



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 07:23 AM UTC

PDB ID : 1G1A / pdb_00001g1a
Title : THE CRYSTAL STRUCTURE OF DTDP-D-GLUCOSE 4,6-DEHYDRATASE (RMLB)FROM SALMONELLA ENTERICA SEROVAR TYPHIMURIUM
Authors : Allard, S.T.M.; Giraud, M.-F.; Whitfield, C.; Graninger, M.; Messner, P.; Naismith, J.H.
Deposited on : 2000-10-11
Resolution : 2.47 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	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

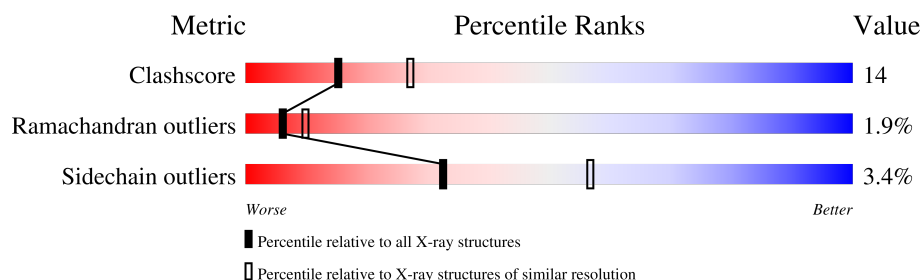
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.47 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))
Clashscore	190562	8295 (2.50-2.46)
Ramachandran outliers	187476	8164 (2.50-2.46)
Sidechain outliers	187428	8166 (2.50-2.46)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	361	 66% 27% 5% 1%
1	B	361	 70% 22% 5% 3%
1	C	361	 70% 22% 5% 3%
1	D	361	 67% 25% 5% 3%

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	SO4	B	5009	-	-	X	-

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 11929 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 DTDP-D-GLUCOSE 4,6-DEHYDRATASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	352	Total	C	N	O	S	33	0	0
			2799	1777	480	536	6			
1	B	352	Total	C	N	O	S	20	0	0
			2799	1777	480	536	6			
1	C	352	Total	C	N	O	S	36	0	0
			2799	1777	480	536	6			
1	D	352	Total	C	N	O	S	27	0	0
			2799	1777	480	536	6			

- Molecule 2 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



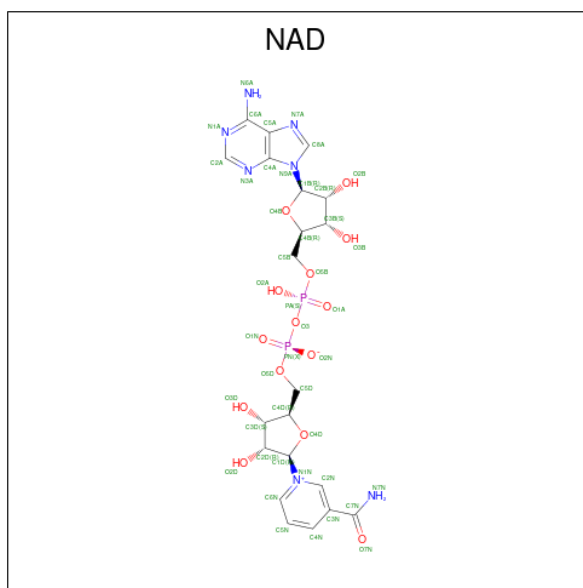
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	C	1	Total O S 5 4 1	0	0
2	C	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0
2	D	1	Total O S 5 4 1	0	0

- Molecule 3 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (CCD ID: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 44	C 21	N 7	O 14	P 2	0	0
3	B	1	Total 44	C 21	N 7	O 14	P 2	0	0
3	C	1	Total 44	C 21	N 7	O 14	P 2	0	0
3	D	1	Total 44	C 21	N 7	O 14	P 2	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	120	Total 120	O 120	0	0
4	B	162	Total 162	O 162	0	0
4	C	106	Total 106	O 106	0	0
4	D	124	Total 124	O 124	0	0

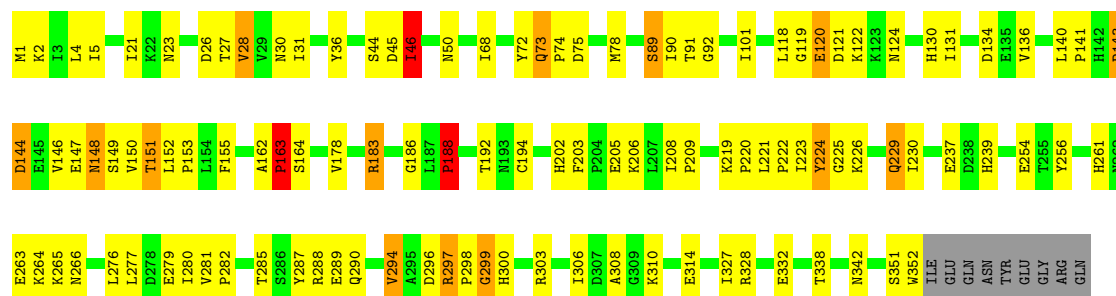
3 Residue-property plots

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. 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. 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.

Note EDS was not executed.

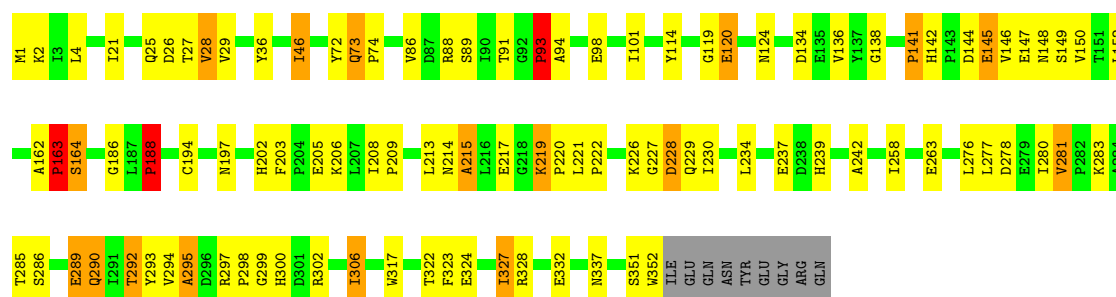
• Molecule 1: DTDP-D-GLUCOSE 4,6-DEHYDRATASE

Chain A: 



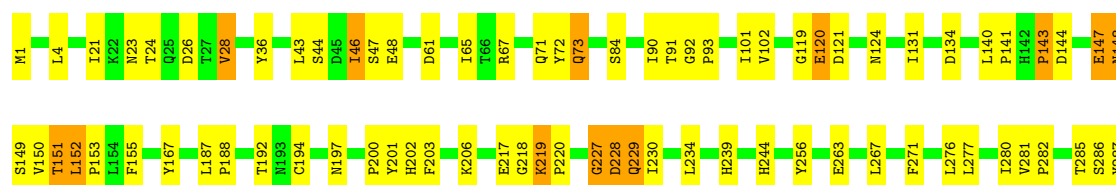
• Molecule 1: DTDP-D-GLUCOSE 4,6-DEHYDRATASE

Chain B: 



• Molecule 1: DTDP-D-GLUCOSE 4,6-DEHYDRATASE

Chain C: 





● Molecule 1: DTDP-D-GLUCOSE 4,6-DEHYDRATASE



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	110.62Å 87.53Å 111.30Å 90.00° 98.04° 90.00°	Depositor
Resolution (Å)	40.80 – 2.47	Depositor
% Data completeness (in resolution range)	90.4 (40.80-2.47)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.202 , 0.249	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	11929	wwPDB-VP
Average B, all atoms (Å ²)	40.0	wwPDB-VP

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: NAD, SO4

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	0.61	0/2870	1.09	16/3908 (0.4%)
1	B	0.62	0/2870	1.14	28/3908 (0.7%)
1	C	0.59	0/2870	1.11	32/3908 (0.8%)
1	D	0.61	0/2870	1.16	33/3908 (0.8%)
All	All	0.61	0/11480	1.12	109/15632 (0.7%)

There are no bond length outliers.

All (109) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	352	TRP	CA-CB-CG	-15.78	83.62	113.60
1	D	229	GLN	OE1-CD-NE2	-9.69	112.91	122.60
1	D	350	GLN	OE1-CD-NE2	-9.65	112.95	122.60
1	C	339	GLN	OE1-CD-NE2	-9.62	112.98	122.60
1	C	290	GLN	OE1-CD-NE2	-9.56	113.04	122.60
1	C	229	GLN	OE1-CD-NE2	-9.42	113.18	122.60
1	B	290	GLN	OE1-CD-NE2	-9.20	113.40	122.60
1	A	229	GLN	OE1-CD-NE2	-8.17	114.43	122.60
1	B	227	GLY	N-CA-C	-7.86	102.80	114.90
1	D	224	TYR	N-CA-C	7.80	119.56	111.14
1	A	73	GLN	CA-C-N	7.76	127.75	119.76
1	A	73	GLN	C-N-CA	7.76	127.75	119.76
1	B	145	GLU	N-CA-C	-7.34	104.93	114.04
1	C	300	HIS	CA-CB-CG	-7.34	106.46	113.80
1	B	337	ASN	N-CA-C	7.31	119.21	110.44
1	B	141	PRO	CA-N-CD	-7.26	101.83	112.00
1	C	219	LYS	CA-C-N	7.08	127.06	119.76
1	C	219	LYS	C-N-CA	7.08	127.06	119.76
1	C	290	GLN	CG-CD-NE2	7.08	127.03	116.40
1	D	226	LYS	N-CA-C	-7.00	104.35	113.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	290	GLN	CG-CD-NE2	6.90	126.75	116.40
1	A	203	PHE	CA-C-N	6.87	127.44	119.47
1	A	203	PHE	C-N-CA	6.87	127.44	119.47
1	C	44	SER	N-CA-C	6.87	119.64	111.33
1	B	322	THR	N-CA-C	-6.82	99.38	109.81
1	C	339	GLN	CG-CD-NE2	6.76	126.54	116.40
1	A	163	PRO	CA-N-CD	-6.75	102.56	112.00
1	D	229	GLN	CG-CD-NE2	6.67	126.41	116.40
1	C	229	GLN	CG-CD-NE2	6.61	126.31	116.40
1	D	296	ASP	N-CA-C	6.58	119.18	109.24
1	A	226	LYS	N-CA-C	-6.58	105.32	113.15
1	D	71	GLN	N-CA-C	6.58	118.53	111.36
1	C	141	PRO	CB-CA-C	6.57	119.90	111.56
1	B	219	LYS	CA-C-N	6.54	126.93	119.93
1	B	219	LYS	C-N-CA	6.54	126.93	119.93
1	C	297	ARG	N-CA-C	6.48	117.97	109.93
1	A	229	GLN	CG-CD-NE2	6.46	126.09	116.40
1	C	28	VAL	N-CA-C	6.46	116.88	108.35
1	C	203	PHE	CA-C-N	6.45	126.95	119.47
1	C	203	PHE	C-N-CA	6.45	126.95	119.47
1	B	163	PRO	CA-C-N	-6.44	112.51	122.49
1	B	163	PRO	C-N-CA	-6.44	112.51	122.49
1	D	28	VAL	N-CA-C	6.36	116.74	108.35
1	D	337	ASN	N-CA-C	6.26	117.95	110.44
1	C	152	LEU	CA-C-N	6.21	126.12	119.85
1	C	152	LEU	C-N-CA	6.21	126.12	119.85
1	A	163	PRO	CA-C-N	-6.12	113.01	122.49
1	A	163	PRO	C-N-CA	-6.12	113.01	122.49
1	D	350	GLN	CG-CD-NE2	6.12	125.57	116.40
1	A	44	SER	N-CA-C	6.03	118.35	111.11
1	C	228	ASP	N-CA-C	6.03	117.52	111.07
1	C	23	ASN	N-CA-C	5.99	120.20	112.41
1	A	90	ILE	N-CA-C	-5.96	105.53	112.98
1	A	89	SER	N-CA-C	5.95	118.61	108.90
1	B	94	ALA	N-CA-C	-5.95	99.54	109.24
1	B	306	ILE	N-CA-C	5.95	117.16	108.53
1	D	91	THR	CB-CA-C	-5.89	102.60	110.79
1	D	221	LEU	CA-C-N	5.87	127.44	120.23
1	D	221	LEU	C-N-CA	5.87	127.44	120.23
1	D	280	ILE	N-CA-C	-5.87	101.30	109.45
1	D	23	ASN	N-CA-C	5.86	120.03	112.41
1	C	227	GLY	N-CA-C	-5.84	104.79	114.48

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	203	PHE	CA-C-N	5.83	125.96	119.32
1	B	203	PHE	C-N-CA	5.83	125.96	119.32
1	B	188	PRO	CA-N-CD	-5.82	103.85	112.00
1	D	322	THR	N-CA-C	-5.79	101.63	110.14
1	D	141	PRO	CB-CA-C	5.73	118.86	111.46
1	C	337	ASN	N-CA-C	5.72	118.20	110.88
1	D	351	SER	N-CA-C	-5.71	106.11	112.57
1	D	227	GLY	N-CA-C	-5.69	105.04	114.48
1	C	147	GLU	CA-C-O	5.67	127.74	121.56
1	B	28	VAL	N-CA-C	5.67	116.84	108.45
1	A	28	VAL	N-CA-C	5.64	115.80	108.35
1	C	306	ILE	N-CA-C	5.63	116.70	108.53
1	D	222	PRO	N-CA-C	5.63	119.35	110.50
1	D	306	ILE	N-CA-C	5.62	116.68	108.53
1	D	283	LYS	N-CA-C	5.62	117.04	110.41
1	D	44	SER	N-CA-C	5.58	118.08	111.33
1	D	297	ARG	N-CA-C	5.52	116.36	109.57
1	C	297	ARG	CA-C-N	5.51	126.73	119.84
1	C	297	ARG	C-N-CA	5.51	126.73	119.84
1	D	293	TYR	N-CA-C	5.50	117.60	108.20
1	A	23	ASN	N-CA-C	5.44	119.70	112.30
1	C	73	GLN	CA-C-N	5.43	125.38	119.78
1	C	73	GLN	C-N-CA	5.43	125.38	119.78
1	D	92	GLY	CA-C-N	5.38	125.29	119.85
1	D	92	GLY	C-N-CA	5.38	125.29	119.85
1	B	222	PRO	N-CA-C	5.37	120.49	111.32
1	D	302	ARG	N-CA-C	5.36	118.98	112.23
1	B	278	ASP	N-CA-C	-5.33	105.52	112.23
1	B	227	GLY	CA-C-N	5.30	127.33	120.44
1	B	227	GLY	C-N-CA	5.30	127.33	120.44
1	C	298	PRO	CA-N-CD	-5.30	104.59	112.00
1	B	281	VAL	N-CA-C	5.28	120.28	108.88
1	C	71	GLN	N-CA-C	5.28	117.11	111.36
1	C	47	SER	N-CA-C	5.22	119.13	112.87
1	B	93	PRO	N-CA-C	5.19	119.23	111.14
1	C	322	THR	N-CA-C	-5.13	101.97	109.81
1	B	73	GLN	CA-C-N	5.12	125.05	119.78
1	B	73	GLN	C-N-CA	5.12	125.05	119.78
1	B	215	ALA	N-CA-C	-5.11	104.79	111.02
1	D	133	THR	N-CA-C	5.09	117.87	109.72
1	D	73	GLN	CA-C-N	5.09	125.02	119.78
1	D	73	GLN	C-N-CA	5.09	125.02	119.78

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	314	GLU	N-CA-C	5.08	119.55	112.90
1	D	47	SER	N-CA-C	5.08	118.96	112.87
1	C	143	PRO	CA-N-CD	-5.07	104.90	112.00
1	B	93	PRO	CA-C-N	-5.07	115.73	122.72
1	B	93	PRO	C-N-CA	-5.07	115.73	122.72

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	2799	0	2717	90	0
1	B	2799	0	2717	74	0
1	C	2799	0	2717	65	0
1	D	2799	0	2717	80	0
2	A	10	0	0	0	0
2	B	15	0	0	4	0
2	C	10	0	0	0	0
2	D	10	0	0	0	0
3	A	44	0	26	0	0
3	B	44	0	26	0	0
3	C	44	0	26	0	0
3	D	44	0	26	0	0
4	A	120	0	0	5	0
4	B	162	0	0	7	0
4	C	106	0	0	2	0
4	D	124	0	0	4	0
All	All	11929	0	10972	302	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 (302) 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:40:LEU:HD12	1:D:352:TRP:C	1.67	1.17
1:C:92:GLY:HA2	4:D:5037:HOH:O	1.55	1.05
1:D:351:SER:O	1:D:352:TRP:HB2	1.56	1.03
1:A:285:THR:HG22	1:A:289:GLU:HG3	1.45	0.98
1:D:280:ILE:C	1:D:282:PRO:HD3	1.89	0.96
1:D:148:ASN:O	1:D:150:VAL:HG23	1.72	0.89
1:D:40:LEU:CD1	1:D:352:TRP:O	2.23	0.87
1:D:40:LEU:CD1	1:D:352:TRP:C	2.50	0.84
1:B:281:VAL:HG12	1:B:281:VAL:O	1.77	0.83
1:B:2:LYS:HG3	1:B:27:THR:HG23	1.60	0.82
1:D:280:ILE:C	1:D:282:PRO:CD	2.56	0.79
1:B:136:VAL:O	1:B:163:PRO:HD3	1.84	0.78
1:D:351:SER:O	1:D:352:TRP:CB	2.31	0.78
1:D:284:ALA:O	1:D:285:THR:OG1	2.04	0.75
1:A:45:ASP:HB3	4:A:5029:HOH:O	1.87	0.74
1:B:93:PRO:HB3	1:B:98:GLU:HG2	1.70	0.73
1:A:136:VAL:O	1:A:163:PRO:HD3	1.87	0.73
1:D:281:VAL:N	1:D:282:PRO:CD	2.51	0.73
1:C:281:VAL:HG12	1:C:281:VAL:O	1.90	0.70
1:C:90:ILE:HD12	1:C:91:THR:N	2.06	0.70
1:C:285:THR:CG2	1:C:289:GLU:HG3	2.22	0.69
1:B:134:ASP:HB3	1:B:306:ILE:HD11	1.73	0.69
1:A:281:VAL:N	1:A:282:PRO:HD3	2.08	0.69
1:B:149:SER:HB2	4:B:5110:HOH:O	1.93	0.68
1:A:134:ASP:HB3	1:A:306:ILE:HD11	1.75	0.68
1:C:134:ASP:HB3	1:C:306:ILE:HD11	1.74	0.68
1:C:101:ILE:HG21	1:D:101:ILE:HG21	1.76	0.68
1:B:206:LYS:HD2	2:B:5002:SO4:O2	1.94	0.67
1:B:276:LEU:CD1	1:B:327:ILE:HG22	2.25	0.67
1:B:162:ALA:N	1:B:163:PRO:CD	2.58	0.66
1:D:134:ASP:HB3	1:D:306:ILE:HD11	1.77	0.66
1:C:229:GLN:HG3	4:C:5051:HOH:O	1.96	0.66
1:B:88:ARG:HG3	4:B:5087:HOH:O	1.94	0.66
1:B:285:THR:HG22	1:B:286:SER:N	2.11	0.66
1:C:276:LEU:CD1	1:C:327:ILE:HG22	2.26	0.66
1:A:31:ILE:HD11	1:A:68:ILE:HG21	1.78	0.65
1:A:21:ILE:HG21	1:A:46:ILE:HG13	1.76	0.65
1:B:285:THR:HG22	1:B:289:GLU:HG3	1.79	0.65
1:D:280:ILE:O	1:D:282:PRO:HD3	1.96	0.65
1:C:153:PRO:O	1:C:303:ARG:NH2	2.30	0.64
1:D:281:VAL:N	1:D:282:PRO:HD2	2.11	0.64
1:C:151:THR:HA	4:C:5023:HOH:O	1.97	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:277:LEU:O	1:C:280:ILE:O	2.16	0.64
1:D:328:ARG:O	1:D:332:GLU:HG3	1.98	0.64
1:A:1:MET:HB3	1:A:26:ASP:OD1	1.99	0.63
1:A:225:GLY:N	1:A:296:ASP:HB3	2.13	0.63
1:A:263:GLU:CD	1:A:303:ARG:HH11	2.05	0.63
1:A:153:PRO:O	1:A:303:ARG:NH2	2.32	0.63
1:A:144:ASP:C	1:A:144:ASP:OD1	2.41	0.63
1:A:285:THR:CG2	1:A:289:GLU:HG3	2.26	0.62
1:B:147:GLU:O	1:B:150:VAL:HG23	1.99	0.62
1:A:229:GLN:H	1:A:229:GLN:CD	2.07	0.62
1:A:230:ILE:CG2	1:A:263:GLU:HG2	2.29	0.62
1:B:229:GLN:NE2	4:B:5084:HOH:O	2.33	0.61
1:B:324:GLU:OE1	2:B:5009:SO4:S	2.57	0.61
1:C:285:THR:HG22	1:C:289:GLU:HG3	1.82	0.61
1:B:21:ILE:HG21	1:B:46:ILE:HG13	1.83	0.60
1:A:89:SER:HB3	1:A:92:GLY:O	2.01	0.60
1:D:1:MET:HB3	1:D:26:ASP:OD1	2.01	0.60
1:A:222:PRO:C	1:A:223:ILE:HD12	2.26	0.60
1:A:277:LEU:O	1:A:280:ILE:O	2.20	0.60
1:D:146:VAL:HG21	1:D:152:LEU:CD2	2.31	0.60
1:D:144:ASP:OD2	1:D:144:ASP:C	2.45	0.59
1:A:186:GLY:O	1:A:188:PRO:HD3	2.03	0.59
1:C:351:SER:O	1:C:352:TRP:HB2	2.02	0.59
1:A:30:ASN:C	1:A:30:ASN:ND2	2.61	0.58
1:D:150:VAL:HA	4:D:5050:HOH:O	2.05	0.57
1:D:283:LYS:O	1:D:283:LYS:HG3	2.05	0.57
1:D:40:LEU:HD11	1:D:352:TRP:O	2.05	0.57
1:C:1:MET:HB3	1:C:26:ASP:OD1	2.06	0.56
1:A:224:TYR:C	1:A:296:ASP:HB3	2.31	0.56
1:D:216:LEU:C	1:D:218:GLY:H	2.13	0.56
1:A:338:THR:HG22	1:A:342:ASN:ND2	2.21	0.56
1:A:279:GLU:O	1:A:282:PRO:HG3	2.05	0.56
1:B:202:HIS:CD2	1:B:206:LYS:HG3	2.41	0.56
1:C:61:ASP:O	1:C:65:ILE:HG12	2.07	0.55
1:A:277:LEU:O	1:A:287:TYR:HE2	1.90	0.55
1:C:297:ARG:CZ	1:C:300:HIS:HB3	2.36	0.55
1:A:263:GLU:CD	1:A:303:ARG:NH1	2.65	0.55
1:A:223:ILE:O	1:A:294:VAL:HG22	2.07	0.54
1:B:323:PHE:CZ	1:B:327:ILE:HG13	2.43	0.54
1:A:281:VAL:HG12	1:A:281:VAL:O	2.07	0.54
1:B:230:ILE:CG2	1:B:263:GLU:HG2	2.38	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:323:PHE:CZ	1:C:327:ILE:HG13	2.43	0.54
1:D:153:PRO:O	1:D:154:LEU:HD23	2.06	0.54
1:A:30:ASN:C	1:A:30:ASN:HD22	2.15	0.54
1:A:202:HIS:CD2	1:A:206:LYS:HG3	2.43	0.54
1:B:93:PRO:HA	4:B:5142:HOH:O	2.07	0.54
1:A:328:ARG:O	1:A:332:GLU:HG3	2.07	0.54
1:D:276:LEU:CD1	1:D:327:ILE:HG22	2.38	0.54
1:C:21:ILE:HG21	1:C:46:ILE:HG13	1.89	0.53
1:D:2:LYS:HA	1:D:27:THR:HG23	1.90	0.53
1:B:162:ALA:N	1:B:163:PRO:HD3	2.23	0.53
1:C:218:GLY:HA2	1:C:290:GLN:NE2	2.23	0.53
1:B:351:SER:O	1:B:352:TRP:HB2	2.09	0.53
1:C:263:GLU:CD	1:C:303:ARG:HH11	2.15	0.53
1:C:202:HIS:CD2	1:C:206:LYS:HG3	2.43	0.53
1:C:281:VAL:N	1:C:282:PRO:HD3	2.24	0.53
1:A:297:ARG:HG3	4:A:5089:HOH:O	2.08	0.53
1:A:351:SER:O	1:A:352:TRP:HB2	2.09	0.53
1:B:324:GLU:OE1	2:B:5009:SO4:O1	2.25	0.53
1:B:144:ASP:OD2	1:B:144:ASP:C	2.52	0.53
1:A:162:ALA:N	1:A:163:PRO:CD	2.72	0.52
1:A:223:ILE:HD12	1:A:223:ILE:N	2.24	0.52
1:B:146:VAL:CG1	1:B:150:VAL:HB	2.40	0.52
1:A:30:ASN:HD22	1:A:31:ILE:N	2.08	0.52
1:D:36:TYR:CD1	1:D:36:TYR:C	2.87	0.52
1:C:280:ILE:HG22	1:C:281:VAL:HG23	1.92	0.52
1:D:147:GLU:O	1:D:148:ASN:C	2.53	0.52
1:D:150:VAL:O	1:D:151:THR:C	2.53	0.52
1:A:183:ARG:HG2	1:B:164:SER:HB2	1.92	0.52
1:A:297:ARG:CG	4:A:5089:HOH:O	2.58	0.52
1:B:162:ALA:H	1:B:163:PRO:HD3	1.75	0.52
1:B:294:VAL:O	1:B:295:ALA:O	2.28	0.52
1:D:192:THR:HG22	1:D:256:TYR:HB2	1.91	0.51
1:D:280:ILE:HG22	1:D:281:VAL:HG23	1.91	0.51
1:C:147:GLU:HG3	1:C:148:ASN:CG	2.35	0.51
1:D:21:ILE:HG21	1:D:46:ILE:HG13	1.92	0.51
1:D:242:ALA:HB2	1:D:317:TRP:CE2	2.46	0.51
1:D:224:TYR:O	1:D:296:ASP:HB3	2.11	0.51
1:C:24:THR:HG21	1:C:244:HIS:CE1	2.47	0.50
1:D:4:LEU:HD21	1:D:31:ILE:HD12	1.92	0.50
1:A:276:LEU:CD1	1:A:327:ILE:HG22	2.41	0.50
1:A:120:GLU:O	1:A:124:ASN:ND2	2.45	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:277:LEU:O	1:D:280:ILE:O	2.29	0.50
1:D:216:LEU:C	1:D:218:GLY:N	2.69	0.50
1:B:1:MET:HB3	1:B:26:ASP:OD1	2.12	0.50
1:D:351:SER:C	1:D:352:TRP:CD1	2.90	0.50
1:B:277:LEU:O	1:B:280:ILE:O	2.30	0.50
1:D:120:GLU:O	1:D:124:ASN:ND2	2.45	0.50
1:B:120:GLU:O	1:B:124:ASN:ND2	2.45	0.49
1:B:194:CYS:SG	1:B:239:HIS:CE1	3.05	0.49
1:A:237:GLU:HA	1:A:237:GLU:OE1	2.13	0.49
1:C:230:ILE:CG2	1:C:263:GLU:HG2	2.43	0.49
1:A:261:HIS:CE1	4:A:5050:HOH:O	2.65	0.49
1:D:121:ASP:CG	1:D:122:LYS:H	2.20	0.49
1:D:277:LEU:O	1:D:287:TYR:HE2	1.95	0.49
1:A:230:ILE:HG21	1:A:263:GLU:HG2	1.94	0.48
1:C:276:LEU:HD12	1:C:327:ILE:HG22	1.94	0.48
1:B:72:TYR:O	1:B:73:GLN:C	2.55	0.48
1:B:293:TYR:HE1	1:C:293:TYR:HB2	1.78	0.48
1:D:224:TYR:HA	1:D:294:VAL:HG23	1.94	0.48
1:A:148:ASN:O	1:A:150:VAL:N	2.46	0.48
1:A:2:LYS:HD2	1:A:27:THR:OG1	2.14	0.48
1:A:338:THR:HG22	1:A:342:ASN:HD21	1.77	0.48
1:B:214:ASN:O	1:B:215:ALA:C	2.56	0.48
1:B:219:LYS:HB3	1:B:220:PRO:HD2	1.94	0.48
1:A:261:HIS:HE1	4:A:5050:HOH:O	1.97	0.48
1:B:285:THR:CG2	1:B:289:GLU:HG3	2.43	0.48
1:A:130:HIS:CG	1:A:178:VAL:HG21	2.49	0.48
1:A:261:HIS:CE1	1:A:308:ALA:HB3	2.49	0.48
1:B:186:GLY:O	1:B:188:PRO:HD3	2.14	0.48
1:B:280:ILE:HG22	1:B:281:VAL:HG23	1.95	0.48
1:A:4:LEU:C	1:A:4:LEU:HD23	2.39	0.47
1:B:290:GLN:O	1:B:292:THR:HG23	2.13	0.47
1:A:229:GLN:HE21	1:A:266:ASN:ND2	2.13	0.47
1:C:227:GLY:HA3	1:C:267:LEU:HB2	1.96	0.47
1:A:147:GLU:O	1:A:150:VAL:HG23	2.14	0.47
1:C:72:TYR:O	1:C:73:GLN:C	2.56	0.47
1:C:194:CYS:SG	1:C:239:HIS:CE1	3.08	0.47
1:D:144:ASP:CG	1:D:302:ARG:HH22	2.20	0.47
1:D:219:LYS:HB3	1:D:220:PRO:HD2	1.97	0.47
1:D:344:VAL:HA	1:D:349:TYR:CD2	2.49	0.47
1:A:119:GLY:O	1:A:120:GLU:C	2.57	0.47
1:A:143:PRO:HD3	1:A:152:LEU:CD1	2.45	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:131:ILE:HD12	1:A:131:ILE:N	2.30	0.47
1:B:215:ALA:HA	1:B:221:LEU:HD21	1.97	0.47
1:D:277:LEU:O	1:D:287:TYR:CE2	2.68	0.47
1:B:74:PRO:HD2	1:B:114:TYR:CZ	2.50	0.47
1:B:205:GLU:OE1	1:B:205:GLU:HA	2.15	0.47
1:B:285:THR:HG22	1:B:286:SER:H	1.80	0.47
1:A:50:ASN:ND2	1:A:50:ASN:H	2.12	0.46
1:A:280:ILE:O	1:A:281:VAL:C	2.56	0.46
1:A:298:PRO:O	1:A:299:GLY:C	2.58	0.46
1:C:43:LEU:O	1:C:46:ILE:HG22	2.15	0.46
1:C:311:ILE:HG13	1:C:315:LEU:HD12	1.97	0.46
1:C:4:LEU:HD23	1:C:4:LEU:C	2.40	0.46
1:A:281:VAL:N	1:A:282:PRO:CD	2.78	0.46
1:B:285:THR:CG2	1:B:286:SER:N	2.77	0.46
1:D:39:ASN:OD1	1:D:41:GLU:HB2	2.15	0.46
1:A:192:THR:HG22	1:A:256:TYR:HB2	1.98	0.46
1:C:219:LYS:HB3	1:C:220:PRO:HD2	1.97	0.46
1:A:254:GLU:OE1	1:A:310:LYS:NZ	2.42	0.46
1:C:119:GLY:O	1:C:120:GLU:C	2.58	0.46
1:A:72:TYR:O	1:A:73:GLN:C	2.59	0.46
1:D:230:ILE:HG21	1:D:263:GLU:HG2	1.98	0.46
1:A:194:CYS:SG	1:A:239:HIS:CE1	3.09	0.45
1:A:205:GLU:H	1:A:205:GLU:CD	2.23	0.45
1:A:263:GLU:OE2	1:A:303:ARG:NH1	2.46	0.45
1:A:277:LEU:O	1:A:287:TYR:CE2	2.69	0.45
1:B:2:LYS:HG3	1:B:27:THR:CG2	2.41	0.45
1:A:101:ILE:HG21	1:B:101:ILE:HG21	1.97	0.45
1:B:242:ALA:HB2	1:B:317:TRP:CE2	2.52	0.45
1:A:288:ARG:C	1:A:290:GLN:N	2.74	0.45
1:A:297:ARG:HA	1:A:298:PRO:HD2	1.84	0.45
1:B:2:LYS:HZ3	1:B:72:TYR:HD2	1.65	0.45
1:D:285:THR:HG23	1:D:289:GLU:HG3	1.99	0.45
1:A:146:VAL:HB	1:A:152:LEU:HD21	1.99	0.45
1:A:75:ASP:OD1	1:A:122:LYS:HE3	2.17	0.45
1:C:200:PRO:HB3	1:C:333:TRP:CG	2.52	0.45
1:C:187:LEU:HD12	1:C:188:PRO:HD2	1.99	0.45
1:C:344:VAL:HA	1:C:349:TYR:CD2	2.52	0.45
1:B:302:ARG:HD2	4:B:5052:HOH:O	2.17	0.44
1:D:276:LEU:HD12	1:D:327:ILE:HG22	1.98	0.44
1:B:219:LYS:HB3	1:B:220:PRO:CD	2.47	0.44
1:B:298:PRO:O	1:B:299:GLY:C	2.61	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:67:ARG:NH1	1:C:67:ARG:HG2	2.32	0.44
1:C:120:GLU:O	1:C:124:ASN:ND2	2.50	0.44
1:D:219:LYS:O	1:D:290:GLN:OE1	2.34	0.44
1:A:152:LEU:HB3	1:A:303:ARG:NH2	2.33	0.44
1:A:221:LEU:HG	1:A:290:GLN:HB3	1.98	0.44
1:C:200:PRO:O	1:C:201:TYR:HB2	2.18	0.44
1:D:202:HIS:CD2	1:D:206:LYS:HG3	2.53	0.44
1:D:230:ILE:CG2	1:D:263:GLU:HG2	2.47	0.44
1:A:224:TYR:HB3	1:A:296:ASP:CB	2.48	0.44
1:A:5:ILE:HG12	1:A:78:MET:HB2	2.00	0.44
1:A:150:VAL:O	1:A:151:THR:OG1	2.29	0.44
1:B:29:VAL:HG13	1:B:29:VAL:O	2.18	0.44
1:C:67:ARG:HG2	1:C:67:ARG:HH11	1.83	0.44
1:D:220:PRO:O	1:D:222:PRO:HD3	2.18	0.44
1:D:285:THR:CG2	1:D:289:GLU:HG3	2.48	0.44
1:A:280:ILE:C	1:A:282:PRO:HD3	2.43	0.44
1:D:72:TYR:O	1:D:73:GLN:C	2.60	0.44
1:D:283:LYS:O	1:D:284:ALA:C	2.59	0.44
1:D:312:SER:O	1:D:316:GLY:HA2	2.17	0.44
1:A:219:LYS:HB3	1:A:220:PRO:CD	2.48	0.43
1:B:86:VAL:HG21	4:B:5050:HOH:O	2.17	0.43
1:B:294:VAL:O	1:B:295:ALA:C	2.61	0.43
1:D:22:LYS:HG3	1:D:46:ILE:HD11	2.00	0.43
1:D:119:GLY:O	1:D:120:GLU:C	2.61	0.43
1:B:119:GLY:O	1:B:120:GLU:C	2.61	0.43
1:B:226:LYS:C	1:B:228:ASP:N	2.70	0.43
1:D:141:PRO:O	1:D:303:ARG:HD3	2.18	0.43
1:B:4:LEU:HA	1:B:29:VAL:HG13	2.00	0.43
1:C:192:THR:HG22	1:C:256:TYR:HB2	2.00	0.43
1:A:150:VAL:O	1:A:151:THR:CB	2.67	0.43
1:C:90:ILE:HD12	1:C:90:ILE:C	2.42	0.43
1:C:297:ARG:NH1	1:C:300:HIS:HB2	2.33	0.43
1:A:297:ARG:HG3	1:A:297:ARG:H	1.45	0.43
1:C:152:LEU:HA	1:C:153:PRO:HD3	1.73	0.43
1:D:29:VAL:O	1:D:29:VAL:HG13	2.19	0.43
1:D:278:ASP:OD2	1:D:286:SER:OG	2.26	0.43
1:D:288:ARG:O	1:D:289:GLU:C	2.61	0.43
1:B:328:ARG:O	1:B:332:GLU:HG3	2.17	0.43
1:C:93:PRO:HB3	1:D:102:VAL:HG13	2.00	0.43
1:D:93:PRO:HG2	1:D:98:GLU:HG2	2.00	0.43
1:B:25:GLN:HA	1:B:25:GLN:OE1	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:131:ILE:HD12	1:C:131:ILE:N	2.34	0.43
1:C:152:LEU:HB3	1:C:303:ARG:NH2	2.34	0.43
1:D:146:VAL:HG21	1:D:152:LEU:HD23	2.00	0.43
1:B:208:ILE:HB	1:B:209:PRO:HD3	2.01	0.43
1:B:226:LYS:HG2	1:C:271:PHE:CD2	2.54	0.43
1:B:324:GLU:OE1	2:B:5009:SO4:O3	2.36	0.43
1:C:197:ASN:HA	1:C:234:LEU:O	2.18	0.43
1:A:140:LEU:HG	1:A:155:PHE:CE2	2.54	0.42
1:C:285:THR:HG22	1:C:286:SER:N	2.34	0.42
1:C:140:LEU:HG	1:C:155:PHE:CE2	2.55	0.42
1:D:4:LEU:C	1:D:4:LEU:HD23	2.44	0.42
1:A:119:GLY:O	1:A:121:ASP:N	2.52	0.42
1:B:283:LYS:HG3	1:B:285:THR:H	1.83	0.42
1:D:150:VAL:CA	4:D:5050:HOH:O	2.66	0.42
1:D:224:TYR:HA	1:D:294:VAL:CG2	2.49	0.42
1:C:102:VAL:HG13	1:D:93:PRO:HB3	2.02	0.42
1:C:197:ASN:HD22	1:C:197:ASN:N	2.18	0.42
1:A:276:LEU:HD12	1:A:327:ILE:HG22	2.01	0.42
1:B:197:ASN:HA	1:B:234:LEU:O	2.19	0.42
1:C:217:GLU:OE1	1:C:219:LYS:HE3	2.19	0.42
1:B:36:TYR:CD1	1:B:36:TYR:C	2.97	0.42
1:B:146:VAL:HG21	1:B:152:LEU:CD2	2.50	0.42
1:C:46:ILE:HD12	1:C:46:ILE:HA	1.90	0.42
1:D:119:GLY:O	1:D:121:ASP:N	2.53	0.41
1:D:142:HIS:HB3	1:D:145:GLU:HG3	2.02	0.41
1:A:36:TYR:CD1	1:A:36:TYR:C	2.98	0.41
1:B:213:LEU:O	1:B:217:GLU:HG3	2.21	0.41
1:C:351:SER:O	1:C:352:TRP:CB	2.67	0.41
1:C:36:TYR:CD1	1:C:36:TYR:C	2.97	0.41
1:A:263:GLU:OE1	1:A:303:ARG:NH1	2.53	0.41
1:B:138:GLY:HA2	1:B:162:ALA:O	2.21	0.41
1:B:293:TYR:CD1	1:B:293:TYR:N	2.89	0.41
1:D:128:PHE:HB3	1:D:189:THR:HG22	2.03	0.41
1:A:152:LEU:HA	1:A:153:PRO:HD2	1.92	0.41
1:A:208:ILE:HB	1:A:209:PRO:HD3	2.03	0.41
1:B:237:GLU:HG2	4:B:5126:HOH:O	2.21	0.41
1:D:5:ILE:HG12	1:D:78:MET:HB2	2.03	0.41
1:D:288:ARG:HD2	4:D:5121:HOH:O	2.20	0.41
1:B:142:HIS:HB3	1:B:145:GLU:HG3	2.02	0.41
1:A:73:GLN:N	1:A:74:PRO:HD3	2.35	0.41
1:A:263:GLU:C	1:A:264:LYS:HG2	2.45	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:146:VAL:HG12	1:B:150:VAL:HB	2.02	0.41
1:C:144:ASP:CG	1:C:302:ARG:HH22	2.28	0.41
1:C:219:LYS:HB3	1:C:220:PRO:CD	2.51	0.41
1:C:230:ILE:HG21	1:C:263:GLU:HG2	2.03	0.41
1:A:229:GLN:O	1:A:265:LYS:HA	2.21	0.40
1:C:84:SER:HA	1:C:167:TYR:CE1	2.56	0.40
1:D:152:LEU:HA	1:D:153:PRO:HD2	1.97	0.40
1:C:281:VAL:HG12	1:C:287:TYR:OH	2.20	0.40
1:D:144:ASP:OD2	1:D:144:ASP:O	2.39	0.40
1:D:245:MET:HE3	1:D:245:MET:HB2	1.99	0.40
1:A:223:ILE:N	1:A:223:ILE:CD1	2.84	0.40
1:D:208:ILE:HB	1:D:209:PRO:HD3	2.03	0.40
1:B:194:CYS:HA	1:B:258:ILE:O	2.22	0.40
1:D:223:ILE:O	1:D:294:VAL:HG22	2.22	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	350/361 (97%)	323 (92%)	17 (5%)	10 (3%)	3	5
1	B	350/361 (97%)	329 (94%)	17 (5%)	4 (1%)	11	20
1	C	350/361 (97%)	324 (93%)	21 (6%)	5 (1%)	9	15
1	D	350/361 (97%)	322 (92%)	21 (6%)	7 (2%)	6	9
All	All	1400/1444 (97%)	1298 (93%)	76 (5%)	26 (2%)	6	10

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	120	GLU

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Mol	Chain	Res	Type
1	A	148	ASN
1	A	149	SER
1	A	151	THR
1	B	148	ASN
1	B	295	ALA
1	D	120	GLU
1	D	148	ASN
1	D	285	THR
1	A	299	GLY
1	B	120	GLU
1	C	120	GLU
1	C	148	ASN
1	C	149	SER
1	D	149	SER
1	D	298	PRO
1	A	118	LEU
1	B	91	THR
1	C	151	THR
1	D	151	THR
1	C	150	VAL
1	A	224	TYR
1	A	294	VAL
1	A	46	ILE
1	A	188	PRO
1	D	150	VAL

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	301/309 (97%)	289 (96%)	12 (4%)	28	51
1	B	301/309 (97%)	287 (95%)	14 (5%)	23	44
1	C	301/309 (97%)	294 (98%)	7 (2%)	44	69
1	D	301/309 (97%)	293 (97%)	8 (3%)	39	64
All	All	1204/1236 (97%)	1163 (97%)	41 (3%)	32	57

All (41) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	28	VAL
1	A	46	ILE
1	A	91	THR
1	A	141	PRO
1	A	143	PRO
1	A	144	ASP
1	A	163	PRO
1	A	164	SER
1	A	183	ARG
1	A	188	PRO
1	A	297	ARG
1	A	300	HIS
1	B	28	VAL
1	B	46	ILE
1	B	89	SER
1	B	93	PRO
1	B	141	PRO
1	B	163	PRO
1	B	164	SER
1	B	188	PRO
1	B	228	ASP
1	B	289	GLU
1	B	292	THR
1	B	297	ARG
1	B	300	HIS
1	B	327	ILE
1	C	28	VAL
1	C	46	ILE
1	C	48	GLU
1	C	121	ASP
1	C	143	PRO
1	C	228	ASP
1	C	327	ILE
1	D	28	VAL
1	D	46	ILE
1	D	64	GLU
1	D	91	THR
1	D	143	PRO
1	D	228	ASP
1	D	296	ASP
1	D	300	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (26) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	30	ASN
1	A	50	ASN
1	A	53	ASN
1	A	125	ASN
1	A	197	ASN
1	A	214	ASN
1	A	229	GLN
1	A	261	HIS
1	A	290	GLN
1	A	339	GLN
1	A	342	ASN
1	B	19	HIS
1	B	23	ASN
1	B	266	ASN
1	C	23	ASN
1	C	25	GLN
1	C	30	ASN
1	C	197	ASN
1	C	266	ASN
1	C	290	GLN
1	D	23	ASN
1	D	148	ASN
1	D	197	ASN
1	D	214	ASN
1	D	266	ASN
1	D	350	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

13 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	NAD	D	700	-	46,48,48	2.57	11 (23%)	64,73,73	2.26	10 (15%)
3	NAD	C	600	-	46,48,48	2.60	10 (21%)	64,73,73	2.22	10 (15%)
2	SO4	A	5005	-	4,4,4	0.40	0	6,6,6	0.15	0
2	SO4	A	5001	-	4,4,4	0.47	0	6,6,6	0.13	0
2	SO4	B	5006	-	4,4,4	0.36	0	6,6,6	0.25	0
2	SO4	D	5008	-	4,4,4	0.41	0	6,6,6	0.19	0
2	SO4	B	5002	-	4,4,4	0.48	0	6,6,6	0.17	0
3	NAD	B	500	-	46,48,48	2.59	8 (17%)	64,73,73	2.20	10 (15%)
3	NAD	A	400	-	46,48,48	2.66	11 (23%)	64,73,73	2.20	10 (15%)
2	SO4	C	5003	-	4,4,4	0.45	0	6,6,6	0.19	0
2	SO4	D	5004	-	4,4,4	0.32	0	6,6,6	0.13	0
2	SO4	C	5007	-	4,4,4	0.45	0	6,6,6	0.18	0
2	SO4	B	5009	-	4,4,4	0.44	0	6,6,6	0.18	0

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	NAD	D	700	-	-	3/30/62/62	0/5/5/5
3	NAD	C	600	-	-	3/30/62/62	0/5/5/5
3	NAD	A	400	-	-	5/30/62/62	0/5/5/5
3	NAD	B	500	-	-	5/30/62/62	0/5/5/5

All (40) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	500	NAD	C5N-C4N	10.40	1.56	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	400	NAD	C5N-C4N	10.15	1.56	1.38
3	C	600	NAD	C5N-C4N	10.09	1.56	1.38
3	D	700	NAD	C5N-C4N	9.94	1.55	1.38
3	C	600	NAD	C4N-C3N	8.18	1.51	1.39
3	A	400	NAD	C4N-C3N	7.96	1.51	1.39
3	B	500	NAD	C4N-C3N	7.67	1.51	1.39
3	D	700	NAD	C4N-C3N	7.50	1.50	1.39
3	B	500	NAD	C2N-N1N	6.89	1.42	1.35
3	A	400	NAD	C2N-N1N	6.85	1.42	1.35
3	D	700	NAD	C2N-N1N	5.66	1.41	1.35
3	C	600	NAD	C2N-N1N	5.21	1.40	1.35
3	B	500	NAD	C2N-C3N	4.83	1.46	1.39
3	A	400	NAD	C2N-C3N	4.81	1.46	1.39
3	D	700	NAD	C2N-C3N	4.73	1.46	1.39
3	C	600	NAD	C6N-N1N	4.58	1.45	1.35
3	A	400	NAD	C6N-N1N	4.43	1.45	1.35
3	D	700	NAD	PA-O3	-4.27	1.54	1.59
3	D	700	NAD	C6N-N1N	4.26	1.45	1.35
3	C	600	NAD	C2N-C3N	4.22	1.45	1.39
3	B	500	NAD	C6N-N1N	4.21	1.44	1.35
3	C	600	NAD	PA-O3	-4.01	1.55	1.59
3	A	400	NAD	PA-O3	-3.77	1.55	1.59
3	B	500	NAD	C2A-N1A	3.27	1.39	1.33
3	C	600	NAD	C2A-N1A	3.26	1.39	1.33
3	D	700	NAD	C2A-N1A	3.15	1.39	1.33
3	B	500	NAD	C4A-N3A	2.87	1.39	1.34
3	D	700	NAD	C3N-C7N	2.77	1.54	1.50
3	A	400	NAD	C2A-N1A	2.72	1.38	1.33
3	B	500	NAD	C3N-C7N	2.65	1.54	1.50
3	C	600	NAD	C8A-N7A	2.63	1.36	1.31
3	A	400	NAD	C3N-C7N	2.62	1.54	1.50
3	D	700	NAD	C4A-N3A	2.62	1.39	1.34
3	C	600	NAD	C4A-N3A	2.51	1.39	1.34
3	A	400	NAD	C4A-N3A	2.45	1.39	1.34
3	C	600	NAD	C3N-C7N	2.39	1.54	1.50
3	A	400	NAD	C8A-N7A	2.29	1.36	1.31
3	A	400	NAD	PN-O3	2.17	1.61	1.59
3	D	700	NAD	C8A-N7A	2.15	1.35	1.31
3	D	700	NAD	PN-O2N	-2.10	1.45	1.55

All (40) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	700	NAD	C5N-C4N-C3N	-9.50	111.03	120.36
3	A	400	NAD	C5N-C4N-C3N	-9.33	111.19	120.36
3	C	600	NAD	C5N-C4N-C3N	-9.32	111.20	120.36
3	B	500	NAD	C5N-C4N-C3N	-9.21	111.31	120.36
3	C	600	NAD	C6N-N1N-C2N	7.81	128.52	121.88
3	B	500	NAD	C6N-N1N-C2N	7.43	128.20	121.88
3	A	400	NAD	C6N-N1N-C2N	7.28	128.07	121.88
3	D	700	NAD	C6N-N1N-C2N	7.20	128.00	121.88
3	D	700	NAD	O7N-C7N-C3N	-5.52	112.84	119.60
3	C	600	NAD	C2N-C3N-C4N	5.08	124.16	118.26
3	A	400	NAD	C6N-C5N-C4N	5.05	126.73	119.45
3	D	700	NAD	C6N-C5N-C4N	5.05	126.72	119.45
3	B	500	NAD	C6N-C5N-C4N	5.05	126.72	119.45
3	A	400	NAD	C2N-C3N-C4N	5.03	124.11	118.26
3	D	700	NAD	C2N-C3N-C4N	5.02	124.10	118.26
3	B	500	NAD	O7N-C7N-C3N	-4.91	113.59	119.60
3	A	400	NAD	O7N-C7N-C3N	-4.90	113.60	119.60
3	C	600	NAD	O7N-C7N-C3N	-4.84	113.68	119.60
3	B	500	NAD	C2N-C3N-C4N	4.79	123.83	118.26
3	C	600	NAD	C6N-C5N-C4N	4.71	126.24	119.45
3	A	400	NAD	C4N-C3N-C7N	-4.68	108.32	121.06
3	D	700	NAD	C4N-C3N-C7N	-4.60	108.54	121.06
3	B	500	NAD	C4N-C3N-C7N	-4.57	108.61	121.06
3	C	600	NAD	C4N-C3N-C7N	-4.33	109.26	121.06
3	C	600	NAD	C2N-N1N-C1D	-4.18	109.92	119.13
3	D	700	NAD	C3N-C7N-N7N	4.02	122.70	117.74
3	D	700	NAD	C2N-N1N-C1D	-3.90	110.53	119.13
3	B	500	NAD	C5N-C6N-N1N	-3.86	115.12	120.38
3	B	500	NAD	C2N-N1N-C1D	-3.82	110.70	119.13
3	C	600	NAD	C5N-C6N-N1N	-3.74	115.29	120.38
3	D	700	NAD	C5N-C6N-N1N	-3.69	115.36	120.38
3	A	400	NAD	C5N-C6N-N1N	-3.66	115.39	120.38
3	A	400	NAD	C2N-N1N-C1D	-3.65	111.08	119.13
3	A	400	NAD	C3N-C7N-N7N	3.47	122.01	117.74
3	B	500	NAD	C3N-C7N-N7N	3.41	121.94	117.74
3	C	600	NAD	C3N-C7N-N7N	2.88	121.28	117.74
3	A	400	NAD	C2N-C3N-C7N	2.81	127.57	119.46
3	B	500	NAD	C2N-C3N-C7N	2.80	127.56	119.46
3	D	700	NAD	C2N-C3N-C7N	2.74	127.36	119.46
3	C	600	NAD	C2N-C3N-C7N	2.46	126.57	119.46

There are no chirality outliers.

All (16) torsion outliers are listed below:

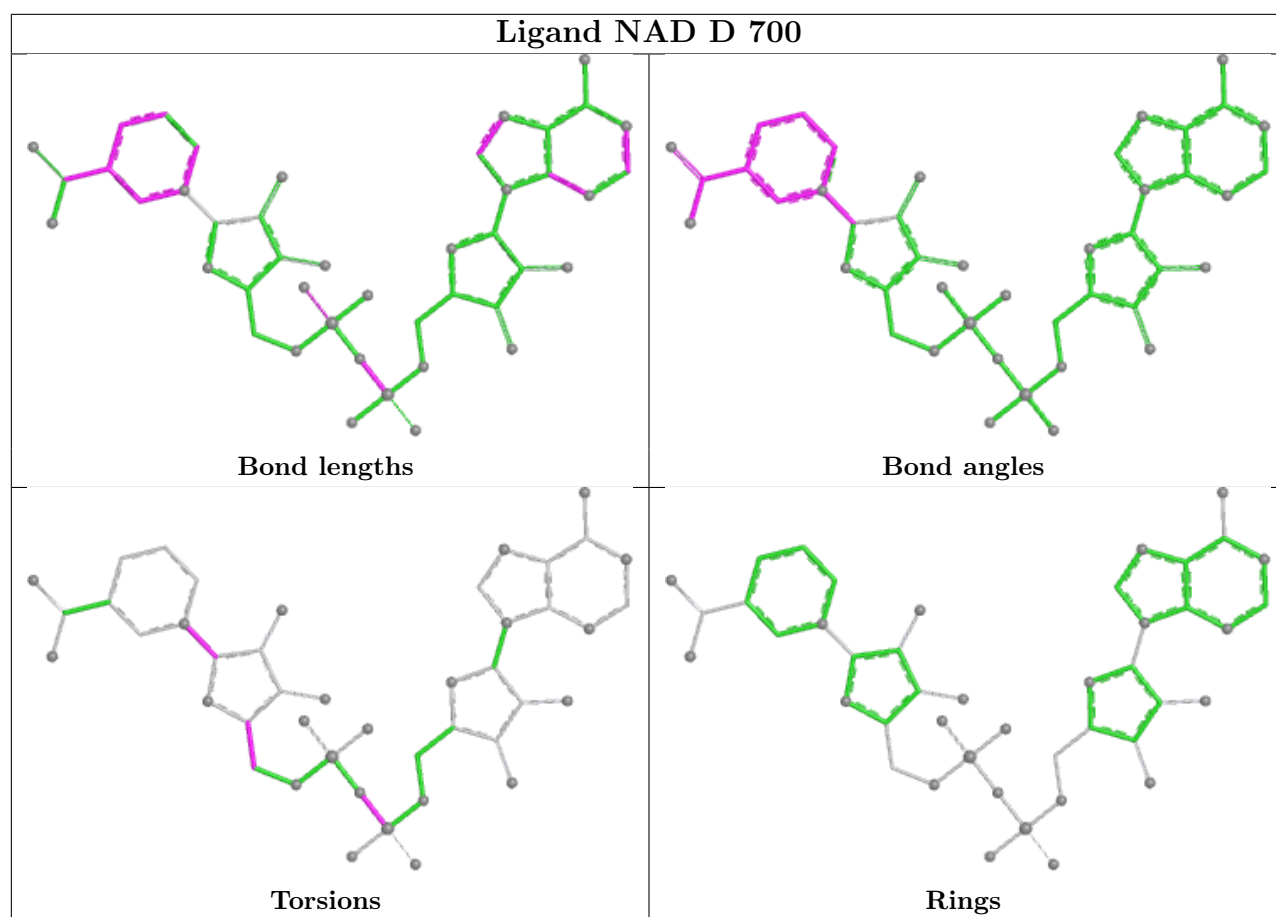
Mol	Chain	Res	Type	Atoms
3	B	500	NAD	O4D-C1D-N1N-C2N
3	B	500	NAD	PN-O3-PA-O1A
3	C	600	NAD	PN-O3-PA-O1A
3	D	700	NAD	PN-O3-PA-O1A
3	A	400	NAD	PN-O3-PA-O1A
3	A	400	NAD	O4D-C1D-N1N-C2N
3	A	400	NAD	O4D-C1D-N1N-C6N
3	B	500	NAD	O4D-C1D-N1N-C6N
3	C	600	NAD	O4D-C1D-N1N-C6N
3	D	700	NAD	O4D-C1D-N1N-C6N
3	D	700	NAD	O4D-C4D-C5D-O5D
3	A	400	NAD	PN-O3-PA-O2A
3	B	500	NAD	PN-O3-PA-O2A
3	A	400	NAD	O4B-C4B-C5B-O5B
3	B	500	NAD	O4B-C4B-C5B-O5B
3	C	600	NAD	O4B-C4B-C5B-O5B

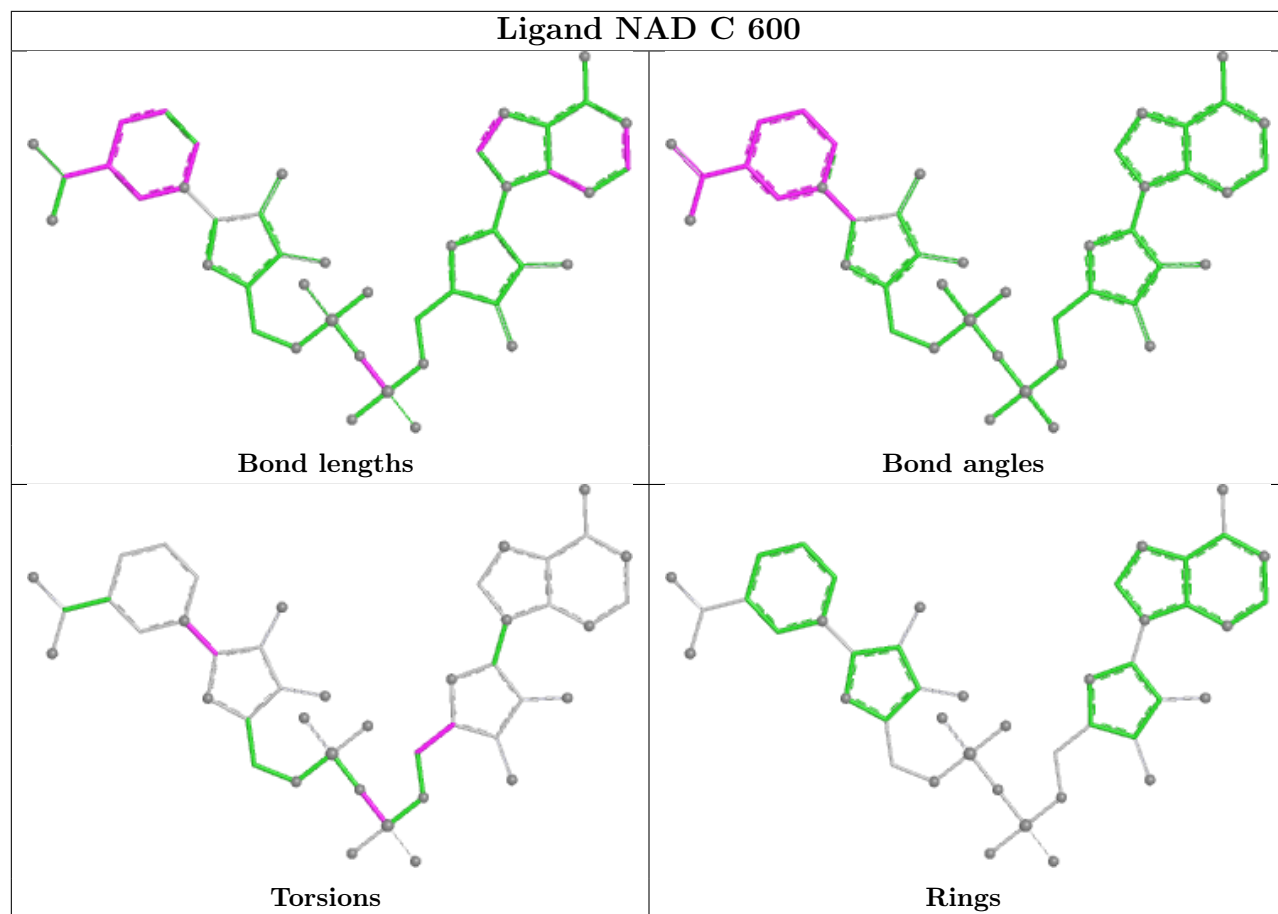
There are no ring outliers.

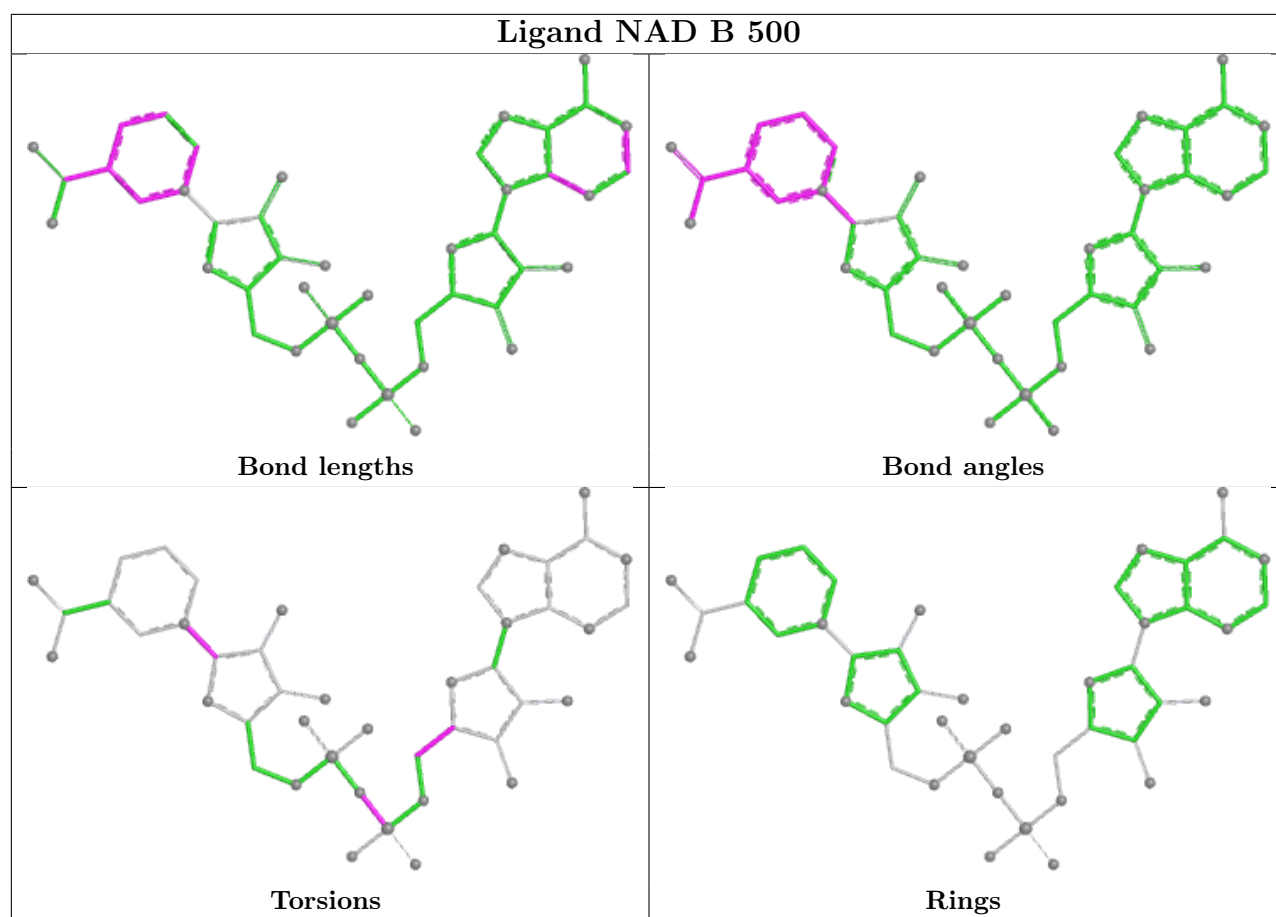
2 monomers are involved in 4 short contacts:

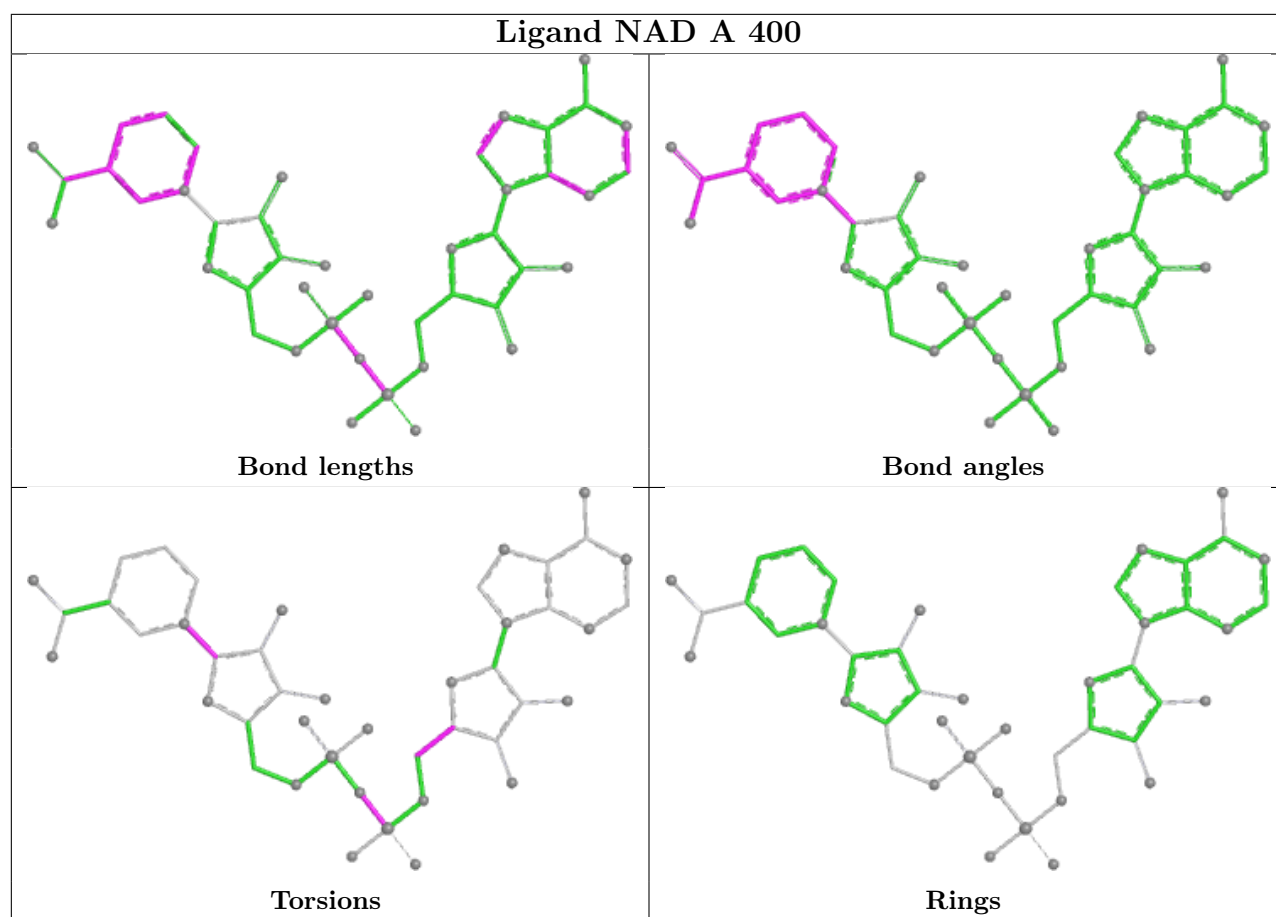
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	5002	SO4	1	0
2	B	5009	SO4	3	0

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









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.