



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 21, 2023 – 02:17 PM EDT

PDB ID : 2QE0
Title : Thioacylenzyme Intermediate of GAPN from *S. Mutans*, New Data Integration and Refinement.
Authors : Corbier, C.; Didierjean, C.; Bricogne, G.; Branlant, G.; D'Ambrosio, K.; Vonrhein, C.
Deposited on : 2007-06-22
Resolution : 2.19 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35

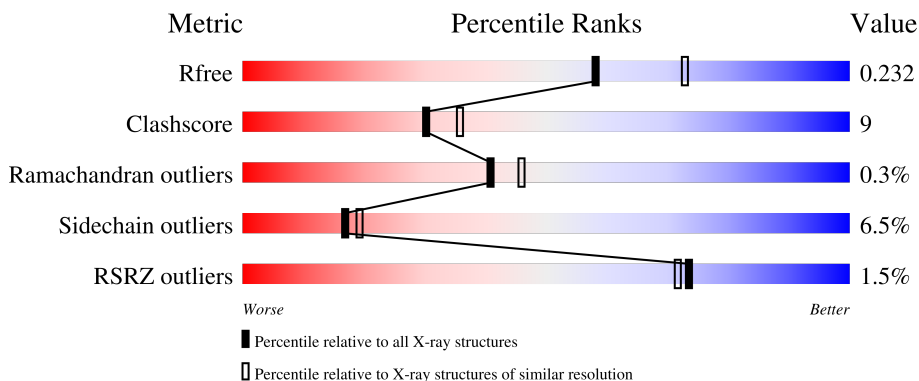
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.19 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	475	 2% 79% 18%
1	B	475	 2% 79% 19%
1	C	475	 1% 83% 14%
1	D	475	 2% 77% 21%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	G3H	A	800	-	X	-	-
2	G3H	B	800	-	X	X	-

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 16008 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.

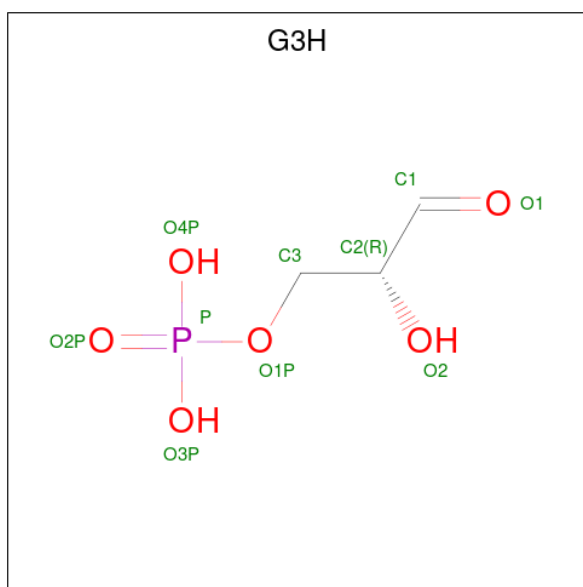
- Molecule 1 is a protein called NADP-dependent glyceraldehyde-3-phosphate dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	474	3598	2287	601	698	12	0	1	0
1	B	474	3598	2287	601	698	12	0	1	0
1	C	474	3598	2287	601	698	12	0	1	0
1	D	474	3598	2287	601	698	12	0	1	0

There are 16 discrepancies between the modelled and reference sequences:

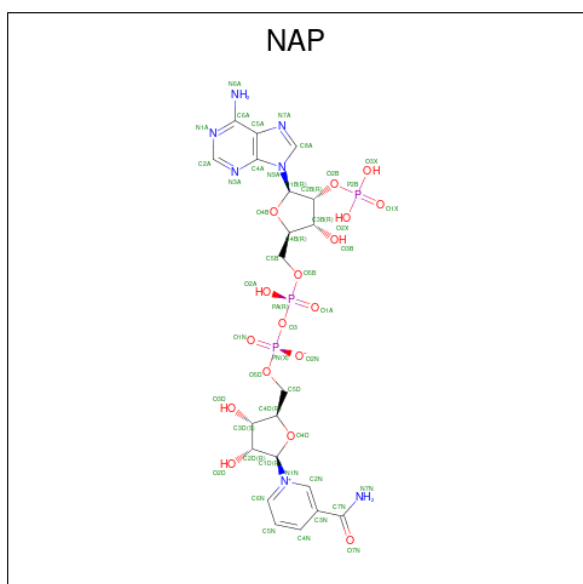
Chain	Residue	Modelled	Actual	Comment	Reference
A	58	ALA	SER	variant	UNP Q59931
A	85	ILE	VAL	variant	UNP Q59931
A	250	ALA	GLU	engineered mutation	UNP Q59931
A	347	THR	ALA	variant	UNP Q59931
B	58	ALA	SER	variant	UNP Q59931
B	85	ILE	VAL	variant	UNP Q59931
B	250	ALA	GLU	engineered mutation	UNP Q59931
B	347	THR	ALA	variant	UNP Q59931
C	58	ALA	SER	variant	UNP Q59931
C	85	ILE	VAL	variant	UNP Q59931
C	250	ALA	GLU	engineered mutation	UNP Q59931
C	347	THR	ALA	variant	UNP Q59931
D	58	ALA	SER	variant	UNP Q59931
D	85	ILE	VAL	variant	UNP Q59931
D	250	ALA	GLU	engineered mutation	UNP Q59931
D	347	THR	ALA	variant	UNP Q59931

- Molecule 2 is GLYCERALDEHYDE-3-PHOSPHATE (three-letter code: G3H) (formula: C₃H₇O₆P).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	P		
2	A	1	10	3	6	1	0	0
2	B	1	10	3	6	1	0	0
2	C	1	10	3	6	1	0	0
2	D	1	10	3	6	1	0	0

- Molecule 3 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: $C_{21}H_{28}N_7O_{17}P_3$).



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

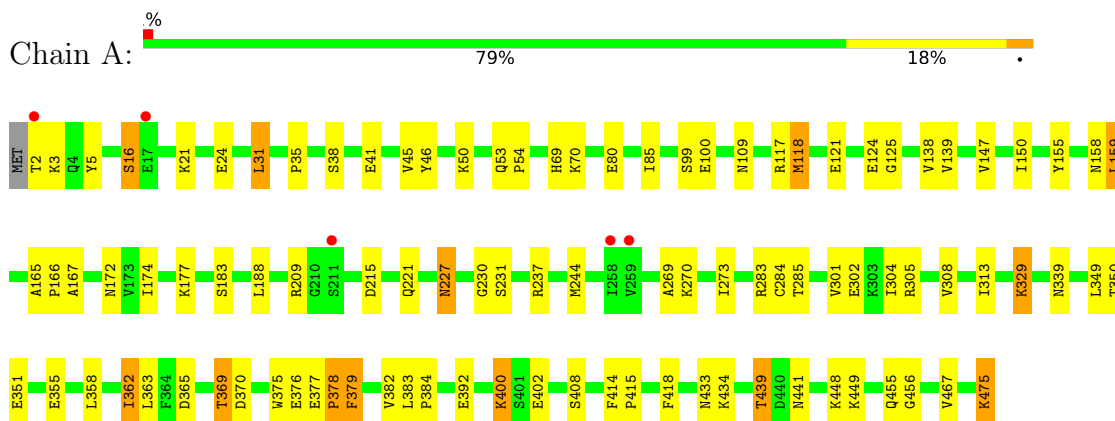
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	368	Total	O	0	0
			368	368		
4	B	300	Total	O	0	0
			300	300		
4	C	403	Total	O	0	0
			403	403		
4	D	313	Total	O	0	0
			313	313		

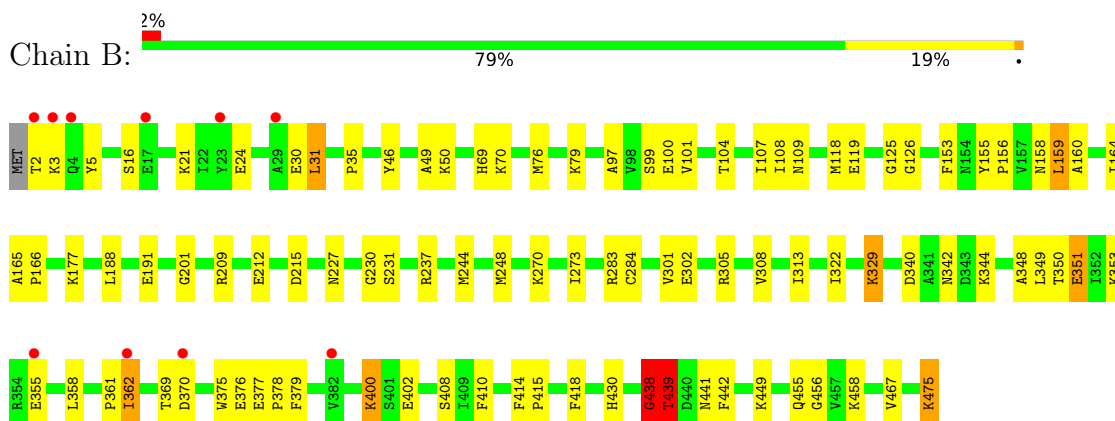
3 Residue-property plots [i](#)

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.

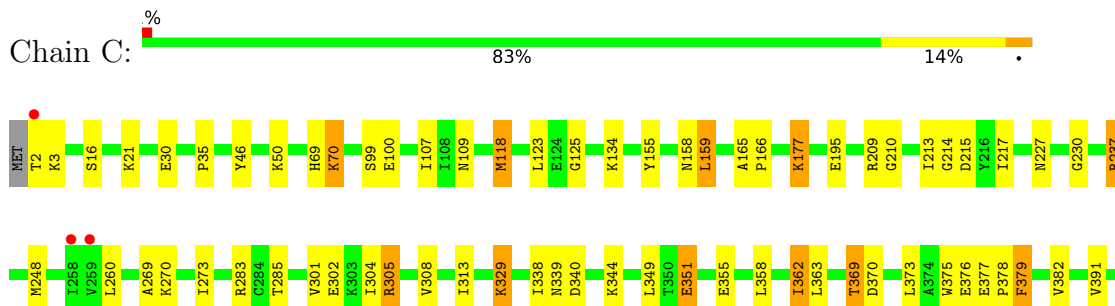
- Molecule 1: NADP-dependent glyceraldehyde-3-phosphate dehydrogenase

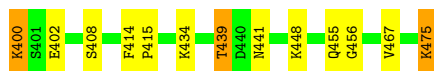


- Molecule 1: NADP-dependent glyceraldehyde-3-phosphate dehydrogenase

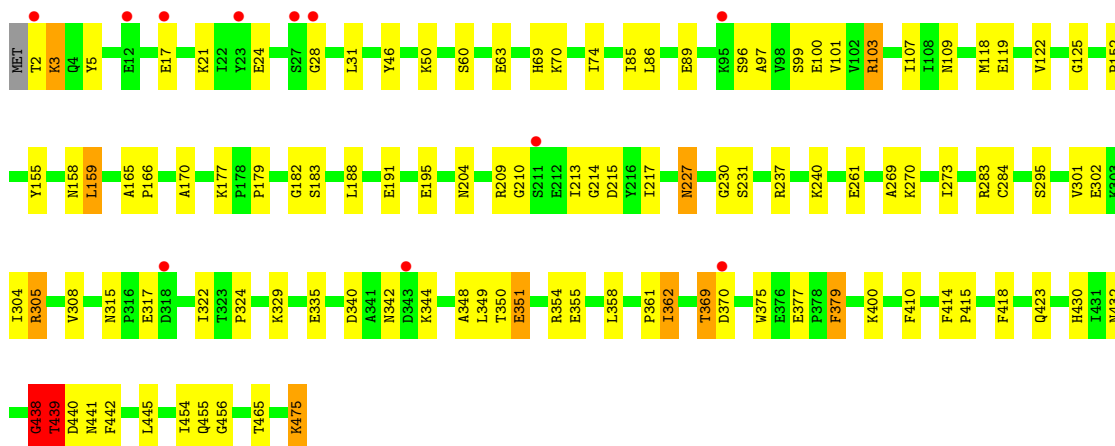
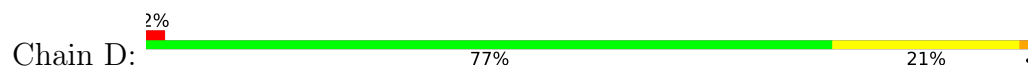


- Molecule 1: NADP-dependent glyceraldehyde-3-phosphate dehydrogenase





- Molecule 1: NADP-dependent glyceraldehyde-3-phosphate dehydrogenase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	142.47Å 155.21Å 113.08Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.78 – 2.19 19.78 – 2.22	Depositor EDS
% Data completeness (in resolution range)	96.5 (19.78-2.19) 99.8 (19.78-2.22)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.27 (at 2.21Å)	Xtrriage
Refinement program	BUSTER-TNT 2.1.1	Depositor
R, R_{free}	0.184 , 0.230 0.187 , 0.232	Depositor DCC
R_{free} test set	12452 reflections (10.01%)	wwPDB-VP
Wilson B-factor (Å ²)	29.1	Xtrriage
Anisotropy	0.380	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 62.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	16008	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 38.04 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.9128e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: G3H, 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	0.58	0/3656	0.73	2/4945 (0.0%)
1	B	0.55	0/3656	0.72	5/4945 (0.1%)
1	C	0.65	0/3656	0.78	3/4945 (0.1%)
1	D	0.61	0/3656	0.77	9/4945 (0.2%)
All	All	0.60	0/14624	0.75	19/19780 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1
1	D	0	1
All	All	0	2

There are no bond length outliers.

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	103	ARG	NE-CZ-NH1	8.77	124.69	120.30
1	D	103	ARG	NE-CZ-NH2	-7.93	116.34	120.30
1	C	283	ARG	NE-CZ-NH2	6.66	123.63	120.30
1	D	283	ARG	NE-CZ-NH2	6.65	123.62	120.30
1	C	456	GLY	N-CA-C	-6.56	96.70	113.10
1	D	305	ARG	NE-CZ-NH1	-6.52	117.04	120.30
1	C	283	ARG	NE-CZ-NH1	-6.22	117.19	120.30
1	B	456	GLY	N-CA-C	-6.09	97.88	113.10
1	B	438	GLY	CA-C-N	-6.01	103.99	117.20
1	D	305	ARG	NE-CZ-NH2	6.00	123.30	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	438	GLY	C-N-CA	5.99	136.67	121.70
1	D	456	GLY	N-CA-C	-5.84	98.49	113.10
1	A	456	GLY	N-CA-C	-5.83	98.53	113.10
1	D	438	GLY	CA-C-N	-5.69	104.68	117.20
1	D	439	THR	CB-CA-C	5.52	126.51	111.60
1	A	283	ARG	NE-CZ-NH1	5.46	123.03	120.30
1	B	439	THR	CB-CA-C	5.35	126.05	111.60
1	D	438	GLY	C-N-CA	5.06	134.35	121.70
1	B	322	ILE	CG1-CB-CG2	-5.01	100.38	111.40

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	438	GLY	Mainchain
1	D	438	GLY	Mainchain

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	3598	0	3651	78	0
1	B	3598	0	3651	71	0
1	C	3598	0	3651	64	1
1	D	3598	0	3651	78	0
2	A	10	0	4	2	0
2	B	10	0	4	4	0
2	C	10	0	4	1	0
2	D	10	0	4	1	0
3	A	48	0	25	8	0
3	B	48	0	25	7	0
3	C	48	0	24	7	0
3	D	48	0	25	9	0
4	A	368	0	0	14	0
4	B	300	0	0	4	0
4	C	403	0	0	10	0
4	D	313	0	0	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	16008	0	14719	272	1

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 9.

All (272) 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:D:230:GLY:HA2	3:D:4476:NAP:H51N	1.31	1.07
1:D:439:THR:HG23	1:D:441:ASN:OD1	1.62	0.98
1:C:439:THR:HG23	1:C:441:ASN:OD1	1.66	0.94
1:A:439:THR:HG23	1:A:441:ASN:OD1	1.68	0.92
1:B:439:THR:HG23	1:B:441:ASN:OD1	1.70	0.91
1:A:125:GLY:HA2	1:B:439:THR:HG21	1.60	0.83
1:B:415:PRO:HB2	1:D:475:LYS:HG3	1.59	0.83
1:A:475:LYS:HG3	1:C:415:PRO:HB2	1.60	0.81
1:A:415:PRO:HB2	1:C:475:LYS:HG3	1.63	0.80
1:B:119:GLU:HG2	1:C:123:LEU:HD23	1.64	0.80
1:B:230:GLY:HA2	3:B:2476:NAP:H52N	1.63	0.79
1:D:305:ARG:HD2	4:D:4635:HOH:O	1.82	0.79
1:B:2:THR:HG21	1:B:21:LYS:HE2	1.65	0.79
1:C:70:LYS:HE3	4:C:3787:HOH:O	1.84	0.78
1:A:302:GLU:OE2	1:A:305:ARG:NH1	2.17	0.78
1:A:369:THR:HG22	4:A:1580:HOH:O	1.84	0.78
1:C:155:TYR:HB2	1:C:159:LEU:HD22	1.69	0.75
1:C:125:GLY:HA2	1:D:439:THR:HG21	1.69	0.74
1:D:107:ILE:HD12	1:D:158:ASN:HD21	1.51	0.74
1:A:375:TRP:CH2	1:A:400:LYS:HG2	2.23	0.72
1:C:118:MET:HB3	4:C:3667:HOH:O	1.88	0.72
1:B:283:ARG:HD3	4:B:2580:HOH:O	1.90	0.72
1:C:302:GLU:OE2	1:C:305:ARG:NH1	2.24	0.71
1:D:155:TYR:HB2	1:D:159:LEU:HD22	1.72	0.71
1:B:302:GLU:OE2	1:B:305:ARG:NH1	2.24	0.71
1:D:230:GLY:CA	3:D:4476:NAP:H51N	2.15	0.71
1:B:475:LYS:HG3	1:D:415:PRO:HB2	1.73	0.70
1:C:439:THR:HG21	1:D:125:GLY:HA2	1.73	0.69
1:C:2:THR:HG22	1:C:30:GLU:OE2	1.92	0.69
1:A:329:LYS:HE2	4:A:1806:HOH:O	1.94	0.68
1:B:377:GLU:O	3:B:2476:NAP:N7N	2.27	0.68
1:B:212:GLU:HB3	4:B:2661:HOH:O	1.94	0.68
1:C:375:TRP:CH2	1:C:400:LYS:HG2	2.30	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:230:GLY:HA2	3:A:1476:NAP:H51N	1.77	0.67
1:B:119:GLU:HG2	1:C:123:LEU:CD2	2.24	0.67
1:C:118:MET:HG2	4:C:3665:HOH:O	1.94	0.67
1:D:100:GLU:HG3	1:D:158:ASN:HB2	1.77	0.66
1:C:215:ASP:OD2	1:C:237:ARG:NH2	2.29	0.66
1:A:118:MET:HG2	4:A:1551:HOH:O	1.93	0.66
1:B:155:TYR:HB2	1:B:159:LEU:HD22	1.79	0.65
1:D:230:GLY:O	3:D:4476:NAP:H3D	1.97	0.65
1:D:350:THR:HG21	1:D:361:PRO:O	1.97	0.65
1:B:340:ASP:O	1:B:344:LYS:HG3	1.98	0.64
1:A:414:PHE:HB3	4:A:1841:HOH:O	1.98	0.63
1:B:100:GLU:HG3	1:B:158:ASN:HB2	1.81	0.63
1:B:375:TRP:CH2	1:B:400:LYS:HG2	2.32	0.63
1:D:69:HIS:ND1	1:D:109:ASN:ND2	2.46	0.63
1:B:16:SER:HB2	1:B:35:PRO:HB3	1.81	0.62
1:B:69:HIS:ND1	1:B:109:ASN:ND2	2.48	0.62
1:C:362:ILE:HG13	1:C:363:LEU:N	2.13	0.62
1:D:439:THR:HG22	1:D:442:PHE:CD2	2.36	0.61
1:A:155:TYR:HB2	1:A:159:LEU:HD22	1.82	0.61
1:A:475:LYS:CG	1:C:415:PRO:HB2	2.29	0.61
1:D:2:THR:HG23	4:D:4773:HOH:O	2.01	0.60
1:C:339:ASN:ND2	4:C:3520:HOH:O	2.24	0.60
1:C:379:PHE:CZ	3:C:3476:NAP:H4D	2.38	0.59
1:A:269:ALA:HB1	1:A:304:ILE:HD13	1.85	0.58
1:C:373:LEU:O	1:C:373:LEU:HG	2.03	0.58
1:D:375:TRP:CH2	1:D:400:LYS:HG2	2.38	0.58
1:A:439:THR:HG21	1:B:125:GLY:HA2	1.86	0.58
1:A:231:SER:HA	3:A:1476:NAP:H2D	1.85	0.58
1:A:177:LYS:HG3	1:A:177:LYS:O	2.03	0.57
1:A:16:SER:HB2	1:A:35:PRO:HB3	1.86	0.57
1:D:24:GLU:HG2	1:D:31:LEU:HG	1.86	0.57
1:C:2:THR:HG21	1:C:21:LYS:HE2	1.87	0.56
1:A:215:ASP:OD2	1:A:237:ARG:NH2	2.39	0.56
1:B:76:MET:O	1:B:79:LYS:HG2	2.04	0.56
1:A:244:MET:HG2	4:B:2624:HOH:O	2.05	0.56
1:D:261:GLU:HG2	1:D:295:SER:OG	2.06	0.56
1:A:362:ILE:HG13	1:A:363:LEU:N	2.20	0.56
1:C:107:ILE:HD12	1:C:158:ASN:HD21	1.70	0.56
1:D:46:TYR:O	1:D:50:LYS:HG2	2.06	0.56
1:B:475:LYS:CG	1:D:415:PRO:HB2	2.35	0.56
1:D:377:GLU:O	3:D:4476:NAP:N7N	2.37	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:3:LYS:HD2	1:D:5:TYR:CE2	2.41	0.56
1:C:269:ALA:HA	1:C:304:ILE:HD11	1.88	0.55
1:A:269:ALA:CB	1:A:304:ILE:HD13	2.37	0.55
1:A:215:ASP:OD1	1:A:237:ARG:NH2	2.40	0.54
1:D:445:LEU:HD13	1:D:454:ILE:HG12	1.89	0.54
1:A:369:THR:HG23	4:A:1762:HOH:O	2.06	0.54
1:C:369:THR:HG22	4:C:3477:HOH:O	2.07	0.54
1:B:231:SER:HA	3:B:2476:NAP:H2D	1.91	0.53
1:B:2:THR:HG21	1:B:21:LYS:CE	2.36	0.53
1:A:449:LYS:HA	1:B:244:MET:CE	2.39	0.53
1:B:230:GLY:O	3:B:2476:NAP:H3D	2.08	0.53
1:D:369:THR:HG23	4:D:4552:HOH:O	2.08	0.53
1:A:305:ARG:HG3	1:A:349:LEU:HB3	1.89	0.53
1:B:377:GLU:OE1	3:B:2476:NAP:O2D	2.26	0.53
1:C:351:GLU:HB3	4:C:3824:HOH:O	2.09	0.53
1:A:5:TYR:O	1:A:35:PRO:HD3	2.08	0.53
1:A:100:GLU:HG3	1:A:158:ASN:HB2	1.91	0.52
1:C:273:ILE:HD11	1:C:308:VAL:HG23	1.92	0.52
1:D:107:ILE:HD12	1:D:158:ASN:ND2	2.23	0.52
1:B:230:GLY:CA	3:B:2476:NAP:H52N	2.35	0.52
1:A:313:ILE:HG22	1:A:358:LEU:HD21	1.90	0.52
1:A:379:PHE:CE1	3:A:1476:NAP:H1D	2.43	0.52
1:B:414:PHE:HB2	1:C:414:PHE:HB2	1.91	0.52
1:A:414:PHE:HB2	1:D:414:PHE:HB2	1.90	0.52
1:A:221:GLN:HG3	4:A:1813:HOH:O	2.09	0.51
1:B:353:LYS:NZ	4:B:2601:HOH:O	2.42	0.51
1:B:230:GLY:HA2	3:B:2476:NAP:C5D	2.37	0.51
4:C:3622:HOH:O	1:D:430:HIS:HD2	1.93	0.51
1:B:2:THR:HG22	1:B:30:GLU:OE2	2.10	0.51
1:C:46:TYR:O	1:C:50:LYS:HG2	2.10	0.51
1:C:313:ILE:HG22	1:C:358:LEU:HD21	1.91	0.51
3:C:3476:NAP:H5N	4:C:3694:HOH:O	2.10	0.51
1:B:97:ALA:O	1:B:101:VAL:HG23	2.10	0.51
1:D:340:ASP:O	1:D:344:LYS:HG3	2.11	0.51
1:A:46:TYR:O	1:A:50:LYS:HG2	2.11	0.51
1:D:210:GLY:O	1:D:214:GLY:HA3	2.11	0.51
1:B:415:PRO:HB2	1:D:475:LYS:CG	2.36	0.50
1:A:2:THR:HG21	1:A:21:LYS:HE2	1.93	0.50
1:A:165:ALA:HB3	1:A:166:PRO:HD3	1.93	0.50
1:D:231:SER:HA	3:D:4476:NAP:H2D	1.94	0.50
1:C:329:LYS:HE2	4:C:3748:HOH:O	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:69:HIS:ND1	1:C:109:ASN:ND2	2.61	0.49
1:D:170:ALA:HB1	1:D:465:THR:CG2	2.42	0.49
1:A:383:LEU:HD12	1:A:384:PRO:HD2	1.94	0.49
1:C:230:GLY:HA2	3:C:3476:NAP:H52N	1.94	0.49
1:D:335:GLU:OE1	1:D:354:ARG:HD3	2.12	0.49
1:B:439:THR:HG22	1:B:442:PHE:CD2	2.48	0.49
1:A:449:LYS:HA	1:B:244:MET:HE1	1.93	0.49
1:D:85:ILE:HD12	1:D:188:LEU:HD11	1.95	0.49
1:B:215:ASP:OD2	1:B:237:ARG:NH2	2.46	0.48
1:A:230:GLY:HA2	3:A:1476:NAP:C5D	2.43	0.48
1:A:339:ASN:ND2	4:A:1549:HOH:O	2.46	0.48
1:D:60:SER:OG	1:D:63:GLU:HG3	2.12	0.48
1:C:376:GLU:O	1:C:378:PRO:HD3	2.13	0.48
1:D:269:ALA:HA	1:D:304:ILE:CD1	2.44	0.48
1:D:301:VAL:CG1	1:D:349:LEU:CD1	2.91	0.48
1:D:28:GLY:HA2	4:D:4524:HOH:O	2.12	0.48
1:A:53:GLN:HB3	1:A:54:PRO:HD3	1.95	0.48
1:B:408:SER:HB3	1:B:410:PHE:CE1	2.48	0.48
1:D:213:ILE:O	1:D:217:ILE:HG23	2.13	0.48
3:D:4476:NAP:H5N	4:D:4757:HOH:O	2.13	0.48
1:D:3:LYS:HD2	1:D:5:TYR:CZ	2.49	0.48
1:D:152:PRO:C	1:D:179:PRO:HG3	2.34	0.48
1:D:103:ARG:HD2	1:D:440:ASP:OD2	2.13	0.48
1:A:230:GLY:HA3	3:A:1476:NAP:H51A	1.95	0.47
1:D:261:GLU:HG2	1:D:295:SER:HG	1.79	0.47
1:A:376:GLU:O	1:A:378:PRO:HD3	2.14	0.47
1:D:379:PHE:CE1	3:D:4476:NAP:H1D	2.50	0.47
1:B:350:THR:HG22	1:B:351:GLU:N	2.30	0.47
1:A:273:ILE:HD11	1:A:308:VAL:HG23	1.97	0.47
1:B:5:TYR:O	1:B:35:PRO:HD3	2.14	0.47
1:C:2:THR:HG21	1:C:21:LYS:CE	2.44	0.47
1:D:97:ALA:O	1:D:101:VAL:HG23	2.15	0.47
1:A:244:MET:CE	1:B:449:LYS:HA	2.44	0.47
1:B:165:ALA:HB3	1:B:166:PRO:HD3	1.96	0.47
1:D:348:ALA:HB1	1:D:362:ILE:CD1	2.45	0.47
1:D:302:GLU:OE2	1:D:305:ARG:NH1	2.30	0.47
1:D:315:ASN:HB3	1:D:317:GLU:OE1	2.15	0.47
1:A:269:ALA:HA	1:A:304:ILE:HD11	1.97	0.47
1:C:304:ILE:N	1:C:304:ILE:HD13	2.30	0.47
1:C:338:ILE:HD11	1:C:382:VAL:HG21	1.97	0.47
1:D:439:THR:HG22	1:D:442:PHE:CG	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:269:ALA:HA	1:A:304:ILE:CD1	2.45	0.46
1:B:376:GLU:O	1:B:378:PRO:HD3	2.15	0.46
1:B:126:GLY:HA3	4:C:3538:HOH:O	2.14	0.46
1:C:338:ILE:HD11	1:C:382:VAL:CG2	2.44	0.46
1:A:362:ILE:HG23	1:A:382:VAL:HG13	1.96	0.46
1:D:103:ARG:HG2	1:D:158:ASN:ND2	2.29	0.46
1:A:80:GLU:HB2	4:A:1622:HOH:O	2.14	0.46
1:C:269:ALA:HA	1:C:304:ILE:CD1	2.45	0.46
1:A:38:SER:OG	1:A:41:GLU:HG3	2.16	0.46
1:B:177:LYS:O	1:B:177:LYS:HG3	2.16	0.46
1:D:301:VAL:CG1	1:D:349:LEU:HD11	2.46	0.46
1:B:24:GLU:HG2	1:B:31:LEU:HG	1.98	0.45
1:B:284[A]:CYS:H	2:B:800:G3H:C1	2.28	0.45
1:B:348:ALA:HB1	1:B:362:ILE:CD1	2.46	0.45
1:C:177:LYS:O	1:C:177:LYS:HG3	2.16	0.45
1:D:159:LEU:HD12	1:D:159:LEU:HA	1.77	0.45
1:B:49:ALA:HA	1:B:201:GLY:O	2.16	0.45
1:C:165:ALA:HB3	1:C:166:PRO:HD3	1.99	0.45
1:C:2:THR:HG21	1:C:21:LYS:NZ	2.32	0.45
1:C:329:LYS:HB3	1:C:329:LYS:HE3	1.77	0.45
1:C:377:GLU:OE1	3:C:3476:NAP:O2D	2.34	0.45
1:A:215:ASP:CG	1:A:237:ARG:HH21	2.19	0.45
1:C:379:PHE:CE1	3:C:3476:NAP:H1D	2.51	0.45
1:D:209:ARG:HG3	1:D:209:ARG:HH11	1.81	0.45
1:D:400:LYS:O	1:D:400:LYS:HG3	2.16	0.45
1:B:215:ASP:OD1	1:B:237:ARG:NH2	2.50	0.45
1:A:301:VAL:HG13	1:A:349:LEU:CD1	2.47	0.45
1:A:209:ARG:HG3	1:A:209:ARG:HH11	1.80	0.45
1:B:248:MET:SD	1:B:455:GLN:HG3	2.56	0.45
3:C:3476:NAP:H2B	3:C:3476:NAP:H51A	1.61	0.44
1:B:313:ILE:HG22	1:B:358:LEU:HD21	1.99	0.44
1:A:41:GLU:O	1:A:45:VAL:HG23	2.17	0.44
1:B:107:ILE:HD12	1:B:158:ASN:HD21	1.82	0.44
1:C:301:VAL:HG13	1:C:349:LEU:CD1	2.48	0.44
1:C:340:ASP:O	1:C:344:LYS:HG3	2.18	0.44
1:D:215:ASP:OD2	1:D:237:ARG:NH2	2.50	0.44
1:D:240:LYS:HE3	4:D:4647:HOH:O	2.16	0.44
1:B:284[B]:CYS:H	2:B:800:G3H:C1	2.30	0.44
1:C:305:ARG:HG3	1:C:349:LEU:HB3	1.98	0.44
1:A:69:HIS:ND1	1:A:109:ASN:ND2	2.64	0.44
1:C:301:VAL:CG1	1:C:349:LEU:CD1	2.95	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:165:ALA:HB3	1:D:166:PRO:HD3	1.99	0.44
1:D:455:GLN:NE2	4:D:4775:HOH:O	2.50	0.44
1:B:159:LEU:HA	1:B:159:LEU:HD12	1.65	0.44
1:D:350:THR:HG22	1:D:351:GLU:N	2.33	0.44
1:C:269:ALA:CB	1:C:304:ILE:CD1	2.96	0.44
1:A:121:GLU:HG3	1:A:139:VAL:HB	1.99	0.43
1:C:260:LEU:HD22	1:C:391:VAL:HG22	1.99	0.43
1:D:322:ILE:HG13	1:D:361:PRO:HD3	1.99	0.43
1:D:379:PHE:CZ	3:D:4476:NAP:H1D	2.53	0.43
1:D:423:GLN:HG2	4:D:4666:HOH:O	2.18	0.43
1:A:209:ARG:NH1	4:A:1491:HOH:O	2.50	0.43
1:B:46:TYR:O	1:B:50:LYS:HG2	2.19	0.43
1:B:400:LYS:O	1:B:400:LYS:HG3	2.19	0.43
1:A:138:VAL:HG13	1:D:122:VAL:HG21	2.00	0.43
1:B:273:ILE:HD11	1:B:308:VAL:HG23	2.00	0.43
1:B:188:LEU:O	1:B:191:GLU:HB2	2.18	0.43
1:B:215:ASP:CG	1:B:237:ARG:HH21	2.22	0.43
1:B:301:VAL:CG1	1:B:349:LEU:CD1	2.96	0.43
4:A:1587:HOH:O	1:B:430:HIS:HD2	2.01	0.42
1:C:155:TYR:CB	1:C:159:LEU:HD22	2.45	0.42
1:A:349:LEU:HD11	1:A:365:ASP:HB2	2.01	0.42
1:D:74:ILE:HD13	1:D:195:GLU:HB3	2.01	0.42
1:B:104:THR:O	1:B:108:ILE:HG13	2.19	0.42
1:B:209:ARG:HH11	1:B:209:ARG:HG3	1.84	0.42
1:C:213:ILE:O	1:C:217:ILE:HG23	2.18	0.42
1:D:188:LEU:O	1:D:191:GLU:HB2	2.19	0.42
1:A:284[A]:CYS:SG	1:A:285:THR:HG23	2.60	0.42
1:C:362:ILE:HG23	1:C:382:VAL:HG22	2.00	0.42
1:A:301:VAL:HG13	1:A:349:LEU:HD13	2.00	0.42
1:A:24:GLU:HG2	1:A:31:LEU:HG	2.01	0.42
1:A:415:PRO:HB2	1:C:475:LYS:CG	2.41	0.42
1:A:415:PRO:HG3	1:D:414:PHE:CZ	2.55	0.42
1:D:410:PHE:HA	1:D:432:ASN:OD1	2.19	0.42
1:A:147:VAL:HB	1:A:174:ILE:HD13	2.01	0.42
1:B:458:LYS:NZ	1:D:119:GLU:OE1	2.52	0.42
1:A:215:ASP:CG	1:A:237:ARG:NH2	2.73	0.42
1:A:227:ASN:C	1:A:227:ASN:HD22	2.22	0.42
1:B:284[B]:CYS:SG	2:B:800:G3H:C1	3.08	0.42
1:B:439:THR:CG2	1:B:441:ASN:OD1	2.57	0.42
1:B:160:ALA:O	1:B:164:ILE:HG13	2.19	0.42
1:C:100:GLU:HG3	1:C:158:ASN:HB2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:379:PHE:CD1	3:C:3476:NAP:H1D	2.54	0.41
1:A:124:GLU:HB3	4:A:1502:HOH:O	2.20	0.41
1:A:150:ILE:HG22	3:A:1476:NAP:H4B	2.02	0.41
1:C:285:THR:OG1	2:C:800:G3H:H31	2.21	0.41
1:C:159:LEU:HD12	1:C:159:LEU:HA	1.95	0.41
1:A:377:GLU:OE1	3:A:1476:NAP:O2D	2.27	0.41
1:B:329:LYS:HE3	1:B:329:LYS:HB3	1.60	0.41
1:A:85:ILE:HD12	1:A:188:LEU:HD11	2.03	0.41
1:A:284[A]:CYS:H	2:A:800:G3H:C1	2.33	0.41
1:A:455:GLN:NE2	4:A:1545:HOH:O	2.53	0.41
1:A:433:ASN:HB3	4:A:1670:HOH:O	2.20	0.41
1:B:284[B]:CYS:SG	2:B:800:G3H:O1	2.74	0.41
1:B:350:THR:HG21	1:B:361:PRO:O	2.20	0.41
1:D:2:THR:HG21	1:D:21:LYS:HE2	2.02	0.41
1:A:167:ALA:O	1:A:172:ASN:HB2	2.20	0.41
1:A:230:GLY:O	3:A:1476:NAP:H3D	2.20	0.41
1:B:153:PHE:O	1:B:156:PRO:HD3	2.20	0.41
1:D:284[A]:CYS:H	2:D:800:G3H:C1	2.34	0.41
1:C:134:LYS:HA	1:C:134:LYS:HD2	1.89	0.41
1:D:439:THR:CG2	1:D:441:ASN:OD1	2.50	0.41
1:A:269:ALA:CB	1:A:304:ILE:CD1	2.99	0.41
1:C:210:GLY:O	1:C:214:GLY:HA3	2.21	0.41
1:D:89:GLU:CD	1:D:182:GLY:HA2	2.42	0.41
1:D:273:ILE:HD11	1:D:308:VAL:HG23	2.03	0.41
1:A:350:THR:HG22	4:A:1818:HOH:O	2.20	0.40
1:C:16:SER:HB2	1:C:35:PRO:HB3	2.03	0.40
1:D:31:LEU:HD23	1:D:31:LEU:HA	1.91	0.40
1:C:248:MET:HG3	1:C:455:GLN:HE21	1.87	0.40
1:C:209:ARG:HG3	1:C:209:ARG:HH11	1.86	0.40
1:D:324:PRO:HD3	1:D:358:LEU:HD13	2.02	0.40
1:D:377:GLU:OE1	3:D:4476:NAP:O2D	2.38	0.40
1:A:284[B]:CYS:H	2:A:800:G3H:C1	2.34	0.40
1:C:248:MET:CG	1:C:455:GLN:HE21	2.35	0.40
1:D:227:ASN:ND2	4:D:4775:HOH:O	2.54	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:3:LYS:NZ	1:C:195:GLU:OE1[2_355]	2.16	0.04

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	473/475 (100%)	463 (98%)	9 (2%)	1 (0%)	47	55
1	B	473/475 (100%)	456 (96%)	15 (3%)	2 (0%)	34	37
1	C	473/475 (100%)	461 (98%)	12 (2%)	0	100	100
1	D	473/475 (100%)	454 (96%)	17 (4%)	2 (0%)	34	37
All	All	1892/1900 (100%)	1834 (97%)	53 (3%)	5 (0%)	41	46

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	438	GLY
1	D	438	GLY
1	B	439	THR
1	D	439	THR
1	A	378	PRO

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	378/378 (100%)	350 (93%)	28 (7%)	13	14
1	B	378/378 (100%)	356 (94%)	22 (6%)	20	23
1	C	378/378 (100%)	354 (94%)	24 (6%)	18	20
1	D	378/378 (100%)	354 (94%)	24 (6%)	18	20
All	All	1512/1512 (100%)	1414 (94%)	98 (6%)	17	19

All (98) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	LYS
1	A	16	SER
1	A	31	LEU
1	A	70	LYS
1	A	99	SER
1	A	117	ARG
1	A	118	MET
1	A	159	LEU
1	A	183	SER
1	A	227	ASN
1	A	270	LYS
1	A	329	LYS
1	A	351	GLU
1	A	355	GLU
1	A	362	ILE
1	A	369	THR
1	A	370	ASP
1	A	379	PHE
1	A	392	GLU
1	A	400	LYS
1	A	402	GLU
1	A	408	SER
1	A	418	PHE
1	A	434	LYS
1	A	439	THR
1	A	448	LYS
1	A	467	VAL
1	A	475	LYS
1	B	3	LYS
1	B	31	LEU
1	B	70	LYS
1	B	99	SER
1	B	118	MET
1	B	159	LEU
1	B	227	ASN
1	B	270	LYS
1	B	329	LYS
1	B	342	ASN
1	B	351	GLU
1	B	355	GLU
1	B	362	ILE
1	B	369	THR

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Mol	Chain	Res	Type
1	B	370	ASP
1	B	379	PHE
1	B	400	LYS
1	B	402	GLU
1	B	418	PHE
1	B	439	THR
1	B	467	VAL
1	B	475	LYS
1	C	70	LYS
1	C	99	SER
1	C	118	MET
1	C	159	LEU
1	C	177	LYS
1	C	227	ASN
1	C	237	ARG
1	C	270	LYS
1	C	305	ARG
1	C	329	LYS
1	C	351	GLU
1	C	355	GLU
1	C	362	ILE
1	C	369	THR
1	C	370	ASP
1	C	379	PHE
1	C	400	LYS
1	C	402	GLU
1	C	408	SER
1	C	434	LYS
1	C	439	THR
1	C	448	LYS
1	C	467	VAL
1	C	475	LYS
1	D	3	LYS
1	D	17	GLU
1	D	70	LYS
1	D	86	LEU
1	D	96	SER
1	D	99	SER
1	D	118	MET
1	D	159	LEU
1	D	177	LYS
1	D	183	SER

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Mol	Chain	Res	Type
1	D	204	ASN
1	D	227	ASN
1	D	270	LYS
1	D	329	LYS
1	D	342	ASN
1	D	351	GLU
1	D	355	GLU
1	D	362	ILE
1	D	369	THR
1	D	370	ASP
1	D	379	PHE
1	D	418	PHE
1	D	439	THR
1	D	475	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	109	ASN
1	A	227	ASN
1	A	342	ASN
1	B	109	ASN
1	B	227	ASN
1	B	342	ASN
1	B	430	HIS
1	C	109	ASN
1	C	227	ASN
1	C	430	HIS
1	C	455	GLN
1	D	109	ASN
1	D	227	ASN
1	D	342	ASN
1	D	430	HIS
1	D	436	GLN
1	D	455	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

8 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	NAP	B	2476	-	45,52,52	1.70	11 (24%)	56,80,80	1.95	13 (23%)
3	NAP	C	3476	-	45,52,52	2.24	14 (31%)	56,80,80	2.50	26 (46%)
2	G3H	D	800	-	8,9,9	2.88	4 (50%)	10,12,12	4.08	6 (60%)
2	G3H	C	800	-	8,9,9	3.14	4 (50%)	10,12,12	4.32	5 (50%)
2	G3H	A	800	-	8,9,9	3.00	5 (62%)	10,12,12	3.73	6 (60%)
3	NAP	A	1476	-	45,52,52	1.77	9 (20%)	56,80,80	1.83	12 (21%)
3	NAP	D	4476	-	45,52,52	1.64	10 (22%)	56,80,80	2.01	12 (21%)
2	G3H	B	800	-	8,9,9	2.98	4 (50%)	10,12,12	4.28	7 (70%)

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	NAP	B	2476	-	-	9/31/67/67	0/5/5/5
3	NAP	C	3476	-	-	16/31/67/67	0/5/5/5
2	G3H	D	800	-	-	1/7/8/8	-
2	G3H	C	800	-	-	1/7/8/8	-
2	G3H	A	800	-	-	1/7/8/8	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAP	A	1476	-	-	6/31/67/67	0/5/5/5
3	NAP	D	4476	-	-	7/31/67/67	0/5/5/5
2	G3H	B	800	-	-	1/7/8/8	-

All (61) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	3476	NAP	C2N-N1N	8.07	1.44	1.35
2	D	800	G3H	P-O1P	5.57	1.78	1.60
3	B	2476	NAP	O4B-C1B	5.43	1.48	1.41
3	D	4476	NAP	O4D-C1D	5.31	1.48	1.41
2	C	800	G3H	P-O1P	5.15	1.76	1.60
2	A	800	G3H	P-O1P	5.03	1.76	1.60
2	B	800	G3H	P-O1P	5.00	1.76	1.60
2	A	800	G3H	O1P-C3	4.83	1.63	1.44
3	A	1476	NAP	C2N-N1N	4.52	1.40	1.35
3	C	3476	NAP	O4D-C1D	4.50	1.47	1.41
2	C	800	G3H	O1P-C3	4.45	1.61	1.44
3	A	1476	NAP	P2B-O2B	4.45	1.67	1.59
3	B	2476	NAP	P2B-O2B	4.01	1.66	1.59
2	C	800	G3H	O2-C2	4.00	1.51	1.43
2	D	800	G3H	O1P-C3	3.92	1.59	1.44
3	C	3476	NAP	C7N-N7N	3.90	1.40	1.33
2	B	800	G3H	O1P-C3	3.87	1.59	1.44
3	A	1476	NAP	O4B-C1B	3.81	1.46	1.41
3	B	2476	NAP	C3N-C7N	-3.76	1.44	1.50
3	A	1476	NAP	C7N-N7N	3.75	1.40	1.33
3	C	3476	NAP	C4A-N3A	-3.66	1.30	1.35
3	A	1476	NAP	C2N-C3N	3.55	1.44	1.39
3	D	4476	NAP	O4B-C1B	3.53	1.46	1.41
2	B	800	G3H	O2-C2	3.50	1.50	1.43
2	B	800	G3H	P-O3P	-3.41	1.41	1.54
2	C	800	G3H	P-O3P	-3.37	1.41	1.54
3	C	3476	NAP	C3N-C7N	3.32	1.55	1.50
3	C	3476	NAP	O2D-C2D	-3.27	1.35	1.43
3	B	2476	NAP	C2D-C1D	-3.22	1.48	1.53
3	D	4476	NAP	C3N-C7N	-3.02	1.46	1.50
3	A	1476	NAP	C3N-C7N	2.99	1.55	1.50
2	D	800	G3H	O2-C2	2.94	1.49	1.43
3	B	2476	NAP	C2N-N1N	2.91	1.38	1.35
3	C	3476	NAP	O7N-C7N	2.78	1.29	1.24
3	C	3476	NAP	P2B-O2B	2.77	1.64	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	800	G3H	P-O3P	-2.76	1.44	1.54
3	C	3476	NAP	O4B-C1B	2.71	1.44	1.41
3	C	3476	NAP	P2B-O2X	-2.62	1.44	1.54
3	D	4476	NAP	P2B-O2B	2.61	1.64	1.59
3	A	1476	NAP	C2D-C1D	-2.59	1.49	1.53
3	B	2476	NAP	C7N-N7N	2.59	1.37	1.33
3	C	3476	NAP	O5B-C5B	-2.57	1.34	1.44
2	A	800	G3H	P-O2P	-2.52	1.42	1.50
3	C	3476	NAP	PN-O1N	2.45	1.59	1.50
3	D	4476	NAP	C3D-C4D	2.42	1.59	1.53
2	D	800	G3H	P-O3P	-2.38	1.45	1.54
3	B	2476	NAP	O7N-C7N	2.38	1.28	1.24
3	B	2476	NAP	PN-O5D	2.36	1.68	1.59
3	B	2476	NAP	O4B-C4B	2.33	1.50	1.45
2	A	800	G3H	O2-C2	2.17	1.48	1.43
3	B	2476	NAP	C3D-C4D	2.13	1.58	1.53
3	A	1476	NAP	O7N-C7N	2.12	1.28	1.24
3	C	3476	NAP	C2D-C1D	-2.11	1.50	1.53
3	A	1476	NAP	PN-O5D	2.11	1.67	1.59
3	C	3476	NAP	O4D-C4D	2.11	1.49	1.45
3	D	4476	NAP	PN-O5D	2.10	1.67	1.59
3	B	2476	NAP	O4D-C1D	2.08	1.44	1.41
3	D	4476	NAP	P2B-O2X	-2.06	1.46	1.54
3	D	4476	NAP	C2D-C1D	-2.06	1.50	1.53
3	D	4476	NAP	C3B-C4B	2.03	1.58	1.53
3	D	4476	NAP	PA-O2A	-2.01	1.45	1.55

All (87) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	800	G3H	O1P-P-O2P	-9.18	80.71	106.47
3	D	4476	NAP	O3D-C3D-C2D	-8.28	85.05	111.82
2	C	800	G3H	O4P-P-O1P	8.21	128.59	106.73
3	C	3476	NAP	C3N-C7N-N7N	8.08	127.44	117.75
2	D	800	G3H	O1P-P-O2P	-7.94	84.20	106.47
2	C	800	G3H	O1P-P-O2P	-7.77	84.69	106.47
2	A	800	G3H	O1P-P-O2P	-7.19	86.32	106.47
3	C	3476	NAP	O4B-C4B-C5B	-6.86	86.81	109.37
2	D	800	G3H	O4P-P-O1P	6.81	124.86	106.73
2	B	800	G3H	O4P-P-O1P	6.68	124.50	106.73
2	A	800	G3H	O4P-P-O1P	6.34	123.59	106.73
3	A	1476	NAP	O4D-C1D-C2D	-6.23	97.81	106.93

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1476	NAP	C5A-C6A-N6A	5.81	129.18	120.35
3	B	2476	NAP	O4D-C4D-C5D	-5.16	92.41	109.37
3	D	4476	NAP	C3D-C2D-C1D	-4.89	93.61	100.98
2	C	800	G3H	O2-C2-C3	-4.88	95.53	110.17
3	B	2476	NAP	O7N-C7N-N7N	4.47	128.92	122.58
2	D	800	G3H	O2-C2-C3	-4.19	97.59	110.17
3	B	2476	NAP	C2N-C3N-C4N	4.04	122.84	118.26
3	C	3476	NAP	O7N-C7N-N7N	-3.90	117.03	122.58
2	B	800	G3H	O1P-C3-C2	-3.89	98.01	108.33
3	B	2476	NAP	C3N-C2N-N1N	-3.87	116.64	120.43
2	C	800	G3H	O2-C2-C1	3.86	116.77	109.17
2	D	800	G3H	O3P-P-O1P	3.82	116.91	106.73
3	B	2476	NAP	O3D-C3D-C2D	-3.79	99.57	111.82
3	D	4476	NAP	O4D-C1D-C2D	3.79	112.46	106.93
3	A	1476	NAP	O2X-P2B-O1X	3.75	125.37	110.68
2	B	800	G3H	O3P-P-O1P	3.75	116.70	106.73
3	B	2476	NAP	C3N-C7N-N7N	-3.73	113.27	117.75
2	A	800	G3H	O2-C2-C3	-3.71	99.05	110.17
3	D	4476	NAP	C5A-C6A-N6A	3.65	125.90	120.35
3	C	3476	NAP	C5B-C4B-C3B	-3.65	101.51	115.18
3	C	3476	NAP	O2D-C2D-C3D	-3.64	100.06	111.82
3	C	3476	NAP	C5A-C6A-N6A	3.62	125.86	120.35
2	C	800	G3H	O1P-C3-C2	-3.49	99.07	108.33
2	B	800	G3H	O2-C2-C3	-3.48	99.73	110.17
2	A	800	G3H	O3P-P-O1P	3.48	115.98	106.73
3	C	3476	NAP	O4D-C1D-C2D	-3.45	101.88	106.93
3	C	3476	NAP	O7N-C7N-C3N	-3.43	115.52	119.63
3	C	3476	NAP	C2N-C3N-C4N	-3.43	114.37	118.26
2	A	800	G3H	O1P-C3-C2	-3.41	99.29	108.33
3	D	4476	NAP	O4D-C4D-C3D	-3.38	98.42	105.11
3	B	2476	NAP	C3D-C2D-C1D	-3.30	96.01	100.98
3	C	3476	NAP	C2D-C3D-C4D	3.24	108.93	102.64
2	D	800	G3H	O2-C2-C1	3.23	115.53	109.17
3	C	3476	NAP	O3X-P2B-O1X	-3.20	98.16	110.68
3	B	2476	NAP	C2D-C3D-C4D	3.00	108.46	102.64
2	D	800	G3H	O1P-C3-C2	-2.92	100.57	108.33
3	C	3476	NAP	C5N-C4N-C3N	2.92	123.80	120.34
3	C	3476	NAP	C3D-C2D-C1D	2.70	105.04	100.98
3	C	3476	NAP	C2N-C3N-C7N	2.68	127.24	119.46
3	A	1476	NAP	O5B-C5B-C4B	-2.60	100.04	108.99
3	C	3476	NAP	O2N-PN-O1N	2.59	125.05	112.24
3	C	3476	NAP	O4D-C4D-C3D	-2.59	99.99	105.11

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1476	NAP	O3D-C3D-C2D	-2.58	103.48	111.82
3	C	3476	NAP	O5D-PN-O1N	-2.56	99.07	109.07
3	D	4476	NAP	C3N-C7N-N7N	-2.50	114.75	117.75
3	A	1476	NAP	O2B-C2B-C3B	2.50	120.73	111.68
3	D	4476	NAP	O2N-PN-O1N	2.42	124.19	112.24
3	C	3476	NAP	O3D-C3D-C4D	-2.41	104.08	111.05
2	B	800	G3H	O3P-P-O2P	2.37	119.96	110.68
3	D	4476	NAP	PN-O3-PA	2.37	140.96	132.83
3	C	3476	NAP	C1B-N9A-C4A	-2.35	122.51	126.64
3	B	2476	NAP	C5A-C6A-N6A	2.33	123.90	120.35
3	C	3476	NAP	C2B-C3B-C4B	-2.33	96.93	101.99
3	A	1476	NAP	C2N-N1N-C1D	2.32	124.30	119.14
3	D	4476	NAP	C2N-C3N-C7N	-2.30	112.78	119.46
3	A	1476	NAP	O4B-C1B-C2B	-2.30	102.61	106.59
3	C	3476	NAP	O2X-P2B-O1X	2.26	119.51	110.68
3	B	2476	NAP	C6N-C5N-C4N	-2.25	116.17	119.44
2	B	800	G3H	O4P-P-O2P	-2.23	101.95	110.68
3	D	4476	NAP	C4N-C3N-C7N	2.22	126.98	121.04
3	B	2476	NAP	O2N-PN-O1N	2.22	123.20	112.24
3	A	1476	NAP	O2B-P2B-O1X	-2.20	100.88	109.39
3	D	4476	NAP	O3B-C3B-C4B	-2.18	104.73	111.05
2	A	800	G3H	O2-C2-C1	2.16	113.43	109.17
3	A	1476	NAP	O2B-C2B-C1B	2.16	117.89	110.10
3	C	3476	NAP	O2A-PA-O5B	2.16	117.78	107.75
3	B	2476	NAP	N3A-C2A-N1A	-2.15	125.32	128.68
3	B	2476	NAP	O4D-C1D-C2D	2.14	110.06	106.93
3	C	3476	NAP	O5B-PA-O1A	-2.14	100.71	109.07
3	C	3476	NAP	C2A-N1A-C6A	2.11	122.36	118.75
3	C	3476	NAP	C4A-C5A-N7A	2.09	111.58	109.40
3	D	4476	NAP	O2D-C2D-C3D	-2.05	105.18	111.82
3	A	1476	NAP	C2N-C3N-C4N	-2.03	115.96	118.26
3	A	1476	NAP	O2N-PN-O1N	2.02	122.22	112.24
3	C	3476	NAP	PA-O5B-C5B	-2.00	109.93	121.68

There are no chirality outliers.

All (42) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	800	G3H	C3-O1P-P-O2P
3	A	1476	NAP	C5D-O5D-PN-O3
3	A	1476	NAP	C5D-O5D-PN-O1N
3	A	1476	NAP	C5D-O5D-PN-O2N

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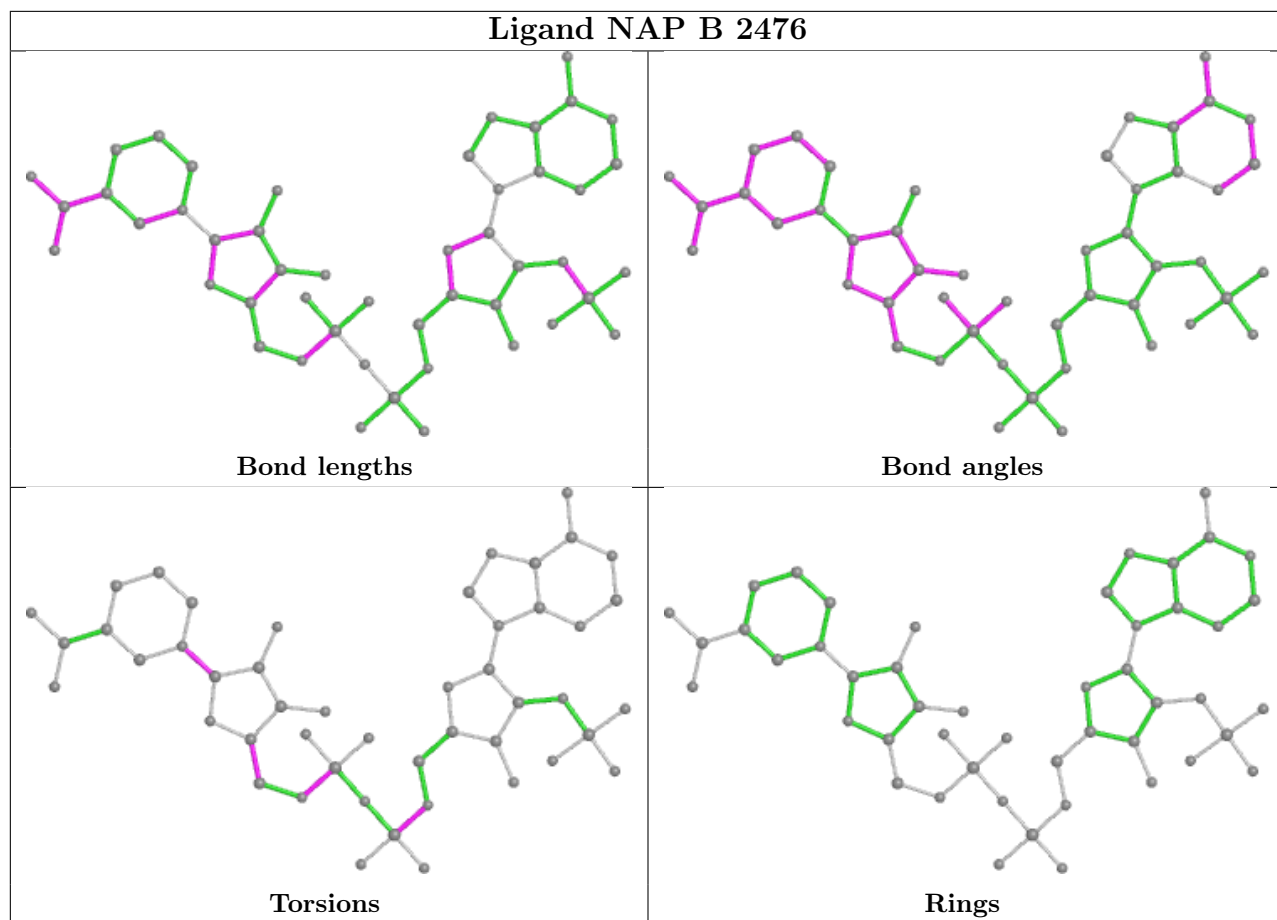
Mol	Chain	Res	Type	Atoms
3	A	1476	NAP	C2D-C1D-N1N-C2N
3	A	1476	NAP	C2D-C1D-N1N-C6N
3	B	2476	NAP	C5B-O5B-PA-O1A
3	B	2476	NAP	O4D-C4D-C5D-O5D
3	B	2476	NAP	C3D-C4D-C5D-O5D
3	B	2476	NAP	O4D-C1D-N1N-C2N
3	B	2476	NAP	C2D-C1D-N1N-C6N
3	C	3476	NAP	C5B-O5B-PA-O3
3	C	3476	NAP	O4B-C4B-C5B-O5B
3	C	3476	NAP	C3B-C4B-C5B-O5B
3	C	3476	NAP	C5D-O5D-PN-O3
3	C	3476	NAP	C5D-O5D-PN-O1N
3	C	3476	NAP	C5D-O5D-PN-O2N
3	C	3476	NAP	O4D-C4D-C5D-O5D
3	C	3476	NAP	C3D-C4D-C5D-O5D
3	C	3476	NAP	C2D-C1D-N1N-C2N
3	C	3476	NAP	C2D-C1D-N1N-C6N
3	D	4476	NAP	C5B-O5B-PA-O1A
3	D	4476	NAP	C5D-O5D-PN-O3
3	D	4476	NAP	C5D-O5D-PN-O2N
3	D	4476	NAP	C3D-C4D-C5D-O5D
3	C	3476	NAP	C2N-C3N-C7N-O7N
3	C	3476	NAP	C2N-C3N-C7N-N7N
3	C	3476	NAP	C4N-C3N-C7N-O7N
3	C	3476	NAP	C4N-C3N-C7N-N7N
3	D	4476	NAP	O4D-C4D-C5D-O5D
2	B	800	G3H	C3-O1P-P-O2P
2	D	800	G3H	C3-O1P-P-O2P
3	A	1476	NAP	PN-O3-PA-O5B
3	D	4476	NAP	PN-O3-PA-O5B
3	B	2476	NAP	C5B-O5B-PA-O3
3	B	2476	NAP	C5D-O5D-PN-O3
3	C	3476	NAP	C2B-O2B-P2B-O2X
3	B	2476	NAP	C5D-O5D-PN-O1N
3	C	3476	NAP	C5B-O5B-PA-O1A
3	D	4476	NAP	C5D-O5D-PN-O1N
2	C	800	G3H	C3-O1P-P-O2P
3	B	2476	NAP	C2D-C1D-N1N-C2N

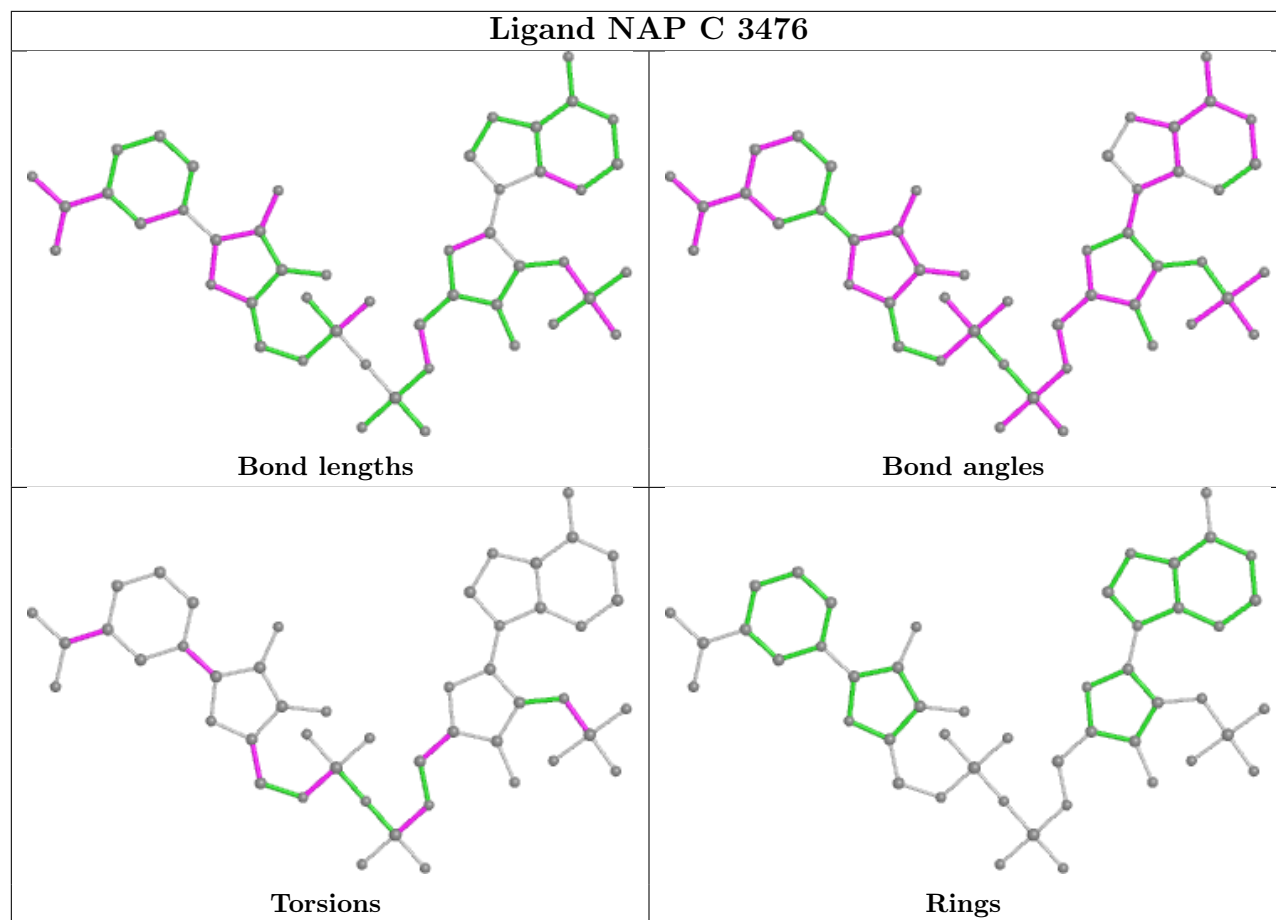
There are no ring outliers.

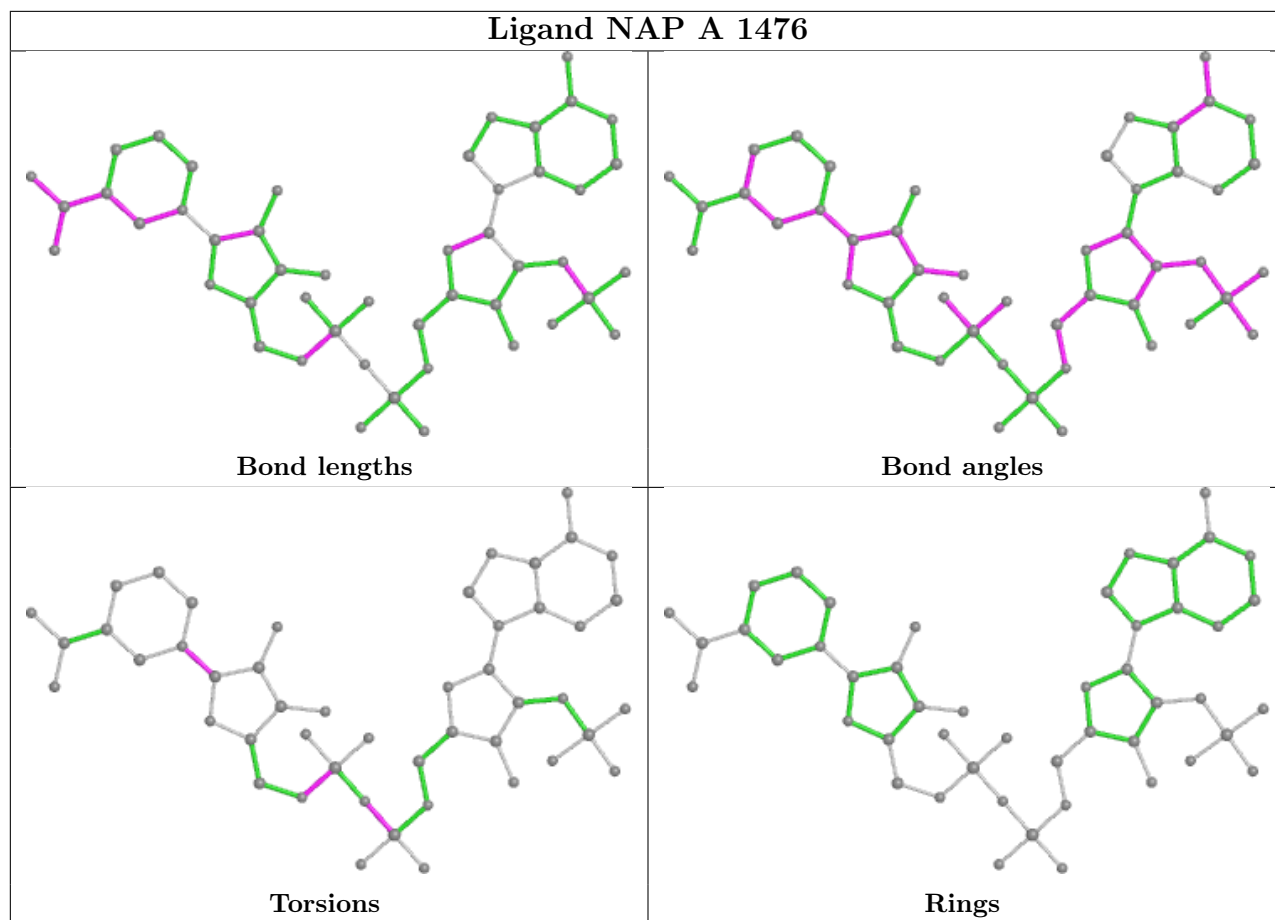
8 monomers are involved in 39 short contacts:

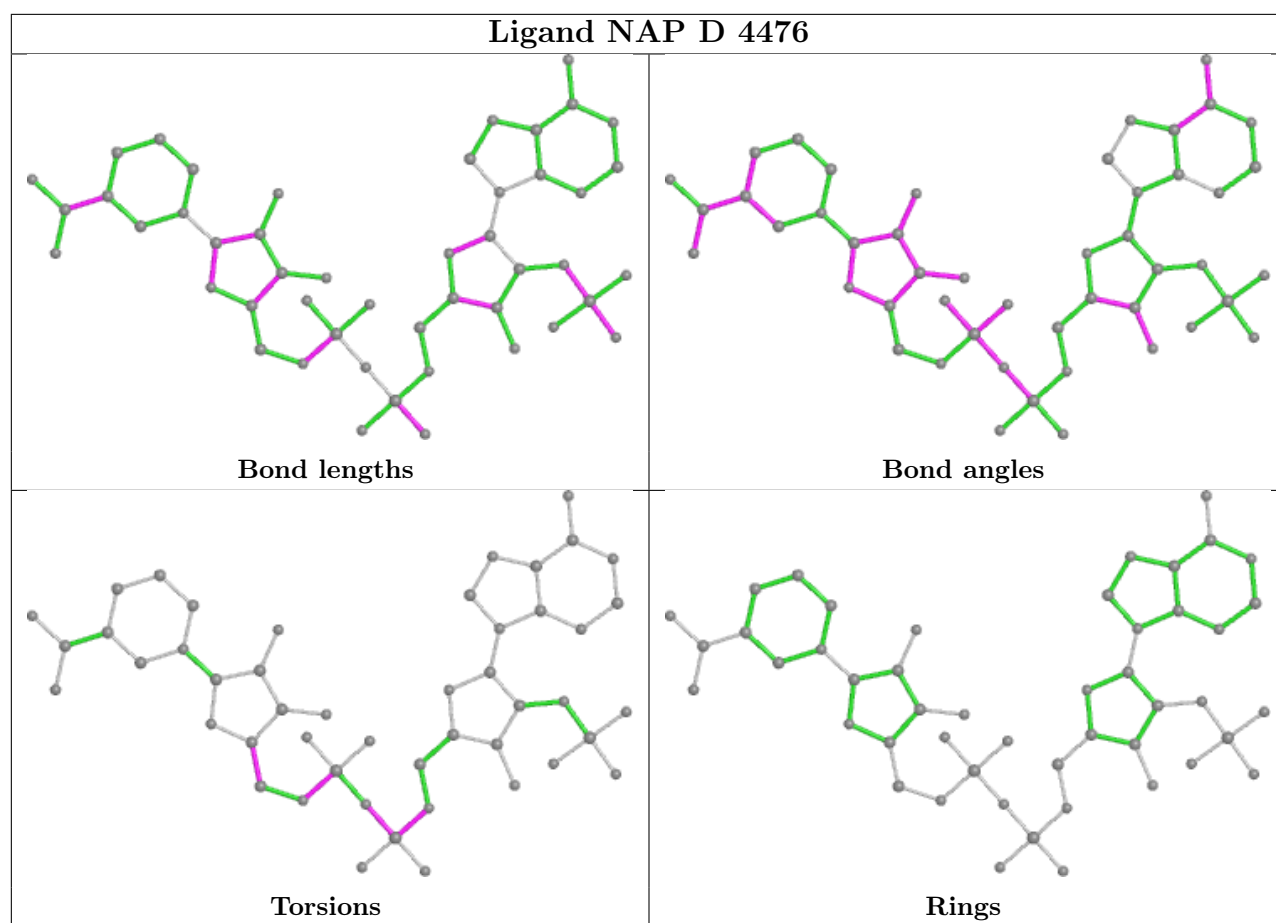
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	2476	NAP	7	0
3	C	3476	NAP	7	0
2	D	800	G3H	1	0
2	C	800	G3H	1	0
2	A	800	G3H	2	0
3	A	1476	NAP	8	0
3	D	4476	NAP	9	0
2	B	800	G3H	4	0

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









5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	474/475 (99%)	-0.23	5 (1%) 80 79	18, 29, 49, 79	0
1	B	474/475 (99%)	-0.10	10 (2%) 63 61	21, 33, 53, 87	0
1	C	474/475 (99%)	-0.38	3 (0%) 89 88	13, 23, 43, 63	0
1	D	474/475 (99%)	-0.10	11 (2%) 60 58	19, 31, 51, 73	0
All	All	1896/1900 (99%)	-0.20	29 (1%) 73 72	13, 29, 50, 87	0

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	2	THR	6.5
1	A	2	THR	5.5
1	B	29	ALA	3.6
1	A	17	GLU	3.4
1	A	258	ILE	3.3
1	A	211	SER	3.1
1	D	370	ASP	2.9
1	B	17	GLU	2.7
1	B	370	ASP	2.7
1	B	23	TYR	2.7
1	A	259	VAL	2.6
1	B	355	GLU	2.6
1	D	23	TYR	2.6
1	C	2	THR	2.5
1	D	343	ASP	2.5
1	C	258	ILE	2.4
1	D	12	GLU	2.4
1	D	17	GLU	2.4
1	D	2	THR	2.3
1	D	95	LYS	2.3
1	D	211	SER	2.3

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Mol	Chain	Res	Type	RSRZ
1	C	259	VAL	2.2
1	B	362	ILE	2.2
1	D	318	ASP	2.2
1	B	3	LYS	2.2
1	D	27	SER	2.1
1	D	28	GLY	2.0
1	B	4	GLN	2.0
1	B	382	VAL	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

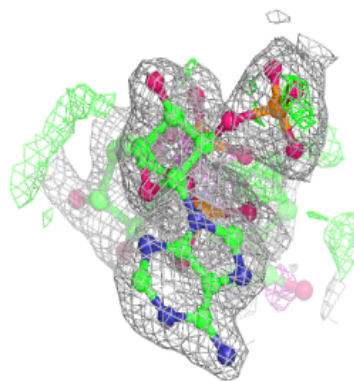
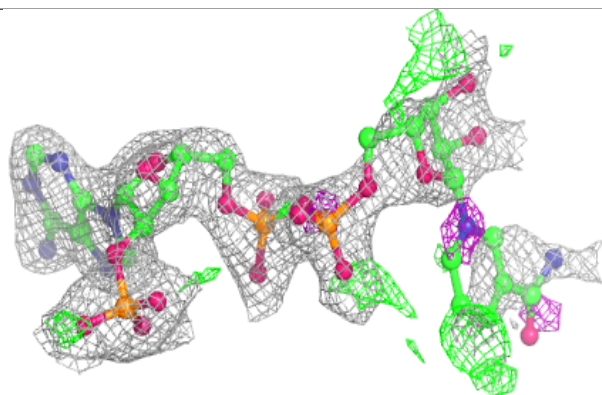
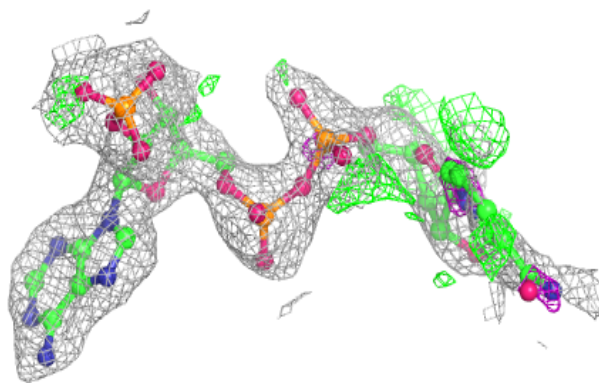
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	NAP	B	2476	48/48	0.85	0.20	33,39,41,43	48
2	G3H	D	800	10/10	0.86	0.23	30,36,38,40	10
2	G3H	A	800	10/10	0.86	0.21	29,34,35,36	10
3	NAP	D	4476	48/48	0.87	0.20	34,41,45,47	48
2	G3H	B	800	10/10	0.90	0.22	31,38,39,41	10
3	NAP	A	1476	48/48	0.90	0.19	33,38,41,43	48
3	NAP	C	3476	48/48	0.92	0.17	23,30,36,38	48
2	G3H	C	800	10/10	0.94	0.19	24,29,29,32	10

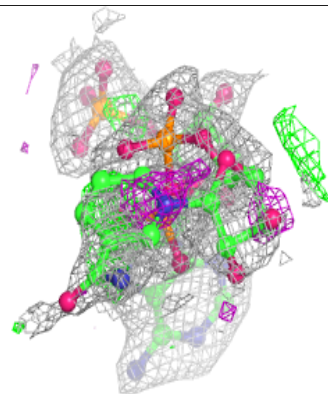
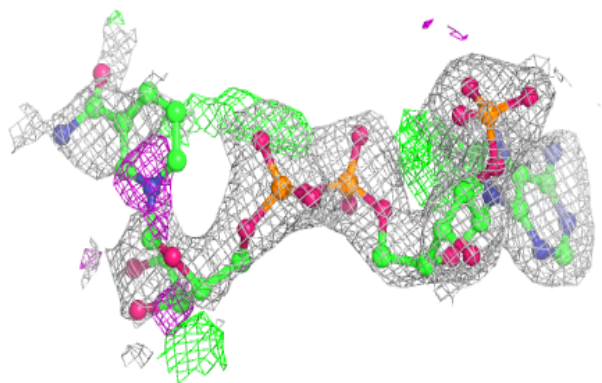
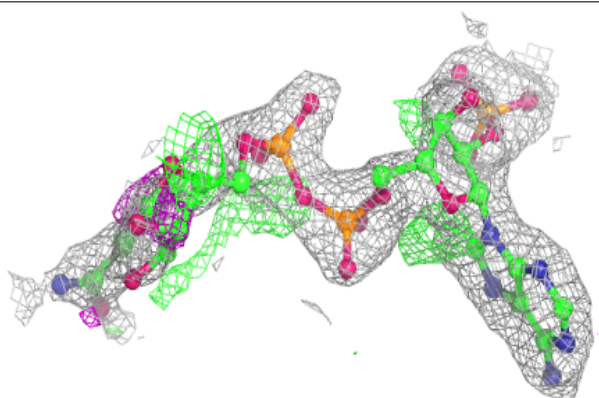
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around NAP B 2476:

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

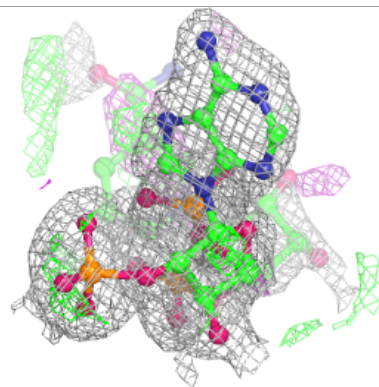
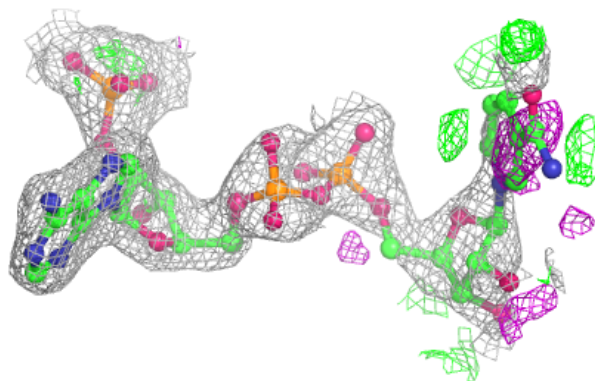
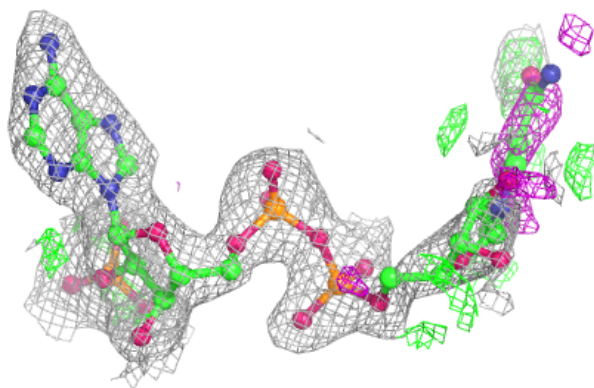
**Electron density around NAP D 4476:**

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

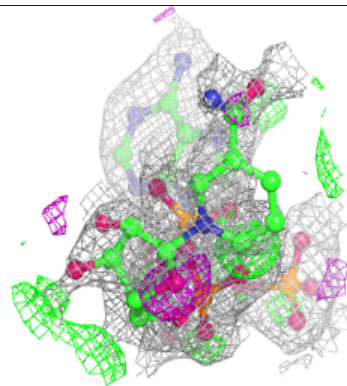
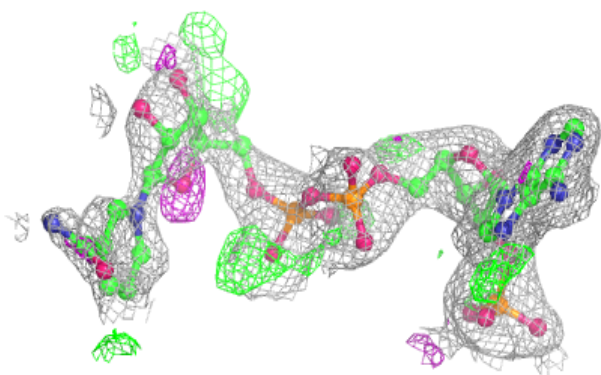
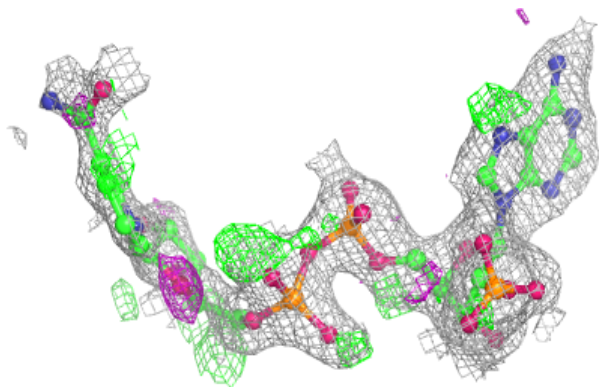


Electron density around NAP A 1476:

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

**Electron density around NAP C 3476:**

$2mF_o-DF_c$ (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.