Full wwPDB X-ray Structure Validation Report (i)

Jun 11, 2024 – 07:30 PM EDT

PDB ID	:	1T90
Title	:	Crystal structure of methylmalonate semialdehyde dehydrogenase from Bacillus subtilis
Authors	:	Dubourg, H.; Didierjean, C.; Stines-Chaumeil, C.; Talfournier, F.; Branlant, G.; Aubry, A.; Corbier, C.
Deposited on	:	2004-05-14
Resolution	:	2.50 Å(reported)

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

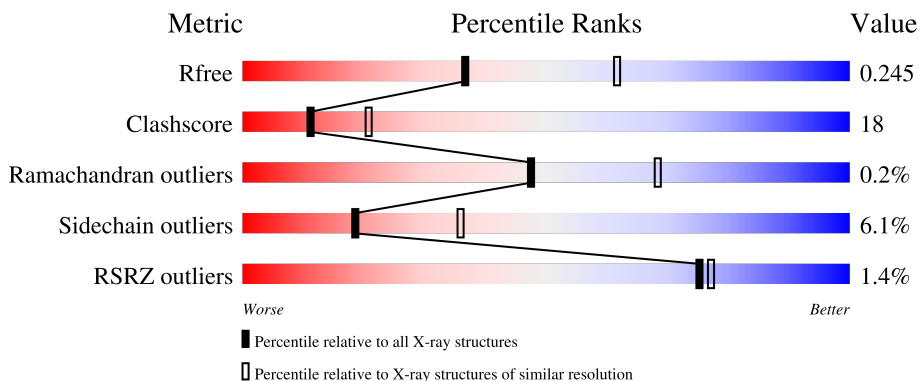|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1   Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

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

Metric	Percentile Ranks	Value
Rfree		0.245
Clashscore		18
Ramachandran outliers		0.2%
Sidechain outliers		6.1%
RSRZ outliers		1.4%

Worse / *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	486	63% / 32% / ·
1	B	486	65% / 32% / ·
1	C	486	68% / 28% / ·
1	D	486	67% / 31% / ·

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 16006 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 Probable methylmalonate-semialdehyde dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	484	Total	C	N	O	S	0	0	0
			3741	2390	626	708	17			
1	B	484	Total	C	N	O	S	0	0	0
			3741	2390	626	708	17			
1	C	484	Total	C	N	O	S	0	0	0
			3741	2390	626	708	17			
1	D	484	Total	C	N	O	S	0	0	0
			3741	2390	626	708	17			

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$).

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

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

• Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	202	Total 202	O 202	0	0
3	B	229	Total 229	O 229	0	0
3	C	246	Total 246	O 246	0	0
3	D	189	Total 189	O 189	0	0

3 Residue-property plots ⓘ

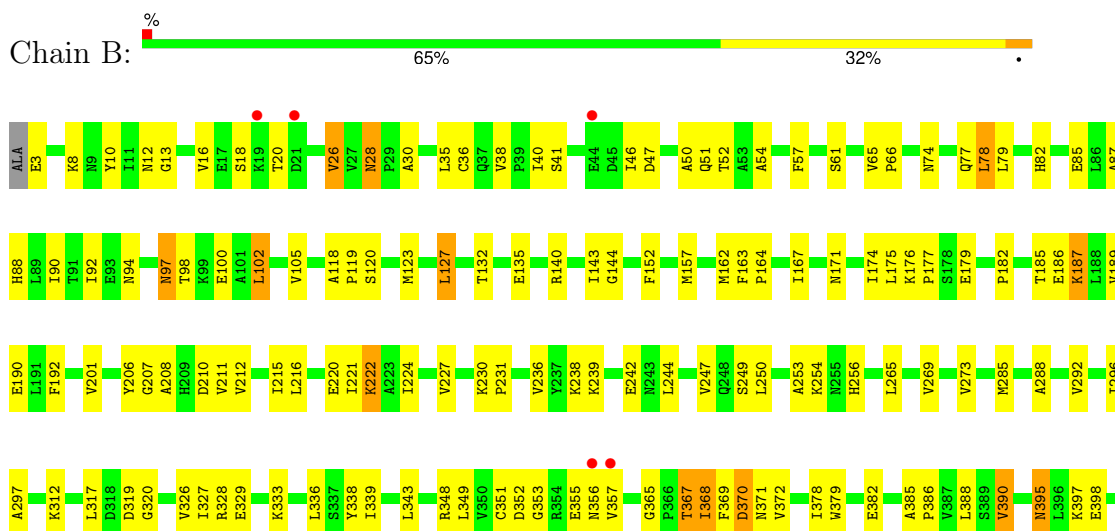These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

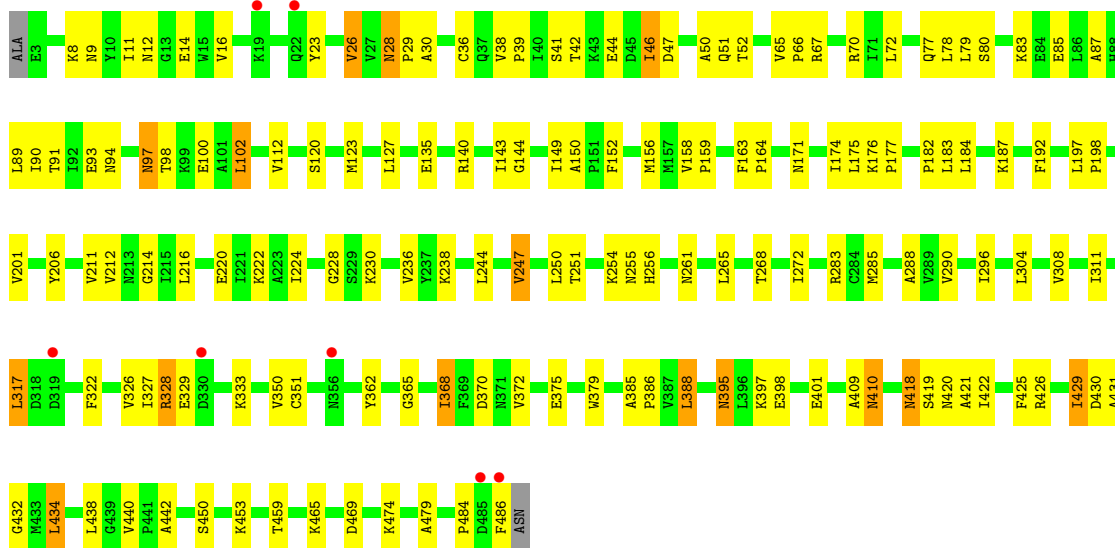- Molecule 1: Probable methylmalonate-semialdehyde dehydrogenase

Chain A:

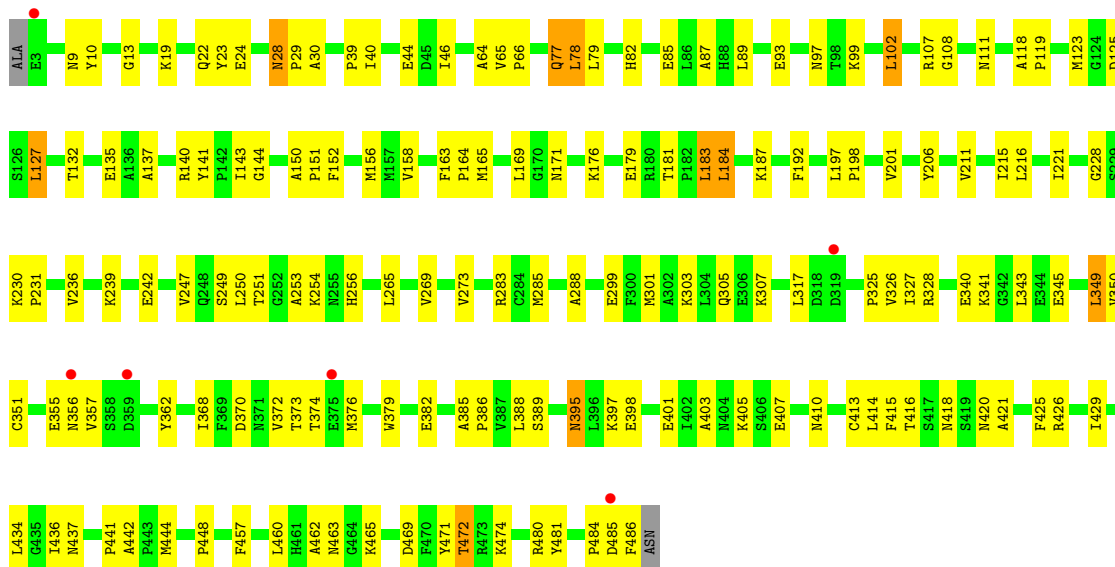- Molecule 1: Probable methylmalonate-semialdehyde dehydrogenase

Chain B:

E401 A409 N410 N418 S419 N420 A421 R426 L434 L438 G439 V440 P441 M444 P448 K453 F457 K465 D469 K474 K475 V476 V477 T478 A479 R480 Y481 D485 F486 ASN

• Molecule 1: Probable methylmalonate-semialdehyde dehydrogenase

%

Chain C: 68%   28%   •

ALA E3 K8 N9 Y10 I11 N12 G13 E14 W15 V16 K19 Q22 Y23 V26 V27 N28 P29 A30 C36 Q37 V38 P39 I40 S41 T42 K43 E44 D45 I46 D47 A50 Q51 T52 V65 P66 R67 R70 I71 L72 Q77 L78 L79 S80 K83 E84 E85 L86 A87 H88

L89 I90 T91 I92 E93 N94 N97 T98 K99 E100 A101 L102 V112 S120 M123 L127 E135 R140 I143 G144 I149 A150 P151 F152 M156 V158 P159 F163 P164 N171 I174 L175 K176 P177 P182 L183 L184 K187 F192 L197 P198

V201 Y206 V211 V212 N213 G214 I215 L216 E220 I221 K222 A223 I224 G228 S229 K230 V236 Y237 K238 L244 V247 L250 T251 K254 N255 H256 N261 L265 T268 I272 R283 C284 M285 A288 V289 V290 I296 L304 V308 I311

L317 D318 D319 F322 V326 I327 R328 E329 D330 K333 V350 C351 M356 Y362 G365 I368 F369 D370 N371 V372 E375 W379 A385 P386 V387 L388 N395 L396 K397 E398 E401 A409 N410 N418 S419 N420 A421 I422 F425 R426 I429 D430 A431

G432 M433 L434 L438 G439 V440 P441 A442 S450 K453 T459 K465 D469 K474 A479 P484 D485 F486 ASN

• Molecule 1: Probable methylmalonate-semialdehyde dehydrogenase

%

Chain D: 67%   31%   •

ALA E3 N9 Y10 G13 K19 Q22 Y23 E24 N28 P29 A30 P39 I40 E44 D45 I46 A64 V65 P66 Q77 L78 L79 H82 E85 L86 A87 H88 L89 E93 N97 T98 K99 L102 R107 G108 N111 A118 P119 M123 G124 D125

S126 L127 T132 E135 A136 A137 R140 Y141 P142 I143 G144 A150 P151 F152 M156 M157 V158 F163 P164 M165 L169 G170 N171 K176 E179 R180 T181 P182 L183 L184 K187 F192 L197 P198 V201 Y206 V211 I215 L216 I221 G228 S229

K230 P231 V236 K239 E242 V247 Q248 S249 L250 T251 G252 A253 K254 N255 H256 L265 V269 V273 R283 C284 M285 A288 E299 F300 M301 A302 K303 L304 Q305 E306 K307 L317 D318 D319 P325 V326 I327 R328 E340 K341 G342 L343 E344 E345 L349 V350

C351 E355 N356 V357 S358 D359 Y362 I368 F369 D370 N371 V372 T373 T374 E375 M376 W379 E382 A385 P386 V387 L388 S389 N395 L396 K397 E398 E401 I402 A403 N404 K405 S406 E407 N410 C413 L414 F415 T416 S417 N418 S419 N420 A421 F425 R426 I429

L434 G435 I436 N437 P441 A442 P443 M444 P448 F457 L460 H461 A462 N463 G464 K465 D469 F470 Y471 T472 R473 K474 R480 Y481 P484 D485 F486 ASN

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	195.20Å 192.50Å 83.50Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.50 19.77 – 2.50	Depositor EDS
% Data completeness (in resolution range)	(Not available) (20.00-2.50) 99.6 (19.77-2.50)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.78 (at 2.50Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.211 , 0.250 0.205 , 0.245	Depositor DCC
R_{free} test set	5418 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	27.0	Xtriage
Anisotropy	0.431	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 46.5	EDS
L-test for twinning[2]	$< \lvert L \rvert > = 0.44$, $< L^2 > = 0.27$	Xtriage
Estimated twinning fraction	0.000 for k,h,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	16006	wwPDB-VP
Average B, all atoms (Å^2)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 52.87 % 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 4.5701e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< \lvert L \rvert >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	0.36	0/3818	0.59	0/5171
1	B	0.37	0/3818	0.61	0/5171
1	C	0.36	0/3818	0.60	0/5171
1	D	0.35	0/3818	0.58	0/5171
All	All	0.36	0/15272	0.60	0/20684

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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	3741	0	3730	165	0
1	B	3741	0	3730	147	0
1	C	3741	0	3730	141	0
1	D	3741	0	3730	136	0
2	A	44	0	26	0	0
2	B	44	0	26	1	0
2	C	44	0	26	2	0
2	D	44	0	26	1	0
3	A	202	0	0	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	229	0	0	8	0
3	C	246	0	0	9	0
3	D	189	0	0	7	0
All	All	16006	0	15024	540	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 18.

All (540) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:418:ASN:HD22	1:B:421:ALA:H	1.03	1.00
1:B:77:GLN:HB2	1:D:77:GLN:HE21	1.29	0.96
1:C:143:ILE:H	1:C:171:ASN:HD21	1.14	0.93
1:B:77:GLN:HG2	1:D:77:GLN:HG2	1.55	0.88
1:B:143:ILE:H	1:B:171:ASN:HD21	1.22	0.87
1:C:418:ASN:HD22	1:C:421:ALA:H	1.22	0.87
1:D:143:ILE:H	1:D:171:ASN:HD21	1.23	0.87
1:D:374:THR:HG21	1:D:405:LYS:HD3	1.55	0.87
1:B:77:GLN:HB2	1:D:77:GLN:NE2	1.88	0.86
1:A:374:THR:HG21	1:A:405:LYS:HD3	1.56	0.85
1:B:216:LEU:HD21	1:B:236:VAL:HG13	1.58	0.85
1:B:351:CYS:HB2	1:B:368:ILE:HG23	1.61	0.83
1:A:351:CYS:HB3	1:A:368:ILE:HG23	1.60	0.82
1:B:418:ASN:ND2	1:B:421:ALA:H	1.76	0.82
1:A:265:LEU:HD12	1:A:303:LYS:HD3	1.63	0.81
1:B:351:CYS:HB2	1:B:368:ILE:CG2	2.12	0.80
1:B:397:LYS:O	1:B:401:GLU:HG3	1.81	0.80
1:B:418:ASN:HD21	1:B:420:ASN:HB2	1.49	0.78
1:D:343:LEU:HD21	1:D:349:LEU:HB2	1.66	0.77
1:A:77:GLN:HG3	1:C:77:GLN:CD	2.06	0.76
1:D:93:GLU:OE2	1:D:183:LEU:HB2	1.85	0.76
1:B:167:ILE:HD12	1:B:201:VAL:HG12	1.68	0.76
1:B:97:ASN:ND2	1:B:100:GLU:H	1.83	0.76
1:B:143:ILE:H	1:B:171:ASN:ND2	1.83	0.76
1:A:143:ILE:H	1:A:171:ASN:HD21	1.35	0.74
1:C:143:ILE:H	1:C:171:ASN:ND2	1.86	0.73
1:A:265:LEU:HD23	1:A:296:ILE:HD11	1.71	0.72
1:D:46:ILE:HD11	1:D:211:VAL:HG13	1.71	0.72
1:A:216:LEU:HD21	1:A:236:VAL:HG13	1.71	0.72
1:C:28:ASN:C	1:C:28:ASN:HD22	1.92	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:397:LYS:O	1:D:401:GLU:HG3	1.91	0.71
1:A:123:MET:CE	1:C:465:LYS:HZ1	2.03	0.71
1:A:140:ARG:HH12	1:A:469:ASP:CG	1.94	0.71
1:B:216:LEU:HD13	1:B:239:LYS:HG2	1.71	0.71
1:A:123:MET:HE3	1:C:465:LYS:HZ1	1.54	0.71
1:A:353:GLY:HA3	1:A:367:THR:HG22	1.72	0.71
1:B:97:ASN:HD21	1:B:100:GLU:H	1.38	0.70
1:D:87:ALA:HB2	1:D:102:LEU:HD13	1.74	0.70
1:C:97:ASN:HD21	1:C:100:GLU:HG3	1.57	0.69
1:B:28:ASN:C	1:B:28:ASN:HD22	1.96	0.69
1:C:350:VAL:HB	1:C:368:ILE:HG13	1.73	0.69
1:B:97:ASN:C	1:B:97:ASN:HD22	1.96	0.68
1:C:418:ASN:ND2	1:C:421:ALA:H	1.90	0.68
1:C:28:ASN:ND2	1:C:30:ALA:H	1.91	0.68
1:A:31:THR:OG1	1:A:33:GLU:HG2	1.94	0.67
1:B:26:VAL:HG11	1:B:36:CYS:SG	2.35	0.67
1:B:465:LYS:NZ	1:D:123:MET:HE3	2.10	0.67
3:C:3523:HOH:O	1:D:474:LYS:HE2	1.95	0.66
1:B:329:GLU:HG3	1:B:333:LYS:HE3	1.77	0.66
1:D:216:LEU:HD13	1:D:239:LYS:HD3	1.77	0.66
1:C:350:VAL:CG2	1:C:370:ASP:HB2	2.26	0.66
1:D:301:MET:O	1:D:305:GLN:HG2	1.95	0.66
1:A:350:VAL:HG23	1:A:370:ASP:HB2	1.76	0.66
1:D:305:GLN:HE22	1:D:368:ILE:HD11	1.60	0.66
1:A:144:GLY:H	1:A:171:ASN:HD22	1.43	0.66
1:A:101:ALA:O	1:A:105:VAL:HG12	1.95	0.66
1:D:144:GLY:H	1:D:171:ASN:HD22	1.42	0.66
1:A:97:ASN:ND2	1:A:100:GLU:H	1.94	0.66
1:B:353:GLY:H	1:B:367:THR:HB	1.61	0.65
1:B:87:ALA:HB2	1:B:102:LEU:HD13	1.78	0.65
1:C:418:ASN:HD21	1:C:420:ASN:HB2	1.62	0.65
1:A:77:GLN:HG3	1:C:77:GLN:CG	2.26	0.65
1:D:484:PRO:HG2	1:D:486:PHE:CZ	2.32	0.65
1:B:163:PHE:O	1:B:167:ILE:HG12	1.96	0.65
1:D:327:ILE:O	1:D:328:ARG:HD3	1.96	0.65
1:C:429:ILE:HD13	1:C:430:ASP:N	2.12	0.64
1:A:385:ALA:HB1	1:A:386:PRO:HD2	1.80	0.64
1:A:254:LYS:HE2	1:A:379:TRP:O	1.98	0.64
1:C:350:VAL:HG23	1:C:370:ASP:HB2	1.78	0.64
1:A:94:ASN:HD22	1:A:96:LYS:H	1.44	0.64
1:A:351:CYS:CB	1:A:368:ILE:HG23	2.29	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:374:THR:HG21	1:A:405:LYS:CD	2.28	0.63
1:C:26:VAL:HA	3:C:3699:HOH:O	1.99	0.63
1:D:65:VAL:CG1	1:D:66:PRO:HD3	2.29	0.62
1:C:97:ASN:C	1:C:97:ASN:HD22	2.00	0.62
1:B:77:GLN:CB	1:D:77:GLN:HE21	2.09	0.62
1:C:255:ASN:HB2	3:C:3731:HOH:O	1.99	0.62
1:D:395:ASN:C	1:D:395:ASN:HD22	2.02	0.62
1:B:65:VAL:CG1	1:B:66:PRO:HD3	2.30	0.61
1:A:28:ASN:HD22	1:A:28:ASN:C	2.02	0.61
1:A:230:LYS:HD2	1:A:454:SER:HB3	1.82	0.61
1:A:481:TYR:HB3	1:C:420:ASN:HD22	1.65	0.61
1:D:87:ALA:CB	1:D:102:LEU:HD13	2.30	0.61
1:B:338:TYR:O	1:B:378:ILE:HD11	2.00	0.61
1:D:93:GLU:HG2	1:D:181:THR:HG22	1.80	0.61
1:B:465:LYS:HZ1	1:D:123:MET:HE3	1.65	0.61
1:A:132:THR:O	1:A:133:ASP:HB2	2.01	0.61
1:A:97:ASN:HD22	1:A:97:ASN:C	2.04	0.61
1:B:28:ASN:ND2	1:B:30:ALA:H	1.99	0.61
1:C:28:ASN:HD22	1:C:30:ALA:H	1.49	0.61
1:B:256:HIS:HE1	1:B:379:TRP:HE1	1.49	0.60
1:C:85:GLU:O	1:C:89:LEU:HD13	2.01	0.60
1:C:9:ASN:ND2	1:C:206:TYR:H	2.00	0.60
1:B:140:ARG:NH1	1:B:469:ASP:OD1	2.33	0.60
1:B:47:ASP:O	1:B:51:GLN:HG3	2.01	0.60
1:A:397:LYS:O	1:A:401:GLU:HG3	2.01	0.60
1:C:65:VAL:CG1	1:C:66:PRO:HD3	2.31	0.60
1:A:123:MET:HE3	1:C:465:LYS:NZ	2.16	0.59
1:C:395:ASN:C	1:C:395:ASN:HD22	2.06	0.59
1:A:87:ALA:CB	1:A:102:LEU:HD13	2.32	0.59
1:B:216:LEU:HD23	1:B:224:ILE:HD13	1.85	0.59
1:C:216:LEU:HD21	1:C:236:VAL:HG13	1.85	0.59
1:B:249:SER:HB2	1:B:457:PHE:HB2	1.85	0.59
1:B:222:LYS:HE3	3:B:2679:HOH:O	2.03	0.58
1:A:162:MET:HE2	1:A:225:SER:O	2.03	0.58
1:C:97:ASN:ND2	1:C:100:GLU:HG3	2.17	0.58
1:D:374:THR:HG21	1:D:405:LYS:CD	2.32	0.58
1:A:89:LEU:HD13	3:A:1639:HOH:O	2.03	0.58
1:B:418:ASN:HD22	1:B:421:ALA:N	1.87	0.58
1:B:426:ARG:HH22	1:D:135:GLU:CD	2.07	0.58
1:A:469:ASP:HA	1:A:472:THR:HG22	1.85	0.58
1:D:23:TYR:CE1	1:D:39:PRO:HB3	2.39	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:350:VAL:CG2	1:A:370:ASP:HB2	2.34	0.57
1:C:397:LYS:O	1:C:401:GLU:HG3	2.03	0.57
1:A:28:ASN:ND2	1:A:30:ALA:H	2.01	0.57
1:D:385:ALA:HB1	1:D:386:PRO:HD2	1.86	0.57
1:C:150:ALA:HB1	3:C:3513:HOH:O	2.04	0.57
1:C:426:ARG:HD2	1:D:141:TYR:OH	2.05	0.57
1:A:319:ASP:OD2	1:A:319:ASP:N	2.38	0.57
1:B:74:ASN:O	1:B:78:LEU:HD22	2.05	0.57
1:D:143:ILE:N	1:D:171:ASN:HD21	1.97	0.57
1:A:35:LEU:HD11	1:A:92:ILE:HG22	1.87	0.57
1:B:352:ASP:O	1:B:355:GLU:HG2	2.04	0.57
1:D:265:LEU:HD11	1:D:299:GLU:HG2	1.87	0.57
1:A:414:LEU:HG	1:A:416:THR:HG22	1.87	0.57
1:D:97:ASN:ND2	1:D:99:LYS:HB3	2.20	0.57
1:A:230:LYS:N	1:A:231:PRO:HD2	2.20	0.56
1:C:87:ALA:HB2	1:C:102:LEU:HD13	1.86	0.56
1:D:414:LEU:HG	1:D:416:THR:HG22	1.86	0.56
1:C:65:VAL:HG13	1:C:66:PRO:HD3	1.86	0.56
1:A:87:ALA:HB2	1:A:102:LEU:HD13	1.88	0.56
1:A:93:GLU:OE1	1:A:183:LEU:HB2	2.06	0.56
1:A:374:THR:HG23	1:A:379:TRP:CZ3	2.40	0.56
1:B:254:LYS:HE2	1:B:379:TRP:O	2.06	0.56
1:D:9:ASN:ND2	1:D:206:TYR:H	2.03	0.56
1:A:395:ASN:C	1:A:395:ASN:HD22	2.09	0.56
1:A:465:LYS:NZ	1:C:123:MET:HE3	2.21	0.56
1:C:285:MET:HB3	1:C:440:VAL:HG13	1.88	0.56
1:D:305:GLN:NE2	1:D:368:ILE:HD11	2.20	0.56
1:B:216:LEU:HD23	1:B:224:ILE:CD1	2.35	0.55
1:C:12:ASN:HB2	1:C:52:THR:HG21	1.87	0.55
1:A:220:GLU:HA	1:A:220:GLU:OE1	2.07	0.55
1:A:215:ILE:HA	1:A:221:ILE:HD12	1.88	0.55
1:B:35:LEU:HD11	1:B:92:ILE:HG22	1.86	0.55
1:C:350:VAL:HB	1:C:368:ILE:CG1	2.35	0.55
1:A:269:VAL:O	1:A:273:VAL:HG23	2.07	0.55
1:C:143:ILE:N	1:C:171:ASN:HD21	1.94	0.55
1:D:350:VAL:CG2	1:D:370:ASP:HB2	2.36	0.55
1:C:97:ASN:ND2	1:C:100:GLU:H	2.04	0.55
1:C:317:LEU:HD22	3:C:3579:HOH:O	2.06	0.55
1:A:357:VAL:HG11	1:A:363:PHE:O	2.07	0.55
1:C:254:LYS:HD3	1:C:288:ALA:CB	2.37	0.55
1:C:197:LEU:HD12	1:C:198:PRO:HD2	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:385:ALA:HB1	1:C:386:PRO:HD2	1.87	0.55
1:B:395:ASN:ND2	1:B:398:GLU:H	2.05	0.54
1:B:182:PRO:HB2	1:B:206:TYR:CE2	2.42	0.54
1:C:438:LEU:HD21	1:D:480:ARG:HB2	1.89	0.54
1:B:46:ILE:HD11	1:B:211:VAL:HG13	1.90	0.54
1:C:459:THR:HB	3:D:4640:HOH:O	2.07	0.54
1:A:28:ASN:HD22	1:A:30:ALA:H	1.56	0.54
1:A:374:THR:HG23	1:A:379:TRP:CH2	2.43	0.54
1:B:208:ALA:O	1:B:212:VAL:HG23	2.07	0.54
1:C:38:VAL:CG2	1:C:182:PRO:HG3	2.38	0.54
1:D:326:VAL:HG22	1:D:362:TYR:O	2.07	0.54
1:B:370:ASP:O	1:B:371:ASN:HB2	2.07	0.54
1:A:13:GLY:O	1:A:14:GLU:HG3	2.08	0.54
1:B:28:ASN:HD22	1:B:30:ALA:H	1.55	0.54
1:B:143:ILE:HG12	1:B:171:ASN:HD21	1.73	0.54
1:C:140:ARG:NH1	1:C:469:ASP:OD1	2.41	0.54
1:A:216:LEU:HD13	1:A:239:LYS:HD3	1.89	0.54
1:C:326:VAL:HG22	1:C:362:TYR:O	2.08	0.54
1:A:135:GLU:CD	1:C:426:ARG:HH22	2.11	0.53
1:A:254:LYS:HD3	1:A:288:ALA:CB	2.38	0.53
1:B:353:GLY:HA3	1:B:367:THR:HG22	1.90	0.53
1:C:91:THR:HG21	1:C:317:LEU:HD13	1.89	0.53
1:B:144:GLY:H	1:B:171:ASN:HD22	1.56	0.53
1:D:29:PRO:HB2	1:D:325:PRO:HG2	1.91	0.53
1:A:9:ASN:ND2	1:A:206:TYR:H	2.05	0.53
1:A:35:LEU:CD1	1:A:92:ILE:HG22	2.38	0.53
1:D:85:GLU:OE1	1:D:187:LYS:HE2	2.08	0.53
1:A:242:GLU:O	1:B:238:LYS:HE2	2.08	0.53
1:A:123:MET:CE	1:C:465:LYS:NZ	2.71	0.53
1:C:87:ALA:CB	1:C:102:LEU:HD13	2.39	0.53
1:D:249:SER:HB2	1:D:457:PHE:HB2	1.89	0.53
1:B:285:MET:SD	1:B:441:PRO:HG2	2.48	0.53
1:A:65:VAL:CG1	1:A:66:PRO:HD3	2.39	0.53
1:A:418:ASN:ND2	1:A:421:ALA:H	2.06	0.53
1:D:269:VAL:O	1:D:273:VAL:HG23	2.09	0.53
1:A:484:PRO:HG2	1:A:486:PHE:CZ	2.44	0.52
1:C:80:SER:O	1:C:83:LYS:HG3	2.09	0.52
1:A:65:VAL:HG12	1:A:66:PRO:HD3	1.91	0.52
1:B:269:VAL:O	1:B:273:VAL:HG23	2.09	0.52
1:C:429:ILE:HD13	1:C:430:ASP:H	1.75	0.52
1:D:253:ALA:O	1:D:382:GLU:HG3	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:88:HIS:O	1:A:92:ILE:HG12	2.10	0.52
1:D:24:GLU:HB2	1:D:40:ILE:HD11	1.91	0.52
1:A:46:ILE:HG21	1:A:214:GLY:HA3	1.91	0.52
1:D:107:ARG:HH12	1:D:444:MET:HA	1.73	0.52
1:A:372:VAL:HG21	1:A:389:SER:HB3	1.91	0.52
1:C:8:LYS:HB3	1:C:16:VAL:O	2.10	0.52
1:C:290:VAL:HG23	1:C:388:LEU:HD21	1.92	0.52
1:D:10:TYR:CZ	1:D:13:GLY:HA2	2.44	0.52
1:D:143:ILE:H	1:D:171:ASN:ND2	2.01	0.52
1:C:409:ALA:HB2	1:C:453:LYS:HE2	1.92	0.52
1:D:156:MET:HB2	1:D:184:LEU:CD1	2.40	0.52
1:C:395:ASN:ND2	1:C:398:GLU:H	2.08	0.52
1:D:179:GLU:CD	1:D:179:GLU:H	2.13	0.52
1:A:329:GLU:OE1	1:A:333:LYS:HE3	2.09	0.52
1:B:319:ASP:O	1:B:319:ASP:OD2	2.28	0.52
1:D:65:VAL:HG13	1:D:66:PRO:HD3	1.92	0.52
1:A:91:THR:HG23	1:A:96:LYS:O	2.09	0.51
1:B:65:VAL:HG13	1:B:66:PRO:HD3	1.92	0.51
1:B:26:VAL:CG1	1:B:36:CYS:SG	2.98	0.51
1:D:216:LEU:HD21	1:D:236:VAL:HG13	1.92	0.51
1:A:110:GLU:CG	1:C:70:ARG:HH22	2.24	0.51
1:B:123:MET:CE	1:D:465:LYS:NZ	2.74	0.51
1:C:47:ASP:O	1:C:51:GLN:HG3	2.09	0.51
1:B:88:HIS:O	1:B:92:ILE:HG12	2.09	0.51
1:B:102:LEU:O	1:B:105:VAL:HG22	2.10	0.51
1:A:98:THR:HB	3:A:1548:HOH:O	2.10	0.51
1:A:429:ILE:HG21	1:A:434:LEU:HD11	1.92	0.51
1:C:479:ALA:CB	1:D:436:ILE:HB	2.40	0.51
1:B:465:LYS:NZ	1:D:123:MET:CE	2.73	0.51
1:C:328:ARG:NH1	3:C:3699:HOH:O	2.43	0.51
1:B:368:ILE:HD11	1:B:390:VAL:CG1	2.41	0.51
1:D:140:ARG:NH1	1:D:469:ASP:OD2	2.44	0.51
1:B:120:SER:O	1:B:123:MET:HE2	2.11	0.51
1:B:3:GLU:HA	1:B:3:GLU:OE1	2.11	0.50
1:B:395:ASN:HD22	1:B:395:ASN:C	2.15	0.50
1:C:90:ILE:O	1:C:94:ASN:HB3	2.11	0.50
1:B:418:ASN:ND2	1:B:421:ALA:N	2.54	0.50
1:C:42:THR:OG1	1:C:44:GLU:HB3	2.12	0.50
1:D:413:CYS:SG	1:D:441:PRO:HD3	2.52	0.50
1:B:35:LEU:CD1	1:B:92:ILE:HG22	2.42	0.50
1:B:175:LEU:HG	1:B:177:PRO:HD3	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:256:HIS:CE1	1:B:379:TRP:HE1	2.29	0.50
1:D:169:LEU:HD12	1:D:471:TYR:HB2	1.94	0.50
1:A:351:CYS:HB3	1:A:368:ILE:CG2	2.37	0.50
1:D:256:HIS:CE1	1:D:403:ALA:HA	2.46	0.50
1:A:326:VAL:HG22	1:A:362:TYR:O	2.10	0.50
3:B:2676:HOH:O	1:C:67:ARG:HD2	2.12	0.50
1:A:216:LEU:HD23	1:A:224:ILE:CD1	2.42	0.50
1:B:92:ILE:HD13	1:B:317:LEU:HD21	1.93	0.50
1:B:339:ILE:HD11	1:B:367:THR:HG21	1.94	0.50
1:A:426:ARG:HG3	1:B:477:VAL:HG21	1.93	0.50
1:C:304:LEU:O	1:C:308:VAL:HG23	2.11	0.49
1:D:230:LYS:N	1:D:231:PRO:HD2	2.26	0.49
1:B:186:GLU:O	1:B:190:GLU:HG3	2.12	0.49
1:D:156:MET:HB2	1:D:184:LEU:HD11	1.94	0.49
1:A:349:LEU:HD21	1:A:352:ASP:HB2	1.94	0.49
1:B:38:VAL:CG2	1:B:182:PRO:HG3	2.42	0.49
1:B:385:ALA:HB1	1:B:386:PRO:HD2	1.93	0.49
1:A:353:GLY:CA	1:A:367:THR:HG22	2.40	0.49
1:B:123:MET:HE3	1:D:465:LYS:NZ	2.27	0.49
1:D:144:GLY:H	1:D:171:ASN:ND2	2.10	0.49
1:C:28:ASN:C	1:C:28:ASN:ND2	2.64	0.49
1:C:216:LEU:HD23	1:C:224:ILE:CD1	2.43	0.49
1:A:254:LYS:HD3	1:A:288:ALA:HB3	1.94	0.49
1:A:268:THR:HG23	1:A:415:PHE:CG	2.48	0.49
1:A:153:ASN:HB2	1:A:282:GLU:O	2.12	0.49
1:C:368:ILE:HA	1:C:388:LEU:O	2.13	0.49
1:D:107:ARG:NH1	1:D:444:MET:HA	2.28	0.49
1:C:163:PHE:CG	1:C:164:PRO:HD3	2.48	0.49
1:C:198:PRO:HG2	1:C:201:VAL:HG21	1.95	0.49
1:D:469:ASP:HA	1:D:472:THR:HG22	1.94	0.49
1:A:136:ALA:HA	1:A:477:VAL:O	2.13	0.48
1:C:329:GLU:OE1	1:C:333:LYS:HE3	2.12	0.48
1:D:230:LYS:HE3	1:D:407:GLU:OE2	2.13	0.48
1:A:290:VAL:HG23	1:A:388:LEU:HD21	1.94	0.48
1:B:285:MET:HB3	1:B:440:VAL:HG13	1.95	0.48
1:A:110:GLU:HG2	1:C:70:ARG:HH22	1.77	0.48
1:A:327:ILE:HG23	1:A:328:ARG:HG2	1.95	0.48
1:C:184:LEU:HD13	1:C:184:LEU:O	2.13	0.48
1:D:374:THR:HG23	1:D:379:TRP:CZ3	2.49	0.48
1:D:395:ASN:ND2	1:D:398:GLU:H	2.11	0.48
1:A:102:LEU:O	1:A:105:VAL:HG13	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:141:TYR:OH	1:B:426:ARG:HD2	2.13	0.48
1:A:94:ASN:ND2	1:A:96:LYS:HE3	2.29	0.48
1:A:97:ASN:HD21	1:A:100:GLU:H	1.60	0.48
1:B:92:ILE:CD1	1:B:317:LEU:HD21	2.44	0.48
1:C:26:VAL:HG11	1:C:36:CYS:SG	2.52	0.48
1:C:93:GLU:OE2	1:C:183:LEU:N	2.43	0.48
1:B:135:GLU:CD	1:D:426:ARG:HH22	2.17	0.48
1:D:269:VAL:HG21	1:D:303:LYS:CG	2.43	0.48
1:B:254:LYS:HD3	1:B:288:ALA:CB	2.44	0.48
1:D:65:VAL:HG12	1:D:66:PRO:HD3	1.96	0.48
1:B:162:MET:HE3	1:B:227:VAL:HG23	1.95	0.47
1:B:163:PHE:CG	1:B:164:PRO:HD3	2.49	0.47
1:A:374:THR:O	1:A:374:THR:HG22	2.12	0.47
3:A:1533:HOH:O	1:B:242:GLU:HG3	2.15	0.47
1:B:50:ALA:HA	1:B:174:ILE:HD11	1.96	0.47
1:B:230:LYS:N	1:B:231:PRO:HD2	2.29	0.47
1:B:254:LYS:HD3	1:B:288:ALA:HB3	1.97	0.47
1:A:90:ILE:HG23	1:A:155:PRO:CG	2.44	0.47
1:B:250:LEU:HD12	1:B:250:LEU:N	2.30	0.47
1:D:350:VAL:HG21	1:D:370:ASP:HB2	1.95	0.47
1:A:327:ILE:HG23	1:A:328:ARG:N	2.29	0.47
1:C:429:ILE:CD1	1:C:431:ALA:H	2.27	0.47
1:D:93:GLU:HG2	1:D:181:THR:HA	1.95	0.47
1:D:228:GLY:O	2:D:4490:NAD:H1D	2.15	0.47
1:D:418:ASN:HD21	1:D:420:ASN:HB2	1.80	0.47
1:A:143:ILE:N	1:A:171:ASN:HD21	2.08	0.47
1:B:143:ILE:HG12	1:B:171:ASN:ND2	2.29	0.47
1:C:97:ASN:C	1:C:97:ASN:ND2	2.67	0.47
1:D:28:ASN:HD22	1:D:30:ALA:H	1.61	0.47
1:D:355:GLU:O	1:D:357:VAL:HG23	2.14	0.47
1:A:230:LYS:HE3	1:A:407:GLU:OE2	2.15	0.47
1:B:28:ASN:C	1:B:28:ASN:ND2	2.67	0.47
1:B:409:ALA:HB2	1:B:453:LYS:HE2	1.96	0.47
1:C:152:PHE:CE1	1:C:327:ILE:HB	2.50	0.47
1:C:228:GLY:O	1:C:251:THR:HA	2.15	0.47
1:C:365:GLY:HA3	3:C:3563:HOH:O	2.15	0.47
1:A:78:LEU:O	1:A:82:HIS:HD2	1.98	0.47
1:B:210:ASP:HB2	3:B:2499:HOH:O	2.15	0.47
1:C:143:ILE:N	1:C:171:ASN:ND2	2.57	0.47
1:B:90:ILE:O	1:B:94:ASN:HB3	2.15	0.47
1:B:87:ALA:CB	1:B:102:LEU:HD13	2.42	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:265:LEU:HG	1:B:296:ILE:HD11	1.97	0.47
1:D:305:GLN:HE22	1:D:350:VAL:HG12	1.80	0.47
1:A:127:LEU:HD13	1:D:123:MET:HG2	1.96	0.46
1:A:462:ALA:O	1:A:463:ASN:HB2	2.16	0.46
1:D:93:GLU:CG	1:D:181:THR:HA	2.45	0.46
1:B:351:CYS:HB2	1:B:368:ILE:HG22	1.93	0.46
1:B:357:VAL:HG11	1:B:365:GLY:H	1.80	0.46
1:D:198:PRO:HG2	1:D:201:VAL:HG21	1.97	0.46
1:C:184:LEU:HD13	1:C:184:LEU:C	2.36	0.46
1:C:144:GLY:H	1:C:171:ASN:HD22	1.64	0.46
1:A:329:GLU:HB2	1:A:362:TYR:CE2	2.51	0.46
1:D:265:LEU:CD1	1:D:299:GLU:HG2	2.45	0.46
1:A:480:ARG:HB2	1:B:438:LEU:HD21	1.98	0.46
1:B:65:VAL:HG12	1:B:66:PRO:HD3	1.98	0.46
1:D:44:GLU:HG3	3:D:4501:HOH:O	2.15	0.46
1:D:28:ASN:HD22	1:D:28:ASN:C	2.18	0.46
1:D:163:PHE:CG	1:D:164:PRO:HD3	2.51	0.46
1:A:97:ASN:HD21	1:A:100:GLU:HG3	1.80	0.46
1:C:98:THR:O	1:C:102:LEU:HB2	2.16	0.46
1:C:26:VAL:CG1	1:C:36:CYS:SG	3.05	0.45
1:C:26:VAL:HG12	1:C:38:VAL:HG23	1.97	0.45
1:A:152:PHE:CD1	1:A:152:PHE:C	2.89	0.45
1:B:97:ASN:ND2	1:B:97:ASN:C	2.68	0.45
1:C:238:LYS:HE2	1:D:242:GLU:O	2.16	0.45
1:A:238:LYS:HE2	1:B:242:GLU:O	2.16	0.45
1:A:254:LYS:O	1:A:256:HIS:HD2	1.98	0.45
1:A:465:LYS:NZ	1:C:123:MET:CE	2.78	0.45
1:C:38:VAL:HG22	1:C:182:PRO:HG3	1.99	0.45
1:C:176:LYS:HG3	1:C:211:VAL:HG11	1.97	0.45
1:C:484:PRO:HG2	1:C:486:PHE:CZ	2.52	0.45
1:A:163:PHE:CG	1:A:164:PRO:HD3	2.52	0.45
1:B:368:ILE:HD12	1:B:369:PHE:N	2.31	0.45
1:C:120:SER:O	1:C:123:MET:HE2	2.15	0.45
1:A:374:THR:HG21	1:A:405:LYS:CE	2.47	0.45
1:A:410:ASN:HD22	1:A:410:ASN:HA	1.65	0.45
1:A:432:GLY:O	1:B:475:LYS:HA	2.17	0.45
1:A:465:LYS:HZ3	1:C:123:MET:CE	2.30	0.45
1:B:10:TYR:CZ	1:B:13:GLY:HA2	2.51	0.45
1:B:38:VAL:HG22	1:B:182:PRO:HG3	1.98	0.45
1:D:46:ILE:CD1	1:D:211:VAL:HG13	2.43	0.45
1:D:151:PRO:HD2	1:D:158:VAL:HG11	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:462:ALA:O	1:D:463:ASN:HB2	2.16	0.45
1:A:28:ASN:HD22	1:A:29:PRO:N	2.15	0.45
1:A:91:THR:HG21	1:A:317:LEU:HD13	1.99	0.45
1:A:409:ALA:HB2	1:A:453:LYS:HG3	1.99	0.45
1:A:481:TYR:CE2	1:C:419:SER:HB3	2.51	0.45
1:C:72:LEU:HD12	1:C:112:VAL:HG13	1.98	0.45
1:C:285:MET:HG3	1:C:442:ALA:HB2	1.98	0.45
1:A:151:PRO:HD2	1:A:158:VAL:HG11	1.98	0.45
1:D:197:LEU:HD12	1:D:198:PRO:HD2	1.99	0.45
1:C:254:LYS:HD3	1:C:288:ALA:HB3	1.99	0.45
1:C:425:PHE:O	1:C:429:ILE:HB	2.16	0.45
1:D:127:LEU:HD12	1:D:127:LEU:HA	1.85	0.45
1:A:465:LYS:HZ1	1:C:123:MET:HE3	1.80	0.45
1:B:54:ALA:HB2	1:B:220:GLU:CG	2.47	0.45
1:B:77:GLN:CG	1:D:77:GLN:HG2	2.36	0.45
1:B:85:GLU:OE1	1:B:187:LYS:HE2	2.17	0.44
1:A:73:PHE:CE1	1:A:116:ALA:HB1	2.52	0.44
1:A:144:GLY:H	1:A:171:ASN:ND2	2.13	0.44
1:D:250:LEU:HD12	1:D:250:LEU:N	2.33	0.44
1:D:372:VAL:HG21	1:D:389:SER:HB3	1.99	0.44
1:A:90:ILE:O	1:A:94:ASN:HB3	2.18	0.44
1:B:215:ILE:HA	1:B:221:ILE:HD12	1.99	0.44
1:C:250:LEU:N	1:C:250:LEU:HD12	2.33	0.44
1:C:410:ASN:HD22	1:C:410:ASN:HA	1.63	0.44
1:A:285:MET:SD	1:A:441:PRO:HG2	2.58	0.44
1:A:418:ASN:HD22	1:A:421:ALA:HB2	1.83	0.44
1:C:311:ILE:HG23	1:C:322:PHE:HB3	1.99	0.44
1:C:459:THR:HG21	1:D:460:LEU:HD12	1.98	0.44
1:B:54:ALA:HB2	1:B:220:GLU:HG3	1.98	0.44
1:B:465:LYS:HZ3	1:D:123:MET:CE	2.31	0.44
1:A:80:SER:O	1:A:83:LYS:HG3	2.18	0.44
1:C:97:ASN:HD21	1:C:100:GLU:H	1.65	0.44
1:A:472:THR:HG23	3:A:1510:HOH:O	2.16	0.44
1:B:152:PHE:CE1	1:B:327:ILE:HB	2.52	0.44
1:B:395:ASN:HD22	1:B:398:GLU:H	1.65	0.44
1:D:19:LYS:HE3	3:D:4556:HOH:O	2.17	0.44
1:D:28:ASN:ND2	1:D:30:ALA:H	2.15	0.44
1:D:448:PRO:HG2	3:D:4517:HOH:O	2.18	0.44
1:C:149:ILE:HG22	2:C:3490:NAD:H4B	2.00	0.44
1:A:176:LYS:HG3	1:A:211:VAL:HG11	1.99	0.43
1:B:448:PRO:HG2	3:B:2520:HOH:O	2.17	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:230:LYS:HA	1:D:251:THR:HB	1.99	0.43
1:D:305:GLN:HE22	1:D:350:VAL:CG1	2.32	0.43
1:B:85:GLU:HG3	3:B:2578:HOH:O	2.17	0.43
1:A:426:ARG:HH22	1:C:135:GLU:CD	2.21	0.43
1:B:444:MET:HE3	3:B:2706:HOH:O	2.18	0.43
1:D:228:GLY:O	1:D:251:THR:HA	2.18	0.43
1:A:296:ILE:HG12	1:A:296:ILE:O	2.18	0.43
1:C:50:ALA:HA	1:C:174:ILE:HD11	2.01	0.43
1:A:140:ARG:NH1	1:A:469:ASP:OD1	2.47	0.43
1:A:436:ILE:HB	1:B:479:ALA:CB	2.48	0.43
1:C:156:MET:O	1:C:159:PRO:HD2	2.17	0.43
1:C:351:CYS:HB3	1:C:368:ILE:HG23	2.00	0.43
1:D:93:GLU:OE2	1:D:183:LEU:N	2.46	0.43
1:A:388:LEU:HD23	1:A:389:SER:H	1.83	0.43
1:A:388:LEU:HD23	1:A:389:SER:N	2.34	0.43
1:C:224:ILE:HB	1:C:247:VAL:HB	2.00	0.43
1:B:177:PRO:HG2	1:B:206:TYR:CD2	2.54	0.43
1:B:419:SER:HB3	1:D:481:TYR:CE2	2.54	0.43
1:B:212:VAL:HG21	2:B:2490:NAD:N3A	2.34	0.43
1:B:312:LYS:HD2	1:B:320:GLY:O	2.19	0.43
1:C:38:VAL:HG21	1:C:182:PRO:HG3	2.00	0.43
1:D:64:ALA:HB1	1:D:66:PRO:HD2	2.00	0.43
1:D:108:GLY:HA2	1:D:111:ASN:HD22	1.83	0.43
1:A:132:THR:HB	3:D:4575:HOH:O	2.19	0.43
1:D:373:THR:N	1:D:376:MET:HE3	2.33	0.43
1:A:149:ILE:HD13	1:A:212:VAL:HG13	2.01	0.42
1:A:448:PRO:HG2	3:A:1530:HOH:O	2.19	0.42
1:B:57:PHE:CE2	1:B:61:SER:HB3	2.54	0.42
1:B:327:ILE:HG23	1:B:328:ARG:N	2.34	0.42
1:C:375:GLU:HG2	3:C:3714:HOH:O	2.18	0.42
1:D:317:LEU:N	1:D:317:LEU:HD22	2.34	0.42
1:D:356:ASN:N	1:D:356:ASN:HD22	2.18	0.42
1:A:253:ALA:O	1:A:382:GLU:HG3	2.19	0.42
1:A:418:ASN:HD21	1:A:420:ASN:HB2	1.85	0.42
1:B:319:ASP:OD2	1:B:319:ASP:C	2.58	0.42
1:B:378:ILE:HD13	1:B:378:ILE:HA	1.80	0.42
1:D:150:ALA:HB1	3:D:4659:HOH:O	2.18	0.42
1:D:350:VAL:HG23	1:D:370:ASP:HB2	2.00	0.42
1:B:8:LYS:HB3	1:B:16:VAL:O	2.18	0.42
1:C:12:ASN:HB2	1:C:52:THR:CG2	2.48	0.42
1:A:344:GLU:O	1:A:344:GLU:HG2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:176:LYS:HG3	1:B:211:VAL:HG11	2.01	0.42
1:D:152:PHE:CE1	1:D:327:ILE:HB	2.55	0.42
1:D:285:MET:HG3	1:D:442:ALA:HB2	2.01	0.42
1:A:57:PHE:CE2	1:A:144:GLY:HA2	2.54	0.42
1:B:292:VAL:HG11	1:B:297:ALA:HA	2.01	0.42
1:C:261:ASN:HA	1:C:296:ILE:HB	2.02	0.42
1:B:127:LEU:HD12	1:B:127:LEU:HA	1.87	0.42
1:C:46:ILE:HD13	1:C:46:ILE:HA	1.92	0.42
1:D:156:MET:HB2	1:D:184:LEU:HG	2.01	0.42
1:B:253:ALA:O	1:B:382:GLU:HG3	2.19	0.42
1:C:212:VAL:HG21	2:C:3490:NAD:N3A	2.35	0.42
1:D:143:ILE:N	1:D:171:ASN:ND2	2.65	0.42
1:D:165:MET:O	1:D:169:LEU:HG	2.20	0.42
1:C:230:LYS:HA	1:C:251:THR:HB	2.01	0.42
1:D:140:ARG:HD3	1:D:472:THR:HG21	2.02	0.42
1:D:215:ILE:HA	1:D:221:ILE:HD12	2.01	0.42
1:A:24:GLU:HB2	1:A:40:ILE:HD11	2.01	0.42
1:A:29:PRO:HB2	1:A:325:PRO:HG2	2.02	0.42
1:A:120:SER:O	1:A:123:MET:HE2	2.19	0.42
1:B:12:ASN:HB2	1:B:52:THR:HG21	2.01	0.42
1:A:26:VAL:HG21	1:A:182:PRO:HG3	2.01	0.41
1:C:350:VAL:HB	1:C:368:ILE:CD1	2.50	0.41
1:D:183:LEU:HD12	1:D:183:LEU:HA	1.88	0.41
1:D:418:ASN:ND2	1:D:420:ASN:HB2	2.35	0.41
1:A:143:ILE:H	1:A:171:ASN:ND2	2.11	0.41
1:A:374:THR:HG21	1:A:405:LYS:NZ	2.35	0.41
1:B:419:SER:OG	1:C:422:ILE:HD12	2.20	0.41
1:C:11:ILE:O	1:C:14:GLU:OE1	2.38	0.41
1:C:158:VAL:HB	1:C:159:PRO:HD3	2.01	0.41
1:D:374:THR:HG22	1:D:374:THR:O	2.19	0.41
1:D:418:ASN:HD22	1:D:421:ALA:H	1.67	0.41
1:B:152:PHE:CD1	1:B:152:PHE:C	2.93	0.41
1:A:97:ASN:ND2	1:A:97:ASN:C	2.73	0.41
1:A:138:ASN:HA	1:A:476:VAL:HA	2.03	0.41
1:A:218:HIS:HA	1:A:219:PRO:HD2	1.93	0.41
1:B:123:MET:HE1	3:B:2492:HOH:O	2.20	0.41
1:C:28:ASN:HD22	1:C:29:PRO:N	2.18	0.41
1:B:40:ILE:HA	1:B:207:GLY:HA2	2.02	0.41
1:C:123:MET:HE1	3:C:3499:HOH:O	2.21	0.41
1:A:158:VAL:HB	1:A:159:PRO:HD3	2.02	0.41
1:A:341:LYS:O	1:A:345:GLU:HG3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:157:MET:HE2	1:B:157:MET:HB3	1.90	0.41
1:B:185:THR:O	1:B:189:VAL:HG23	2.21	0.41
1:C:175:LEU:HG	1:C:177:PRO:HD3	2.02	0.41
1:D:415:PHE:CD1	1:D:437:ASN:HA	2.56	0.41
1:A:77:GLN:HG3	1:C:77:GLN:HG2	2.01	0.41
1:A:90:ILE:HG23	1:A:155:PRO:HG3	2.02	0.41
1:A:349:LEU:C	1:A:349:LEU:HD23	2.40	0.41
1:A:433:MET:HG3	1:A:450:SER:O	2.20	0.41
3:A:1540:HOH:O	1:B:474:LYS:HE2	2.20	0.41
1:C:220:GLU:OE2	1:C:220:GLU:HA	2.20	0.41
1:C:254:LYS:O	1:C:256:HIS:HD2	2.04	0.41
1:D:351:CYS:HB3	1:D:368:ILE:HG23	2.03	0.41
1:D:395:ASN:C	1:D:395:ASN:ND2	2.73	0.41
1:A:79:LEU:HD12	1:A:79:LEU:HA	1.93	0.41
1:B:348:ARG:HB2	1:B:370:ASP:OD1	2.20	0.41
1:C:46:ILE:HG21	1:C:214:GLY:HA3	2.03	0.41
1:C:268:THR:HG22	1:C:272:ILE:HD12	2.02	0.41
1:C:429:ILE:HG21	1:C:434:LEU:HD11	2.02	0.41
1:D:78:LEU:O	1:D:82:HIS:HD2	2.03	0.41
1:D:187:LYS:HA	1:D:187:LYS:HD3	1.84	0.41
1:D:303:LYS:HE3	1:D:307:LYS:HZ2	1.85	0.41
1:D:341:LYS:O	1:D:345:GLU:HG3	2.20	0.41
1:D:341:LYS:HG3	3:D:4667:HOH:O	2.21	0.41
1:A:38:VAL:CG1	1:A:182:PRO:HG3	2.52	0.41
1:A:123:MET:HE1	1:C:465:LYS:HZ1	1.82	0.41
1:A:418:ASN:HD22	1:A:421:ALA:H	1.68	0.41
1:A:422:ILE:HD13	1:B:481:TYR:OH	2.21	0.41
1:B:18:SER:HB3	1:B:20:THR:HG22	2.02	0.41
1:C:26:VAL:HG13	1:C:36:CYS:O	2.21	0.41
1:B:123:MET:HE1	1:D:465:LYS:NZ	2.36	0.40
1:B:162:MET:CE	1:B:227:VAL:HG23	2.51	0.40
1:C:14:GLU:OE1	1:C:14:GLU:N	2.53	0.40
1:C:89:LEU:O	1:C:93:GLU:HB3	2.21	0.40
1:C:140:ARG:NH1	1:C:474:LYS:NZ	2.69	0.40
1:C:265:LEU:HG	1:C:296:ILE:HD11	2.03	0.40
1:D:429:ILE:HD12	1:D:429:ILE:HA	1.95	0.40
1:A:77:GLN:HG3	1:C:77:GLN:NE2	2.36	0.40
1:A:83:LYS:HD3	3:A:1569:HOH:O	2.21	0.40
1:A:266:GLU:OE2	1:A:303:LYS:NZ	2.46	0.40
1:B:78:LEU:O	1:B:82:HIS:HD2	2.04	0.40
1:C:432:GLY:HA3	1:C:450:SER:O	2.22	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:125:ASP:O	1:D:137:ALA:HA	2.21	0.40
1:D:176:LYS:HG3	1:D:211:VAL:HG11	2.03	0.40
1:A:338:TYR:CG	1:A:383:ILE:HD12	2.56	0.40
1:B:98:THR:HG21	3:B:2617:HOH:O	2.20	0.40
1:D:414:LEU:HD22	1:D:425:PHE:CB	2.51	0.40
1:A:6:LYS:HE2	1:A:23:TYR:CZ	2.57	0.40
1:A:108:GLY:HA2	1:A:111:ASN:HD22	1.85	0.40
1:A:338:TYR:HA	1:A:341:LYS:HE3	2.04	0.40
1:A:385:ALA:HB1	1:A:386:PRO:CD	2.50	0.40
1:B:343:LEU:HD21	1:B:349:LEU:HG	2.02	0.40
1:C:23:TYR:CE1	1:C:39:PRO:HB3	2.56	0.40
1:C:256:HIS:HE1	1:C:379:TRP:HE1	1.70	0.40
1:D:118:ALA:N	1:D:119:PRO:CD	2.85	0.40
1:A:38:VAL:HG11	1:A:182:PRO:CB	2.51	0.40
1:A:92:ILE:HD11	1:A:317:LEU:HD21	2.04	0.40
1:A:383:ILE:HB	3:A:1595:HOH:O	2.21	0.40
1:B:118:ALA:N	1:B:119:PRO:CD	2.84	0.40
1:D:254:LYS:HD3	1:D:288:ALA:HB3	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	482/486 (99%)	459 (95%)	22 (5%)	1 (0%)	47	68
1	B	482/486 (99%)	453 (94%)	27 (6%)	2 (0%)	34	54
1	C	482/486 (99%)	463 (96%)	18 (4%)	1 (0%)	47	68
1	D	482/486 (99%)	460 (95%)	22 (5%)	0	100	100
All	All	1928/1944 (99%)	1835 (95%)	89 (5%)	4 (0%)	47	68

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	356	ASN
1	C	41	SER
1	A	371	ASN
1	B	41	SER

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	399/400 (100%)	372 (93%)	27 (7%)	16	30
1	B	399/400 (100%)	374 (94%)	25 (6%)	18	34
1	C	399/400 (100%)	375 (94%)	24 (6%)	19	37
1	D	399/400 (100%)	377 (94%)	22 (6%)	21	41
All	All	1596/1600 (100%)	1498 (94%)	98 (6%)	18	36

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

Mol	Chain	Res	Type
1	A	28	ASN
1	A	46	ILE
1	A	78	LEU
1	A	79	LEU
1	A	97	ASN
1	A	98	THR
1	A	102	LEU
1	A	105	VAL
1	A	127	LEU
1	A	132	THR
1	A	183	LEU
1	A	184	LEU
1	A	187	LYS
1	A	192	PHE
1	A	244	LEU
1	A	247	VAL
1	A	265	LEU
1	A	317	LEU

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Mol	Chain	Res	Type
1	A	319	ASP
1	A	367	THR
1	A	368	ILE
1	A	388	LEU
1	A	395	ASN
1	A	410	ASN
1	A	434	LEU
1	A	469	ASP
1	A	485	ASP
1	B	26	VAL
1	B	28	ASN
1	B	78	LEU
1	B	79	LEU
1	B	97	ASN
1	B	102	LEU
1	B	127	LEU
1	B	132	THR
1	B	179	GLU
1	B	187	LYS
1	B	192	PHE
1	B	222	LYS
1	B	244	LEU
1	B	247	VAL
1	B	326	VAL
1	B	336	LEU
1	B	367	THR
1	B	368	ILE
1	B	370	ASP
1	B	372	VAL
1	B	388	LEU
1	B	390	VAL
1	B	395	ASN
1	B	410	ASN
1	B	434	LEU
1	C	26	VAL
1	C	28	ASN
1	C	46	ILE
1	C	78	LEU
1	C	79	LEU
1	C	97	ASN
1	C	102	LEU
1	C	127	LEU

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Mol	Chain	Res	Type
1	C	187	LYS
1	C	192	PHE
1	C	222	LYS
1	C	244	LEU
1	C	247	VAL
1	C	283	ARG
1	C	317	LEU
1	C	328	ARG
1	C	368	ILE
1	C	372	VAL
1	C	388	LEU
1	C	395	ASN
1	C	410	ASN
1	C	418	ASN
1	C	429	ILE
1	C	434	LEU
1	D	22	GLN
1	D	28	ASN
1	D	77	GLN
1	D	78	LEU
1	D	79	LEU
1	D	89	LEU
1	D	102	LEU
1	D	127	LEU
1	D	132	THR
1	D	183	LEU
1	D	184	LEU
1	D	192	PHE
1	D	247	VAL
1	D	283	ARG
1	D	340	GLU
1	D	349	LEU
1	D	388	LEU
1	D	395	ASN
1	D	410	ASN
1	D	434	LEU
1	D	472	THR
1	D	485	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (71) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	9	ASN
1	A	22	GLN
1	A	28	ASN
1	A	51	GLN
1	A	74	ASN
1	A	77	GLN
1	A	81	GLN
1	A	82	HIS
1	A	94	ASN
1	A	97	ASN
1	A	111	ASN
1	A	171	ASN
1	A	248	GLN
1	A	256	HIS
1	A	356	ASN
1	A	395	ASN
1	A	410	ASN
1	A	418	ASN
1	A	420	ASN
1	A	428	ASN
1	A	463	ASN
1	B	9	ASN
1	B	28	ASN
1	B	51	GLN
1	B	74	ASN
1	B	77	GLN
1	B	81	GLN
1	B	82	HIS
1	B	97	ASN
1	B	171	ASN
1	B	256	HIS
1	B	356	ASN
1	B	395	ASN
1	B	410	ASN
1	B	418	ASN
1	B	420	ASN
1	B	463	ASN
1	C	9	ASN
1	C	28	ASN
1	C	51	GLN
1	C	74	ASN
1	C	81	GLN
1	C	97	ASN

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Mol	Chain	Res	Type
1	C	111	ASN
1	C	171	ASN
1	C	256	HIS
1	C	356	ASN
1	C	371	ASN
1	C	395	ASN
1	C	410	ASN
1	C	418	ASN
1	C	420	ASN
1	C	463	ASN
1	D	9	ASN
1	D	28	ASN
1	D	51	GLN
1	D	74	ASN
1	D	77	GLN
1	D	81	GLN
1	D	82	HIS
1	D	111	ASN
1	D	171	ASN
1	D	256	HIS
1	D	305	GLN
1	D	356	ASN
1	D	395	ASN
1	D	410	ASN
1	D	418	ASN
1	D	420	ASN
1	D	428	ASN
1	D	463	ASN

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 monosaccharides 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	4490	-	42,48,48	3.00	11 (26%)	50,73,73	1.51	7 (14%)
2	NAD	A	1490	-	42,48,48	3.00	12 (28%)	50,73,73	1.52	8 (16%)
2	NAD	C	3490	-	42,48,48	2.97	11 (26%)	50,73,73	1.52	9 (18%)
2	NAD	B	2490	-	42,48,48	3.02	10 (23%)	50,73,73	1.54	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	4490	-	-	1/26/62/62	0/5/5/5
2	NAD	A	1490	-	-	1/26/62/62	0/5/5/5
2	NAD	C	3490	-	-	1/26/62/62	0/5/5/5
2	NAD	B	2490	-	-	1/26/62/62	0/5/5/5

All (44) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1490	NAD	C2N-N1N	9.68	1.45	1.35
2	B	2490	NAD	C4N-C3N	9.51	1.53	1.39
2	C	3490	NAD	C4N-C3N	9.44	1.53	1.39
2	D	4490	NAD	C4N-C3N	9.31	1.53	1.39
2	D	4490	NAD	C2N-N1N	9.26	1.45	1.35
2	A	1490	NAD	C4N-C3N	9.09	1.53	1.39
2	B	2490	NAD	C2N-N1N	9.04	1.44	1.35
2	C	3490	NAD	C2N-N1N	8.82	1.44	1.35
2	C	3490	NAD	C5N-C4N	7.04	1.50	1.38
2	B	2490	NAD	C5N-C4N	6.95	1.50	1.38
2	A	1490	NAD	C5N-C4N	6.70	1.50	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	4490	NAD	C5N-C4N	6.62	1.50	1.38
2	B	2490	NAD	PN-O3	5.77	1.65	1.59
2	D	4490	NAD	C2A-N3A	5.57	1.40	1.32
2	A	1490	NAD	PN-O3	5.56	1.65	1.59
2	D	4490	NAD	PN-O3	5.55	1.65	1.59
2	C	3490	NAD	C2A-N3A	5.54	1.40	1.32
2	B	2490	NAD	C2A-N3A	5.44	1.40	1.32
2	A	1490	NAD	C2A-N3A	5.33	1.40	1.32
2	C	3490	NAD	PN-O3	4.45	1.64	1.59
2	C	3490	NAD	C6N-N1N	4.42	1.45	1.35
2	B	2490	NAD	C6N-N1N	4.19	1.44	1.35
2	D	4490	NAD	C6N-N1N	4.04	1.44	1.35
2	D	4490	NAD	C4A-N3A	4.00	1.41	1.35
2	A	1490	NAD	C4A-N3A	3.99	1.41	1.35
2	B	2490	NAD	C4A-N3A	3.97	1.41	1.35
2	C	3490	NAD	C4A-N3A	3.89	1.40	1.35
2	A	1490	NAD	C6N-N1N	3.85	1.44	1.35
2	D	4490	NAD	O4D-C1D	3.50	1.45	1.40
2	A	1490	NAD	O4D-C1D	3.37	1.45	1.40
2	C	3490	NAD	O4D-C1D	3.15	1.45	1.40
2	C	3490	NAD	C2N-C3N	-3.06	1.34	1.39
2	B	2490	NAD	C2N-C3N	-2.96	1.34	1.39
2	B	2490	NAD	O4D-C1D	2.80	1.44	1.40
2	D	4490	NAD	C2N-C3N	-2.79	1.34	1.39
2	A	1490	NAD	C2N-C3N	-2.70	1.34	1.39
2	B	2490	NAD	O4B-C1B	2.36	1.44	1.40
2	C	3490	NAD	O4D-C4D	2.25	1.50	1.45
2	A	1490	NAD	O4B-C1B	2.23	1.43	1.40
2	A	1490	NAD	O4D-C4D	2.19	1.49	1.45
2	C	3490	NAD	O4B-C1B	2.17	1.43	1.40
2	D	4490	NAD	O4D-C4D	2.16	1.49	1.45
2	D	4490	NAD	O4B-C1B	2.11	1.43	1.40
2	A	1490	NAD	C1B-N9A	-2.01	1.44	1.49

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1490	NAD	N3A-C2A-N1A	-5.03	121.84	128.67
2	C	3490	NAD	N3A-C2A-N1A	-5.01	121.88	128.67
2	B	2490	NAD	N3A-C2A-N1A	-4.96	121.95	128.67
2	D	4490	NAD	N3A-C2A-N1A	-4.86	122.07	128.67
2	C	3490	NAD	C5N-C4N-C3N	-3.64	116.79	120.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	4490	NAD	C5N-C4N-C3N	-3.63	116.79	120.36
2	A	1490	NAD	C5N-C4N-C3N	-3.53	116.89	120.36
2	B	2490	NAD	C5N-C4N-C3N	-3.48	116.94	120.36
2	B	2490	NAD	O4B-C1B-N9A	-3.45	104.17	108.75
2	A	1490	NAD	O4B-C1B-N9A	-3.43	104.20	108.75
2	D	4490	NAD	O4B-C1B-N9A	-3.27	104.41	108.75
2	C	3490	NAD	O4B-C1B-N9A	-3.23	104.46	108.75
2	D	4490	NAD	C2N-C3N-C4N	3.04	121.80	118.26
2	C	3490	NAD	C2N-C3N-C4N	2.99	121.73	118.26
2	B	2490	NAD	C2N-C3N-C4N	2.91	121.65	118.26
2	A	1490	NAD	C2N-C3N-C4N	2.89	121.62	118.26
2	C	3490	NAD	O2A-PA-O1A	2.86	125.75	112.44
2	B	2490	NAD	O2A-PA-O1A	2.85	125.71	112.44
2	D	4490	NAD	O2A-PA-O1A	2.84	125.67	112.44
2	A	1490	NAD	O2A-PA-O1A	2.78	125.38	112.44
2	A	1490	NAD	C6N-N1N-C1D	-2.59	114.64	119.73
2	B	2490	NAD	C6N-N1N-C1D	-2.54	114.74	119.73
2	C	3490	NAD	C6N-N1N-C1D	-2.45	114.92	119.73
2	D	4490	NAD	C6N-N1N-C1D	-2.45	114.93	119.73
2	B	2490	NAD	C5A-C6A-N1A	-2.34	114.65	120.23
2	D	4490	NAD	C5A-C6A-N1A	-2.31	114.73	120.23
2	C	3490	NAD	C5A-C6A-N1A	-2.30	114.74	120.23
2	B	2490	NAD	C6N-N1N-C2N	2.29	123.82	121.88
2	A	1490	NAD	C5A-C6A-N1A	-2.26	114.84	120.23
2	C	3490	NAD	C6N-N1N-C2N	2.07	123.64	121.88
2	C	3490	NAD	N6A-C6A-N1A	2.03	122.66	118.33
2	A	1490	NAD	C6N-N1N-C2N	2.02	123.60	121.88
2	B	2490	NAD	N6A-C6A-N1A	2.02	122.64	118.33

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1490	NAD	C4D-C5D-O5D-PN
2	D	4490	NAD	C4D-C5D-O5D-PN
2	B	2490	NAD	C4D-C5D-O5D-PN
2	C	3490	NAD	C4D-C5D-O5D-PN

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	4490	NAD	1	0
2	C	3490	NAD	2	0
2	B	2490	NAD	1	0

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

Ligand NAD D 4490

Bond lengths

Bond angles

Torsions

Rings

Ligand NAD A 1490

Bond lengths

Bond angles

Torsions

Rings

Full wwPDB X-ray Structure Validation Report

Ligand NAD C 3490

Bond lengths

Bond angles

Torsions

Rings

Ligand NAD B 2490

Bond lengths

Bond angles

Torsions

Rings
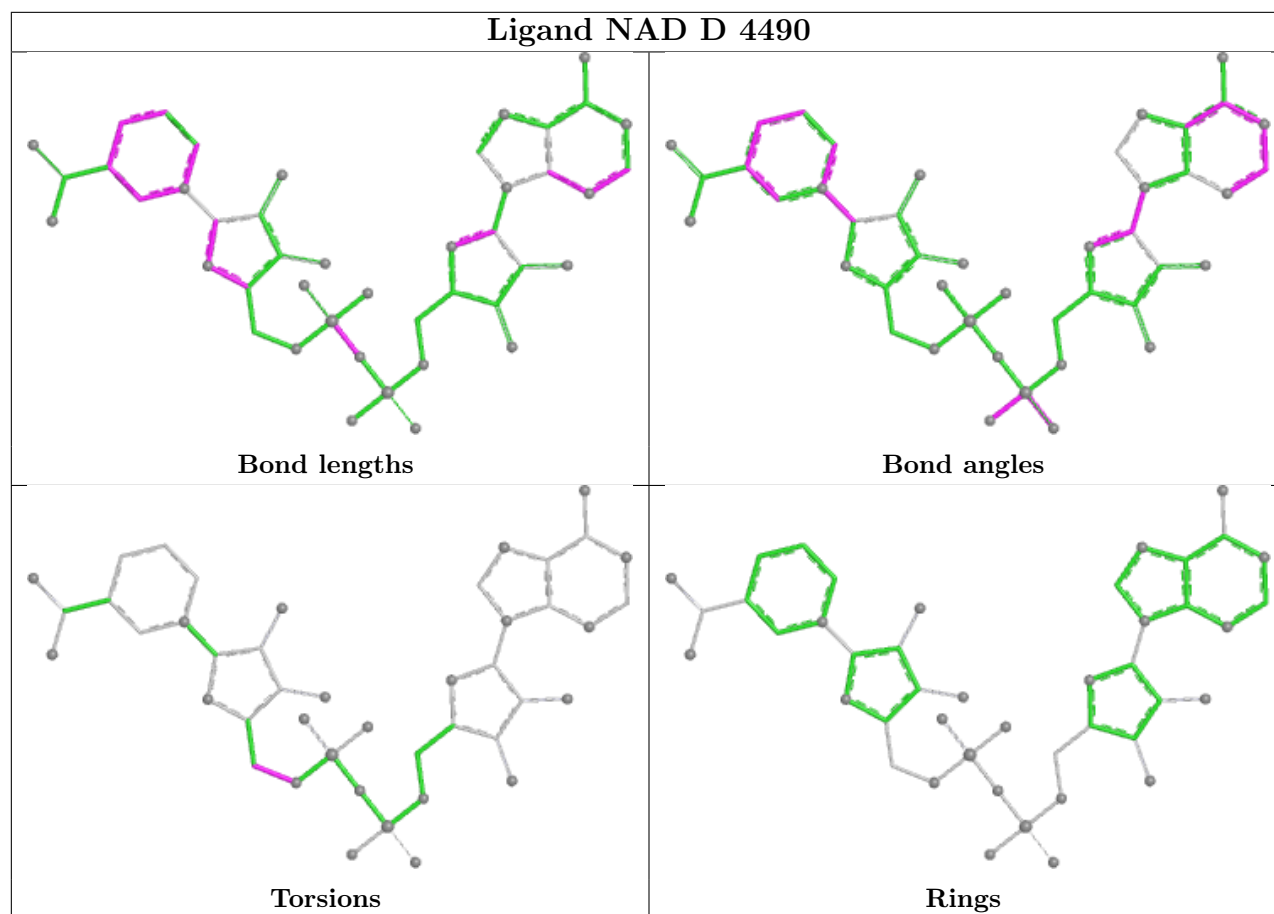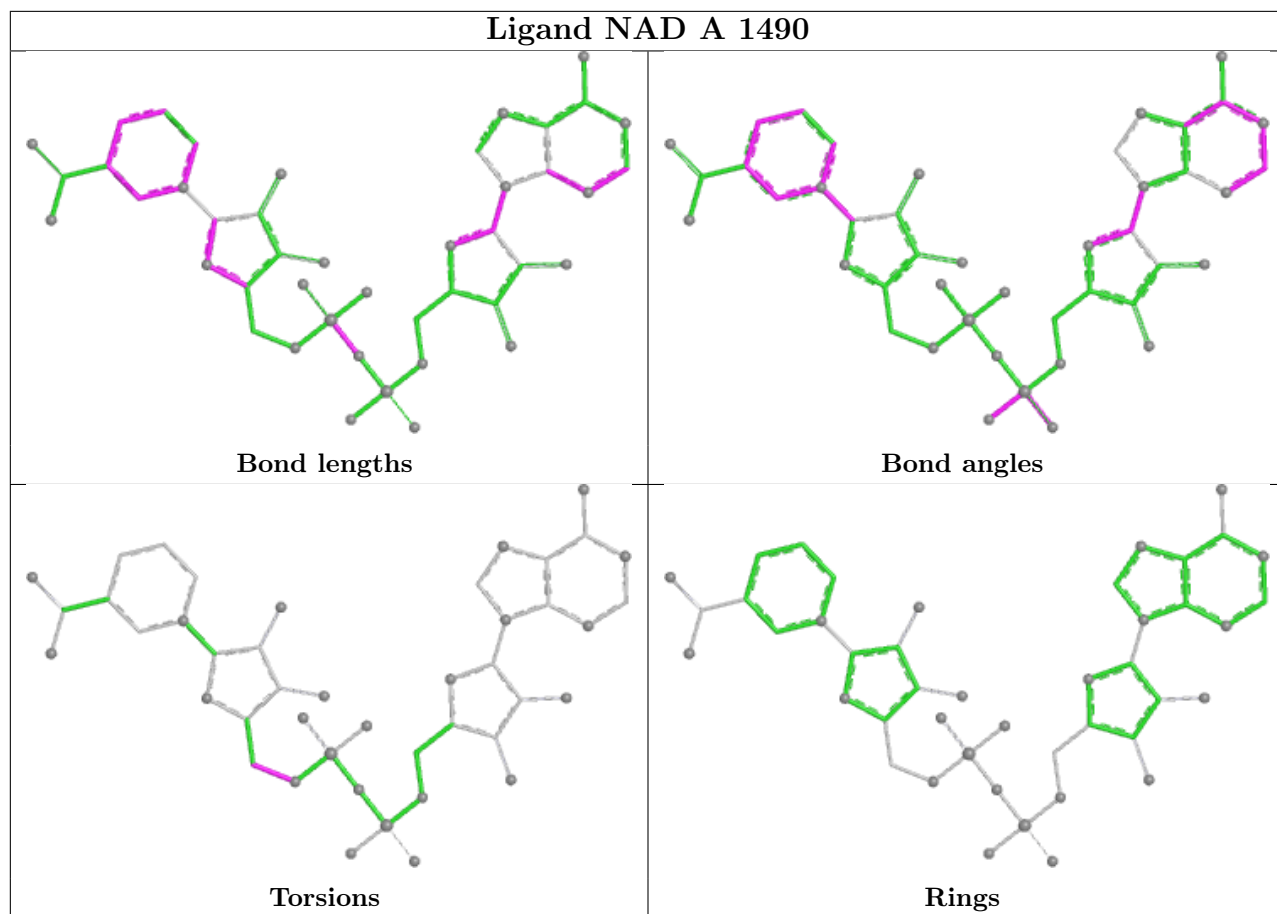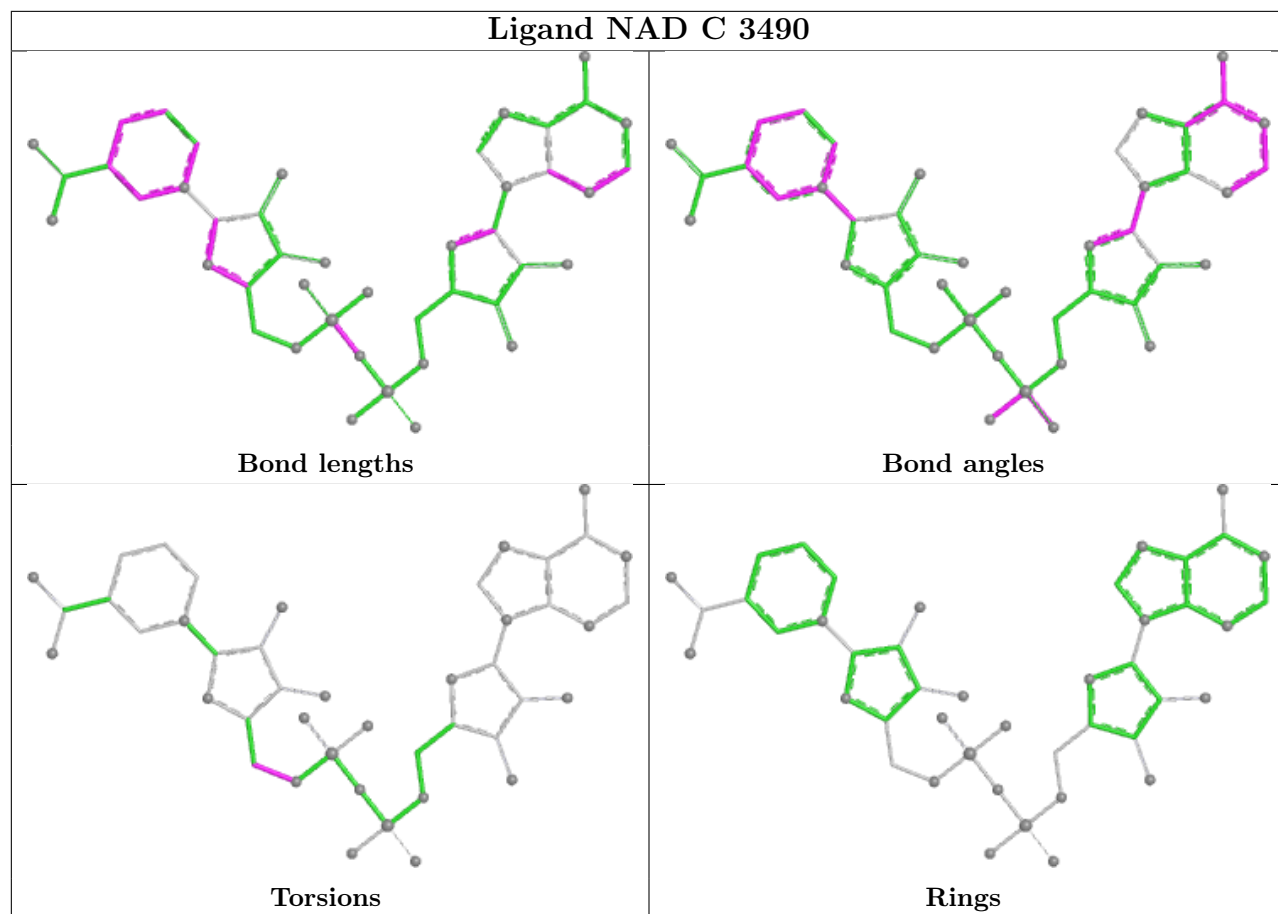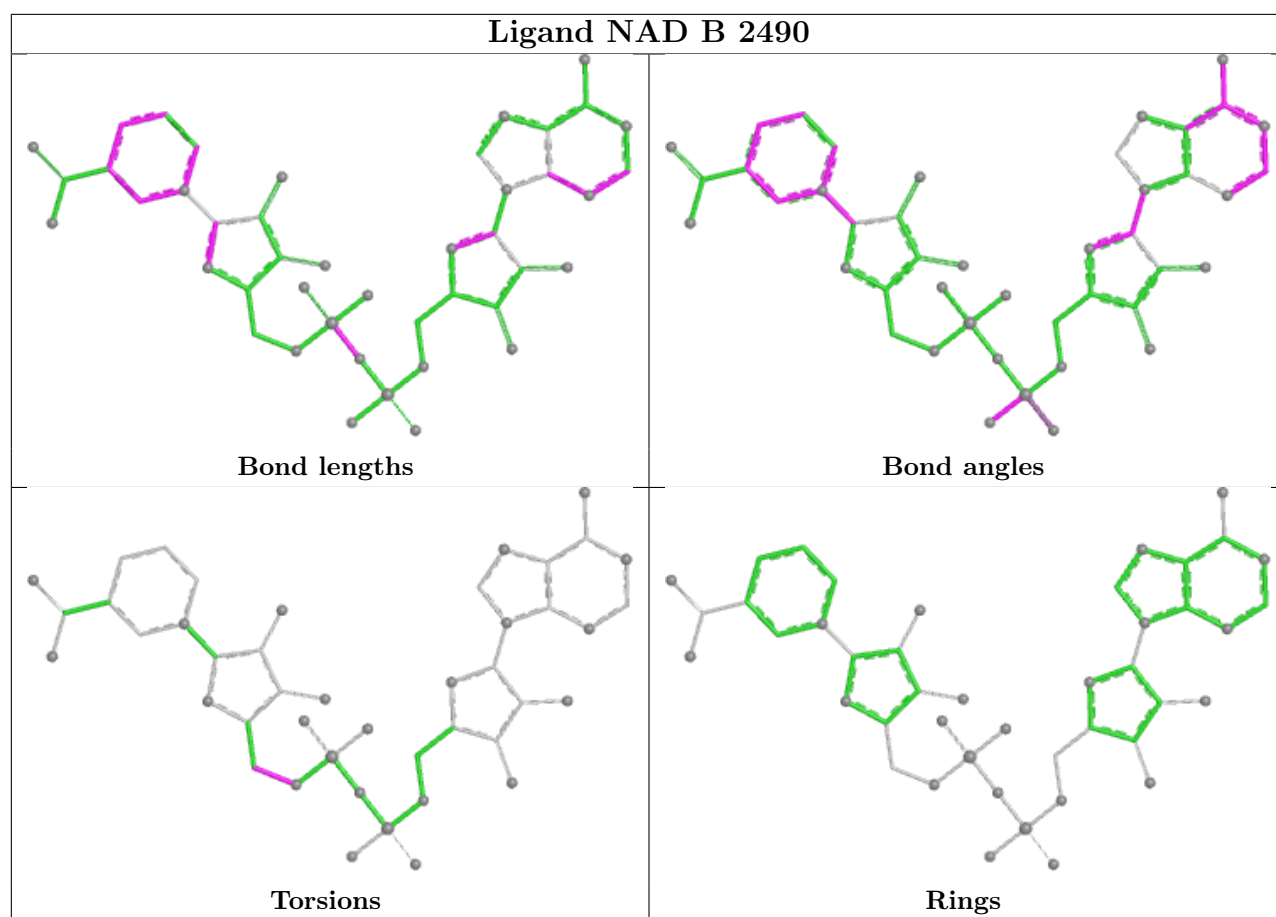
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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(Å²)	Q<0.9
1	A	484/486 (99%)	-0.35	7 (1%)	75	77	12, 29, 50, 67	0
1	B	484/486 (99%)	-0.40	7 (1%)	75	77	13, 26, 46, 71	0
1	C	484/486 (99%)	-0.44	7 (1%)	75	77	14, 26, 45, 64	0
1	D	484/486 (99%)	-0.34	6 (1%)	79	80	11, 30, 50, 66	0
All	All	1936/1944 (99%)	-0.39	27 (1%)	75	77	11, 27, 49, 71	0

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	356	ASN	5.5
1	C	356	ASN	4.1
1	D	356	ASN	3.7
1	B	485	ASP	3.5
1	C	485	ASP	3.4
1	A	356	ASN	3.3
1	C	19	LYS	3.2
1	A	485	ASP	3.1
1	A	359	ASP	3.1
1	A	330	ASP	3.0
1	A	3	GLU	2.9
1	D	485	ASP	2.8
1	A	357	VAL	2.8
1	D	319	ASP	2.8
1	D	359	ASP	2.7
1	B	21	ASP	2.5
1	C	330	ASP	2.5
1	D	375	GLU	2.5
1	B	486	PHE	2.5
1	B	19	LYS	2.4
1	C	319	ASP	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	319	ASP	2.4
1	C	22	GLN	2.3
1	C	486	PHE	2.2
1	B	357	VAL	2.2
1	D	3	GLU	2.2
1	B	44	GLU	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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
2	NAD	C	3490	44/44	0.94	0.17	37,40,46,48	0
2	NAD	D	4490	44/44	0.94	0.16	37,42,44,45	0
2	NAD	A	1490	44/44	0.95	0.15	36,40,42,44	0
2	NAD	B	2490	44/44	0.96	0.14	38,41,45,46	0

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

Electron density around NAD C 3490:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
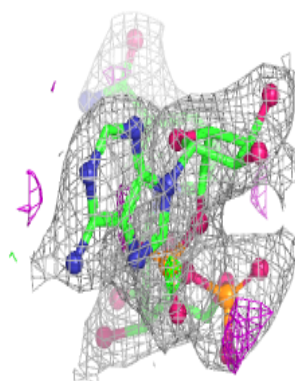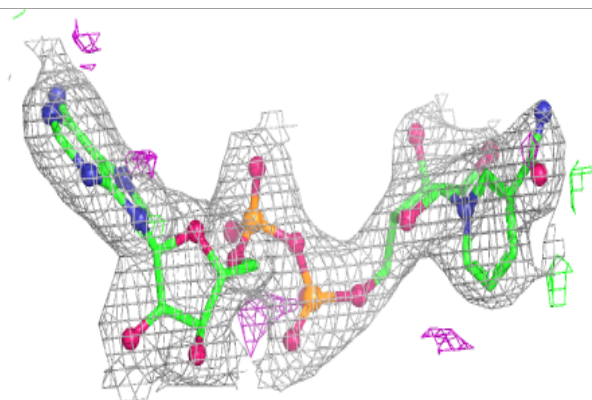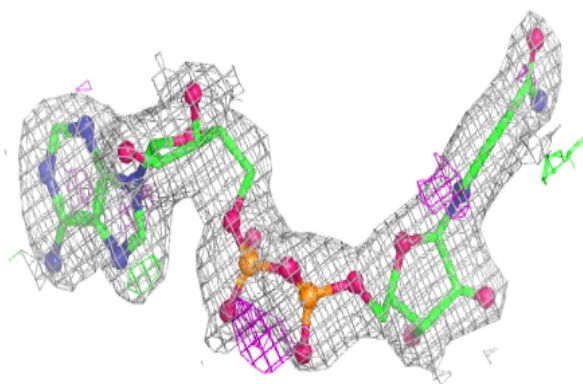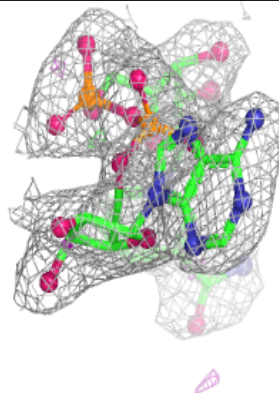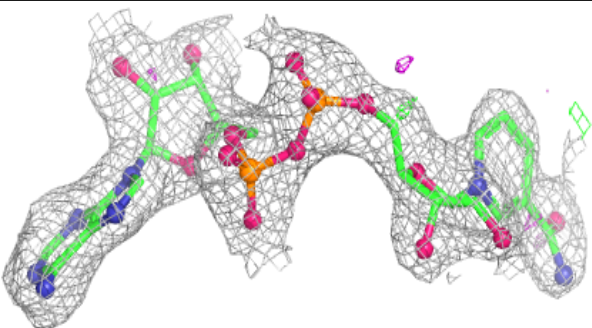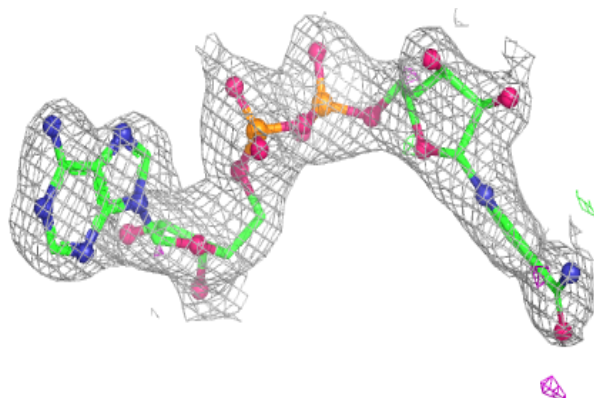mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
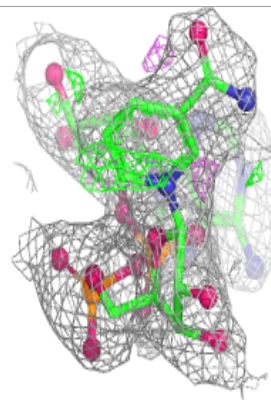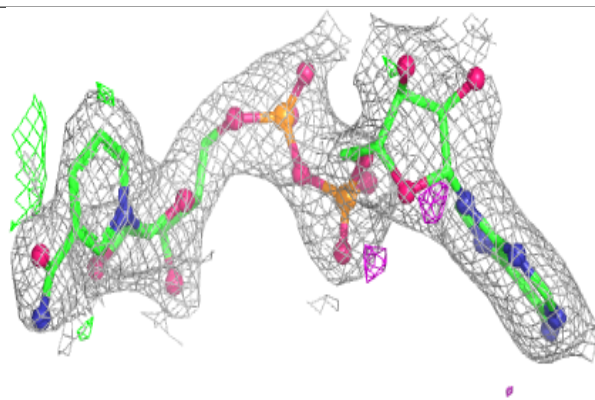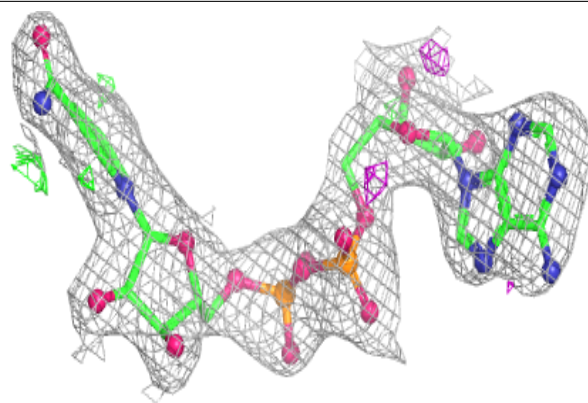
Electron density around NAD D 4490:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
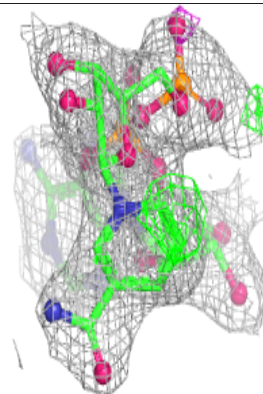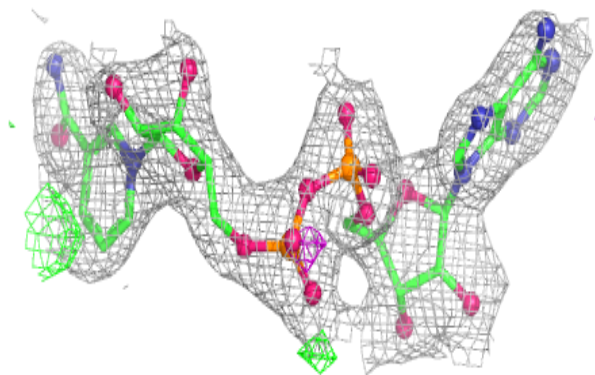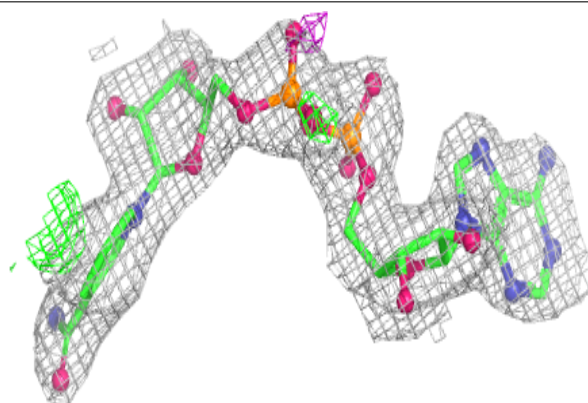
Electron density around NAD A 1490:

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

Electron density around NAD B 2490:

$2mF_o$-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 ⓘ

There are no such residues in this entry.