



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 15, 2024 – 08:20 PM EST

PDB ID : 1B3R
Title : RAT LIVER S-ADENOSYLHOMOCYSTEIN HYDROLASE
Authors : Hu, Y.; Komoto, J.; Huang, Y.; Takusagawa, F.; Gomi, T.; Ogawa, H.; Takata, Y.; Fujioka, M.
Deposited on : 1998-12-14
Resolution : 2.80 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 : 2022.3.0, CSD as543be (2022)
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.40

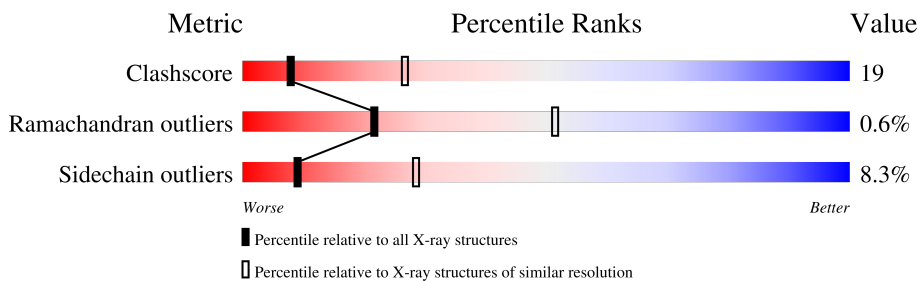
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	180529	4123 (2.80-2.80)
Ramachandran outliers	177936	4071 (2.80-2.80)
Sidechain outliers	177891	4073 (2.80-2.80)

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	431	
1	B	431	
1	C	431	
1	D	431	

2 Entry composition [i](#)

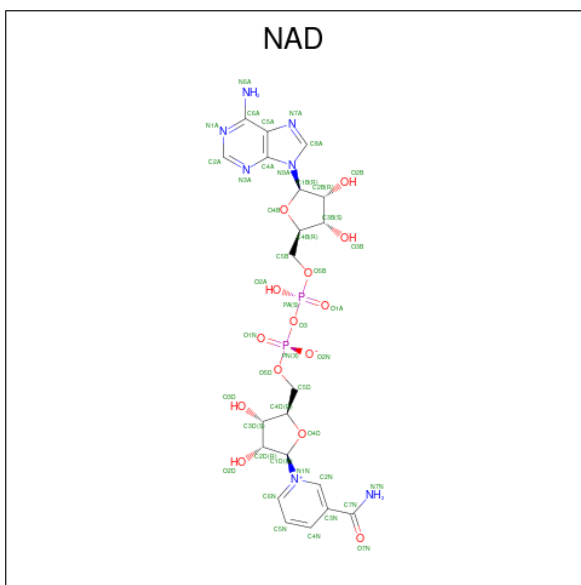
There are 3 unique types of molecules in this entry. The entry contains 17535 atoms, of which 3738 are hydrogens and 0 are deuteriums.

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 PROTEIN (S-ADENOSYLHOMOCYSTEINE HYDROLASE).

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	428	Total 4022	C 2098	H 720	N 568	O 611	S 25	719	0	0
1	B	428	Total 4022	C 2098	H 720	N 568	O 611	S 25	720	0	0
1	C	428	Total 4022	C 2098	H 720	N 568	O 611	S 25	720	0	0
1	D	428	Total 4022	C 2098	H 720	N 568	O 611	S 25	720	0	0

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: C₂₁H₂₇N₇O₁₄P₂).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	H	N	O	P		
2	A	1	Total 52	C 21	H 8	N 7	O 14	P 2	8	0
2	B	1	Total 52	C 21	H 8	N 7	O 14	P 2	8	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
2	C	1	Total	C	H	N	O	P	8	0
			52	21	8	7	14	2		
2	D	1	Total	C	H	N	O	P	8	0
			52	21	8	7	14	2		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	110	Total	H	O	220	0
			330	220	110		
3	B	109	Total	H	O	218	0
			327	218	109		
3	C	94	Total	H	O	188	0
			282	188	94		
3	D	100	Total	H	O	200	0
			300	200	100		

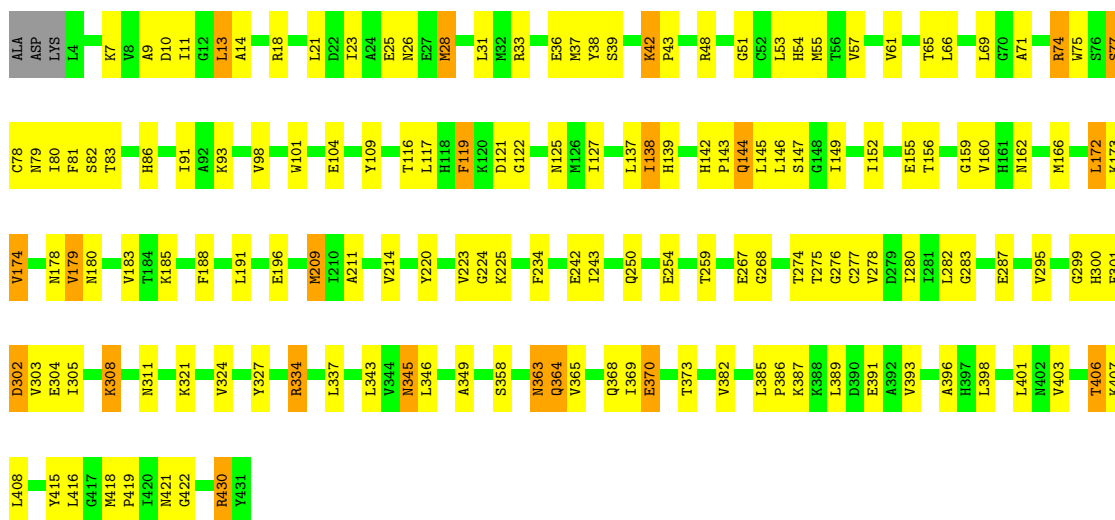
3 Residue-property plots

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.

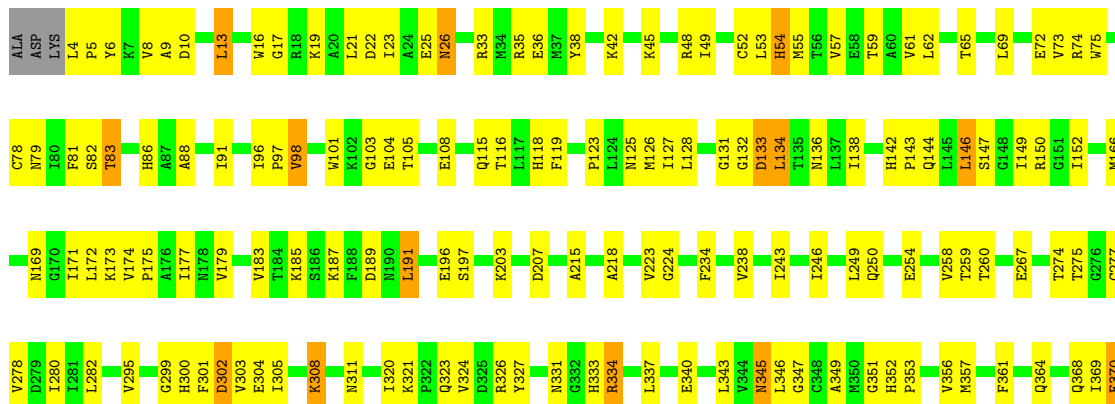
- Molecule 1: PROTEIN (S-ADENOSYLHOMOCYSTEINE HYDROLASE)

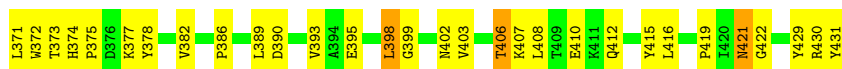
Chain A: 



- Molecule 1: PROTEIN (S-ADENOSYLHOMOCYSTEINE HYDROLASE)

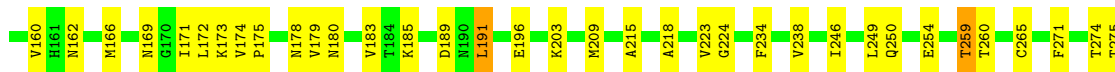
Chain B: 





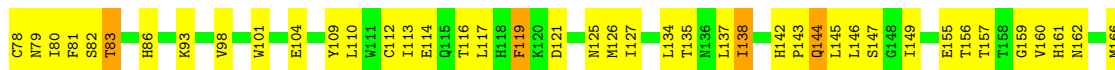
● Molecule 1: PROTEIN (S-ADENOSYLHOMOCYSTEINE HYDROLASE)

Chain C: 59% 36%



● Molecule 1: PROTEIN (S-ADENOSYLHOMOCYSTEINE HYDROLASE)

Chain D: 63% 32% 5%



4 Data and refinement statistics

Xtrriage (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	94.76Å 134.48Å 102.26Å 90.00° 114.35° 90.00°	Depositor
Resolution (Å)	8.00 – 2.80	Depositor
% Data completeness (in resolution range)	97.5 (8.00-2.80)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, R_{free}	0.199 , 0.269	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	17535	wwPDB-VP
Average B, all atoms (Å ²)	18.0	wwPDB-VP

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: NAD

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	0.50	0/3367	0.75	2/4557 (0.0%)
1	B	0.49	0/3367	0.76	2/4557 (0.0%)
1	C	0.48	0/3367	0.75	2/4557 (0.0%)
1	D	0.49	0/3367	0.74	1/4557 (0.0%)
All	All	0.49	0/13468	0.75	7/18228 (0.0%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	302	ASP	N-CA-C	6.28	127.95	111.00
1	B	302	ASP	N-CA-C	6.27	127.93	111.00
1	D	302	ASP	N-CA-C	6.17	127.65	111.00
1	C	302	ASP	N-CA-C	6.07	127.39	111.00
1	C	191	LEU	CA-CB-CG	5.32	127.54	115.30
1	B	72	GLU	N-CA-C	-5.27	96.77	111.00
1	A	430	ARG	N-CA-C	-5.14	97.11	111.00

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	3302	720	3324	129	0
1	B	3302	720	3324	151	0
1	C	3302	720	3324	140	0
1	D	3302	720	3324	136	0
2	A	44	8	26	3	0
2	B	44	8	26	4	0
2	C	44	8	26	4	0
2	D	44	8	26	2	0
3	A	110	220	0	0	0
3	B	109	218	0	0	0
3	C	94	188	0	0	0
3	D	100	200	0	0	0
All	All	13797	3738	13400	519	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 19.

All (519) 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:143:PRO:HA	1:D:146:LEU:HD13	1.44	0.97
1:B:370:GLU:HG3	1:B:389:LEU:HD11	1.51	0.92
1:A:143:PRO:HA	1:A:146:LEU:HD13	1.51	0.92
1:B:21:LEU:HD23	1:B:57:VAL:HG13	1.52	0.91
1:A:14:ALA:HB1	1:A:93:LYS:HD2	1.53	0.90
1:C:370:GLU:HG3	1:C:389:LEU:HD11	1.54	0.88
1:D:275:THR:CG2	1:D:277:CYS:HB3	2.04	0.88
1:D:28:MET:HE2	1:D:31:LEU:HD12	1.55	0.87
1:A:275:THR:CG2	1:A:277:CYS:HB3	2.05	0.86
1:A:343:LEU:HD12	1:A:346:LEU:HD12	1.56	0.86
1:B:275:THR:CG2	1:B:277:CYS:HB3	2.07	0.85
1:D:14:ALA:HB1	1:D:93:LYS:HD2	1.61	0.82
1:B:345:ASN:HD22	1:B:345:ASN:H	1.26	0.82
1:C:21:LEU:HD23	1:C:57:VAL:HG13	1.60	0.81
1:C:275:THR:HG22	1:C:277:CYS:HB3	1.63	0.79
1:B:54:HIS:CE1	1:B:78:CYS:SG	2.76	0.78
1:D:275:THR:HG22	1:D:277:CYS:HB3	1.65	0.78
1:A:28:MET:CE	1:A:31:LEU:HD12	2.15	0.77
1:C:54:HIS:CE1	1:C:78:CYS:SG	2.77	0.77
1:D:343:LEU:HD12	1:D:346:LEU:HD12	1.64	0.77
1:D:9:ALA:HB2	1:D:101:TRP:HB2	1.64	0.77
1:C:275:THR:CG2	1:C:277:CYS:HB3	2.14	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:224:GLY:N	1:A:274:THR:HG21	2.00	0.77
1:C:345:ASN:HD22	1:C:345:ASN:H	1.31	0.76
1:B:275:THR:HG22	1:B:277:CYS:HB3	1.68	0.75
1:B:275:THR:HG21	1:B:280:ILE:HD11	1.67	0.75
1:B:374:HIS:HB3	1:B:377:LYS:HG2	1.69	0.75
1:C:374:HIS:HB3	1:C:377:LYS:HG2	1.68	0.74
1:B:419:PRO:HB2	1:B:422:GLY:H	1.52	0.74
1:A:55:MET:HE2	1:A:75:TRP:CD1	2.23	0.74
1:A:275:THR:HG22	1:A:277:CYS:HB3	1.70	0.74
1:D:28:MET:CE	1:D:31:LEU:HD12	2.18	0.73
1:D:321:LYS:HD3	1:D:324:VAL:HG21	1.69	0.73
1:A:321:LYS:HD3	1:A:324:VAL:HG21	1.70	0.73
1:A:416:LEU:HD11	1:B:277:CYS:HB2	1.70	0.73
1:B:127:ILE:HG23	1:B:134:LEU:HD13	1.71	0.72
1:B:21:LEU:O	1:B:25:GLU:HG3	1.90	0.72
1:C:10:ASP:HB3	1:C:13:LEU:HD22	1.69	0.72
1:A:387:LYS:O	1:A:391:GLU:HG3	1.90	0.71
1:C:48:ARG:HD2	1:C:119:PHE:CG	2.24	0.71
1:B:326:ARG:NH1	1:D:23:ILE:HG12	2.06	0.71
1:C:54:HIS:ND1	1:C:78:CYS:SG	2.64	0.70
1:C:323:GLN:HG3	1:C:347:GLY:O	1.91	0.70
1:C:127:ILE:HG23	1:C:134:LEU:HD13	1.73	0.70
1:C:419:PRO:HB2	1:C:422:GLY:H	1.56	0.70
1:A:223:VAL:HB	1:A:274:THR:HG23	1.73	0.69
1:B:10:ASP:HB3	1:B:13:LEU:HD22	1.73	0.69
1:A:345:ASN:H	1:A:345:ASN:HD22	1.38	0.69
1:A:75:TRP:HB3	1:A:98:VAL:HG12	1.74	0.69
1:D:33:ARG:HD2	1:D:396:ALA:HA	1.75	0.69
1:D:370:GLU:HG3	1:D:389:LEU:HD11	1.75	0.68
1:A:9:ALA:HB2	1:A:101:TRP:HB2	1.74	0.68
1:A:406:THR:HG22	1:B:260:THR:HG22	1.76	0.68
1:C:75:TRP:HH2	1:C:128:LEU:HD13	1.59	0.68
1:C:146:LEU:HD23	1:C:173:LYS:HG3	1.74	0.68
1:A:224:GLY:CA	1:A:274:THR:HG21	2.25	0.67
1:B:54:HIS:ND1	1:B:78:CYS:SG	2.67	0.67
1:B:398:LEU:HG	1:B:403:VAL:HG11	1.77	0.67
1:A:33:ARG:HD2	1:A:396:ALA:HA	1.77	0.66
1:D:33:ARG:O	1:D:37:MET:HB2	1.95	0.66
1:C:275:THR:HG21	1:C:280:ILE:HD11	1.77	0.66
1:C:21:LEU:O	1:C:25:GLU:HG3	1.95	0.66
1:C:48:ARG:HD2	1:C:119:PHE:CB	2.25	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:75:TRP:HB3	1:D:98:VAL:HG12	1.78	0.66
1:A:275:THR:HG21	1:A:277:CYS:HB3	1.78	0.65
1:C:74:ARG:HD3	1:C:116:THR:HA	1.78	0.65
1:A:79:ASN:HB3	1:A:82:SER:OG	1.96	0.65
1:D:21:LEU:O	1:D:25:GLU:HG3	1.96	0.65
1:B:299:GLY:HA2	2:B:432:NAD:O4D	1.97	0.64
1:C:48:ARG:HD2	1:C:119:PHE:HB2	1.78	0.64
1:C:277:CYS:HB2	1:D:416:LEU:HD11	1.80	0.64
1:B:35:ARG:HG3	1:B:65:THR:HG23	1.80	0.64
1:B:146:LEU:HD23	1:B:173:LYS:HG3	1.81	0.63
1:C:345:ASN:HD22	1:C:345:ASN:N	1.97	0.63
1:B:74:ARG:HD3	1:B:116:THR:HA	1.79	0.63
1:B:126:MET:HE2	1:B:150:ARG:HB3	1.79	0.63
1:D:55:MET:HE2	1:D:75:TRP:CD1	2.33	0.63
1:D:224:GLY:N	1:D:274:THR:HG21	2.14	0.63
1:B:105:THR:OG1	1:B:108:GLU:HG3	1.99	0.63
1:C:260:THR:HG22	1:D:406:THR:HG22	1.81	0.63
1:B:55:MET:HG2	1:B:88:ALA:HB2	1.80	0.62
1:C:127:ILE:HG23	1:C:134:LEU:CD1	2.29	0.62
1:B:196:GLU:HG3	1:D:209:MET:HE3	1.80	0.62
1:A:21:LEU:O	1:A:25:GLU:HG3	1.99	0.62
1:D:78:CYS:HA	1:D:109:TYR:OH	2.00	0.62
1:B:42:LYS:HB3	1:B:45:LYS:HG2	1.82	0.62
1:C:79:ASN:HB3	1:C:82:SER:OG	2.00	0.62
1:C:55:MET:HG2	1:C:88:ALA:HB2	1.82	0.61
1:C:386:PRO:HG2	1:C:389:LEU:HD12	1.82	0.61
1:A:74:ARG:HD3	1:A:116:THR:HA	1.82	0.61
1:D:275:THR:HG21	1:D:277:CYS:HB3	1.82	0.61
1:A:407:LYS:HE3	1:A:421:ASN:OD1	2.00	0.61
1:B:81:PHE:CE1	1:B:103:GLY:HA2	2.36	0.61
1:D:308:LYS:HE3	1:D:308:LYS:HA	1.83	0.61
1:C:408:LEU:HD13	1:D:243:ILE:HG21	1.82	0.60
1:D:385:LEU:HD12	1:D:386:PRO:HD2	1.83	0.60
1:D:387:LYS:O	1:D:391:GLU:HG3	2.01	0.60
1:B:308:LYS:NZ	1:B:311:ASN:HD22	2.00	0.60
1:A:370:GLU:HG3	1:A:389:LEU:HD11	1.84	0.60
1:C:278:VAL:HG12	1:C:303:VAL:HB	1.83	0.59
1:B:48:ARG:HD2	1:B:119:PHE:CG	2.37	0.59
1:A:166:MET:CE	1:A:172:LEU:HD23	2.32	0.59
1:D:275:THR:HG21	1:D:280:ILE:HD11	1.84	0.59
1:D:398:LEU:HG	1:D:403:VAL:HG11	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:308:LYS:HE3	1:C:308:LYS:HA	1.84	0.59
1:B:345:ASN:HD22	1:B:345:ASN:N	1.99	0.59
1:C:162:ASN:ND2	1:C:166:MET:HE2	2.18	0.59
1:C:218:ALA:O	1:C:274:THR:HB	2.03	0.59
1:C:138:ILE:HG22	1:C:146:LEU:CD1	2.33	0.59
1:B:275:THR:HG21	1:B:277:CYS:HB3	1.84	0.58
1:C:169:ASN:HB2	1:C:171:ILE:HG13	1.85	0.58
1:A:78:CYS:HA	1:A:109:TYR:OH	2.03	0.58
1:D:345:ASN:H	1:D:345:ASN:HD22	1.50	0.58
1:D:419:PRO:HB2	1:D:422:GLY:H	1.69	0.58
1:A:275:THR:HG23	2:A:432:NAD:C8A	2.34	0.58
1:A:345:ASN:HD22	1:A:345:ASN:N	2.02	0.58
1:C:126:MET:HE2	1:C:372:TRP:HE3	1.69	0.58
1:C:16:TRP:CE3	1:C:86:HIS:HB3	2.37	0.58
1:C:343:LEU:HD12	1:C:346:LEU:HD12	1.86	0.58
1:A:308:LYS:NZ	1:A:311:ASN:HD22	2.02	0.57
1:C:152:ILE:HD11	1:C:174:VAL:HG13	1.85	0.57
1:A:142:HIS:HB3	1:A:145:LEU:HD12	1.85	0.57
1:D:365:VAL:O	1:D:369:ILE:HG13	2.04	0.57
1:D:407:LYS:HE3	1:D:421:ASN:OD1	2.03	0.57
1:D:138:ILE:HD13	1:D:142:HIS:HB2	1.86	0.57
1:A:242:GLU:O	1:B:406:THR:HG23	2.05	0.57
1:B:75:TRP:HB3	1:B:98:VAL:HG12	1.85	0.57
1:A:13:LEU:HB2	1:A:86:HIS:HA	1.86	0.57
1:D:308:LYS:NZ	1:D:311:ASN:HD22	2.03	0.57
1:B:33:ARG:HA	1:B:36:GLU:HG2	1.87	0.57
1:D:345:ASN:HD22	1:D:345:ASN:N	2.02	0.57
1:B:308:LYS:HE3	1:B:308:LYS:HA	1.87	0.57
1:B:278:VAL:HG12	1:B:303:VAL:HB	1.87	0.56
1:B:166:MET:HA	1:B:171:ILE:HD12	1.87	0.56
1:D:24:ALA:O	1:D:28:MET:HG3	2.06	0.56
1:B:79:ASN:HB3	1:B:82:SER:OG	2.06	0.56
1:C:81:PHE:CE1	1:C:103:GLY:HA2	2.41	0.56
1:A:278:VAL:HG12	1:A:303:VAL:HB	1.87	0.56
1:B:323:GLN:HG3	1:B:347:GLY:O	2.06	0.56
1:D:13:LEU:HB2	1:D:86:HIS:HA	1.88	0.56
1:B:81:PHE:CD1	1:B:103:GLY:HA2	2.41	0.56
1:D:80:ILE:HG22	1:D:104:GLU:HB2	1.88	0.56
1:C:308:LYS:NZ	1:C:311:ASN:HD22	2.04	0.56
1:C:370:GLU:HG3	1:C:389:LEU:CD1	2.31	0.56
1:D:224:GLY:CA	1:D:274:THR:HG21	2.36	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:275:THR:HG22	1:A:277:CYS:N	2.21	0.55
1:C:91:ILE:CG2	1:C:96:ILE:HB	2.37	0.55
1:A:419:PRO:HB2	1:A:422:GLY:HA3	1.89	0.55
1:B:48:ARG:HD2	1:B:119:PHE:CB	2.36	0.55
1:A:419:PRO:HB2	1:A:422:GLY:H	1.72	0.55
1:C:17:GLY:HA3	1:C:86:HIS:O	2.07	0.55
1:D:275:THR:HG23	2:D:432:NAD:C8A	2.37	0.55
1:B:65:THR:O	1:B:69:LEU:HD13	2.07	0.55
1:C:91:ILE:HG22	1:C:96:ILE:HB	1.89	0.55
1:C:321:LYS:HG2	1:C:324:VAL:HB	1.89	0.55
1:D:9:ALA:HB2	1:D:101:TRP:CB	2.35	0.55
1:D:21:LEU:HD23	1:D:57:VAL:HG13	1.89	0.55
1:D:327:TYR:O	1:D:334:ARG:HA	2.07	0.55
1:A:33:ARG:HA	1:A:36:GLU:HG2	1.88	0.55
1:C:275:THR:HG23	2:C:432:NAD:C5A	2.37	0.54
1:A:243:ILE:HG21	1:B:408:LEU:HD13	1.88	0.54
1:B:334:ARG:HD3	1:B:334:ARG:N	2.21	0.54
1:A:403:VAL:HG22	1:B:258:VAL:HB	1.88	0.54
1:B:69:LEU:HD23	1:B:369:ILE:HD11	1.90	0.54
1:B:275:THR:HG23	2:B:432:NAD:N7A	2.22	0.54
1:D:223:VAL:HB	1:D:274:THR:HG23	1.89	0.54
1:B:126:MET:CE	1:B:150:ARG:HB3	2.38	0.54
1:B:275:THR:HG23	2:B:432:NAD:C5A	2.37	0.54
1:C:126:MET:CE	1:C:372:TRP:HE3	2.21	0.54
1:C:343:LEU:HD12	1:C:346:LEU:CD1	2.38	0.54
1:A:155:GLU:CD	1:A:364:GLN:HE22	2.12	0.54
1:C:19:LYS:O	1:C:23:ILE:HG13	2.07	0.54
1:A:11:ILE:O	1:A:11:ILE:HG12	2.08	0.53
1:A:21:LEU:HD23	1:A:57:VAL:HG13	1.91	0.53
1:B:16:TRP:CE3	1:B:86:HIS:HB3	2.42	0.53
1:B:395:GLU:HA	1:B:398:LEU:HD22	1.89	0.53
1:B:19:LYS:O	1:B:23:ILE:HG13	2.08	0.53
1:B:419:PRO:HB2	1:B:422:GLY:N	2.23	0.53
1:B:308:LYS:HZ2	1:B:311:ASN:HD22	1.57	0.53
1:B:38:TYR:HB2	1:B:69:LEU:HG	1.90	0.53
1:B:138:ILE:HG22	1:B:146:LEU:CD1	2.38	0.53
1:B:246:ILE:O	1:B:250:GLN:HG3	2.09	0.53
1:C:17:GLY:HA2	1:C:86:HIS:CD2	2.43	0.53
1:D:162:ASN:O	1:D:166:MET:HG3	2.07	0.53
1:B:48:ARG:HD2	1:B:119:PHE:HB2	1.89	0.53
1:B:152:ILE:HD11	1:B:174:VAL:HG13	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:42:LYS:HB3	1:C:45:LYS:HG2	1.91	0.53
1:A:275:THR:HG22	1:A:277:CYS:H	1.73	0.53
1:A:209:MET:HE3	1:C:196:GLU:HG3	1.90	0.53
1:A:209:MET:CE	1:C:196:GLU:HG3	2.39	0.53
1:B:138:ILE:HG22	1:B:146:LEU:HD13	1.89	0.53
1:A:398:LEU:HG	1:A:403:VAL:HG11	1.91	0.53
1:B:275:THR:HG22	1:B:277:CYS:N	2.24	0.53
1:C:35:ARG:HG3	1:C:65:THR:HG23	1.91	0.53
1:D:276:GLY:HA2	1:D:300:HIS:HB2	1.91	0.53
1:D:138:ILE:CD1	1:D:145:LEU:HB2	2.38	0.52
1:A:295:VAL:HG12	1:A:305:ILE:HD13	1.92	0.52
1:B:275:THR:HB	1:B:304:GLU:OE1	2.09	0.52
1:C:126:MET:HE2	1:C:150:ARG:HB3	1.90	0.52
1:A:33:ARG:O	1:A:37:MET:HB2	2.10	0.52
1:A:48:ARG:HD3	1:A:121:ASP:OD2	2.09	0.52
1:A:146:LEU:HD23	1:A:173:LYS:HG3	1.92	0.52
1:B:126:MET:CE	1:B:372:TRP:HE3	2.22	0.52
1:B:386:PRO:HG2	1:B:389:LEU:HD12	1.90	0.52
1:B:398:LEU:HG	1:B:403:VAL:CG1	2.39	0.52
1:C:52:CYS:SG	1:C:78:CYS:HB3	2.49	0.52
1:D:39:SER:O	1:D:42:LYS:HD2	2.08	0.52
1:A:28:MET:HE2	1:A:31:LEU:HD12	1.89	0.52
1:A:278:VAL:HG13	1:B:415:TYR:CE2	2.45	0.52
1:D:28:MET:HA	1:D:358:SER:HB2	1.91	0.52
1:A:275:THR:HG21	1:A:280:ILE:HD11	1.91	0.52
1:D:419:PRO:HB2	1:D:422:GLY:HA3	1.92	0.52
1:A:308:LYS:HE3	1:A:308:LYS:HA	1.92	0.52
1:C:337:LEU:CD1	1:C:340:GLU:HA	2.39	0.52
1:A:119:PHE:CD1	1:A:119:PHE:N	2.78	0.52
1:A:416:LEU:HD11	1:B:277:CYS:CB	2.39	0.52
1:C:357:MET:HE3	1:C:357:MET:HA	1.92	0.52
1:C:386:PRO:HG2	1:C:389:LEU:CD1	2.40	0.52
1:D:373:THR:HG22	1:D:373:THR:O	2.10	0.52
1:C:419:PRO:HB2	1:C:422:GLY:N	2.25	0.51
1:A:101:TRP:O	1:A:104:GLU:HG3	2.10	0.51
1:B:218:ALA:O	1:B:274:THR:HB	2.10	0.51
1:C:129:ASP:OD2	1:C:135:THR:HG23	2.10	0.51
1:C:105:THR:OG1	1:C:108:GLU:HG3	2.11	0.51
1:C:38:TYR:HB2	1:C:69:LEU:HG	1.92	0.51
1:D:48:ARG:HD3	1:D:121:ASP:OD2	2.11	0.51
1:C:156:THR:O	1:C:160:VAL:HG23	2.12	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:275:THR:HG22	1:D:277:CYS:N	2.26	0.51
1:B:127:ILE:HG23	1:B:134:LEU:CD1	2.38	0.50
1:C:179:VAL:HG13	1:C:363:ASN:HB3	1.93	0.50
1:D:33:ARG:HA	1:D:36:GLU:HG2	1.93	0.50
1:D:275:THR:HG22	1:D:277:CYS:CB	2.40	0.50
1:A:117:LEU:HD11	1:A:137:LEU:HD21	1.91	0.50
1:A:277:CYS:SG	1:B:412:GLN:HG2	2.52	0.50
1:A:385:LEU:HD12	1:A:386:PRO:HD2	1.92	0.50
1:C:299:GLY:HA2	2:C:432:NAD:O4D	2.12	0.50
1:B:377:LYS:HG3	1:B:378:TYR:CD1	2.46	0.50
1:C:275:THR:HG23	2:C:432:NAD:C8A	2.42	0.50
1:C:279:ASP:HB3	1:C:282:LEU:HD11	1.92	0.50
1:D:101:TRP:O	1:D:104:GLU:HG3	2.11	0.50
1:C:60:ALA:HA	1:C:63:ILE:HD12	1.94	0.50
1:C:295:VAL:HG12	1:C:305:ILE:HD13	1.93	0.50
1:D:127:ILE:HD11	1:D:149:ILE:HD13	1.92	0.50
1:B:343:LEU:HD12	1:B:346:LEU:HD12	1.94	0.50
1:C:81:PHE:CD1	1:C:103:GLY:HA2	2.46	0.50
1:C:412:GLN:HG2	1:D:277:CYS:SG	2.52	0.50
1:D:53:LEU:HD23	1:D:54:HIS:N	2.27	0.50
1:A:39:SER:O	1:A:42:LYS:HD2	2.11	0.50
1:C:430:ARG:HA	1:D:430:ARG:HD3	1.94	0.50
1:A:250:GLN:O	1:A:254:GLU:HG2	2.11	0.50
1:D:334:ARG:HD3	1:D:334:ARG:N	2.27	0.50
1:A:408:LEU:HD13	1:B:243:ILE:HG21	1.94	0.49
1:B:55:MET:HB3	1:B:83:THR:HB	1.93	0.49
1:D:113:ILE:HG21	1:D:137:LEU:HD13	1.94	0.49
1:D:119:PHE:CD1	1:D:119:PHE:N	2.81	0.49
1:A:28:MET:HE3	1:A:31:LEU:HD12	1.91	0.49
1:A:138:ILE:HG23	1:A:146:LEU:HD12	1.93	0.49
1:C:377:LYS:HG3	1:C:378:TYR:CD1	2.47	0.49
1:A:159:GLY:O	1:A:162:ASN:HB3	2.12	0.49
1:B:215:ALA:O	1:B:238:VAL:HA	2.12	0.49
1:B:223:VAL:HB	1:B:274:THR:HG23	1.94	0.49
1:A:327:TYR:O	1:A:334:ARG:HA	2.12	0.49
1:D:127:ILE:HG23	1:D:134:LEU:HD13	1.94	0.49
1:B:169:ASN:HB2	1:B:171:ILE:HG13	1.95	0.49
1:C:126:MET:CE	1:C:150:ARG:HB3	2.42	0.49
1:C:320:ILE:HD11	1:C:326:ARG:HD3	1.94	0.49
1:B:74:ARG:NH1	1:B:115:GLN:O	2.46	0.49
1:B:142:HIS:N	1:B:143:PRO:CD	2.75	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:28:MET:HA	1:A:358:SER:HB2	1.93	0.49
1:A:80:ILE:HG13	1:A:81:PHE:CD2	2.48	0.49
1:B:337:LEU:CD1	1:B:340:GLU:HA	2.43	0.48
1:C:33:ARG:HA	1:C:36:GLU:HG2	1.95	0.48
1:C:223:VAL:HB	1:C:274:THR:HG23	1.95	0.48
1:C:395:GLU:HA	1:C:398:LEU:HD22	1.94	0.48
1:D:101:TRP:CH2	1:D:112:CYS:SG	3.06	0.48
1:D:156:THR:O	1:D:160:VAL:HG23	2.13	0.48
1:D:171:ILE:O	1:D:173:LYS:HG2	2.13	0.48
1:D:398:LEU:HG	1:D:403:VAL:CG1	2.43	0.48
1:C:142:HIS:N	1:C:143:PRO:CD	2.76	0.48
1:A:18:ARG:NH1	1:A:21:LEU:HD12	2.29	0.48
1:B:300:HIS:HD2	1:B:303:VAL:HG22	1.78	0.48
1:D:79:ASN:HB3	1:D:82:SER:OG	2.14	0.48
1:B:369:ILE:O	1:B:373:THR:HB	2.14	0.48
1:C:59:THR:O	1:C:63:ILE:HG13	2.13	0.48
1:D:142:HIS:HA	1:D:144:GLN:OE1	2.14	0.48
1:B:275:THR:HG23	2:B:432:NAD:C8A	2.44	0.48
1:D:110:LEU:O	1:D:114:GLU:HG3	2.14	0.48
1:B:185:LYS:HD3	1:B:185:LYS:C	2.33	0.48
1:C:49:ILE:HB	1:C:73:VAL:HG22	1.96	0.48
1:A:7:LYS:HG3	1:A:101:TRP:CZ3	2.48	0.48
1:D:11:ILE:HG12	1:D:11:ILE:O	2.14	0.48
1:D:74:ARG:HD3	1:D:116:THR:HA	1.95	0.48
1:B:326:ARG:HH12	1:D:23:ILE:HG12	1.79	0.47
1:C:146:LEU:HA	1:C:149:ILE:HD12	1.95	0.47
1:D:138:ILE:HG23	1:D:146:LEU:CD1	2.44	0.47
1:A:179:VAL:HG13	1:A:363:ASN:HB3	1.96	0.47
1:B:49:ILE:HB	1:B:73:VAL:HG22	1.96	0.47
1:C:152:ILE:O	1:C:371:LEU:HD11	2.14	0.47
1:D:18:ARG:NH1	1:D:21:LEU:HD12	2.30	0.47
1:B:126:MET:HE3	1:B:372:TRP:HA	1.95	0.47
1:C:55:MET:HB3	1:C:83:THR:HB	1.96	0.47
1:C:74:ARG:HG2	1:C:97:PRO:HB2	1.95	0.47
1:D:265:CYS:HA	1:D:271:PHE:CZ	2.50	0.47
1:B:320:ILE:HD11	1:B:326:ARG:HD3	1.96	0.47
1:B:17:GLY:HA2	1:B:86:HIS:CD2	2.50	0.47
1:B:337:LEU:HD12	1:B:340:GLU:HA	1.95	0.47
1:C:21:LEU:HD21	1:C:60:ALA:HB3	1.96	0.47
1:C:75:TRP:HB3	1:C:98:VAL:HG12	1.95	0.47
1:C:316:GLU:HB2	1:C:328:LEU:HB3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:143:PRO:HA	1:D:146:LEU:CD1	2.31	0.47
1:A:283:GLY:O	1:A:287:GLU:HG3	2.15	0.47
1:A:415:TYR:OH	1:B:303:VAL:HG21	2.14	0.47
1:B:75:TRP:HH2	1:B:128:LEU:HD13	1.80	0.47
1:C:300:HIS:HD2	1:C:303:VAL:HG22	1.78	0.47
1:C:345:ASN:H	1:C:345:ASN:ND2	2.08	0.47
1:D:38:TYR:HB3	1:D:43:PRO:CD	2.45	0.47
1:D:117:LEU:HD11	1:D:137:LEU:HD21	1.95	0.47
1:B:196:GLU:HG3	1:D:209:MET:CE	2.45	0.47
1:C:215:ALA:O	1:C:238:VAL:HA	2.14	0.47
1:B:203:LYS:O	1:B:207:ASP:N	2.46	0.47
1:C:189:ASP:O	1:C:352:HIS:CE1	2.68	0.47
1:C:275:THR:HG23	2:C:432:NAD:N7A	2.30	0.47
1:D:55:MET:HE1	1:D:98:VAL:HG11	1.96	0.47
1:D:274:THR:CG2	1:D:274:THR:O	2.63	0.46
1:D:379:PRO:HD2	1:D:383:HIS:CE1	2.50	0.46
1:A:373:THR:HG22	1:A:373:THR:O	2.14	0.46
1:A:38:TYR:HB3	1:A:43:PRO:CD	2.45	0.46
1:A:220:TYR:O	1:A:225:LYS:NZ	2.47	0.46
1:C:7:LYS:HD3	1:C:111:TRP:CH2	2.50	0.46
1:C:315:VAL:CG2	1:C:330:LYS:HG2	2.46	0.46
1:D:44:LEU:HB3	1:D:71:ALA:HB2	1.96	0.46
1:D:274:THR:O	1:D:274:THR:HG22	2.15	0.46
1:B:131:GLY:O	1:B:133:ASP:N	2.49	0.46
1:C:334:ARG:N	1:C:334:ARG:CD	2.78	0.46
1:C:373:THR:HG22	1:C:373:THR:O	2.15	0.46
1:D:159:GLY:O	1:D:162:ASN:HB3	2.15	0.46
1:A:54:HIS:CD2	1:A:78:CYS:SG	3.07	0.46
1:A:162:ASN:O	1:A:166:MET:HG3	2.15	0.46
1:A:127:ILE:HD11	1:A:149:ILE:HD13	1.97	0.46
1:B:177:ILE:HG13	1:B:371:LEU:HD21	1.98	0.46
1:D:214:VAL:HB	1:D:268:GLY:HA2	1.97	0.46
1:A:274:THR:HG22	1:A:274:THR:O	2.16	0.46
1:A:275:THR:HG23	2:A:432:NAD:N7A	2.31	0.46
1:A:214:VAL:HB	1:A:268:GLY:HA2	1.97	0.46
1:B:407:LYS:NZ	1:B:421:ASN:HB3	2.31	0.46
1:C:301:PHE:CE1	1:C:343:LEU:HG	2.51	0.46
1:C:334:ARG:H	1:C:334:ARG:HD3	1.79	0.46
1:C:404:LYS:HB2	1:D:259:THR:HA	1.98	0.46
1:C:125:ASN:ND2	1:C:372:TRP:CH2	2.84	0.46
1:C:277:CYS:CB	1:D:416:LEU:HD11	2.45	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:275:THR:HG23	2:D:432:NAD:N7A	2.31	0.46
1:D:343:LEU:HD12	1:D:346:LEU:CD1	2.41	0.46
1:D:80:ILE:HG13	1:D:81:PHE:CD2	2.50	0.46
1:A:54:HIS:HA	1:A:77:SER:OG	2.17	0.45
1:A:275:THR:HG22	1:A:277:CYS:CB	2.44	0.45
1:C:406:THR:HG23	1:D:242:GLU:O	2.16	0.45
1:D:166:MET:CE	1:D:172:LEU:HD23	2.46	0.45
1:A:178:ASN:OD1	1:A:180:ASN:HB3	2.16	0.45
1:A:243:ILE:HG22	1:B:406:THR:O	2.16	0.45
1:B:8:VAL:HG12	1:B:9:ALA:N	2.31	0.45
1:B:136:ASN:ND2	1:B:166:MET:HE1	2.32	0.45
1:B:343:LEU:HD12	1:B:346:LEU:CD1	2.47	0.45
1:B:356:VAL:HG12	1:D:209:MET:SD	2.56	0.45
1:C:291:ASP:OD1	1:C:334:ARG:HD3	2.15	0.45
1:A:401:LEU:HD11	1:B:249:LEU:CD1	2.46	0.45
1:D:275:THR:HG22	1:D:277:CYS:H	1.80	0.45
1:D:419:PRO:HB2	1:D:422:GLY:N	2.31	0.45
1:A:188:PHE:HE2	1:B:249:LEU:HD21	1.82	0.45
1:B:55:MET:CG	1:B:88:ALA:HB2	2.45	0.45
1:B:327:TYR:O	1:B:334:ARG:HA	2.16	0.45
1:B:17:GLY:HA3	1:B:86:HIS:O	2.17	0.45
1:B:295:VAL:HG12	1:B:305:ILE:HD13	1.96	0.45
1:C:28:MET:HA	1:C:358:SER:HB2	1.98	0.45
1:A:276:GLY:HA2	1:A:300:HIS:HB2	1.99	0.45
1:A:277:CYS:HB2	1:B:416:LEU:HD21	1.99	0.45
1:C:57:VAL:O	1:C:61:VAL:HG23	2.17	0.45
1:B:146:LEU:HA	1:B:149:ILE:HD12	1.99	0.45
1:C:126:MET:HE3	1:C:372:TRP:HA	1.99	0.45
1:C:308:LYS:HZ1	1:C:311:ASN:HD22	1.65	0.45
1:A:9:ALA:HB2	1:A:101:TRP:CB	2.46	0.44
1:A:54:HIS:NE2	1:A:78:CYS:SG	2.90	0.44
1:A:142:HIS:N	1:A:143:PRO:CD	2.80	0.44
1:A:419:PRO:HB2	1:A:422:GLY:CA	2.47	0.44
1:D:125:ASN:HA	1:D:149:ILE:HA	1.99	0.44
1:A:138:ILE:HG23	1:A:146:LEU:CD1	2.48	0.44
1:B:197:SER:HB2	1:B:345:ASN:HB2	2.00	0.44
1:C:166:MET:HA	1:C:171:ILE:HD12	1.99	0.44
1:D:363:ASN:ND2	1:D:393:VAL:HG11	2.32	0.44
1:A:419:PRO:HB2	1:A:422:GLY:N	2.32	0.44
1:B:126:MET:HE2	1:B:372:TRP:HE3	1.81	0.44
1:C:249:LEU:CD1	1:D:401:LEU:HD11	2.48	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:138:ILE:CD1	1:A:145:LEU:HB2	2.48	0.44
1:A:139:HIS:HA	1:A:146:LEU:HD11	1.99	0.44
1:B:101:TRP:O	1:B:104:GLU:HG3	2.18	0.44
1:C:277:CYS:O	1:C:304:GLU:HG2	2.18	0.44
1:D:138:ILE:HG23	1:D:146:LEU:HD12	1.99	0.44
1:D:155:GLU:CD	1:D:364:GLN:HE22	2.21	0.44
1:A:365:VAL:O	1:A:369:ILE:HG13	2.19	0.43
1:B:125:ASN:ND2	1:B:372:TRP:CH2	2.85	0.43
1:A:343:LEU:HD12	1:A:346:LEU:CD1	2.37	0.43
1:C:65:THR:O	1:C:69:LEU:HD13	2.18	0.43
1:D:59:THR:O	1:D:63:ILE:HG13	2.19	0.43
1:B:127:ILE:HD11	1:B:149:ILE:HD13	2.00	0.43
1:D:278:VAL:HG12	1:D:303:VAL:HB	2.00	0.43
1:A:119:PHE:HB2	1:A:122:GLY:O	2.19	0.43
1:A:51:GLY:HA3	1:A:75:TRP:CE3	2.54	0.43
1:A:185:LYS:C	1:A:185:LYS:HD3	2.39	0.43
1:B:59:THR:O	1:B:62:LEU:HB3	2.19	0.43
1:B:101:TRP:CE2	1:B:104:GLU:HG2	2.53	0.43
1:B:301:PHE:CE1	1:B:343:LEU:HG	2.54	0.43
1:C:9:ALA:HB2	1:C:101:TRP:HB2	2.01	0.43
1:C:75:TRP:CH2	1:C:128:LEU:HD13	2.45	0.43
1:D:205:ALA:HB1	1:D:324:VAL:HG22	2.01	0.43
1:D:320:ILE:HD11	1:D:326:ARG:HD2	2.01	0.43
1:B:183:VAL:HG12	1:B:390:ASP:OD2	2.19	0.43
1:D:142:HIS:HB3	1:D:145:LEU:HD12	2.01	0.43
1:B:143:PRO:HA	1:B:146:LEU:HD22	2.00	0.43
1:D:74:ARG:HB3	1:D:116:THR:HA	2.00	0.43
1:A:334:ARG:HD3	1:A:334:ARG:N	2.33	0.43
1:A:430:ARG:HD3	1:B:430:ARG:HA	2.01	0.42
1:B:331:ASN:OD1	1:B:333:HIS:HB2	2.18	0.42
1:C:334:ARG:N	1:C:334:ARG:HD3	2.33	0.42
1:C:370:GLU:O	1:C:374:HIS:HB2	2.19	0.42
1:D:419:PRO:HB2	1:D:422:GLY:CA	2.49	0.42
1:A:211:ALA:HB2	1:A:234:PHE:O	2.19	0.42
1:B:91:ILE:CG2	1:B:96:ILE:HB	2.49	0.42
1:A:299:GLY:HA2	2:A:432:NAD:O4D	2.18	0.42
1:B:373:THR:O	1:B:375:PRO:HD3	2.19	0.42
1:A:51:GLY:HA3	1:A:75:TRP:CZ3	2.55	0.42
1:A:401:LEU:HD11	1:B:249:LEU:HD12	2.00	0.42
1:B:57:VAL:O	1:B:61:VAL:HG23	2.20	0.42
1:B:386:PRO:HG2	1:B:389:LEU:CD1	2.49	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:265:CYS:HA	1:C:271:PHE:CE2	2.54	0.42
1:B:334:ARG:N	1:B:334:ARG:CD	2.83	0.42
1:D:142:HIS:N	1:D:143:PRO:CD	2.82	0.42
1:D:93:LYS:O	1:D:93:LYS:HG2	2.19	0.42
1:D:126:MET:CE	1:D:372:TRP:HE3	2.32	0.42
1:B:189:ASP:O	1:B:352:HIS:CE1	2.73	0.42
1:B:321:LYS:HG2	1:B:324:VAL:HB	2.01	0.42
1:C:6:TYR:C	1:C:6:TYR:CD1	2.93	0.42
1:C:81:PHE:O	1:C:102:LYS:HG3	2.20	0.42
1:C:246:ILE:O	1:C:250:GLN:HG3	2.20	0.42
1:A:23:ILE:HG23	1:C:326:ARG:NH1	2.35	0.42
1:A:66:LEU:O	1:A:71:ALA:HB3	2.19	0.42
1:A:345:ASN:O	1:A:349:ALA:HB3	2.20	0.42
1:B:126:MET:HE3	1:B:372:TRP:CA	2.50	0.42
1:A:152:ILE:HD11	1:A:174:VAL:HG13	2.01	0.42
1:B:345:ASN:O	1:B:349:ALA:HB3	2.20	0.42
1:D:8:VAL:HG12	1:D:10:ASP:H	1.85	0.42
1:D:55:MET:O	1:D:83:THR:HA	2.20	0.42
1:D:178:ASN:OD1	1:D:180:ASN:HB3	2.20	0.42
1:A:53:LEU:O	1:A:54:HIS:C	2.57	0.41
1:A:142:HIS:HA	1:A:144:GLN:OE1	2.20	0.41
1:A:166:MET:HE3	1:A:172:LEU:HD23	2.02	0.41
1:B:224:GLY:N	1:B:274:THR:HG21	2.34	0.41
1:B:429:TYR:CE2	1:B:431:TYR:HA	2.54	0.41
1:C:185:LYS:HD3	1:C:185:LYS:C	2.40	0.41
1:C:345:ASN:O	1:C:349:ALA:HB3	2.20	0.41
1:D:321:LYS:HD3	1:D:324:VAL:CG2	2.45	0.41
1:A:65:THR:O	1:A:69:LEU:HD13	2.21	0.41
1:A:224:GLY:N	1:A:274:THR:CG2	2.79	0.41
1:C:131:GLY:O	1:C:133:ASP:N	2.54	0.41
1:D:48:ARG:HA	1:D:72:GLU:HB2	2.03	0.41
1:B:23:ILE:HD13	1:D:320:ILE:HD13	2.02	0.41
1:C:178:ASN:OD1	1:C:180:ASN:HB3	2.20	0.41
1:D:7:LYS:HG3	1:D:101:TRP:CZ3	2.54	0.41
1:D:386:PRO:HD2	1:D:389:LEU:HD12	2.02	0.41
1:D:386:PRO:HB2	1:D:389:LEU:HG	2.02	0.41
1:B:174:VAL:HA	1:B:175:PRO:HD3	1.87	0.41
1:A:91:ILE:HD13	1:A:91:ILE:HA	1.95	0.41
1:B:352:HIS:HA	1:B:353:PRO:HD3	1.86	0.41
1:C:224:GLY:N	1:C:274:THR:HG21	2.35	0.41
1:B:4:LEU:HD22	1:B:5:PRO:HD2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:96:ILE:HA	1:B:97:PRO:HD3	1.86	0.41
1:B:399:GLY:C	1:B:402:ASN:H	2.24	0.41
1:C:7:LYS:HD3	1:C:111:TRP:CZ3	2.56	0.41
1:A:196:GLU:HB3	1:C:203:LYS:NZ	2.35	0.41
1:B:118:HIS:HA	1:B:123:PRO:HA	2.02	0.41
1:B:345:ASN:H	1:B:345:ASN:ND2	2.05	0.41
1:C:99:PHE:O	1:C:100:ALA:HB2	2.21	0.41
1:D:127:ILE:HG21	1:D:135:THR:HG23	2.02	0.41
1:A:277:CYS:O	1:A:304:GLU:HG2	2.20	0.41
1:B:4:LEU:CD2	1:B:5:PRO:HD2	2.49	0.41
1:B:26:ASN:HD22	1:B:26:ASN:HA	1.57	0.41
1:C:259:THR:HG22	1:D:404:LYS:HD2	2.02	0.41
1:D:62:LEU:O	1:D:65:THR:HB	2.20	0.41
1:A:125:ASN:HA	1:A:149:ILE:HA	2.02	0.41
1:A:156:THR:O	1:A:160:VAL:HG23	2.21	0.41
1:C:10:ASP:O	1:C:13:LEU:HB2	2.21	0.41
1:C:183:VAL:HG11	1:D:246:ILE:HD13	2.03	0.41
1:C:275:THR:HG21	1:C:277:CYS:HB3	1.98	0.41
1:D:26:ASN:O	1:D:400:LYS:HE2	2.21	0.41
1:D:143:PRO:CA	1:D:146:LEU:HD13	2.32	0.41
1:D:157:THR:HG22	1:D:161:HIS:CE1	2.55	0.41
1:D:301:PHE:CD1	1:D:343:LEU:HG	2.55	0.41
1:D:363:ASN:O	1:D:366:MET:HB2	2.20	0.41
1:A:57:VAL:O	1:A:61:VAL:HG23	2.20	0.41
1:A:117:LEU:HD11	1:A:137:LEU:CD2	2.52	0.41
1:B:361:PHE:O	1:B:364:GLN:HB2	2.21	0.41
1:C:334:ARG:O	1:C:335:ILE:HD13	2.21	0.41
1:D:18:ARG:HG3	1:D:22:ASP:OD2	2.21	0.41
1:D:179:VAL:HG13	1:D:363:ASN:HB3	2.02	0.41
1:D:185:LYS:HD3	1:D:185:LYS:C	2.41	0.41
1:B:187:LYS:O	1:B:191:LEU:HB3	2.22	0.40
1:B:52:CYS:SG	1:B:78:CYS:HB3	2.61	0.40
1:B:334:ARG:HD3	1:B:334:ARG:H	1.84	0.40
1:C:398:LEU:HG	1:C:403:VAL:HG11	2.04	0.40
1:D:54:HIS:NE2	1:D:78:CYS:SG	2.95	0.40
1:A:14:ALA:CB	1:A:93:LYS:HD2	2.37	0.40
1:B:357:MET:HE3	1:B:357:MET:HA	2.04	0.40
1:D:379:PRO:HD2	1:D:383:HIS:HE1	1.87	0.40
1:C:275:THR:HB	1:C:304:GLU:OE1	2.21	0.40
1:A:10:ASP:HB3	1:A:13:LEU:CD2	2.52	0.40
1:A:385:LEU:HG	1:A:389:LEU:HB2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:55:MET:HG2	1:B:88:ALA:CB	2.51	0.40
1:B:346:LEU:HD23	1:B:351:GLY:HA3	2.04	0.40
1:C:26:ASN:HD22	1:C:26:ASN:HA	1.54	0.40
1:C:174:VAL:HA	1:C:175:PRO:HD3	1.92	0.40
1:C:352:HIS:HB3	1:C:356:VAL:HG21	2.04	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	426/431 (99%)	396 (93%)	29 (7%)	1 (0%)	44	73
1	B	426/431 (99%)	397 (93%)	25 (6%)	4 (1%)	14	42
1	C	426/431 (99%)	394 (92%)	28 (7%)	4 (1%)	14	42
1	D	426/431 (99%)	399 (94%)	26 (6%)	1 (0%)	44	73
All	All	1704/1724 (99%)	1586 (93%)	108 (6%)	10 (1%)	22	51

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	302	ASP
1	B	132	GLY
1	B	133	ASP
1	B	302	ASP
1	C	132	GLY
1	C	302	ASP
1	D	302	ASP
1	B	6	TYR
1	C	6	TYR
1	C	133	ASP

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	351/353 (99%)	318 (91%)	33 (9%)	7	23
1	B	351/353 (99%)	321 (92%)	30 (8%)	8	27
1	C	351/353 (99%)	326 (93%)	25 (7%)	12	35
1	D	351/353 (99%)	322 (92%)	29 (8%)	9	28
All	All	1404/1412 (99%)	1287 (92%)	117 (8%)	9	28

All (117) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	LEU
1	A	26	ASN
1	A	28	MET
1	A	42	LYS
1	A	74	ARG
1	A	77	SER
1	A	83	THR
1	A	119	PHE
1	A	138	ILE
1	A	144	GLN
1	A	147	SER
1	A	172	LEU
1	A	174	VAL
1	A	179	VAL
1	A	183	VAL
1	A	191	LEU
1	A	209	MET
1	A	259	THR
1	A	267	GLU
1	A	282	LEU
1	A	301	PHE
1	A	308	LYS
1	A	334	ARG
1	A	337	LEU

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Mol	Chain	Res	Type
1	A	345	ASN
1	A	363	ASN
1	A	364	GLN
1	A	368	GLN
1	A	370	GLU
1	A	382	VAL
1	A	393	VAL
1	A	406	THR
1	A	418	MET
1	B	13	LEU
1	B	22	ASP
1	B	26	ASN
1	B	53	LEU
1	B	54	HIS
1	B	83	THR
1	B	98	VAL
1	B	134	LEU
1	B	144	GLN
1	B	146	LEU
1	B	147	SER
1	B	172	LEU
1	B	179	VAL
1	B	191	LEU
1	B	234	PHE
1	B	254	GLU
1	B	259	THR
1	B	267	GLU
1	B	282	LEU
1	B	308	LYS
1	B	334	ARG
1	B	345	ASN
1	B	368	GLN
1	B	370	GLU
1	B	382	VAL
1	B	393	VAL
1	B	398	LEU
1	B	406	THR
1	B	410	GLU
1	B	421	ASN
1	C	13	LEU
1	C	26	ASN
1	C	53	LEU

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Mol	Chain	Res	Type
1	C	54	HIS
1	C	83	THR
1	C	134	LEU
1	C	144	GLN
1	C	172	LEU
1	C	191	LEU
1	C	209	MET
1	C	234	PHE
1	C	254	GLU
1	C	259	THR
1	C	282	LEU
1	C	308	LYS
1	C	334	ARG
1	C	345	ASN
1	C	356	VAL
1	C	370	GLU
1	C	382	VAL
1	C	393	VAL
1	C	398	LEU
1	C	406	THR
1	C	410	GLU
1	C	421	ASN
1	D	13	LEU
1	D	26	ASN
1	D	28	MET
1	D	77	SER
1	D	83	THR
1	D	119	PHE
1	D	138	ILE
1	D	144	GLN
1	D	147	SER
1	D	172	LEU
1	D	174	VAL
1	D	183	VAL
1	D	191	LEU
1	D	209	MET
1	D	259	THR
1	D	282	LEU
1	D	301	PHE
1	D	308	LYS
1	D	321	LYS
1	D	334	ARG

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Mol	Chain	Res	Type
1	D	337	LEU
1	D	345	ASN
1	D	363	ASN
1	D	364	GLN
1	D	368	GLN
1	D	370	GLU
1	D	382	VAL
1	D	406	THR
1	D	418	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (37) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	54	HIS
1	A	115	GLN
1	A	161	HIS
1	A	180	ASN
1	A	288	GLN
1	A	300	HIS
1	A	311	ASN
1	A	352	HIS
1	A	359	ASN
1	A	363	ASN
1	A	364	GLN
1	B	26	ASN
1	B	136	ASN
1	B	162	ASN
1	B	169	ASN
1	B	180	ASN
1	B	288	GLN
1	B	300	HIS
1	B	311	ASN
1	B	352	HIS
1	B	368	GLN
1	C	136	ASN
1	C	162	ASN
1	C	169	ASN
1	C	180	ASN
1	C	288	GLN
1	C	300	HIS
1	C	311	ASN
1	C	352	HIS

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Mol	Chain	Res	Type
1	D	115	GLN
1	D	161	HIS
1	D	180	ASN
1	D	288	GLN
1	D	300	HIS
1	D	311	ASN
1	D	359	ASN
1	D	364	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAD	D	432	-	42,48,48	1.67	6 (14%)	50,73,73	1.63	11 (22%)
2	NAD	A	432	-	42,48,48	1.40	5 (11%)	50,73,73	1.62	9 (18%)
2	NAD	C	432	-	42,48,48	1.71	3 (7%)	50,73,73	2.07	16 (32%)
2	NAD	B	432	-	42,48,48	1.61	5 (11%)	50,73,73	1.80	9 (18%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAD	D	432	-	-	6/26/62/62	0/5/5/5
2	NAD	A	432	-	-	6/26/62/62	0/5/5/5
2	NAD	C	432	-	-	6/26/62/62	0/5/5/5
2	NAD	B	432	-	-	4/26/62/62	0/5/5/5

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	432	NAD	C2N-N1N	8.65	1.44	1.35
2	D	432	NAD	C2N-N1N	7.42	1.43	1.35
2	B	432	NAD	C2N-N1N	6.79	1.42	1.35
2	A	432	NAD	C2N-N1N	5.31	1.40	1.35
2	B	432	NAD	C3N-C7N	3.44	1.55	1.50
2	A	432	NAD	O4B-C1B	3.20	1.45	1.40
2	D	432	NAD	O4B-C1B	3.08	1.44	1.40
2	C	432	NAD	C3N-C7N	3.08	1.55	1.50
2	D	432	NAD	PA-O3	-2.91	1.56	1.59
2	B	432	NAD	O4B-C1B	2.91	1.44	1.40
2	A	432	NAD	C6N-N1N	2.82	1.41	1.35
2	D	432	NAD	C3N-C7N	2.60	1.54	1.50
2	B	432	NAD	C6N-N1N	2.54	1.41	1.35
2	C	432	NAD	C6N-N1N	2.40	1.40	1.35
2	A	432	NAD	C3N-C7N	2.36	1.54	1.50
2	D	432	NAD	C6N-N1N	2.32	1.40	1.35
2	A	432	NAD	C5A-N7A	-2.08	1.32	1.39
2	D	432	NAD	C3D-C4D	-2.07	1.47	1.53
2	B	432	NAD	C1B-N9A	-2.03	1.44	1.49

All (45) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	432	NAD	C4B-O4B-C1B	-5.91	104.52	109.92
2	B	432	NAD	C4B-O4B-C1B	-5.77	104.64	109.92
2	D	432	NAD	N3A-C2A-N1A	-5.31	121.46	128.67
2	C	432	NAD	N3A-C2A-N1A	-5.24	121.56	128.67
2	A	432	NAD	N3A-C2A-N1A	-4.86	122.08	128.67
2	B	432	NAD	N3A-C2A-N1A	-4.35	122.77	128.67
2	A	432	NAD	C4A-C5A-N7A	3.98	113.54	109.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	432	NAD	C4A-C5A-N7A	3.88	113.44	109.34
2	C	432	NAD	C4A-C5A-N7A	3.75	113.30	109.34
2	C	432	NAD	O4D-C4D-C5D	3.68	121.13	109.33
2	B	432	NAD	O2D-C2D-C3D	-3.55	100.44	111.82
2	C	432	NAD	O4B-C1B-N9A	3.51	113.40	108.75
2	A	432	NAD	O7N-C7N-C3N	3.49	123.86	119.60
2	D	432	NAD	O7N-C7N-C3N	3.32	123.66	119.60
2	C	432	NAD	O7N-C7N-C3N	3.27	123.59	119.60
2	B	432	NAD	C6N-N1N-C2N	-3.21	119.15	121.88
2	B	432	NAD	O4D-C4D-C5D	3.10	119.25	109.33
2	C	432	NAD	O2D-C2D-C3D	-3.08	101.94	111.82
2	D	432	NAD	O2A-PA-O3	2.94	115.22	107.27
2	D	432	NAD	C4A-C5A-N7A	2.72	112.22	109.34
2	D	432	NAD	C6N-N1N-C2N	-2.67	119.60	121.88
2	A	432	NAD	C5N-C4N-C3N	2.63	122.95	120.36
2	C	432	NAD	C5B-C4B-C3B	-2.56	106.00	115.21
2	C	432	NAD	C5A-C6A-N1A	-2.54	114.18	120.23
2	D	432	NAD	O3-PA-O1A	-2.51	103.14	110.70
2	C	432	NAD	C1B-N9A-C4A	-2.50	122.26	126.64
2	A	432	NAD	C6A-C5A-C4A	2.45	122.66	117.90
2	A	432	NAD	C4D-O4D-C1D	-2.44	107.69	109.92
2	C	432	NAD	C6A-C5A-C4A	2.42	122.60	117.90
2	A	432	NAD	O4B-C4B-C3B	2.40	109.91	105.15
2	C	432	NAD	C5N-C6N-N1N	-2.33	117.21	120.38
2	D	432	NAD	O2D-C2D-C3D	-2.26	104.57	111.82
2	A	432	NAD	O2A-PA-O3	2.25	113.35	107.27
2	B	432	NAD	C1B-N9A-C4A	-2.23	122.73	126.64
2	D	432	NAD	C5D-C4D-C3D	-2.22	107.22	115.21
2	B	432	NAD	C6N-N1N-C1D	2.22	124.08	119.73
2	D	432	NAD	C4D-O4D-C1D	-2.21	107.90	109.92
2	B	432	NAD	C6A-C5A-C4A	2.18	122.14	117.90
2	C	432	NAD	O3D-C3D-C4D	-2.16	104.87	111.08
2	D	432	NAD	C6A-C5A-C4A	2.13	122.04	117.90
2	C	432	NAD	O2A-PA-O3	2.12	113.02	107.27
2	D	432	NAD	O4B-C1B-N9A	2.09	111.51	108.75
2	C	432	NAD	C5D-C4D-C3D	-2.05	107.82	115.21
2	A	432	NAD	C4B-O4B-C1B	-2.03	108.06	109.92
2	C	432	NAD	N6A-C6A-N1A	2.03	122.66	118.33

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	432	NAD	O4D-C1D-N1N-C2N
2	A	432	NAD	O4D-C1D-N1N-C6N
2	A	432	NAD	C2D-C1D-N1N-C2N
2	A	432	NAD	C2D-C1D-N1N-C6N
2	B	432	NAD	O4D-C1D-N1N-C2N
2	B	432	NAD	O4D-C1D-N1N-C6N
2	B	432	NAD	C2D-C1D-N1N-C2N
2	C	432	NAD	O4D-C1D-N1N-C2N
2	C	432	NAD	O4D-C1D-N1N-C6N
2	C	432	NAD	C2D-C1D-N1N-C2N
2	C	432	NAD	C2D-C1D-N1N-C6N
2	D	432	NAD	O4D-C1D-N1N-C2N
2	D	432	NAD	O4D-C1D-N1N-C6N
2	D	432	NAD	C2D-C1D-N1N-C2N
2	D	432	NAD	C2D-C1D-N1N-C6N
2	D	432	NAD	O4B-C4B-C5B-O5B
2	A	432	NAD	O4B-C4B-C5B-O5B
2	D	432	NAD	C3B-C4B-C5B-O5B
2	A	432	NAD	C3B-C4B-C5B-O5B
2	C	432	NAD	O4B-C4B-C5B-O5B
2	B	432	NAD	C2D-C1D-N1N-C6N
2	C	432	NAD	C3B-C4B-C5B-O5B

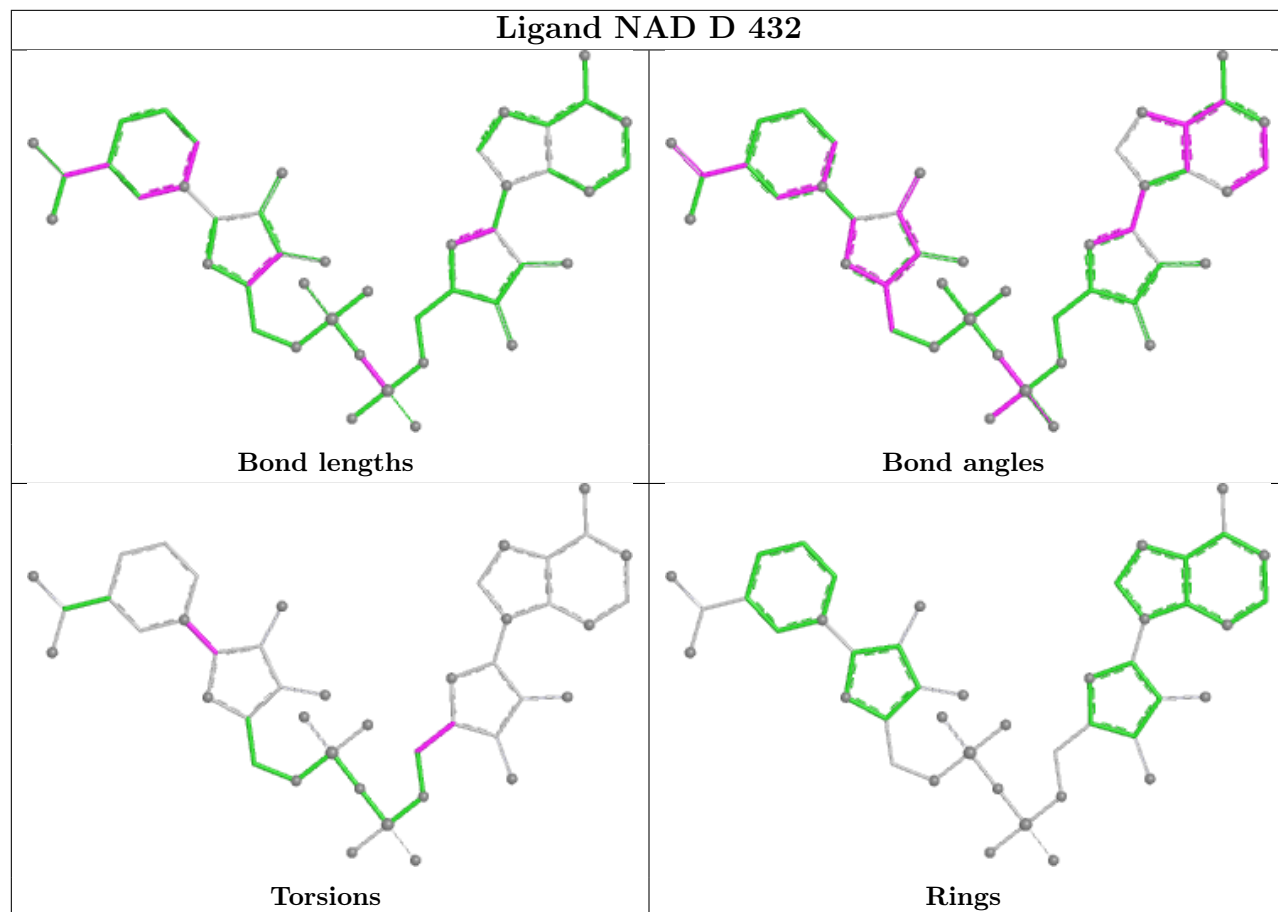
There are no ring outliers.

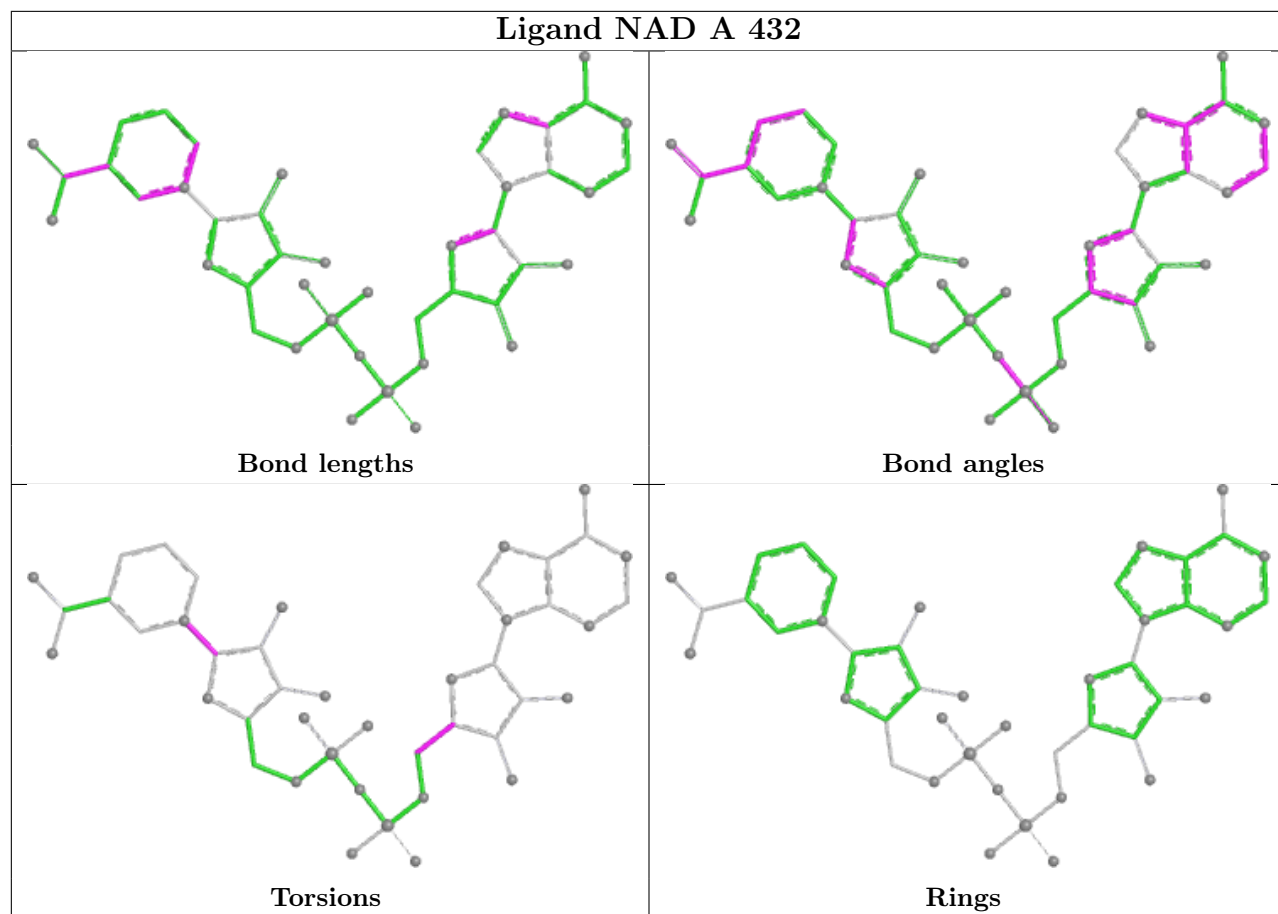
4 monomers are involved in 13 short contacts:

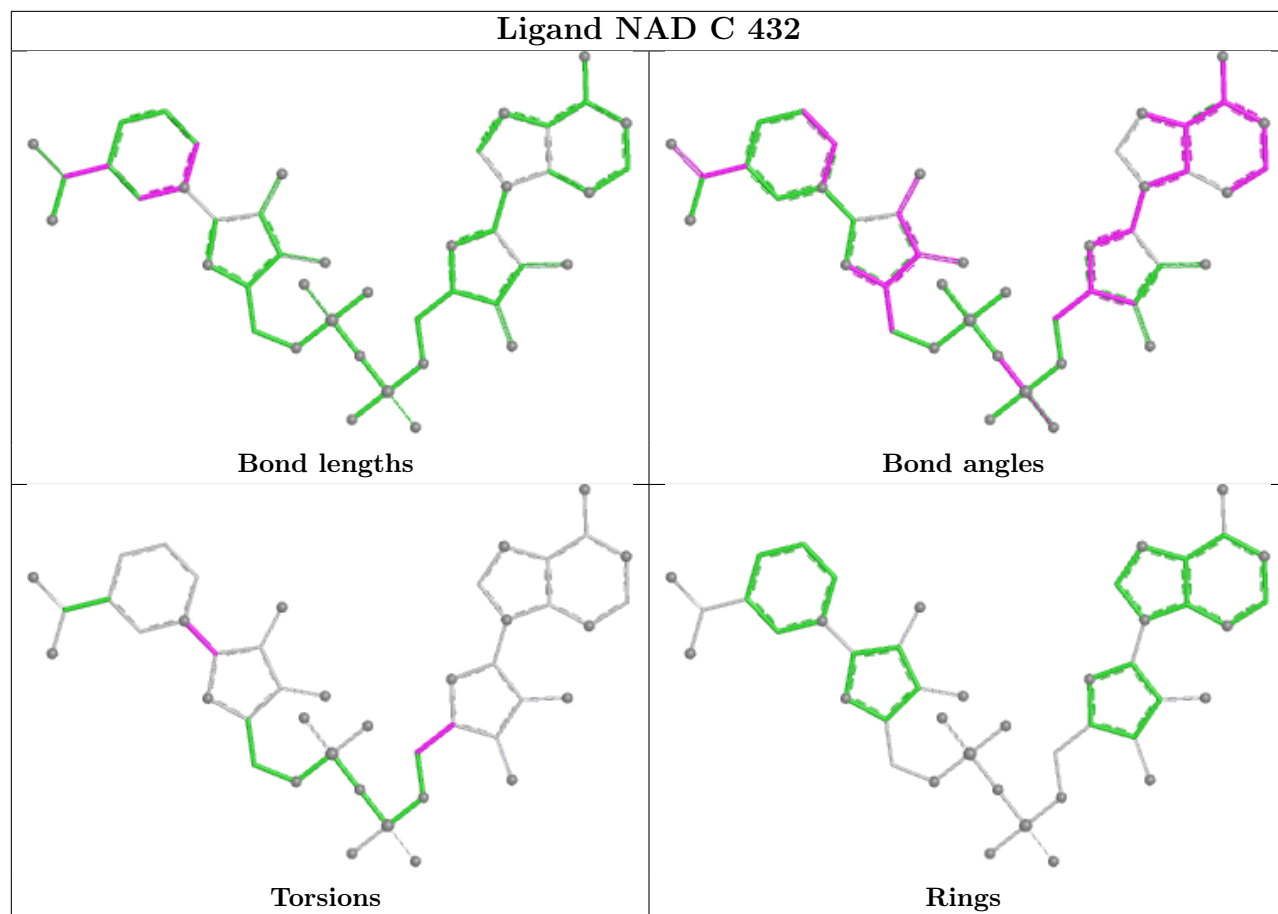
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	432	NAD	2	0
2	A	432	NAD	3	0
2	C	432	NAD	4	0
2	B	432	NAD	4	0

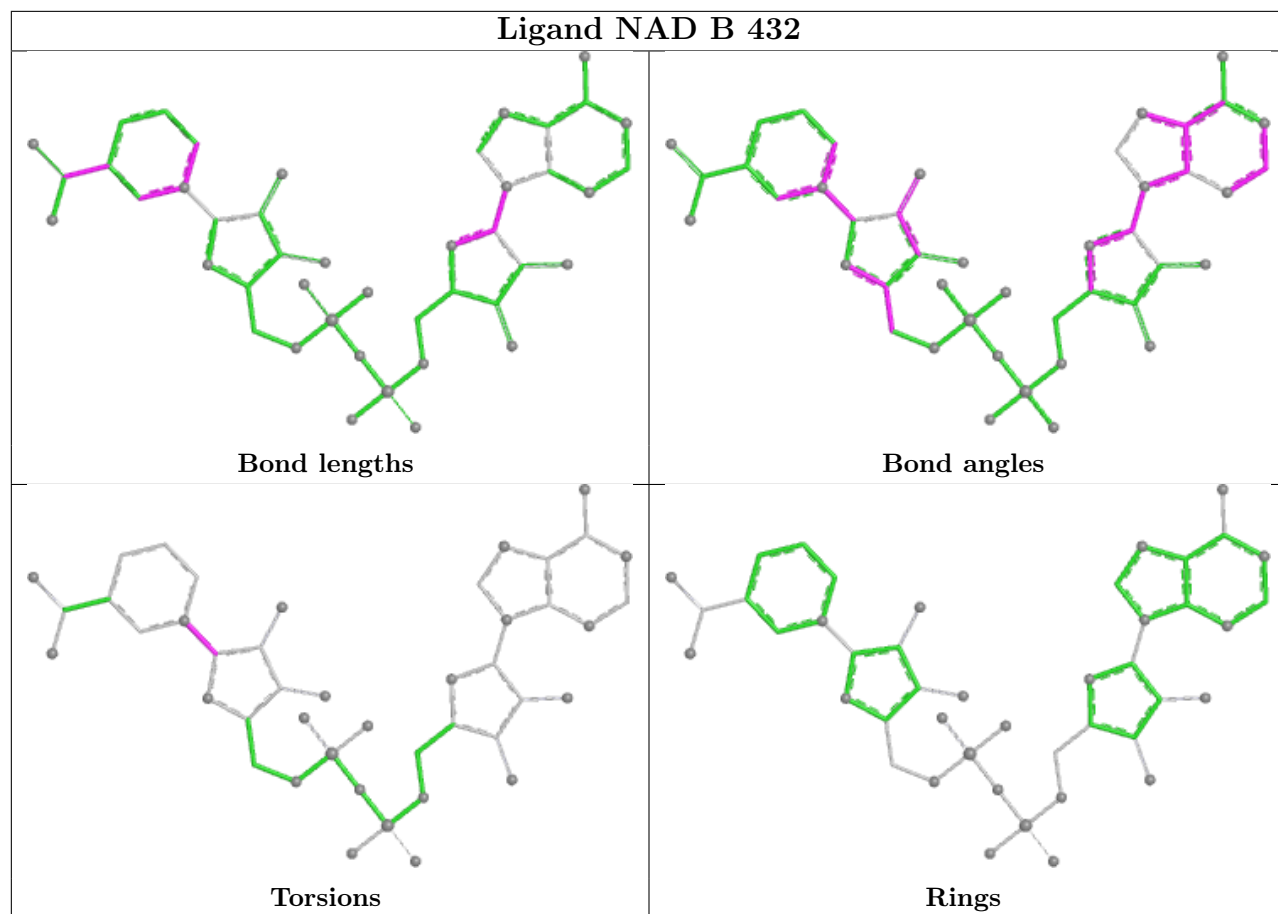
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

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.