



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 13, 2023 – 01:19 PM JST

PDB ID : 5X9U  
Title : Crystal structure of group III chaperonin in the open state  
Authors : An, Y.J.; Cha, S.S.  
Deposited on : 2017-03-09  
Resolution : 4.00 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

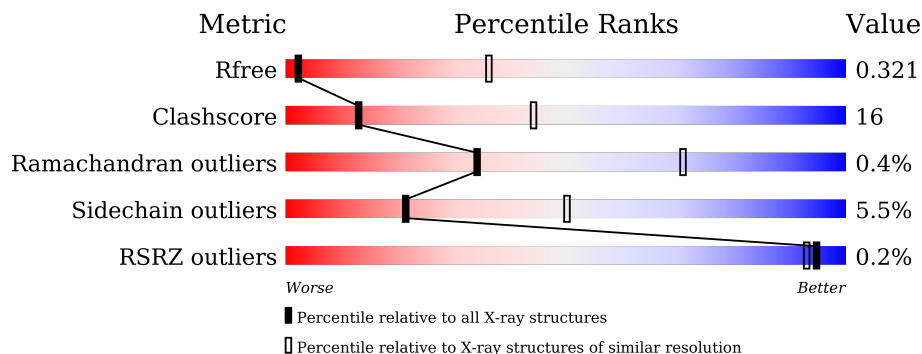
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 4.00 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	1087 (4.30-3.70)
Clashscore	141614	1148 (4.30-3.70)
Ramachandran outliers	138981	1108 (4.30-3.70)
Sidechain outliers	138945	1099 (4.30-3.70)
RSRZ outliers	127900	1028 (4.34-3.66)

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	A	521	 68% 26% • 5%
1	B	521	 62% 31% • 5%
1	C	521	 63% 30% • 5%
1	D	521	 58% 33% • 5%

## 2 Entry composition [i](#)

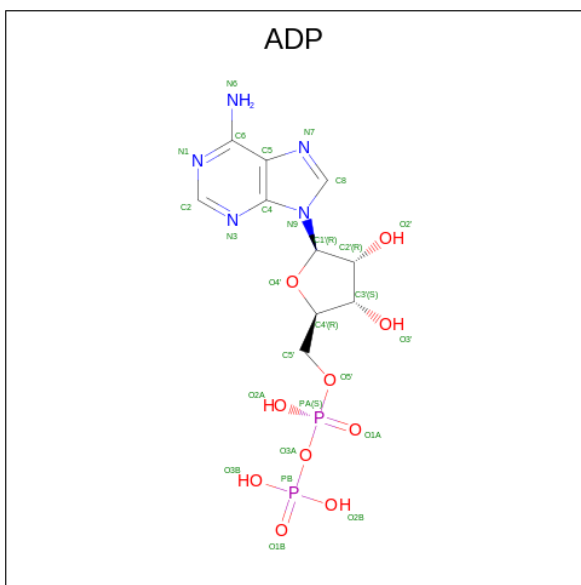
There are 2 unique types of molecules in this entry. The entry contains 14773 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Thermosome, alpha subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	494	Total	C	N	O	S	0	0	0
			3673	2334	623	701	15			
1	B	494	Total	C	N	O	S	0	0	0
			3665	2330	620	700	15			
1	C	494	Total	C	N	O	S	0	0	0
			3665	2330	620	700	15			
1	D	494	Total	C	N	O	S	0	0	0
			3662	2329	620	698	15			

- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula:  $C_{10}H_{15}N_5O_{10}P_2$ ).



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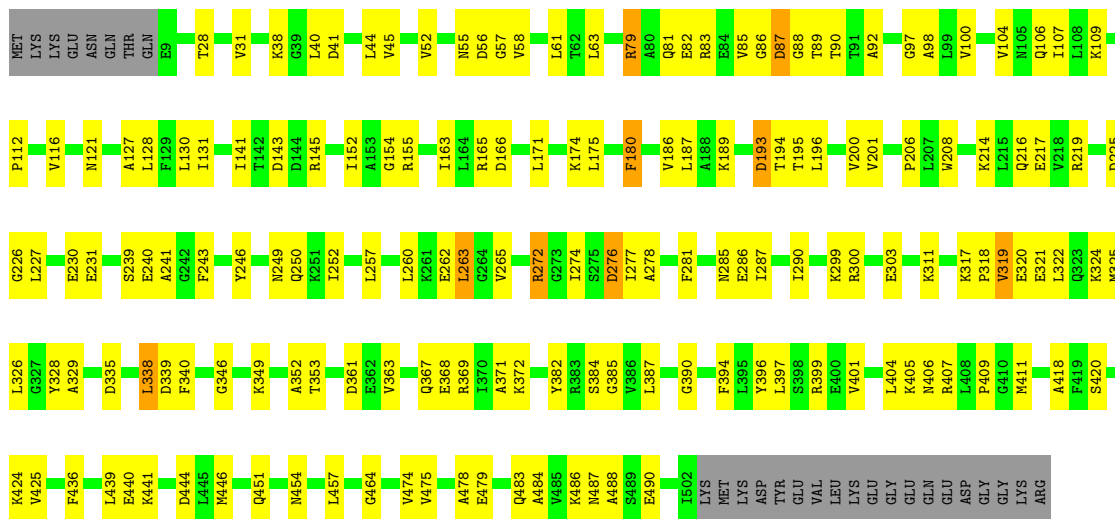
<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>					<b>ZeroOcc</b>	<b>AltConf</b>
2	C	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	D	1	Total	C	N	O	P	0	0
			27	10	5	10	2		



GLN  
GLU  
ASP  
GLY  
GLY  
LYS  
LYS  
ARG

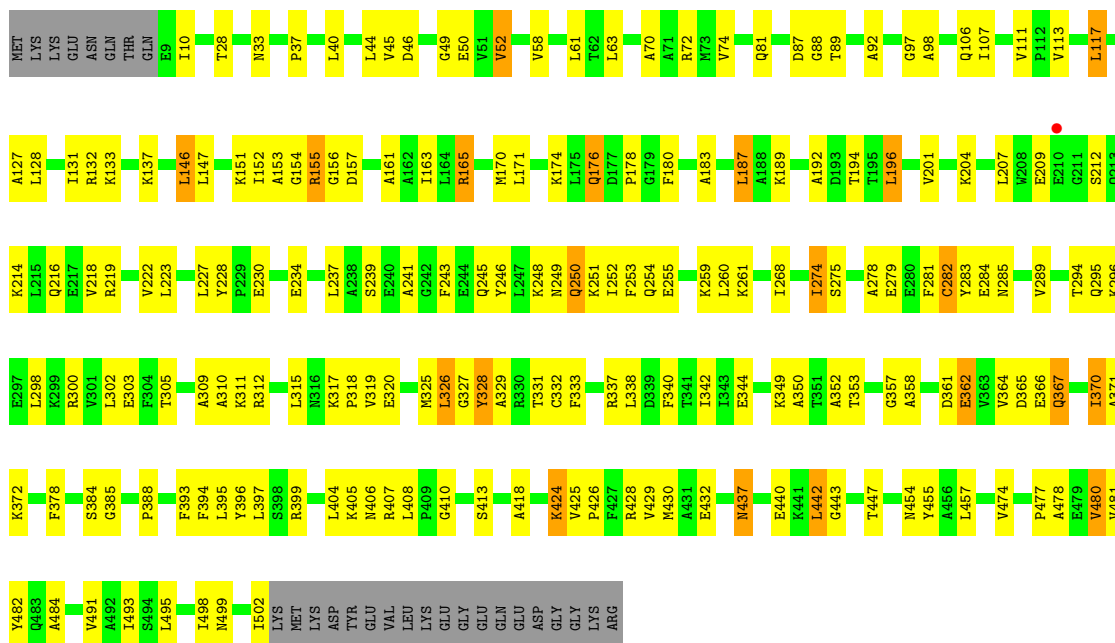
• Molecule 1: Thermosome, alpha subunit

Chain C: 63% 30% 5%



• Molecule 1: Thermosome, alpha subunit

Chain D: 58% 33% 5%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 4 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	209.78Å 209.78Å 169.81Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.45 – 4.00 49.45 – 4.00	Depositor EDS
% Data completeness (in resolution range)	99.7 (49.45-4.00) 99.7 (49.45-4.00)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.36 (at 4.00Å)	Xtrriage
Refinement program	PHENIX 1.9_1692	Depositor
R, $R_{free}$	0.253 , 0.321 0.257 , 0.321	Depositor DCC
$R_{free}$ test set	1647 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	132.9	Xtrriage
Anisotropy	0.417	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.26 , 62.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.41$ , $\langle L^2 \rangle = 0.23$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	14773	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	131.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.34% 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: ADP

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	0.28	0/3716	0.51	0/5029
1	B	0.29	0/3708	0.53	1/5019 (0.0%)
1	C	0.29	0/3708	0.52	0/5019
1	D	0.28	0/3705	0.54	0/5015
All	All	0.28	0/14837	0.53	1/20082 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	207	LEU	CA-CB-CG	5.94	128.97	115.30

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	A	3673	0	3735	100	0
1	B	3665	0	3719	140	2
1	C	3665	0	3719	125	0
1	D	3662	0	3717	142	2
2	A	27	0	12	2	0
2	B	27	0	12	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	27	0	12	4	0
2	D	27	0	12	3	0
All	All	14773	0	14938	488	2

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 16.

All (488) 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:189:LYS:NZ	1:C:339:ASP:O	1.99	0.94
1:D:358:ALA:HB2	1:D:367:GLN:HE22	1.39	0.87
1:B:308:ARG:HB3	1:B:325:MET:HG3	1.57	0.86
1:D:227:LEU:HD12	1:D:312:ARG:HH12	1.39	0.86
1:A:329:ALA:H	1:A:346:GLY:HA2	1.41	0.85
1:A:138:VAL:HG21	1:A:146:LEU:HD21	1.58	0.84
1:A:194:THR:HG22	1:A:357:GLY:H	1.42	0.83
1:C:399:ARG:HH21	1:C:446:MET:HG3	1.44	0.83
1:C:394:PHE:HA	1:C:397:LEU:HD12	1.60	0.83
1:C:272:ARG:HB3	1:C:272:ARG:HH11	1.43	0.83
1:A:406:ASN:HA	1:D:447:THR:HG22	1.60	0.82
1:C:28:THR:HG21	1:C:97:GLY:HA3	1.58	0.82
1:B:447:THR:HG22	1:C:406:ASN:HA	1.63	0.81
1:A:28:THR:HG21	1:A:97:GLY:HA3	1.64	0.79
1:D:437:ASN:ND2	1:D:440:GLU:OE1	2.15	0.79
1:B:189:LYS:HG2	1:B:203:ASN:HD22	1.49	0.78
1:D:300:ARG:NH2	1:D:352:ALA:O	2.17	0.78
1:B:329:ALA:H	1:B:346:GLY:HA2	1.49	0.76
1:D:328:TYR:HA	1:D:329:ALA:HB3	1.68	0.75
1:A:189:LYS:HZ2	1:A:340:PHE:HD2	1.31	0.75
1:C:44:LEU:HD22	1:C:63:LEU:HB3	1.70	0.74
1:D:253:PHE:HZ	1:D:278:ALA:HB2	1.53	0.74
1:A:54:THR:HG21	1:A:59:THR:HB	1.70	0.73
1:C:317:LYS:NZ	1:C:322:LEU:HA	2.03	0.73
1:B:28:THR:HG21	1:B:97:GLY:HA3	1.71	0.72
1:D:44:LEU:HB2	1:D:52:VAL:HG13	1.72	0.72
1:B:119:GLY:HA3	1:B:412:GLU:CD	2.10	0.72
1:A:58:VAL:HA	1:A:61:LEU:HD12	1.72	0.71
1:B:317:LYS:NZ	1:B:325:MET:SD	2.63	0.71
1:A:231:GLU:OE2	1:A:312:ARG:NH1	2.21	0.70
1:B:187:LEU:O	1:B:189:LYS:NZ	2.18	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:454:ASN:HD21	1:B:457:LEU:HG	1.56	0.70
1:B:424:LYS:HZ3	1:B:442:LEU:HB2	1.55	0.69
1:D:317:LYS:NZ	1:D:325:MET:HG3	2.07	0.69
1:A:183:ALA:HB1	1:A:372:LYS:HD2	1.75	0.68
1:B:424:LYS:NZ	1:B:442:LEU:HB2	2.09	0.68
1:C:328:TYR:HA	1:C:329:ALA:HB3	1.76	0.68
1:C:85:VAL:HG12	1:C:87:ASP:H	1.58	0.67
1:D:251:LYS:HE3	1:D:255:GLU:OE2	1.94	0.67
1:C:107:ILE:HG12	1:C:116:VAL:HG21	1.76	0.67
1:B:263:LEU:HD11	1:B:322:LEU:HD22	1.75	0.67
1:B:441:LYS:HZ2	1:B:459:LEU:HD22	1.58	0.67
1:D:317:LYS:HZ3	1:D:325:MET:HG3	1.58	0.67
1:D:216:GLN:HG2	1:D:331:THR:HG22	1.75	0.67
1:C:88:GLY:N	2:C:601:ADP:O1B	2.24	0.67
1:A:318:PRO:O	1:A:320:GLU:N	2.25	0.66
1:B:57:GLY:HA3	1:B:90:THR:HG22	1.76	0.66
1:B:106:GLN:HE22	1:B:415:GLY:HA2	1.61	0.66
1:D:281:PHE:O	1:D:285:ASN:ND2	2.29	0.66
1:B:98:ALA:HB1	1:B:425:VAL:HG21	1.79	0.65
1:D:300:ARG:NH2	1:D:353:THR:OG1	2.28	0.65
1:B:328:TYR:HA	1:B:329:ALA:HB3	1.77	0.65
1:D:259:LYS:NZ	1:D:315:LEU:O	2.22	0.65
1:C:390:GLY:N	2:C:601:ADP:O2'	2.26	0.65
1:A:281:PHE:O	1:A:285:ASN:ND2	2.29	0.65
1:B:424:LYS:HZ3	1:B:442:LEU:HD13	1.62	0.65
1:A:328:TYR:HA	1:A:329:ALA:HB3	1.77	0.64
1:B:174:LYS:HZ2	1:B:350:ALA:H	1.44	0.64
1:D:384:SER:HB3	1:D:478:ALA:HB3	1.80	0.64
1:D:147:LEU:HG	1:D:161:ALA:HB1	1.80	0.64
1:A:57:GLY:HA3	1:A:90:THR:HG22	1.80	0.64
1:C:385:GLY:O	1:C:478:ALA:N	2.29	0.64
1:B:24:VAL:HG11	1:B:100:VAL:HG21	1.80	0.64
1:B:208:TRP:HZ2	1:B:283:TYR:HA	1.63	0.63
1:B:229:PRO:HD3	1:B:275:SER:HB2	1.80	0.63
1:D:274:ILE:HD11	1:D:289:VAL:HG11	1.79	0.63
1:D:227:LEU:HD12	1:D:312:ARG:NH1	2.13	0.63
1:B:317:LYS:HD2	1:B:321:GLU:HB3	1.81	0.62
1:C:130:LEU:HD21	1:C:397:LEU:HD23	1.81	0.62
1:D:303:GLU:OE2	1:D:349:LYS:HB3	1.99	0.62
1:B:259:LYS:NZ	1:B:319:VAL:HG22	2.14	0.62
1:D:194:THR:HG22	1:D:357:GLY:H	1.64	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:394:PHE:HA	1:A:397:LEU:HD12	1.82	0.62
1:B:259:LYS:HB3	1:B:259:LYS:HZ2	1.63	0.62
1:D:364:VAL:HA	1:D:367:GLN:NE2	2.15	0.62
1:A:151:LYS:HZ3	1:A:158:GLU:HA	1.63	0.61
1:C:175:LEU:HD23	1:C:180:PHE:HE2	1.65	0.61
1:D:28:THR:HG21	1:D:97:GLY:HA3	1.82	0.61
1:B:201:VAL:HG22	1:B:353:THR:HG21	1.82	0.61
1:D:227:LEU:CD1	1:D:312:ARG:HH12	2.10	0.61
1:B:369:ARG:HA	1:B:372:LYS:HE3	1.82	0.61
1:D:305:THR:HG22	1:D:329:ALA:HB2	1.83	0.60
1:C:231:GLU:N	1:C:231:GLU:OE1	2.34	0.60
1:C:226:GLY:HA3	1:C:272:ARG:HH11	1.67	0.60
1:C:226:GLY:HA3	1:C:272:ARG:NH1	2.17	0.60
1:D:58:VAL:HA	1:D:61:LEU:HD12	1.83	0.60
1:D:207:LEU:HD21	1:D:279:GLU:HG3	1.84	0.60
1:D:318:PRO:O	1:D:320:GLU:N	2.34	0.60
1:B:174:LYS:NZ	1:B:350:ALA:H	2.00	0.59
1:B:189:LYS:HG2	1:B:203:ASN:ND2	2.16	0.59
1:C:174:LYS:NZ	1:C:349:LYS:HD3	2.18	0.59
1:C:206:PRO:HA	1:C:290:ILE:HG12	1.85	0.59
1:C:317:LYS:HZ3	1:C:322:LEU:HA	1.68	0.59
1:B:424:LYS:HD3	1:B:442:LEU:HD13	1.85	0.59
1:A:183:ALA:O	1:A:372:LYS:NZ	2.26	0.59
1:C:285:ASN:O	1:C:286:GLU:HG2	2.03	0.59
1:A:222:VAL:HG21	1:A:302:LEU:HD13	1.85	0.58
1:B:365:ASP:O	1:B:369:ARG:HG3	2.03	0.58
1:B:388:PRO:HG2	1:B:393:PHE:HB2	1.85	0.58
1:C:98:ALA:HB1	1:C:425:VAL:HG21	1.86	0.58
1:B:281:PHE:O	1:B:285:ASN:ND2	2.36	0.58
1:A:256:ASN:HA	1:A:259:LYS:HD3	1.86	0.58
1:A:429:VAL:HG12	1:A:433:ASN:HD21	1.69	0.58
1:D:44:LEU:HB3	1:D:63:LEU:HD12	1.86	0.58
1:A:294:THR:HB	1:A:297:GLU:H	1.68	0.57
1:C:58:VAL:HA	1:C:61:LEU:HD12	1.86	0.57
1:B:142:THR:O	1:B:165:ARG:NH2	2.38	0.57
1:B:394:PHE:HA	1:B:397:LEU:HD12	1.85	0.57
1:A:409:PRO:HA	1:D:447:THR:HG21	1.86	0.57
1:D:222:VAL:HG21	1:D:302:LEU:HD23	1.86	0.57
1:A:249:ASN:HA	1:A:252:ILE:HG12	1.87	0.57
1:B:186:VAL:HG22	1:B:354:VAL:HB	1.87	0.57
1:A:151:LYS:HD3	1:A:161:ALA:HB2	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:424:LYS:HZ1	1:D:428:ARG:HD2	1.69	0.57
1:C:214:LYS:NZ	1:C:216:GLN:HG2	2.19	0.57
1:B:28:THR:HA	1:B:31:VAL:HG22	1.85	0.56
1:D:437:ASN:OD1	1:D:437:ASN:N	2.26	0.56
1:C:152:ILE:HD11	1:C:474:VAL:HA	1.87	0.56
1:D:384:SER:HB3	1:D:385:GLY:HA3	1.86	0.56
1:C:128:LEU:HA	1:C:131:ILE:HD12	1.86	0.56
1:D:163:ILE:HG23	1:D:196:LEU:HB3	1.88	0.56
1:D:426:PRO:O	1:D:429:VAL:HG22	2.06	0.56
1:C:317:LYS:HZ1	1:C:322:LEU:HA	1.70	0.55
1:D:250:GLN:O	1:D:254:GLN:HG2	2.05	0.55
1:D:261:LYS:HB2	1:D:281:PHE:HZ	1.71	0.55
1:B:138:VAL:HG21	1:B:146:LEU:HD21	1.88	0.55
1:B:424:LYS:HZ3	1:B:442:LEU:CB	2.19	0.55
1:A:81:GLN:HG2	1:A:89:THR:HA	1.89	0.55
1:B:216:GLN:HG3	1:B:331:THR:HG23	1.87	0.55
1:D:37:PRO:HD3	2:D:601:ADP:C8	2.42	0.55
1:B:58:VAL:HA	1:B:61:LEU:HD12	1.88	0.55
1:C:329:ALA:H	1:C:346:GLY:HA2	1.71	0.55
1:A:368:GLU:O	1:A:372:LYS:HG2	2.07	0.55
1:B:144:ASP:HA	1:B:147:LEU:HD23	1.88	0.55
1:D:227:LEU:HA	1:D:312:ARG:NH1	2.21	0.55
1:C:300:ARG:NH2	1:C:352:ALA:O	2.40	0.55
1:C:440:GLU:HG3	1:C:441:LYS:HD3	1.87	0.55
1:A:106:GLN:O	1:A:111:VAL:HG22	2.06	0.54
1:C:390:GLY:H	2:C:601:ADP:HO2'	1.55	0.54
1:D:312:ARG:NH1	1:D:312:ARG:HG2	2.22	0.54
1:B:230:GLU:N	1:B:249:ASN:HD21	2.06	0.54
1:D:410:GLY:O	1:D:413:SER:OG	2.14	0.54
1:B:456:ALA:O	1:B:469:MET:HG2	2.08	0.54
1:C:201:VAL:HG22	1:C:353:THR:HG21	1.89	0.54
1:C:249:ASN:HA	1:C:252:ILE:HG12	1.89	0.54
1:C:195:THR:OG1	1:C:196:LEU:N	2.40	0.54
1:D:201:VAL:HG22	1:D:353:THR:HG21	1.88	0.54
1:A:189:LYS:NZ	1:A:339:ASP:O	2.40	0.54
1:B:239:SER:O	1:B:241:ALA:N	2.35	0.54
1:D:128:LEU:HD22	1:D:482:TYR:HE1	1.73	0.53
1:D:394:PHE:HA	1:D:397:LEU:HD12	1.90	0.53
1:C:141:ILE:HG12	1:C:382:TYR:HE1	1.73	0.53
1:C:219:ARG:NH1	1:C:263:LEU:HD22	2.24	0.53
1:D:151:LYS:O	1:D:156:GLY:N	2.41	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:202:ILE:HG22	1:B:204:LYS:HD2	1.90	0.53
1:C:81:GLN:HG2	1:C:89:THR:HA	1.91	0.53
1:B:225:ASP:OD2	1:B:312:ARG:HG2	2.09	0.53
1:C:106:GLN:HG3	1:C:418:ALA:HB2	1.90	0.53
1:D:223:LEU:HG	1:D:311:LYS:HA	1.90	0.53
1:A:176:GLN:HG3	1:A:383:ARG:NH2	2.24	0.53
1:B:402:GLU:HG3	1:B:420:SER:OG	2.09	0.53
1:B:112:PRO:O	1:B:116:VAL:HG23	2.09	0.52
1:A:225:ASP:OD2	1:A:312:ARG:HG3	2.10	0.52
1:B:454:ASN:ND2	1:B:457:LEU:HG	2.23	0.52
1:D:92:ALA:HB2	1:D:484:ALA:HB1	1.91	0.52
1:C:300:ARG:NH2	1:C:353:THR:OG1	2.40	0.52
1:A:243:PHE:O	1:A:246:TYR:HB3	2.09	0.52
1:C:131:ILE:HG23	1:C:387:LEU:HD11	1.91	0.52
1:B:412:GLU:OE2	1:B:416:VAL:HG23	2.09	0.52
1:B:322:LEU:O	1:B:326:LEU:HG	2.10	0.52
1:C:262:GLU:HG2	1:C:319:VAL:HG11	1.92	0.52
1:D:117:LEU:HD11	1:D:493:ILE:HG23	1.91	0.52
1:A:195:THR:OG1	1:A:196:LEU:N	2.42	0.52
1:D:424:LYS:NZ	1:D:442:LEU:HG	2.25	0.52
1:A:85:VAL:HG12	1:A:87:ASP:H	1.75	0.51
1:D:147:LEU:HD12	1:D:165:ARG:HD3	1.91	0.51
1:C:127:ALA:O	1:C:131:ILE:HG13	2.11	0.51
1:D:81:GLN:OE1	1:D:89:THR:HA	2.10	0.51
1:C:44:LEU:HG	1:C:45:VAL:N	2.25	0.51
1:C:384:SER:OG	1:C:479:GLU:HB2	2.11	0.51
1:D:189:LYS:HB2	1:D:192:ALA:HB2	1.93	0.51
1:A:402:GLU:OE2	1:D:405:LYS:NZ	2.43	0.51
1:A:390:GLY:N	2:A:601:ADP:O2'	2.26	0.51
1:B:259:LYS:NZ	1:B:259:LYS:HB3	2.26	0.51
1:C:321:GLU:HG3	1:C:324:LYS:HD2	1.93	0.51
1:D:154:GLY:O	1:D:155:ARG:HB2	2.11	0.51
1:A:153:ALA:HB1	1:A:373:ASP:HB3	1.93	0.51
1:B:37:PRO:HD3	2:B:601:ADP:C8	2.46	0.51
1:B:440:GLU:HA	1:C:411:MET:HG2	1.93	0.51
1:A:38:LYS:HD2	1:B:114:SER:HB3	1.92	0.50
1:A:186:VAL:HG22	1:A:354:VAL:HB	1.92	0.50
1:C:272:ARG:HB3	1:C:272:ARG:NH1	2.19	0.50
1:C:317:LYS:HE2	1:C:325:MET:HG3	1.92	0.50
1:A:370:ILE:HG13	1:A:371:ALA:N	2.27	0.50
1:B:128:LEU:HA	1:B:131:ILE:HD12	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:424:LYS:NZ	1:B:442:LEU:HD13	2.27	0.50
1:B:261:LYS:HG3	1:B:285:ASN:OD1	2.12	0.50
1:D:98:ALA:HB1	1:D:425:VAL:HG21	1.94	0.50
1:D:370:ILE:HG13	1:D:371:ALA:N	2.26	0.50
1:C:335:ASP:OD2	1:C:338:LEU:HB2	2.12	0.50
1:B:405:LYS:NZ	1:C:424:LYS:NZ	2.60	0.50
1:D:152:ILE:HG13	1:D:153:ALA:N	2.27	0.50
1:D:395:LEU:HD12	1:D:399:ARG:HE	1.77	0.50
1:B:81:GLN:OE1	1:B:89:THR:HA	2.12	0.49
1:B:171:LEU:HD11	1:B:350:ALA:O	2.12	0.49
1:B:230:GLU:O	1:B:249:ASN:ND2	2.45	0.49
1:B:414:TYR:CE2	1:C:439:LEU:HG	2.47	0.49
1:D:187:LEU:HD21	1:D:189:LYS:HE3	1.94	0.49
1:D:326:LEU:HD23	1:D:327:GLY:H	1.77	0.49
1:B:82:GLU:HB2	1:B:89:THR:HG21	1.94	0.49
1:A:261:LYS:HG3	1:A:281:PHE:HZ	1.76	0.49
1:C:163:ILE:HD12	1:C:194:THR:HG22	1.93	0.49
1:C:317:LYS:HD2	1:C:321:GLU:HB3	1.94	0.49
1:C:483:GLN:HA	1:C:486:LYS:HB3	1.93	0.49
1:A:445:LEU:HD21	1:A:458:GLY:HA2	1.95	0.49
1:D:46:ASP:O	1:D:49:GLY:N	2.45	0.49
1:C:186:VAL:HG21	1:C:371:ALA:HB1	1.95	0.49
1:D:428:ARG:HG2	1:D:432:GLU:OE2	2.12	0.49
1:C:174:LYS:HZ2	1:C:349:LYS:HD3	1.78	0.49
1:D:340:PHE:HE1	1:D:342:ILE:HD11	1.77	0.49
1:A:148:ALA:HA	1:A:151:LYS:HB2	1.95	0.49
1:C:483:GLN:O	1:C:487:ASN:ND2	2.46	0.49
1:A:28:THR:HA	1:A:31:VAL:HG22	1.95	0.49
1:A:112:PRO:O	1:A:116:VAL:HG23	2.13	0.49
1:B:175:LEU:HD21	1:B:182:LEU:HD22	1.94	0.49
1:B:204:LYS:NZ	1:B:297:GLU:OE1	2.46	0.49
1:C:260:LEU:HD22	1:C:265:VAL:HG21	1.95	0.49
1:B:111:VAL:HG22	1:C:439:LEU:CD2	2.43	0.48
1:B:208:TRP:CZ2	1:B:283:TYR:HA	2.44	0.48
1:B:424:LYS:HZ3	1:B:442:LEU:CD1	2.26	0.48
1:C:239:SER:O	1:C:241:ALA:N	2.42	0.48
1:C:440:GLU:O	1:C:444:ASP:HB2	2.13	0.48
1:D:170:MET:HG3	1:D:171:LEU:HG	1.94	0.48
1:A:98:ALA:HB1	1:A:425:VAL:HG21	1.94	0.48
1:A:131:ILE:HG23	1:A:387:LEU:HD11	1.96	0.48
1:B:187:LEU:HB3	1:B:189:LYS:HZ1	1.78	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:207:LEU:HD12	1:B:207:LEU:O	2.13	0.48
1:D:443:GLY:O	1:D:447:THR:HG23	2.14	0.48
1:A:151:LYS:NZ	1:A:157:ASP:O	2.47	0.48
1:A:429:VAL:HG12	1:A:433:ASN:ND2	2.28	0.48
1:A:127:ALA:O	1:A:131:ILE:HG13	2.14	0.48
1:B:253:PHE:CZ	1:B:278:ALA:HB2	2.49	0.48
1:B:284:GLU:HG2	1:B:285:ASN:ND2	2.29	0.48
1:A:152:ILE:HG13	1:A:153:ALA:N	2.27	0.48
1:A:483:GLN:HG3	1:A:486:LYS:HD3	1.96	0.48
1:A:474:VAL:HG11	2:A:601:ADP:C2	2.49	0.47
1:C:112:PRO:O	1:C:116:VAL:HG23	2.14	0.47
1:A:483:GLN:HA	1:A:486:LYS:HB3	1.97	0.47
1:D:146:LEU:HB3	1:D:378:PHE:CE1	2.49	0.47
1:D:318:PRO:C	1:D:320:GLU:H	2.17	0.47
1:A:285:ASN:O	1:A:286:GLU:HG2	2.15	0.47
1:B:85:VAL:HG11	1:B:480:VAL:HG13	1.97	0.47
1:D:171:LEU:HD13	1:D:174:LYS:HE2	1.94	0.47
1:A:285:ASN:O	1:A:287:ILE:HG13	2.15	0.47
1:B:140:SER:C	1:B:142:THR:H	2.17	0.47
1:D:338:LEU:HB3	1:D:340:PHE:CE2	2.50	0.47
1:B:402:GLU:OE2	1:C:405:LYS:NZ	2.48	0.47
1:D:246:TYR:HA	1:D:249:ASN:ND2	2.29	0.47
1:A:414:TYR:OH	1:D:442:LEU:HD12	2.14	0.47
1:C:240:GLU:O	1:C:243:PHE:HB3	2.15	0.47
1:C:317:LYS:NZ	1:C:322:LEU:HD12	2.28	0.47
1:C:368:GLU:O	1:C:372:LYS:HG3	2.15	0.47
1:D:454:ASN:HD21	1:D:457:LEU:HG	1.79	0.47
1:A:173:ASP:O	1:A:176:GLN:NE2	2.47	0.47
1:A:294:THR:HG22	1:A:296:LYS:H	1.80	0.47
1:A:128:LEU:HA	1:A:131:ILE:HD12	1.97	0.47
1:A:318:PRO:C	1:A:320:GLU:H	2.18	0.47
1:D:294:THR:HG22	1:D:296:LYS:HG2	1.97	0.47
1:B:451:GLN:NE2	1:C:407:ARG:O	2.47	0.47
1:C:277:ILE:HD12	1:C:277:ILE:H	1.80	0.47
1:B:314:SER:O	1:B:317:LYS:HE2	2.15	0.46
1:C:193:ASP:OD1	1:C:193:ASP:N	2.48	0.46
1:C:281:PHE:O	1:C:285:ASN:ND2	2.46	0.46
1:D:128:LEU:HD22	1:D:482:TYR:CE1	2.49	0.46
1:D:282:CYS:SG	1:D:283:TYR:N	2.88	0.46
1:D:405:LYS:HG2	1:D:406:ASN:ND2	2.30	0.46
1:B:162:ALA:O	1:B:165:ARG:HG2	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:250:GLN:O	1:D:253:PHE:HB3	2.16	0.46
1:C:363:VAL:HG12	1:C:367:GLN:HG2	1.97	0.46
1:A:122:ARG:HD3	1:A:408:LEU:HD13	1.97	0.46
1:C:82:GLU:OE2	1:C:86:GLY:HA2	2.16	0.46
1:C:175:LEU:HD23	1:C:180:PHE:CE2	2.47	0.46
1:D:268:ILE:HB	1:D:289:VAL:HG13	1.97	0.46
1:C:143:ASP:OD2	1:C:145:ARG:HG3	2.15	0.46
1:B:122:ARG:HH21	1:B:412:GLU:HG2	1.81	0.46
1:B:254:GLN:HA	1:B:257:LEU:HD12	1.97	0.46
1:B:447:THR:HG21	1:C:409:PRO:HA	1.95	0.46
1:D:243:PHE:O	1:D:246:TYR:HB3	2.16	0.46
1:D:204:LYS:HA	1:D:204:LYS:HD2	1.58	0.46
1:D:362:GLU:H	1:D:362:GLU:HG2	1.48	0.46
1:B:186:VAL:HG11	1:B:371:ALA:HB1	1.98	0.46
1:D:152:ILE:HG21	1:D:474:VAL:HG12	1.97	0.46
1:D:222:VAL:HG23	1:D:309:ALA:HA	1.98	0.46
1:B:203:ASN:O	1:B:204:LYS:HG3	2.16	0.45
1:B:468:ASP:HB3	1:B:471:ALA:HB3	1.99	0.45
1:D:342:ILE:HG22	1:D:344:GLU:OE1	2.17	0.45
1:A:220:LEU:O	1:A:327:GLY:N	2.49	0.45
1:C:41:ASP:OD1	1:D:498:ILE:HA	2.17	0.45
1:D:424:LYS:NZ	1:D:428:ARG:HD2	2.31	0.45
1:A:228:TYR:HB2	1:A:312:ARG:CZ	2.46	0.45
1:C:40:LEU:HB3	1:C:41:ASP:H	1.63	0.45
1:C:100:VAL:O	1:C:104:VAL:HG23	2.16	0.45
1:D:239:SER:O	1:D:241:ALA:N	2.43	0.45
1:B:70:ALA:O	1:B:74:VAL:HG23	2.17	0.45
1:D:234:GLU:O	1:D:237:LEU:HG	2.17	0.45
1:A:227:LEU:HD23	1:A:278:ALA:HB1	1.98	0.45
1:B:206:PRO:HG3	1:B:290:ILE:HD11	1.98	0.45
1:D:361:ASP:OD1	1:D:361:ASP:N	2.45	0.45
1:B:81:GLN:NE2	1:B:88:GLY:O	2.43	0.45
1:B:227:LEU:HB2	1:B:270:LEU:HD11	1.99	0.45
1:C:200:VAL:HG12	1:C:300:ARG:HH21	1.81	0.45
1:C:404:LEU:HD22	1:C:407:ARG:HD3	1.99	0.45
1:A:87:ASP:OD1	1:A:88:GLY:N	2.50	0.45
1:D:152:ILE:HG21	1:D:474:VAL:HA	1.99	0.45
1:D:223:LEU:HA	1:D:310:ALA:O	2.16	0.45
1:A:56:ASP:OD1	1:A:57:GLY:N	2.49	0.45
1:A:194:THR:CG2	1:A:357:GLY:H	2.23	0.45
1:B:127:ALA:O	1:B:131:ILE:HG13	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:203:ASN:HA	1:B:340:PHE:CB	2.46	0.45
1:B:261:LYS:HB2	1:B:281:PHE:HZ	1.82	0.45
1:B:441:LYS:HD2	1:B:441:LYS:HA	1.84	0.45
1:C:317:LYS:HZ1	1:C:322:LEU:HD12	1.82	0.45
1:C:83:ARG:HA	1:C:83:ARG:HD3	1.80	0.44
1:C:56:ASP:OD2	1:C:57:GLY:N	2.50	0.44
1:D:132:ARG:HD3	1:D:132:ARG:HA	1.83	0.44
1:A:218:VAL:HG21	1:A:332:CYS:HB3	1.99	0.44
1:D:312:ARG:HA	1:D:315:LEU:HD13	1.98	0.44
1:B:424:LYS:HE2	1:B:442:LEU:HD22	2.00	0.44
1:C:109:LYS:HD2	1:C:109:LYS:HA	1.62	0.44
1:C:246:TYR:O	1:C:250:GLN:HG2	2.16	0.44
1:A:227:LEU:HD12	1:A:227:LEU:HA	1.83	0.44
1:B:72:ARG:HA	1:B:72:ARG:HD2	1.78	0.44
1:C:152:ILE:HD11	1:C:475:VAL:H	1.82	0.44
1:D:218:VAL:HG21	1:D:332:CYS:HB3	1.99	0.44
1:B:187:LEU:HB3	1:B:189:LYS:NZ	2.32	0.44
1:C:154:GLY:O	1:C:155:ARG:HB2	2.17	0.44
1:D:127:ALA:O	1:D:131:ILE:HG13	2.18	0.44
1:D:212:SER:HB3	1:D:333:PHE:CE1	2.53	0.44
1:B:225:ASP:HA	1:B:272:ARG:HE	1.81	0.44
1:C:454:ASN:HD22	1:C:457:LEU:HG	1.83	0.44
1:A:100:VAL:O	1:A:104:VAL:HG23	2.18	0.44
1:B:140:SER:O	1:B:142:THR:N	2.50	0.44
1:B:229:PRO:HD3	1:B:275:SER:CB	2.45	0.44
1:B:428:ARG:HH21	1:B:439:LEU:HD11	1.83	0.44
1:D:33:ASN:O	1:D:40:LEU:N	2.39	0.44
1:C:260:LEU:HD23	1:C:260:LEU:HA	1.81	0.44
1:C:322:LEU:O	1:C:326:LEU:HG	2.18	0.44
1:B:411:MET:HE2	1:B:411:MET:HB2	1.83	0.43
1:D:88:GLY:HA2	2:D:601:ADP:O2A	2.17	0.43
1:D:183:ALA:HB1	1:D:372:LYS:HA	2.00	0.43
1:B:253:PHE:CE2	1:B:278:ALA:HB2	2.53	0.43
1:C:28:THR:HA	1:C:31:VAL:HG22	2.00	0.43
1:C:79:ARG:NH1	1:C:83:ARG:HG3	2.32	0.43
1:A:85:VAL:HG13	1:A:480:VAL:HG22	1.99	0.43
1:A:457:LEU:HD23	1:A:457:LEU:HA	1.80	0.43
1:B:228:TYR:HB2	1:B:312:ARG:NH2	2.33	0.43
1:D:478:ALA:O	1:D:481:VAL:HG22	2.18	0.43
1:B:106:GLN:NE2	1:B:415:GLY:HA2	2.30	0.43
1:B:299:LYS:HD3	1:B:299:LYS:HA	1.85	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:225:ASP:HB2	1:C:311:LYS:HG2	2.00	0.43
1:D:230:GLU:HB2	1:D:249:ASN:HB2	2.00	0.43
1:A:410:GLY:HA3	1:A:412:GLU:CD	2.39	0.43
1:B:87:ASP:OD1	1:B:88:GLY:N	2.51	0.43
1:D:214:LYS:HE2	1:D:331:THR:HB	2.01	0.43
1:D:230:GLU:HG3	1:D:252:ILE:HD11	2.00	0.43
1:D:295:GLN:OE1	1:D:295:GLN:N	2.43	0.43
1:A:151:LYS:NZ	1:A:161:ALA:HB2	2.34	0.43
1:B:43:MET:HA	1:B:52:VAL:O	2.19	0.43
1:B:295:GLN:OE1	1:B:295:GLN:N	2.46	0.43
1:B:361:ASP:N	1:B:361:ASP:OD1	2.50	0.43
1:C:38:LYS:HD3	1:C:38:LYS:HA	1.73	0.43
1:C:318:PRO:O	1:C:320:GLU:N	2.52	0.43
1:D:312:ARG:HG2	1:D:312:ARG:HH11	1.84	0.43
1:D:405:LYS:HE3	1:D:406:ASN:OD1	2.18	0.43
1:A:85:VAL:CG1	1:A:480:VAL:HG22	2.48	0.43
1:A:256:ASN:O	1:A:259:LYS:HB2	2.19	0.43
1:A:295:GLN:O	1:A:299:LYS:HG2	2.19	0.43
1:C:127:ALA:O	1:C:130:LEU:HG	2.19	0.43
1:B:133:LYS:HD3	1:B:133:LYS:HA	1.86	0.43
1:D:227:LEU:HD12	1:D:312:ARG:HH22	1.83	0.43
1:D:249:ASN:O	1:D:252:ILE:HG12	2.18	0.43
1:A:43:MET:HE3	1:B:501:ILE:HG12	2.00	0.43
1:A:115:LYS:O	1:A:412:GLU:HA	2.19	0.43
1:A:404:LEU:HD11	1:A:416:VAL:HG21	2.00	0.43
1:C:263:LEU:HD12	1:C:322:LEU:HD23	2.00	0.43
1:D:234:GLU:HA	1:D:237:LEU:HD23	2.00	0.43
1:D:477:PRO:HB2	1:D:480:VAL:HG12	2.00	0.43
1:A:302:LEU:HD12	1:A:302:LEU:HA	1.89	0.42
1:A:445:LEU:HD13	1:A:466:PHE:CD1	2.55	0.42
1:C:227:LEU:HB3	1:C:274:ILE:HG13	2.01	0.42
1:B:203:ASN:HA	1:B:340:PHE:HB2	2.01	0.42
1:C:299:LYS:O	1:C:303:GLU:HG2	2.18	0.42
1:D:454:ASN:OD1	1:D:457:LEU:HG	2.19	0.42
1:A:64:MET:HG3	1:B:502:ILE:HG21	2.00	0.42
1:A:311:LYS:HB3	1:A:311:LYS:HE3	1.79	0.42
1:B:407:ARG:O	1:C:451:GLN:NE2	2.52	0.42
1:C:274:ILE:HG12	1:C:278:ALA:HB3	2.02	0.42
1:D:349:LYS:HG3	1:D:350:ALA:N	2.33	0.42
1:D:404:LEU:HD22	1:D:407:ARG:HD3	2.00	0.42
1:D:428:ARG:O	1:D:432:GLU:HG2	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:331:THR:OG1	1:A:344:GLU:HG3	2.19	0.42
1:B:52:VAL:HG21	1:B:63:LEU:HD23	2.02	0.42
1:B:434:ALA:HB2	1:B:461:PHE:HB3	2.02	0.42
1:C:285:ASN:O	1:C:287:ILE:HG13	2.19	0.42
1:D:424:LYS:HZ3	1:D:442:LEU:HG	1.84	0.42
1:B:303:GLU:HB3	1:B:349:LYS:HB2	2.01	0.42
1:B:474:VAL:HG11	2:B:601:ADP:N3	2.35	0.42
1:D:10:ILE:HD12	1:D:10:ILE:HA	1.92	0.42
1:D:176:GLN:O	1:D:178:PRO:HD3	2.20	0.42
1:D:317:LYS:HE3	1:D:317:LYS:HB2	1.83	0.42
1:A:428:ARG:O	1:A:432:GLU:HG2	2.19	0.42
1:C:487:ASN:OD1	1:C:488:ALA:N	2.53	0.42
1:B:262:GLU:OE2	1:B:319:VAL:HG13	2.20	0.42
1:C:257:LEU:HD13	1:C:281:PHE:CG	2.54	0.42
1:C:486:LYS:NZ	1:C:490:GLU:OE1	2.53	0.42
1:D:246:TYR:HA	1:D:249:ASN:HD21	1.85	0.42
1:B:98:ALA:CB	1:B:425:VAL:HG21	2.48	0.42
1:B:322:LEU:HD12	1:B:323:GLN:H	1.83	0.42
1:D:426:PRO:O	1:D:430:MET:HG2	2.19	0.42
1:C:276:ASP:OD1	1:C:276:ASP:N	2.53	0.42
1:C:396:TYR:HA	1:C:399:ARG:NH1	2.34	0.42
1:D:260:LEU:HD23	1:D:260:LEU:HA	1.90	0.42
1:D:365:ASP:OD1	1:D:366:GLU:HG2	2.20	0.42
1:A:368:GLU:HG2	1:A:372:LYS:HE2	2.01	0.42
1:B:259:LYS:HZ1	1:B:319:VAL:HG22	1.85	0.42
1:B:405:LYS:HZ1	1:C:424:LYS:NZ	2.17	0.41
1:C:79:ARG:O	1:C:83:ARG:HG2	2.19	0.41
1:D:87:ASP:OD1	1:D:88:GLY:N	2.53	0.41
1:D:187:LEU:O	1:D:187:LEU:HD13	2.20	0.41
1:D:248:LYS:O	1:D:251:LYS:HB3	2.20	0.41
1:C:57:GLY:HA3	1:C:90:THR:HG22	2.01	0.41
1:D:253:PHE:CZ	1:D:278:ALA:HB2	2.43	0.41
1:D:388:PRO:HG2	1:D:393:PHE:HB2	2.01	0.41
1:B:442:LEU:HD12	1:B:446:MET:HB2	2.03	0.41
1:C:92:ALA:HB2	1:C:484:ALA:HB1	2.01	0.41
1:D:89:THR:N	2:D:601:ADP:O3B	2.53	0.41
1:D:212:SER:HB3	1:D:333:PHE:HE1	1.86	0.41
1:A:449:GLN:NE2	1:A:457:LEU:O	2.38	0.41
1:B:483:GLN:HA	1:B:486:LYS:HB3	2.02	0.41
1:C:338:LEU:HB3	1:C:340:PHE:CE2	2.54	0.41
1:D:106:GLN:HG3	1:D:418:ALA:HB2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:396:TYR:CD1	1:D:455:TYR:HB3	2.55	0.41
1:A:111:VAL:HA	1:A:112:PRO:HD3	1.76	0.41
1:A:111:VAL:HG23	1:A:116:VAL:HG22	2.02	0.41
1:B:249:ASN:HA	1:B:252:ILE:HG12	2.01	0.41
1:C:193:ASP:O	1:C:195:THR:HG22	2.20	0.41
1:A:70:ALA:O	1:A:74:VAL:HG23	2.21	0.41
1:B:128:LEU:HB3	1:B:482:TYR:HE1	1.86	0.41
1:C:90:THR:OG1	2:C:601:ADP:O3B	2.39	0.41
1:C:174:LYS:HE3	1:C:349:LYS:NZ	2.36	0.41
1:D:107:ILE:HA	1:D:111:VAL:O	2.20	0.41
1:A:246:TYR:HA	1:A:249:ASN:HD21	1.86	0.41
1:A:424:LYS:HD2	1:A:442:LEU:HD21	2.02	0.41
1:B:254:GLN:O	1:B:257:LEU:HB2	2.21	0.41
1:D:45:VAL:HA	1:D:50:GLU:O	2.21	0.41
1:C:405:LYS:HG2	1:C:406:ASN:ND2	2.35	0.41
1:D:228:TYR:HA	1:D:275:SER:HB2	2.03	0.41
1:D:261:LYS:HG3	1:D:285:ASN:OD1	2.21	0.41
1:A:151:LYS:CD	1:A:161:ALA:HB2	2.51	0.41
1:A:383:ARG:HA	1:A:383:ARG:HD3	1.90	0.41
1:B:68:HIS:HA	1:B:69:PRO:HD3	1.93	0.41
1:B:138:VAL:HG11	1:B:146:LEU:HD11	2.02	0.41
1:B:474:VAL:HG11	2:B:601:ADP:C2	2.56	0.41
1:C:44:LEU:HA	1:D:502:ILE:HD12	2.03	0.41
1:C:141:ILE:HG12	1:C:382:TYR:CE1	2.55	0.41
1:C:401:VAL:HG12	1:C:420:SER:HB2	2.02	0.41
1:B:85:VAL:HG12	1:B:87:ASP:H	1.85	0.41
1:B:299:LYS:O	1:B:303:GLU:HG2	2.21	0.40
1:B:333:PHE:CE2	1:B:335:ASP:HB2	2.56	0.40
1:D:384:SER:CB	1:D:385:GLY:HA3	2.51	0.40
1:A:405:LYS:HD2	1:A:417:MET:CE	2.51	0.40
1:B:228:TYR:HB2	1:B:312:ARG:CZ	2.51	0.40
1:C:230:GLU:O	1:C:249:ASN:ND2	2.54	0.40
1:D:70:ALA:O	1:D:74:VAL:HG23	2.22	0.40
1:D:312:ARG:HH11	1:D:312:ARG:CG	2.35	0.40
1:D:337:ARG:O	1:D:338:LEU:HD12	2.21	0.40
1:D:491:VAL:O	1:D:495:LEU:HB2	2.21	0.40
1:A:111:VAL:HG11	1:A:414:TYR:CD2	2.56	0.40
1:A:128:LEU:HB3	1:A:482:TYR:HE1	1.86	0.40
1:A:193:ASP:O	1:A:195:THR:HG22	2.20	0.40
1:A:491:VAL:O	1:A:495:LEU:HB2	2.22	0.40
1:B:220:LEU:O	1:B:327:GLY:N	2.54	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:248:LYS:HA	1:B:248:LYS:HD2	1.87	0.40
1:B:430:MET:HB3	1:B:461:PHE:CE2	2.56	0.40
1:C:171:LEU:HD13	1:C:171:LEU:HA	1.90	0.40
1:B:137:LYS:HA	1:B:137:LYS:HD2	1.81	0.40
1:C:405:LYS:HE3	1:C:406:ASN:OD1	2.21	0.40
1:C:436:PHE:CE1	1:C:464:GLY:HA2	2.56	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:258:LYS:NZ	1:D:284:GLU:OE2[4_454]	1.79	0.41
1:B:280:GLU:OE1	1:D:251:LYS:NZ[4_454]	2.06	0.14

## 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	492/521 (94%)	458 (93%)	33 (7%)	1 (0%)	47 79
1	B	492/521 (94%)	463 (94%)	26 (5%)	3 (1%)	25 63
1	C	492/521 (94%)	459 (93%)	32 (6%)	1 (0%)	47 79
1	D	492/521 (94%)	456 (93%)	33 (7%)	3 (1%)	25 63
All	All	1968/2084 (94%)	1836 (93%)	124 (6%)	8 (0%)	34 71

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	319	VAL
1	B	141	ILE
1	C	319	VAL

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Mol	Chain	Res	Type
1	D	155	ARG
1	D	319	VAL
1	D	157	ASP
1	B	319	VAL
1	B	240	GLU

### 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	373/415 (90%)	358 (96%)	15 (4%)	31 57
1	B	371/415 (89%)	352 (95%)	19 (5%)	24 52
1	C	371/415 (89%)	353 (95%)	18 (5%)	25 52
1	D	370/415 (89%)	340 (92%)	30 (8%)	11 39
All	All	1485/1660 (90%)	1403 (94%)	82 (6%)	21 50

All (82) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	20	ASN
1	A	53	VAL
1	A	142	THR
1	A	151	LYS
1	A	155	ARG
1	A	180	PHE
1	A	187	LEU
1	A	209	GLU
1	A	311	LYS
1	A	338	LEU
1	A	344	GLU
1	A	361	ASP
1	A	366	GLU
1	A	370	ILE
1	A	432	GLU
1	B	147	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	180	PHE
1	B	187	LEU
1	B	207	LEU
1	B	215	LEU
1	B	244	GLU
1	B	245	GLN
1	B	259	LYS
1	B	260	LEU
1	B	262	GLU
1	B	282	CYS
1	B	284	GLU
1	B	308	ARG
1	B	322	LEU
1	B	344	GLU
1	B	377	SER
1	B	405	LYS
1	B	408	LEU
1	B	441	LYS
1	C	52	VAL
1	C	55	ASN
1	C	79	ARG
1	C	87	ASP
1	C	121	ASN
1	C	165	ARG
1	C	166	ASP
1	C	180	PHE
1	C	187	LEU
1	C	193	ASP
1	C	208	TRP
1	C	217	GLU
1	C	263	LEU
1	C	272	ARG
1	C	276	ASP
1	C	338	LEU
1	C	361	ASP
1	C	369	ARG
1	D	52	VAL
1	D	72	ARG
1	D	113	VAL
1	D	117	LEU
1	D	133	LYS
1	D	137	LYS

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Mol	Chain	Res	Type
1	D	146	LEU
1	D	165	ARG
1	D	176	GLN
1	D	180	PHE
1	D	187	LEU
1	D	196	LEU
1	D	209	GLU
1	D	219	ARG
1	D	245	GLN
1	D	250	GLN
1	D	274	ILE
1	D	282	CYS
1	D	298	LEU
1	D	326	LEU
1	D	328	TYR
1	D	362	GLU
1	D	367	GLN
1	D	370	ILE
1	D	408	LEU
1	D	424	LYS
1	D	437	ASN
1	D	442	LEU
1	D	480	VAL
1	D	499	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	68	HIS
1	A	433	ASN
1	B	106	GLN
1	B	203	ASN
1	B	249	ASN
1	C	249	ASN
1	D	367	GLN

### 5.3.3 RNA

There are no RNA molecules in this entry.



## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

4 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	ADP	B	601	-	24,29,29	0.98	1 (4%)	29,45,45	1.60	4 (13%)
2	ADP	A	601	-	24,29,29	0.95	1 (4%)	29,45,45	1.63	3 (10%)
2	ADP	C	601	-	24,29,29	0.88	1 (4%)	29,45,45	1.45	4 (13%)
2	ADP	D	601	-	24,29,29	0.93	1 (4%)	29,45,45	1.64	5 (17%)

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	ADP	B	601	-	-	4/12/32/32	0/3/3/3
2	ADP	A	601	-	-	5/12/32/32	0/3/3/3
2	ADP	C	601	-	-	2/12/32/32	0/3/3/3
2	ADP	D	601	-	-	5/12/32/32	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601	ADP	C5-C4	2.45	1.47	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	601	ADP	C5-C4	2.33	1.47	1.40
2	A	601	ADP	C5-C4	2.28	1.47	1.40
2	C	601	ADP	C5-C4	2.28	1.47	1.40

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	ADP	PA-O3A-PB	-5.45	114.14	132.83
2	B	601	ADP	PA-O3A-PB	-5.33	114.52	132.83
2	D	601	ADP	PA-O3A-PB	-5.27	114.76	132.83
2	C	601	ADP	PA-O3A-PB	-3.92	119.39	132.83
2	A	601	ADP	N3-C2-N1	-3.24	123.61	128.68
2	C	601	ADP	N3-C2-N1	-3.16	123.74	128.68
2	D	601	ADP	N3-C2-N1	-3.12	123.80	128.68
2	A	601	ADP	C4-C5-N7	-3.12	106.15	109.40
2	B	601	ADP	C4-C5-N7	-3.00	106.27	109.40
2	C	601	ADP	C3'-C2'-C1'	2.93	105.39	100.98
2	B	601	ADP	N3-C2-N1	-2.86	124.21	128.68
2	D	601	ADP	C3'-C2'-C1'	2.76	105.13	100.98
2	C	601	ADP	C4-C5-N7	-2.42	106.88	109.40
2	D	601	ADP	C4-C5-N7	-2.38	106.92	109.40
2	B	601	ADP	C3'-C2'-C1'	2.36	104.53	100.98
2	D	601	ADP	O3B-PB-O2B	2.06	115.50	107.64

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	ADP	C5'-O5'-PA-O1A
2	A	601	ADP	C5'-O5'-PA-O2A
2	B	601	ADP	C5'-O5'-PA-O2A
2	B	601	ADP	C5'-O5'-PA-O3A
2	B	601	ADP	O4'-C4'-C5'-O5'
2	D	601	ADP	C5'-O5'-PA-O2A
2	D	601	ADP	C5'-O5'-PA-O3A
2	B	601	ADP	C3'-C4'-C5'-O5'
2	D	601	ADP	O4'-C4'-C5'-O5'
2	D	601	ADP	C3'-C4'-C5'-O5'
2	A	601	ADP	O4'-C4'-C5'-O5'
2	A	601	ADP	C3'-C4'-C5'-O5'
2	C	601	ADP	PB-O3A-PA-O2A
2	D	601	ADP	C4'-C5'-O5'-PA

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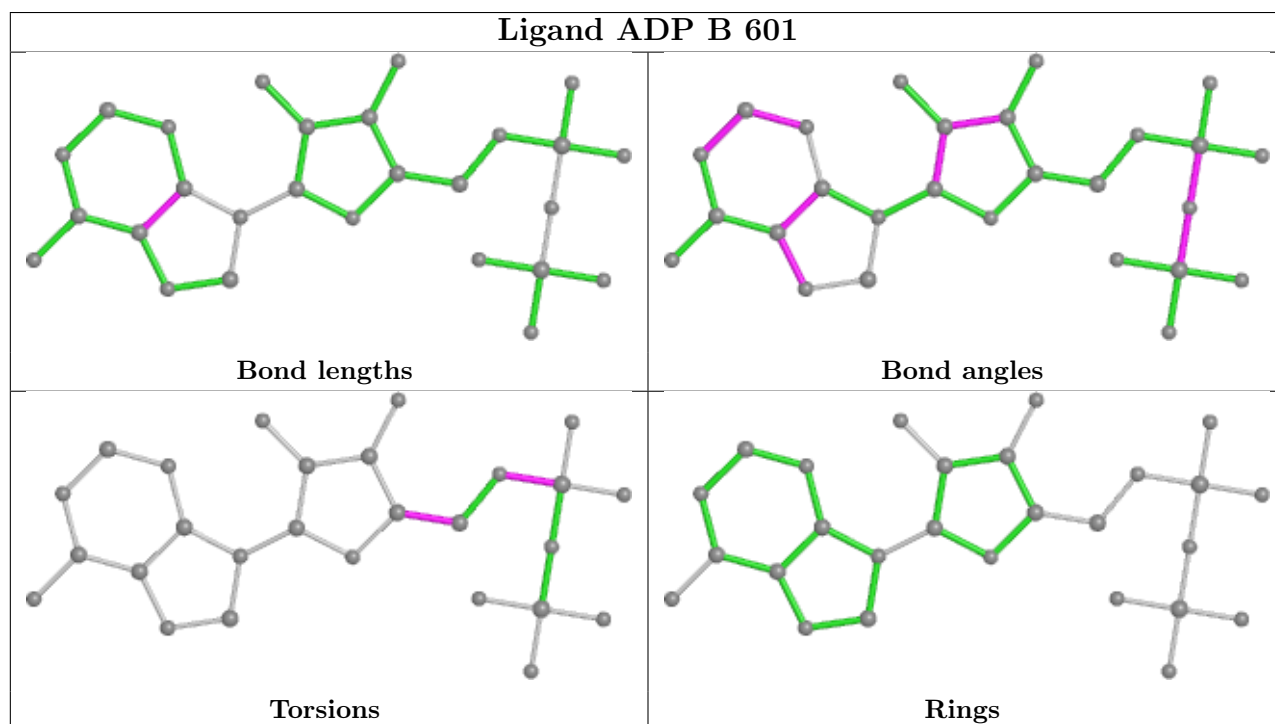
Mol	Chain	Res	Type	Atoms
2	A	601	ADP	C5'-O5'-PA-O3A
2	C	601	ADP	PB-O3A-PA-O1A

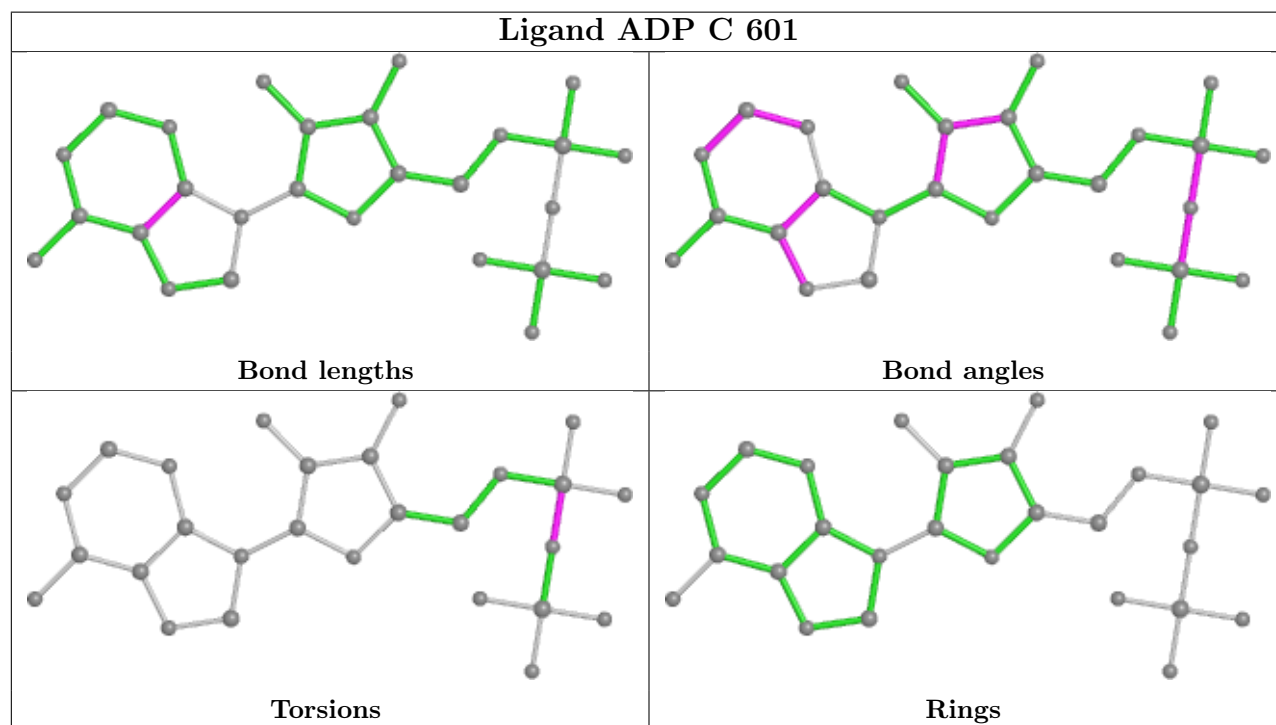
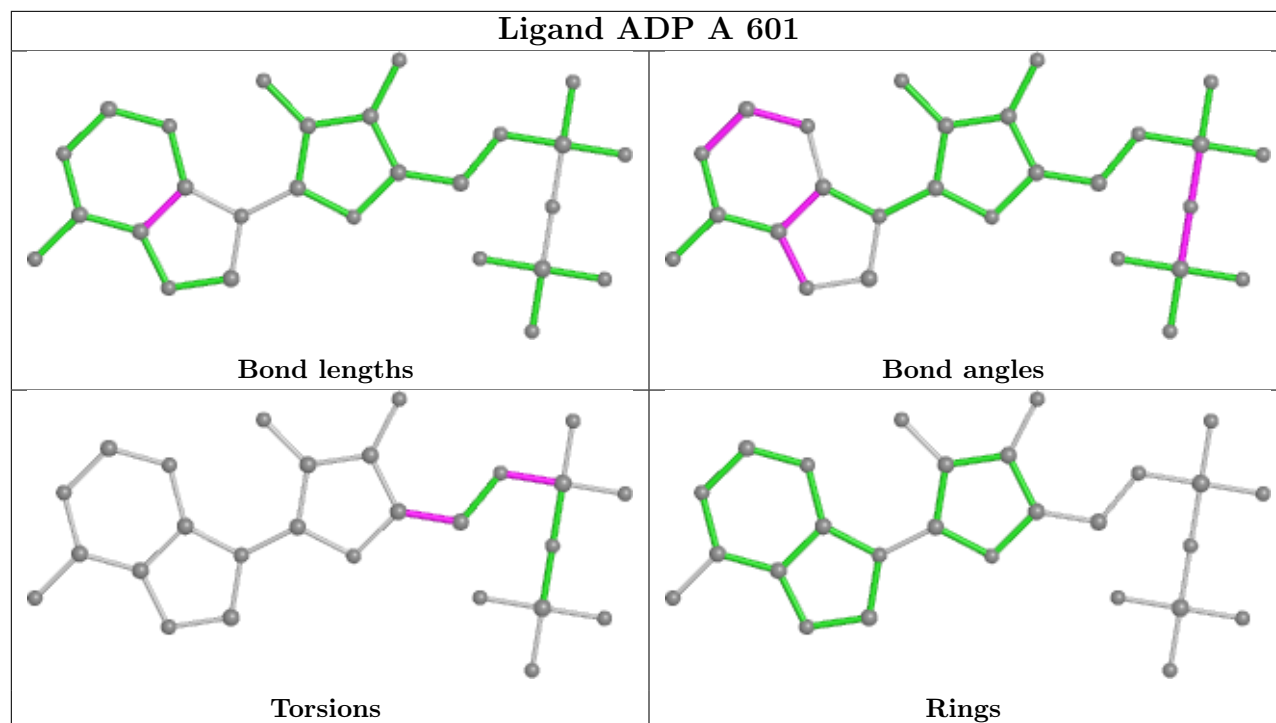
There are no ring outliers.

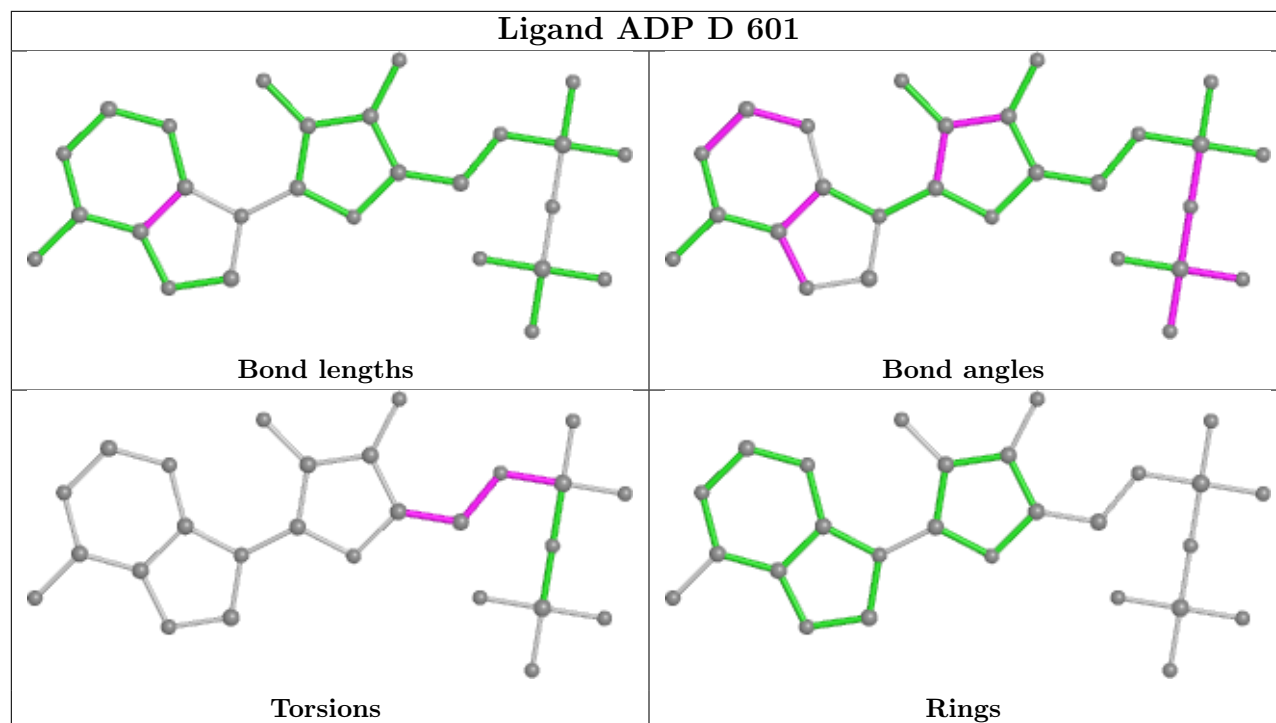
4 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	601	ADP	3	0
2	A	601	ADP	2	0
2	C	601	ADP	4	0
2	D	601	ADP	3	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 [i](#)

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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	494/521 (94%)	-0.40	0 <a href="#">100</a>   <a href="#">100</a>	81, 108, 166, 209	0
1	B	494/521 (94%)	-0.26	2 (0%) <a href="#">92</a>   <a href="#">87</a>	80, 120, 228, 257	0
1	C	494/521 (94%)	-0.36	0 <a href="#">100</a>   <a href="#">100</a>	80, 110, 172, 226	0
1	D	494/521 (94%)	-0.35	1 (0%) <a href="#">95</a>   <a href="#">93</a>	82, 127, 222, 238	0
All	All	1976/2084 (94%)	-0.34	3 (0%) <a href="#">95</a>   <a href="#">93</a>	80, 112, 215, 257	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	210	GLU	2.9
1	B	312	ARG	2.5
1	B	265	VAL	2.2

### 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](#)

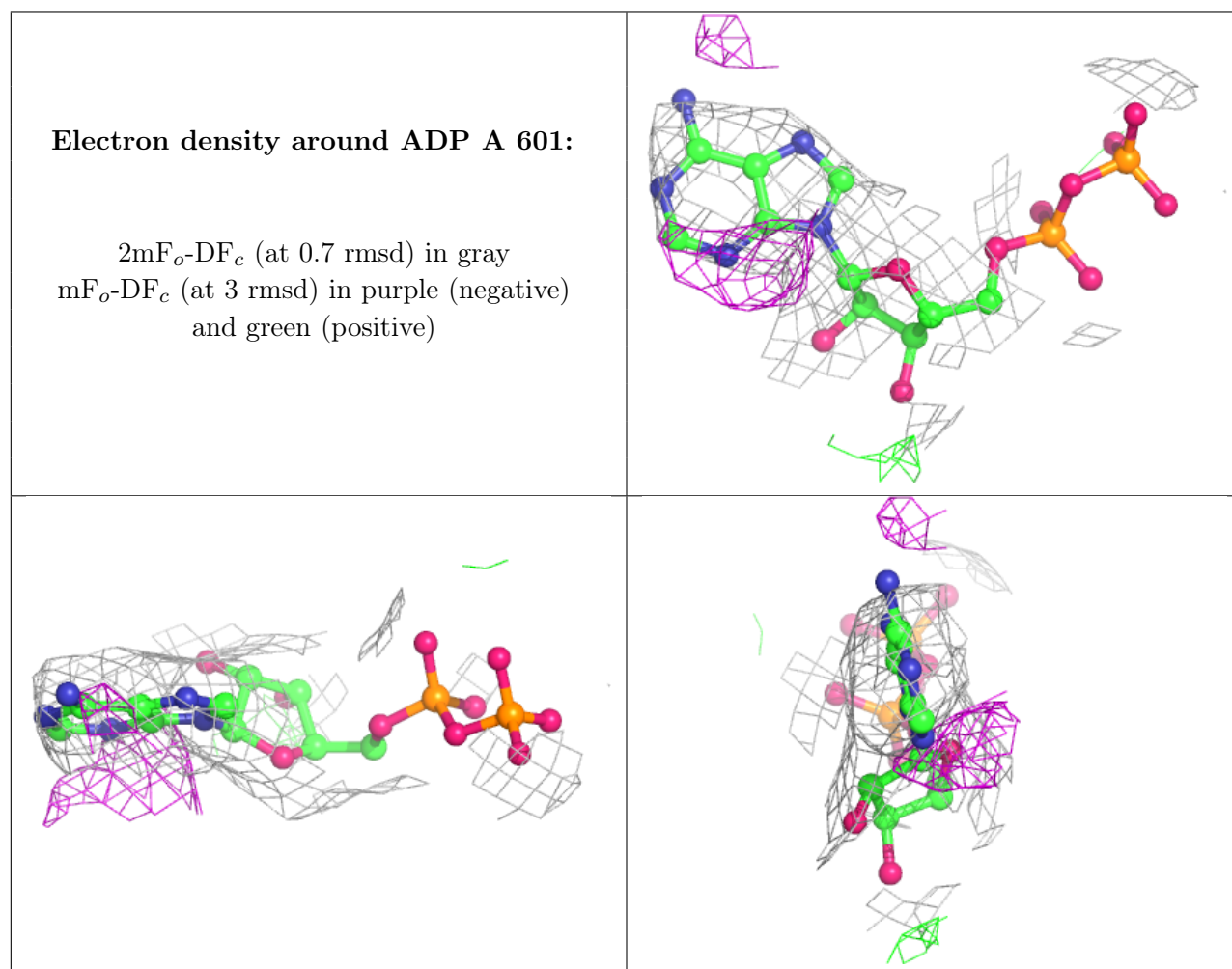
There are no monosaccharides in this entry.

### 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.

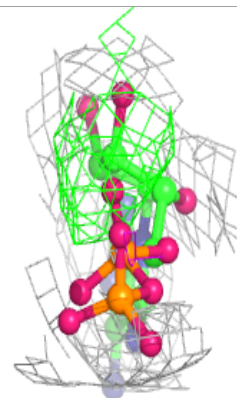
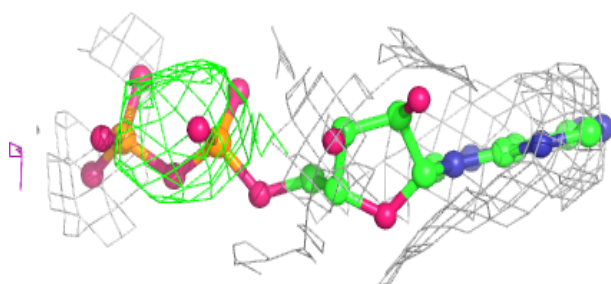
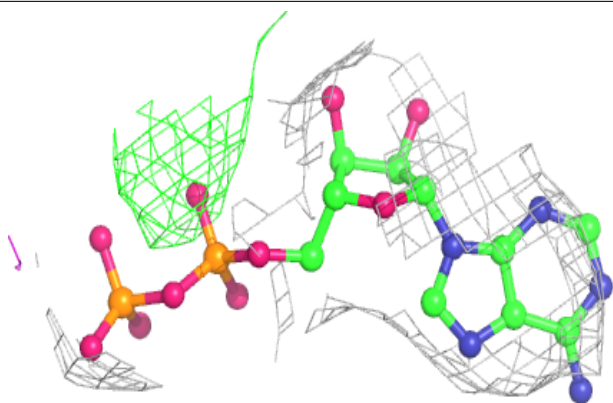
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	ADP	A	601	27/27	0.88	0.27	95,109,123,126	0
2	ADP	D	601	27/27	0.88	0.28	90,98,114,124	0
2	ADP	B	601	27/27	0.89	0.24	86,95,111,111	0
2	ADP	C	601	27/27	0.91	0.23	82,93,110,113	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

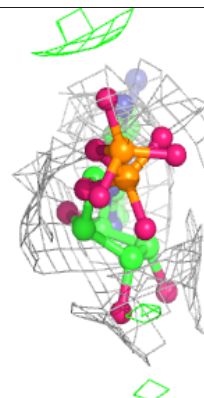
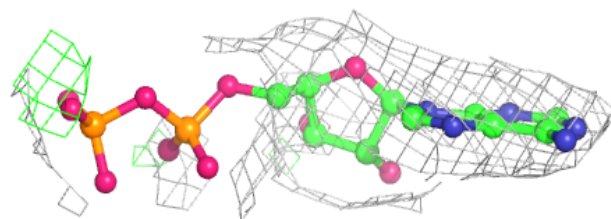
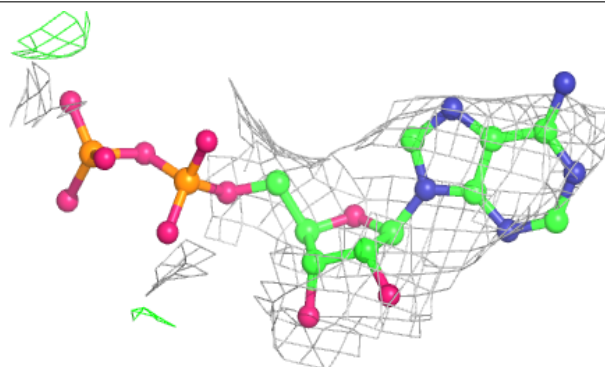


**Electron density around ADP D 601:**

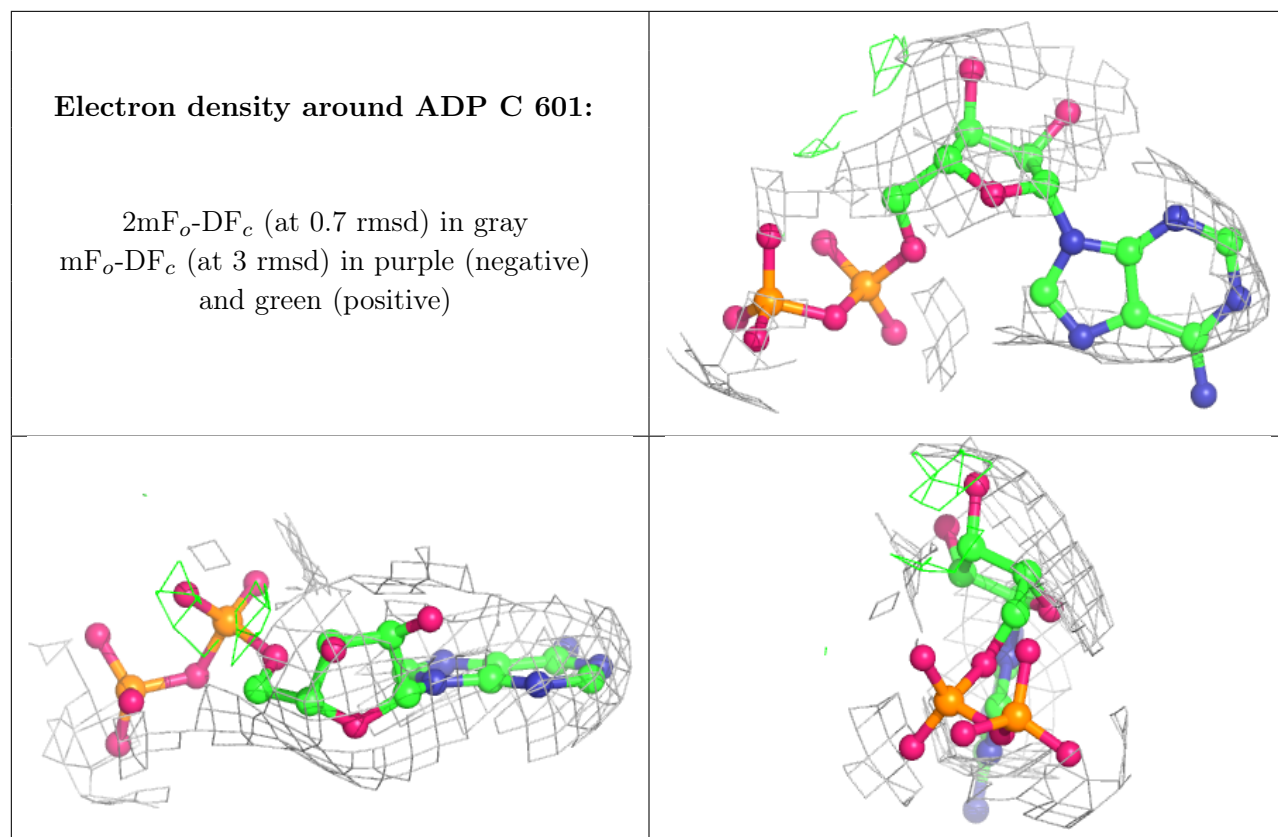
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around ADP B 601:**

$2mF_o-DF_c$  (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.