



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 7, 2026 – 06:35 PM JST

PDB ID : 9XIO / pdb_00009xio
Title : Toxoplasma gondii dihydrofolate reductase thymidylate synthase (TgDHFR-TS) complexed with P218, NADPH and dUMP
Authors : Vanichtanankul, J.; Saeyang, T.; Yuthavong, Y.; Kamchonwongpaisan, S.
Deposited on : 2025-11-03
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	:	4-5-2 with Phenix2.0
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

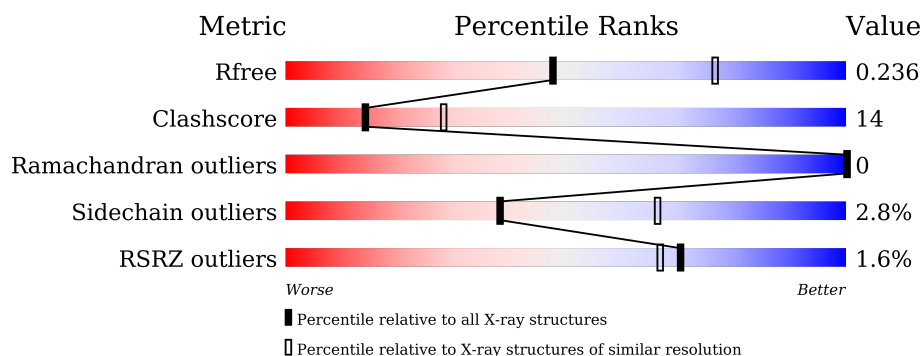
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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}	180053	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (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 $\leq 5\%$. 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	610	2% 59% 29% • 10%
1	B	610	% 61% 27% • 11%
1	C	610	% 65% 23% • 11%
1	D	610	% 62% 26% • 11%

2 Entry composition [i](#)

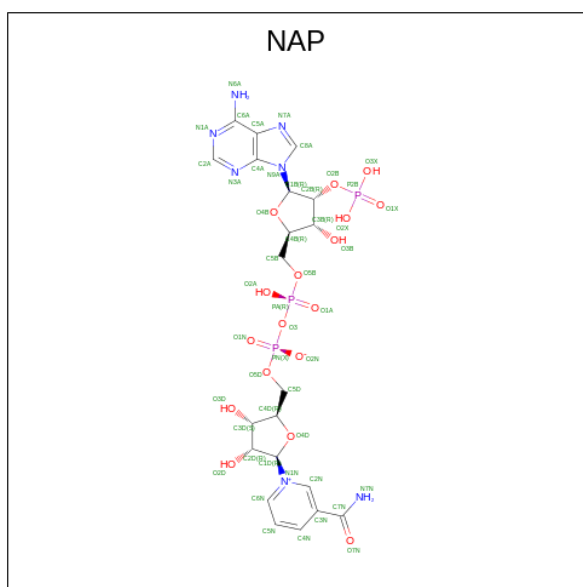
There are 5 unique types of molecules in this entry. The entry contains 18363 atoms, of which 94 are hydrogens and 0 are deuteriums.

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 Bifunctional dihydrofolate reductase-thymidylate synthase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	548	Total	C	H	N	O	S	0	0	0
			4490	2798	94	774	800	24			
1	B	541	Total	C	N	O	S		0	0	0
			4344	2767	766	787	24				
1	C	540	Total	C	N	O	S		0	0	0
			4337	2763	765	785	24				
1	D	542	Total	C	N	O	S		0	0	0
			4354	2774	767	789	24				

- Molecule 2 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (CCD ID: NAP) (formula: C₂₁H₂₈N₇O₁₇P₃).



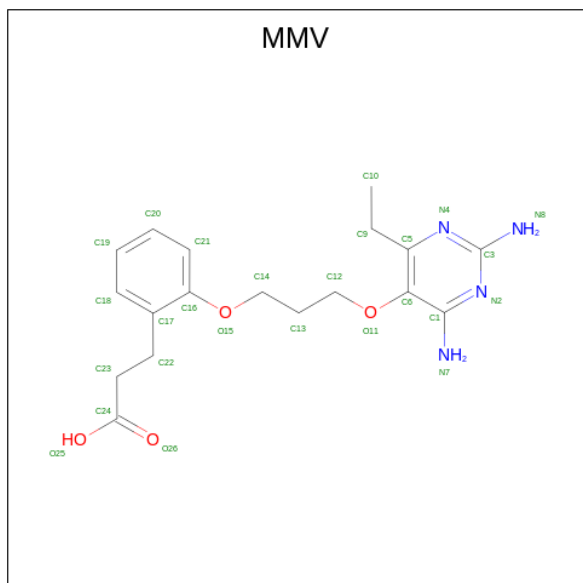
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	B	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

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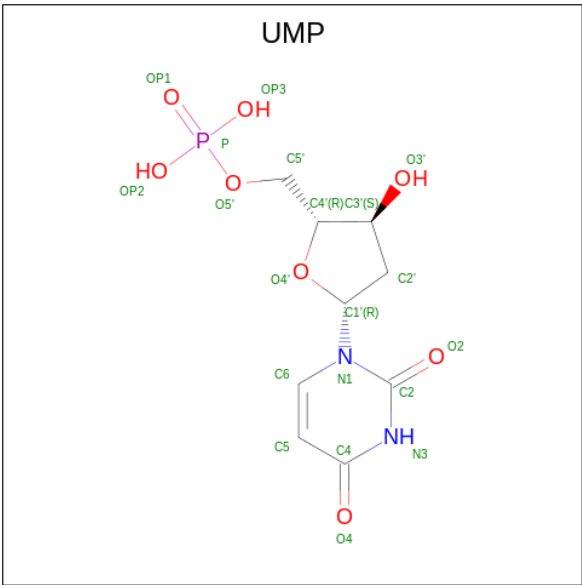
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	C	1	Total	C	N	O	P	
			48	21	7	17	3	
2	D	1	Total	C	N	O	P	
			48	21	7	17	3	

- Molecule 3 is 3-(2-{3-[(2,4-diamino-6-ethylpyrimidin-5-yl)oxy]propoxy}phenyl)propanoic acid (CCD ID: MMV) (formula: C₁₈H₂₄N₄O₄) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O		
			26	18	4	4		
3	B	1	Total	C	N	O		
			26	18	4	4		
3	C	1	Total	C	N	O		
			26	18	4	4		
3	D	1	Total	C	N	O		
			26	18	4	4		

- Molecule 4 is 2'-DEOXYURIDINE 5'-MONOPHOSPHATE (CCD ID: UMP) (formula: C₉H₁₃N₂O₈P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
4	B	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
4	C	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
4	D	1	Total	C	N	O	P	0	0
			20	9	2	8	1		

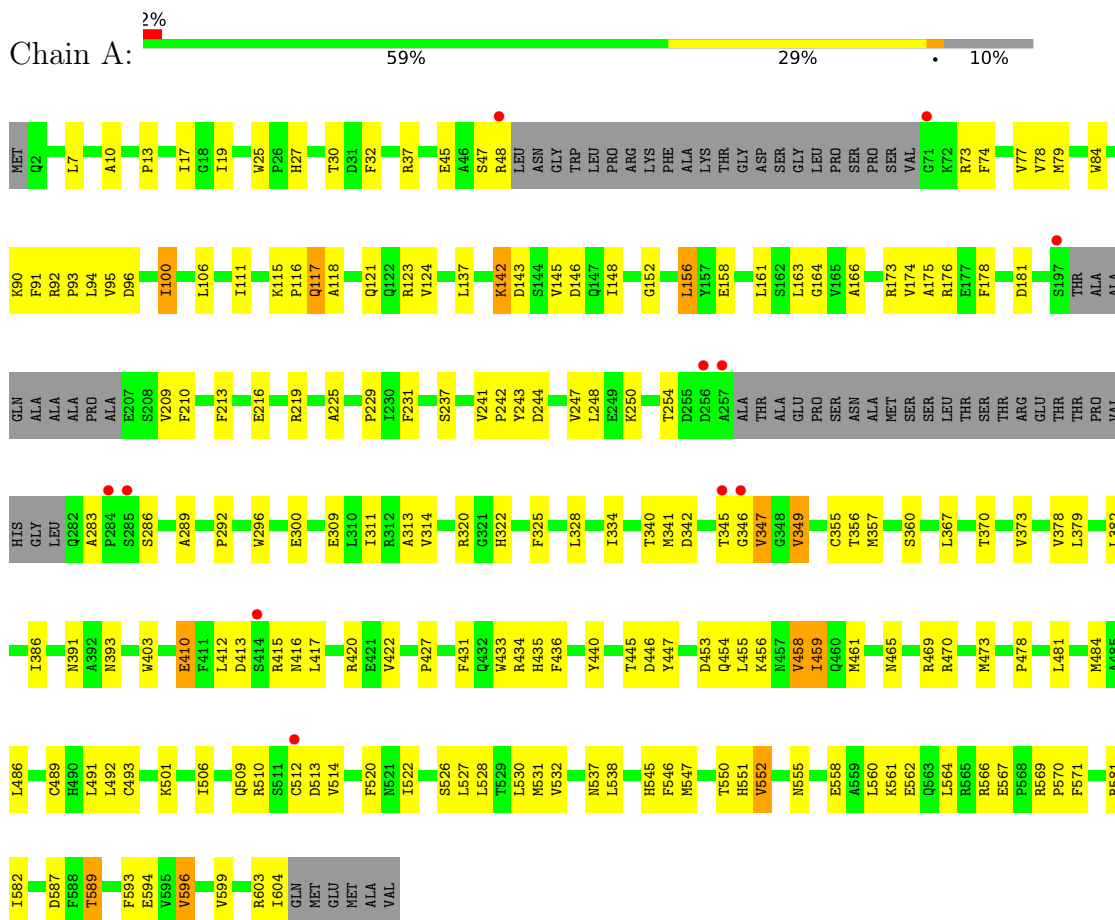
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	108	Total	O	0	0
			108	108		
5	B	99	Total	O	0	0
			99	99		
5	C	134	Total	O	0	0
			134	134		
5	D	121	Total	O	0	0
			121	121		

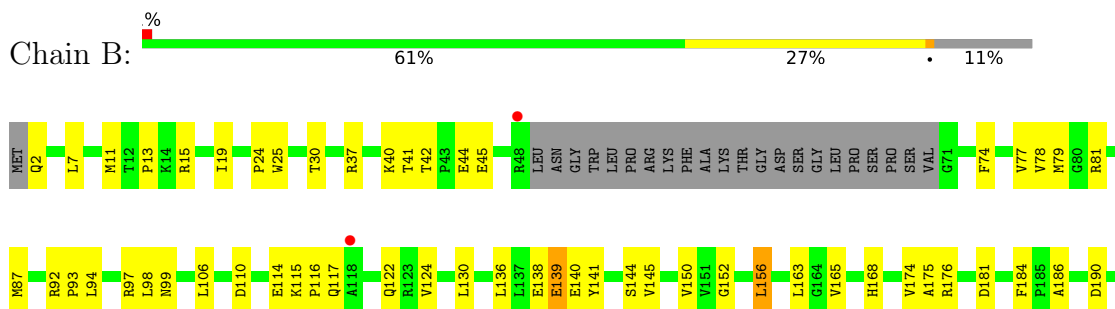
3 Residue-property plots

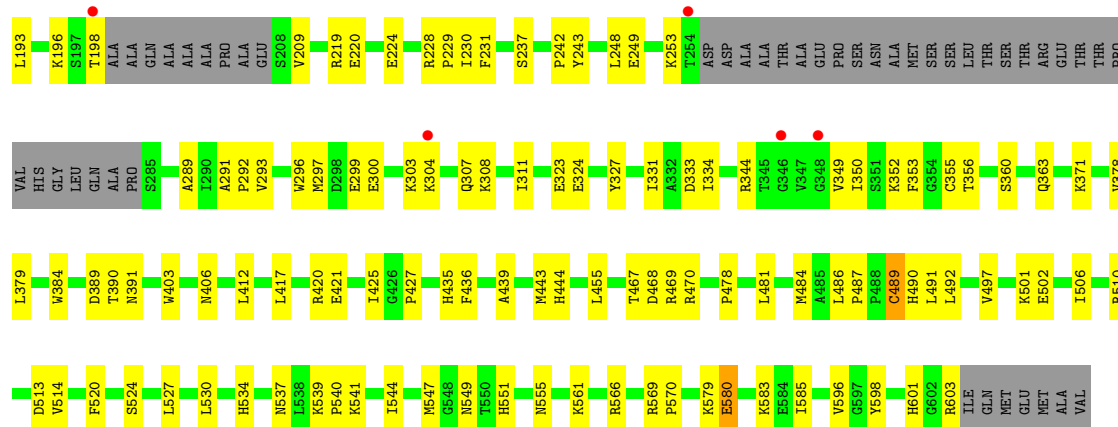
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

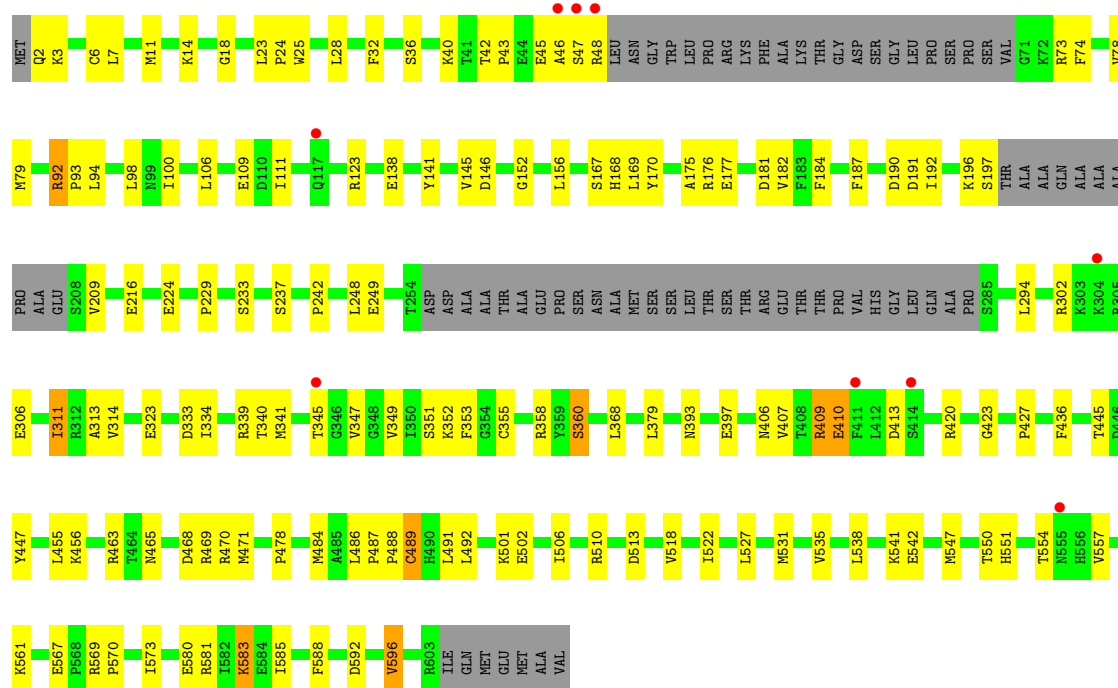


- Molecule 1: Bifunctional dihydrofolate reductase-thymidylate synthase

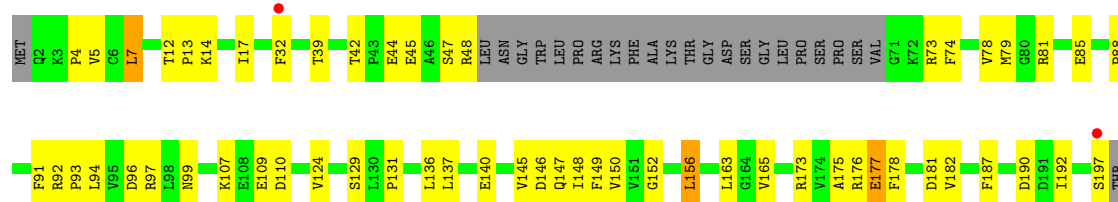




• Molecule 1: Bifunctional dihydrofolate reductase-thymidylate synthase



• Molecule 1: Bifunctional dihydrofolate reductase-thymidylate synthase





4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	69.17Å 93.34Å 116.99Å 83.70° 80.67° 80.25°	Depositor
Resolution (Å)	35.65 – 2.50 35.65 – 2.50	Depositor EDS
% Data completeness (in resolution range)	85.5 (35.65-2.50) 85.4 (35.65-2.50)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.64 (at 2.51Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.172 , 0.236 0.172 , 0.236	Depositor DCC
R_{free} test set	4216 reflections (4.31%)	wwPDB-VP
Wilson B-factor (Å ²)	37.1	Xtriage
Anisotropy	0.049	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 38.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	18363	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.24% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: NAP, MMV, UMP

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	0.38	0/4501	0.56	0/6092
1	B	0.37	0/4448	0.54	0/6019
1	C	0.39	0/4441	0.57	0/6009
1	D	0.37	0/4458	0.56	0/6032
All	All	0.38	0/17848	0.56	0/24152

There are no bond length outliers.

There are no bond angle outliers.

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	4396	94	4352	155	0
1	B	4344	0	4309	136	0
1	C	4337	0	4302	115	0
1	D	4354	0	4319	128	0
2	A	48	0	25	1	0
2	B	48	0	25	1	0
2	C	48	0	25	0	0
2	D	48	0	25	3	0
3	A	26	0	23	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	26	0	23	1	0
3	C	26	0	23	1	0
3	D	26	0	23	7	0
4	A	20	0	11	4	0
4	B	20	0	11	3	0
4	C	20	0	11	2	0
4	D	20	0	11	1	0
5	A	108	0	0	7	0
5	B	99	0	0	5	0
5	C	134	0	0	9	0
5	D	121	0	0	2	0
All	All	18269	94	17518	502	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 14.

All (502) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:461:MET:HE2	1:A:465:ASN:HB3	1.39	1.03
1:B:115:LYS:HG2	1:B:116:PRO:HD2	1.45	0.97
1:B:333:ASP:OD2	1:B:352:LYS:HE2	1.69	0.93
1:B:2:GLN:HA	1:B:138:GLU:OE2	1.72	0.90
1:A:582:ILE:HG23	1:A:587:ASP:HB2	1.55	0.88
1:C:393:ASN:O	1:C:397:GLU:HG3	1.74	0.87
1:A:106:LEU:HD13	1:A:111:ILE:HD11	1.57	0.85
1:B:303:LYS:O	1:B:307:GLN:HG2	1.77	0.84
1:C:470:ARG:HE	1:D:487:PRO:HG2	1.43	0.82
1:B:176:ARG:HD2	1:B:596:VAL:CG1	2.11	0.81
1:A:461:MET:HE2	1:A:465:ASN:CB	2.10	0.80
1:A:175:ALA:HB3	1:A:242:PRO:HG2	1.65	0.78
1:A:527:LEU:HG	1:A:531:MET:HE3	1.66	0.78
1:B:98:LEU:HD13	1:B:122:GLN:HB3	1.65	0.76
3:D:702:MMV:H2	3:D:702:MMV:H11	1.48	0.75
1:A:355:CYS:HB2	1:A:547:MET:HE3	1.68	0.75
1:A:115:LYS:HG3	1:A:116:PRO:HD2	1.69	0.75
2:A:701:NAP:H8A	2:A:701:NAP:H52A	1.69	0.75
1:A:341:MET:HE3	1:B:467:THR:HG22	1.68	0.74
1:B:311:ILE:HD11	1:B:561:LYS:HD2	1.70	0.74
1:B:141:TYR:HB3	1:B:145:VAL:HG23	1.68	0.74
1:C:470:ARG:NE	1:D:487:PRO:HG2	2.03	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:224:GLU:HG2	1:D:253:LYS:HG3	1.69	0.73
1:C:141:TYR:HB3	1:C:145:VAL:HG23	1.73	0.71
1:B:501:LYS:NZ	5:B:801:HOH:O	2.22	0.71
1:C:349:VAL:CG1	1:C:551:HIS:HB2	2.22	0.70
1:C:48:ARG:HD2	1:D:302:ARG:HD3	1.72	0.70
1:A:413:ASP:O	1:A:416:ASN:N	2.26	0.69
1:B:92:ARG:HA	1:B:93:PRO:C	2.16	0.69
1:C:48:ARG:HD2	1:D:302:ARG:CD	2.22	0.69
1:C:580:GLU:O	1:C:583:LYS:HE3	1.90	0.69
1:B:110:ASP:O	1:B:114:GLU:HG2	1.93	0.69
1:B:13:PRO:HD3	1:B:174:VAL:O	1.93	0.69
1:C:478:PRO:HD2	1:D:436:PHE:CE1	2.28	0.68
1:D:17:ILE:O	2:D:701:NAP:H2N	1.93	0.68
1:A:513:ASP:H	4:A:703:UMP:H2"	1.57	0.68
1:A:470:ARG:NH2	1:B:344:ARG:HD3	2.09	0.68
1:A:100:ILE:HD11	1:A:137:LEU:HD21	1.76	0.68
1:A:555:ASN:ND2	5:A:801:HOH:O	2.26	0.68
1:B:115:LYS:CG	1:B:116:PRO:HD2	2.21	0.68
1:D:13:PRO:HD2	1:D:177:GLU:HG3	1.77	0.67
1:D:107:LYS:HB2	1:D:110:ASP:OD2	1.94	0.67
1:A:501:LYS:HE3	1:A:538:LEU:HD23	1.76	0.67
1:C:569:ARG:HB3	1:C:570:PRO:HD2	1.77	0.67
1:A:100:ILE:CD1	1:A:137:LEU:HD21	2.26	0.66
1:B:229:PRO:HA	1:B:248:LEU:HD23	1.77	0.66
1:A:599:VAL:HG22	5:A:809:HOH:O	1.95	0.66
1:A:470:ARG:HD3	1:B:487:PRO:HG2	1.77	0.65
1:C:176:ARG:HD2	1:C:596:VAL:CG2	2.26	0.65
1:B:87:MET:HE3	1:B:92:ARG:HB3	1.80	0.64
1:D:253:LYS:O	1:D:254:THR:HB	1.97	0.64
3:D:702:MMV:H11	3:D:702:MMV:N7	2.12	0.64
1:A:454:GLN:O	1:A:458:VAL:HG13	1.97	0.64
1:C:339:ARG:NH1	1:D:499:ASP:OD1	2.31	0.64
1:D:94:LEU:CD2	3:D:702:MMV:H20	2.28	0.64
1:A:341:MET:CE	1:B:467:THR:HG22	2.28	0.64
1:A:382:LEU:HD23	1:A:531:MET:HE3	1.79	0.64
1:C:406:ASN:CG	1:C:486:LEU:HD11	2.23	0.64
1:C:345:THR:OG1	1:C:347:VAL:HG23	1.96	0.64
1:A:469:ARG:O	1:B:510:ARG:HD2	1.97	0.64
1:A:478:PRO:HA	1:A:481:LEU:HG	1.79	0.63
1:B:327:TYR:CZ	1:B:331:ILE:HD11	2.33	0.63
1:D:461:MET:SD	1:D:465:ASN:HB3	2.38	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:117:GLN:HE21	1:A:117:GLN:HA	1.62	0.63
1:C:409:ARG:NH1	1:C:420:ARG:O	2.31	0.63
1:B:300:GLU:O	1:B:303:LYS:HG2	1.98	0.63
1:C:109:GLU:CD	1:C:109:GLU:H	2.07	0.63
1:B:311:ILE:CD1	1:B:561:LYS:HD2	2.29	0.63
1:D:129:SER:HB2	1:D:131:PRO:HD2	1.81	0.62
1:A:47:SER:O	1:A:48:ARG:HB2	1.99	0.62
1:D:412:LEU:HD13	1:D:420:ARG:CB	2.29	0.62
1:D:554:THR:O	1:D:557:VAL:HG12	1.99	0.62
1:A:506:ILE:HG13	1:B:353:PHE:CE2	2.35	0.61
1:C:216:GLU:CD	1:C:216:GLU:H	2.06	0.61
1:C:233:SER:CB	1:D:297:MET:HE1	2.30	0.61
1:C:353:PHE:CE2	1:D:506:ILE:HG13	2.34	0.61
1:C:302:ARG:O	1:C:306:GLU:HG2	2.00	0.61
1:D:581:ARG:O	1:D:581:ARG:HG2	1.98	0.61
1:A:436:PHE:CE1	1:B:478:PRO:HD2	2.35	0.61
1:A:73:ARG:NH1	1:A:143:ASP:O	2.33	0.61
1:C:176:ARG:HD2	1:C:596:VAL:HG23	1.81	0.61
1:D:94:LEU:HD21	3:D:702:MMV:H20	1.82	0.61
1:A:73:ARG:NH2	1:A:146:ASP:OD1	2.34	0.61
1:B:11:MET:SD	1:B:193:LEU:HD11	2.41	0.61
1:D:406:ASN:CG	1:D:486:LEU:HD11	2.26	0.61
1:B:228:ARG:HG3	1:B:228:ARG:HH11	1.65	0.60
1:A:173:ARG:HB2	1:A:244:ASP:OD1	2.01	0.60
1:A:492:LEU:HD23	1:A:493:CYS:N	2.16	0.60
1:B:87:MET:SD	1:B:94:LEU:HD21	2.41	0.60
1:D:99:ASN:HB2	1:D:124:VAL:HG22	1.82	0.60
1:A:410:GLU:CD	1:A:410:GLU:H	2.10	0.60
1:A:427:PRO:O	1:A:484:MET:HE2	2.01	0.60
1:D:45:GLU:OE1	1:D:45:GLU:HA	2.02	0.59
1:B:379:LEU:HD13	1:B:527:LEU:HD21	1.84	0.59
1:C:175:ALA:HB3	1:C:242:PRO:HG2	1.84	0.59
1:A:349:VAL:HG12	1:A:551:HIS:HB2	1.84	0.59
1:B:40:LYS:HE3	1:B:97:ARG:NH2	2.18	0.59
1:C:436:PHE:CE1	1:D:478:PRO:HD2	2.38	0.59
1:A:142:LYS:HG2	1:A:143:ASP:OD1	2.02	0.59
1:D:4:PRO:HG2	1:D:147:GLN:HG2	1.84	0.59
1:D:298:ASP:OD2	1:D:302:ARG:HG3	2.02	0.59
1:A:552:VAL:HG21	1:A:560:LEU:CD1	2.33	0.59
1:B:355:CYS:HB2	1:B:547:MET:HE3	1.85	0.59
1:B:598:TYR:HA	5:B:829:HOH:O	2.03	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:130:LEU:HD23	1:B:163:LEU:HD12	1.85	0.58
1:D:427:PRO:O	1:D:484:MET:HE2	2.03	0.58
1:B:293:VAL:CG1	1:B:297:MET:HE3	2.33	0.58
1:C:469:ARG:HD2	1:D:511:SER:OG	2.03	0.58
1:D:468:ASP:O	1:D:471:MET:HE2	2.04	0.58
1:C:513:ASP:N	4:C:703:UMP:H2''	2.18	0.58
1:D:74:PHE:O	1:D:145:VAL:HA	2.04	0.58
1:A:283:ALA:HB3	1:A:286:SER:OG	2.04	0.58
1:A:478:PRO:HD2	1:B:436:PHE:CE1	2.39	0.58
1:B:78:VAL:HG12	1:B:156:LEU:HD21	1.85	0.58
1:B:117:GLN:H	1:B:117:GLN:CD	2.12	0.58
1:C:581:ARG:NH2	1:C:592:ASP:OD1	2.36	0.58
1:D:88:PRO:HG2	1:D:91:PHE:CD2	2.39	0.57
1:A:527:LEU:HG	1:A:531:MET:CE	2.34	0.57
1:C:92:ARG:HA	1:C:93:PRO:C	2.29	0.57
1:B:98:LEU:HD13	1:B:122:GLN:CB	2.34	0.57
1:B:115:LYS:HG2	1:B:116:PRO:CD	2.27	0.57
1:D:7:LEU:HD12	1:D:150:VAL:HB	1.86	0.57
1:D:412:LEU:HD13	1:D:420:ARG:HB3	1.87	0.57
1:A:340:THR:O	1:A:341:MET:HG3	2.05	0.57
1:B:580:GLU:O	1:B:583:LYS:HE2	2.04	0.57
1:B:136:LEU:HD11	1:B:141:TYR:HE1	1.68	0.57
1:C:355:CYS:HB2	1:C:547:MET:HE3	1.86	0.57
1:C:409:ARG:NE	1:C:409:ARG:HA	2.20	0.57
1:B:99:ASN:HB2	1:B:124:VAL:HG22	1.86	0.57
1:B:190:ASP:OD1	1:B:196:LYS:HE2	2.04	0.56
1:C:106:LEU:CD2	1:C:111:ILE:HD11	2.34	0.56
1:C:229:PRO:HA	1:C:248:LEU:HD23	1.87	0.56
1:A:334:ILE:HG21	1:A:552:VAL:HG12	1.87	0.56
1:C:409:ARG:NH2	1:C:413:ASP:OD1	2.37	0.56
1:D:334:ILE:HD11	1:D:550:THR:HG22	1.86	0.56
1:B:186:ALA:O	1:B:209:VAL:HG12	2.06	0.56
1:B:291:ALA:HB3	1:B:292:PRO:HD3	1.87	0.56
1:B:478:PRO:HA	1:B:481:LEU:HG	1.86	0.56
1:C:78:VAL:HG12	1:C:156:LEU:HD21	1.87	0.56
1:A:379:LEU:HD13	1:A:527:LEU:HD21	1.88	0.56
1:B:308:LYS:HZ3	1:B:308:LYS:HB2	1.71	0.56
1:A:74:PHE:O	1:A:145:VAL:HA	2.06	0.56
1:A:514:VAL:HG12	1:A:551:HIS:O	2.06	0.56
1:B:175:ALA:HB3	1:B:242:PRO:HG2	1.88	0.56
1:B:384:TRP:CH2	1:B:425:ILE:HD13	2.41	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:233:SER:HB3	1:D:297:MET:HE1	1.88	0.55
1:C:333:ASP:OD2	1:C:352:LYS:HE2	2.05	0.55
1:C:506:ILE:HG13	1:D:353:PHE:CE2	2.41	0.55
1:B:384:TRP:HH2	1:B:425:ILE:HD13	1.71	0.55
1:B:569:ARG:HB3	1:B:570:PRO:HD2	1.87	0.55
1:C:167:SER:HB2	5:C:862:HOH:O	2.05	0.55
1:A:469:ARG:HG2	1:B:549:ASN:ND2	2.21	0.55
1:B:421:GLU:CD	1:B:444:HIS:HE2	2.14	0.55
1:C:358:ARG:HG3	5:C:909:HOH:O	2.05	0.55
1:A:90:LYS:HG2	1:A:91:PHE:CD2	2.42	0.55
1:A:513:ASP:N	4:A:703:UMP:H2"	2.22	0.55
2:D:701:NAP:H52A	2:D:701:NAP:H8A	1.89	0.55
1:A:94:LEU:HD21	3:A:702:MMV:H20	1.88	0.55
1:D:137:LEU:HD13	1:D:148:ILE:HG12	1.89	0.55
1:B:403:TRP:CZ3	1:B:486:LEU:HD12	2.42	0.55
1:C:6:CYS:SG	1:C:170:TYR:HE1	2.30	0.55
1:A:161:LEU:HB3	1:A:209:VAL:HG21	1.89	0.55
1:D:434:ARG:HA	1:D:453:ASP:OD1	2.06	0.55
1:C:379:LEU:HD13	1:C:527:LEU:HD21	1.89	0.54
1:D:93:PRO:HB3	1:D:124:VAL:HG21	1.88	0.54
1:A:176:ARG:HD2	1:A:596:VAL:CG1	2.38	0.54
1:C:2:GLN:NE2	5:C:806:HOH:O	2.40	0.54
1:B:406:ASN:OD1	1:B:486:LEU:HD21	2.08	0.54
1:C:436:PHE:CZ	1:D:478:PRO:HD2	2.43	0.54
1:D:173:ARG:HB2	1:D:244:ASP:OD1	2.07	0.54
1:D:47:SER:O	1:D:48:ARG:HB2	2.07	0.54
1:A:78:VAL:HG12	1:A:156:LEU:HD21	1.90	0.54
1:D:181:ASP:OD1	1:D:182:VAL:HG23	2.07	0.54
1:D:490:HIS:H	1:D:490:HIS:CD2	2.24	0.54
1:A:415:ARG:O	1:A:417:LEU:HG	2.07	0.54
1:C:2:GLN:HG3	1:C:3:LYS:N	2.21	0.54
1:D:376:LYS:HD2	5:D:817:HOH:O	2.07	0.54
1:A:501:LYS:CE	1:A:538:LEU:HD23	2.38	0.53
1:C:43:PRO:O	1:C:46:ALA:HB3	2.07	0.53
1:D:136:LEU:HD11	1:D:140:GLU:OE1	2.09	0.53
1:B:412:LEU:HD13	1:B:420:ARG:HB3	1.91	0.53
1:B:435:HIS:O	1:B:436:PHE:C	2.50	0.53
1:B:470:ARG:HD2	5:B:840:HOH:O	2.09	0.53
1:C:311:ILE:HD11	1:C:561:LYS:HE2	1.90	0.53
1:B:81:ARG:CD	1:B:106:LEU:HD13	2.38	0.53
1:B:566:ARG:HB3	1:B:601:HIS:CE1	2.43	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:78:VAL:HG12	1:D:156:LEU:HD21	1.91	0.53
1:C:491:LEU:HD11	1:D:492:LEU:HD21	1.90	0.53
1:A:137:LEU:CD1	1:A:148:ILE:HD13	2.39	0.53
1:A:311:ILE:HD12	1:A:311:ILE:N	2.24	0.53
1:A:492:LEU:HD23	1:A:492:LEU:C	2.34	0.53
1:B:229:PRO:CA	1:B:248:LEU:HD23	2.38	0.53
1:A:289:ALA:O	1:A:292:PRO:HD2	2.09	0.53
1:A:412:LEU:HD13	1:A:420:ARG:HB3	1.91	0.53
1:A:435:HIS:O	1:A:436:PHE:C	2.52	0.53
1:C:541:LYS:HE3	5:C:838:HOH:O	2.09	0.52
1:A:10:ALA:O	1:A:17:ILE:HG22	2.10	0.52
1:C:407:VAL:HB	1:C:423:GLY:HA2	1.91	0.52
1:B:491:LEU:C	1:B:491:LEU:HD12	2.34	0.52
1:A:95:VAL:HG12	1:A:96:ASP:OD2	2.10	0.52
1:C:11:MET:HE1	1:C:184:PHE:CG	2.44	0.52
1:A:386:ILE:O	1:A:434:ARG:NH1	2.41	0.52
1:C:323:GLU:OE2	1:C:360:SER:OG	2.28	0.52
1:B:324:GLU:O	1:B:324:GLU:HG2	2.09	0.52
1:D:409:ARG:HE	1:D:413:ASP:CG	2.18	0.52
1:A:453:ASP:OD2	1:A:456:LYS:HB2	2.10	0.52
1:D:360:SER:O	1:D:361:LEU:HD23	2.09	0.52
1:B:303:LYS:HG3	1:B:304:LYS:N	2.25	0.51
1:B:455:LEU:HD21	1:B:585:ILE:HG12	1.91	0.51
1:C:216:GLU:OE1	1:C:216:GLU:N	2.42	0.51
1:A:347:VAL:HG12	1:A:555:ASN:HD21	1.75	0.51
1:D:176:ARG:HD2	1:D:596:VAL:CG1	2.40	0.51
1:C:340:THR:C	1:C:341:MET:HG3	2.36	0.51
1:D:187:PHE:CE1	1:D:190:ASP:HB3	2.45	0.51
1:A:118:ALA:HB3	1:A:121:GLN:HG2	1.92	0.51
1:A:37:ARG:HG3	1:B:296:TRP:HB2	1.93	0.51
1:A:391:ASN:OD1	1:A:393:ASN:HB2	2.11	0.51
1:A:123:ARG:NE	5:A:811:HOH:O	2.44	0.51
1:A:433:TRP:CE2	1:A:473:MET:HE3	2.46	0.51
1:C:470:ARG:HE	1:D:487:PRO:CG	2.20	0.51
1:D:355:CYS:HB2	1:D:547:MET:HE3	1.93	0.51
1:D:412:LEU:HD13	1:D:420:ARG:HB2	1.91	0.50
3:D:702:MMV:H2	3:D:702:MMV:C12	2.21	0.50
1:B:412:LEU:HD13	1:B:420:ARG:CB	2.41	0.50
1:D:413:ASP:OD1	1:D:418:PRO:HA	2.11	0.50
1:B:506:ILE:HG12	1:B:544:ILE:HB	1.93	0.50
1:D:231:PHE:CE2	1:D:319:PHE:CD2	3.00	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:469:ARG:NH2	4:B:703:UMP:OP3	2.34	0.50
1:A:455:LEU:O	1:A:459:ILE:HD12	2.11	0.49
1:B:371:LYS:HE3	1:B:603:ARG:HA	1.94	0.49
1:C:463:ARG:NH2	1:C:535:VAL:O	2.38	0.49
1:B:77:VAL:HG21	1:B:94:LEU:HD12	1.95	0.49
1:A:37:ARG:HG3	1:B:296:TRP:CB	2.43	0.49
1:D:79:MET:HA	1:D:152:GLY:O	2.12	0.49
1:A:581:ARG:HH22	1:A:589:THR:HG23	1.77	0.49
1:C:123:ARG:HG3	1:C:123:ARG:HH11	1.78	0.49
1:C:334:ILE:HD11	1:C:550:THR:HG22	1.95	0.49
1:D:88:PRO:HG2	1:D:91:PHE:HD2	1.78	0.49
1:D:224:GLU:OE2	1:D:253:LYS:HE3	2.12	0.49
1:A:492:LEU:HD11	1:B:491:LEU:HD11	1.94	0.49
1:B:406:ASN:CG	1:B:486:LEU:HD11	2.38	0.49
1:B:427:PRO:O	1:B:484:MET:HE2	2.12	0.49
1:B:136:LEU:HD13	1:B:136:LEU:C	2.38	0.49
1:D:384:TRP:HH2	1:D:425:ILE:HD13	1.78	0.49
1:B:491:LEU:HD23	1:B:510:ARG:HG2	1.94	0.49
1:D:42:THR:OG1	1:D:44:GLU:HG2	2.13	0.49
1:A:210:PHE:CD1	1:A:219:ARG:HG3	2.48	0.48
1:A:526:SER:O	1:A:530:LEU:HD13	2.13	0.48
1:B:537:ASN:ND2	5:B:809:HOH:O	2.46	0.48
1:B:92:ARG:HA	1:B:93:PRO:O	2.14	0.48
1:A:84:TRP:CE2	1:A:92:ARG:HD2	2.48	0.48
1:C:2:GLN:HA	1:C:138:GLU:OE1	2.14	0.48
1:A:216:GLU:OE1	1:A:216:GLU:N	2.42	0.48
1:B:15:ARG:HD2	1:B:184:PHE:O	2.13	0.48
1:C:181:ASP:OD1	1:C:182:VAL:HG23	2.13	0.48
1:C:506:ILE:HG13	1:D:353:PHE:CZ	2.49	0.48
1:D:371:LYS:HE3	1:D:603:ARG:CZ	2.44	0.48
1:A:356:THR:HG22	1:A:546:PHE:CD1	2.49	0.48
1:B:7:LEU:HD12	1:B:150:VAL:HB	1.95	0.48
1:D:376:LYS:HE2	1:D:376:LYS:HA	1.95	0.48
1:A:599:VAL:HG23	1:A:599:VAL:O	2.13	0.48
1:B:176:ARG:HD2	1:B:596:VAL:HG11	1.92	0.48
1:B:198:THR:HG22	1:B:198:THR:O	2.14	0.48
1:C:168:HIS:NE2	1:C:249:GLU:HG3	2.29	0.48
1:A:334:ILE:HD11	1:A:550:THR:HG22	1.96	0.48
1:A:603:ARG:NH1	1:A:603:ARG:HB3	2.29	0.48
1:B:228:ARG:HG3	1:B:228:ARG:NH1	2.28	0.48
1:C:2:GLN:HG3	1:C:3:LYS:H	1.77	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:314:VAL:HG11	1:C:567:GLU:HG3	1.95	0.48
1:A:489:CYS:SG	4:A:703:UMP:C6	3.06	0.48
1:B:136:LEU:CD1	1:B:141:TYR:HE1	2.27	0.48
1:C:79:MET:HA	1:C:152:GLY:O	2.14	0.48
1:B:19:ILE:HA	1:B:181:ASP:OD1	2.14	0.47
1:D:232:ILE:HG12	1:D:246:VAL:HG12	1.96	0.47
1:B:530:LEU:HD22	1:B:540:PRO:HG3	1.96	0.47
1:A:528:LEU:O	1:A:532:VAL:HG23	2.13	0.47
1:A:581:ARG:NH2	1:A:589:THR:HG23	2.29	0.47
1:D:14:LYS:HG2	1:D:177:GLU:HG2	1.95	0.47
1:A:216:GLU:H	1:A:216:GLU:CD	2.21	0.47
1:D:192:ILE:HD13	1:D:229:PRO:HG3	1.96	0.47
1:D:340:THR:HA	1:D:349:VAL:O	2.15	0.47
1:C:531:MET:HE3	1:C:588:PHE:CG	2.49	0.47
1:D:384:TRP:CH2	1:D:425:ILE:HD13	2.50	0.47
1:A:446:ASP:C	1:A:446:ASP:OD1	2.57	0.47
1:A:582:ILE:HG23	1:A:587:ASP:CB	2.38	0.47
1:B:580:GLU:H	1:B:580:GLU:HG2	1.55	0.47
1:A:342:ASP:HB3	1:A:346:GLY:HA2	1.97	0.47
1:B:333:ASP:CG	1:B:352:LYS:HE2	2.38	0.47
1:D:224:GLU:CD	1:D:253:LYS:HE3	2.39	0.47
1:A:431:PHE:CE1	1:A:440:TYR:HD1	2.33	0.47
1:D:94:LEU:HB3	1:D:97:ARG:NH2	2.30	0.46
1:A:27:HIS:CE1	1:A:32:PHE:CD1	3.04	0.46
1:A:93:PRO:HB3	1:A:124:VAL:CG2	2.45	0.46
1:A:501:LYS:NZ	1:A:537:ASN:HD22	2.13	0.46
1:B:168:HIS:HA	1:B:248:LEU:O	2.15	0.46
1:A:470:ARG:NH1	1:B:487:PRO:HG2	2.30	0.46
1:C:32:PHE:HB2	5:C:919:HOH:O	2.14	0.46
1:C:176:ARG:HD2	1:C:596:VAL:HG21	1.97	0.46
1:D:427:PRO:HB3	1:D:440:TYR:HB2	1.98	0.46
1:D:513:ASP:OD2	1:D:516:LEU:HB2	2.16	0.46
1:A:45:GLU:HG3	5:A:832:HOH:O	2.15	0.46
1:A:94:LEU:CD2	3:A:702:MMV:H20	2.45	0.46
1:B:489:CYS:SG	4:B:703:UMP:C6	3.09	0.46
1:C:456:LYS:HE2	1:C:456:LYS:HB3	1.75	0.46
1:B:168:HIS:NE2	1:B:249:GLU:HG3	2.31	0.46
1:C:7:LEU:HB2	1:C:169:LEU:HD22	1.98	0.46
1:C:445:THR:HB	1:C:447:TYR:CZ	2.51	0.46
1:A:30:THR:HB	1:A:243:TYR:OH	2.15	0.46
1:C:42:THR:OG1	1:C:45:GLU:HG3	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:465:ASN:HD21	1:D:344:ARG:HE	1.63	0.46
1:D:214:CYS:HB3	1:D:216:GLU:OE1	2.16	0.46
1:D:575:ASN:HB2	1:D:594:GLU:HG2	1.97	0.46
1:C:488:PRO:O	1:C:510:ARG:NE	2.48	0.46
1:B:81:ARG:HD3	1:B:106:LEU:HD13	1.97	0.46
1:D:210:PHE:CE2	1:D:219:ARG:HA	2.51	0.46
1:A:93:PRO:HB3	1:A:124:VAL:HG21	1.98	0.45
1:B:391:ASN:CG	1:B:443:MET:HE3	2.41	0.45
1:B:534:HIS:CD2	1:B:579:LYS:HD3	2.51	0.45
1:D:32:PHE:CE2	3:D:702:MMV:H7	2.51	0.45
1:A:594:GLU:HA	5:A:842:HOH:O	2.15	0.45
1:D:210:PHE:CD2	1:D:219:ARG:HG3	2.52	0.45
1:A:558:GLU:OE1	1:A:561:LYS:HD3	2.16	0.45
1:B:502:GLU:HB3	1:B:541:LYS:HB2	1.99	0.45
1:D:512:CYS:HB3	1:D:518:VAL:CG2	2.47	0.45
1:A:296:TRP:HB3	1:B:37:ARG:HG3	1.99	0.45
1:A:562:GLU:OE1	1:A:562:GLU:HA	2.15	0.45
1:B:378:VAL:HG23	1:B:520:PHE:CE2	2.52	0.45
1:C:14:LYS:HD2	1:C:177:GLU:OE2	2.17	0.45
1:C:48:ARG:CD	1:D:302:ARG:HD3	2.45	0.45
1:C:581:ARG:HD2	5:C:922:HOH:O	2.16	0.45
1:D:480:ALA:O	1:D:484:MET:HG3	2.16	0.45
1:A:19:ILE:HA	1:A:181:ASP:OD1	2.17	0.45
1:A:334:ILE:CG2	1:A:552:VAL:HG12	2.47	0.45
1:A:445:THR:HB	1:A:447:TYR:CZ	2.51	0.45
1:A:461:MET:HE3	1:A:461:MET:HA	1.98	0.45
1:B:30:THR:HB	1:B:243:TYR:OH	2.17	0.45
1:B:163:LEU:HB3	1:B:165:VAL:HG13	1.97	0.45
1:C:465:ASN:ND2	1:D:344:ARG:HE	2.15	0.45
1:C:489:CYS:SG	4:C:703:UMP:C6	3.09	0.45
1:A:78:VAL:HG12	1:A:156:LEU:CD2	2.47	0.45
1:A:92:ARG:HA	1:A:93:PRO:C	2.42	0.45
1:A:137:LEU:HD12	1:A:148:ILE:HD13	1.99	0.45
1:C:40:LYS:NZ	5:C:803:HOH:O	2.32	0.45
1:D:562:GLU:OE1	1:D:562:GLU:HA	2.16	0.45
1:C:491:LEU:HD12	1:C:492:LEU:HB2	1.99	0.45
1:D:175:ALA:HB3	1:D:242:PRO:HG2	1.98	0.45
1:D:327:TYR:CZ	1:D:331:ILE:HD11	2.51	0.45
1:D:343:ASP:OD1	1:D:343:ASP:N	2.50	0.45
1:C:106:LEU:HD21	1:C:111:ILE:HD11	1.99	0.44
1:A:357:MET:HE1	1:A:522:ILE:HD11	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:24:PRO:HG2	1:B:25:TRP:CZ3	2.52	0.44
1:C:18:GLY:HA2	1:C:24:PRO:HG3	1.99	0.44
1:D:5:VAL:HB	1:D:165:VAL:O	2.17	0.44
1:D:163:LEU:O	1:D:215:PRO:HB3	2.17	0.44
1:D:427:PRO:HD2	1:D:483:GLU:O	2.18	0.44
2:D:701:NAP:H6N	2:D:701:NAP:H2D	1.74	0.44
1:B:176:ARG:HD2	1:B:596:VAL:HG12	1.96	0.44
1:D:445:THR:HB	1:D:447:TYR:CZ	2.52	0.44
1:B:81:ARG:NE	2:B:701:NAP:O3X	2.48	0.44
1:D:175:ALA:HB2	1:D:570:PRO:HG2	2.00	0.44
1:D:360:SER:C	1:D:361:LEU:HD23	2.42	0.44
1:D:374:PHE:CE1	1:D:376:LYS:HB3	2.52	0.44
1:D:580:GLU:O	1:D:583:LYS:HE3	2.17	0.44
1:C:48:ARG:HD2	1:D:302:ARG:HD2	1.98	0.44
1:A:106:LEU:HA	1:A:106:LEU:HD23	1.61	0.44
1:C:191:ASP:CB	1:C:196:LYS:HG3	2.48	0.44
1:D:534:HIS:CE1	1:D:579:LYS:HG2	2.53	0.44
1:D:599:VAL:O	1:D:599:VAL:HG23	2.18	0.44
1:A:345:THR:OG1	1:A:347:VAL:HG23	2.17	0.44
1:A:378:VAL:HG23	1:A:520:PHE:CE2	2.53	0.44
1:A:436:PHE:CD1	1:B:478:PRO:HD2	2.53	0.44
1:C:410:GLU:H	1:C:410:GLU:CD	2.21	0.44
1:D:12:THR:HB	1:D:13:PRO:CD	2.48	0.44
1:D:39:THR:HA	1:D:149:PHE:CE2	2.53	0.44
1:D:81:ARG:HD2	1:D:85:GLU:OE2	2.18	0.44
1:A:309:GLU:OE1	1:A:309:GLU:HA	2.19	0.43
1:B:139:GLU:HG3	1:B:140:GLU:N	2.31	0.43
1:A:118:ALA:HB3	1:A:121:GLN:CG	2.48	0.43
1:D:367:LEU:HA	5:D:820:HOH:O	2.18	0.43
1:B:491:LEU:HD12	1:B:492:LEU:HB2	2.00	0.43
1:A:13:PRO:HD3	1:A:174:VAL:O	2.18	0.43
1:B:79:MET:HA	1:B:152:GLY:O	2.18	0.43
1:B:87:MET:SD	3:B:702:MMV:H15	2.58	0.43
1:A:79:MET:HA	1:A:152:GLY:O	2.19	0.43
1:A:90:LYS:HD2	1:A:91:PHE:CE2	2.54	0.43
1:B:74:PHE:CZ	1:B:144:SER:HB2	2.53	0.43
1:C:79:MET:C	1:C:156:LEU:HD22	2.43	0.43
1:C:351:SER:HB3	1:C:551:HIS:HB3	2.00	0.43
1:C:487:PRO:HG3	1:D:470:ARG:NH1	2.33	0.43
1:D:349:VAL:HG13	1:D:551:HIS:HB2	2.01	0.43
1:A:328:LEU:HD22	1:A:564:LEU:HD12	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:289:ALA:O	1:B:292:PRO:HD2	2.19	0.43
1:C:358:ARG:HH21	1:C:542:GLU:CD	2.27	0.43
1:D:603:ARG:HE	1:D:604:ILE:H	1.65	0.43
1:A:379:LEU:HD11	1:A:593:PHE:CE2	2.54	0.43
1:C:14:LYS:HD2	1:C:177:GLU:CD	2.44	0.43
1:C:349:VAL:HG13	1:C:551:HIS:HB2	2.01	0.43
1:D:92:ARG:HA	1:D:93:PRO:C	2.43	0.43
3:D:702:MMV:N7	3:D:702:MMV:C12	2.81	0.43
4:D:703:UMP:OP2	4:D:703:UMP:H3'	2.18	0.43
1:A:137:LEU:HD13	1:A:148:ILE:HD13	2.01	0.43
1:A:489:CYS:HB2	4:A:703:UMP:C5	2.54	0.43
1:A:512:CYS:SG	1:A:547:MET:HG2	2.59	0.43
1:C:73:ARG:NH1	1:C:146:ASP:OD1	2.52	0.43
1:A:163:LEU:HD12	1:A:163:LEU:HA	1.84	0.43
1:B:231:PHE:CD1	1:B:231:PHE:C	2.96	0.43
1:B:555:ASN:OD1	1:B:555:ASN:N	2.52	0.43
1:C:468:ASP:O	1:C:471:MET:HE2	2.19	0.43
1:C:501:LYS:HB3	1:C:538:LEU:HD23	2.01	0.43
1:A:356:THR:HG21	1:B:356:THR:HG21	2.01	0.42
1:C:224:GLU:HG3	5:C:868:HOH:O	2.18	0.42
1:A:558:GLU:OE1	1:A:558:GLU:HA	2.18	0.42
1:B:350:ILE:O	1:B:551:HIS:HA	2.20	0.42
1:B:371:LYS:CE	1:B:603:ARG:HA	2.49	0.42
1:C:7:LEU:HB2	1:C:169:LEU:CD2	2.50	0.42
1:C:557:VAL:O	1:C:561:LYS:HG3	2.20	0.42
1:D:310:LEU:HD12	1:D:310:LEU:HA	1.76	0.42
1:A:491:LEU:HD21	1:A:510:ARG:HB3	2.01	0.42
1:D:47:SER:O	1:D:48:ARG:CB	2.67	0.42
1:A:117:GLN:HA	1:A:117:GLN:NE2	2.31	0.42
1:C:478:PRO:HD2	1:D:436:PHE:CZ	2.55	0.42
1:D:73:ARG:NH2	1:D:146:ASP:OD1	2.53	0.42
1:D:376:LYS:HA	1:D:376:LYS:CE	2.49	0.42
1:A:77:VAL:HG21	1:A:94:LEU:HD12	2.01	0.42
1:A:229:PRO:HA	1:A:248:LEU:HD23	2.02	0.42
1:A:403:TRP:CZ3	1:A:486:LEU:HD12	2.54	0.42
1:B:24:PRO:HD2	1:B:25:TRP:CD2	2.54	0.42
1:A:367:LEU:HD11	1:A:373:VAL:HB	2.01	0.42
1:D:441:LYS:HD2	1:D:445:THR:HG21	2.02	0.42
1:D:454:GLN:HB2	1:D:473:MET:HG3	2.01	0.42
1:A:25:TRP:HB3	1:A:178:PHE:CE2	2.55	0.42
1:A:313:ALA:HB2	1:A:564:LEU:HG	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:328:LEU:HD11	1:A:370:THR:HG21	2.01	0.42
1:C:25:TRP:CD1	1:C:28:LEU:HG	2.55	0.42
1:D:237:SER:HB2	1:D:573:ILE:HD11	2.00	0.42
1:A:115:LYS:CG	1:A:116:PRO:HD2	2.47	0.42
1:B:237:SER:OG	1:B:363:GLN:O	2.31	0.42
1:B:539:LYS:HB3	1:B:539:LYS:HE2	1.83	0.42
1:D:345:THR:OG1	1:D:347:VAL:HG23	2.19	0.42
1:B:334:ILE:CD1	1:B:514:VAL:HG21	2.50	0.41
1:C:42:THR:HG23	1:C:45:GLU:OE2	2.20	0.41
1:C:427:PRO:O	1:C:484:MET:HE2	2.19	0.41
1:D:340:THR:O	1:D:341:MET:HG3	2.20	0.41
1:A:176:ARG:HD2	1:A:596:VAL:HG11	2.02	0.41
1:C:294:LEU:HA	1:C:294:LEU:HD23	1.77	0.41
1:C:94:LEU:CD2	3:C:702:MMV:H23	2.50	0.41
1:D:178:PHE:HZ	1:D:241:VAL:HG22	1.85	0.41
1:D:386:ILE:CD1	1:D:531:MET:HE1	2.50	0.41
1:A:123:ARG:HD3	5:A:811:HOH:O	2.20	0.41
1:A:320:ARG:HB3	1:A:325:PHE:CD2	2.55	0.41
1:A:569:ARG:HB3	1:A:570:PRO:HD2	2.03	0.41
1:B:468:ASP:OD1	1:B:469:ARG:N	2.54	0.41
1:B:490:HIS:CD2	1:B:490:HIS:H	2.37	0.41
1:C:74:PHE:CE1	1:C:98:LEU:HB2	2.54	0.41
1:D:441:LYS:N	1:D:447:TYR:OH	2.51	0.41
1:A:296:TRP:CB	1:B:37:ARG:HG3	2.51	0.41
1:A:403:TRP:HB2	5:A:839:HOH:O	2.20	0.41
1:A:566:ARG:CZ	1:A:604:ILE:HD13	2.50	0.41
1:B:390:THR:O	1:B:425:ILE:HG12	2.20	0.41
1:C:23:LEU:HA	1:C:24:PRO:HD3	1.86	0.41
1:D:96:ASP:O	1:D:97:ARG:HG3	2.20	0.41
1:A:237:SER:HA	1:A:241:VAL:O	2.20	0.41
1:A:470:ARG:HH11	1:B:487:PRO:HG2	1.84	0.41
1:C:187:PHE:CE1	1:C:190:ASP:HB3	2.56	0.41
1:C:502:GLU:HB3	1:C:541:LYS:HB2	2.01	0.41
1:A:300:GLU:OE1	1:A:300:GLU:HA	2.21	0.41
1:B:44:GLU:H	1:B:44:GLU:CD	2.28	0.41
1:C:18:GLY:CA	1:C:24:PRO:HG3	2.51	0.41
1:D:386:ILE:HD12	1:D:531:MET:HE1	2.02	0.41
1:A:7:LEU:HD13	1:A:166:ALA:CB	2.51	0.41
1:A:213:PHE:HB2	1:A:225:ALA:HB2	2.01	0.41
1:A:231:PHE:HB3	1:A:247:VAL:HB	2.02	0.41
1:B:439:ALA:N	5:B:805:HOH:O	2.38	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:313:ALA:O	1:C:314:VAL:C	2.64	0.41
1:A:314:VAL:HG11	1:A:567:GLU:HG3	2.02	0.41
1:B:384:TRP:CD1	1:B:389:ASP:HB3	2.56	0.41
1:C:340:THR:O	1:C:341:MET:HG3	2.21	0.41
1:C:349:VAL:CG1	1:C:551:HIS:CB	2.95	0.41
1:C:518:VAL:O	1:C:522:ILE:HG13	2.21	0.41
1:D:384:TRP:CD1	1:D:389:ASP:HB3	2.56	0.41
1:B:41:THR:HG22	1:B:45:GLU:HB3	2.02	0.41
1:B:219:ARG:O	1:B:219:ARG:HG2	2.21	0.41
1:A:356:THR:HA	1:A:545:HIS:O	2.20	0.40
1:A:509:GLN:NE2	1:A:512:CYS:HA	2.37	0.40
1:B:230:ILE:HD13	1:B:230:ILE:HG21	1.87	0.40
1:B:468:ASP:OD1	1:B:470:ARG:N	2.46	0.40
1:B:513:ASP:HB2	4:B:703:UMP:H1'	2.03	0.40
1:A:164:GLY:O	1:A:250:LYS:HE2	2.21	0.40
1:B:224:GLU:CD	1:B:253:LYS:HD2	2.47	0.40
1:C:455:LEU:HD21	1:C:585:ILE:HG12	2.03	0.40
1:D:301:ASP:HB3	1:D:305:ARG:NH1	2.36	0.40
1:D:604:ILE:HD12	1:D:604:ILE:N	2.36	0.40
1:A:322:HIS:HE1	1:A:571:PHE:CE1	2.39	0.40
1:B:323:GLU:OE2	1:B:360:SER:OG	2.35	0.40
1:C:209:VAL:HA	5:C:830:HOH:O	2.20	0.40
1:D:603:ARG:HE	1:D:604:ILE:HD13	1.87	0.40
1:C:74:PHE:O	1:C:145:VAL:HA	2.21	0.40
1:C:237:SER:HB2	1:C:573:ILE:HD11	2.02	0.40
1:D:156:LEU:HD12	1:D:156:LEU:HA	1.80	0.40
1:D:391:ASN:CG	1:D:443:MET:HE3	2.46	0.40
1:B:98:LEU:HD22	1:B:141:TYR:CE2	2.57	0.40
1:B:417:LEU:HB3	1:B:420:ARG:HG2	2.03	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	A	540/610 (88%)	509 (94%)	31 (6%)	0	100	100
1	B	533/610 (87%)	506 (95%)	27 (5%)	0	100	100
1	C	532/610 (87%)	513 (96%)	19 (4%)	0	100	100
1	D	534/610 (88%)	519 (97%)	15 (3%)	0	100	100
All	All	2139/2440 (88%)	2047 (96%)	92 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	478/525 (91%)	462 (97%)	16 (3%)	33	61
1	B	473/525 (90%)	463 (98%)	10 (2%)	47	74
1	C	472/525 (90%)	457 (97%)	15 (3%)	34	62
1	D	474/525 (90%)	462 (98%)	12 (2%)	42	69
All	All	1897/2100 (90%)	1844 (97%)	53 (3%)	38	66

All (53) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	100	ILE
1	A	117	GLN
1	A	142	LYS
1	A	156	LEU
1	A	158	GLU
1	A	254	THR
1	A	347	VAL
1	A	349	VAL
1	A	360	SER
1	A	410	GLU
1	A	422	VAL
1	A	458	VAL
1	A	459	ILE

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Mol	Chain	Res	Type
1	A	552	VAL
1	A	589	THR
1	A	596	VAL
1	B	42	THR
1	B	139	GLU
1	B	156	LEU
1	B	220	GLU
1	B	299	GLU
1	B	349	VAL
1	B	489	CYS
1	B	497	VAL
1	B	524	SER
1	B	580	GLU
1	C	36	SER
1	C	47	SER
1	C	92	ARG
1	C	100	ILE
1	C	192	ILE
1	C	197	SER
1	C	311	ILE
1	C	360	SER
1	C	368	LEU
1	C	409	ARG
1	C	410	GLU
1	C	489	CYS
1	C	554	THR
1	C	583	LYS
1	C	596	VAL
1	D	7	LEU
1	D	109	GLU
1	D	156	LEU
1	D	177	GLU
1	D	197	SER
1	D	356	THR
1	D	402	ILE
1	D	472	LEU
1	D	489	CYS
1	D	552	VAL
1	D	579	LYS
1	D	603	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	27	HIS
1	A	117	GLN
1	A	537	ASN
1	A	555	ASN
1	B	393	ASN
1	B	537	ASN
1	C	2	GLN
1	C	27	HIS
1	C	117	GLN
1	C	337	ASN
1	C	465	ASN
1	D	147	GLN
1	D	406	ASN
1	D	460	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

12 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	$\# Z > 2$
3	MMV	A	702	-	26,27,27	1.66	3 (11%)	32,35,35	1.56	6 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	MMV	C	702	-	26,27,27	1.66	4 (15%)	32,35,35	1.72	7 (21%)
4	UMP	A	703	-	21,21,21	0.86	1 (4%)	31,31,31	1.53	5 (16%)
2	NAP	B	701	-	49,52,52	2.59	13 (26%)	69,80,80	1.84	17 (24%)
2	NAP	C	701	-	49,52,52	2.47	10 (20%)	69,80,80	1.78	18 (26%)
2	NAP	D	701	-	49,52,52	2.37	11 (22%)	69,80,80	1.74	16 (23%)
4	UMP	D	703	-	21,21,21	0.99	2 (9%)	31,31,31	1.65	7 (22%)
4	UMP	B	703	-	21,21,21	0.82	1 (4%)	31,31,31	1.73	6 (19%)
4	UMP	C	703	-	21,21,21	0.80	1 (4%)	31,31,31	1.59	5 (16%)
3	MMV	B	702	-	26,27,27	1.65	2 (7%)	32,35,35	1.79	7 (21%)
2	NAP	A	701	-	49,52,52	2.30	15 (30%)	69,80,80	1.74	14 (20%)
3	MMV	D	702	-	26,27,27	1.85	3 (11%)	32,35,35	1.86	5 (15%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	MMV	A	702	-	-	2/15/15/15	0/2/2/2
3	MMV	C	702	-	-	1/15/15/15	0/2/2/2
4	UMP	A	703	-	-	5/10/22/22	0/2/2/2
2	NAP	B	701	-	-	8/35/67/67	0/5/5/5
2	NAP	C	701	-	-	6/35/67/67	0/5/5/5
2	NAP	D	701	-	-	7/35/67/67	0/5/5/5
4	UMP	D	703	-	-	6/10/22/22	0/2/2/2
4	UMP	B	703	-	-	5/10/22/22	0/2/2/2
4	UMP	C	703	-	-	1/10/22/22	0/2/2/2
3	MMV	B	702	-	-	8/15/15/15	0/2/2/2
2	NAP	A	701	-	-	6/35/67/67	0/5/5/5
3	MMV	D	702	-	-	6/15/15/15	0/2/2/2

All (66) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	701	NAP	P2B-O2B	9.73	1.77	1.59
2	D	701	NAP	P2B-O2B	9.52	1.77	1.59
2	B	701	NAP	P2B-O2B	9.28	1.76	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	NAP	P2B-O2B	8.78	1.75	1.59
2	C	701	NAP	C4N-C3N	8.23	1.53	1.39
2	B	701	NAP	C4N-C3N	7.17	1.51	1.39
3	D	702	MMV	C3-N8	5.94	1.45	1.33
3	A	702	MMV	C3-N8	5.91	1.45	1.33
2	B	701	NAP	C5N-C4N	5.83	1.51	1.38
2	D	701	NAP	C4N-C3N	5.77	1.49	1.39
2	A	701	NAP	C4N-C3N	5.72	1.49	1.39
2	D	701	NAP	C5N-C4N	5.37	1.50	1.38
3	B	702	MMV	C3-N8	5.25	1.44	1.33
2	C	701	NAP	C5N-C4N	5.16	1.49	1.38
2	B	701	NAP	C3N-C7N	-5.14	1.42	1.50
3	C	702	MMV	C3-N8	5.05	1.44	1.33
3	D	702	MMV	C1-N7	4.94	1.46	1.34
3	B	702	MMV	C1-N7	4.57	1.45	1.34
3	C	702	MMV	C1-N7	4.45	1.45	1.34
2	A	701	NAP	C5N-C4N	4.37	1.48	1.38
2	B	701	NAP	PN-O5D	4.26	1.76	1.59
3	A	702	MMV	C1-N7	4.20	1.44	1.34
2	C	701	NAP	C7N-N7N	4.19	1.41	1.33
2	C	701	NAP	PN-O5D	4.04	1.75	1.59
2	C	701	NAP	C6N-N1N	3.97	1.45	1.35
2	D	701	NAP	PN-O5D	3.87	1.75	1.59
2	D	701	NAP	C2N-N1N	3.84	1.39	1.35
2	A	701	NAP	PN-O5D	3.77	1.74	1.59
2	D	701	NAP	C3N-C7N	-3.57	1.45	1.50
2	A	701	NAP	O2B-C2B	-3.57	1.31	1.44
2	B	701	NAP	C7N-N7N	3.55	1.39	1.33
2	D	701	NAP	O2B-C2B	-3.45	1.31	1.44
2	B	701	NAP	O2B-C2B	-3.45	1.31	1.44
2	A	701	NAP	C7N-N7N	3.39	1.39	1.33
2	B	701	NAP	C2N-N1N	3.11	1.38	1.35
2	D	701	NAP	C6N-N1N	3.02	1.42	1.35
2	B	701	NAP	C6N-N1N	2.99	1.42	1.35
2	A	701	NAP	C5A-C4A	2.93	1.44	1.39
2	B	701	NAP	C2A-N1A	2.87	1.39	1.33
2	B	701	NAP	C4A-N3A	2.85	1.40	1.34
2	D	701	NAP	C7N-N7N	2.80	1.38	1.33
2	A	701	NAP	C2D-C1D	2.80	1.58	1.53
2	A	701	NAP	C8A-N9A	2.63	1.42	1.37
2	A	701	NAP	C6N-C5N	-2.59	1.32	1.38
2	C	701	NAP	O2B-C2B	-2.59	1.34	1.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	NAP	C2N-C3N	-2.56	1.35	1.39
2	D	701	NAP	C6N-C5N	-2.51	1.33	1.38
2	B	701	NAP	C5A-C4A	2.30	1.43	1.39
2	A	701	NAP	C3D-C4D	2.27	1.58	1.53
2	A	701	NAP	C2A-N1A	2.24	1.38	1.33
4	C	703	UMP	C6-C5	2.22	1.40	1.35
3	A	702	MMV	C1-N2	-2.21	1.31	1.35
3	C	702	MMV	C1-N2	-2.21	1.31	1.35
4	D	703	UMP	C2-N1	2.21	1.42	1.38
2	A	701	NAP	C3N-C7N	-2.21	1.47	1.50
2	B	701	NAP	O4D-C1D	2.15	1.44	1.41
3	D	702	MMV	C1-N2	-2.13	1.32	1.35
3	C	702	MMV	C3-N2	-2.12	1.31	1.35
4	D	703	UMP	C6-C5	2.10	1.39	1.35
2	A	701	NAP	C8A-N7A	2.10	1.35	1.31
2	C	701	NAP	C5A-C4A	2.10	1.42	1.39
2	D	701	NAP	O4D-C1D	2.09	1.44	1.41
2	C	701	NAP	C6N-C5N	-2.09	1.34	1.38
4	A	703	UMP	C6-C5	2.08	1.39	1.35
2	C	701	NAP	C2N-N1N	2.02	1.37	1.35
4	B	703	UMP	C6-C5	2.00	1.39	1.35

All (113) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	701	NAP	C5N-C4N-C3N	-7.18	111.85	120.34
2	A	701	NAP	C5N-C4N-C3N	-6.83	112.26	120.34
2	D	701	NAP	C5N-C4N-C3N	-6.24	112.96	120.34
2	C	701	NAP	C5N-C4N-C3N	-5.87	113.40	120.34
4	B	703	UMP	C4-N3-C2	-5.37	119.49	126.58
3	D	702	MMV	C3-N2-C1	5.09	122.61	116.99
3	D	702	MMV	C3-N4-C5	4.96	120.37	116.24
2	B	701	NAP	PN-O3-PA	-4.76	116.48	132.83
2	D	701	NAP	PN-O3-PA	-4.72	116.62	132.83
3	C	702	MMV	C3-N4-C5	4.64	120.11	116.24
4	B	703	UMP	N3-C2-N1	4.63	121.04	114.89
3	B	702	MMV	C3-N4-C5	4.61	120.08	116.24
4	C	703	UMP	C4-N3-C2	-4.54	120.59	126.58
2	B	701	NAP	C2N-C3N-C4N	4.43	123.28	118.26
2	C	701	NAP	PN-O3-PA	-4.26	118.22	132.83
2	A	701	NAP	PN-O3-PA	-4.25	118.23	132.83
3	A	702	MMV	C3-N4-C5	4.24	119.78	116.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	703	UMP	C4-N3-C2	-4.19	121.05	126.58
4	D	703	UMP	C4-N3-C2	-4.15	121.11	126.58
3	C	702	MMV	C3-N2-C1	3.99	121.39	116.99
2	C	701	NAP	C2N-C3N-C4N	3.84	122.61	118.26
2	D	701	NAP	C2N-C3N-C4N	3.77	122.53	118.26
4	C	703	UMP	N3-C2-N1	3.76	119.89	114.89
2	C	701	NAP	O2B-P2B-O1X	-3.75	94.93	109.39
2	A	701	NAP	O7N-C7N-N7N	-3.61	117.45	122.58
3	B	702	MMV	C3-N2-C1	3.58	120.94	116.99
2	A	701	NAP	C2N-C3N-C4N	3.45	122.17	118.26
4	D	703	UMP	C1'-N1-C2	3.38	124.30	117.64
4	A	703	UMP	N3-C2-N1	3.32	119.30	114.89
4	D	703	UMP	N3-C2-N1	3.26	119.22	114.89
3	B	702	MMV	N7-C1-N2	3.26	121.65	117.03
3	A	702	MMV	C3-N2-C1	3.24	120.57	116.99
4	B	703	UMP	C5-C4-N3	3.23	119.67	114.84
4	C	703	UMP	O4-C4-C5	-3.11	119.70	125.16
4	D	703	UMP	C5-C4-N3	3.07	119.44	114.84
2	B	701	NAP	O7N-C7N-C3N	3.07	123.31	119.63
3	B	702	MMV	C6-C5-N4	-3.06	118.67	122.46
4	A	703	UMP	C5-C4-N3	3.05	119.41	114.84
4	A	703	UMP	O4-C4-C5	-3.04	119.82	125.16
2	C	701	NAP	O7N-C7N-N7N	-3.03	118.27	122.58
2	B	701	NAP	O2B-P2B-O1X	-3.01	97.78	109.39
4	C	703	UMP	C5-C4-N3	2.98	119.30	114.84
2	D	701	NAP	O7N-C7N-C3N	2.89	123.09	119.63
2	C	701	NAP	O2B-C2B-C1B	-2.89	99.71	110.10
2	C	701	NAP	C3B-C2B-C1B	-2.84	97.56	102.89
4	B	703	UMP	O4-C4-C5	-2.77	120.29	125.16
2	B	701	NAP	O3X-P2B-O2X	2.75	118.13	107.64
3	D	702	MMV	N4-C3-N2	-2.72	121.16	125.42
4	D	703	UMP	O4-C4-C5	-2.70	120.41	125.16
2	C	701	NAP	N3A-C4A-N9A	2.68	131.50	127.08
2	A	701	NAP	O2B-C2B-C1B	-2.66	100.51	110.10
3	C	702	MMV	N8-C3-N4	2.66	121.39	117.25
2	D	701	NAP	PA-O5B-C5B	-2.65	106.11	121.68
2	B	701	NAP	N3A-C4A-N9A	2.65	131.44	127.08
2	D	701	NAP	O2B-P2B-O1X	-2.64	99.19	109.39
2	A	701	NAP	O2B-P2B-O1X	-2.63	99.24	109.39
4	D	703	UMP	C1'-N1-C6	-2.63	116.35	121.55
2	C	701	NAP	C2B-C1B-N9A	2.63	117.96	113.53
2	D	701	NAP	O3X-P2B-O2X	2.62	117.65	107.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	703	UMP	O2-C2-N1	-2.61	119.31	122.79
2	C	701	NAP	O3X-P2B-O2X	2.60	117.58	107.64
2	A	701	NAP	O3X-P2B-O2X	2.59	117.54	107.64
2	D	701	NAP	O7N-C7N-N7N	-2.59	118.90	122.58
2	B	701	NAP	O3X-P2B-O2B	-2.59	94.41	105.99
3	A	702	MMV	O25-C24-C23	2.55	122.23	114.03
2	A	701	NAP	O7N-C7N-C3N	2.53	122.66	119.63
4	C	703	UMP	C1'-N1-C2	2.49	122.56	117.64
3	C	702	MMV	C6-C5-N4	-2.49	119.37	122.46
2	C	701	NAP	O7N-C7N-C3N	2.49	122.61	119.63
2	D	701	NAP	PN-O5D-C5D	-2.49	107.10	121.68
2	D	701	NAP	O2B-C2B-C1B	-2.47	101.22	110.10
2	C	701	NAP	PA-O5B-C5B	-2.46	107.23	121.68
2	B	701	NAP	C2A-N1A-C6A	-2.45	114.57	118.77
2	D	701	NAP	C2A-N1A-C6A	-2.44	114.58	118.77
4	D	703	UMP	O2-C2-N3	-2.42	116.99	121.50
3	C	702	MMV	O15-C16-C17	2.41	118.94	115.78
2	D	701	NAP	O3X-P2B-O2B	-2.41	95.21	105.99
2	C	701	NAP	PN-O5D-C5D	-2.40	107.63	121.68
2	C	701	NAP	C2A-N1A-C6A	-2.37	114.69	118.77
3	A	702	MMV	O15-C16-C17	2.37	118.88	115.78
3	B	702	MMV	C22-C17-C16	-2.36	117.48	121.14
2	B	701	NAP	O7N-C7N-N7N	-2.36	119.22	122.58
2	C	701	NAP	C5A-C4A-N3A	-2.35	123.68	126.75
2	B	701	NAP	C5A-C4A-N3A	-2.35	123.68	126.75
3	B	702	MMV	C10-C9-C5	-2.34	109.12	114.88
2	A	701	NAP	PA-O5B-C5B	-2.33	107.99	121.68
2	B	701	NAP	PA-O5B-C5B	-2.31	108.15	121.68
4	B	703	UMP	O4'-C1'-N1	2.31	111.98	107.86
2	C	701	NAP	C5A-C6A-N6A	-2.30	118.42	123.43
2	A	701	NAP	PN-O5D-C5D	-2.30	108.22	121.68
2	B	701	NAP	PN-O5D-C5D	-2.29	108.24	121.68
3	A	702	MMV	C6-C5-N4	-2.26	119.66	122.46
2	A	701	NAP	C3B-C2B-C1B	-2.25	98.65	102.89
3	C	702	MMV	N4-C3-N2	-2.25	121.89	125.42
2	D	701	NAP	O4B-C4B-C3B	2.25	109.56	105.11
2	C	701	NAP	C2B-C3B-C4B	-2.23	97.14	101.99
2	D	701	NAP	N3A-C4A-N9A	2.23	130.76	127.08
3	A	702	MMV	N4-C3-N2	-2.20	121.97	125.42
2	B	701	NAP	O2B-C2B-C1B	-2.18	102.24	110.10
3	B	702	MMV	N4-C3-N2	-2.17	122.01	125.42
4	A	703	UMP	C1'-N1-C2	2.16	121.89	117.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	702	MMV	C6-C1-N7	2.13	125.49	121.76
2	A	701	NAP	N3A-C4A-N9A	2.12	130.58	127.08
3	D	702	MMV	O11-C6-C5	-2.10	116.10	119.17
2	B	701	NAP	C3B-C2B-C1B	-2.08	98.98	102.89
3	C	702	MMV	O25-C24-C23	2.08	120.70	114.03
2	D	701	NAP	C5A-C4A-N3A	-2.07	124.05	126.75
2	A	701	NAP	C2A-N1A-C6A	-2.05	115.25	118.77
2	A	701	NAP	O3X-P2B-O2B	-2.02	96.94	105.99
2	D	701	NAP	O2A-PA-O1A	2.01	122.20	112.24
2	C	701	NAP	O2A-PA-O1A	2.00	122.15	112.24
2	B	701	NAP	C5D-C4D-C3D	-2.00	107.67	115.18
2	B	701	NAP	O2X-P2B-O1X	2.00	118.51	110.68

There are no chirality outliers.

All (61) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	701	NAP	C2B-O2B-P2B-O2X
2	A	701	NAP	PA-O3-PN-O5D
2	A	701	NAP	O4D-C1D-N1N-C2N
2	A	701	NAP	O4D-C1D-N1N-C6N
2	A	701	NAP	C2D-C1D-N1N-C2N
2	B	701	NAP	O4D-C1D-N1N-C2N
2	B	701	NAP	O4D-C1D-N1N-C6N
2	B	701	NAP	C2D-C1D-N1N-C2N
2	C	701	NAP	PA-O3-PN-O5D
2	C	701	NAP	O4D-C1D-N1N-C2N
2	C	701	NAP	O4D-C1D-N1N-C6N
2	C	701	NAP	C2D-C1D-N1N-C2N
2	D	701	NAP	C2B-O2B-P2B-O2X
2	D	701	NAP	PA-O3-PN-O5D
2	D	701	NAP	O4D-C1D-N1N-C2N
2	D	701	NAP	O4D-C1D-N1N-C6N
2	D	701	NAP	C2D-C1D-N1N-C2N
2	D	701	NAP	C2D-C1D-N1N-C6N
3	D	702	MMV	C1-C6-O11-C12
3	D	702	MMV	C5-C6-O11-C12
4	A	703	UMP	O4'-C4'-C5'-O5'
4	A	703	UMP	C5'-O5'-P-OP2
4	A	703	UMP	C5'-O5'-P-OP3
4	B	703	UMP	C5'-O5'-P-OP1
4	B	703	UMP	C5'-O5'-P-OP2

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Mol	Chain	Res	Type	Atoms
4	B	703	UMP	C5'-O5'-P-OP3
4	D	703	UMP	C5'-O5'-P-OP2
4	D	703	UMP	C5'-O5'-P-OP3
4	B	703	UMP	C3'-C4'-C5'-O5'
4	B	703	UMP	O4'-C4'-C5'-O5'
3	B	702	MMV	C12-C13-C14-O15
4	A	703	UMP	C3'-C4'-C5'-O5'
3	B	702	MMV	O11-C12-C13-C14
3	D	702	MMV	C12-C13-C14-O15
4	A	703	UMP	C5'-O5'-P-OP1
4	D	703	UMP	C5'-O5'-P-OP1
2	B	701	NAP	C4D-C5D-O5D-PN
2	B	701	NAP	PA-O3-PN-O5D
4	D	703	UMP	C4'-C5'-O5'-P
4	D	703	UMP	O4'-C4'-C5'-O5'
2	D	701	NAP	C4D-C5D-O5D-PN
2	B	701	NAP	C5D-O5D-PN-O1N
4	C	703	UMP	O4'-C4'-C5'-O5'
3	B	702	MMV	C16-C17-C22-C23
3	B	702	MMV	C21-C16-O15-C14
2	A	701	NAP	C4D-C5D-O5D-PN
3	B	702	MMV	C18-C17-C22-C23
2	C	701	NAP	C4D-C5D-O5D-PN
3	C	702	MMV	C16-C17-C22-C23
3	D	702	MMV	C16-C17-C22-C23
3	B	702	MMV	C17-C16-O15-C14
3	A	702	MMV	C22-C23-C24-O26
3	D	702	MMV	C22-C23-C24-O26
3	B	702	MMV	C22-C23-C24-O25
3	D	702	MMV	C22-C23-C24-O25
3	B	702	MMV	C22-C23-C24-O26
3	A	702	MMV	C22-C23-C24-O25
2	B	701	NAP	C5D-O5D-PN-O3
2	B	701	NAP	C2D-C1D-N1N-C6N
4	D	703	UMP	C3'-C4'-C5'-O5'
2	C	701	NAP	C5D-O5D-PN-O1N

There are no ring outliers.

11 monomers are involved in 26 short contacts:

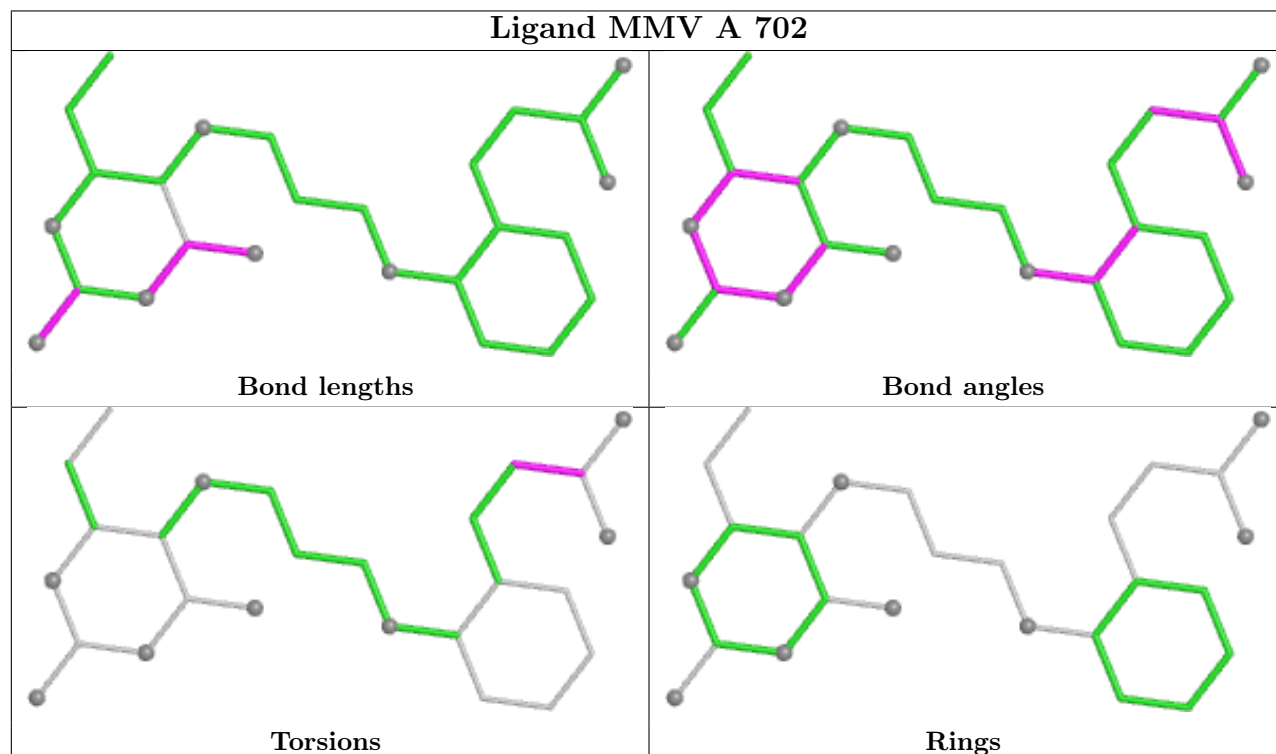
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	702	MMV	2	0

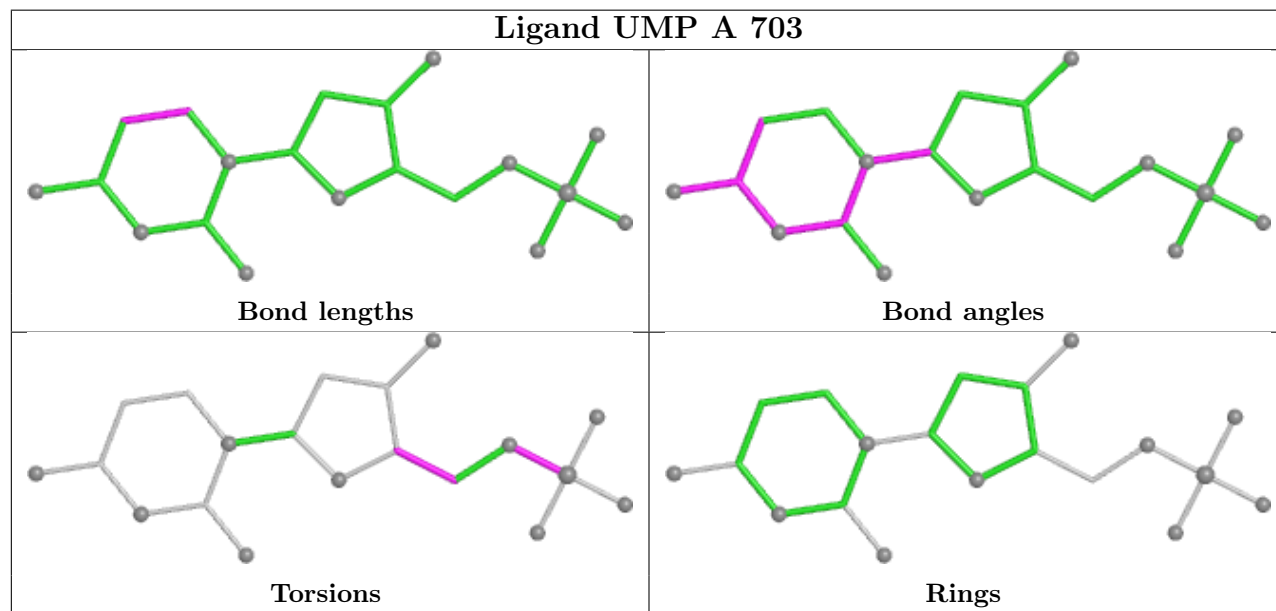
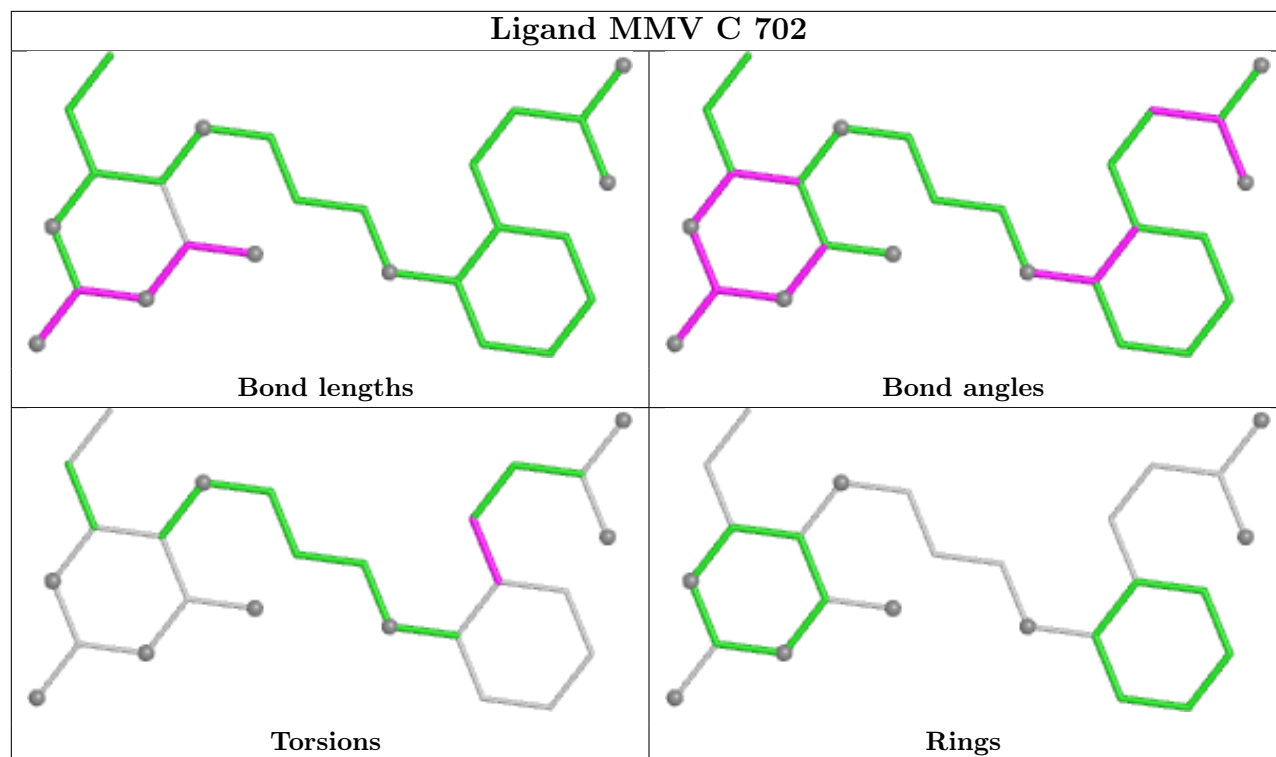
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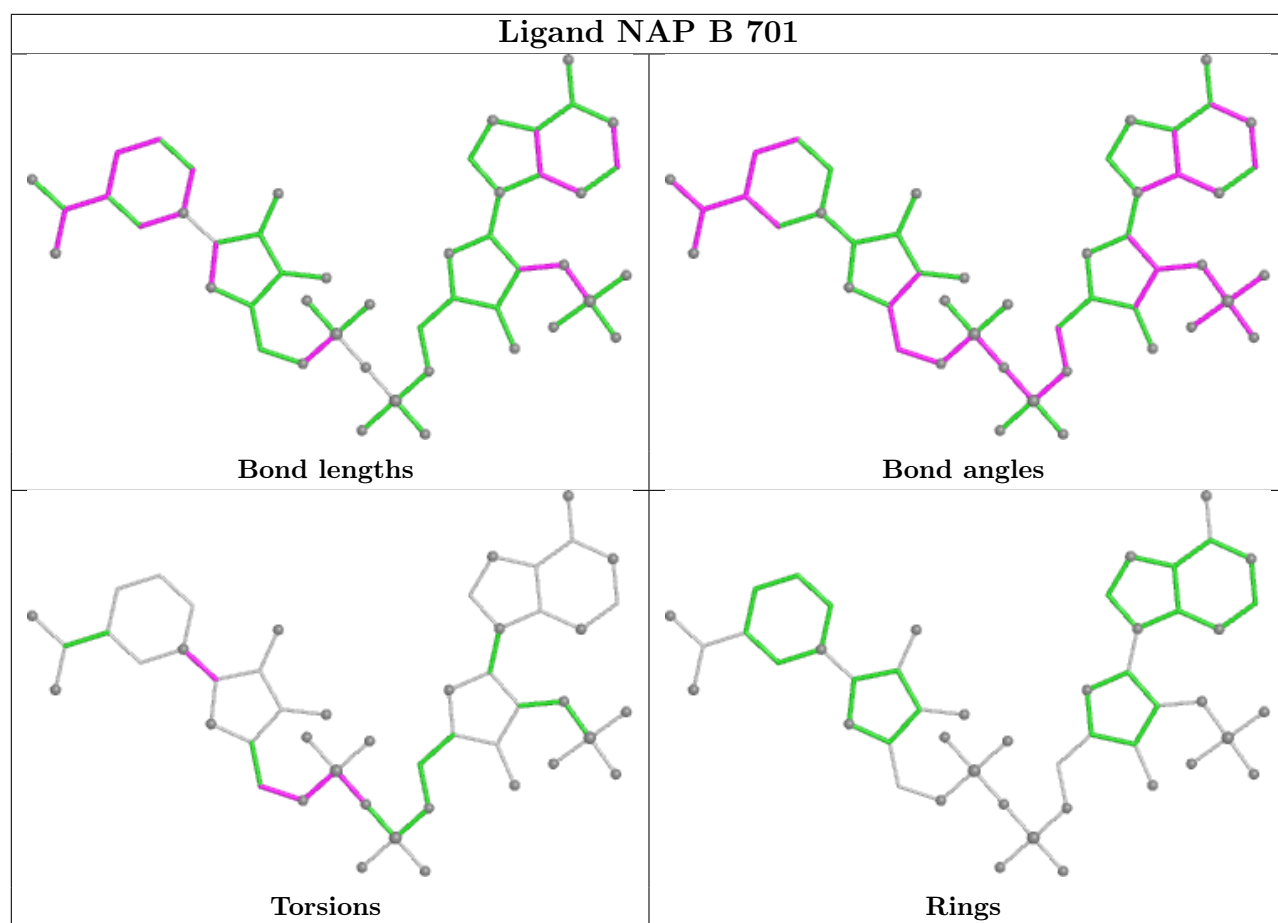
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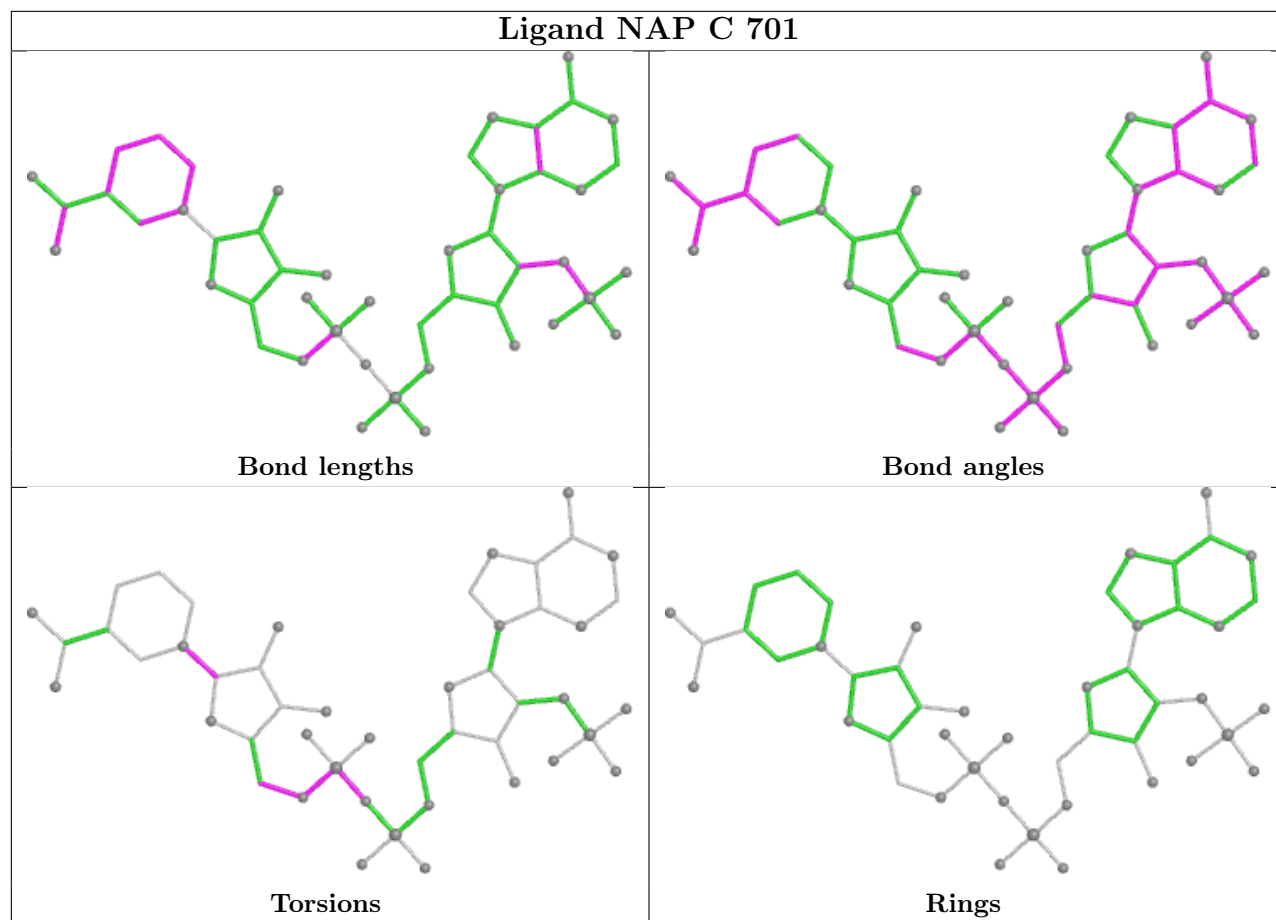
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	702	MMV	1	0
4	A	703	UMP	4	0
2	B	701	NAP	1	0
2	D	701	NAP	3	0
4	D	703	UMP	1	0
4	B	703	UMP	3	0
4	C	703	UMP	2	0
3	B	702	MMV	1	0
2	A	701	NAP	1	0
3	D	702	MMV	7	0

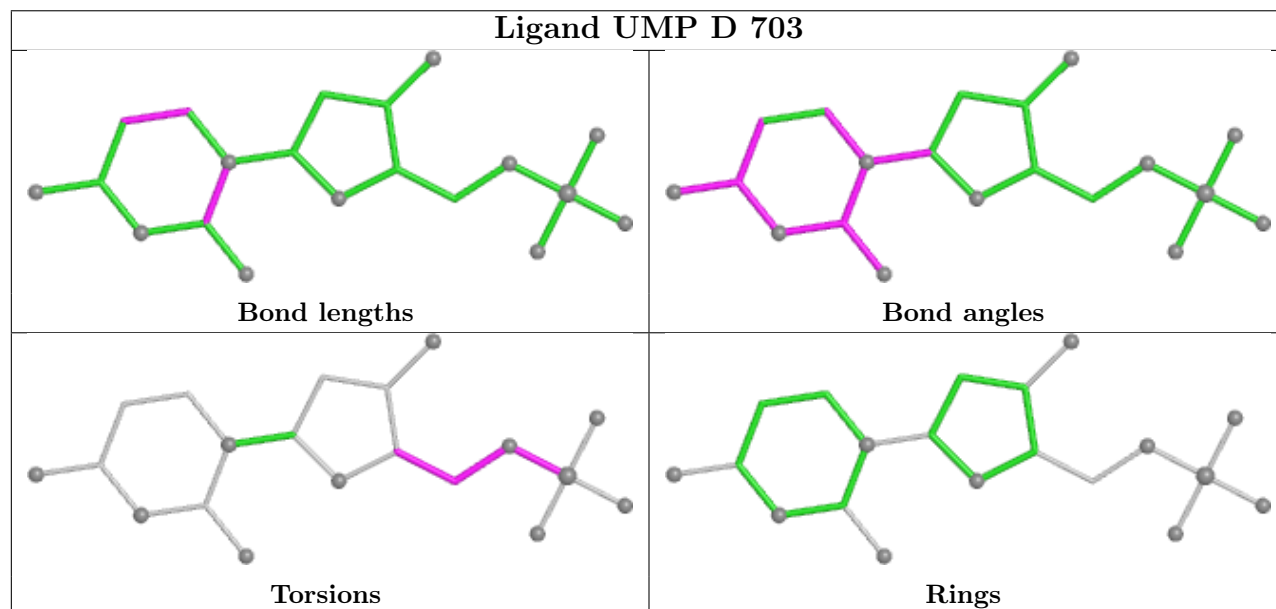
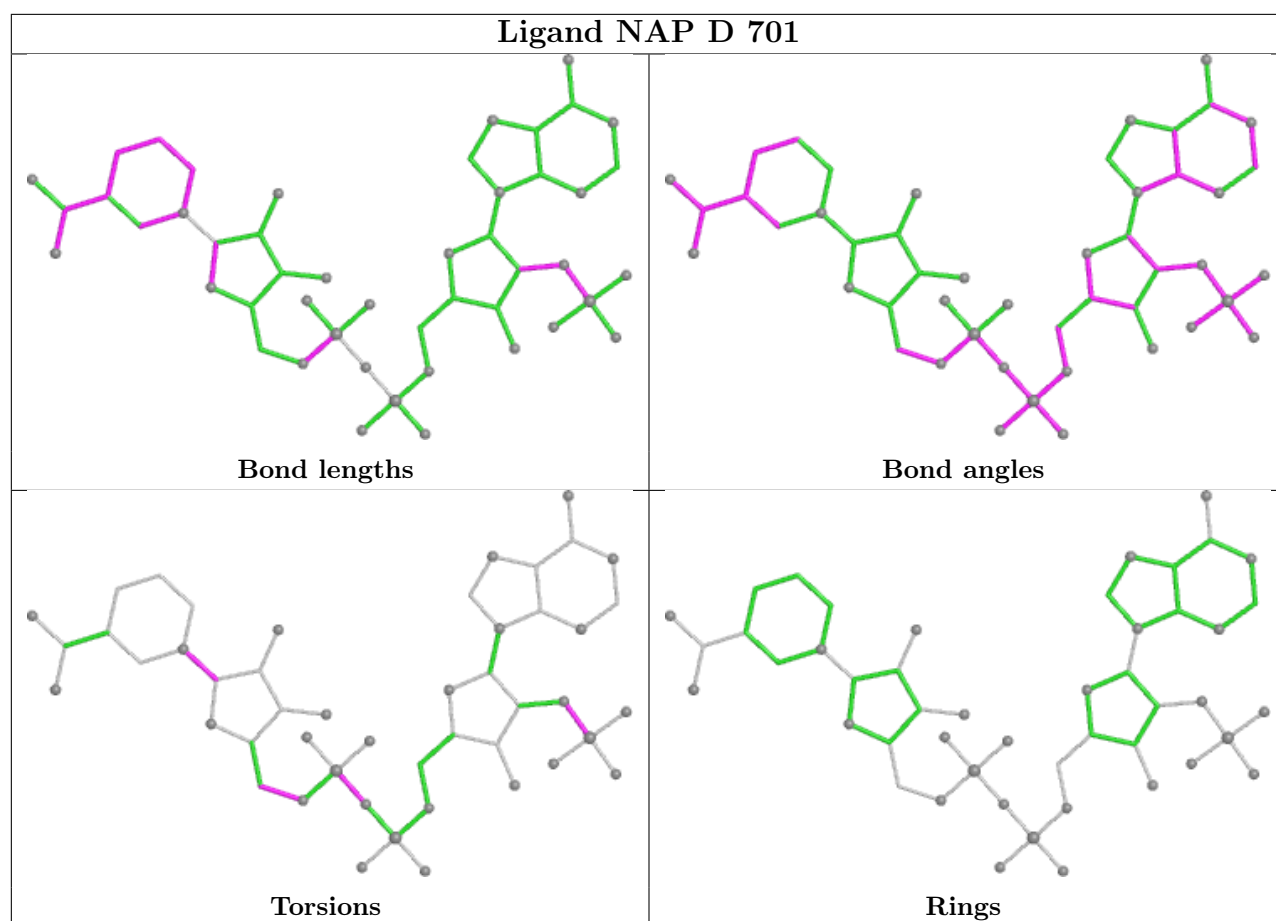
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

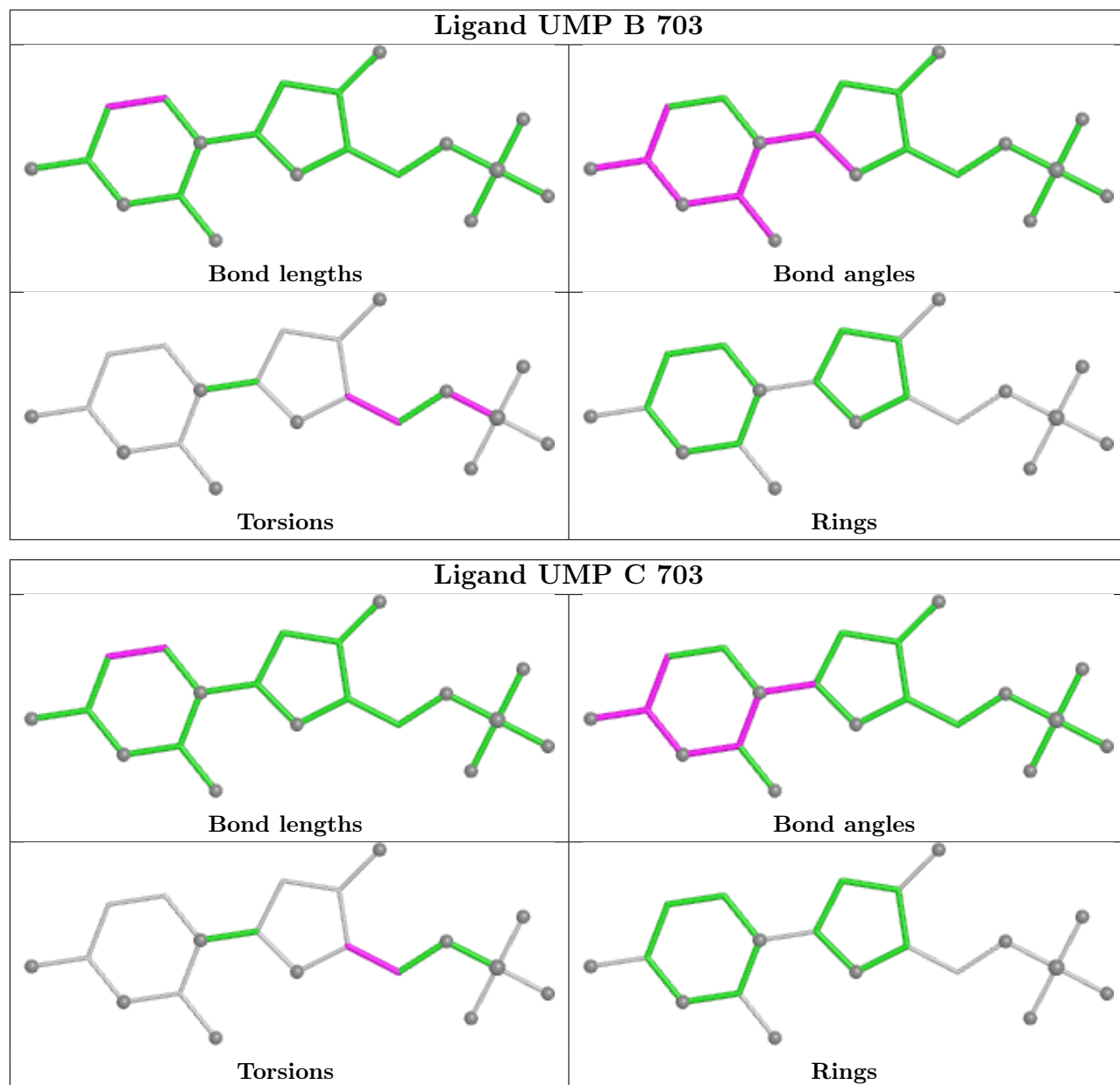


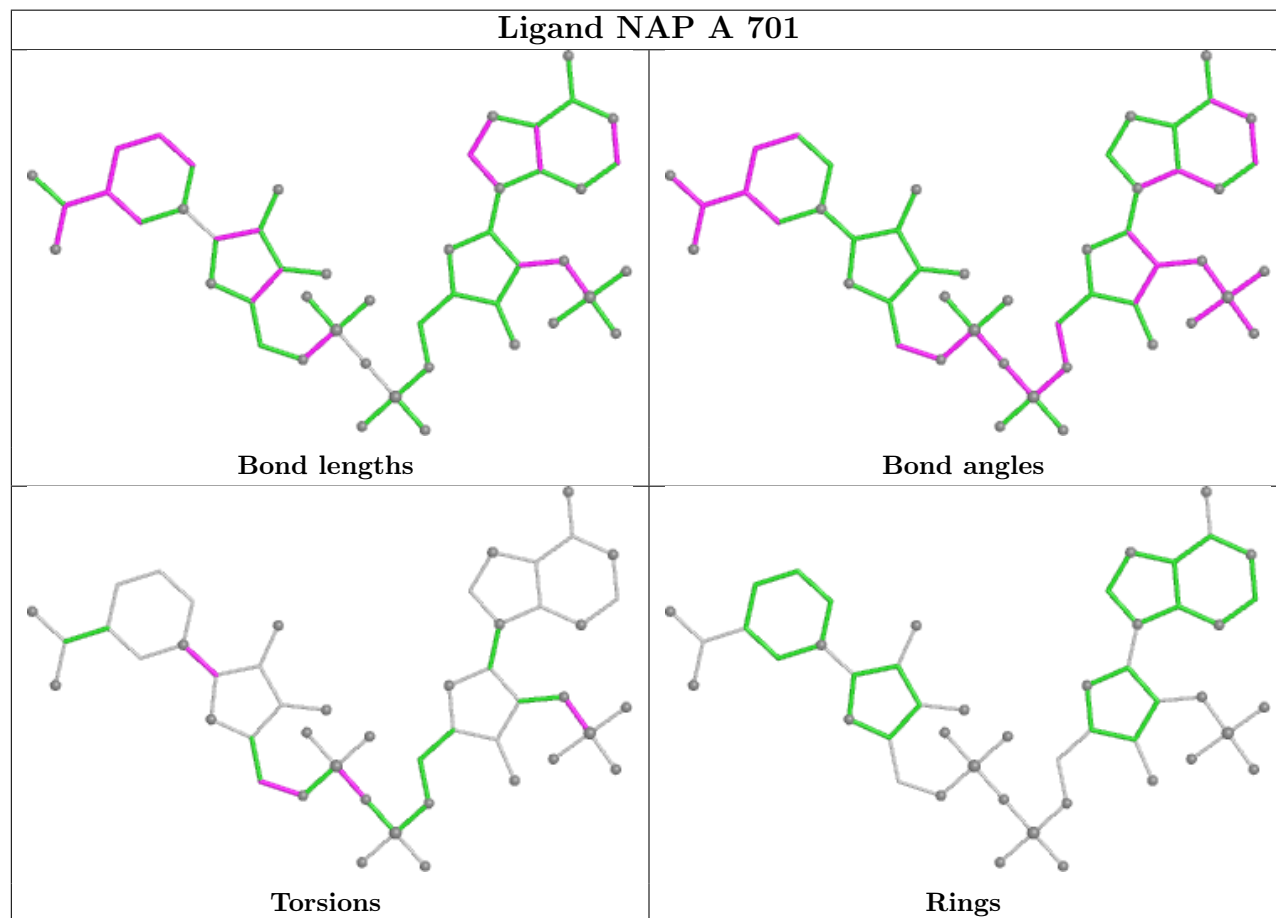
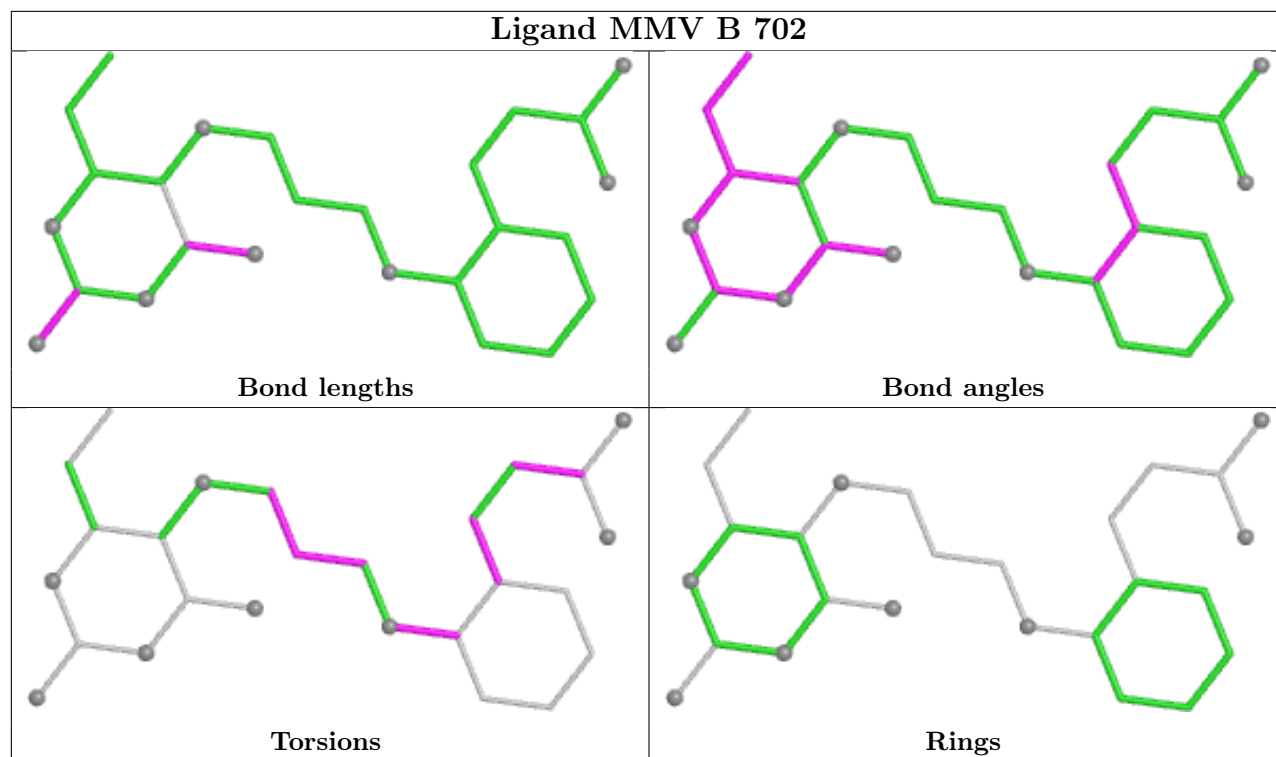


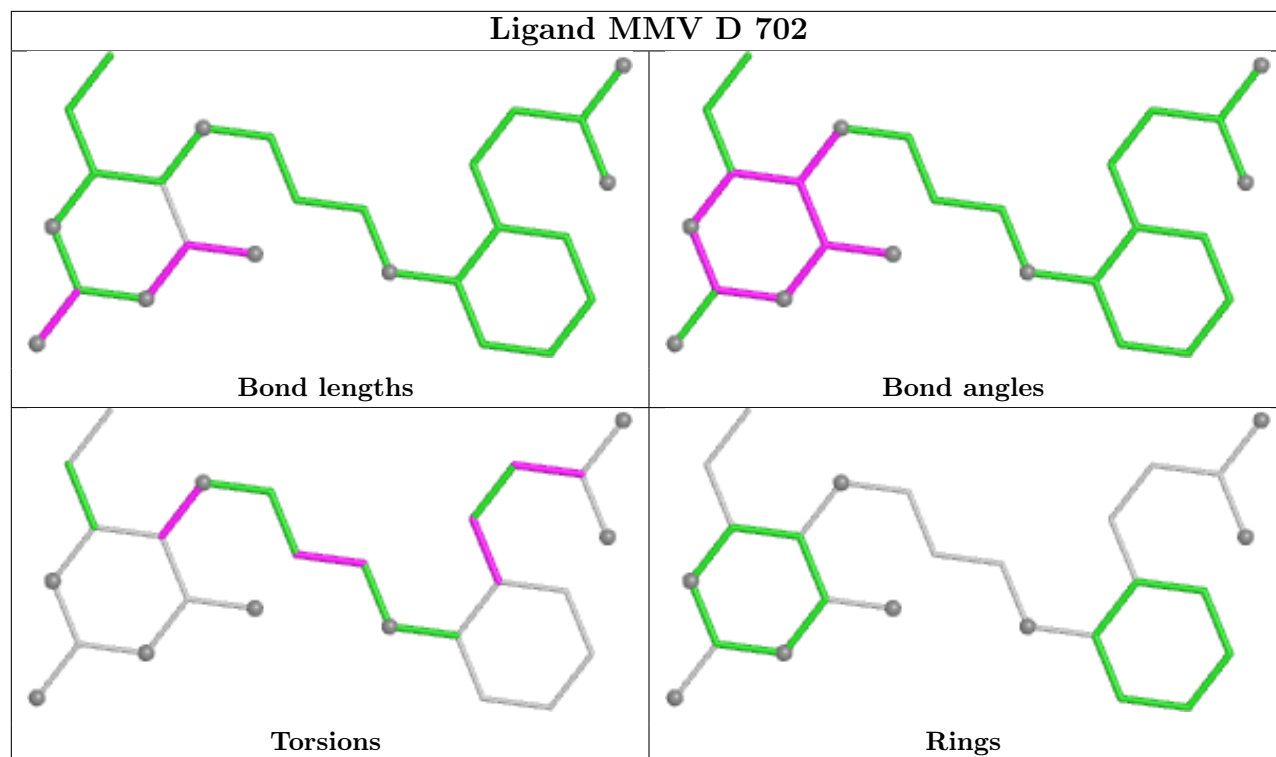












5.7 Other polymers [i](#)

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, 95th 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	548/610 (89%)	-0.12	11 (2%) 65 61	22, 37, 70, 88	0
1	B	541/610 (88%)	-0.14	7 (1%) 75 71	24, 36, 70, 89	0
1	C	540/610 (88%)	-0.29	9 (1%) 69 65	20, 31, 61, 93	0
1	D	542/610 (88%)	-0.21	7 (1%) 75 71	22, 35, 70, 87	0
All	All	2171/2440 (88%)	-0.19	34 (1%) 70 67	20, 35, 69, 93	0

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	257	ALA	4.9
1	A	71	GLY	3.9
1	A	197	SER	3.6
1	D	304	LYS	3.3
1	A	256	ASP	3.2
1	C	48	ARG	3.1
1	D	308	LYS	3.1
1	C	411	PHE	2.9
1	D	197	SER	2.9
1	A	512	CYS	2.8
1	B	48	ARG	2.8
1	C	46	ALA	2.7
1	C	414	SER	2.7
1	D	306	GLU	2.7
1	B	254	THR	2.6
1	B	198	THR	2.6
1	A	345	THR	2.6
1	A	285	SER	2.5
1	C	345	THR	2.5
1	C	555	ASN	2.4
1	B	118	ALA	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	304	LYS	2.3
1	D	512	CYS	2.3
1	A	346	GLY	2.2
1	C	304	LYS	2.2
1	D	344	ARG	2.2
1	B	346	GLY	2.2
1	C	47	SER	2.2
1	C	117	GLN	2.1
1	A	414	SER	2.1
1	D	32	PHE	2.1
1	A	48	ARG	2.1
1	B	348	GLY	2.0
1	A	284	PRO	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 oligosaccharides 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, 95th 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.

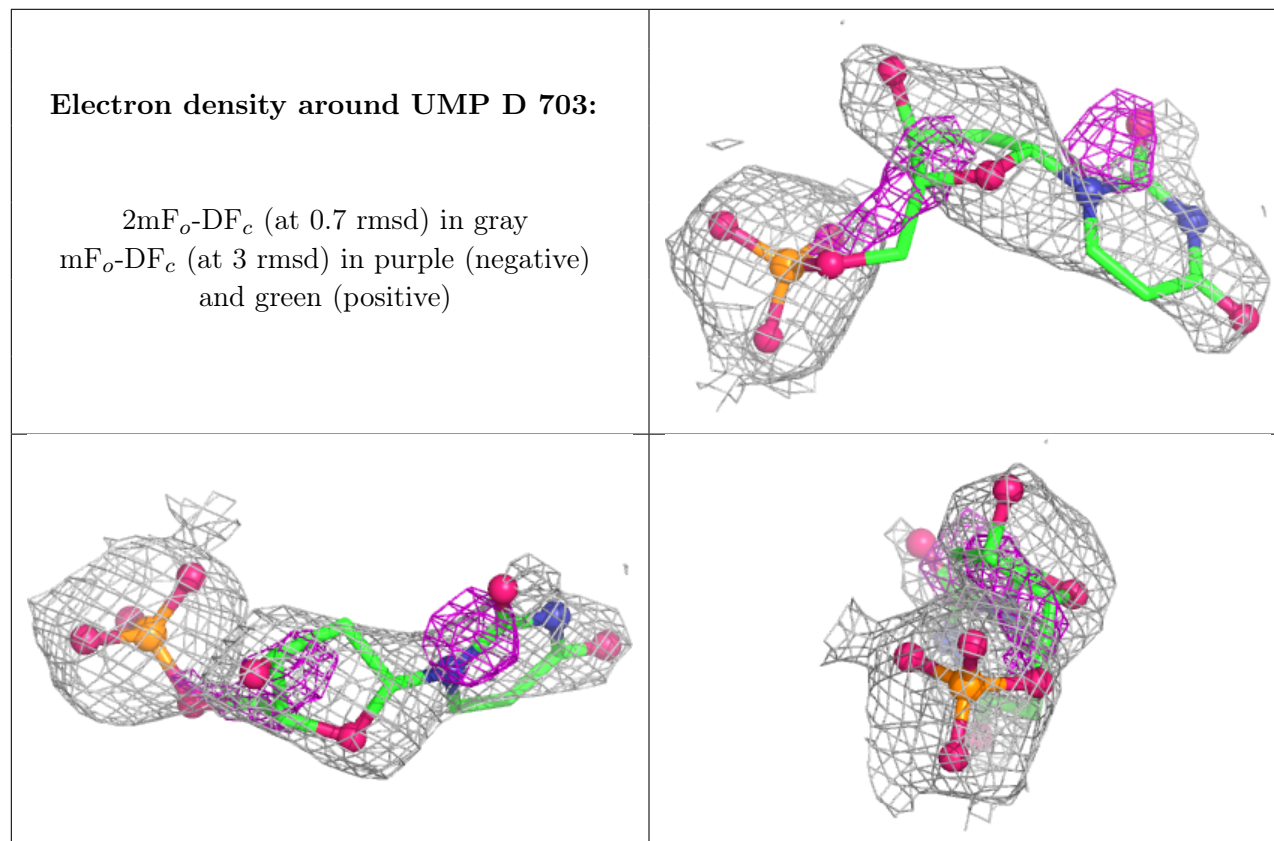
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	UMP	D	703	20/20	0.86	0.13	55,65,74,75	0
4	UMP	C	703	20/20	0.88	0.10	49,59,68,68	0
4	UMP	A	703	20/20	0.88	0.12	52,62,71,72	0
3	MMV	D	702	26/26	0.93	0.09	25,40,53,55	0
3	MMV	B	702	26/26	0.95	0.09	22,39,57,64	0
4	UMP	B	703	20/20	0.96	0.07	41,50,55,56	0
3	MMV	A	702	26/26	0.96	0.07	25,34,45,48	0
3	MMV	C	702	26/26	0.96	0.07	18,25,48,53	0
2	NAP	D	701	48/48	0.97	0.07	21,35,45,48	0
2	NAP	A	701	48/48	0.97	0.07	21,30,40,44	0

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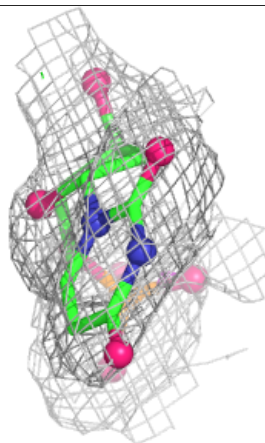
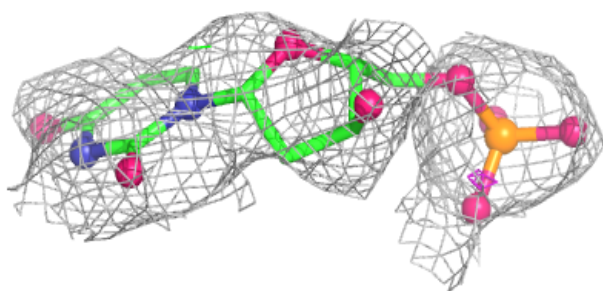
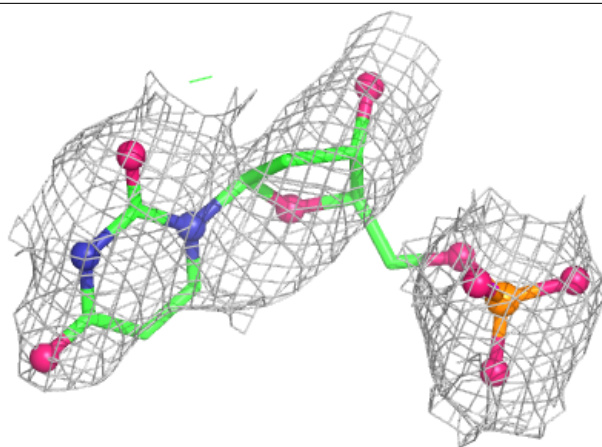
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	NAP	B	701	48/48	0.97	0.08	26,36,43,50	0
2	NAP	C	701	48/48	0.98	0.06	20,27,34,37	0

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.

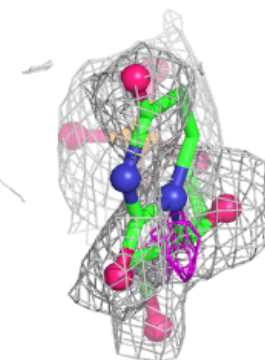
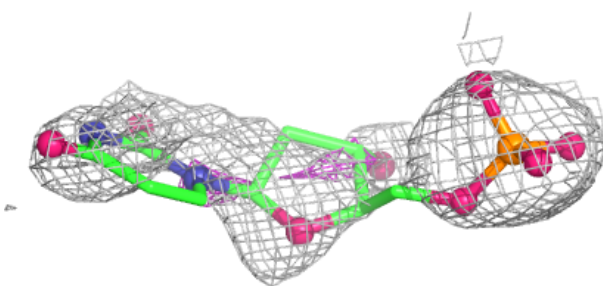
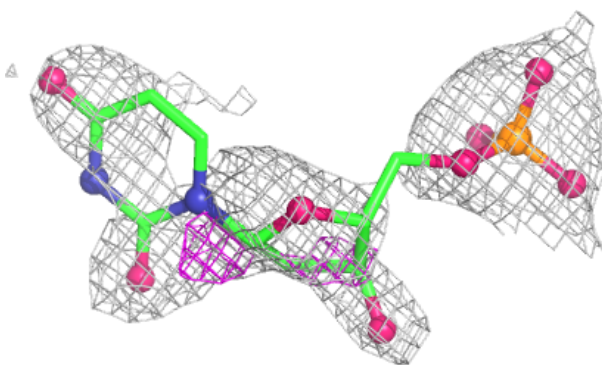


Electron density around UMP C 703:

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

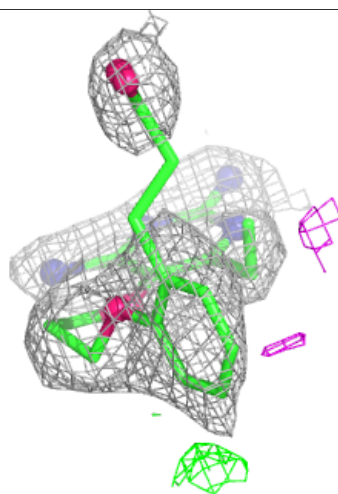
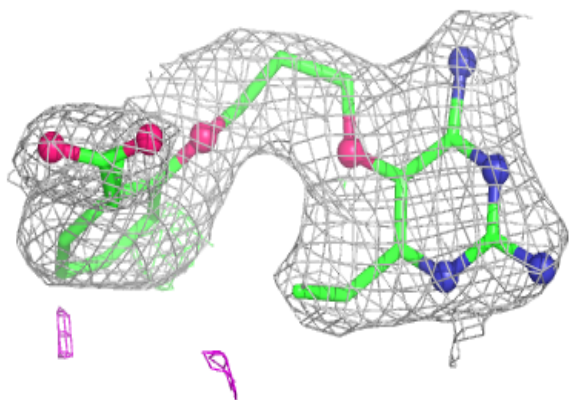
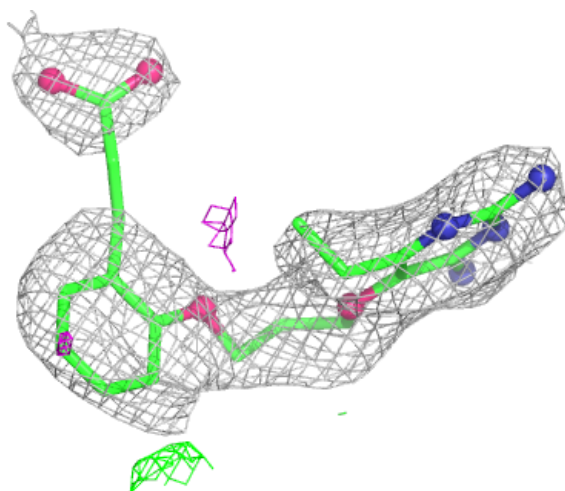
**Electron density around UMP A 703:**

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



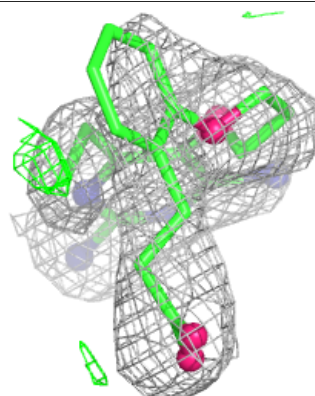
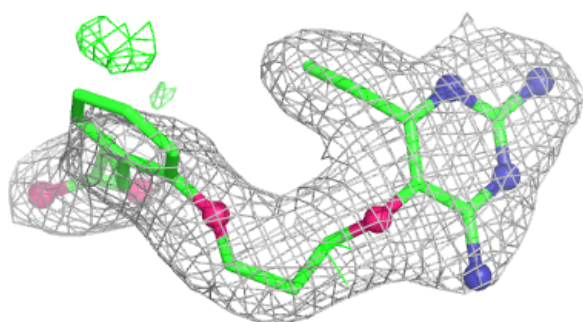
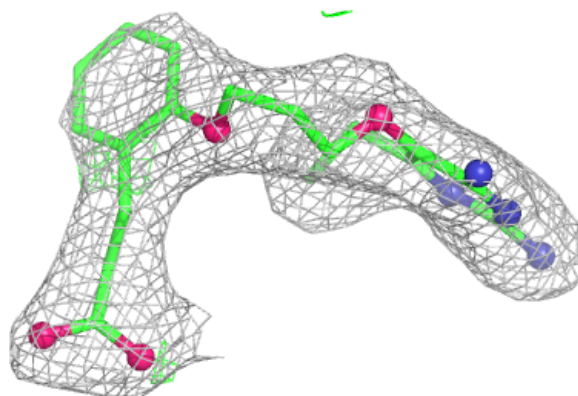
Electron density around MMV D 702:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

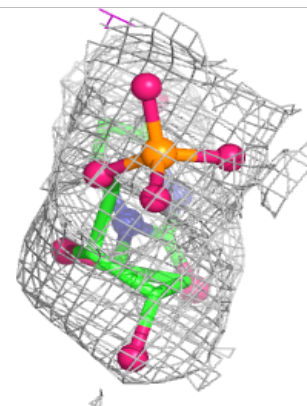
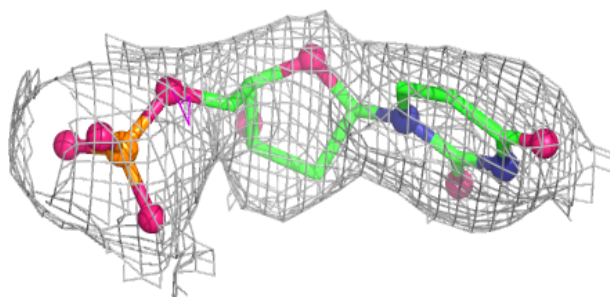
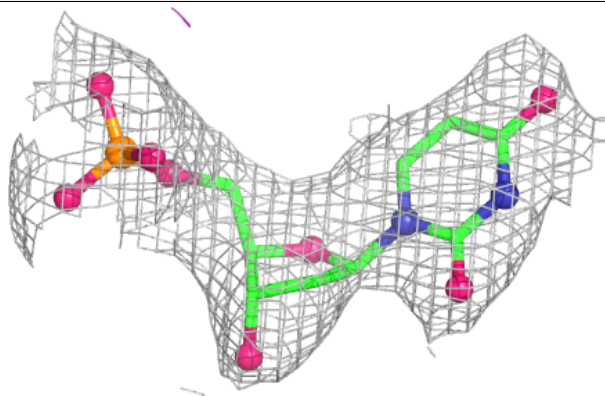


Electron density around MMV B 702:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

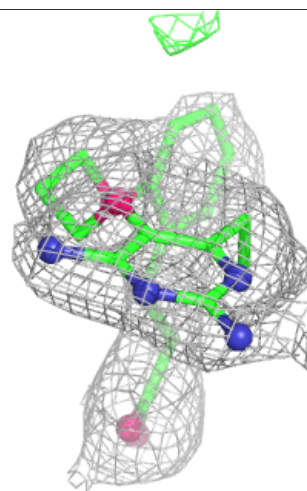
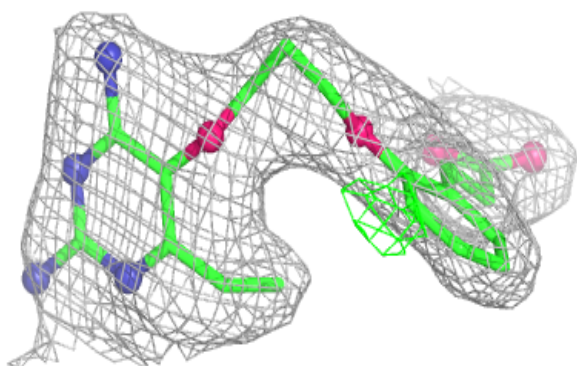
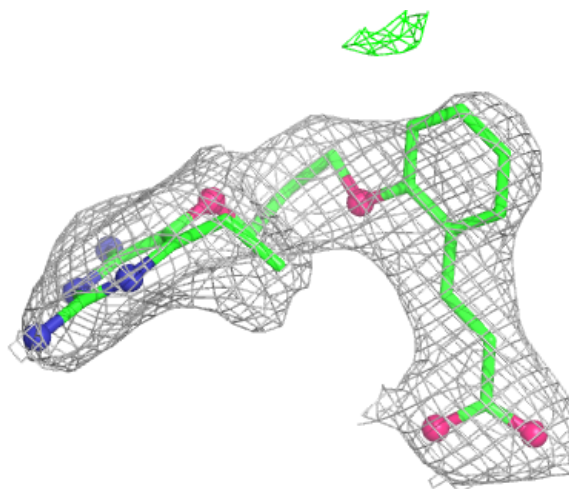
**Electron density around UMP B 703:**

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



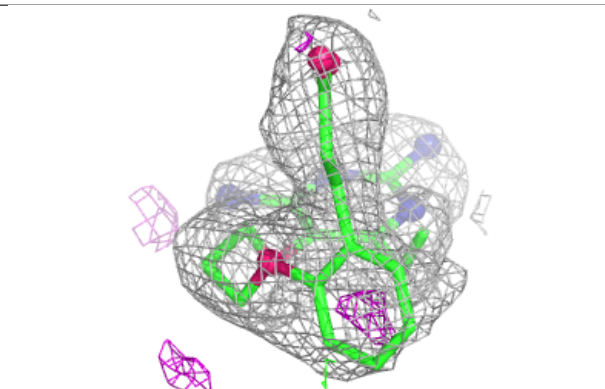
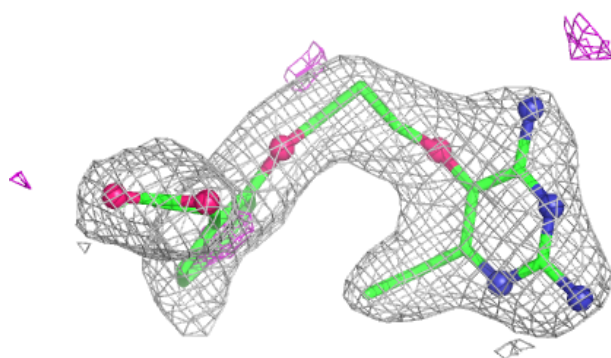
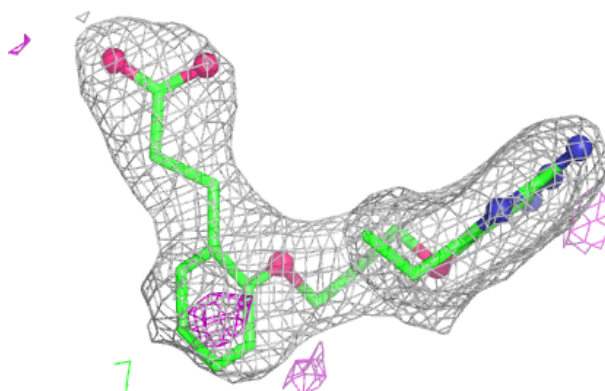
Electron density around MMV A 702:

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and green (positive)

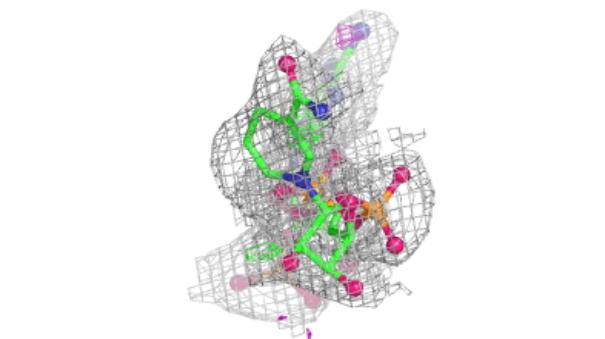
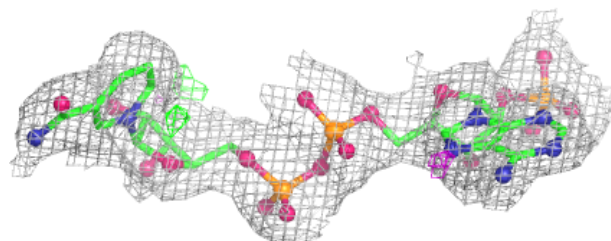
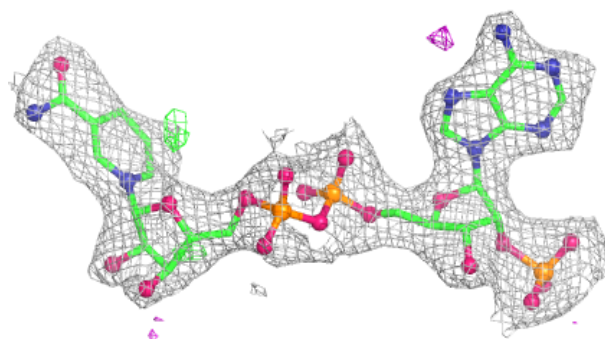


Electron density around MMV C 702:

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and green (positive)

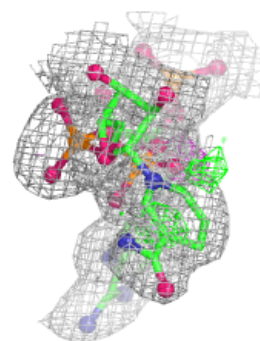
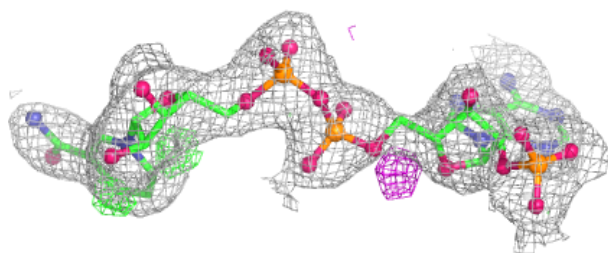
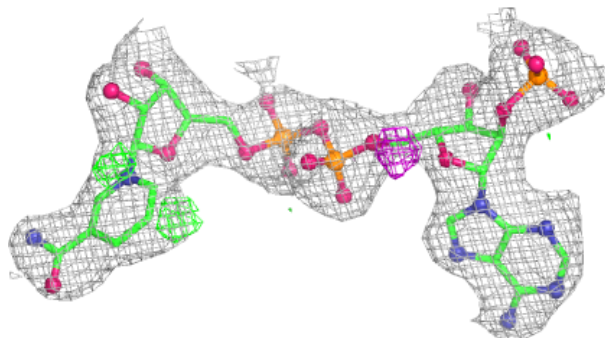
**Electron density around NAP D 701:**

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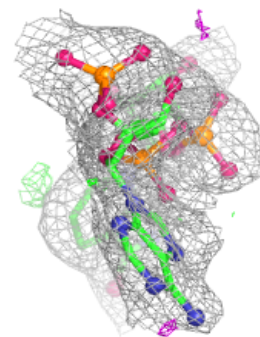
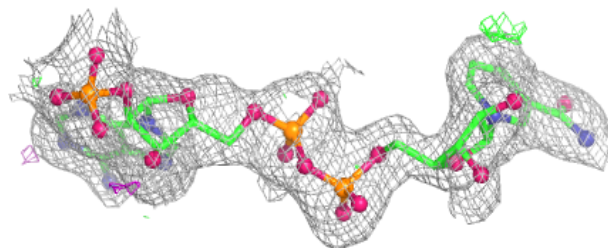
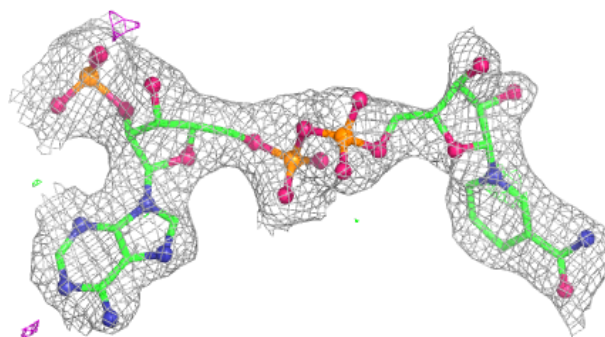


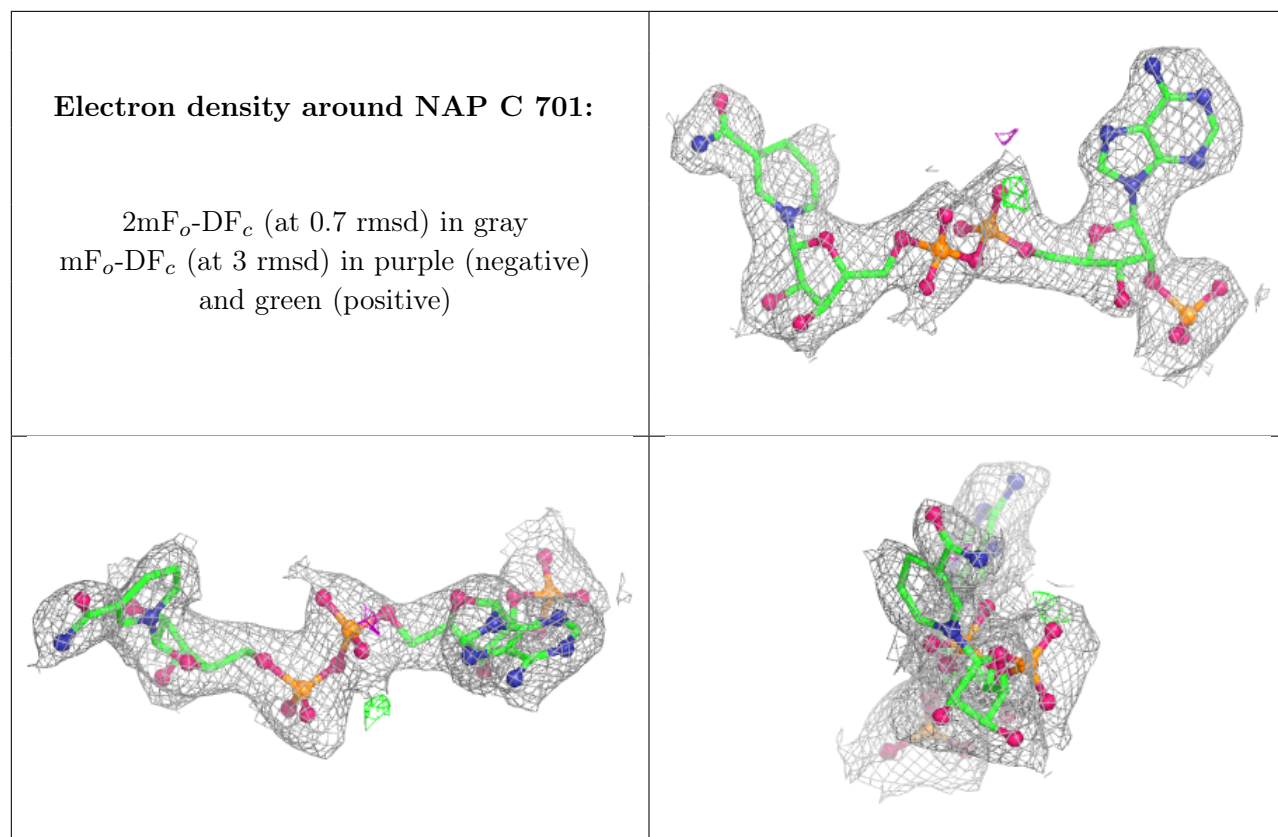
Electron density around NAP A 701:

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and green (positive)

**Electron density around NAP B 701:**

$2mF_o-DF_c$ (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.