



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 16, 2023 – 08:39 PM EST

PDB ID : 2OAP  
Title : Crystal structure of the archaeal secretion ATPase GspE in complex with AMP-PNP  
Authors : Yamagata, A.; Tainer, J.A.  
Deposited on : 2006-12-17  
Resolution : 2.95 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](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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 2.36  
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) : 2.36

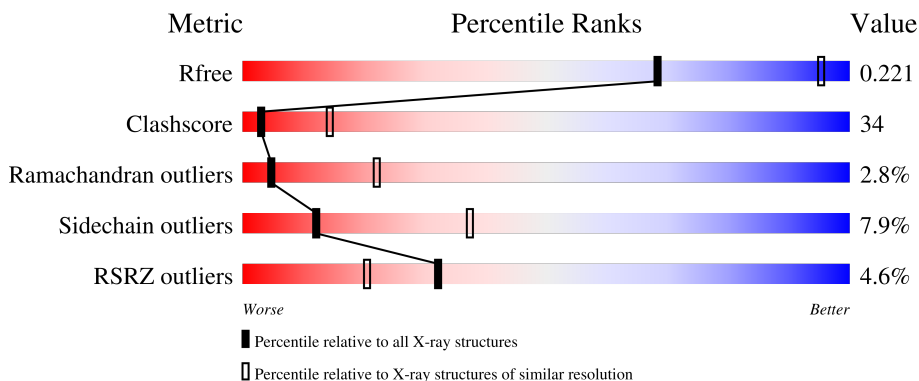
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.95 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	3104 (3.00-2.92)
Clashscore	141614	3462 (3.00-2.92)
Ramachandran outliers	138981	3340 (3.00-2.92)
Sidechain outliers	138945	3343 (3.00-2.92)
RSRZ outliers	127900	2986 (3.00-2.92)

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  $\geq 3$ , 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	1	511	
1	2	511	

## 2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 8040 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 Type II secretion system protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	1	498	3916	2501	669	728	1	17	0	0	0
1	2	503	4061	2593	681	770	1	16	0	0	0

There are 36 discrepancies between the modelled and reference sequences:

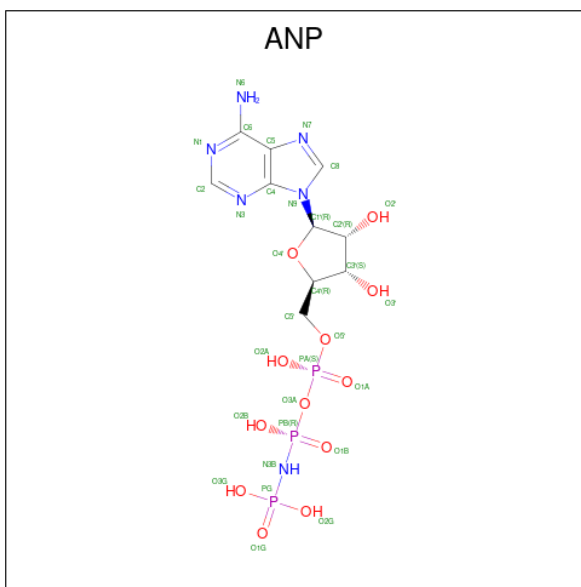
Chain	Residue	Modelled	Actual	Comment	Reference
1	1	MSE	MET	modified residue	UNP O29598
1	121	MSE	MET	modified residue	UNP O29598
1	139	MSE	MET	modified residue	UNP O29598
1	180	MSE	MET	modified residue	UNP O29598
1	281	MSE	MET	modified residue	UNP O29598
1	282	MSE	MET	modified residue	UNP O29598
1	315	MSE	MET	modified residue	UNP O29598
1	322	MSE	MET	modified residue	UNP O29598
1	354	MSE	MET	modified residue	UNP O29598
1	372	MSE	MET	modified residue	UNP O29598
1	387	MSE	MET	modified residue	UNP O29598
1	399	MSE	MET	modified residue	UNP O29598
1	446	MSE	MET	modified residue	UNP O29598
1	453	MSE	MET	modified residue	UNP O29598
1	468	MSE	MET	modified residue	UNP O29598
1	478	MSE	MET	modified residue	UNP O29598
1	504	MSE	MET	modified residue	UNP O29598
1	507	MSE	MET	modified residue	UNP O29598
2	1	MSE	MET	modified residue	UNP O29598
2	121	MSE	MET	modified residue	UNP O29598
2	139	MSE	MET	modified residue	UNP O29598
2	180	MSE	MET	modified residue	UNP O29598
2	281	MSE	MET	modified residue	UNP O29598
2	282	MSE	MET	modified residue	UNP O29598
2	315	MSE	MET	modified residue	UNP O29598

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Chain	Residue	Modelled	Actual	Comment	Reference
2	322	MSE	MET	modified residue	UNP O29598
2	354	MSE	MET	modified residue	UNP O29598
2	372	MSE	MET	modified residue	UNP O29598
2	387	MSE	MET	modified residue	UNP O29598
2	399	MSE	MET	modified residue	UNP O29598
2	446	MSE	MET	modified residue	UNP O29598
2	453	MSE	MET	modified residue	UNP O29598
2	468	MSE	MET	modified residue	UNP O29598
2	478	MSE	MET	modified residue	UNP O29598
2	504	MSE	MET	modified residue	UNP O29598
2	507	MSE	MET	modified residue	UNP O29598

- Molecule 2 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (three-letter code: ANP) (formula: C<sub>10</sub>H<sub>17</sub>N<sub>6</sub>O<sub>12</sub>P<sub>3</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	1	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
2	2	1	Total	C	N	O	P	0	0
			31	10	6	12	3		

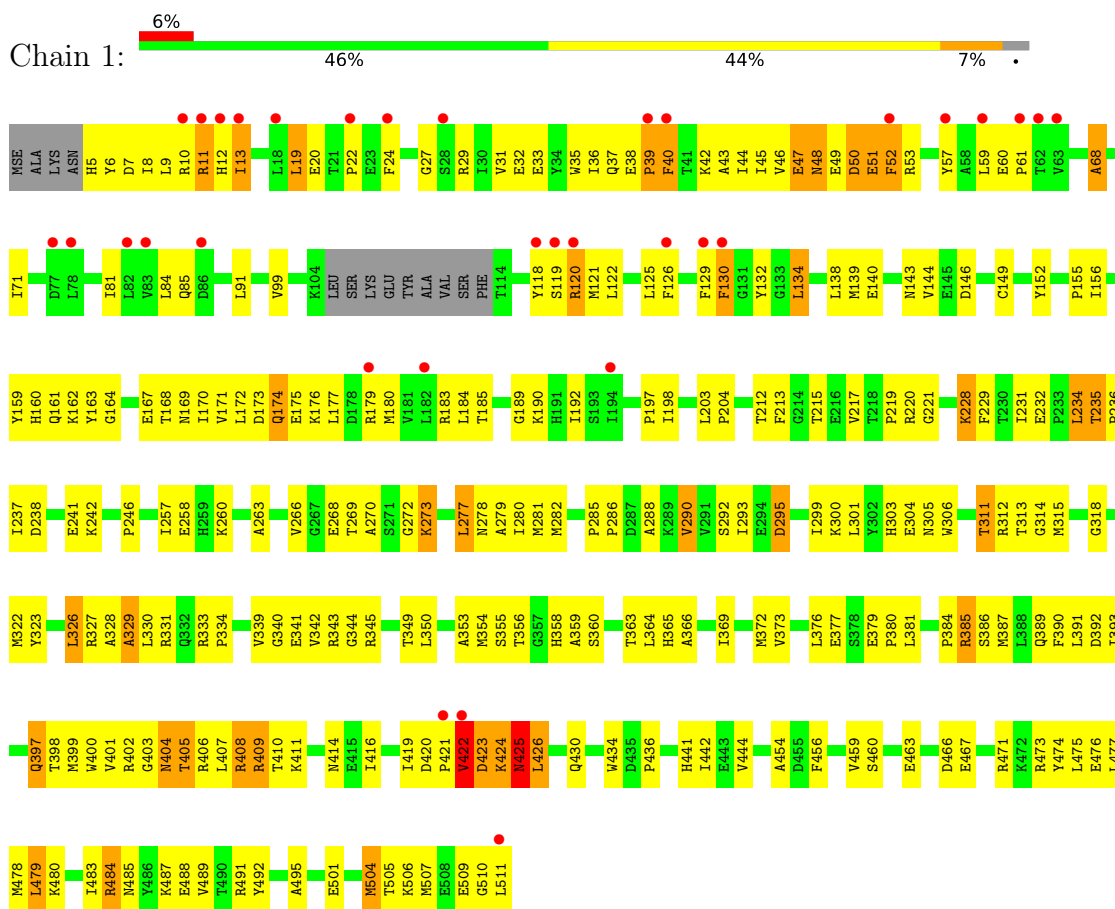
- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	2	1	Total	Mg	0	0
			1	1		

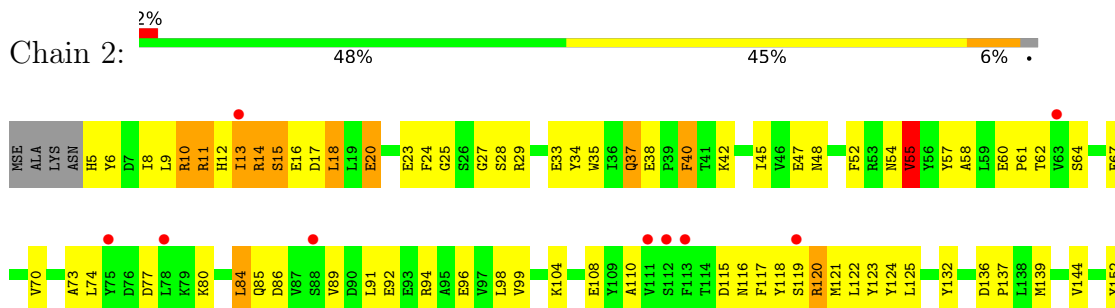
### 3 Residue-property plots

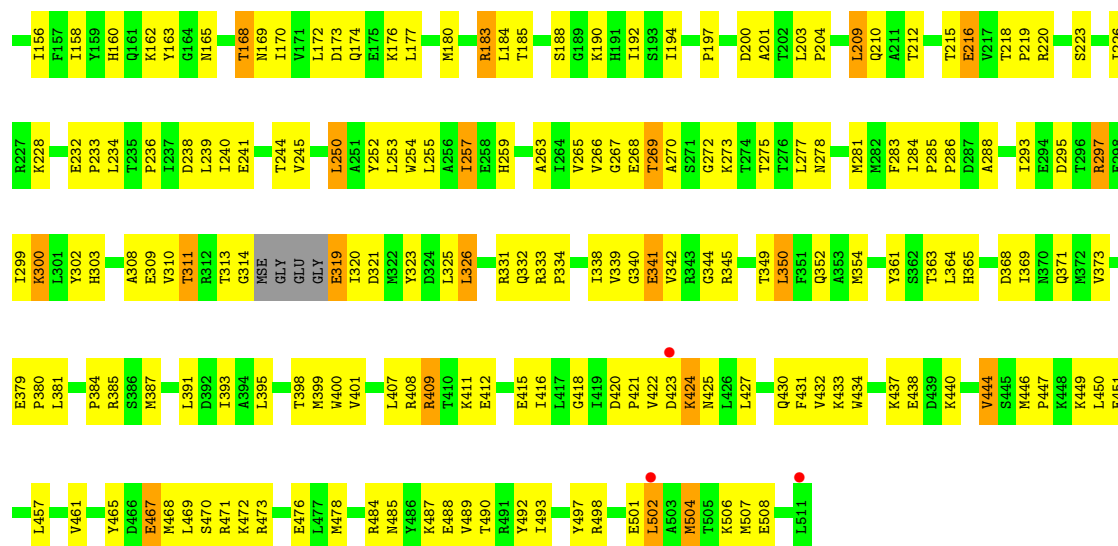
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Type II secretion system protein



- Molecule 1: Type II secretion system protein





## 4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	132.86Å 132.86Å 442.26Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.83 – 2.95 49.83 – 2.95	Depositor EDS
% Data completeness (in resolution range)	97.1 (49.83-2.95) 97.1 (49.83-2.95)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.42 (at 2.96Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.226 , 0.234 0.213 , 0.221	Depositor DCC
$R_{free}$ test set	1590 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	56.2	Xtrriage
Anisotropy	0.390	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 51.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	8040	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	52.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.13% of the height of the origin peak. No significant pseudotranslation is detected.*

<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 [i](#)

### 5.1 Standard geometry [i](#)

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

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	1	0.37	0/3977	0.66	4/5365 (0.1%)
1	2	0.37	0/4125	0.65	0/5560
All	All	0.37	0/8102	0.65	4/10925 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	1	424	LYS	N-CA-C	-6.13	94.45	111.00
1	1	422	VAL	N-CA-C	-5.32	96.64	111.00
1	1	425	ASN	N-CA-C	5.22	125.11	111.00
1	1	423	ASP	N-CA-C	5.10	124.78	111.00

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	1	3916	0	3816	280	0
1	2	4061	0	4039	271	0
2	1	31	0	13	3	0
2	2	31	0	13	4	0
3	2	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	8040	0	7881	543	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 (543) 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)
1:2:446:MSE:HG2	1:2:447:PRO:HD2	1.35	1.04
1:1:278:ASN:HD21	1:1:300:LYS:H	1.12	0.98
1:1:391:LEU:HD22	1:1:416:ILE:HD12	1.45	0.97
1:1:215:THR:HG22	1:1:221:GLY:HA2	1.48	0.95
1:2:270:ALA:H	2:2:513:ANP:HNB1	1.10	0.94
1:1:31:VAL:HB	1:1:45:ILE:HG22	1.49	0.93
1:2:278:ASN:HD21	1:2:300:LYS:H	1.11	0.92
1:1:180:MSE:HE2	1:1:184:LEU:HG	1.53	0.91
1:2:180:MSE:HE2	1:2:184:LEU:HG	1.55	0.89
1:1:423:ASP:HB2	1:1:425:ASN:H	1.38	0.88
1:1:484:ARG:HH11	1:1:484:ARG:HB2	1.38	0.87
1:1:168:THR:HG22	1:1:170:ILE:H	1.39	0.87
1:1:13:ILE:HB	1:1:119:SER:HB3	1.59	0.84
1:2:340:GLY:O	1:2:363:THR:HB	1.77	0.83
1:1:475:LEU:HD23	1:1:478:MSE:HE3	1.60	0.82
1:2:281:MSE:HE2	1:2:338:ILE:HG12	1.61	0.82
1:1:8:ILE:H	1:1:8:ILE:HD12	1.45	0.81
1:2:10:ARG:HA	1:2:13:ILE:HG23	1.65	0.79
1:2:473:ARG:HD3	1:2:504:MSE:HE1	1.65	0.78
1:1:409:ARG:HG2	1:1:409:ARG:HH11	1.48	0.78
1:1:120:ARG:NH1	1:1:120:ARG:HB3	1.99	0.77
1:1:474:TYR:CD2	1:1:478:MSE:HE2	2.20	0.77
1:2:352:GLN:HE21	1:2:387:MSE:HE1	1.49	0.77
1:2:369:ILE:N	1:2:369:ILE:HD12	1.99	0.77
1:1:120:ARG:HB3	1:1:120:ARG:HH11	1.50	0.76
1:2:35:TRP:CD2	1:2:38:GLU:HB3	2.19	0.76
1:1:235:THR:HG21	1:1:489:VAL:HG21	1.68	0.76
1:1:419:ILE:HG23	1:1:425:ASN:OD1	1.87	0.75
1:2:270:ALA:N	2:2:513:ANP:HNB1	1.85	0.74
1:2:25:GLY:O	1:2:28:SER:HB3	1.86	0.74
1:1:185:THR:HG21	1:1:192:ILE:H	1.53	0.74
1:1:379:GLU:HG3	1:1:380:PRO:HA	1.70	0.73
1:2:11:ARG:HG2	1:2:11:ARG:HH11	1.52	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:36:ILE:HD11	1:1:43:ALA:HB2	1.70	0.73
1:1:377:GLU:OE1	1:1:385:ARG:HD2	1.88	0.72
1:2:424:LYS:H	1:2:424:LYS:HE2	1.52	0.72
1:1:13:ILE:HB	1:1:119:SER:CB	2.20	0.71
1:2:501:GLU:H	1:2:501:GLU:CD	1.94	0.71
1:1:278:ASN:ND2	1:1:299:ILE:HA	2.05	0.71
1:1:409:ARG:HD2	1:1:434:TRP:CE2	2.26	0.70
1:2:13:ILE:HG13	1:2:14:ARG:H	1.57	0.70
1:2:399:MSE:HE2	1:2:408:ARG:NH2	2.07	0.70
1:1:235:THR:HA	1:1:282:MSE:HE1	1.73	0.69
1:1:278:ASN:HD21	1:1:300:LYS:N	1.86	0.69
1:2:185:THR:HG21	1:2:192:ILE:HB	1.73	0.69
1:1:168:THR:HG22	1:1:170:ILE:N	2.07	0.69
1:1:398:THR:HG22	1:1:399:MSE:N	2.07	0.69
1:1:398:THR:HG22	1:1:399:MSE:H	1.57	0.68
1:1:350:LEU:HD11	1:1:360:SER:HB3	1.75	0.68
1:2:233:PRO:HG2	1:2:300:LYS:HB3	1.76	0.68
1:1:258:GLU:OE2	1:1:471:ARG:NH2	2.27	0.68
1:1:9:LEU:HG	1:1:10:ARG:H	1.59	0.68
1:1:12:HIS:HD2	1:1:99:VAL:HG21	1.59	0.67
1:2:203:LEU:HB3	1:2:204:PRO:HD2	1.74	0.67
1:2:350:LEU:HD13	1:2:354:MSE:HE3	1.74	0.67
1:1:475:LEU:HD23	1:1:478:MSE:CE	2.24	0.67
1:2:190:LYS:HD2	1:2:201:ALA:HB2	1.77	0.66
1:1:8:ILE:HD12	1:1:8:ILE:N	2.09	0.66
1:2:168:THR:HG23	1:2:170:ILE:H	1.61	0.66
1:1:485:ASN:HB2	1:1:488:GLU:HG2	1.78	0.66
1:1:279:ALA:HA	1:1:282:MSE:HE3	1.77	0.65
1:2:180:MSE:HE2	1:2:184:LEU:CG	2.26	0.65
1:1:344:GLY:HA2	1:1:381:LEU:HD12	1.78	0.65
1:2:485:ASN:O	1:2:489:VAL:HG23	1.96	0.65
1:2:502:LEU:O	1:2:506:LYS:HG3	1.96	0.65
1:1:156:ILE:O	1:1:168:THR:HB	1.96	0.65
1:1:292:SER:C	1:1:293:ILE:HD12	2.16	0.65
1:2:478:MSE:HE1	1:2:489:VAL:HG13	1.78	0.65
1:1:231:ILE:O	1:1:232:GLU:HB2	1.96	0.65
1:2:352:GLN:HE21	1:2:387:MSE:CE	2.10	0.65
1:2:132:TYR:CD2	1:2:139:MSE:HG2	2.32	0.64
1:2:156:ILE:O	1:2:168:THR:HB	1.96	0.64
1:2:257:ILE:HD11	1:2:283:PHE:C	2.17	0.64
1:1:322:MSE:HE1	1:1:341:GLU:O	1.98	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:400:TRP:CE3	1:1:407:LEU:HD12	2.32	0.64
1:1:236:PRO:HD3	1:1:282:MSE:HE3	1.79	0.64
1:2:295:ASP:HA	1:2:311:THR:HB	1.79	0.64
1:1:272:GLY:HA2	2:1:512:ANP:O1A	1.98	0.64
1:2:281:MSE:HE1	1:2:361:TYR:CD1	2.33	0.64
1:2:446:MSE:HE3	1:2:450:LEU:HD22	1.80	0.64
1:1:442:ILE:HD12	1:1:442:ILE:N	2.13	0.63
1:1:229:PHE:O	1:1:231:ILE:HG13	1.98	0.63
1:2:498:ARG:HG3	1:2:498:ARG:HH11	1.63	0.63
1:2:272:GLY:N	2:2:513:ANP:O2B	2.31	0.63
1:2:269:THR:HG22	1:2:365:HIS:CE1	2.33	0.63
1:1:5:HIS:CD2	1:1:130:PHE:HB2	2.34	0.63
1:2:415:GLU:OE1	1:2:449:LYS:HB2	1.97	0.63
1:2:168:THR:CG2	1:2:170:ILE:H	2.11	0.63
1:2:473:ARG:HH11	1:2:504:MSE:HE1	1.62	0.63
1:2:257:ILE:HD11	1:2:284:ILE:N	2.13	0.62
1:2:446:MSE:HG2	1:2:447:PRO:CD	2.21	0.62
1:1:32:GLU:HG2	1:1:33:GLU:H	1.64	0.62
1:2:252:TYR:HA	1:2:468:MSE:HE2	1.80	0.62
1:1:45:ILE:HG12	1:1:163:TYR:CE1	2.34	0.62
1:1:51:GLU:O	1:1:53:ARG:HG2	2.00	0.62
1:2:23:GLU:CD	1:2:23:GLU:H	2.02	0.62
1:1:492:TYR:CD2	1:1:507:MSE:HE1	2.33	0.62
1:2:24:PHE:HB3	1:2:28:SER:OG	2.00	0.62
1:2:451:GLU:HG2	1:2:461:VAL:HG21	1.82	0.62
1:2:399:MSE:HE2	1:2:408:ARG:CZ	2.30	0.62
1:1:328:ALA:HB2	1:1:331:ARG:NH2	2.15	0.61
1:2:281:MSE:HE3	1:2:284:ILE:HD11	1.82	0.61
1:2:10:ARG:HH12	1:2:37:GLN:HG3	1.64	0.61
1:2:212:THR:HG22	1:2:223:SER:H	1.66	0.61
1:2:433:LYS:NZ	1:2:433:LYS:HB3	2.16	0.61
1:1:330:LEU:HD23	1:1:330:LEU:O	2.00	0.61
1:2:9:LEU:HD22	1:2:40:PHE:CZ	2.35	0.61
1:1:12:HIS:CD2	1:1:99:VAL:HG21	2.35	0.60
1:1:229:PHE:CE2	1:1:231:ILE:HD11	2.37	0.60
1:2:8:ILE:HD13	1:2:92:GLU:HA	1.82	0.60
1:1:355:SER:HA	1:1:390:PHE:CD2	2.36	0.60
1:2:369:ILE:N	1:2:369:ILE:CD1	2.64	0.60
1:1:19:LEU:H	1:1:120:ARG:HD3	1.66	0.60
1:1:364:LEU:HD13	1:1:372:MSE:HG3	1.81	0.60
1:2:67:GLU:HB3	1:2:117:PHE:HE1	1.66	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:119:SER:C	1:1:121:MSE:H	2.03	0.60
1:1:180:MSE:HE3	1:1:183:ARG:HB3	1.81	0.60
1:1:235:THR:HG22	1:1:238:ASP:H	1.66	0.60
1:1:434:TRP:CZ3	1:1:436:PRO:HB3	2.36	0.60
1:2:244:THR:HG23	1:2:245:VAL:HG23	1.83	0.60
1:2:420:ASP:O	1:2:424:LYS:HA	2.01	0.60
1:1:8:ILE:H	1:1:8:ILE:CD1	2.12	0.60
1:1:484:ARG:HH11	1:1:484:ARG:CB	2.14	0.60
1:1:175:GLU:HG3	1:1:176:LYS:N	2.16	0.60
1:2:219:PRO:O	1:2:220:ARG:HB2	2.02	0.60
1:2:12:HIS:CD2	1:2:99:VAL:HG21	2.36	0.59
1:2:300:LYS:HB2	1:2:300:LYS:NZ	2.17	0.59
1:1:398:THR:OG1	1:1:411:LYS:HB2	2.01	0.59
1:2:144:VAL:HG13	1:2:158:ILE:HB	1.83	0.59
1:1:8:ILE:O	1:1:11:ARG:HD3	2.01	0.59
1:1:44:ILE:HD11	1:1:59:LEU:HD22	1.84	0.59
1:2:485:ASN:N	1:2:485:ASN:HD22	2.00	0.59
1:1:144:VAL:O	1:1:144:VAL:HG23	2.01	0.59
1:1:293:ILE:HD12	1:1:293:ILE:N	2.18	0.59
1:1:356:THR:HG22	1:1:356:THR:O	2.03	0.59
1:2:409:ARG:HD2	1:2:434:TRP:CE2	2.38	0.59
1:1:57:TYR:HE2	1:1:59:LEU:HD12	1.67	0.59
1:1:408:ARG:HH11	1:1:408:ARG:HG3	1.68	0.59
1:2:313:THR:O	1:2:313:THR:HG23	2.01	0.59
1:2:369:ILE:HD11	1:2:412:GLU:OE2	2.01	0.59
1:1:171:VAL:O	1:1:172:LEU:HD23	2.02	0.59
1:1:333:ARG:HD2	1:1:358:HIS:NE2	2.18	0.59
1:2:277:LEU:O	1:2:281:MSE:HB2	2.03	0.58
1:1:85:GLN:HE21	1:1:85:GLN:HA	1.69	0.58
1:1:197:PRO:O	1:1:212:THR:HA	2.02	0.58
1:2:10:ARG:HA	1:2:13:ILE:CG2	2.32	0.58
1:1:409:ARG:HG2	1:1:409:ARG:NH1	2.11	0.58
1:1:32:GLU:HG2	1:1:33:GLU:N	2.19	0.58
1:1:279:ALA:HA	1:1:282:MSE:CE	2.34	0.58
1:2:446:MSE:CG	1:2:447:PRO:HD2	2.20	0.58
1:1:219:PRO:HG3	1:2:297:ARG:HD3	1.86	0.58
1:2:424:LYS:HE2	1:2:424:LYS:N	2.19	0.58
1:2:465:TYR:CE1	1:2:469:LEU:HD11	2.38	0.58
1:1:11:ARG:N	1:1:13:ILE:HD12	2.18	0.58
1:1:149:CYS:SG	1:1:177:LEU:HD11	2.44	0.58
1:2:144:VAL:O	1:2:228:LYS:HE2	2.03	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:134:LEU:HD22	1:1:134:LEU:H	1.69	0.57
1:1:44:ILE:N	1:1:44:ILE:HD12	2.19	0.57
1:1:295:ASP:CG	1:1:343:ARG:HH22	2.08	0.57
1:1:315:MSE:HE3	1:1:315:MSE:O	2.04	0.57
1:2:233:PRO:CG	1:2:300:LYS:HB3	2.33	0.57
1:2:379:GLU:HG3	1:2:380:PRO:HA	1.85	0.57
1:2:450:LEU:HD11	1:2:468:MSE:CE	2.35	0.57
1:1:192:ILE:HD11	1:1:213:PHE:N	2.18	0.56
1:1:277:LEU:HD22	1:1:281:MSE:HG2	1.87	0.56
1:1:52:PHE:HD1	1:1:52:PHE:H	1.53	0.56
1:2:281:MSE:HE2	1:2:338:ILE:CG1	2.34	0.56
1:2:212:THR:HG22	1:2:223:SER:N	2.21	0.56
1:2:321:ASP:OD1	1:2:323:TYR:HB3	2.05	0.56
1:1:215:THR:CG2	1:1:221:GLY:HA2	2.29	0.56
1:1:304:GLU:O	1:1:306:TRP:N	2.39	0.56
1:2:11:ARG:HG2	1:2:11:ARG:NH1	2.19	0.56
1:2:236:PRO:O	1:2:240:ILE:HG13	2.06	0.56
1:1:51:GLU:O	1:1:53:ARG:N	2.40	0.55
1:1:134:LEU:H	1:1:134:LEU:CD2	2.19	0.55
1:1:401:VAL:HA	1:1:405:THR:O	2.06	0.55
1:2:23:GLU:N	1:2:23:GLU:OE2	2.40	0.55
1:2:70:VAL:O	1:2:74:LEU:HD23	2.06	0.55
1:2:263:ALA:HB2	1:2:393:ILE:HB	1.87	0.55
1:2:447:PRO:HG2	1:2:450:LEU:HD22	1.87	0.55
1:1:185:THR:HG22	1:1:190:LYS:O	2.05	0.55
1:1:506:LYS:HB3	1:1:511:LEU:OXT	2.06	0.55
1:2:108:GLU:C	1:2:110:ALA:H	2.08	0.55
1:2:342:VAL:CG2	1:2:364:LEU:HD23	2.36	0.55
1:2:86:ASP:OD1	1:2:89:VAL:HG23	2.07	0.55
1:2:136:ASP:HB3	1:2:137:PRO:HD3	1.88	0.55
1:1:203:LEU:HB3	1:1:204:PRO:HD2	1.87	0.55
1:2:116:ASN:ND2	1:2:120:ARG:HH21	2.03	0.55
1:2:57:TYR:HA	1:2:169:ASN:ND2	2.21	0.55
1:2:121:MSE:HG2	1:2:125:LEU:CD2	2.37	0.55
1:2:180:MSE:HA	1:2:180:MSE:HE3	1.89	0.55
1:1:84:LEU:HD13	1:1:129:PHE:CE2	2.42	0.55
1:1:420:ASP:O	1:1:423:ASP:OD2	2.24	0.55
1:2:234:LEU:HD12	1:2:275:THR:HG21	1.89	0.55
1:2:272:GLY:HA2	2:2:513:ANP:O1A	2.07	0.55
1:2:8:ILE:O	1:2:11:ARG:HB2	2.07	0.55
1:1:344:GLY:CA	1:1:381:LEU:HD12	2.37	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:389:GLN:HB3	1:1:419:ILE:HG13	1.88	0.55
1:2:297:ARG:NH2	1:2:299:ILE:O	2.40	0.54
1:2:498:ARG:HH11	1:2:498:ARG:CG	2.20	0.54
1:1:33:GLU:HG2	1:1:42:LYS:HE2	1.89	0.54
1:1:215:THR:HG22	1:1:221:GLY:CA	2.28	0.54
1:1:60:GLU:HB3	1:1:61:PRO:HD2	1.90	0.54
1:1:384:PRO:HG2	1:1:387:MSE:CG	2.38	0.54
1:2:218:THR:HG22	1:2:218:THR:O	2.06	0.54
1:1:122:LEU:HD22	1:1:126:PHE:HE1	1.73	0.54
1:1:342:VAL:HG23	1:1:342:VAL:O	2.07	0.54
1:1:323:TYR:CE1	1:1:327:ARG:NE	2.72	0.54
1:2:465:TYR:HE1	1:2:469:LEU:HD11	1.72	0.54
1:2:194:ILE:HG23	1:2:216:GLU:HG2	1.89	0.54
1:2:418:GLY:H	1:2:427:LEU:HB2	1.73	0.54
1:1:235:THR:HG23	1:1:236:PRO:N	2.23	0.54
1:1:301:LEU:HB2	1:1:306:TRP:CZ3	2.43	0.54
1:1:329:ALA:H	1:1:331:ARG:H	1.56	0.54
1:1:330:LEU:HD12	1:1:353:ALA:HB2	1.90	0.54
1:2:10:ARG:O	1:2:13:ILE:HG12	2.08	0.54
1:1:246:PRO:HD3	1:1:441:HIS:CD2	2.43	0.54
1:2:64:SER:OG	1:2:67:GLU:HG3	2.08	0.54
1:1:263:ALA:HA	1:1:393:ILE:O	2.08	0.53
1:2:54:ASN:O	1:2:55:VAL:HG13	2.07	0.53
1:2:393:ILE:HG22	1:2:395:LEU:HD12	1.89	0.53
1:1:238:ASP:O	1:1:242:LYS:HG2	2.08	0.53
1:1:364:LEU:HD23	1:1:365:HIS:N	2.23	0.53
1:1:475:LEU:HA	1:1:478:MSE:HE3	1.90	0.53
1:2:385:ARG:O	1:2:385:ARG:HD3	2.08	0.53
1:1:81:ILE:HB	1:1:84:LEU:HD12	1.90	0.53
1:1:122:LEU:HD22	1:1:126:PHE:CE1	2.43	0.53
1:1:423:ASP:HB2	1:1:425:ASN:N	2.16	0.53
1:2:239:LEU:HD22	1:2:244:THR:HG21	1.90	0.53
1:2:416:ILE:N	1:2:416:ILE:HD12	2.22	0.53
1:1:384:PRO:HG2	1:1:387:MSE:HG3	1.90	0.53
1:2:35:TRP:HA	1:2:42:LYS:HG3	1.90	0.53
1:1:409:ARG:HD2	1:1:434:TRP:CZ2	2.44	0.53
1:2:18:LEU:HD13	1:2:119:SER:O	2.09	0.53
1:1:68:ALA:O	1:1:71:ILE:HG22	2.09	0.52
1:2:409:ARG:HG2	1:2:409:ARG:HH11	1.74	0.52
1:1:168:THR:CG2	1:1:169:ASN:N	2.73	0.52
1:2:84:LEU:HA	1:2:94:ARG:HB2	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:22:PRO:HB3	1:1:24:PHE:CZ	2.44	0.52
1:2:278:ASN:ND2	1:2:300:LYS:H	1.94	0.52
1:1:9:LEU:HG	1:1:10:ARG:N	2.25	0.52
1:2:160:HIS:ND1	1:2:163:TYR:HD1	2.07	0.52
1:1:7:ASP:O	1:1:11:ARG:HD2	2.10	0.52
1:1:350:LEU:O	1:1:353:ALA:HB3	2.10	0.52
1:2:197:PRO:O	1:2:212:THR:HA	2.10	0.52
1:2:234:LEU:HD22	1:2:238:ASP:HB3	1.91	0.52
1:1:356:THR:O	1:1:356:THR:CG2	2.57	0.52
1:2:10:ARG:CA	1:2:13:ILE:HG23	2.38	0.52
1:1:12:HIS:O	1:1:118:TYR:HE2	1.93	0.52
1:1:46:VAL:HG12	1:1:47:GLU:O	2.10	0.52
1:2:84:LEU:HD12	1:2:85:GLN:N	2.24	0.52
1:2:118:TYR:C	1:2:120:ARG:H	2.13	0.52
1:1:441:HIS:C	1:1:442:ILE:HD12	2.30	0.51
1:2:341:GLU:HA	1:2:363:THR:O	2.10	0.51
1:1:155:PRO:HA	1:1:171:VAL:HG22	1.92	0.51
1:2:14:ARG:HD3	1:2:115:ASP:HA	1.92	0.51
1:1:35:TRP:CZ3	1:1:39:PRO:HA	2.46	0.51
1:2:118:TYR:CE1	1:2:122:LEU:HD22	2.45	0.51
1:2:492:TYR:CD2	1:2:507:MSE:HE1	2.45	0.51
1:1:229:PHE:CZ	1:1:300:LYS:HE3	2.45	0.51
1:2:188:SER:OG	1:2:203:LEU:HD23	2.09	0.51
1:2:431:PHE:CD1	1:2:432:VAL:HG23	2.45	0.51
1:1:235:THR:O	1:1:238:ASP:HB2	2.10	0.51
1:2:344:GLY:HA2	1:2:381:LEU:HD12	1.92	0.51
1:1:487:LYS:O	1:1:491:ARG:HG3	2.09	0.51
1:2:9:LEU:C	1:2:9:LEU:HD23	2.31	0.51
1:1:326:LEU:HD22	1:1:349:THR:HG22	1.91	0.51
1:2:173:ASP:CG	1:2:176:LYS:HD3	2.32	0.51
1:1:57:TYR:CE2	1:1:59:LEU:HD12	2.46	0.50
1:1:40:PHE:N	1:1:40:PHE:CD1	2.79	0.50
1:2:35:TRP:CE3	1:2:38:GLU:HB3	2.46	0.50
1:2:302:TYR:HB3	1:2:490:THR:HG21	1.93	0.50
1:2:438:GLU:HB2	1:2:440:LYS:HG3	1.94	0.50
1:2:6:TYR:CD2	1:2:37:GLN:HG2	2.46	0.50
1:2:255:LEU:HD23	1:2:471:ARG:CZ	2.41	0.50
1:1:118:TYR:O	1:1:121:MSE:HB3	2.12	0.50
1:1:380:PRO:HG3	1:2:384:PRO:HG3	1.94	0.50
1:2:13:ILE:HG13	1:2:14:ARG:N	2.24	0.50
1:2:162:LYS:HD2	1:2:163:TYR:CE1	2.46	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:446:MSE:HE3	1:2:450:LEU:CD2	2.41	0.50
1:1:229:PHE:CE1	1:1:300:LYS:HE3	2.47	0.49
1:2:60:GLU:HB3	1:2:61:PRO:HD2	1.92	0.49
1:2:121:MSE:HG2	1:2:125:LEU:HD23	1.94	0.49
1:2:278:ASN:ND2	1:2:299:ILE:HA	2.27	0.49
1:1:180:MSE:HE2	1:1:184:LEU:CG	2.33	0.49
1:1:235:THR:HG22	1:1:237:ILE:N	2.27	0.49
1:2:20:GLU:HG3	1:2:62:THR:OG1	2.12	0.49
1:2:409:ARG:HD2	1:2:434:TRP:NE1	2.26	0.49
1:2:395:LEU:HD12	1:2:395:LEU:N	2.28	0.49
1:2:12:HIS:O	1:2:13:ILE:C	2.50	0.49
1:2:116:ASN:HD22	1:2:120:ARG:HH21	1.60	0.49
1:2:391:LEU:O	1:2:416:ILE:HB	2.12	0.49
1:1:391:LEU:HD23	1:1:392:ASP:N	2.27	0.49
1:2:411:LYS:O	1:2:412:GLU:HB2	2.12	0.49
1:2:501:GLU:CD	1:2:501:GLU:N	2.64	0.49
1:1:173:ASP:OD2	1:1:176:LYS:HB2	2.12	0.49
1:2:23:GLU:CD	1:2:23:GLU:N	2.67	0.49
1:1:29:ARG:O	1:1:46:VAL:HG13	2.12	0.49
1:1:144:VAL:O	1:1:144:VAL:CG2	2.60	0.49
1:1:402:ARG:HA	1:1:402:ARG:NE	2.27	0.49
1:1:152:TYR:CD2	1:1:174:GLN:HA	2.48	0.48
1:1:369:ILE:HD11	1:1:414:ASN:CB	2.43	0.48
1:1:467:GLU:OE2	1:1:471:ARG:NH1	2.43	0.48
1:2:45:ILE:N	1:2:45:ILE:HD12	2.28	0.48
1:2:58:ALA:N	1:2:169:ASN:HD21	2.11	0.48
1:1:376:LEU:HA	1:1:381:LEU:HD23	1.95	0.48
1:2:200:ASP:HB2	1:2:210:GLN:HE22	1.78	0.48
1:2:450:LEU:HD11	1:2:468:MSE:HE3	1.94	0.48
1:1:235:THR:CG2	1:1:236:PRO:N	2.77	0.48
1:1:473:ARG:NH1	1:1:477:LEU:HD11	2.29	0.48
1:2:270:ALA:O	1:2:399:MSE:HE3	2.14	0.48
1:1:37:GLN:CG	1:1:140:GLU:HG2	2.44	0.48
1:1:119:SER:O	1:1:121:MSE:N	2.45	0.48
1:1:185:THR:HG21	1:1:192:ILE:HG22	1.95	0.48
1:2:9:LEU:HD22	1:2:40:PHE:CE2	2.48	0.48
1:2:422:VAL:O	1:2:423:ASP:HB2	2.14	0.48
1:2:484:ARG:HG3	1:2:484:ARG:HH11	1.79	0.48
1:1:397:GLN:NE2	1:1:410:THR:HA	2.29	0.48
1:2:215:THR:HA	1:2:218:THR:O	2.13	0.48
1:2:253:LEU:O	1:2:257:ILE:HG23	2.14	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:235:THR:CG2	1:1:237:ILE:H	2.27	0.48
1:1:198:ILE:HD13	1:2:325:LEU:HD21	1.96	0.47
1:1:311:THR:HG22	1:2:331:ARG:NH2	2.29	0.47
1:1:329:ALA:O	1:1:334:PRO:HD3	2.14	0.47
1:1:419:ILE:CG2	1:1:420:ASP:N	2.78	0.47
1:2:70:VAL:O	1:2:73:ALA:HB3	2.14	0.47
1:2:423:ASP:HB2	1:2:425:ASN:HD21	1.80	0.47
1:1:9:LEU:HD11	1:1:122:LEU:HB3	1.95	0.47
1:1:273:LYS:HB2	2:1:512:ANP:O1B	2.14	0.47
1:2:14:ARG:O	1:2:15:SER:HB2	2.15	0.47
1:1:288:ALA:O	1:1:303:HIS:HE1	1.97	0.47
1:1:442:ILE:N	1:1:442:ILE:CD1	2.78	0.47
1:2:23:GLU:O	1:2:23:GLU:HG2	2.14	0.47
1:2:254:TRP:CD1	1:2:471:ARG:NH1	2.83	0.47
1:2:269:THR:O	1:2:270:ALA:HB3	2.14	0.47
1:2:400:TRP:CE3	1:2:407:LEU:HD23	2.50	0.47
1:1:312:ARG:HD2	1:1:318:GLY:O	2.14	0.47
1:2:96:GLU:C	1:2:98:LEU:N	2.67	0.47
1:1:369:ILE:O	1:1:373:VAL:HG23	2.15	0.47
1:1:460:SER:OG	1:1:463:GLU:HB2	2.15	0.46
1:1:85:GLN:HA	1:1:85:GLN:NE2	2.30	0.46
1:2:281:MSE:HG2	1:2:338:ILE:HD13	1.98	0.46
1:1:266:VAL:CG1	1:1:366:ALA:HB3	2.46	0.46
1:1:400:TRP:HE3	1:1:407:LEU:HD12	1.75	0.46
1:1:6:TYR:O	1:1:10:ARG:HB3	2.15	0.46
1:1:189:GLY:O	1:1:190:LYS:HD3	2.16	0.46
1:1:269:THR:O	1:1:270:ALA:HB3	2.15	0.46
1:1:277:LEU:HD22	1:1:281:MSE:CG	2.45	0.46
1:2:326:LEU:HD13	1:2:349:THR:CG2	2.46	0.46
1:2:398:THR:CG2	1:2:411:LYS:HB2	2.45	0.46
1:1:45:ILE:HG22	1:1:45:ILE:O	2.16	0.46
1:1:229:PHE:HE2	1:1:231:ILE:HD11	1.81	0.46
1:1:235:THR:HA	1:1:282:MSE:CE	2.44	0.46
1:2:180:MSE:CE	1:2:183:ARG:HD2	2.45	0.46
1:1:146:ASP:OD2	1:2:333:ARG:HD3	2.16	0.46
1:1:272:GLY:CA	2:1:512:ANP:O1A	2.64	0.46
1:2:152:TYR:CD2	1:2:174:GLN:HA	2.50	0.46
1:1:138:LEU:O	1:1:144:VAL:HG21	2.15	0.46
1:1:237:ILE:N	1:1:237:ILE:HD12	2.30	0.46
1:1:10:ARG:O	1:1:11:ARG:HB3	2.15	0.46
1:2:15:SER:HB3	1:2:119:SER:OG	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:266:VAL:HG12	1:2:267:GLY:N	2.29	0.46
1:2:451:GLU:HG2	1:2:461:VAL:CG2	2.45	0.46
1:1:492:TYR:HD2	1:1:507:MSE:CE	2.28	0.46
1:1:492:TYR:HD2	1:1:507:MSE:HE1	1.79	0.46
1:2:77:ASP:O	1:2:80:LYS:HB2	2.16	0.46
1:2:194:ILE:HG23	1:2:216:GLU:CG	2.46	0.46
1:2:250:LEU:HD12	1:2:250:LEU:HA	1.75	0.46
1:2:384:PRO:HG2	1:2:387:MSE:CG	2.46	0.46
1:1:52:PHE:CD1	1:1:52:PHE:N	2.82	0.46
1:1:143:ASN:HB3	1:1:160:HIS:CE1	2.51	0.46
1:1:217:VAL:HG13	1:2:310:VAL:O	2.15	0.46
1:2:484:ARG:HG3	1:2:484:ARG:NH1	2.30	0.46
1:1:159:TYR:CE2	1:1:164:GLY:HA2	2.51	0.45
1:1:237:ILE:HG22	1:1:484:ARG:HD2	1.97	0.45
1:2:14:ARG:HH11	1:2:14:ARG:HB2	1.81	0.45
1:2:33:GLU:O	1:2:34:TYR:HB3	2.16	0.45
1:2:350:LEU:HD13	1:2:354:MSE:CE	2.44	0.45
1:2:416:ILE:N	1:2:416:ILE:CD1	2.80	0.45
1:2:465:TYR:O	1:2:468:MSE:HB3	2.16	0.45
1:1:125:LEU:O	1:1:129:PHE:HD1	1.99	0.45
1:1:257:ILE:HD13	1:1:280:ILE:O	2.15	0.45
1:1:376:LEU:HD23	1:1:381:LEU:HD23	1.99	0.45
1:1:339:VAL:O	1:1:340:GLY:C	2.55	0.45
1:2:209:LEU:HD23	1:2:210:GLN:H	1.81	0.45
1:2:326:LEU:HD13	1:2:349:THR:HB	1.98	0.45
1:1:229:PHE:CE2	1:1:231:ILE:CD1	2.99	0.45
1:1:27:GLY:O	1:1:48:ASN:HA	2.17	0.45
1:1:126:PHE:HA	1:1:130:PHE:CD1	2.51	0.45
1:1:473:ARG:HH12	1:1:477:LEU:HD11	1.81	0.45
1:1:476:GLU:O	1:1:480:LYS:HD2	2.17	0.45
1:2:67:GLU:HB3	1:2:117:PHE:CE1	2.49	0.45
1:2:288:ALA:O	1:2:303:HIS:HE1	2.00	0.45
1:2:302:TYR:CD1	1:2:487:LYS:HG2	2.52	0.45
1:2:478:MSE:HG2	1:2:507:MSE:CE	2.47	0.45
1:2:219:PRO:O	1:2:220:ARG:CB	2.63	0.45
1:2:352:GLN:HG2	1:2:387:MSE:CE	2.46	0.45
1:2:369:ILE:O	1:2:373:VAL:HG23	2.17	0.45
1:1:234:LEU:HD12	1:1:234:LEU:HA	1.79	0.45
1:2:485:ASN:N	1:2:485:ASN:ND2	2.64	0.45
1:1:235:THR:HG23	1:1:236:PRO:HD2	1.99	0.45
1:1:235:THR:H	1:1:238:ASP:HB2	1.82	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:313:THR:HG23	1:1:315:MSE:H	1.81	0.45
1:1:333:ARG:HD2	1:1:333:ARG:HA	1.83	0.45
1:2:108:GLU:C	1:2:110:ALA:N	2.71	0.45
1:1:419:ILE:HG22	1:1:420:ASP:N	2.31	0.45
1:2:37:GLN:HE21	1:2:37:GLN:HB2	1.56	0.45
1:2:61:PRO:HB2	1:2:120:ARG:HG3	1.99	0.45
1:2:314:GLY:O	1:2:319:GLU:HG3	2.16	0.45
1:2:339:VAL:HG21	1:2:350:LEU:HG	1.98	0.45
1:1:120:ARG:NH1	1:1:120:ARG:CB	2.76	0.44
1:2:117:PHE:CE2	1:2:121:MSE:HE3	2.52	0.44
1:2:420:ASP:OD1	1:2:421:PRO:HD2	2.17	0.44
1:1:198:ILE:HD12	1:2:320:ILE:HD13	1.99	0.44
1:1:485:ASN:HB2	1:1:488:GLU:CG	2.46	0.44
1:2:117:PHE:HE2	1:2:121:MSE:HE3	1.81	0.44
1:2:259:HIS:HE1	1:2:457:LEU:HD21	1.81	0.44
1:2:498:ARG:HA	1:2:498:ARG:HD3	1.77	0.44
1:1:285:PRO:HA	1:1:286:PRO:HD2	1.76	0.44
1:1:421:PRO:O	1:1:422:VAL:O	2.36	0.44
1:1:483:ILE:HA	1:1:488:GLU:OE2	2.17	0.44
1:1:139:MSE:HA	1:1:228:LYS:HE2	1.99	0.44
1:1:492:TYR:O	1:1:495:ALA:HB3	2.17	0.44
1:2:400:TRP:HE3	1:2:407:LEU:HD23	1.82	0.44
1:1:330:LEU:HD23	1:1:330:LEU:C	2.37	0.44
1:2:18:LEU:HB3	1:2:120:ARG:HD3	2.00	0.44
1:1:492:TYR:CD2	1:1:507:MSE:CE	3.01	0.44
1:2:9:LEU:HD11	1:2:123:TYR:HA	1.98	0.44
1:2:209:LEU:CD2	1:2:210:GLN:N	2.81	0.44
1:1:119:SER:C	1:1:121:MSE:N	2.71	0.44
1:2:118:TYR:O	1:2:122:LEU:HB2	2.18	0.44
1:2:173:ASP:OD2	1:2:176:LYS:HD3	2.18	0.44
1:1:61:PRO:HB2	1:1:120:ARG:HD2	2.00	0.44
1:1:192:ILE:CD1	1:1:213:PHE:HB2	2.48	0.44
1:1:474:TYR:CE2	1:1:478:MSE:HE2	2.52	0.44
1:1:12:HIS:O	1:1:118:TYR:CE2	2.71	0.43
1:1:192:ILE:HG23	1:1:192:ILE:O	2.18	0.43
1:1:232:GLU:OE1	1:1:232:GLU:HA	2.17	0.43
1:2:240:ILE:CG1	1:2:250:LEU:HD23	2.48	0.43
1:2:332:GLN:HB2	1:2:334:PRO:HD3	2.00	0.43
1:1:198:ILE:HD11	1:1:217:VAL:HG21	2.00	0.43
1:1:235:THR:HG23	1:1:236:PRO:CD	2.48	0.43
1:2:16:GLU:O	1:2:17:ASP:HB3	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:138:LEU:O	1:1:144:VAL:CG2	2.67	0.43
1:2:8:ILE:CD1	1:2:92:GLU:HA	2.49	0.43
1:2:423:ASP:HB2	1:2:425:ASN:ND2	2.34	0.43
1:2:473:ARG:HD3	1:2:504:MSE:CE	2.43	0.43
1:2:168:THR:HG23	1:2:169:ASN:N	2.33	0.43
1:2:401:VAL:O	1:2:401:VAL:HG23	2.18	0.43
1:1:11:ARG:H	1:1:13:ILE:HD12	1.81	0.43
1:1:57:TYR:HA	1:1:169:ASN:OD1	2.18	0.43
1:1:363:THR:HG22	1:1:364:LEU:N	2.33	0.43
1:1:386:SER:HA	1:1:419:ILE:CD1	2.48	0.43
1:2:40:PHE:CD1	1:2:40:PHE:N	2.86	0.43
1:2:450:LEU:HD11	1:2:468:MSE:HE1	2.00	0.43
1:1:5:HIS:HA	1:1:91:LEU:HD21	2.01	0.43
1:1:132:TYR:C	1:1:183:ARG:HH12	2.22	0.43
1:1:511:LEU:C	1:1:511:LEU:HD23	2.39	0.43
1:2:473:ARG:HH11	1:2:504:MSE:CE	2.28	0.43
1:2:504:MSE:O	1:2:508:GLU:HG2	2.18	0.43
1:1:159:TYR:HA	1:1:164:GLY:O	2.19	0.43
1:1:241:GLU:HG3	1:1:479:LEU:HD21	2.01	0.43
1:2:173:ASP:OD2	1:2:173:ASP:C	2.56	0.43
1:2:368:ASP:C	1:2:369:ILE:HD12	2.38	0.43
1:1:176:LYS:HA	1:1:179:ARG:NH1	2.34	0.42
1:1:430:GLN:O	1:1:444:VAL:HG23	2.19	0.42
1:1:473:ARG:HD3	1:1:504:MSE:HE1	2.00	0.42
1:2:29:ARG:NH2	1:2:47:GLU:OE1	2.52	0.42
1:1:37:GLN:O	1:1:40:PHE:HD1	2.01	0.42
1:1:323:TYR:HE1	1:1:327:ARG:HH21	1.66	0.42
1:1:403:GLY:C	1:1:405:THR:H	2.19	0.42
1:2:257:ILE:HD11	1:2:284:ILE:CA	2.49	0.42
1:1:288:ALA:O	1:1:303:HIS:CE1	2.72	0.42
1:2:99:VAL:HG13	1:2:118:TYR:OH	2.18	0.42
1:2:5:HIS:HA	1:2:91:LEU:HD21	2.01	0.42
1:2:257:ILE:HD11	1:2:284:ILE:HA	2.00	0.42
1:2:431:PHE:CE1	1:2:432:VAL:HG23	2.55	0.42
1:1:134:LEU:HD22	1:1:134:LEU:N	2.35	0.42
1:1:168:THR:HG22	1:1:169:ASN:N	2.34	0.42
1:1:409:ARG:HD2	1:1:434:TRP:NE1	2.33	0.42
1:2:9:LEU:O	1:2:11:ARG:N	2.52	0.42
1:2:14:ARG:HH11	1:2:14:ARG:CG	2.32	0.42
1:2:285:PRO:HA	1:2:286:PRO:HD2	1.81	0.42
1:1:219:PRO:C	1:1:221:GLY:H	2.23	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:241:GLU:CD	1:2:484:ARG:HE	2.23	0.42
1:2:473:ARG:CD	1:2:504:MSE:HE1	2.44	0.42
1:1:85:GLN:HE21	1:1:85:GLN:CA	2.30	0.42
1:2:152:TYR:CE2	1:2:174:GLN:HA	2.55	0.42
1:2:168:THR:CG2	1:2:169:ASN:N	2.83	0.42
1:2:273:LYS:HE2	1:2:363:THR:CG2	2.49	0.42
1:2:368:ASP:HB2	1:2:371:GLN:HG3	2.01	0.42
1:1:426:LEU:HD22	1:1:426:LEU:HA	1.89	0.42
1:2:37:GLN:O	1:2:40:PHE:HD1	2.03	0.41
1:2:430:GLN:O	1:2:444:VAL:CG2	2.68	0.41
1:1:505:THR:O	1:1:509:GLU:HG2	2.20	0.41
1:2:180:MSE:HE2	1:2:184:LEU:CD2	2.49	0.41
1:2:342:VAL:O	1:2:342:VAL:HG23	2.20	0.41
1:1:38:GLU:HA	1:1:39:PRO:HA	1.80	0.41
1:1:46:VAL:HG12	1:1:47:GLU:N	2.35	0.41
1:1:219:PRO:HD2	1:2:308:ALA:O	2.20	0.41
1:1:326:LEU:HD13	1:1:349:THR:HB	2.01	0.41
1:2:61:PRO:HG2	1:2:124:TYR:CE1	2.56	0.41
1:1:266:VAL:HG12	1:1:366:ALA:O	2.20	0.41
1:1:272:GLY:O	1:1:273:LYS:C	2.59	0.41
1:1:363:THR:CG2	1:1:364:LEU:N	2.82	0.41
1:2:472:LYS:O	1:2:476:GLU:HG3	2.20	0.41
1:1:160:HIS:HB3	1:1:163:TYR:HB2	2.03	0.41
1:1:260:LYS:HB3	1:1:359:ALA:HB2	2.02	0.41
1:1:273:LYS:HD2	1:1:363:THR:HG23	2.03	0.41
1:2:14:ARG:O	1:2:15:SER:CB	2.68	0.41
1:2:35:TRP:CG	1:2:38:GLU:HB3	2.55	0.41
1:2:239:LEU:CD2	1:2:244:THR:HG21	2.50	0.41
1:2:467:GLU:O	1:2:470:SER:HB3	2.20	0.41
1:1:37:GLN:HG2	1:1:140:GLU:HG2	2.03	0.41
1:2:333:ARG:N	1:2:334:PRO:CD	2.84	0.41
1:2:398:THR:HG22	1:2:411:LYS:HB2	2.02	0.41
1:1:198:ILE:HG12	1:1:212:THR:HG22	2.03	0.41
1:2:489:VAL:O	1:2:493:ILE:HG13	2.21	0.41
1:1:179:ARG:HG3	1:1:180:MSE:N	2.36	0.41
1:1:391:LEU:HD21	1:1:393:ILE:O	2.21	0.41
1:1:398:THR:CG2	1:1:399:MSE:N	2.77	0.41
1:2:9:LEU:C	1:2:9:LEU:CD2	2.89	0.41
1:2:498:ARG:CG	1:2:498:ARG:NH1	2.83	0.41
1:1:39:PRO:HD2	1:1:40:PHE:CE1	2.55	0.41
1:1:350:LEU:HG	1:1:354:MSE:HE3	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2:180:MSE:HE1	1:2:183:ARG:HD2	2.03	0.41
1:1:266:VAL:HG13	1:1:366:ALA:HB3	2.03	0.40
1:1:290:VAL:HG13	1:1:306:TRP:HB2	2.04	0.40
1:1:404:ASN:O	1:1:404:ASN:ND2	2.55	0.40
1:2:293:ILE:CD1	1:2:326:LEU:HA	2.51	0.40
1:2:485:ASN:HB2	1:2:488:GLU:HG2	2.02	0.40
1:1:53:ARG:HH21	1:1:167:GLU:HB2	1.86	0.40
1:1:162:LYS:HE2	1:1:163:TYR:CZ	2.56	0.40
1:1:314:GLY:O	1:1:315:MSE:C	2.60	0.40
1:2:209:LEU:HD22	1:2:210:GLN:N	2.36	0.40
1:1:478:MSE:HG2	1:1:507:MSE:CE	2.51	0.40
1:1:463:GLU:O	1:1:466:ASP:HB3	2.21	0.40
1:2:14:ARG:HD2	1:2:118:TYR:CD1	2.57	0.40
1:2:27:GLY:O	1:2:48:ASN:HA	2.21	0.40
1:2:139:MSE:HE1	1:2:226:ILE:HG21	2.03	0.40
1:2:172:LEU:HA	1:2:176:LYS:HE2	2.04	0.40
1:1:454:ALA:HB1	1:1:459:VAL:O	2.22	0.40
1:2:409:ARG:HG2	1:2:409:ARG:NH1	2.36	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	1	494/511 (97%)	417 (84%)	58 (12%)	19 (4%)	3	15
1	2	499/511 (98%)	442 (89%)	48 (10%)	9 (2%)	8	33
All	All	993/1022 (97%)	859 (86%)	106 (11%)	28 (3%)	5	22

All (28) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	1	11	ARG
1	1	52	PHE
1	1	68	ALA
1	2	13	ILE
1	1	20	GLU
1	1	120	ARG
1	1	305	ASN
1	1	329	ALA
1	1	405	THR
1	1	425	ASN
1	1	510	GLY
1	2	104	LYS
1	1	49	GLU
1	1	174	GLN
1	1	273	LYS
1	2	10	ARG
1	2	15	SER
1	2	55	VAL
1	2	345	ARG
1	2	437	LYS
1	1	19	LEU
1	1	48	ASN
1	1	345	ARG
1	1	50	ASP
1	1	422	VAL
1	2	52	PHE
1	2	341	GLU
1	1	220	ARG

### 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	1	406/439 (92%)	374 (92%)	32 (8%)	12	37
1	2	444/439 (101%)	409 (92%)	35 (8%)	12	37
All	All	850/878 (97%)	783 (92%)	67 (8%)	12	37

All (67) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	1	13	ILE
1	1	39	PRO
1	1	40	PHE
1	1	47	GLU
1	1	50	ASP
1	1	51	GLU
1	1	130	PHE
1	1	134	LEU
1	1	161	GLN
1	1	228	LYS
1	1	234	LEU
1	1	235	THR
1	1	268	GLU
1	1	277	LEU
1	1	290	VAL
1	1	295	ASP
1	1	311	THR
1	1	326	LEU
1	1	385	ARG
1	1	397	GLN
1	1	404	ASN
1	1	406	ARG
1	1	408	ARG
1	1	409	ARG
1	1	424	LYS
1	1	425	ASN
1	1	426	LEU
1	1	456	PHE
1	1	479	LEU
1	1	484	ARG
1	1	501	GLU
1	1	504	MSE
1	2	11	ARG
1	2	14	ARG
1	2	18	LEU
1	2	20	GLU
1	2	37	GLN
1	2	40	PHE
1	2	55	VAL
1	2	84	LEU
1	2	120	ARG
1	2	165	ASN

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Mol	Chain	Res	Type
1	2	168	THR
1	2	177	LEU
1	2	183	ARG
1	2	209	LEU
1	2	216	GLU
1	2	232	GLU
1	2	250	LEU
1	2	257	ILE
1	2	265	VAL
1	2	268	GLU
1	2	269	THR
1	2	297	ARG
1	2	300	LYS
1	2	309	GLU
1	2	311	THR
1	2	319	GLU
1	2	326	LEU
1	2	350	LEU
1	2	409	ARG
1	2	424	LYS
1	2	444	VAL
1	2	467	GLU
1	2	497	TYR
1	2	502	LEU
1	2	504	MSE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	1	85	GLN
1	1	161	GLN
1	1	278	ASN
1	1	303	HIS
1	1	397	GLN
1	1	404	ASN
1	1	485	ASN
1	2	48	ASN
1	2	54	ASN
1	2	116	ASN
1	2	143	ASN
1	2	210	GLN
1	2	278	ASN

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Mol	Chain	Res	Type
1	2	303	HIS
1	2	352	GLN
1	2	365	HIS
1	2	370	ASN
1	2	371	GLN
1	2	389	GLN
1	2	397	GLN
1	2	414	ASN
1	2	425	ASN
1	2	429	ASN
1	2	441	HIS
1	2	485	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 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 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
2	ANP	1	512	-	29,33,33	1.46	4 (13%)	31,52,52	1.54	4 (12%)
2	ANP	2	513	3	29,33,33	1.54	6 (20%)	31,52,52	1.57	6 (19%)

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	ANP	1	512	-	-	8/14/38/38	0/3/3/3
2	ANP	2	513	3	-	5/14/38/38	0/3/3/3

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	1	512	ANP	PG-O1G	4.42	1.53	1.46
2	2	513	ANP	PG-O1G	4.41	1.53	1.46
2	1	512	ANP	PB-O3A	3.52	1.63	1.59
2	2	513	ANP	PB-O1B	3.18	1.51	1.46
2	1	512	ANP	PB-O2B	-3.04	1.48	1.56
2	2	513	ANP	PB-O2B	-2.58	1.49	1.56
2	2	513	ANP	PG-O2G	-2.47	1.50	1.56
2	2	513	ANP	C2-N3	2.41	1.36	1.32
2	1	512	ANP	C2-N3	2.36	1.35	1.32
2	2	513	ANP	C8-N7	-2.09	1.31	1.34

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	2	513	ANP	O2B-PB-O1B	4.65	119.67	109.92
2	1	512	ANP	O1G-PG-N3B	-4.36	105.35	111.77
2	1	512	ANP	O2B-PB-O1B	3.96	118.23	109.92
2	2	513	ANP	O1G-PG-N3B	-3.62	106.44	111.77
2	2	513	ANP	O4'-C4'-C5'	-2.82	100.09	109.37
2	2	513	ANP	O1B-PB-N3B	-2.30	108.38	111.77
2	1	512	ANP	O4'-C4'-C5'	-2.24	102.00	109.37
2	1	512	ANP	C5-C6-N6	2.13	123.59	120.35
2	2	513	ANP	O2B-PB-O3A	2.07	111.56	104.64
2	2	513	ANP	O2G-PG-O3G	2.00	112.97	107.64

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	1	512	ANP	PB-N3B-PG-O1G
2	1	512	ANP	PG-N3B-PB-O1B

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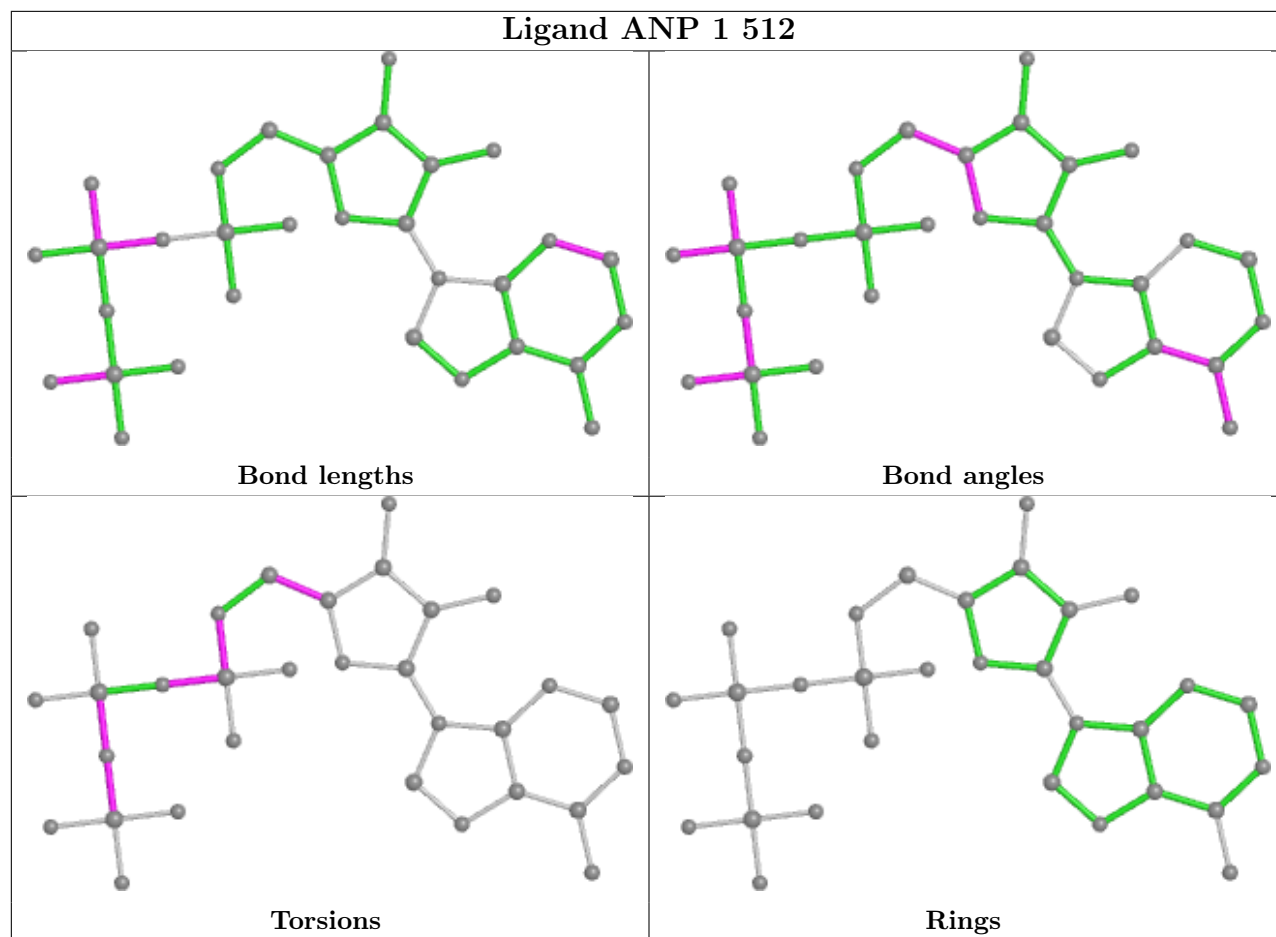
Mol	Chain	Res	Type	Atoms
2	1	512	ANP	C5'-O5'-PA-O1A
2	1	512	ANP	O4'-C4'-C5'-O5'
2	2	513	ANP	PB-N3B-PG-O1G
2	2	513	ANP	O4'-C4'-C5'-O5'
2	1	512	ANP	C3'-C4'-C5'-O5'
2	2	513	ANP	C3'-C4'-C5'-O5'
2	1	512	ANP	PB-O3A-PA-O1A
2	1	512	ANP	C5'-O5'-PA-O3A
2	1	512	ANP	C5'-O5'-PA-O2A
2	2	513	ANP	PB-O3A-PA-O1A
2	2	513	ANP	C5'-O5'-PA-O1A

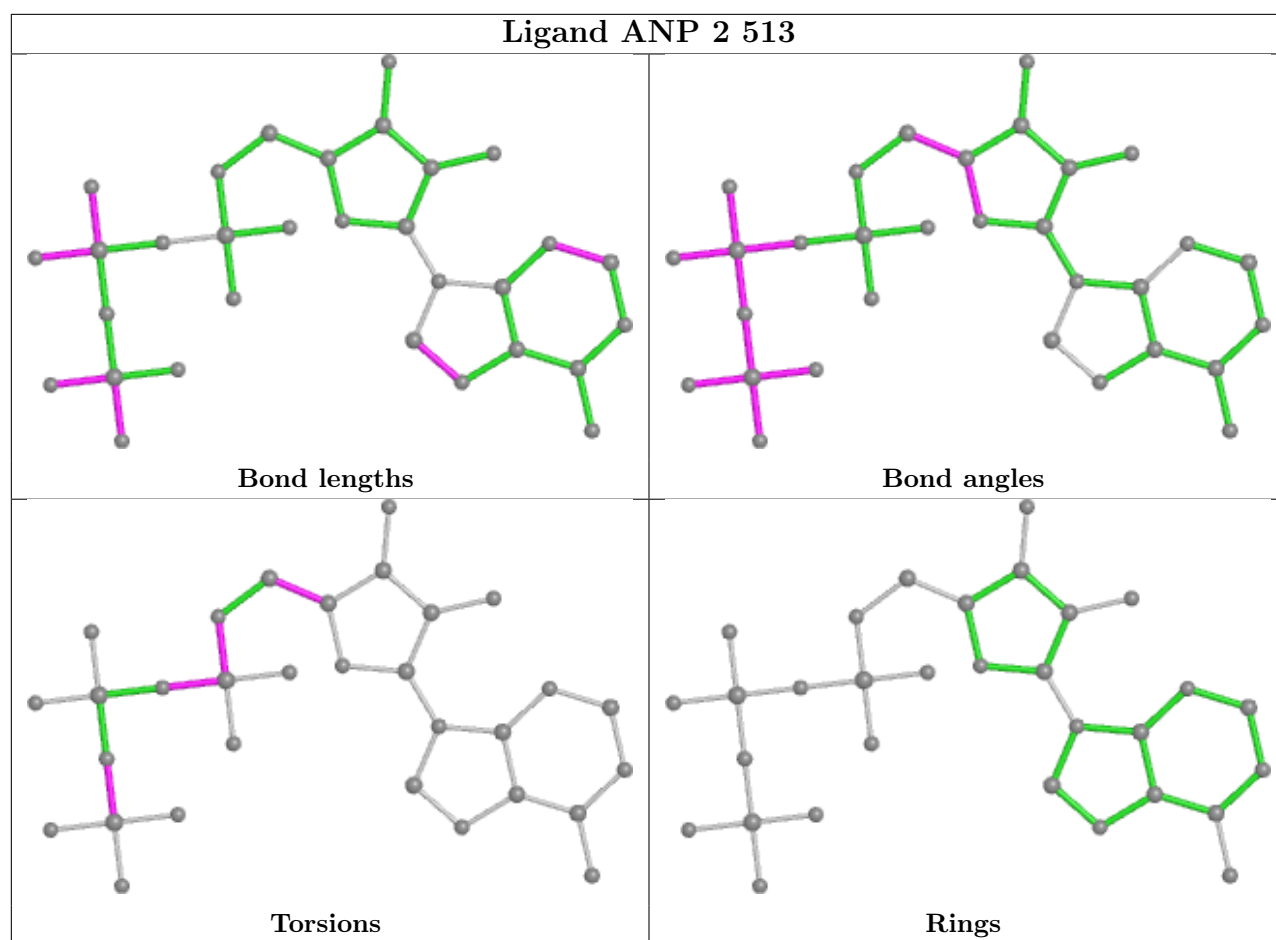
There are no ring outliers.

2 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	1	512	ANP	3	0
2	2	513	ANP	4	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

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	1	481/511 (94%)	0.29	33 (6%) 16 10	15, 49, 107, 123	0
1	2	487/511 (95%)	0.14	12 (2%) 57 40	23, 47, 84, 96	0
All	All	968/1022 (94%)	0.21	45 (4%) 32 20	15, 48, 100, 123	0

All (45) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	1	12	HIS	4.9
1	1	82	LEU	4.9
1	1	511	LEU	4.9
1	2	511	LEU	4.6
1	1	78	LEU	4.6
1	1	39	PRO	4.5
1	1	119	SER	4.0
1	2	113	PHE	3.9
1	1	130	PHE	3.8
1	1	129	PHE	3.8
1	1	422	VAL	3.7
1	1	40	PHE	3.7
1	1	63	VAL	3.6
1	2	119	SER	3.6
1	1	83	VAL	3.5
1	1	126	PHE	3.4
1	1	13	ILE	3.3
1	2	111	VAL	2.9
1	1	120	ARG	2.9
1	1	59	LEU	2.8
1	1	61	PRO	2.8
1	1	10	ARG	2.8
1	1	52	PHE	2.7
1	1	77	ASP	2.7

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Mol	Chain	Res	Type	RSRZ
1	1	22	PRO	2.7
1	1	179	ARG	2.6
1	1	421	PRO	2.6
1	2	78	LEU	2.5
1	2	13	ILE	2.5
1	2	423	ASP	2.4
1	1	28	SER	2.4
1	2	75	TYR	2.3
1	2	112	SER	2.2
1	1	57	TYR	2.2
1	1	24	PHE	2.1
1	1	18	LEU	2.1
1	1	86	ASP	2.1
1	2	63	VAL	2.1
1	2	502	LEU	2.1
1	1	11	ARG	2.1
1	1	118	TYR	2.1
1	2	88	SER	2.1
1	1	182	LEU	2.0
1	1	194	ILE	2.0
1	1	62	THR	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<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
3	MG	2	512	1/1	0.64	0.37	27,27,27,27	0
2	ANP	1	512	31/31	0.94	0.23	34,39,45,46	0

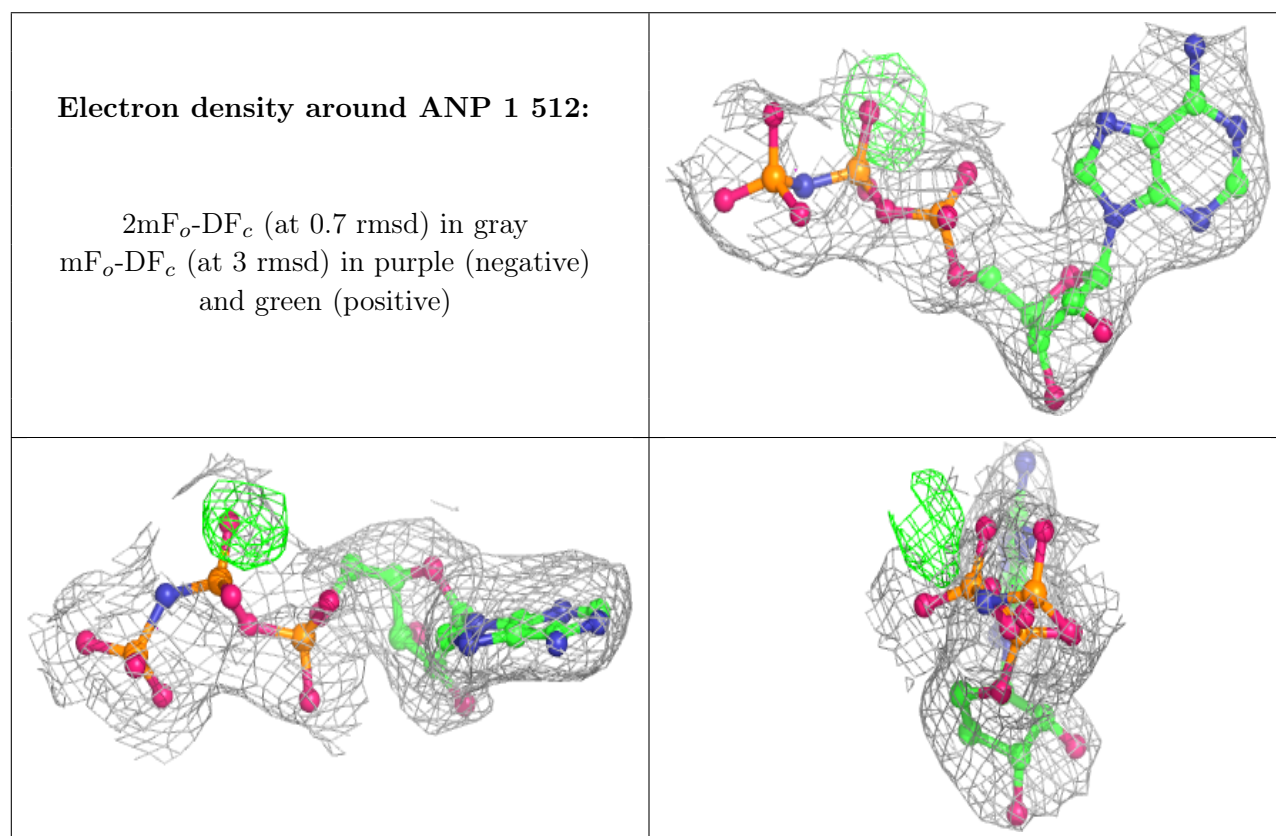
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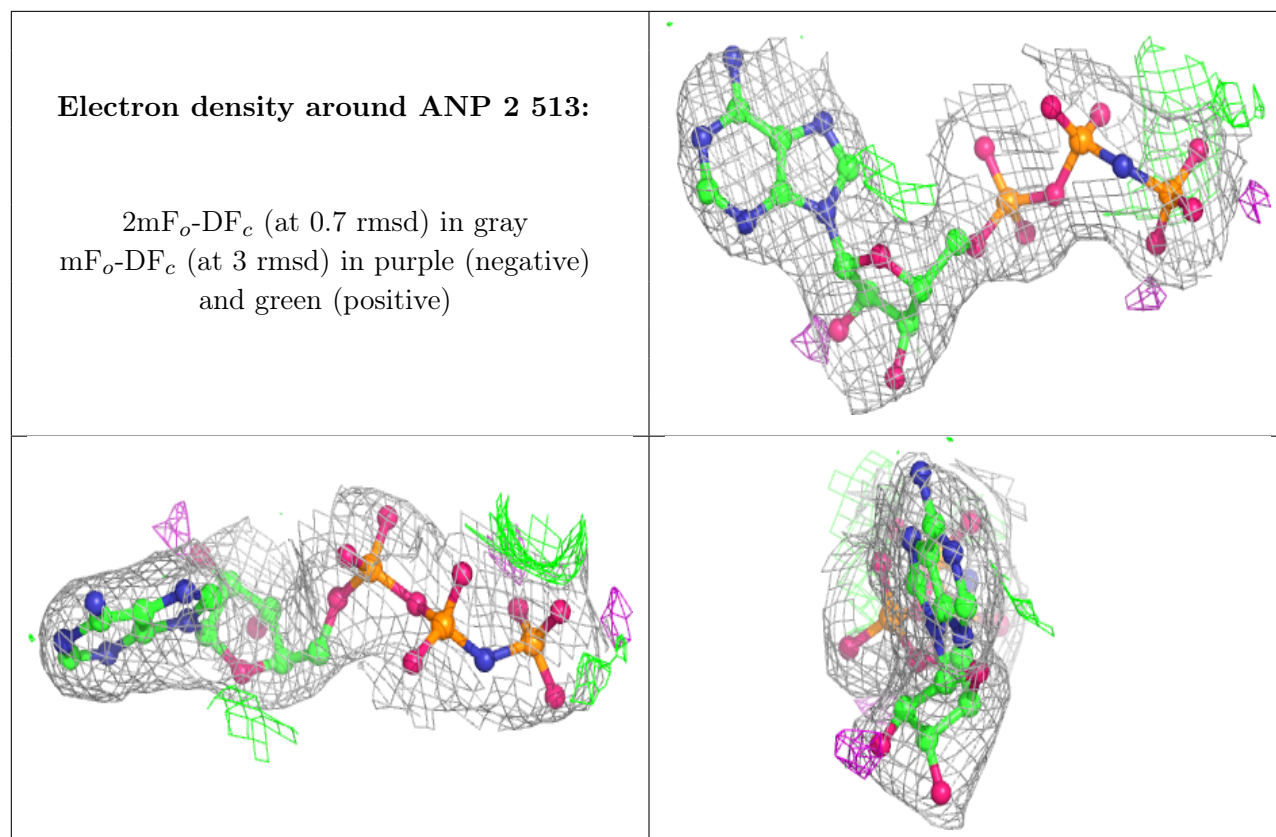


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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	ANP	2	513	31/31	0.96	0.20	33,39,45,47	0

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.





## 6.5 Other polymers [i](#)

There are no such residues in this entry.