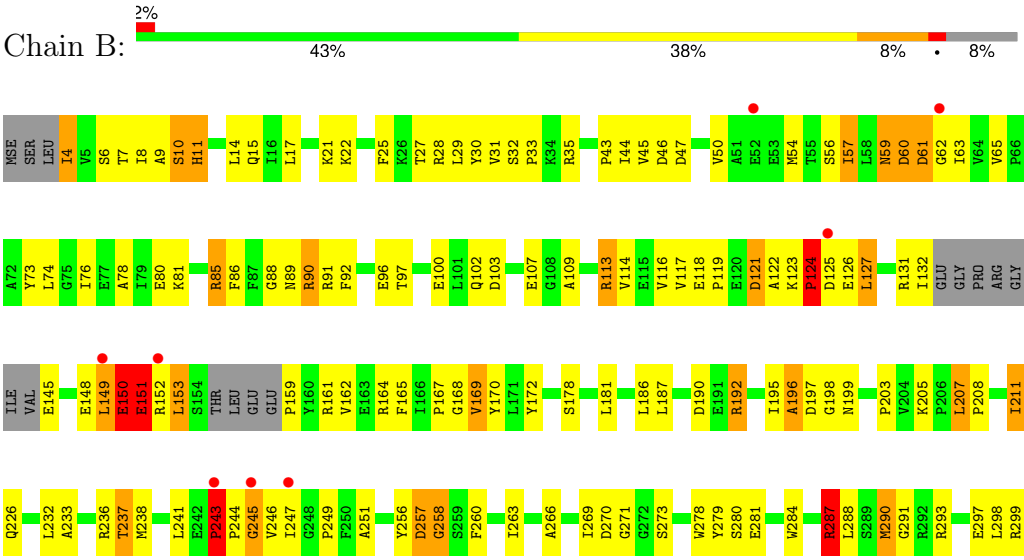
• Molecule 1: Hypothetical protein

Chain A:



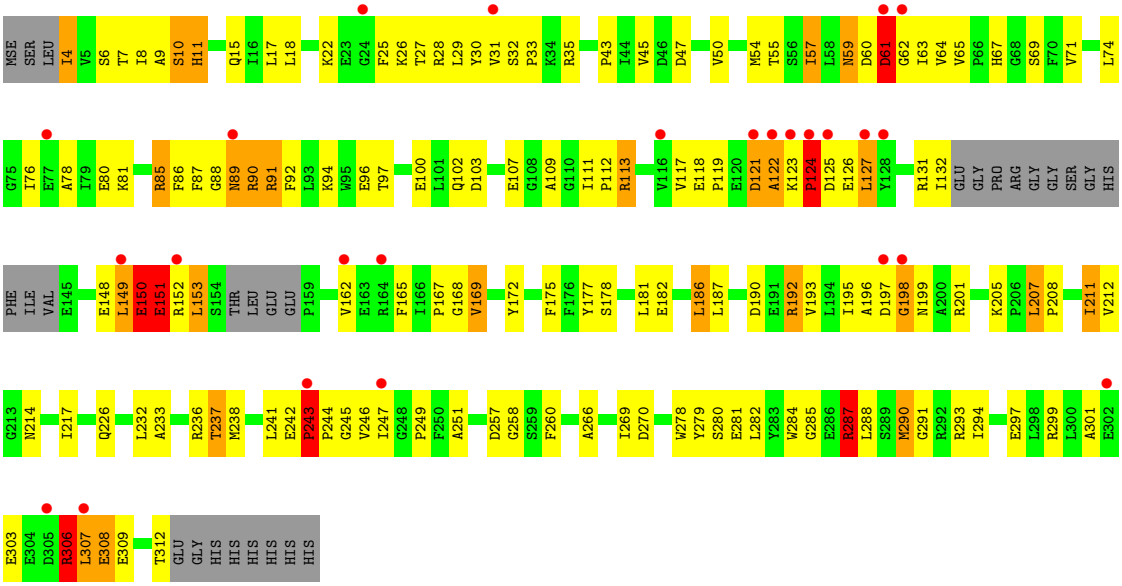
• Molecule 1: Hypothetical protein

Chain B:



• Molecule 1: Hypothetical protein

Chain C:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	63.34Å 87.40Å 175.91Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	31.00 – 2.50 49.24 – 2.38	Depositor EDS
% Data completeness (in resolution range)	84.5 (31.00-2.50) 85.3 (49.24-2.38)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.40 (at 2.39Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.276 , 0.300 0.281 , 0.309	Depositor DCC
R_{free} test set	816 reflections (2.32%)	wwPDB-VP
Wilson B-factor (Å^2)	51.4	Xtriage
Anisotropy	0.336	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 41.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	7416	wwPDB-VP
Average B, all atoms (Å^2)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.05% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: ATP

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	0.48	0/2414	0.75	2/3263 (0.1%)
1	B	0.49	0/2414	0.76	2/3263 (0.1%)
1	C	0.50	0/2414	0.76	1/3263 (0.0%)
All	All	0.49	0/7242	0.76	5/9789 (0.1%)

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

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	258	GLY	N-CA-C	-6.19	97.61	113.10
1	A	258	GLY	N-CA-C	-5.85	98.48	113.10
1	B	258	GLY	N-CA-C	-5.80	98.59	113.10
1	B	245	GLY	N-CA-C	5.49	126.82	113.10
1	A	245	GLY	N-CA-C	5.25	126.23	113.10

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	170	TYR	Sidechain

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	2361	0	2356	170	0
1	B	2361	0	2356	172	0
1	C	2361	0	2356	161	0
2	A	31	0	12	1	0
2	B	31	0	12	1	0
2	C	31	0	12	1	0
3	A	80	0	0	12	0
3	B	85	0	0	20	0
3	C	75	0	0	11	0
All	All	7416	0	7104	489	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 34.

All (489) 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:78:ALA:HB3	3:C:419:HOH:O	1.43	1.14
1:B:8:ILE:HG23	1:B:54:MSE:HE2	1.30	1.13
1:A:8:ILE:HG23	1:A:54:MSE:HE2	1.32	1.09
1:C:8:ILE:HG23	1:C:54:MSE:HE2	1.34	1.08
1:B:150:GLU:HG2	1:B:151:GLU:H	1.23	1.03
1:A:150:GLU:HG2	1:A:151:GLU:H	1.26	0.98
1:B:78:ALA:HB3	3:B:446:HOH:O	1.64	0.97
1:C:150:GLU:HG2	1:C:151:GLU:H	1.29	0.96
1:B:113:ARG:HH11	1:B:113:ARG:HB3	1.30	0.96
1:A:195:ILE:HD11	1:A:208:PRO:HB2	1.50	0.92
1:C:150:GLU:HG2	1:C:151:GLU:N	1.82	0.92
1:A:30:TYR:O	1:A:54:MSE:HE1	1.71	0.91
1:C:195:ILE:HD11	1:C:208:PRO:HB2	1.52	0.90
1:B:195:ILE:HD11	1:B:208:PRO:HB2	1.51	0.90
1:A:113:ARG:HH11	1:A:113:ARG:HB3	1.36	0.89
1:B:150:GLU:HG2	1:B:151:GLU:N	1.83	0.89
1:A:150:GLU:HG2	1:A:151:GLU:N	1.84	0.88
1:C:113:ARG:HB3	1:C:113:ARG:HH11	1.37	0.88

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:30:TYR:O	1:C:54:MSE:HE1	1.75	0.85
1:B:30:TYR:O	1:B:54:MSE:HE1	1.76	0.84
1:C:290:MSE:HE2	1:C:293:ARG:HB3	1.59	0.84
1:A:123:LYS:HB2	1:A:150:GLU:HB2	1.59	0.84
1:C:28:ARG:HH11	1:C:59:ASN:HD21	1.26	0.83
1:B:28:ARG:HH11	1:B:59:ASN:HD21	1.27	0.82
1:C:123:LYS:HB2	1:C:150:GLU:HB2	1.61	0.82
1:B:123:LYS:HB2	1:B:150:GLU:HB2	1.61	0.82
1:A:290:MSE:HE2	1:A:293:ARG:HB3	1.61	0.82
1:A:197:ASP:C	1:A:199:ASN:H	1.84	0.80
1:A:28:ARG:HH11	1:A:59:ASN:HD21	1.26	0.80
1:B:103:ASP:O	1:B:107:GLU:HG3	1.82	0.80
1:C:103:ASP:O	1:C:107:GLU:HG3	1.82	0.80
1:A:107:GLU:HG2	1:A:113:ARG:NH2	1.98	0.79
1:C:107:GLU:HG2	1:C:113:ARG:NH2	1.97	0.79
1:B:4:ILE:HD12	1:B:25:PHE:HD2	1.48	0.78
1:C:197:ASP:C	1:C:199:ASN:H	1.83	0.78
1:B:197:ASP:C	1:B:199:ASN:H	1.86	0.78
1:C:197:ASP:O	1:C:199:ASN:N	2.17	0.78
1:B:8:ILE:CG2	1:B:54:MSE:HE2	2.12	0.77
1:B:290:MSE:HE2	1:B:293:ARG:HB3	1.64	0.77
1:A:103:ASP:O	1:A:107:GLU:HG3	1.83	0.77
1:A:173:VAL:HB	3:A:456:HOH:O	1.83	0.77
1:B:281:GLU:HB2	3:B:402:HOH:O	1.83	0.77
1:A:4:ILE:HD12	1:A:25:PHE:HD2	1.50	0.76
1:B:107:GLU:HG2	1:B:113:ARG:NH2	2.00	0.76
1:A:197:ASP:O	1:A:199:ASN:N	2.19	0.76
1:A:8:ILE:CG2	1:A:54:MSE:HE2	2.15	0.75
1:A:28:ARG:HH11	1:A:59:ASN:ND2	1.84	0.75
1:C:199:ASN:HB3	3:C:430:HOH:O	1.86	0.75
1:C:8:ILE:HG12	1:C:54:MSE:HE3	1.68	0.75
1:B:28:ARG:HH11	1:B:59:ASN:ND2	1.84	0.74
1:C:4:ILE:HD12	1:C:25:PHE:HD2	1.52	0.73
1:B:190:ASP:OD1	1:B:214:ASN:HB3	1.88	0.72
1:C:28:ARG:HH11	1:C:59:ASN:ND2	1.86	0.72
1:B:290:MSE:HA	1:B:290:MSE:HE3	1.71	0.72
1:B:150:GLU:CG	1:B:151:GLU:H	2.03	0.71
1:B:197:ASP:O	1:B:199:ASN:N	2.23	0.71
1:A:8:ILE:HG12	1:A:54:MSE:HE3	1.73	0.70
1:B:6:SER:HB3	1:B:28:ARG:HB3	1.73	0.70
1:B:60:ASP:O	1:B:62:GLY:N	2.25	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:190:ASP:OD1	1:A:214:ASN:HB3	1.91	0.70
1:A:278:TRP:HA	1:A:287:ARG:HD2	1.72	0.70
1:C:249:PRO:HB3	1:C:290:MSE:SE	2.41	0.70
1:A:6:SER:HB3	1:A:28:ARG:HB3	1.74	0.70
1:B:8:ILE:HG12	1:B:54:MSE:CE	2.22	0.70
1:C:15:GLN:HE21	1:C:291:GLY:H	1.37	0.70
1:C:6:SER:HB3	1:C:28:ARG:HB3	1.73	0.69
1:A:150:GLU:CG	1:A:151:GLU:H	2.04	0.69
1:C:123:LYS:CB	1:C:150:GLU:HB2	2.22	0.69
1:A:15:GLN:HE22	1:A:290:MSE:HB3	1.57	0.69
1:C:15:GLN:HE22	1:C:290:MSE:HB3	1.57	0.69
1:B:78:ALA:HA	1:B:81:LYS:HE2	1.74	0.69
1:C:197:ASP:C	1:C:199:ASN:N	2.43	0.69
1:A:60:ASP:O	1:A:62:GLY:N	2.26	0.69
1:B:8:ILE:HG12	1:B:54:MSE:HE3	1.75	0.69
1:B:278:TRP:HA	1:B:287:ARG:HD2	1.73	0.69
1:A:8:ILE:HG12	1:A:54:MSE:CE	2.22	0.68
1:B:197:ASP:C	1:B:199:ASN:N	2.46	0.68
1:A:290:MSE:HA	1:A:290:MSE:CE	2.24	0.68
1:C:8:ILE:CG2	1:C:54:MSE:HE2	2.19	0.68
1:A:123:LYS:CB	1:A:150:GLU:HB2	2.22	0.68
1:B:123:LYS:CB	1:B:150:GLU:HB2	2.23	0.68
1:C:190:ASP:OD1	1:C:214:ASN:HB3	1.93	0.68
1:A:17:LEU:HD22	1:A:27:THR:HG23	1.76	0.68
1:C:278:TRP:HA	1:C:287:ARG:HD2	1.76	0.68
1:C:290:MSE:CE	1:C:290:MSE:HA	2.23	0.68
1:C:60:ASP:O	1:C:62:GLY:N	2.27	0.68
1:C:150:GLU:CG	1:C:151:GLU:H	2.06	0.67
1:A:301:ALA:HB1	1:A:307:LEU:H	1.60	0.67
1:B:178:SER:HB2	1:B:297:GLU:OE2	1.95	0.67
1:C:67:HIS:HD2	1:C:69:SER:H	1.43	0.67
1:B:279:TYR:N	3:B:402:HOH:O	2.27	0.67
1:B:301:ALA:HB1	1:B:307:LEU:H	1.58	0.67
1:B:290:MSE:HA	1:B:290:MSE:CE	2.25	0.66
1:C:89:ASN:ND2	1:C:244:PRO:HG2	2.10	0.66
1:C:281:GLU:OE1	1:C:287:ARG:HD3	1.95	0.66
1:A:78:ALA:HA	1:A:81:LYS:HE2	1.78	0.66
1:B:89:ASN:ND2	1:B:244:PRO:HG2	2.10	0.66
1:C:8:ILE:HG12	1:C:54:MSE:CE	2.25	0.66
1:B:85:ARG:HG3	1:B:85:ARG:HH11	1.59	0.66
1:C:78:ALA:HA	1:C:81:LYS:HE2	1.76	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:307:LEU:HD13	1:C:307:LEU:O	1.96	0.66
1:A:67:HIS:HD2	1:A:69:SER:H	1.43	0.66
1:A:15:GLN:HE21	1:A:291:GLY:H	1.44	0.65
1:A:290:MSE:HA	1:A:290:MSE:HE3	1.78	0.65
1:B:17:LEU:HD22	1:B:27:THR:HG23	1.78	0.65
1:A:89:ASN:ND2	1:A:244:PRO:HG2	2.11	0.65
1:A:197:ASP:C	1:A:199:ASN:N	2.44	0.65
1:A:281:GLU:OE1	1:A:287:ARG:HD3	1.96	0.65
1:B:4:ILE:N	3:B:485:HOH:O	2.30	0.65
1:A:195:ILE:HD11	1:A:208:PRO:CB	2.25	0.65
1:A:201:ARG:HA	1:B:196:ALA:O	1.97	0.65
1:B:67:HIS:HD2	1:B:69:SER:H	1.44	0.65
1:C:124:PRO:HA	1:C:150:GLU:HB3	1.78	0.65
1:B:113:ARG:HH11	1:B:113:ARG:CB	2.07	0.64
1:A:124:PRO:HA	1:A:150:GLU:HB3	1.79	0.64
1:A:85:ARG:HG3	1:A:85:ARG:HH11	1.62	0.64
1:C:11:HIS:CD2	1:C:67:HIS:HB2	2.33	0.64
1:B:15:GLN:HE22	1:B:290:MSE:HB3	1.61	0.64
1:B:11:HIS:CD2	1:B:67:HIS:HB2	2.33	0.64
1:B:195:ILE:HD11	1:B:208:PRO:CB	2.26	0.64
1:B:278:TRP:HB2	3:B:402:HOH:O	1.97	0.64
1:C:100:GLU:CD	1:C:100:GLU:H	2.01	0.64
1:C:178:SER:HB2	1:C:297:GLU:OE2	1.98	0.64
1:A:11:HIS:CD2	1:A:67:HIS:HB2	2.33	0.64
1:A:165:PHE:CE2	1:A:167:PRO:HG3	2.33	0.64
1:A:187:LEU:HD12	1:A:290:MSE:HE1	1.80	0.63
1:B:78:ALA:CB	3:B:446:HOH:O	2.31	0.63
1:C:211:ILE:O	1:C:211:ILE:HG13	1.96	0.63
1:B:89:ASN:O	1:B:90:ARG:HB2	1.99	0.63
1:C:301:ALA:HB1	1:C:307:LEU:H	1.64	0.63
1:A:100:GLU:CD	1:A:100:GLU:H	2.01	0.63
1:A:205:LYS:O	1:A:207:LEU:HD13	1.99	0.63
1:B:15:GLN:HE21	1:B:291:GLY:H	1.47	0.63
1:B:165:PHE:CE2	1:B:167:PRO:HG3	2.33	0.63
1:C:17:LEU:HD22	1:C:27:THR:HG23	1.79	0.63
1:A:89:ASN:O	1:A:90:ARG:HB2	1.97	0.62
1:C:195:ILE:HD11	1:C:208:PRO:CB	2.28	0.62
1:C:35:ARG:HG3	1:C:35:ARG:HH11	1.65	0.62
1:C:71:VAL:HA	1:C:74:LEU:O	1.99	0.62
1:B:124:PRO:HA	1:B:150:GLU:HB3	1.82	0.61
1:B:205:LYS:O	1:B:207:LEU:HD13	2.00	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:122:ALA:HB3	1:B:126:GLU:HG2	1.83	0.61
1:C:124:PRO:C	1:C:126:GLU:H	2.02	0.61
1:C:232:LEU:O	1:C:236:ARG:HG2	2.00	0.61
1:C:290:MSE:HE2	1:C:293:ARG:CB	2.30	0.61
1:A:71:VAL:HA	1:A:74:LEU:O	2.00	0.61
1:B:165:PHE:HE2	1:B:167:PRO:HG3	1.66	0.60
1:A:35:ARG:HG3	1:A:35:ARG:HH11	1.64	0.60
1:B:85:ARG:O	1:B:312:THR:O	2.18	0.60
1:B:57:ILE:HA	3:B:401:HOH:O	2.01	0.60
1:C:85:ARG:HG3	1:C:85:ARG:HH11	1.65	0.60
1:C:90:ARG:HB3	1:C:312:THR:HG21	1.84	0.60
1:A:178:SER:HB2	1:A:297:GLU:OE2	2.01	0.60
1:B:35:ARG:HH11	1:B:35:ARG:HG3	1.67	0.60
1:B:85:ARG:HG3	1:B:85:ARG:NH1	2.17	0.60
1:B:187:LEU:HD12	1:B:290:MSE:HE1	1.83	0.60
1:C:205:LYS:O	1:C:207:LEU:HD13	2.01	0.60
1:A:211:ILE:HG13	1:A:211:ILE:O	2.02	0.60
1:B:287:ARG:O	1:B:288:LEU:HB3	2.01	0.60
1:A:287:ARG:O	1:A:288:LEU:HB3	2.02	0.60
1:A:307:LEU:HD13	1:A:307:LEU:O	2.02	0.60
1:B:307:LEU:HD13	1:B:307:LEU:O	2.02	0.60
1:C:89:ASN:O	1:C:90:ARG:HB2	2.02	0.59
1:C:290:MSE:HE2	1:C:290:MSE:HA	1.84	0.59
1:A:232:LEU:O	1:A:236:ARG:HG2	2.02	0.59
1:B:71:VAL:HA	1:B:74:LEU:O	2.02	0.59
1:C:195:ILE:CD1	1:C:208:PRO:HB2	2.31	0.59
1:A:85:ARG:HG3	1:A:85:ARG:NH1	2.17	0.59
1:B:168:GLY:O	1:B:169:VAL:O	2.20	0.59
1:C:124:PRO:CA	1:C:150:GLU:HB3	2.33	0.59
1:B:148:GLU:OE2	1:B:151:GLU:HG3	2.03	0.59
1:C:287:ARG:O	1:C:288:LEU:HB3	2.02	0.59
1:A:113:ARG:HH11	1:A:113:ARG:CB	2.12	0.58
1:A:165:PHE:HE2	1:A:167:PRO:HG3	1.66	0.58
1:B:281:GLU:OE1	1:B:287:ARG:HD3	2.03	0.58
1:A:122:ALA:HB3	1:A:126:GLU:HG2	1.85	0.58
1:A:131:ARG:HG2	1:A:131:ARG:HH11	1.68	0.58
1:B:232:LEU:O	1:B:236:ARG:HG2	2.02	0.58
1:B:124:PRO:C	1:B:126:GLU:H	2.07	0.58
1:C:131:ARG:HH11	1:C:131:ARG:HG2	1.69	0.58
1:A:124:PRO:C	1:A:126:GLU:H	2.06	0.58
1:A:243:PRO:HB2	1:A:244:PRO:CD	2.33	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:124:PRO:CB	1:C:150:GLU:HB3	2.34	0.58
1:B:100:GLU:H	1:B:100:GLU:CD	2.07	0.58
1:B:301:ALA:HB1	1:B:307:LEU:N	2.19	0.58
1:C:131:ARG:HG3	1:C:132:ILE:H	1.69	0.58
1:C:165:PHE:CE2	1:C:167:PRO:HG3	2.38	0.58
1:A:131:ARG:HG3	1:A:132:ILE:H	1.70	0.57
1:B:243:PRO:HB2	1:B:244:PRO:CD	2.33	0.57
1:B:278:TRP:HE3	3:B:402:HOH:O	1.87	0.57
1:A:57:ILE:HA	3:A:464:HOH:O	2.04	0.57
1:A:167:PRO:HG2	3:C:441:HOH:O	2.04	0.57
1:A:197:ASP:HB3	3:A:462:HOH:O	2.04	0.57
1:C:113:ARG:HH11	1:C:113:ARG:CB	2.11	0.57
1:A:252:LEU:HB2	3:A:456:HOH:O	2.05	0.56
1:A:85:ARG:O	1:A:312:THR:O	2.23	0.56
1:A:301:ALA:HB1	1:A:307:LEU:N	2.21	0.56
1:B:32:SER:HB2	1:B:33:PRO:HD2	1.87	0.56
1:B:257:ASP:HB3	3:B:431:HOH:O	2.03	0.56
1:C:85:ARG:HG3	1:C:85:ARG:NH1	2.19	0.56
1:B:278:TRP:O	1:B:280:SER:N	2.35	0.56
1:B:195:ILE:CD1	1:B:208:PRO:HB2	2.31	0.56
1:A:124:PRO:CA	1:A:150:GLU:HB3	2.35	0.56
1:C:122:ALA:HB3	1:C:126:GLU:HG2	1.88	0.56
1:C:243:PRO:HB2	1:C:244:PRO:CD	2.35	0.56
1:C:165:PHE:HE2	1:C:167:PRO:HG3	1.71	0.56
1:A:32:SER:HB2	1:A:33:PRO:HD2	1.89	0.55
1:A:168:GLY:O	1:A:169:VAL:O	2.24	0.55
1:C:131:ARG:HG3	1:C:132:ILE:N	2.21	0.55
1:A:89:ASN:H	1:A:247:ILE:HD12	1.71	0.55
1:A:249:PRO:HB3	1:A:290:MSE:SE	2.57	0.55
1:B:131:ARG:HG3	1:B:132:ILE:H	1.72	0.55
1:A:107:GLU:HG2	1:A:113:ARG:CZ	2.36	0.55
1:B:117:VAL:O	1:B:162:VAL:HB	2.07	0.55
1:B:308:GLU:HB2	3:B:417:HOH:O	2.05	0.55
1:B:131:ARG:HG3	1:B:132:ILE:N	2.23	0.54
1:B:151:GLU:O	1:B:152:ARG:HB3	2.07	0.54
1:C:6:SER:HA	1:C:28:ARG:O	2.07	0.54
1:C:107:GLU:HG2	1:C:113:ARG:CZ	2.36	0.54
1:A:117:VAL:O	1:A:162:VAL:HB	2.08	0.54
1:C:178:SER:OG	1:C:181:LEU:HB2	2.06	0.54
1:B:27:THR:HG21	1:B:45:VAL:HA	1.90	0.54
1:A:131:ARG:HG3	1:A:132:ILE:N	2.22	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:9:ALA:O	1:B:10:SER:HB3	2.07	0.54
1:C:124:PRO:HB3	1:C:150:GLU:HB3	1.89	0.54
1:A:194:LEU:HD22	1:C:201:ARG:CZ	2.38	0.54
1:C:301:ALA:HB1	1:C:307:LEU:N	2.23	0.54
1:A:195:ILE:CD1	1:A:208:PRO:HB2	2.29	0.54
1:B:76:ILE:HG22	1:B:80:GLU:OE2	2.08	0.54
1:C:32:SER:HB2	1:C:33:PRO:HD2	1.89	0.54
1:C:15:GLN:NE2	1:C:291:GLY:H	2.05	0.53
1:B:107:GLU:HG2	1:B:113:ARG:CZ	2.38	0.53
1:A:148:GLU:OE2	1:A:151:GLU:HG3	2.08	0.53
1:B:145:GLU:N	3:B:463:HOH:O	2.41	0.53
1:C:89:ASN:H	1:C:247:ILE:HD12	1.73	0.53
1:A:124:PRO:CB	1:A:150:GLU:HB3	2.38	0.53
1:C:9:ALA:O	1:C:10:SER:HB3	2.09	0.53
1:A:15:GLN:NE2	1:A:290:MSE:HB3	2.23	0.53
1:C:57:ILE:HG21	1:C:74:LEU:HD13	1.91	0.53
1:A:233:ALA:O	1:A:237:THR:HG23	2.09	0.52
1:B:124:PRO:CA	1:B:150:GLU:HB3	2.39	0.52
1:A:131:ARG:HG2	1:A:131:ARG:NH1	2.23	0.52
1:A:164:ARG:HD2	3:A:408:HOH:O	2.08	0.52
1:A:278:TRP:O	1:A:280:SER:N	2.42	0.52
1:C:124:PRO:O	1:C:126:GLU:N	2.43	0.52
1:B:233:ALA:O	1:B:237:THR:HG23	2.09	0.52
1:C:124:PRO:C	1:C:126:GLU:N	2.62	0.52
1:A:306:ARG:HG3	1:A:309:GLU:OE1	2.08	0.52
1:C:131:ARG:HG2	1:C:131:ARG:NH1	2.24	0.52
1:A:127:LEU:HD13	1:A:165:PHE:CG	2.44	0.52
1:A:172:TYR:OH	2:A:400:ATP:H5'1	2.10	0.52
1:B:211:ILE:O	1:B:211:ILE:HG13	2.08	0.52
1:C:85:ARG:O	1:C:312:THR:O	2.28	0.52
1:A:76:ILE:HG22	1:A:80:GLU:OE2	2.10	0.52
1:A:169:VAL:HG11	1:C:212:VAL:HG21	1.92	0.52
1:B:27:THR:CG2	1:B:45:VAL:HA	2.40	0.52
1:C:74:LEU:HB3	3:C:419:HOH:O	2.10	0.52
1:A:290:MSE:HE2	1:A:293:ARG:CB	2.37	0.52
1:C:148:GLU:OE2	1:C:151:GLU:HG3	2.09	0.52
1:A:9:ALA:O	1:A:10:SER:HB3	2.11	0.51
1:B:122:ALA:HB3	1:B:126:GLU:CG	2.40	0.51
1:B:6:SER:HA	1:B:28:ARG:O	2.10	0.51
1:C:187:LEU:HD12	1:C:290:MSE:HE1	1.90	0.51
1:B:15:GLN:NE2	1:B:290:MSE:HB3	2.25	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:192:ARG:NH2	1:C:270:ASP:OD1	2.43	0.51
1:B:63:ILE:HD12	1:B:63:ILE:N	2.26	0.51
1:B:195:ILE:HG12	1:B:208:PRO:O	2.10	0.51
1:C:168:GLY:O	1:C:169:VAL:O	2.27	0.51
1:B:8:ILE:HG12	1:B:54:MSE:HE2	1.93	0.51
1:A:6:SER:HA	1:A:28:ARG:O	2.09	0.51
1:A:203:PRO:HG3	1:B:203:PRO:CB	2.40	0.51
1:A:212:VAL:HG21	1:B:169:VAL:HG11	1.92	0.51
1:B:172:TYR:OH	2:B:400:ATP:H5'1	2.11	0.51
1:C:30:TYR:C	1:C:54:MSE:HE1	2.31	0.51
1:A:124:PRO:C	1:A:126:GLU:N	2.64	0.51
1:A:124:PRO:HB3	1:A:150:GLU:HB3	1.93	0.51
1:B:151:GLU:HB2	1:B:153:LEU:HD12	1.93	0.51
1:C:96:GLU:OE1	1:C:266:ALA:HA	2.11	0.51
1:A:63:ILE:N	1:A:63:ILE:HD12	2.26	0.50
1:B:127:LEU:HD13	1:B:165:PHE:CG	2.46	0.50
1:B:124:PRO:C	1:B:126:GLU:N	2.64	0.50
1:C:150:GLU:HA	3:C:416:HOH:O	2.11	0.50
1:A:151:GLU:O	1:A:152:ARG:HB3	2.12	0.50
1:C:127:LEU:HD13	1:C:165:PHE:CG	2.47	0.50
1:B:151:GLU:CG	1:B:152:ARG:H	2.25	0.50
1:A:187:LEU:CD1	1:A:290:MSE:HE1	2.42	0.50
1:B:306:ARG:HG3	1:B:309:GLU:OE1	2.11	0.50
1:C:177:TYR:O	1:C:247:ILE:O	2.29	0.50
1:C:251:ALA:HB3	1:C:266:ALA:HB3	1.94	0.50
1:A:90:ARG:HB3	1:A:312:THR:HG21	1.94	0.50
1:B:124:PRO:CB	1:B:150:GLU:HB3	2.41	0.50
1:B:249:PRO:HB3	1:B:290:MSE:SE	2.62	0.50
1:B:124:PRO:O	1:B:126:GLU:N	2.45	0.50
1:B:131:ARG:HG2	1:B:131:ARG:HH11	1.77	0.50
1:C:15:GLN:NE2	1:C:290:MSE:HB3	2.23	0.50
1:C:151:GLU:O	1:C:152:ARG:HB3	2.11	0.50
1:B:76:ILE:HD11	1:B:97:THR:HG21	1.94	0.50
1:A:14:LEU:HB2	3:A:406:HOH:O	2.10	0.49
1:C:100:GLU:CD	1:C:100:GLU:N	2.65	0.49
1:C:4:ILE:O	1:C:62:GLY:CA	2.60	0.49
1:A:27:THR:HG21	1:A:45:VAL:HA	1.95	0.49
1:A:30:TYR:C	1:A:54:MSE:HE1	2.33	0.49
1:C:63:ILE:N	1:C:63:ILE:HD12	2.27	0.49
1:A:57:ILE:HG21	1:A:74:LEU:HD13	1.94	0.49
1:A:15:GLN:NE2	1:A:291:GLY:H	2.10	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:113:ARG:HD2	3:B:430:HOH:O	2.12	0.49
1:B:22:LYS:HE3	1:C:285:GLY:O	2.12	0.49
1:C:233:ALA:O	1:C:237:THR:HG23	2.13	0.49
1:C:172:TYR:OH	2:C:400:ATP:H5'1	2.11	0.49
1:A:124:PRO:O	1:A:126:GLU:N	2.46	0.49
1:C:27:THR:CG2	1:C:45:VAL:HA	2.43	0.49
1:A:27:THR:CG2	1:A:45:VAL:HA	2.43	0.48
1:A:151:GLU:HB2	1:A:153:LEU:HD12	1.95	0.48
1:C:117:VAL:O	1:C:162:VAL:HB	2.13	0.48
1:C:278:TRP:O	1:C:279:TYR:HB2	2.12	0.48
1:A:109:ALA:HA	1:A:237:THR:HG21	1.95	0.48
1:A:299:ARG:O	1:A:303:GLU:HG3	2.13	0.48
1:C:76:ILE:HG22	1:C:80:GLU:OE2	2.13	0.48
1:B:299:ARG:O	1:B:303:GLU:HG3	2.13	0.48
1:A:217:ILE:HD12	1:C:193:VAL:HG21	1.96	0.48
1:C:149:LEU:HB3	3:C:406:HOH:O	2.13	0.48
1:C:299:ARG:O	1:C:303:GLU:HG3	2.13	0.48
1:C:7:THR:O	1:C:29:LEU:HD12	2.14	0.48
1:A:194:LEU:HB2	1:C:201:ARG:NH1	2.29	0.48
1:A:201:ARG:HD2	1:B:196:ALA:HB3	1.95	0.48
1:A:76:ILE:HD11	1:A:97:THR:HG21	1.95	0.48
1:A:96:GLU:OE1	1:A:266:ALA:HA	2.14	0.48
1:A:100:GLU:CD	1:A:100:GLU:N	2.66	0.48
1:B:96:GLU:OE1	1:B:266:ALA:HA	2.14	0.48
1:B:15:GLN:NE2	1:B:291:GLY:H	2.12	0.47
1:C:27:THR:HG21	1:C:45:VAL:HA	1.96	0.47
1:A:8:ILE:HG12	1:A:54:MSE:HE2	1.96	0.47
1:A:122:ALA:HB3	1:A:126:GLU:CG	2.44	0.47
1:A:192:ARG:NH2	1:A:270:ASP:OD1	2.47	0.47
1:B:28:ARG:HA	1:B:47:ASP:O	2.14	0.47
1:B:124:PRO:HB3	1:B:150:GLU:HB3	1.96	0.47
1:C:278:TRP:O	1:C:280:SER:N	2.41	0.47
1:B:127:LEU:HD12	1:B:127:LEU:H	1.78	0.47
1:A:278:TRP:O	1:A:279:TYR:HB2	2.14	0.47
1:B:57:ILE:HG21	1:B:74:LEU:HD13	1.96	0.47
1:B:164:ARG:HD2	3:B:426:HOH:O	2.13	0.47
1:C:127:LEU:H	1:C:127:LEU:HD12	1.79	0.47
1:B:30:TYR:C	1:B:54:MSE:HE1	2.35	0.47
1:B:89:ASN:H	1:B:247:ILE:HD12	1.80	0.47
1:C:76:ILE:HD11	1:C:97:THR:HG21	1.98	0.46
1:A:178:SER:OG	1:A:181:LEU:HB2	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:151:GLU:HB2	1:C:153:LEU:HD12	1.96	0.46
1:B:109:ALA:HA	1:B:237:THR:HG21	1.97	0.46
1:B:149:LEU:HB3	3:B:473:HOH:O	2.15	0.46
1:A:187:LEU:HD22	1:A:280:SER:HB3	1.97	0.46
1:B:192:ARG:NH2	1:B:270:ASP:OD1	2.49	0.46
1:A:4:ILE:O	1:A:62:GLY:CA	2.63	0.46
1:B:150:GLU:O	1:B:151:GLU:C	2.54	0.45
1:A:151:GLU:CG	1:A:152:ARG:H	2.29	0.45
1:B:121:ASP:OD1	1:B:123:LYS:HB3	2.16	0.45
1:B:131:ARG:HG2	1:B:131:ARG:NH1	2.30	0.45
1:B:151:GLU:HB2	1:B:153:LEU:CD1	2.47	0.45
1:C:169:VAL:HA	3:C:456:HOH:O	2.16	0.45
1:A:195:ILE:HG12	1:A:208:PRO:O	2.16	0.45
1:C:150:GLU:O	1:C:151:GLU:C	2.54	0.45
1:A:150:GLU:O	1:A:151:GLU:C	2.54	0.45
1:B:90:ARG:HB3	1:B:312:THR:HG21	1.98	0.45
1:C:131:ARG:NE	3:C:414:HOH:O	2.49	0.45
1:B:187:LEU:HD22	1:B:280:SER:HB3	1.98	0.45
1:A:31:VAL:O	1:A:50:VAL:HA	2.17	0.45
1:B:17:LEU:HD11	1:B:29:LEU:HD13	1.98	0.45
1:B:116:VAL:HG13	1:B:161:ARG:HG3	1.98	0.45
1:C:195:ILE:C	1:C:197:ASP:H	2.21	0.45
1:B:27:THR:HG21	1:B:44:ILE:O	2.17	0.44
1:C:122:ALA:HB3	1:C:126:GLU:CG	2.47	0.44
1:A:8:ILE:O	1:A:67:HIS:HE1	2.01	0.44
1:A:132:ILE:HG22	1:A:159:PRO:O	2.18	0.44
1:A:284:TRP:CH2	1:A:293:ARG:NE	2.85	0.44
1:C:100:GLU:HB3	3:C:443:HOH:O	2.16	0.44
1:B:8:ILE:O	1:B:67:HIS:HE1	2.00	0.44
1:B:14:LEU:HB2	3:B:450:HOH:O	2.18	0.44
1:B:290:MSE:HE2	1:B:293:ARG:CB	2.42	0.44
1:A:121:ASP:OD1	1:A:123:LYS:HB3	2.17	0.44
1:A:251:ALA:HB3	1:A:266:ALA:HB3	1.99	0.44
1:B:132:ILE:HG22	1:B:159:PRO:O	2.18	0.44
1:B:187:LEU:CD1	1:B:290:MSE:HE1	2.46	0.44
1:C:187:LEU:CD1	1:C:290:MSE:HE1	2.48	0.44
1:B:31:VAL:O	1:B:50:VAL:HA	2.18	0.44
1:B:251:ALA:HB3	1:B:266:ALA:HB3	1.99	0.44
1:C:151:GLU:CG	1:C:152:ARG:H	2.31	0.44
1:A:127:LEU:H	1:A:127:LEU:HD12	1.81	0.44
1:A:131:ARG:NE	3:A:436:HOH:O	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:298:LEU:O	1:B:302:GLU:HG2	2.18	0.44
1:C:284:TRP:CH2	1:C:293:ARG:NE	2.86	0.44
1:B:73:TYR:O	1:B:74:LEU:HD23	2.17	0.43
1:B:131:ARG:NE	3:B:427:HOH:O	2.51	0.43
1:B:178:SER:OG	1:B:181:LEU:HB2	2.18	0.43
1:A:203:PRO:HG3	1:B:203:PRO:HB3	1.99	0.43
1:B:28:ARG:HD2	1:B:59:ASN:HD21	1.82	0.43
1:A:126:GLU:HA	1:A:126:GLU:OE1	2.17	0.43
1:C:67:HIS:CD2	1:C:69:SER:H	2.31	0.43
1:C:109:ALA:HA	1:C:237:THR:HG21	2.00	0.43
1:A:73:TYR:O	1:A:74:LEU:HD23	2.18	0.43
1:B:284:TRP:CH2	1:B:293:ARG:NE	2.87	0.43
1:A:197:ASP:O	1:A:198:GLY:C	2.55	0.43
1:A:288:LEU:HD12	3:A:455:HOH:O	2.18	0.43
1:A:263:ILE:HB	3:A:436:HOH:O	2.18	0.43
1:A:92:PHE:CD1	1:A:238:MSE:HE2	2.53	0.43
1:A:116:VAL:HG13	1:A:161:ARG:HG3	2.00	0.43
1:A:151:GLU:HB2	1:A:153:LEU:CD1	2.49	0.43
1:A:244:PRO:HD2	3:A:403:HOH:O	2.18	0.43
1:B:169:VAL:HA	3:B:411:HOH:O	2.17	0.43
1:C:28:ARG:HA	1:C:47:ASP:O	2.19	0.43
1:A:123:LYS:HA	1:A:124:PRO:HA	1.83	0.43
1:B:100:GLU:CD	1:B:100:GLU:N	2.71	0.43
1:B:127:LEU:HD12	1:B:127:LEU:N	2.34	0.43
1:C:126:GLU:HA	1:C:126:GLU:OE1	2.18	0.43
1:C:312:THR:O	1:C:312:THR:HG22	2.19	0.43
1:A:177:TYR:O	1:A:247:ILE:O	2.36	0.43
1:A:203:PRO:HD3	3:B:467:HOH:O	2.19	0.43
1:C:187:LEU:HD22	1:C:280:SER:HB3	2.01	0.43
1:C:306:ARG:HG3	1:C:309:GLU:OE1	2.19	0.43
1:B:126:GLU:OE1	1:B:126:GLU:HA	2.19	0.42
1:A:28:ARG:HA	1:A:47:ASP:O	2.19	0.42
1:A:276:ASP:HA	3:A:463:HOH:O	2.19	0.42
1:B:21:LYS:HG3	3:B:435:HOH:O	2.19	0.42
1:C:92:PHE:CD1	1:C:238:MSE:HE2	2.53	0.42
1:C:31:VAL:O	1:C:50:VAL:HA	2.19	0.42
1:C:35:ARG:HH11	1:C:35:ARG:CG	2.32	0.42
1:A:175:PHE:CE2	1:A:186:LEU:HD22	2.54	0.42
1:B:306:ARG:HB3	1:B:307:LEU:H	1.59	0.42
1:C:269:ILE:HG23	1:C:269:ILE:O	2.19	0.42
1:A:282:LEU:O	1:C:43:PRO:HD2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:28:ARG:HD2	1:A:59:ASN:HD21	1.85	0.42
1:B:114:VAL:HG11	1:B:263:ILE:HG22	2.01	0.42
1:C:8:ILE:O	1:C:67:HIS:HE1	2.02	0.42
1:C:175:PHE:CE2	1:C:186:LEU:HD22	2.54	0.42
1:A:269:ILE:O	1:A:269:ILE:HG23	2.19	0.42
1:B:92:PHE:CD1	1:B:238:MSE:HE2	2.55	0.42
1:C:57:ILE:HA	3:C:454:HOH:O	2.20	0.42
1:C:308:GLU:CD	1:C:308:GLU:O	2.58	0.42
1:A:172:TYR:CD1	1:A:172:TYR:N	2.87	0.42
1:C:111:ILE:HA	1:C:112:PRO:HD3	1.95	0.42
1:C:151:GLU:HB2	1:C:153:LEU:CD1	2.50	0.41
1:B:4:ILE:O	1:B:62:GLY:CA	2.67	0.41
1:A:7:THR:O	1:A:29:LEU:HD12	2.20	0.41
1:A:195:ILE:C	1:A:197:ASP:H	2.23	0.41
1:A:195:ILE:HD11	1:A:208:PRO:CG	2.50	0.41
1:B:195:ILE:HD11	1:B:208:PRO:CG	2.50	0.41
1:C:6:SER:O	1:C:64:VAL:O	2.39	0.41
1:C:178:SER:O	1:C:182:GLU:N	2.54	0.41
1:A:27:THR:HG21	1:A:44:ILE:O	2.20	0.41
1:A:129:PHE:CZ	1:A:145:GLU:HB3	2.56	0.41
1:B:256:TYR:CZ	1:B:258:GLY:HA2	2.55	0.41
1:B:271:GLY:C	1:B:273:SER:H	2.22	0.41
1:C:60:ASP:HB3	1:C:61:ASP:H	1.62	0.41
1:A:4:ILE:O	1:A:62:GLY:HA3	2.21	0.41
1:A:256:TYR:CZ	1:A:258:GLY:HA2	2.56	0.41
1:B:243:PRO:CB	1:B:244:PRO:CD	2.99	0.41
1:C:26:LYS:HD2	1:C:26:LYS:HA	1.90	0.41
1:B:172:TYR:CD1	1:B:172:TYR:N	2.89	0.41
1:C:18:LEU:O	1:C:22:LYS:HB2	2.21	0.41
1:C:195:ILE:HG12	1:C:208:PRO:O	2.20	0.41
1:A:4:ILE:O	1:A:63:ILE:N	2.51	0.41
1:A:220:ARG:HG3	1:C:211:ILE:HD11	2.03	0.41
1:A:243:PRO:CB	1:A:244:PRO:CD	2.99	0.41
1:B:172:TYR:CE1	1:B:192:ARG:HG2	2.56	0.41
1:C:123:LYS:HA	1:C:124:PRO:HA	1.84	0.41
1:C:172:TYR:N	1:C:172:TYR:CD1	2.87	0.41
1:C:197:ASP:O	1:C:198:GLY:C	2.55	0.41
1:C:242:GLU:HA	1:C:243:PRO:HD2	1.84	0.41
1:C:290:MSE:HA	1:C:290:MSE:HE3	1.97	0.41
1:B:7:THR:O	1:B:29:LEU:HD12	2.21	0.41
1:B:27:THR:O	1:B:46:ASP:HB2	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:195:ILE:C	1:B:197:ASP:H	2.24	0.41
1:B:203:PRO:HD3	3:C:430:HOH:O	2.21	0.41
1:B:269:ILE:HG23	1:B:269:ILE:O	2.21	0.41
1:B:271:GLY:C	1:B:273:SER:N	2.74	0.41
1:C:121:ASP:OD1	1:C:123:LYS:HB3	2.21	0.41
1:C:90:ARG:CB	1:C:312:THR:HG21	2.49	0.40
1:B:280:SER:OG	1:B:287:ARG:O	2.22	0.40
1:C:91:ARG:O	1:C:94:LYS:HG2	2.22	0.40
1:A:18:LEU:O	1:A:22:LYS:HB2	2.21	0.40
1:A:232:LEU:HD23	1:A:232:LEU:HA	1.96	0.40
1:B:74:LEU:HB3	3:B:446:HOH:O	2.20	0.40
1:C:87:PHE:CE2	1:C:294:ILE:HG23	2.56	0.40
1:A:193:VAL:HG21	1:B:217:ILE:HD12	2.03	0.40
1:A:199:ASN:HB3	3:A:432:HOH:O	2.21	0.40
1:B:43:PRO:HD2	1:C:282:LEU:O	2.21	0.40
1:C:4:ILE:O	1:C:63:ILE:N	2.50	0.40
1:A:17:LEU:HD11	1:A:29:LEU:HD13	2.02	0.40
1:A:178:SER:O	1:A:182:GLU:N	2.55	0.40
1:B:89:ASN:O	1:B:90:ARG:CB	2.69	0.40
1:B:297:GLU:OE1	1:B:297:GLU:HA	2.22	0.40

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	287/320 (90%)	235 (82%)	25 (9%)	27 (9%)	0	0
1	B	287/320 (90%)	234 (82%)	26 (9%)	27 (9%)	0	0
1	C	287/320 (90%)	234 (82%)	24 (8%)	29 (10%)	0	0
All	All	861/960 (90%)	703 (82%)	75 (9%)	83 (10%)	0	0

All (83) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	61	ASP
1	A	90	ARG
1	A	119	PRO
1	A	121	ASP
1	A	169	VAL
1	A	243	PRO
1	A	260	PHE
1	A	306	ARG
1	B	61	ASP
1	B	90	ARG
1	B	119	PRO
1	B	121	ASP
1	B	169	VAL
1	B	243	PRO
1	B	260	PHE
1	B	306	ARG
1	C	61	ASP
1	C	90	ARG
1	C	119	PRO
1	C	121	ASP
1	C	169	VAL
1	C	243	PRO
1	C	260	PHE
1	C	306	ARG
1	A	86	PHE
1	A	88	GLY
1	A	151	GLU
1	A	153	LEU
1	A	198	GLY
1	A	245	GLY
1	A	287	ARG
1	B	10	SER
1	B	11	HIS
1	B	86	PHE
1	B	88	GLY
1	B	125	ASP
1	B	151	GLU
1	B	153	LEU
1	B	198	GLY
1	B	245	GLY
1	B	287	ARG
1	C	86	PHE

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Mol	Chain	Res	Type
1	C	88	GLY
1	C	125	ASP
1	C	151	GLU
1	C	153	LEU
1	C	198	GLY
1	C	245	GLY
1	C	287	ARG
1	A	10	SER
1	A	11	HIS
1	A	57	ILE
1	A	125	ASP
1	B	57	ILE
1	C	10	SER
1	C	11	HIS
1	C	124	PRO
1	A	55	THR
1	A	59	ASN
1	A	60	ASP
1	A	124	PRO
1	A	150	GLU
1	A	307	LEU
1	B	59	ASN
1	B	60	ASP
1	B	124	PRO
1	B	150	GLU
1	B	307	LEU
1	C	57	ILE
1	C	59	ASN
1	C	89	ASN
1	C	307	LEU
1	A	246	VAL
1	B	196	ALA
1	C	55	THR
1	C	122	ALA
1	C	150	GLU
1	C	196	ALA
1	C	246	VAL
1	A	65	VAL
1	B	246	VAL
1	C	65	VAL
1	B	65	VAL

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	249/267 (93%)	222 (89%)	27 (11%)	6	12
1	B	249/267 (93%)	222 (89%)	27 (11%)	6	12
1	C	249/267 (93%)	223 (90%)	26 (10%)	7	13
All	All	747/801 (93%)	667 (89%)	80 (11%)	6	13

All (80) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	ILE
1	A	56	SER
1	A	61	ASP
1	A	85	ARG
1	A	91	ARG
1	A	102	GLN
1	A	113	ARG
1	A	118	GLU
1	A	124	PRO
1	A	127	LEU
1	A	149	LEU
1	A	150	GLU
1	A	151	GLU
1	A	186	LEU
1	A	192	ARG
1	A	207	LEU
1	A	211	ILE
1	A	217	ILE
1	A	226	GLN
1	A	237	THR
1	A	241	LEU
1	A	243	PRO
1	A	257	ASP
1	A	287	ARG
1	A	290	MSE
1	A	306	ARG

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Mol	Chain	Res	Type
1	A	308	GLU
1	B	4	ILE
1	B	56	SER
1	B	61	ASP
1	B	85	ARG
1	B	91	ARG
1	B	102	GLN
1	B	113	ARG
1	B	118	GLU
1	B	124	PRO
1	B	127	LEU
1	B	149	LEU
1	B	150	GLU
1	B	151	GLU
1	B	186	LEU
1	B	192	ARG
1	B	207	LEU
1	B	211	ILE
1	B	217	ILE
1	B	226	GLN
1	B	237	THR
1	B	241	LEU
1	B	243	PRO
1	B	257	ASP
1	B	287	ARG
1	B	290	MSE
1	B	306	ARG
1	B	308	GLU
1	C	4	ILE
1	C	61	ASP
1	C	85	ARG
1	C	91	ARG
1	C	102	GLN
1	C	113	ARG
1	C	118	GLU
1	C	124	PRO
1	C	127	LEU
1	C	149	LEU
1	C	150	GLU
1	C	151	GLU
1	C	186	LEU
1	C	192	ARG

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Mol	Chain	Res	Type
1	C	207	LEU
1	C	211	ILE
1	C	217	ILE
1	C	226	GLN
1	C	237	THR
1	C	241	LEU
1	C	243	PRO
1	C	257	ASP
1	C	287	ARG
1	C	290	MSE
1	C	306	ARG
1	C	308	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	11	HIS
1	A	15	GLN
1	A	59	ASN
1	A	67	HIS
1	B	11	HIS
1	B	15	GLN
1	B	59	ASN
1	B	67	HIS
1	B	214	ASN
1	C	11	HIS
1	C	15	GLN
1	C	59	ASN
1	C	67	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

3 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	ATP	A	400	-	28,33,33	2.06	7 (25%)	34,52,52	1.45	3 (8%)
2	ATP	C	400	-	28,33,33	2.05	6 (21%)	34,52,52	1.41	3 (8%)
2	ATP	B	400	-	28,33,33	2.17	6 (21%)	34,52,52	1.41	2 (5%)

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	ATP	A	400	-	-	0/18/38/38	0/3/3/3
2	ATP	C	400	-	-	0/18/38/38	0/3/3/3
2	ATP	B	400	-	-	0/18/38/38	0/3/3/3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	400	ATP	PA-O3A	7.72	1.67	1.59
2	C	400	ATP	PA-O3A	6.30	1.66	1.59
2	A	400	ATP	PA-O3A	6.26	1.66	1.59
2	B	400	ATP	PB-O3B	4.50	1.64	1.59
2	C	400	ATP	PB-O3B	4.45	1.64	1.59
2	A	400	ATP	PB-O3B	4.43	1.64	1.59
2	B	400	ATP	O4'-C1'	3.93	1.46	1.40
2	C	400	ATP	O4'-C1'	3.45	1.45	1.40
2	A	400	ATP	O4'-C1'	3.36	1.45	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	400	ATP	PG-O2G	3.31	1.67	1.54
2	A	400	ATP	PG-O2G	3.06	1.66	1.54
2	C	400	ATP	C8-N7	-2.95	1.29	1.34
2	A	400	ATP	C8-N7	-2.79	1.29	1.34
2	C	400	ATP	PG-O3G	2.67	1.64	1.54
2	B	400	ATP	C8-N7	-2.65	1.29	1.34
2	A	400	ATP	PG-O3G	2.61	1.64	1.54
2	B	400	ATP	PG-O2G	2.46	1.64	1.54
2	A	400	ATP	PB-O3A	2.45	1.62	1.59
2	B	400	ATP	PG-O3G	2.11	1.62	1.54

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	400	ATP	N3-C2-N1	-5.98	120.56	128.67
2	C	400	ATP	N3-C2-N1	-5.97	120.57	128.67
2	B	400	ATP	N3-C2-N1	-5.88	120.69	128.67
2	A	400	ATP	O4'-C1'-N9	2.31	111.81	108.75
2	C	400	ATP	C2'-C3'-C4'	2.10	106.67	102.61
2	C	400	ATP	O4'-C1'-N9	2.06	111.48	108.75
2	A	400	ATP	C2'-C3'-C4'	2.04	106.55	102.61
2	B	400	ATP	C2'-C3'-C4'	2.01	106.49	102.61

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

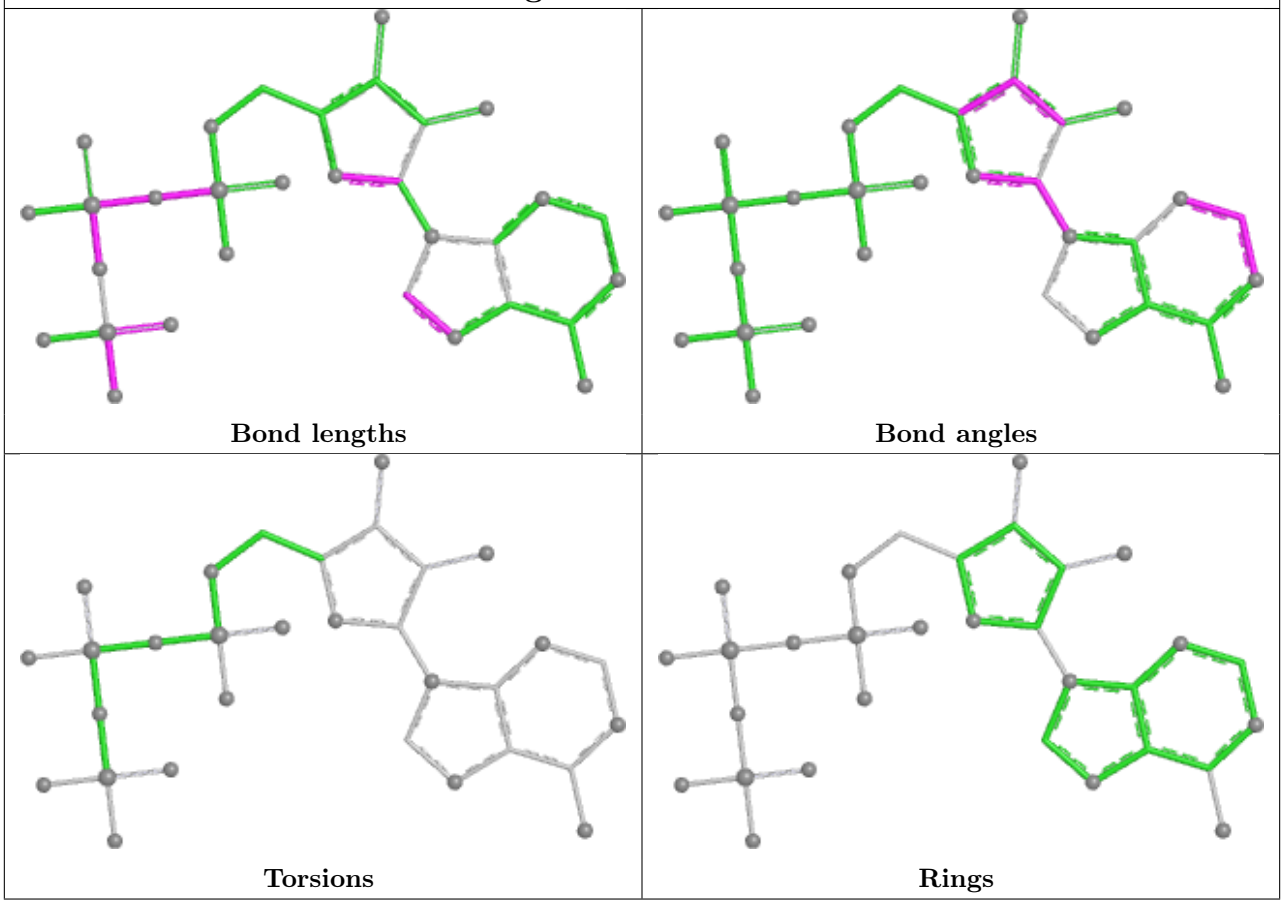
3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	400	ATP	1	0
2	C	400	ATP	1	0
2	B	400	ATP	1	0

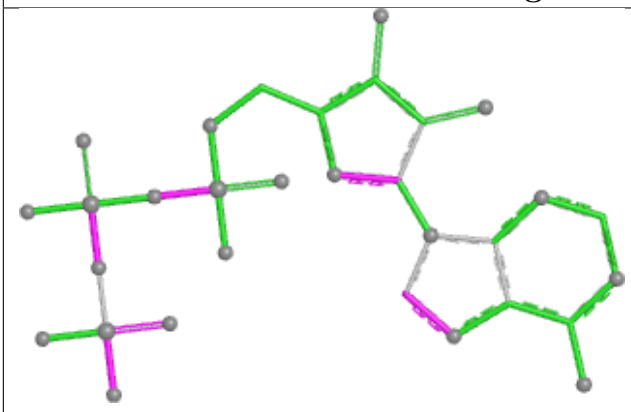
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

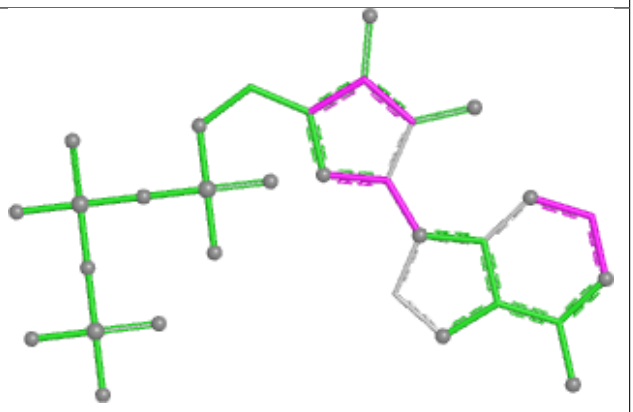
Ligand ATP A 400



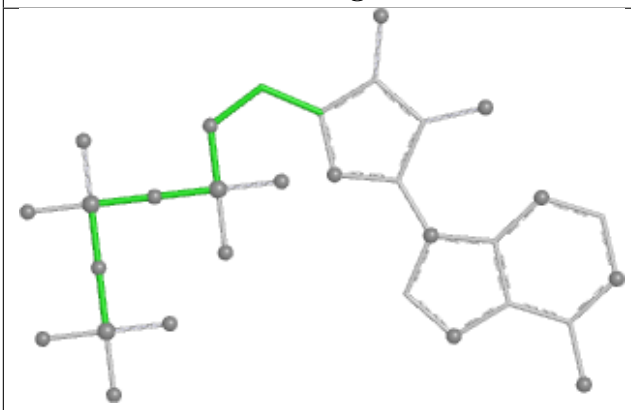
Ligand ATP C 400



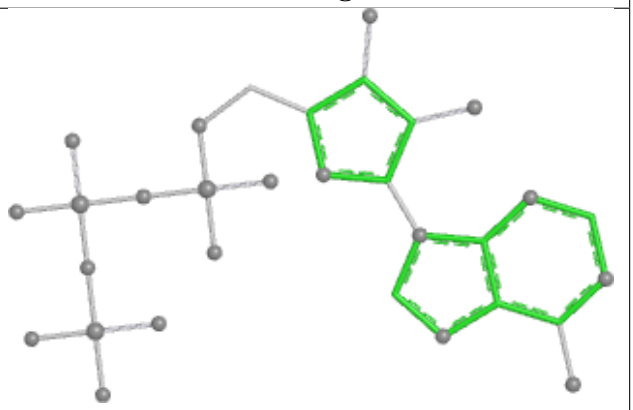
Bond lengths



Bond angles

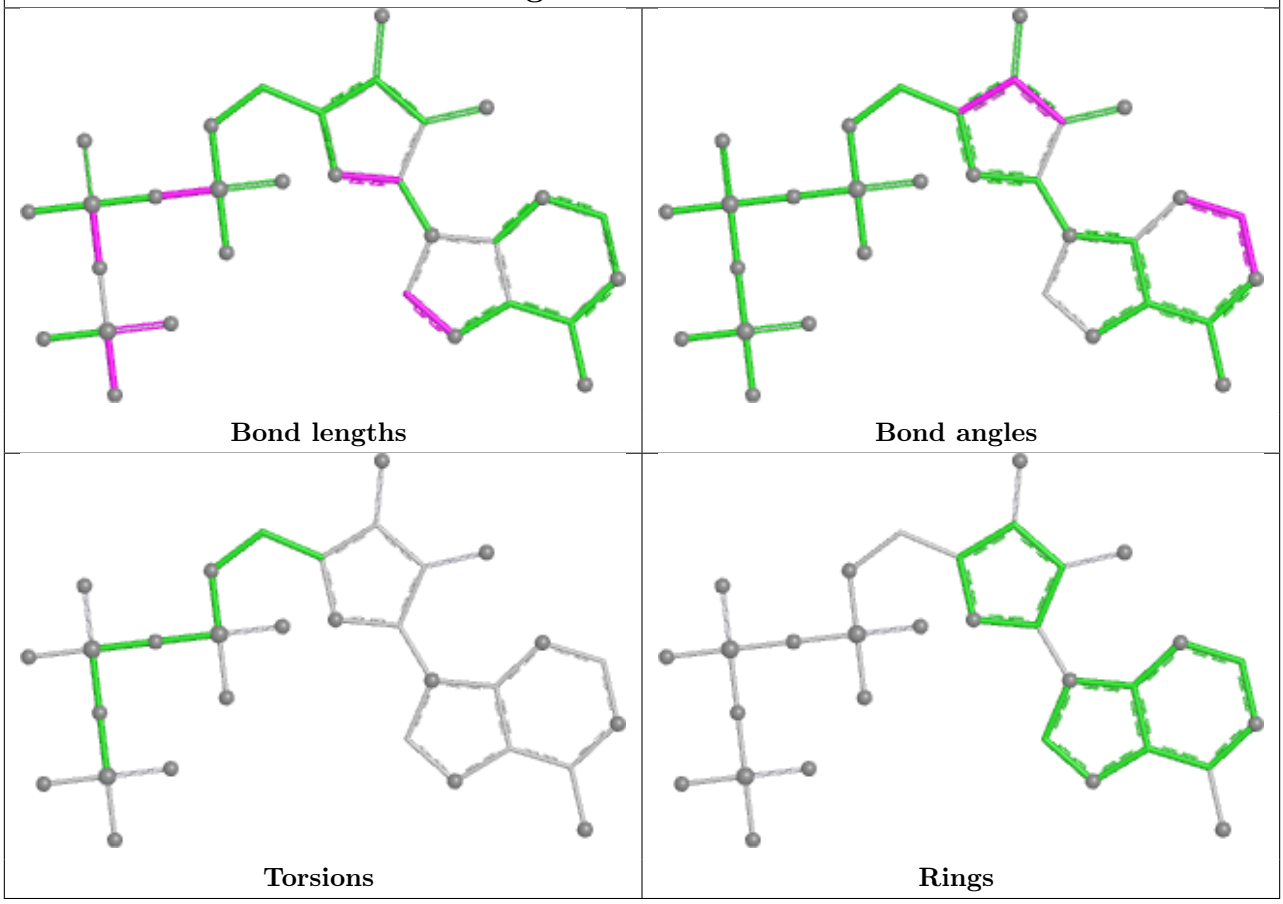


Torsions



Rings

Ligand ATP B 400



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} 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	290/320 (90%)	0.50	17 (5%)	22	23	31, 51, 76, 105	0
1	B	290/320 (90%)	0.35	8 (2%)	53	56	25, 54, 80, 93	0
1	C	290/320 (90%)	0.62	25 (8%)	10	10	38, 57, 84, 95	0
All	All	870/960 (90%)	0.49	50 (5%)	23	25	25, 54, 82, 105	0

All (50) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	125	ASP	8.8
1	C	125	ASP	7.7
1	A	152	ARG	7.4
1	C	122	ALA	6.6
1	A	123	LYS	6.6
1	A	121	ASP	6.6
1	C	121	ASP	5.1
1	A	243	PRO	4.8
1	C	152	ARG	4.6
1	C	164	ARG	4.6
1	C	62	GLY	4.2
1	C	123	LYS	4.1
1	B	125	ASP	4.1
1	C	307	LEU	3.7
1	C	61	ASP	3.6
1	C	243	PRO	3.5
1	C	198	GLY	3.4
1	B	62	GLY	3.4
1	A	122	ALA	3.3
1	A	162	VAL	3.2
1	A	60	ASP	3.2
1	B	149	LEU	3.2
1	A	160	TYR	3.1

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Mol	Chain	Res	Type	RSRZ
1	B	247	ILE	3.1
1	C	124	PRO	3.0
1	A	128	TYR	3.0
1	A	150	GLU	3.0
1	A	151	GLU	3.0
1	C	302	GLU	3.0
1	C	149	LEU	2.9
1	C	305	ASP	2.8
1	C	128	TYR	2.8
1	C	197	ASP	2.8
1	A	149	LEU	2.8
1	C	24	GLY	2.7
1	B	52	GLU	2.7
1	A	148	GLU	2.6
1	C	31	VAL	2.5
1	B	152	ARG	2.5
1	A	153	LEU	2.4
1	A	62	GLY	2.4
1	C	77	GLU	2.3
1	A	95	TRP	2.3
1	C	89	ASN	2.2
1	C	127	LEU	2.1
1	C	116	VAL	2.1
1	B	243	PRO	2.1
1	C	247	ILE	2.1
1	C	162	VAL	2.0
1	B	245	GLY	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

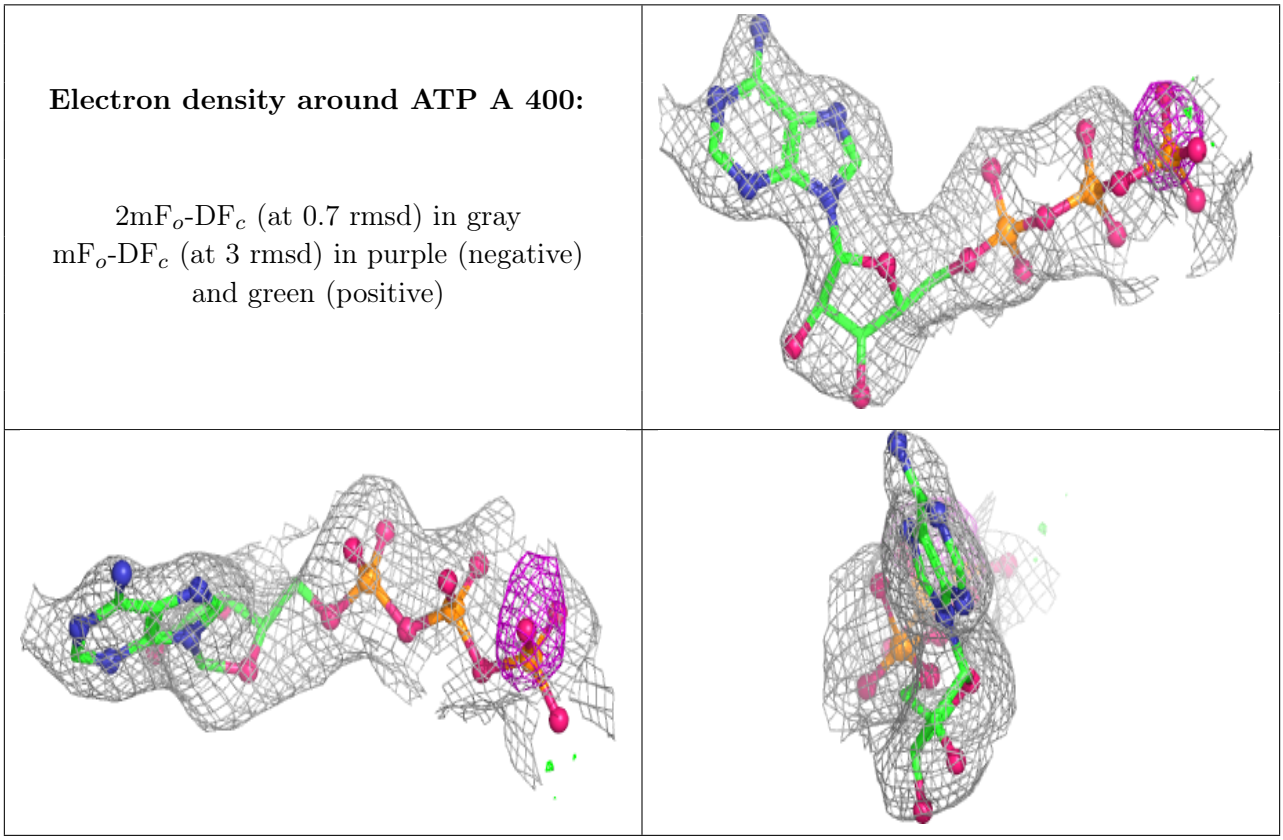
median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	ATP	A	400	31/31	0.80	0.20	63,66,90,92	0
2	ATP	C	400	31/31	0.80	0.19	57,61,81,83	0
2	ATP	B	400	31/31	0.85	0.19	45,55,75,76	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.

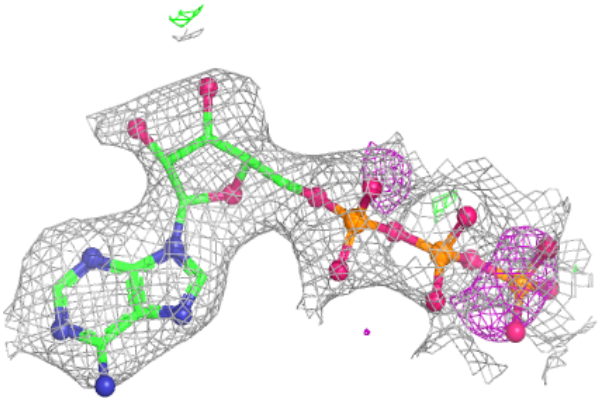
Electron density around ATP A 400:

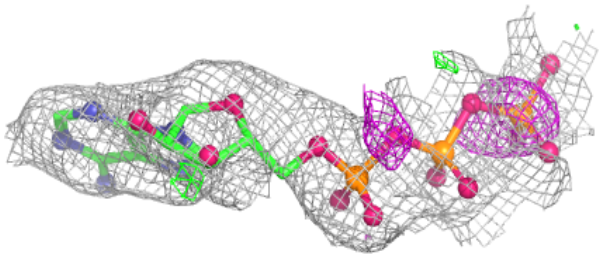
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

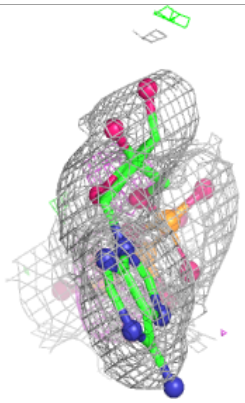


Electron density around ATP C 400:

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

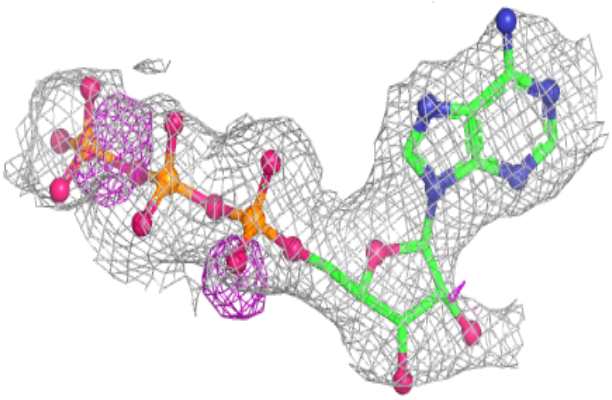


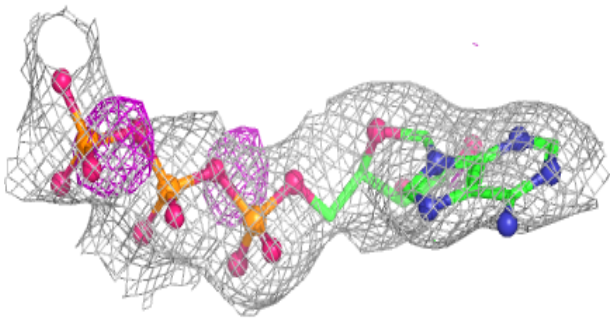


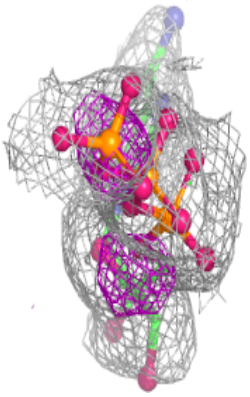


Electron density around ATP B 400:

$2mF_o$-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.