



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:19 PM UTC

PDB ID : 5FA6 / pdb\_00005fa6  
Title : wild type human CYPOR  
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Deposited on : 2015-12-11  
Resolution : 2.30 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 : 4-5-2 with Phenix2.0  
Mogul : 2022.3.0, CSD as543be (2022)  
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 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

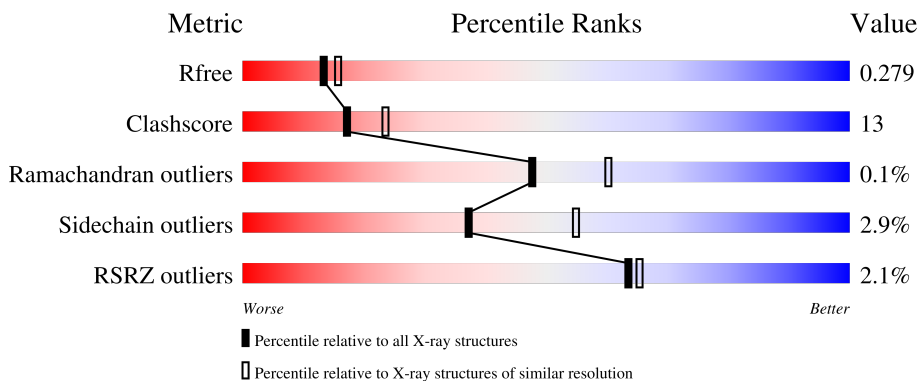
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

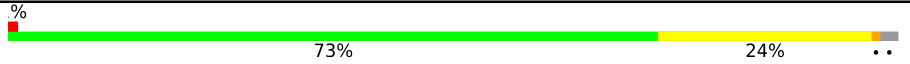

The reported resolution of this entry is 2.30 Å.

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	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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	618	 73% 24% ..
1	B	618	 62% 33% ..

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 10067 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 NADPH–cytochrome P450 reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	606	4830	3056	836	915	23	0	0	0
1	B	602	4808	3042	835	908	23	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	63	GLY	-	expression tag	UNP P16435
A	64	SER	-	expression tag	UNP P16435
A	65	HIS	-	expression tag	UNP P16435
A	66	MET	-	expression tag	UNP P16435
B	63	GLY	-	expression tag	UNP P16435
B	64	SER	-	expression tag	UNP P16435
B	65	HIS	-	expression tag	UNP P16435
B	66	MET	-	expression tag	UNP P16435

- Molecule 2 is FLAVIN MONONUCLEOTIDE (CCD ID: FMN) (formula: C<sub>17</sub>H<sub>21</sub>N<sub>4</sub>O<sub>9</sub>P).





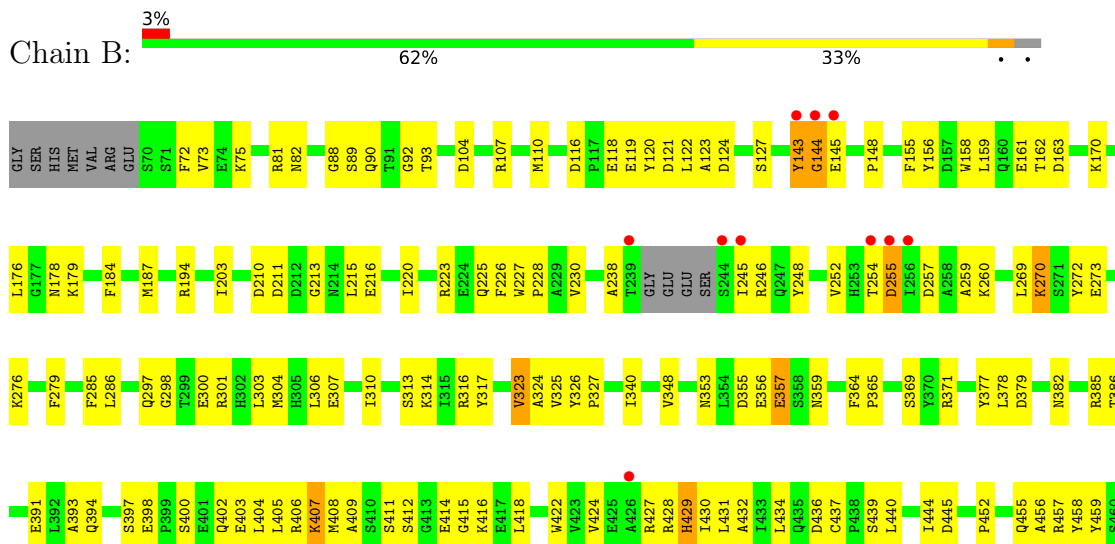
### 3 Residue-property plots [i](#)

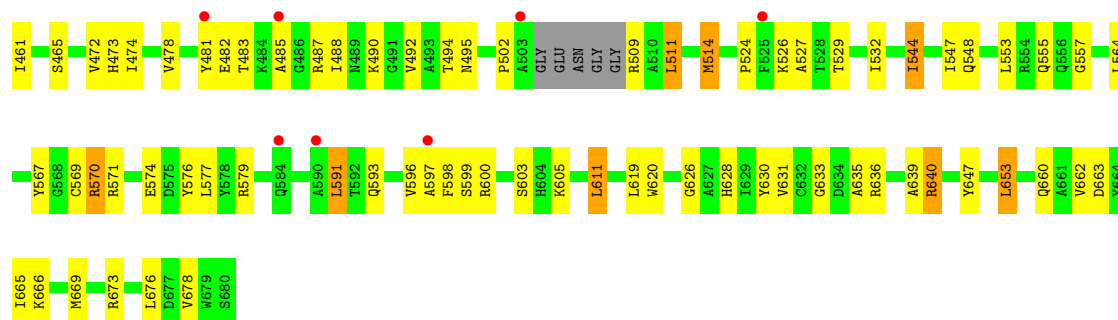
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

- Molecule 1: NADPH-cytochrome P450 reductase



- Molecule 1: NADPH-cytochrome P450 reductase





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	70.07Å 119.32Å 156.86Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.32 – 2.30 39.32 – 2.30	Depositor EDS
% Data completeness (in resolution range)	90.0 (39.32-2.30) 90.0 (39.32-2.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.53 (at 2.29Å)	Xtrriage
Refinement program	CNS 1.3	Depositor
R, $R_{free}$	0.225 , 0.280 0.225 , 0.279	Depositor DCC
$R_{free}$ test set	2692 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	45.5	Xtrriage
Anisotropy	0.304	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 24.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	10067	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	54.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.07% 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: FAD, FMN, NAP

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	0.49	0/4940	0.99	19/6688 (0.3%)
1	B	0.42	0/4917	0.97	27/6654 (0.4%)
All	All	0.46	0/9857	0.98	46/13342 (0.3%)

There are no bond length outliers.

All (46) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	245	ILE	N-CA-C	9.20	128.48	109.34
1	B	254	THR	CB-CA-C	8.83	124.69	109.24
1	A	145	GLU	N-CA-C	8.21	122.70	111.54
1	A	510	ALA	N-CA-C	8.06	122.16	111.28
1	B	246	ARG	N-CA-C	8.01	121.56	110.35
1	A	492	VAL	N-CA-C	7.97	117.91	110.42
1	B	544	ILE	N-CA-C	-7.38	103.09	110.62
1	B	255	ASP	N-CA-CB	-7.37	99.41	110.90
1	A	88	GLY	N-CA-C	-7.12	96.30	113.18
1	B	502	PRO	CB-CA-C	-6.86	100.24	111.56
1	B	161	GLU	N-CA-C	6.64	121.69	112.45
1	A	244	SER	N-CA-CB	-6.50	99.51	110.83
1	B	636	ARG	N-CA-C	6.37	118.23	111.28
1	B	144	GLY	N-CA-C	6.23	127.94	113.18
1	A	233	HIS	N-CA-C	6.21	117.71	111.07
1	B	88	GLY	N-CA-C	-6.13	98.66	113.18
1	B	570	ARG	N-CA-C	6.11	117.74	111.14
1	B	633	GLY	N-CA-C	6.03	117.48	111.21
1	A	92	GLY	N-CA-C	6.00	123.32	115.40
1	A	424	VAL	N-CA-C	5.99	116.05	110.42
1	B	92	GLY	N-CA-C	5.90	122.10	115.08
1	B	424	VAL	N-CA-C	5.84	115.91	110.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	377	TYR	N-CA-C	5.81	120.65	113.50
1	A	275	GLN	N-CA-C	5.81	117.76	108.41
1	A	386	THR	N-CA-C	5.55	118.05	111.33
1	A	261	VAL	N-CA-C	5.52	116.05	107.99
1	B	89	SER	N-CA-CB	5.51	120.06	110.81
1	B	252	VAL	N-CA-C	5.46	115.96	107.99
1	B	514	MET	N-CA-C	5.39	116.19	108.74
1	A	244	SER	N-CA-C	5.36	118.13	109.40
1	B	357	GLU	N-CA-CB	-5.32	102.58	110.61
1	B	161	GLU	CB-CA-C	-5.30	100.09	110.11
1	A	123	ALA	N-CA-C	-5.28	106.09	112.54
1	A	213	GLY	N-CA-C	-5.28	100.66	113.18
1	B	603	SER	N-CA-C	5.27	118.50	111.75
1	B	437	CYS	CA-C-N	5.25	125.56	119.47
1	B	437	CYS	C-N-CA	5.25	125.56	119.47
1	B	378	LEU	N-CA-C	5.16	117.98	109.72
1	B	143	TYR	N-CA-C	5.13	117.79	109.06
1	A	442	PRO	CA-C-N	-5.12	114.72	120.14
1	A	442	PRO	C-N-CA	-5.12	114.72	120.14
1	B	213	GLY	N-CA-C	-5.10	101.09	113.18
1	A	163	ASP	N-CA-C	-5.09	104.89	111.71
1	A	476	ALA	N-CA-C	5.04	117.04	109.23
1	B	599	SER	N-CA-C	5.03	119.12	112.89
1	A	184	PHE	N-CA-C	5.02	116.97	109.59

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	4830	0	4688	94	0
1	B	4808	0	4671	150	0
2	A	31	0	19	0	0
2	B	31	0	19	0	0
3	A	53	0	31	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	53	0	31	1	0
4	A	31	0	11	0	0
4	B	31	0	11	1	0
5	A	139	0	0	4	0
5	B	60	0	0	0	0
All	All	10067	0	9481	243	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 13.

All (243) 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:B:144:GLY:O	1:B:145:GLU:HG2	1.50	1.12
1:B:379:ASP:HB3	1:B:452:PRO:HG2	1.43	0.99
1:A:407:LYS:HD3	1:A:414:GLU:HG3	1.53	0.89
1:A:404:LEU:HD22	1:A:408:MET:HE2	1.58	0.86
1:A:609:GLN:HA	1:A:612:LEU:HD12	1.63	0.80
1:B:303:LEU:HD22	1:B:577:LEU:HD21	1.64	0.79
1:B:397:SER:HB2	1:B:439:SER:HB2	1.64	0.78
1:A:276:LYS:NZ	1:A:276:LYS:HB3	1.99	0.78
1:A:379:ASP:HB3	1:A:452:PRO:HG2	1.66	0.76
1:A:399:PRO:O	1:A:403:GLU:HG2	1.86	0.76
1:B:407:LYS:HD3	1:B:418:LEU:HD23	1.67	0.75
1:B:270:LYS:HE3	1:B:270:LYS:HA	1.69	0.74
1:B:406:ARG:HG2	1:B:406:ARG:HH11	1.54	0.73
1:B:81:ARG:HH11	1:B:81:ARG:HG3	1.54	0.72
1:B:405:LEU:HA	1:B:408:MET:HE3	1.73	0.70
1:B:323:VAL:HG13	1:B:459:TYR:HB2	1.72	0.69
1:B:569:CYS:O	1:B:598:PHE:HA	1.92	0.69
1:A:628:HIS:NE2	1:A:673:ARG:HG2	2.07	0.69
1:A:144:GLY:O	1:A:147:ASP:HB2	1.93	0.69
1:A:389:LEU:HD11	1:A:423:VAL:HG21	1.74	0.69
1:A:298:GLY:HA3	1:A:300:GLU:OE2	1.92	0.69
1:A:635:ALA:HB2	1:A:678:VAL:HB	1.74	0.68
1:B:404:LEU:CD1	1:B:418:LEU:HD21	2.25	0.67
1:A:111:ARG:HG2	1:A:111:ARG:HH11	1.60	0.66
1:B:620:TRP:HB2	1:B:653:LEU:HD23	1.77	0.66
1:A:418:LEU:HD21	1:B:276:LYS:HB3	1.79	0.65
1:B:144:GLY:O	1:B:145:GLU:CG	2.38	0.64
1:B:436:ASP:OD1	1:B:487:ARG:NH1	2.31	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:429:HIS:CE1	1:B:432:ALA:HB2	2.33	0.63
1:A:306:LEU:HD11	1:A:497:LEU:HB3	1.81	0.63
1:B:640:ARG:HA	1:B:640:ARG:HH11	1.64	0.62
1:B:532:ILE:HD13	1:B:619:LEU:HD22	1.81	0.62
1:B:82:ASN:ND2	1:B:110:MET:HE2	2.14	0.62
1:B:544:ILE:O	1:B:548:GLN:HG3	1.99	0.61
1:A:89:SER:HB2	1:A:94:ALA:HB3	1.81	0.61
1:A:393:ALA:O	1:A:402:GLN:HG3	2.00	0.61
1:B:404:LEU:HG	1:B:408:MET:HE2	1.83	0.60
1:B:404:LEU:HD12	1:B:418:LEU:HD21	1.83	0.60
1:B:300:GLU:HG3	1:B:301:ARG:H	1.65	0.60
1:A:111:ARG:HG2	1:A:111:ARG:NH1	2.16	0.60
1:B:148:PRO:HB3	1:B:187:MET:SD	2.42	0.60
1:A:276:LYS:HB3	1:A:276:LYS:HZ2	1.66	0.60
1:B:298:GLY:HA3	1:B:574:GLU:OE1	2.02	0.59
1:A:569:CYS:HB2	1:A:575:ASP:OD1	2.02	0.59
1:A:193:LYS:O	1:A:197:GLN:HG3	2.02	0.59
1:A:571:ARG:HD3	1:A:574:GLU:OE1	2.03	0.59
1:B:179:LYS:HE3	1:B:184:PHE:CE2	2.38	0.58
1:B:482:GLU:HA	1:B:488:ILE:HD13	1.83	0.58
1:B:270:LYS:HE2	1:B:273:GLU:OE2	2.03	0.58
1:A:564:LEU:N	1:A:564:LEU:HD12	2.18	0.58
1:B:123:ALA:HA	1:B:158:TRP:CZ2	2.39	0.58
1:B:406:ARG:HG2	1:B:406:ARG:NH1	2.17	0.57
1:B:626:GLY:HA2	1:B:673:ARG:NH2	2.20	0.57
1:A:671:LYS:NZ	5:A:804:HOH:O	2.36	0.57
1:B:576:TYR:CD1	1:B:579:ARG:HB2	2.40	0.57
1:B:304:MET:HG3	1:B:306:LEU:HD11	1.87	0.57
1:A:178:ASN:HB3	1:A:181:TYR:HD2	1.68	0.57
1:B:631:VAL:HB	1:B:676:LEU:HD23	1.87	0.57
1:A:628:HIS:CD2	1:A:673:ARG:HG2	2.39	0.57
1:A:101:LEU:O	1:A:104:ASP:HB2	2.05	0.57
1:B:104:ASP:HB2	1:B:227:TRP:CZ2	2.39	0.56
1:A:631:VAL:HB	1:A:676:LEU:HD23	1.88	0.56
1:B:386:THR:HB	1:B:409:ALA:HA	1.88	0.56
1:A:466:LYS:HD3	1:A:552:TRP:CZ3	2.40	0.56
1:B:260:LYS:HA	1:B:269:LEU:HD21	1.88	0.55
1:B:325:VAL:HG12	1:B:514:MET:HB3	1.88	0.55
1:A:145:GLU:N	5:A:803:HOH:O	2.36	0.55
1:B:326:TYR:CE1	1:B:456:ALA:HB2	2.42	0.55
1:B:407:LYS:C	1:B:409:ALA:H	2.15	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:640:ARG:HG2	1:A:640:ARG:HH11	1.72	0.54
1:B:526:LYS:HE3	1:B:529:THR:OG1	2.08	0.54
1:B:666:LYS:O	1:B:669:MET:HB2	2.08	0.54
1:A:231:CYS:HA	1:A:236:VAL:HG23	1.89	0.54
1:A:103:LYS:HE2	1:A:247:GLN:OE1	2.08	0.54
1:B:304:MET:HG3	1:B:306:LEU:CD1	2.38	0.54
1:B:407:LYS:NZ	1:B:407:LYS:HB3	2.22	0.54
1:B:490:LYS:HB3	1:B:495:ASN:ND2	2.23	0.54
1:B:547:ILE:HD13	1:B:591:LEU:HG	1.90	0.54
1:A:231:CYS:HA	1:A:236:VAL:CG2	2.39	0.53
1:B:158:TRP:O	1:B:162:THR:HG22	2.08	0.53
1:B:571:ARG:HB2	1:B:574:GLU:HB3	1.91	0.52
1:A:265:GLU:HA	1:A:272:TYR:CZ	2.43	0.52
1:B:524:PRO:HG3	1:B:628:HIS:CD2	2.44	0.52
1:A:390:TYR:HE1	1:A:406:ARG:HG2	1.73	0.52
1:B:628:HIS:HB3	1:B:630:TYR:CE1	2.45	0.52
1:A:330:ASP:O	1:A:334:VAL:HG23	2.10	0.52
1:A:81:ARG:HH11	1:A:113:MET:HB3	1.76	0.51
1:A:398:GLU:OE1	1:A:399:PRO:HD2	2.10	0.51
1:A:555:GLN:C	1:A:557:GLY:H	2.18	0.51
1:B:148:PRO:HB3	1:B:187:MET:CE	2.41	0.51
1:B:73:VAL:HG21	1:B:127:SER:HB2	1.92	0.51
1:B:122:LEU:HG	1:B:155:PHE:CD1	2.44	0.51
1:B:478:VAL:HA	1:B:494:THR:HB	1.93	0.51
1:B:257:ASP:C	1:B:259:ALA:N	2.67	0.51
1:B:310:ILE:HD13	1:B:472:VAL:HG23	1.93	0.51
1:B:639:ALA:HB2	1:B:678:VAL:HG11	1.92	0.51
1:B:340:ILE:HG12	1:B:340:ILE:O	2.11	0.51
1:A:236:VAL:C	1:A:237:GLU:HG3	2.37	0.50
1:A:544:ILE:O	1:A:548:GLN:HG3	2.11	0.50
1:B:597:ALA:HB2	1:B:611:LEU:HD22	1.94	0.50
1:A:407:LYS:HD3	1:A:414:GLU:CG	2.33	0.50
1:B:286:LEU:HD23	1:B:511:LEU:HD23	1.92	0.50
1:A:217:GLU:CD	1:A:220:ILE:HD11	2.37	0.50
1:B:665:ILE:HG22	1:B:669:MET:HE3	1.94	0.50
1:A:256:ILE:HD13	1:A:261:VAL:HG22	1.94	0.50
1:A:128:LEU:N	1:A:129:PRO:CD	2.74	0.49
1:B:391:GLU:O	1:B:394:GLN:HG2	2.12	0.49
1:B:398:GLU:H	1:B:439:SER:CB	2.26	0.49
1:B:226:PHE:O	1:B:230:VAL:HG23	2.12	0.49
1:B:72:PHE:HB3	1:B:120:TYR:CD1	2.47	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:576:TYR:CG	1:B:579:ARG:HB2	2.48	0.49
1:A:217:GLU:OE1	1:A:220:ILE:HD11	2.14	0.48
1:A:236:VAL:O	1:A:237:GLU:HG3	2.12	0.48
1:B:571:ARG:HB2	1:B:574:GLU:CB	2.43	0.48
1:B:407:LYS:HD3	1:B:418:LEU:CD2	2.41	0.48
1:B:481:TYR:CD1	1:B:481:TYR:N	2.82	0.48
1:A:143:TYR:CD1	1:A:149:THR:HG22	2.48	0.48
1:B:90:GLN:HG2	1:B:143:TYR:CZ	2.49	0.48
1:B:427:ARG:HG3	1:B:481:TYR:HE2	1.77	0.48
1:A:430:ILE:HG23	1:A:431:LEU:N	2.29	0.48
1:B:81:ARG:HH22	1:B:355:ASP:CG	2.22	0.48
1:A:413:GLY:O	1:A:417:GLU:HG2	2.14	0.48
1:B:81:ARG:HG3	1:B:81:ARG:NH1	2.22	0.47
1:B:227:TRP:HB2	1:B:228:PRO:HD3	1.95	0.47
1:B:524:PRO:HG3	1:B:628:HIS:CG	2.48	0.47
1:A:517:ARG:HH21	1:A:517:ARG:HG3	1.80	0.47
1:B:272:TYR:O	1:B:286:LEU:HD22	2.14	0.47
1:B:303:LEU:CD2	1:B:577:LEU:HD21	2.38	0.47
1:B:434:LEU:HD23	1:B:440:LEU:HD23	1.97	0.47
1:A:141:ALA:HA	1:A:176:LEU:O	2.14	0.47
1:A:313:SER:O	1:A:314:LYS:HB2	2.13	0.47
1:B:159:LEU:HB3	1:B:194:ARG:HG2	1.96	0.46
1:B:303:LEU:N	1:B:303:LEU:HD12	2.30	0.46
1:B:591:LEU:HD22	1:B:593:GLN:O	2.15	0.46
1:B:635:ALA:HB2	1:B:678:VAL:HB	1.97	0.46
1:A:431:LEU:O	1:A:435:GLN:HG3	2.16	0.46
1:B:324:ALA:HA	1:B:457:ARG:O	2.15	0.46
1:B:570:ARG:O	1:B:571:ARG:HG3	2.15	0.46
1:B:323:VAL:HG11	1:B:474:ILE:HG12	1.97	0.46
1:B:364:PHE:HB2	1:B:365:PRO:HD2	1.97	0.46
1:A:250:LEU:HD12	1:A:251:VAL:H	1.80	0.46
1:A:567:TYR:CG	1:A:568:GLY:N	2.84	0.46
1:A:631:VAL:HB	1:A:676:LEU:CD2	2.46	0.46
1:B:400:SER:C	1:B:402:GLN:H	2.23	0.46
1:B:555:GLN:C	1:B:557:GLY:H	2.24	0.46
1:B:93:THR:HG21	1:B:215:LEU:HD23	1.97	0.46
1:A:352:ASN:OD1	1:A:362:HIS:CE1	2.68	0.45
1:A:249:GLU:HB3	1:A:354:LEU:HD21	1.98	0.45
1:A:303:LEU:HD22	1:A:577:LEU:HD21	1.99	0.45
1:B:257:ASP:C	1:B:259:ALA:H	2.25	0.45
1:B:660:GLN:O	1:B:663:ASP:HB2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:647:TYR:CE1	1:A:662:VAL:HA	2.52	0.45
1:B:170:LYS:HB3	1:B:203:ILE:CG1	2.46	0.45
1:B:211:ASP:OD1	1:B:211:ASP:O	2.33	0.45
1:B:620:TRP:CB	1:B:653:LEU:HD23	2.44	0.45
1:A:390:TYR:CE1	1:A:406:ARG:HG2	2.51	0.45
1:A:482:GLU:OE2	1:B:509:ARG:HG2	2.17	0.45
1:A:180:THR:HB	1:A:635:ALA:O	2.17	0.45
1:A:352:ASN:OD1	1:A:362:HIS:HE1	1.99	0.45
1:B:316:ARG:HG2	1:B:316:ARG:HH11	1.80	0.45
1:B:324:ALA:HB2	1:B:458:TYR:CD1	2.52	0.45
1:A:347:VAL:O	1:A:369:SER:HA	2.17	0.45
1:A:398:GLU:HG2	1:A:401:GLU:HG3	1.99	0.45
1:A:602:GLN:CD	1:A:602:GLN:N	2.75	0.45
1:A:291:THR:HG22	1:A:292:ASN:N	2.32	0.44
1:A:319:SER:OG	1:A:464:SER:HA	2.17	0.44
1:A:123:ALA:HA	1:A:158:TRP:CZ2	2.53	0.44
1:A:248:TYR:CD2	1:A:363:PRO:HD3	2.52	0.44
1:B:600:ARG:HG2	1:B:605:LYS:NZ	2.33	0.44
1:B:220:ILE:HG22	1:B:411:SER:HB3	1.98	0.44
1:B:407:LYS:C	1:B:409:ALA:N	2.76	0.44
1:A:105:ALA:HB3	5:A:884:HOH:O	2.18	0.44
1:B:107:ARG:O	1:B:238:ALA:HA	2.18	0.44
1:B:483:THR:HG23	1:B:485:ALA:H	1.81	0.44
1:B:248:TYR:CD2	1:B:353:ASN:HA	2.53	0.44
1:A:178:ASN:HB3	1:A:181:TYR:CD2	2.50	0.44
1:B:371:ARG:HG3	1:B:371:ARG:HH11	1.83	0.44
1:B:444:ILE:HG23	1:B:445:ASP:N	2.33	0.44
1:A:517:ARG:HG3	1:A:517:ARG:NH2	2.33	0.44
1:B:75:LYS:HE2	1:B:357:GLU:O	2.18	0.43
1:B:327:PRO:HB2	1:B:492:VAL:HG12	2.00	0.43
1:B:323:VAL:CG1	1:B:459:TYR:HB2	2.43	0.43
1:A:383:PRO:HA	1:A:384:PRO:HD3	1.92	0.43
1:B:411:SER:HA	1:B:416:LYS:HD3	2.00	0.43
1:B:412:SER:CA	1:B:416:LYS:HG3	2.49	0.43
1:B:116:ASP:HB3	1:B:119:GLU:HG2	2.01	0.43
1:B:220:ILE:CG2	1:B:411:SER:HB3	2.48	0.43
1:B:176:LEU:N	1:B:176:LEU:HD12	2.34	0.43
1:B:398:GLU:H	1:B:439:SER:HB2	1.83	0.43
1:B:393:ALA:HA	1:B:405:LEU:HD12	2.00	0.43
1:B:422:TRP:CD1	1:B:428:ARG:NH1	2.87	0.43
1:A:72:PHE:HB3	1:A:120:TYR:CD2	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:176:LEU:HD23	1:A:215:LEU:HD21	2.01	0.42
1:B:307:GLU:HG2	1:B:473:HIS:CD2	2.55	0.42
1:B:526:LYS:HE3	1:B:526:LYS:HB2	1.76	0.42
1:A:276:LYS:HB3	1:A:276:LYS:HZ3	1.81	0.42
1:B:407:LYS:HB3	1:B:407:LYS:HZ3	1.84	0.42
1:B:121:ASP:HB3	1:B:124:ASP:OD2	2.19	0.42
1:B:411:SER:C	1:B:416:LYS:HD3	2.45	0.42
1:A:138:PHE:CE2	1:A:195:LEU:HD11	2.55	0.42
1:A:478:VAL:HA	1:A:494:THR:HB	2.00	0.42
3:B:702:FAD:HM81	3:B:702:FAD:HM73	1.82	0.42
1:B:404:LEU:HG	1:B:408:MET:CE	2.48	0.42
1:A:405:LEU:HD23	1:A:408:MET:CE	2.50	0.42
1:A:501:GLU:HA	1:A:502:PRO:HD3	1.89	0.42
1:B:317:TYR:O	1:B:465:SER:HB3	2.19	0.42
1:B:178:ASN:HA	1:B:210:ASP:OD1	2.20	0.42
1:A:325:VAL:HG12	1:A:514:MET:HB3	2.02	0.42
1:B:527:ALA:HB2	1:B:553:LEU:HD13	2.02	0.42
1:A:142:THR:CG2	1:A:146:GLY:HA2	2.50	0.41
1:A:144:GLY:HA2	5:A:803:HOH:O	2.19	0.41
1:B:155:PHE:CZ	1:B:159:LEU:HD11	2.55	0.41
1:B:404:LEU:HD12	1:B:418:LEU:CD2	2.47	0.41
1:A:405:LEU:HA	1:A:408:MET:HE3	2.02	0.41
1:B:118:GLU:O	1:B:118:GLU:HG3	2.19	0.41
1:B:317:TYR:CE2	1:B:461:ILE:HG21	2.55	0.41
1:B:567:TYR:O	1:B:596:VAL:HA	2.20	0.41
1:B:605:LYS:NZ	4:B:703:NAP:O1X	2.51	0.41
1:A:90:GLN:HB3	1:A:143:TYR:CZ	2.55	0.41
1:B:348:VAL:HA	1:B:369:SER:HA	2.03	0.41
1:B:148:PRO:HG3	1:B:156:TYR:CB	2.51	0.41
1:B:455:GLN:O	1:B:457:ARG:NH2	2.48	0.41
1:A:398:GLU:CG	1:A:401:GLU:HG3	2.50	0.41
1:A:626:GLY:HA2	1:A:673:ARG:NH2	2.35	0.41
1:B:82:ASN:HD21	1:B:110:MET:HE2	1.81	0.41
1:B:324:ALA:HB2	1:B:458:TYR:CE1	2.55	0.41
1:B:430:ILE:HG23	1:B:431:LEU:N	2.36	0.41
1:B:647:TYR:CE1	1:B:662:VAL:HA	2.56	0.41
1:B:81:ARG:NH1	1:B:81:ARG:CG	2.84	0.41
1:B:279:PHE:CG	1:B:285:PHE:HB2	2.56	0.41
1:A:104:ASP:OD2	1:A:223:ARG:HD2	2.21	0.40
1:B:364:PHE:O	1:B:365:PRO:C	2.65	0.40
1:B:404:LEU:HA	1:B:407:LYS:HD2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:406:ARG:NH1	1:B:406:ARG:CG	2.84	0.40
1:B:107:ARG:NH2	1:B:223:ARG:HH21	2.19	0.40
1:B:403:GLU:HA	1:B:406:ARG:HD2	2.03	0.40
1:A:136:VAL:O	1:A:171:PHE:HA	2.21	0.40
1:A:518:LYS:HE3	1:A:518:LYS:HB2	1.96	0.40
1:A:364:PHE:O	1:A:365:PRO:C	2.63	0.40
1:B:216:GLU:OE1	1:B:385:ARG:HD3	2.21	0.40
1:B:313:SER:O	1:B:314:LYS:HB2	2.21	0.40
1:B:364:PHE:HB2	1:B:365:PRO:CD	2.51	0.40
1:B:414:GLU:O	1:B:415:GLY:C	2.65	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	602/618 (97%)	570 (95%)	32 (5%)	0	100	100
1	B	596/618 (96%)	547 (92%)	48 (8%)	1 (0%)	43	55
All	All	1198/1236 (97%)	1117 (93%)	80 (7%)	1 (0%)	48	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	356	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	512/525 (98%)	498 (97%)	14 (3%)	39	58
1	B	510/525 (97%)	494 (97%)	16 (3%)	35	52
All	All	1022/1050 (97%)	992 (97%)	30 (3%)	37	55

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	128	LEU
1	A	145	GLU
1	A	187	MET
1	A	232	GLU
1	A	255	ASP
1	A	276	LYS
1	A	290	THR
1	A	297	GLN
1	A	300	GLU
1	A	327	PRO
1	A	404	LEU
1	A	407	LYS
1	A	564	LEU
1	A	591	LEU
1	B	163	ASP
1	B	225	GLN
1	B	255	ASP
1	B	270	LYS
1	B	297	GLN
1	B	323	VAL
1	B	359	ASN
1	B	382	ASN
1	B	407	LYS
1	B	429	HIS
1	B	511	LEU
1	B	564	LEU
1	B	591	LEU
1	B	611	LEU
1	B	640	ARG
1	B	653	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	90	GLN
1	A	153	GLN
1	A	183	HIS
1	A	329	ASN
1	A	394	GLN
1	A	402	GLN
1	A	556	GLN
1	B	470	ASN
1	B	595	ASN
1	B	614	GLN
1	B	628	HIS

### 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](#)

6 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	FAD	B	702	-	58,58,58	2.31	12 (20%)	85,89,89	1.94	17 (20%)
4	NAP	B	703	-	32,33,52	1.64	7 (21%)	50,52,80	1.94	12 (24%)
2	FMN	B	701	-	33,33,33	2.63	13 (39%)	48,50,50	1.67	14 (29%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	FAD	A	702	-	58,58,58	2.31	13 (22%)	85,89,89	1.95	16 (18%)
2	FMN	A	701	-	33,33,33	2.77	14 (42%)	48,50,50	1.56	12 (25%)
4	NAP	A	703	-	32,33,52	1.63	7 (21%)	50,52,80	1.93	14 (28%)

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	FAD	B	702	-	-	2/34/50/50	0/6/6/6
4	NAP	B	703	-	-	8/21/37/67	0/3/3/5
2	FMN	B	701	-	-	0/18/18/18	0/3/3/3
3	FAD	A	702	-	-	3/34/50/50	0/6/6/6
2	FMN	A	701	-	-	0/18/18/18	0/3/3/3
4	NAP	A	703	-	-	6/21/37/67	0/3/3/5

All (66) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	702	FAD	C8A-N7A	8.57	1.48	1.31
3	A	702	FAD	C8A-N7A	8.52	1.48	1.31
2	B	701	FMN	C8M-C8	-7.15	1.37	1.51
2	A	701	FMN	C8M-C8	-6.62	1.38	1.51
3	A	702	FAD	C8A-N9A	6.26	1.48	1.37
3	B	702	FAD	C8A-N9A	6.25	1.48	1.37
3	B	702	FAD	C8M-C8	-6.17	1.39	1.51
3	A	702	FAD	C8M-C8	-6.16	1.39	1.51
3	B	702	FAD	C7M-C7	-6.15	1.39	1.51
3	A	702	FAD	C7M-C7	-6.11	1.39	1.51
2	A	701	FMN	C10-N10	5.82	1.49	1.37
2	A	701	FMN	C9-C9A	5.23	1.48	1.39
2	A	701	FMN	C4A-N5	5.09	1.41	1.30
2	B	701	FMN	C10-N10	5.05	1.48	1.37
2	B	701	FMN	C4A-N5	5.00	1.41	1.30
2	B	701	FMN	C9-C9A	4.54	1.47	1.39
2	A	701	FMN	C9A-N10	4.41	1.48	1.41
2	B	701	FMN	C9A-C5A	4.25	1.48	1.41
2	A	701	FMN	C9A-C5A	4.02	1.47	1.41
2	B	701	FMN	C9A-N10	3.97	1.48	1.41
2	A	701	FMN	C8-C7	3.96	1.50	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	701	FMN	C8-C7	3.87	1.50	1.40
3	B	702	FAD	C9A-N10	-3.77	1.34	1.41
3	A	702	FAD	C9A-N10	-3.76	1.34	1.41
4	B	703	NAP	C2A-N3A	3.66	1.40	1.33
3	A	702	FAD	C2A-N3A	3.66	1.40	1.33
4	A	703	NAP	C2A-N3A	3.65	1.40	1.33
3	B	702	FAD	C2A-N3A	3.64	1.40	1.33
3	B	702	FAD	C2A-N1A	3.64	1.40	1.33
4	A	703	NAP	C2A-N1A	3.62	1.40	1.33
3	B	702	FAD	C10-N1	3.58	1.40	1.33
3	A	702	FAD	C10-N1	3.56	1.40	1.33
3	A	702	FAD	C2A-N1A	3.55	1.40	1.33
4	B	703	NAP	C2A-N1A	3.55	1.40	1.33
2	A	701	FMN	C10-N1	3.49	1.40	1.33
2	B	701	FMN	C4'-C3'	3.45	1.59	1.53
2	A	701	FMN	C1'-C2'	3.27	1.57	1.52
2	B	701	FMN	C10-N1	3.21	1.39	1.33
2	A	701	FMN	C4'-C3'	3.20	1.59	1.53
4	B	703	NAP	C5A-C4A	-3.09	1.33	1.39
4	B	703	NAP	C5A-N7A	-3.05	1.33	1.39
4	A	703	NAP	C5A-C4A	-3.04	1.33	1.39
4	A	703	NAP	C5A-N7A	-3.03	1.33	1.39
3	B	702	FAD	C5A-N7A	-3.01	1.33	1.39
3	A	702	FAD	C5A-N7A	-3.01	1.33	1.39
3	A	702	FAD	C5A-C4A	-2.96	1.33	1.39
2	A	701	FMN	C6-C5A	2.94	1.44	1.40
3	B	702	FAD	C5A-C4A	-2.93	1.33	1.39
3	B	702	FAD	C5X-N5	-2.72	1.34	1.39
4	B	703	NAP	C5A-C6A	-2.69	1.33	1.41
3	A	702	FAD	C5X-N5	-2.68	1.34	1.39
4	A	703	NAP	C5A-C6A	-2.67	1.33	1.41
3	A	702	FAD	C5A-C6A	-2.67	1.33	1.41
3	B	702	FAD	C5A-C6A	-2.64	1.33	1.41
2	B	701	FMN	C6-C5A	2.56	1.43	1.40
2	B	701	FMN	C1'-C2'	2.51	1.56	1.52
2	A	701	FMN	O2'-C2'	2.47	1.48	1.43
4	B	703	NAP	C8A-N9A	-2.43	1.33	1.37
4	A	703	NAP	C8A-N9A	-2.40	1.33	1.37
2	A	701	FMN	C6-C7	2.38	1.42	1.39
2	A	701	FMN	C7M-C7	2.35	1.55	1.51
2	B	701	FMN	C7M-C7	2.26	1.55	1.51
4	B	703	NAP	C4A-N9A	-2.06	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	701	FMN	O2'-C2'	2.06	1.47	1.43
4	A	703	NAP	C4A-N9A	-2.02	1.33	1.37
3	A	702	FAD	C4A-N9A	-2.01	1.33	1.37

All (85) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	702	FAD	N9A-C8A-N7A	-9.42	100.58	113.94
3	A	702	FAD	N9A-C8A-N7A	-9.38	100.63	113.94
3	B	702	FAD	N3A-C2A-N1A	-7.40	117.38	128.58
3	A	702	FAD	N3A-C2A-N1A	-7.30	117.53	128.58
4	B	703	NAP	N3A-C2A-N1A	-7.15	117.76	128.58
4	A	703	NAP	N3A-C2A-N1A	-7.07	117.88	128.58
3	B	702	FAD	C5A-C4A-N3A	-4.53	120.48	126.72
4	B	703	NAP	N9A-C8A-N7A	-4.45	107.63	113.94
3	A	702	FAD	C5A-C4A-N3A	-4.36	120.71	126.72
4	A	703	NAP	N9A-C8A-N7A	-4.30	107.83	113.94
4	B	703	NAP	C5A-C4A-N3A	-4.16	120.99	126.72
2	B	701	FMN	C9A-C5A-N5	4.07	126.77	122.45
4	A	703	NAP	C5A-C4A-N3A	-4.04	121.15	126.72
3	A	702	FAD	C5A-C4A-N9A	4.03	110.21	105.81
2	A	701	FMN	C9A-C5A-N5	3.87	126.56	122.45
2	A	701	FMN	O4'-C4'-C3'	-3.76	100.45	109.25
3	B	702	FAD	C5A-C4A-N9A	3.69	109.83	105.81
3	B	702	FAD	C2A-N3A-C4A	3.58	120.58	111.83
3	A	702	FAD	C2A-N3A-C4A	3.45	120.27	111.83
2	B	701	FMN	C4'-C3'-C2'	-3.37	107.96	113.57
3	A	702	FAD	C5A-N7A-C8A	3.35	108.71	103.45
2	B	701	FMN	O4'-C4'-C3'	-3.29	101.56	109.25
4	B	703	NAP	C2A-N3A-C4A	3.25	119.77	111.83
3	B	702	FAD	C5A-N7A-C8A	3.24	108.55	103.45
4	A	703	NAP	C2A-N3A-C4A	3.17	119.57	111.83
4	B	703	NAP	C5A-N7A-C8A	3.10	108.32	103.45
3	B	702	FAD	C4-N3-C2	-3.06	120.20	125.64
4	A	703	NAP	C5A-N7A-C8A	2.99	108.15	103.45
3	B	702	FAD	C5A-C6A-N6A	-2.99	115.88	123.29
3	A	702	FAD	C5A-C6A-N6A	-2.99	115.88	123.29
3	A	702	FAD	C4-N3-C2	-2.98	120.35	125.64
3	A	702	FAD	C10-C4X-N5	-2.98	118.73	124.81
4	A	703	NAP	C3B-C2B-C1B	-2.91	97.24	102.81
3	B	702	FAD	C2B-C3B-C4B	-2.90	97.01	102.61
2	A	701	FMN	O4-C4-N3	-2.80	114.86	120.11

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	703	NAP	C5A-C6A-N6A	-2.78	116.40	123.29
3	A	702	FAD	C4'-C3'-C2'	-2.77	108.97	113.57
3	A	702	FAD	C4A-N9A-C8A	2.74	108.61	105.74
4	A	703	NAP	C5A-C6A-N6A	-2.71	116.57	123.29
2	B	701	FMN	O4-C4-N3	-2.67	115.10	120.11
2	B	701	FMN	O4'-C4'-C5'	-2.66	104.13	109.99
2	B	701	FMN	C8M-C8-C7	2.64	126.15	120.76
3	B	702	FAD	C4X-C4-N3	2.61	119.89	113.25
2	B	701	FMN	C5A-C9A-N10	-2.58	115.63	117.97
3	A	702	FAD	C4X-C4-N3	2.58	119.82	113.25
3	B	702	FAD	C10-C4X-N5	-2.54	119.62	124.81
2	A	701	FMN	C8M-C8-C7	2.53	125.92	120.76
2	B	701	FMN	C5A-N5-C4A	-2.52	114.02	118.09
2	A	701	FMN	C4'-C3'-C2'	-2.51	109.40	113.57
4	B	703	NAP	C6A-C5A-C4A	2.50	120.60	117.18
4	B	703	NAP	C4A-N9A-C8A	2.50	108.36	105.74
2	B	701	FMN	C8M-C8-C9	-2.49	115.19	119.57
4	A	703	NAP	C6A-C5A-C4A	2.45	120.53	117.18
3	B	702	FAD	C4X-C10-N10	2.42	119.95	116.48
4	B	703	NAP	C3B-C2B-C1B	-2.42	98.18	102.81
4	B	703	NAP	C4A-C5A-N7A	-2.42	107.82	110.58
2	A	701	FMN	C5A-C9A-N10	-2.39	115.80	117.97
4	A	703	NAP	C4A-C5A-N7A	-2.35	107.90	110.58
4	A	703	NAP	C4A-N9A-C8A	2.34	108.19	105.74
3	B	702	FAD	C6A-C5A-C4A	2.30	120.31	117.18
2	A	701	FMN	O2P-P-O1P	2.29	119.77	110.83
3	A	702	FAD	C9A-C5X-N5	-2.28	120.03	122.45
3	B	702	FAD	O4-C4-C4X	-2.28	120.52	126.53
2	B	701	FMN	C7M-C7-C6	-2.24	115.63	119.57
3	B	702	FAD	C9A-C5X-N5	-2.23	120.08	122.45
3	A	702	FAD	C6A-C5A-C4A	2.22	120.22	117.18
3	A	702	FAD	C2B-C3B-C4B	-2.22	98.32	102.61
4	A	703	NAP	N3A-C4A-N9A	2.22	130.94	127.17
3	A	702	FAD	O4-C4-C4X	-2.19	120.75	126.53
2	A	701	FMN	C8M-C8-C9	-2.19	115.71	119.57
2	A	701	FMN	C5A-N5-C4A	-2.17	114.57	118.09
2	B	701	FMN	O2P-P-O1P	2.16	119.26	110.83
4	A	703	NAP	O4B-C1B-N9A	2.15	112.22	108.09
2	B	701	FMN	C5'-C4'-C3'	2.13	116.24	112.22
4	B	703	NAP	N3A-C4A-N9A	2.13	130.79	127.17
2	B	701	FMN	O3P-P-O5'	-2.11	101.17	106.67
3	B	702	FAD	C4A-N9A-C8A	2.11	107.95	105.74

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	703	NAP	O2N-PN-O1N	2.10	119.03	110.83
2	A	701	FMN	O4'-C4'-C5'	-2.08	105.40	109.99
2	A	701	FMN	C5'-C4'-C3'	2.08	116.14	112.22
4	A	703	NAP	O4B-C1B-C2B	-2.07	103.02	106.59
2	B	701	FMN	C9-C9A-N10	2.05	124.61	121.85
4	B	703	NAP	O2N-PN-O1N	2.04	118.78	110.83
3	B	702	FAD	C5'-C4'-C3'	-2.02	108.41	112.22
2	A	701	FMN	O3P-P-O5'	-2.01	101.44	106.67

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	703	NAP	PA-O3-PN-O2N
4	B	703	NAP	C2B-C1B-N9A-C8A
4	A	703	NAP	C2B-C1B-N9A-C4A
4	B	703	NAP	C2B-C1B-N9A-C4A
4	A	703	NAP	C2B-C1B-N9A-C8A
4	A	703	NAP	C2B-O2B-P2B-O1X
4	A	703	NAP	PA-O3-PN-O1N
4	B	703	NAP	PA-O3-PN-O1N
4	B	703	NAP	PA-O3-PN-O2N
3	A	702	FAD	PA-O3P-P-O1P
4	B	703	NAP	C2B-O2B-P2B-O1X
3	A	702	FAD	C5'-O5'-P-O1P
3	A	702	FAD	PA-O3P-P-O2P
3	B	702	FAD	PA-O3P-P-O1P
4	B	703	NAP	PA-O3-PN-O5D
4	B	703	NAP	PN-O3-PA-O2A
4	A	703	NAP	O4B-C1B-N9A-C8A
4	B	703	NAP	O4B-C1B-N9A-C8A
3	B	702	FAD	PA-O3P-P-O2P

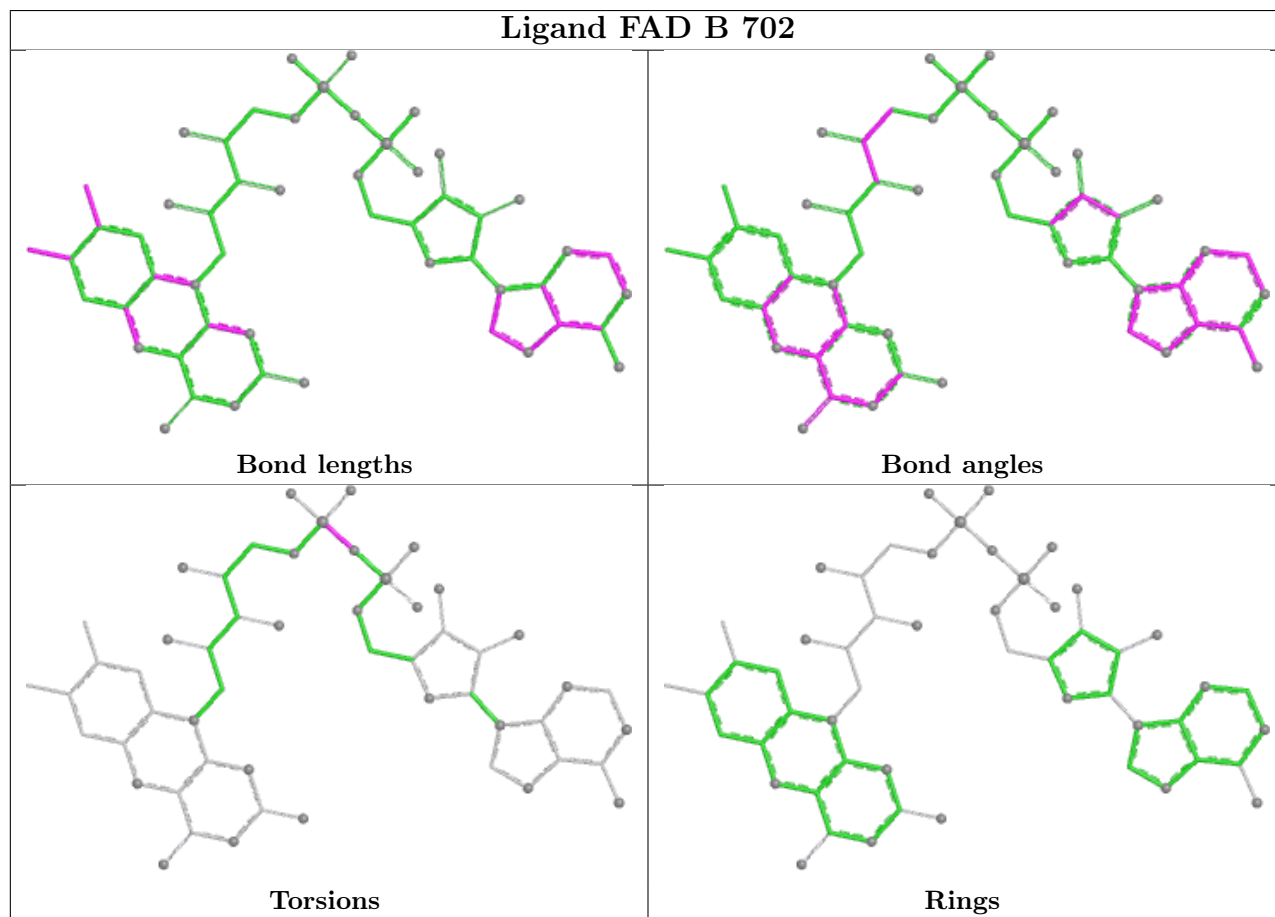
There are no ring outliers.

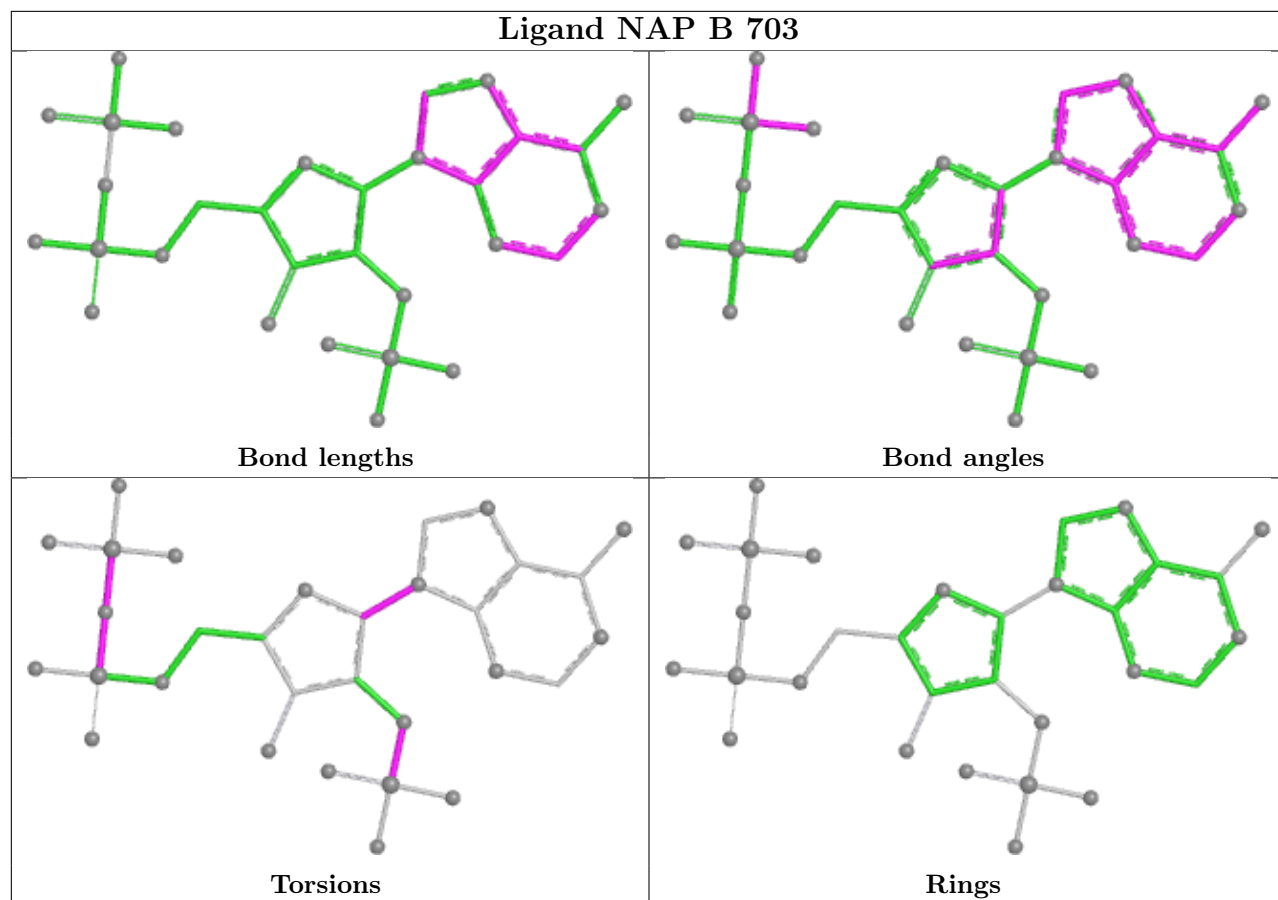
2 monomers are involved in 2 short contacts:

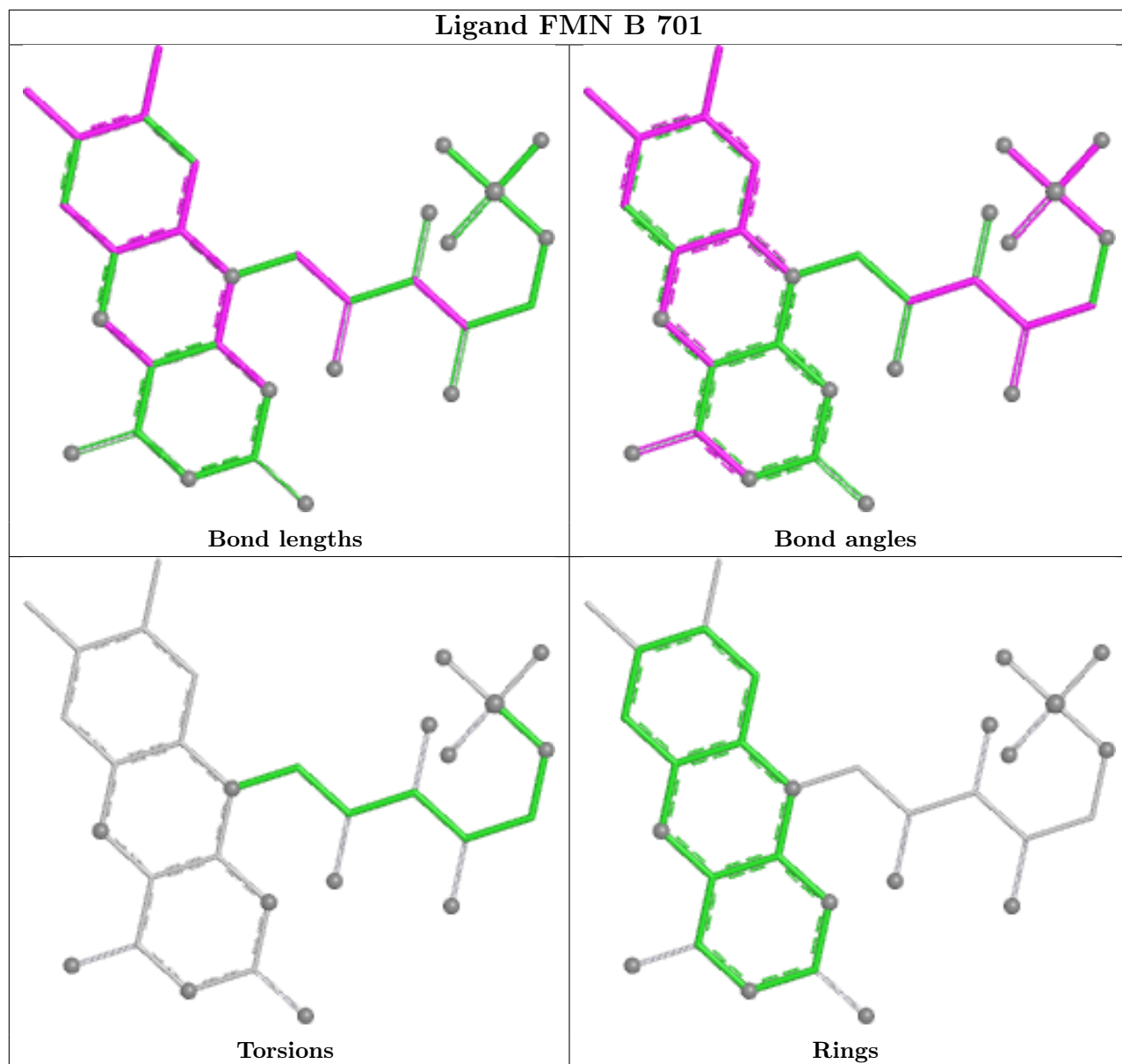
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	702	FAD	1	0
4	B	703	NAP	1	0

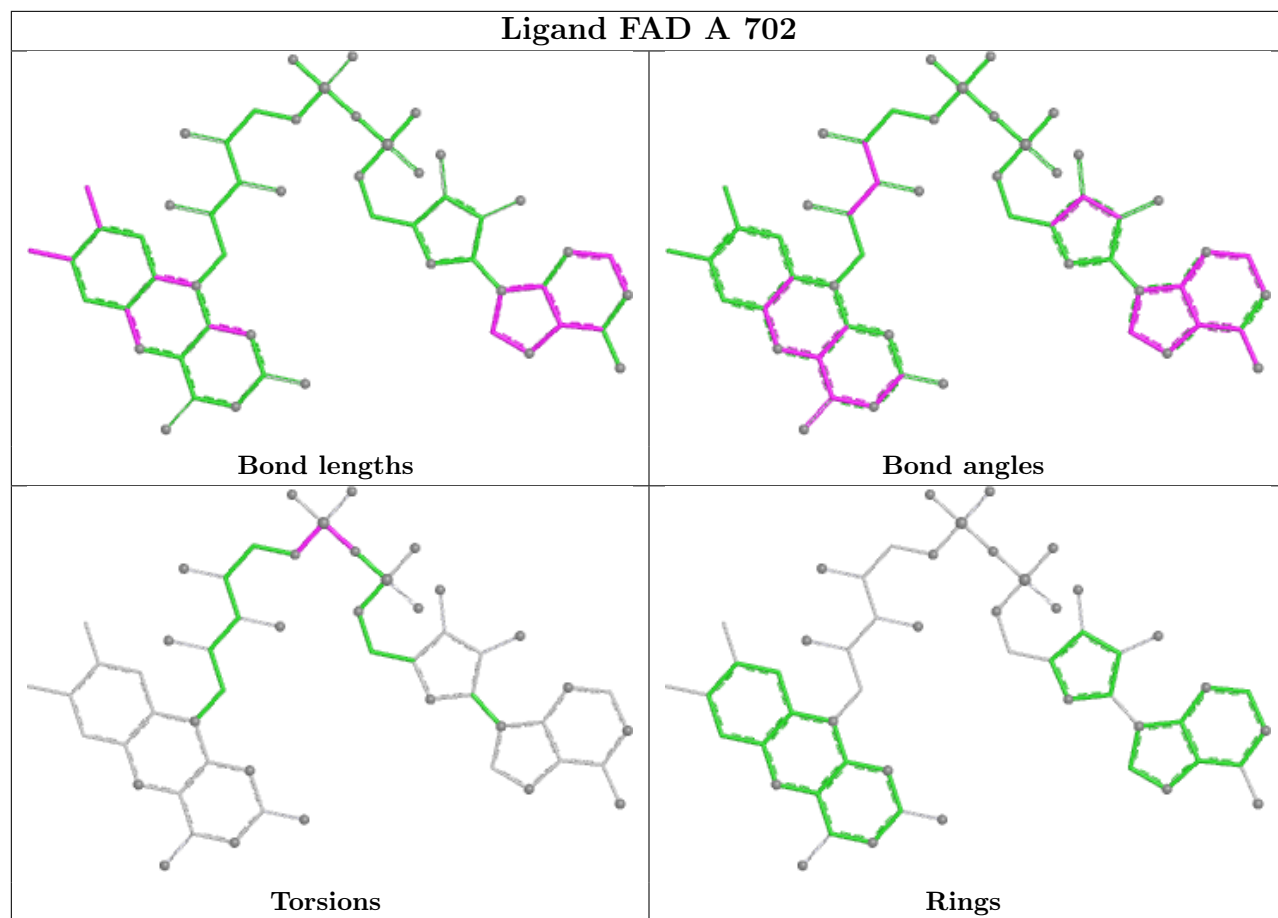
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

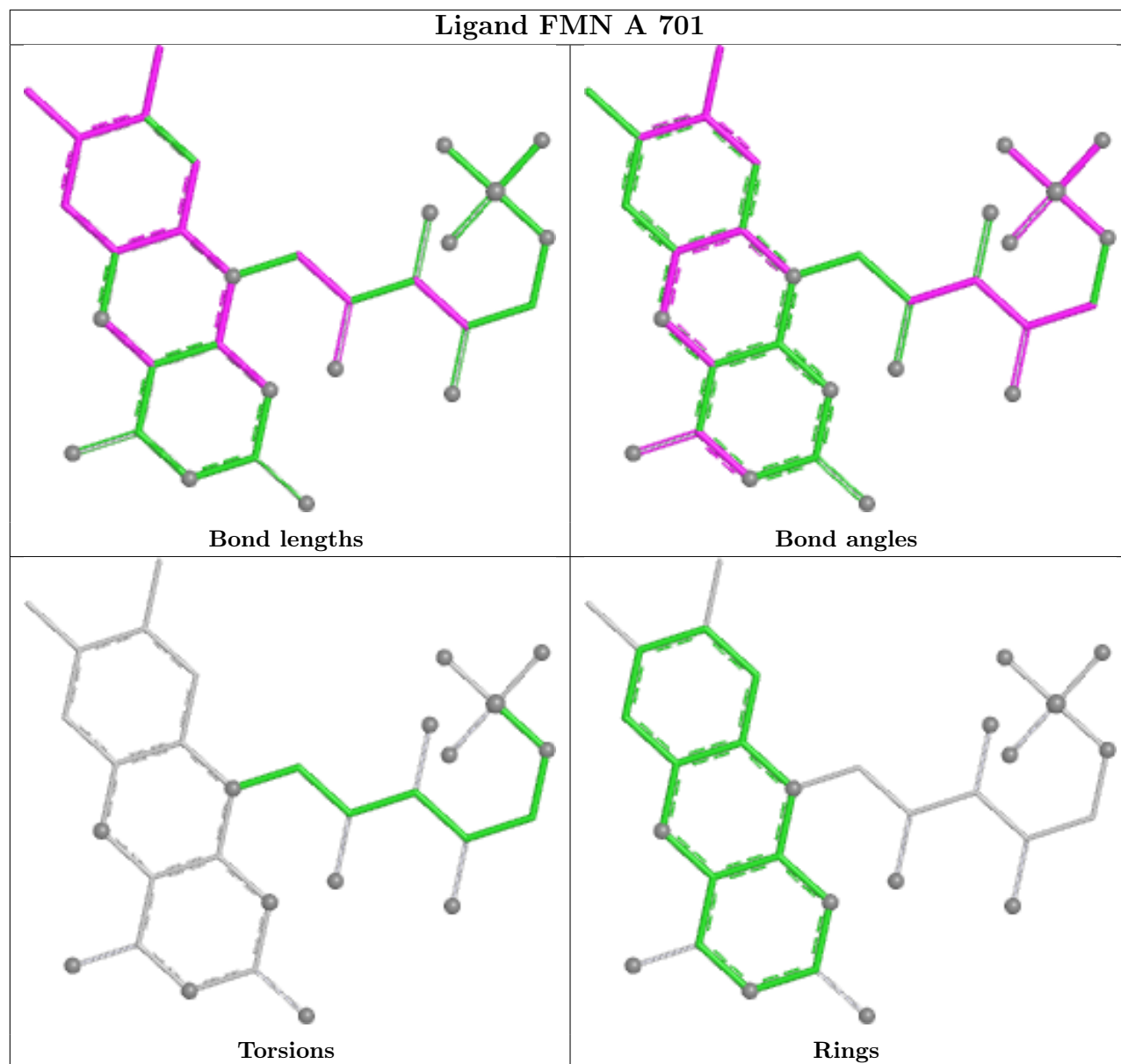
bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within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

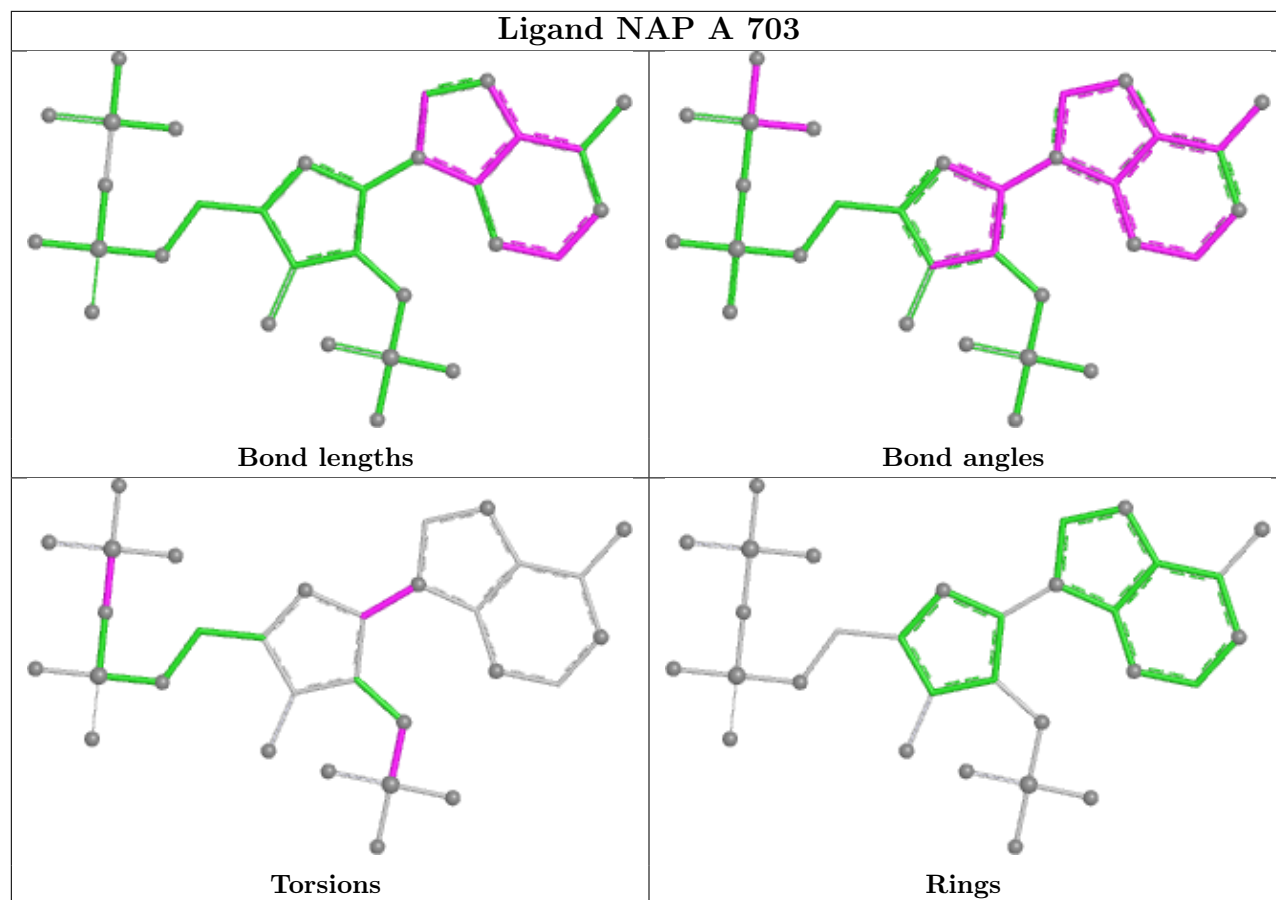












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

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	606/618 (98%)	0.06	8 (1%) 75 76	30, 47, 72, 95	0
1	B	602/618 (97%)	0.49	17 (2%) 55 57	36, 60, 83, 91	0
All	All	1208/1236 (97%)	0.27	25 (2%) 63 65	30, 53, 80, 95	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	244	SER	3.7
1	B	143	TYR	3.6
1	B	254	THR	3.6
1	B	525	PHE	3.1
1	A	243	SER	2.8
1	A	242	GLU	2.7
1	A	255	ASP	2.7
1	B	255	ASP	2.6
1	B	481	TYR	2.6
1	B	256	ILE	2.6
1	B	144	GLY	2.5
1	A	509	ARG	2.4
1	A	510	ALA	2.4
1	B	503	ALA	2.4
1	A	503	ALA	2.3
1	B	584	GLN	2.3
1	A	603	SER	2.3
1	A	241	GLU	2.2
1	B	485	ALA	2.2
1	B	245	ILE	2.2
1	B	239	THR	2.2
1	B	426	ALA	2.2
1	B	597	ALA	2.1
1	B	145	GLU	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	590	ALA	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](#)

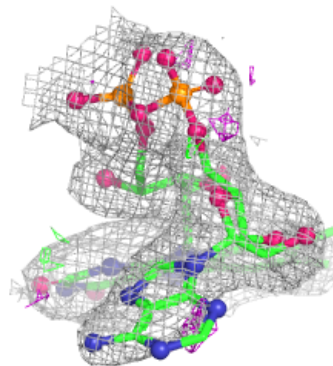
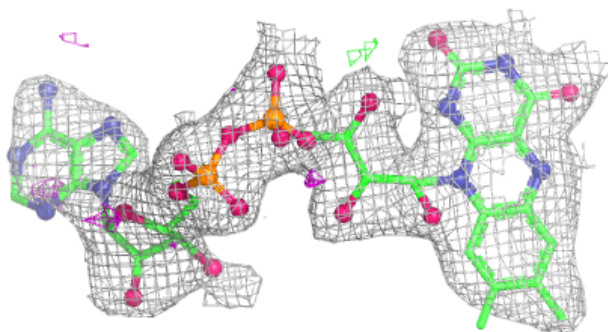
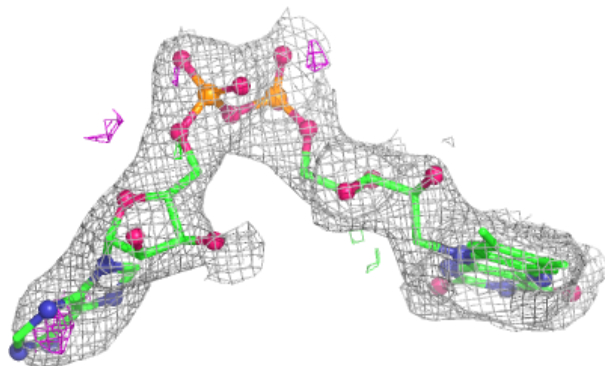
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	FAD	B	702	53/53	0.92	0.10	49,68,83,85	0
4	NAP	B	703	31/48	0.92	0.10	56,61,84,90	0
4	NAP	A	703	31/48	0.93	0.08	43,54,77,85	0
2	FMN	B	701	31/31	0.93	0.11	47,61,64,65	0
2	FMN	A	701	31/31	0.96	0.07	35,43,47,50	0
3	FAD	A	702	53/53	0.97	0.06	32,37,50,52	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.

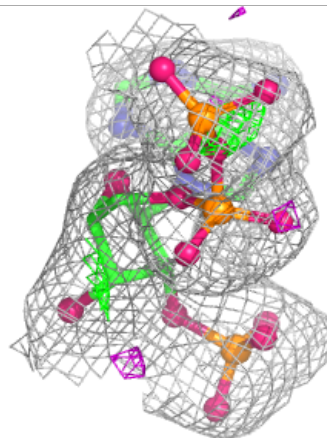
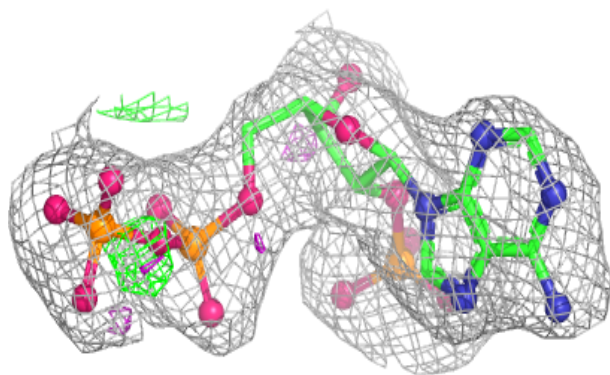
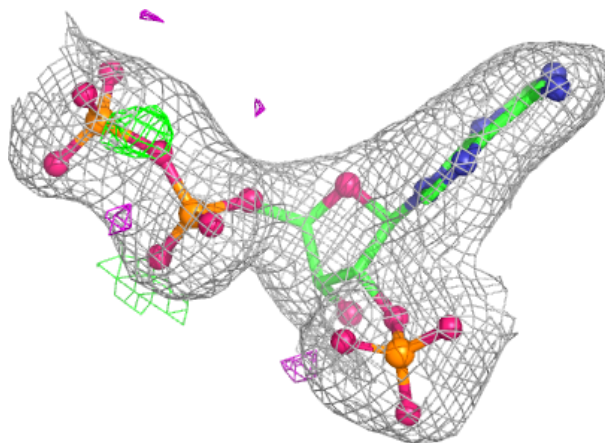
**Electron density around FAD B 702:**

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



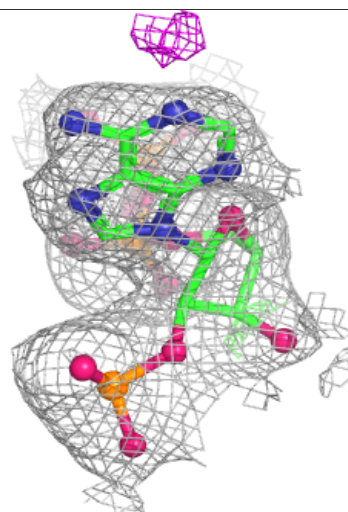
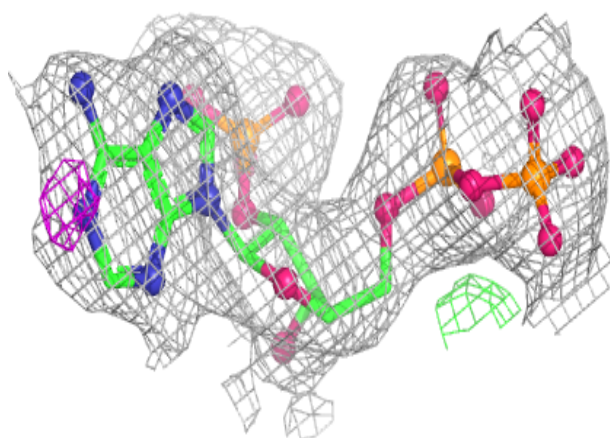
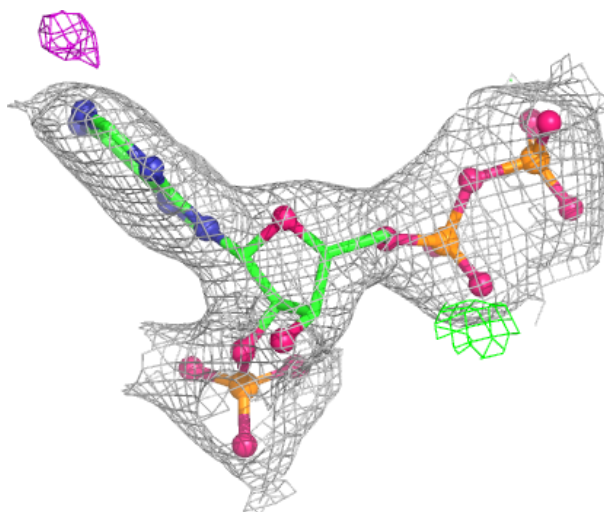
**Electron density around NAP B 703:**

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



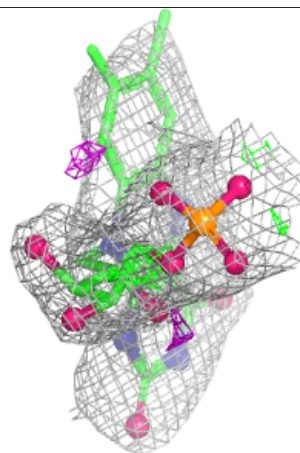
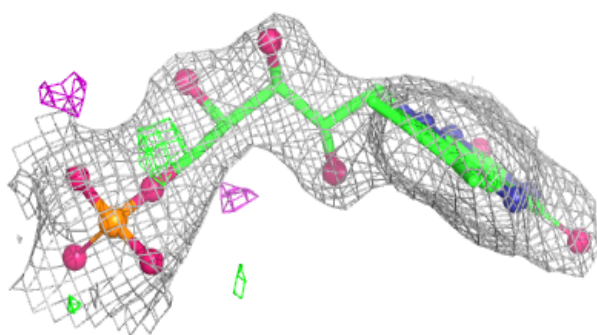
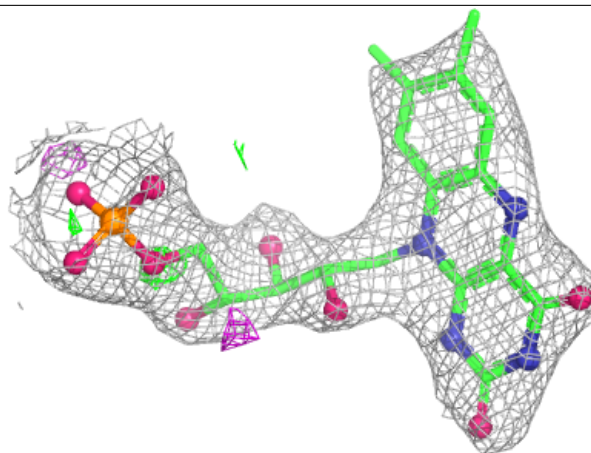
**Electron density around NAP A 703:**

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



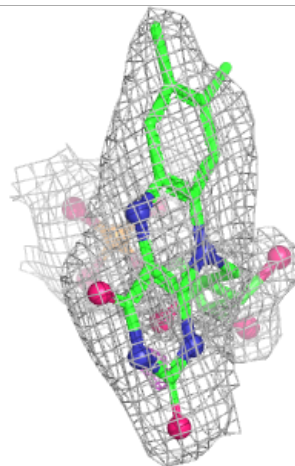
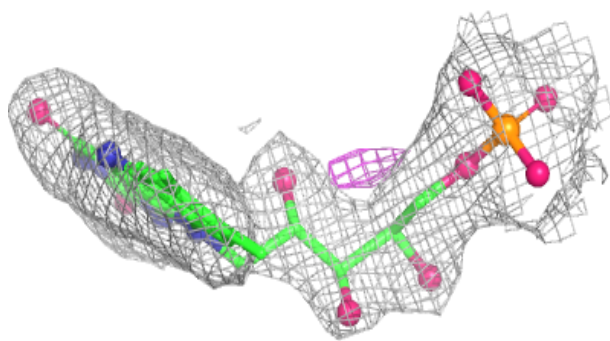
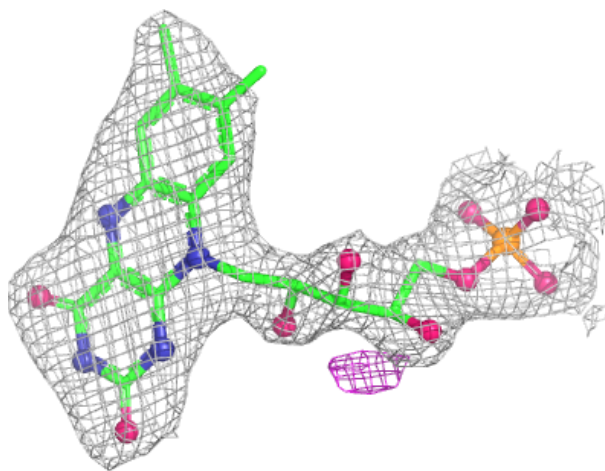
**Electron density around FMN B 701:**

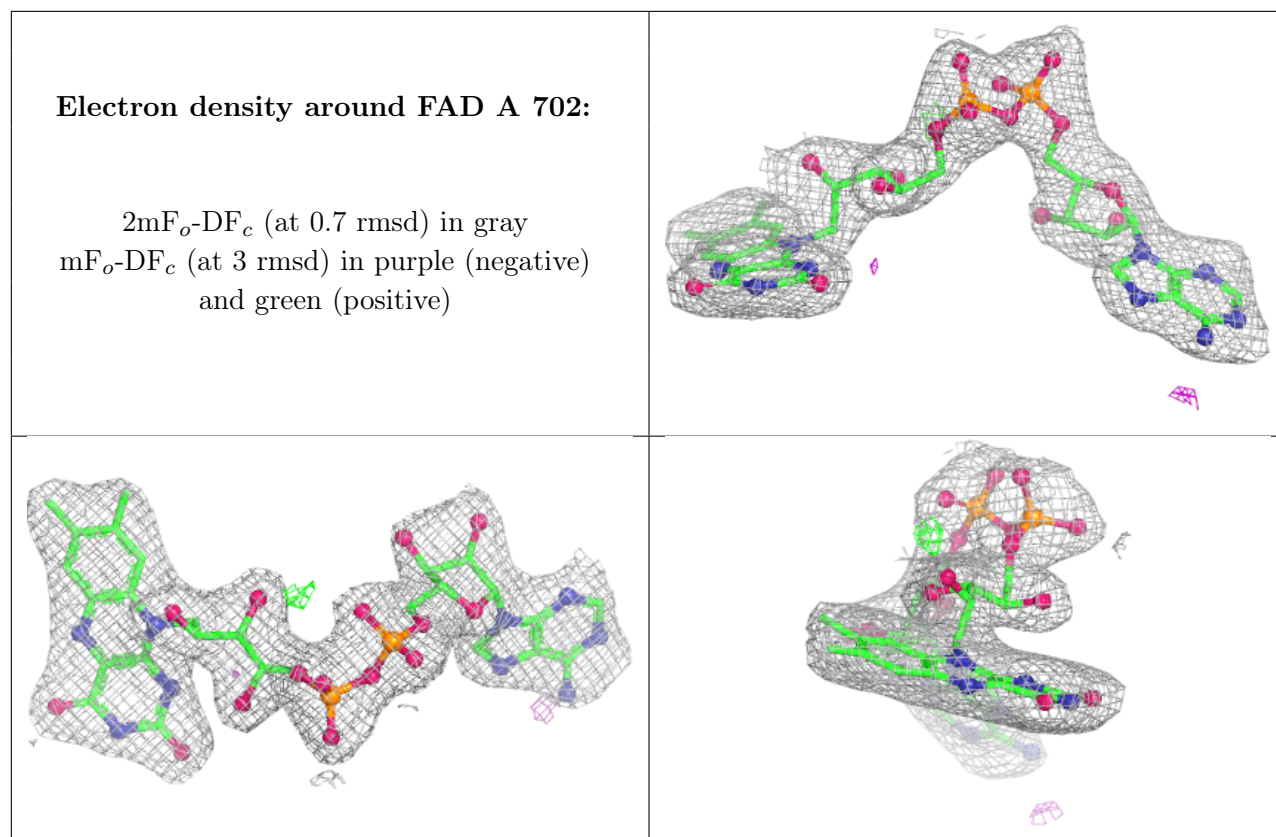
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around FMN A 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.