



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 24, 2023 – 08:53 PM EDT

PDB ID : 3BE0  
Title : The Role of Asn 242 in P450cin  
Authors : Meharena, Y.T.; Poulos, T.L.  
Deposited on : 2007-11-15  
Resolution : 3.05 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
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

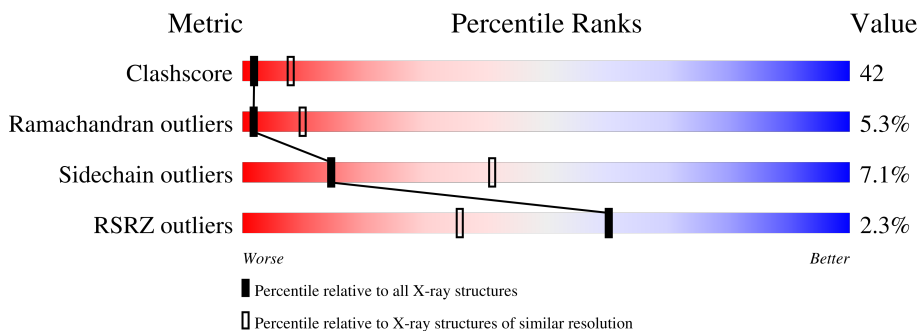
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.05 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	141614	1864 (3.10-3.02)
Ramachandran outliers	138981	1794 (3.10-3.02)
Sidechain outliers	138945	1793 (3.10-3.02)
RSRZ outliers	127900	1713 (3.10-3.02)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	397	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 41%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 52%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 7%; height: 10px; background-color: orange;"></div> </div> <p style="font-size: small; margin-top: 5px;">2%      41%      52%      7%</p>
1	B	397	<div style="display: flex; align-items: center;"> <div style="width: 3%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 39%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 52%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 9%; height: 10px; background-color: orange;"></div> </div> <p style="font-size: small; margin-top: 5px;">3%      39%      52%      9%</p>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 6489 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 P450cin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	397	Total 3146	C 2006	N 548	O 581	S 11	0	0	0
1	B	397	Total 3146	C 2006	N 548	O 581	S 11	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	242	ALA	ASN	engineered mutation	UNP Q8VQF6
B	242	ALA	ASN	engineered mutation	UNP Q8VQF6

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula:  $C_{34}H_{32}FeN_4O_4$ ).



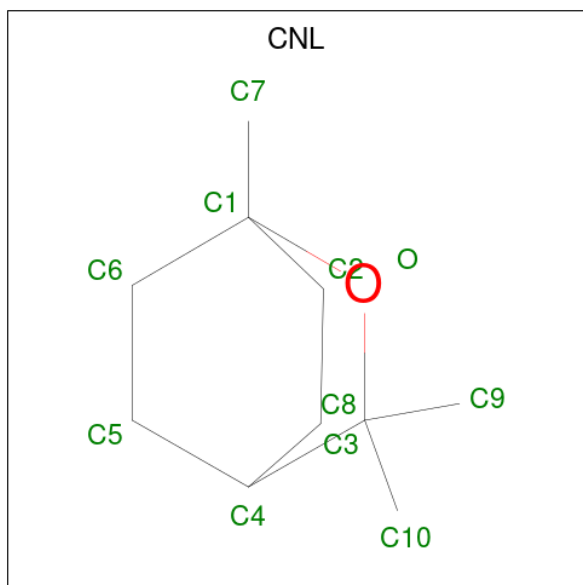
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Fe	N	O		
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
2	B	1	43	34	1	4	4	0	0

- Molecule 3 is 1,3,3-TRIMETHYL-2-OXABICYCLO[2.2.2]OCTANE (three-letter code: CNL) (formula: C<sub>10</sub>H<sub>18</sub>O).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
3	A	1	11	10	1	0	0
3	B	1	11	10	1	0	0

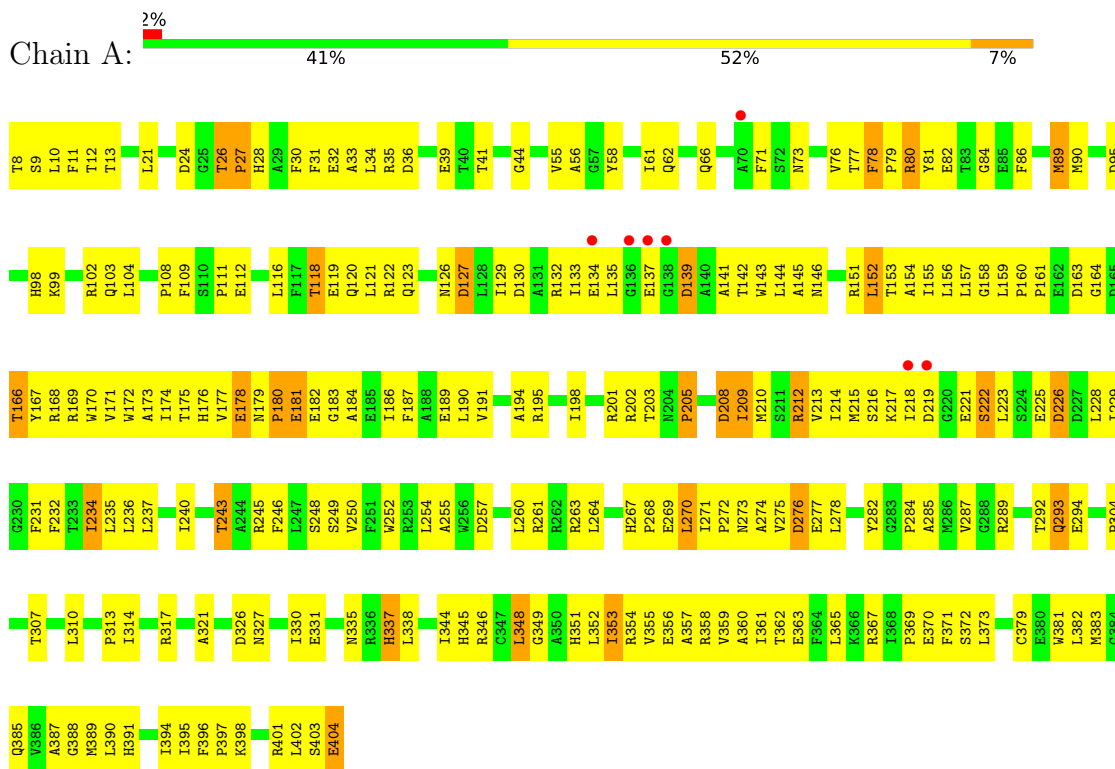
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	56	56	56	0	0
4	B	33	33	33	0	0

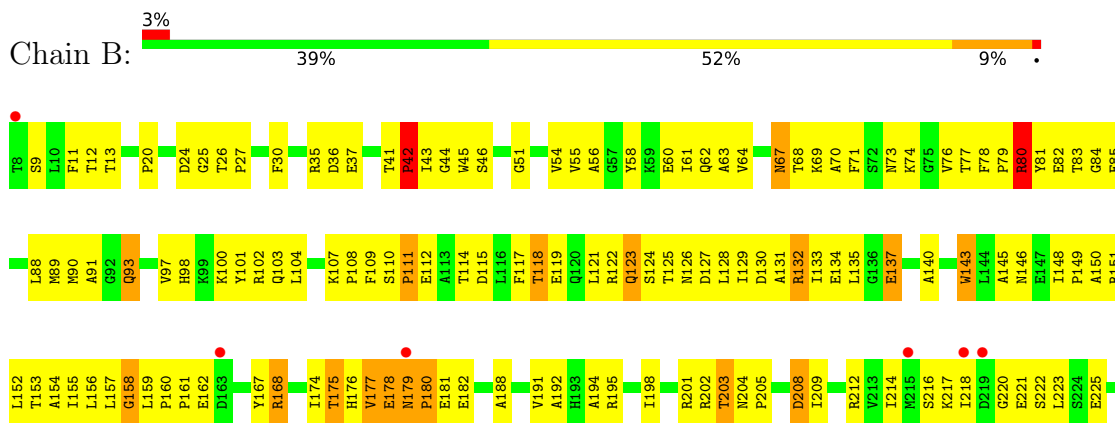
### 3 Residue-property plots i

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

- Molecule 1: P450cin



- Molecule 1: P450cin





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	59.40Å 128.68Å 69.02Å 90.00° 97.84° 90.00°	Depositor
Resolution (Å)	47.95 – 3.05 47.95 – 3.05	Depositor EDS
% Data completeness (in resolution range)	91.4 (47.95-3.05) 91.5 (47.95-3.05)	Depositor EDS
$R_{merge}$	0.15	Depositor
$R_{sym}$	0.15	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.67 (at 3.07Å)	Xtrriage
Refinement program	CNS 1.2	Depositor
R, $R_{free}$	0.236 , 0.322 0.242 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	54.7	Xtrriage
Anisotropy	0.630	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 67.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	6489	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	60.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 18.82% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

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

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	0.41	0/3226	0.66	0/4386
1	B	0.40	0/3226	0.66	0/4386
All	All	0.41	0/6452	0.66	0/8772

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	3146	0	3098	270	0
1	B	3146	0	3098	269	1
2	A	43	0	30	7	0
2	B	43	0	30	5	0
3	A	11	0	18	0	0
3	B	11	0	18	0	0
4	A	56	0	0	23	1
4	B	33	0	0	8	0
All	All	6489	0	6292	533	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 42.



All (533) 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:A:326:ASP:HB3	1:B:263:ARG:NH2	1.76	0.99
1:B:122:ARG:HH22	1:B:362:THR:HG21	1.28	0.97
1:B:398:LYS:NZ	1:B:398:LYS:HB3	1.82	0.95
1:B:133:ILE:HG13	1:B:368:ILE:HD11	1.49	0.92
1:A:385:GLN:OE1	4:A:538:HOH:O	1.89	0.91
1:B:80:ARG:HD3	1:B:81:TYR:N	1.88	0.89
1:B:158:GLY:HA3	1:B:201:ARG:HH22	1.37	0.89
1:A:370:GLU:HG2	4:A:549:HOH:O	1.74	0.88
1:A:370:GLU:CG	4:A:549:HOH:O	2.21	0.87
1:A:122:ARG:HG3	1:A:363:GLU:HG3	1.57	0.86
1:A:327:ASN:HA	4:B:531:HOH:O	1.74	0.86
1:B:157:LEU:HB2	1:B:159:LEU:CD1	2.06	0.85
1:B:157:LEU:HB2	1:B:159:LEU:HD11	1.58	0.84
1:B:375:PRO:HD3	1:B:395:ILE:HD13	1.60	0.83
1:B:354:ARG:HB3	1:B:358:ARG:HH22	1.43	0.83
1:A:357:ALA:O	1:A:361:ILE:HG22	1.78	0.82
1:A:287:VAL:HA	4:A:522:HOH:O	1.81	0.80
1:A:212:ARG:NH1	1:A:212:ARG:HB2	1.96	0.79
1:B:272:PRO:HG3	1:B:358:ARG:HD2	1.63	0.79
1:A:194:ALA:O	1:A:198:ILE:HG13	1.83	0.79
1:A:270:LEU:HD12	4:A:524:HOH:O	1.83	0.77
1:A:217:LYS:HG2	1:A:222:SER:HA	1.67	0.77
1:B:74:LYS:HG3	1:B:290:LEU:HD23	1.66	0.77
1:A:130:ASP:HB3	1:A:401:ARG:CZ	2.16	0.77
1:A:353:ILE:HD13	1:A:353:ILE:H	1.48	0.77
1:A:151:ARG:O	1:A:155:ILE:HG12	1.85	0.76
1:A:367:ARG:HH22	1:A:401:ARG:HA	1.51	0.76
1:B:398:LYS:HB3	1:B:398:LYS:HZ2	1.51	0.75
1:A:264:LEU:HD13	1:A:361:ILE:HD11	1.67	0.75
1:B:179:ASN:C	1:B:181:GLU:H	1.89	0.75
1:B:146:ASN:HD22	1:B:168:ARG:HH21	1.35	0.75
1:B:151:ARG:O	1:B:155:ILE:HD13	1.87	0.74
1:A:396:PHE:HB2	1:A:397:PRO:HD2	1.69	0.74
1:B:152:LEU:HD21	1:B:352:LEU:HD11	1.68	0.74
1:A:327:ASN:HB3	1:B:327:ASN:HD22	1.51	0.74
1:A:172:TRP:CD1	1:A:177:VAL:HG21	2.23	0.73
1:A:225:GLU:HA	1:A:228:LEU:HG	1.69	0.73
1:A:212:ARG:HB2	1:A:212:ARG:HH11	1.52	0.73
1:A:61:ILE:HG23	1:A:310:LEU:HD22	1.70	0.73
1:A:143:TRP:O	1:A:144:LEU:HD23	1.89	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:156:LEU:HB3	1:A:209:ILE:HD11	1.72	0.72
1:B:133:ILE:HG13	1:B:368:ILE:CD1	2.21	0.71
1:A:89:MET:HB3	1:A:90:MET:HE2	1.71	0.71
1:A:156:LEU:O	1:A:208:ASP:HB2	1.91	0.71
1:B:137:GLU:HB3	1:B:395:ILE:HA	1.73	0.69
1:A:157:LEU:HB2	1:A:159:LEU:HD12	1.74	0.69
1:B:194:ALA:O	1:B:198:ILE:HG13	1.92	0.69
1:B:111:PRO:HB3	1:B:351:HIS:CD2	2.28	0.69
1:B:122:ARG:HA	1:B:359:VAL:HG21	1.75	0.69
1:A:358:ARG:NH2	4:A:545:HOH:O	2.24	0.68
1:B:67:ASN:HD21	1:B:70:ALA:HB3	1.57	0.68
1:A:159:LEU:O	1:A:161:PRO:HD3	1.94	0.68
1:A:401:ARG:HH21	1:A:403:SER:HB3	1.59	0.68
1:B:67:ASN:ND2	1:B:70:ALA:HB3	2.09	0.68
1:B:236:LEU:O	1:B:236:LEU:HG	1.94	0.67
1:A:121:LEU:HD21	1:A:152:LEU:HD22	1.77	0.67
1:A:146:ASN:HB2	4:A:539:HOH:O	1.94	0.67
1:B:131:ALA:O	1:B:132:ARG:HG2	1.95	0.67
1:B:337:HIS:HD2	1:B:339:SER:HB2	1.58	0.67
1:B:123:GLN:HG3	1:B:127:ASP:OD1	1.94	0.66
1:B:398:LYS:HB3	1:B:398:LYS:HZ3	1.57	0.66
1:A:111:PRO:HA	1:A:351:HIS:CD2	2.29	0.66
1:A:401:ARG:HH21	1:A:403:SER:CB	2.08	0.66
1:A:358:ARG:NE	4:A:545:HOH:O	2.24	0.66
1:A:209:ILE:O	1:A:212:ARG:HG2	1.95	0.66
1:A:55:VAL:O	1:A:61:ILE:HD11	1.97	0.65
1:B:346:ARG:HD3	1:B:347:CYS:N	2.11	0.65
1:B:179:ASN:O	1:B:181:GLU:N	2.29	0.65
1:A:126:ASN:ND2	1:A:363:GLU:OE2	2.27	0.65
1:B:267:HIS:HB2	1:B:270:LEU:HD12	1.79	0.65
1:A:213:VAL:O	1:A:216:SER:HB2	1.97	0.65
1:A:152:LEU:HD12	1:A:152:LEU:O	1.96	0.65
1:A:146:ASN:HD22	1:A:168:ARG:HD3	1.62	0.65
1:B:370:GLU:O	1:B:397:PRO:HD2	1.97	0.64
1:B:235:LEU:C	1:B:237:LEU:H	1.99	0.64
1:B:245:ARG:HA	1:B:245:ARG:NE	2.12	0.64
1:A:337:HIS:O	1:A:338:LEU:HD23	1.97	0.64
1:B:125:THR:HG23	1:B:148:ILE:HD11	1.80	0.64
1:B:35:ARG:HD2	1:B:36:ASP:N	2.13	0.64
1:A:130:ASP:OD2	1:A:403:SER:HB2	1.98	0.63
1:B:80:ARG:HD3	1:B:81:TYR:H	1.64	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:243:THR:HG23	1:B:353:ILE:HD13	1.80	0.63
1:A:367:ARG:HH12	1:A:402:LEU:HG	1.63	0.63
1:A:348:LEU:O	1:A:348:LEU:HD22	1.99	0.63
1:A:250:VAL:O	1:A:254:LEU:HG	1.98	0.62
1:A:284:PRO:HB3	1:A:387:ALA:O	1.99	0.62
1:A:104:LEU:HD11	1:A:218:ILE:HD11	1.80	0.62
1:B:93:GLN:HE21	1:B:93:GLN:N	1.97	0.62
1:A:367:ARG:NH1	1:A:402:LEU:HG	2.14	0.62
1:A:234:ILE:HD12	2:A:450:HEM:CMD	2.30	0.62
1:B:76:VAL:HG13	1:B:77:THR:N	2.15	0.61
1:B:379:CYS:HB3	1:B:389:MET:HE3	1.81	0.61
1:A:164:GLY:HA3	1:A:168:ARG:NH2	2.15	0.61
1:B:175:THR:HG22	1:B:175:THR:O	2.01	0.61
1:A:217:LYS:HG2	1:A:222:SER:CA	2.29	0.61
1:A:268:PRO:HA	1:A:271:ILE:HD12	1.82	0.61
1:B:24:ASP:OD1	1:B:26:THR:HG23	2.01	0.61
1:A:55:VAL:HB	1:A:310:LEU:HD23	1.83	0.61
1:A:129:ILE:O	1:A:133:ILE:HB	2.00	0.61
1:B:382:LEU:O	1:B:387:ALA:HB1	2.01	0.60
1:B:107:LYS:HD3	1:B:212:ARG:CZ	2.31	0.60
1:A:172:TRP:O	1:A:177:VAL:HG23	2.01	0.60
4:A:511:HOH:O	1:B:327:ASN:HA	2.02	0.60
1:A:12:THR:HG23	1:A:13:THR:N	2.16	0.60
1:A:90:MET:O	2:A:450:HEM:HBD2	2.02	0.60
1:A:122:ARG:HD3	1:A:363:GLU:OE2	2.02	0.60
1:A:11:PHE:CD2	1:A:44:GLY:HA3	2.37	0.60
1:B:132:ARG:HB2	1:B:143:TRP:CZ2	2.37	0.60
1:A:33:ALA:O	1:A:36:ASP:HB2	2.01	0.59
1:A:177:VAL:HG12	1:A:177:VAL:O	2.00	0.59
1:B:217:LYS:HG2	1:B:222:SER:HA	1.83	0.59
1:A:31:PHE:CD1	1:A:314:ILE:HD11	2.38	0.59
1:B:345:HIS:HA	2:B:450:HEM:O1D	2.02	0.59
1:B:268:PRO:HA	1:B:271:ILE:HD13	1.85	0.59
1:B:158:GLY:CA	1:B:201:ARG:HH22	2.13	0.59
1:A:129:ILE:HD13	1:A:367:ARG:HE	1.67	0.59
1:A:218:ILE:O	1:A:219:ASP:HB2	2.03	0.59
1:B:76:VAL:HG13	1:B:77:THR:H	1.67	0.58
1:B:146:ASN:HB3	1:B:168:ARG:NH2	2.18	0.58
1:B:203:THR:C	1:B:205:PRO:HD3	2.23	0.58
1:B:253:ARG:CZ	1:B:328:ILE:HD12	2.33	0.58
1:A:12:THR:HA	4:A:505:HOH:O	2.02	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:111:PRO:HG2	1:B:112:GLU:OE1	2.03	0.58
1:A:234:ILE:HD12	2:A:450:HEM:HMD1	1.85	0.58
1:B:231:PHE:HA	1:B:234:ILE:HG22	1.84	0.58
1:B:237:LEU:C	1:B:237:LEU:HD23	2.24	0.58
1:A:35:ARG:HD2	1:A:35:ARG:C	2.24	0.58
1:A:395:ILE:O	1:A:395:ILE:HG13	2.04	0.58
1:A:28:HIS:HE1	1:A:282:TYR:CE1	2.21	0.57
1:A:36:ASP:O	1:A:39:GLU:HG3	2.03	0.57
1:B:42:PRO:HB3	1:B:60:GLU:HG2	1.85	0.57
1:A:181:GLU:O	1:A:184:ALA:N	2.35	0.57
1:A:111:PRO:HA	1:A:351:HIS:HD2	1.67	0.57
1:A:121:LEU:HD21	1:A:152:LEU:CD2	2.34	0.57
1:A:252:TRP:HD1	1:A:373:LEU:HD21	1.69	0.57
1:B:46:SER:O	1:B:51:GLY:HA2	2.05	0.57
1:B:134:GLU:HG2	1:B:399:GLY:O	2.04	0.57
1:A:271:ILE:N	1:A:272:PRO:HD2	2.20	0.57
1:B:384:GLY:O	4:B:525:HOH:O	2.18	0.57
1:B:336:ARG:HG2	4:B:526:HOH:O	2.04	0.56
1:B:74:LYS:CG	1:B:290:LEU:HD23	2.35	0.56
1:A:243:THR:HG23	1:A:353:ILE:HG22	1.88	0.56
1:A:214:ILE:HB	1:A:215:MET:HE2	1.86	0.56
1:B:109:PHE:CZ	2:B:450:HEM:HBC1	2.40	0.56
1:B:122:ARG:NH2	1:B:362:THR:HG21	2.10	0.56
1:A:398:LYS:HB2	1:A:398:LYS:NZ	2.21	0.56
1:A:252:TRP:CD1	1:A:373:LEU:HD21	2.41	0.56
1:A:285:ALA:HB3	4:A:501:HOH:O	2.05	0.56
1:A:358:ARG:CZ	4:A:545:HOH:O	2.54	0.56
1:A:123:GLN:O	1:A:127:ASP:HB2	2.06	0.56
1:B:230:GLY:O	1:B:234:ILE:HG22	2.05	0.56
1:A:172:TRP:NE1	1:A:177:VAL:HG21	2.21	0.56
1:B:150:ALA:HA	1:B:240:ILE:CD1	2.37	0.56
1:B:68:THR:HG22	1:B:344:ILE:HD11	1.87	0.55
1:A:129:ILE:HD12	1:A:130:ASP:N	2.21	0.55
1:B:64:VAL:HG11	1:B:310:LEU:HD21	1.89	0.55
1:A:175:THR:O	1:A:176:HIS:HB3	2.07	0.55
1:B:252:TRP:HB2	1:B:392:VAL:HG11	1.88	0.55
1:A:246:PHE:O	1:A:249:SER:HB2	2.07	0.55
1:B:62:GLN:C	1:B:64:VAL:H	2.10	0.55
1:B:71:PHE:HB3	1:B:289:ARG:HD2	1.88	0.55
1:A:277:GLU:HA	1:A:335:ASN:HD21	1.72	0.55
1:B:35:ARG:HD2	1:B:35:ARG:C	2.27	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:100:LYS:HD3	1:B:218:ILE:HG21	1.87	0.55
1:B:292:THR:O	1:B:304:PRO:HG3	2.07	0.55
1:A:326:ASP:HB3	1:B:263:ARG:CZ	2.36	0.55
1:A:349:GLY:O	1:A:353:ILE:HD13	2.07	0.54
1:A:186:ILE:HA	1:A:189:GLU:OE1	2.07	0.54
1:B:152:LEU:HD12	1:B:152:LEU:O	2.07	0.54
1:A:8:THR:N	4:A:515:HOH:O	2.41	0.54
1:A:62:GLN:O	1:A:66:GLN:HG3	2.07	0.54
1:A:270:LEU:C	1:A:272:PRO:HD2	2.28	0.54
1:B:133:ILE:CG1	1:B:368:ILE:HD11	2.31	0.54
1:A:95:ASP:OD1	1:A:99:LYS:N	2.37	0.54
1:B:379:CYS:CB	1:B:389:MET:HE3	2.37	0.54
1:B:398:LYS:NZ	1:B:398:LYS:CB	2.64	0.54
1:A:179:ASN:ND2	1:A:182:GLU:HB2	2.23	0.54
1:B:204:ASN:N	1:B:205:PRO:HD3	2.23	0.54
1:B:243:THR:HA	2:B:450:HEM:HBB1	1.90	0.54
1:A:213:VAL:HA	1:A:216:SER:OG	2.08	0.53
1:A:152:LEU:HD12	1:A:152:LEU:C	2.28	0.53
1:A:179:ASN:CG	1:A:180:PRO:HD2	2.29	0.53
1:B:123:GLN:O	1:B:126:ASN:N	2.41	0.53
1:B:231:PHE:HA	1:B:234:ILE:CG2	2.38	0.53
1:A:367:ARG:NH2	1:A:401:ARG:HA	2.22	0.53
1:A:401:ARG:HE	1:A:403:SER:HB3	1.74	0.53
1:B:174:ILE:C	1:B:176:HIS:H	2.11	0.53
1:B:126:ASN:OD1	1:B:363:GLU:HB3	2.08	0.53
1:A:76:VAL:HG13	1:A:77:THR:N	2.23	0.53
1:A:153:THR:O	1:A:156:LEU:N	2.36	0.53
1:A:154:ALA:HA	1:A:159:LEU:HB2	1.90	0.53
1:A:359:VAL:O	1:A:360:ALA:C	2.47	0.53
1:A:381:TRP:CZ3	1:A:388:GLY:HA2	2.44	0.53
1:A:163:ASP:HB2	1:A:167:TYR:CE2	2.44	0.53
1:A:289:ARG:O	1:A:307:THR:HG23	2.08	0.53
1:B:358:ARG:NH2	4:B:510:HOH:O	2.42	0.53
1:B:107:LYS:HD3	1:B:212:ARG:NH1	2.23	0.52
1:B:350:ALA:O	1:B:353:ILE:HG22	2.09	0.52
1:B:67:ASN:HD21	1:B:70:ALA:CB	2.21	0.52
1:B:272:PRO:O	1:B:274:ALA:N	2.42	0.52
1:A:24:ASP:OD2	1:A:26:THR:HG23	2.08	0.52
1:B:121:LEU:C	1:B:123:GLN:H	2.12	0.52
1:B:351:HIS:CE1	4:B:515:HOH:O	2.61	0.52
1:B:76:VAL:HA	1:B:288:GLY:O	2.10	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:160:PRO:HB3	1:B:162:GLU:OE1	2.08	0.52
1:A:102:ARG:C	1:A:104:LEU:H	2.13	0.52
1:B:359:VAL:HG23	1:B:363:GLU:HG2	1.91	0.52
1:A:89:MET:HG2	1:A:231:PHE:CE1	2.45	0.52
1:A:146:ASN:CB	4:A:539:HOH:O	2.56	0.52
1:A:175:THR:O	1:A:176:HIS:CB	2.58	0.52
1:B:284:PRO:O	1:B:386:VAL:HA	2.10	0.52
1:A:132:ARG:HA	1:A:135:LEU:HD13	1.92	0.51
1:B:280:ARG:HG3	1:B:337:HIS:HB3	1.90	0.51
1:A:41:THR:O	1:A:41:THR:HG22	2.11	0.51
1:A:270:LEU:CD1	4:A:524:HOH:O	2.47	0.51
1:B:269:GLU:O	1:B:272:PRO:HD2	2.10	0.51
1:A:272:PRO:HG2	1:A:273:ASN:H	1.76	0.51
1:A:276:ASP:OD1	1:A:354:ARG:NH1	2.43	0.51
1:B:359:VAL:O	1:B:360:ALA:C	2.48	0.51
1:B:140:ALA:HB3	1:B:392:VAL:HG23	1.92	0.51
1:B:228:LEU:C	1:B:230:GLY:H	2.13	0.51
1:B:229:ILE:O	1:B:229:ILE:HG22	2.11	0.51
1:A:118:THR:C	1:A:120:GLN:H	2.14	0.51
1:B:337:HIS:CD2	1:B:339:SER:HB2	2.44	0.51
1:A:354:ARG:HG2	1:A:354:ARG:HH11	1.76	0.51
1:B:253:ARG:NH2	1:B:328:ILE:HD12	2.25	0.51
1:B:93:GLN:N	1:B:93:GLN:NE2	2.58	0.51
1:A:84:GLY:HA3	4:A:534:HOH:O	2.11	0.51
1:A:179:ASN:OD1	1:A:182:GLU:HB2	2.11	0.51
1:A:267:HIS:N	1:A:268:PRO:HD3	2.26	0.51
1:B:235:LEU:C	1:B:237:LEU:N	2.65	0.51
1:B:268:PRO:HA	1:B:271:ILE:CD1	2.41	0.51
1:B:352:LEU:O	1:B:356:GLU:HG3	2.11	0.51
1:A:153:THR:O	1:A:154:ALA:C	2.50	0.51
1:A:179:ASN:CG	1:A:182:GLU:HB2	2.31	0.51
1:B:336:ARG:NH1	1:B:336:ARG:HB3	2.26	0.51
1:A:170:TRP:HB3	1:A:190:LEU:HD12	1.93	0.50
1:A:396:PHE:HB2	1:A:397:PRO:CD	2.40	0.50
1:B:26:THR:HB	1:B:27:PRO:HD2	1.93	0.50
1:B:178:GLU:O	1:B:179:ASN:HB2	2.10	0.50
1:B:181:GLU:HA	1:B:181:GLU:OE1	2.11	0.50
1:A:326:ASP:HB3	1:B:263:ARG:HH21	1.72	0.50
1:B:102:ARG:C	1:B:104:LEU:H	2.14	0.50
1:A:76:VAL:HG13	1:A:77:THR:HG23	1.93	0.50
1:A:139:ASP:HB3	1:A:142:THR:OG1	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:172:TRP:C	1:A:175:THR:HG22	2.32	0.50
1:B:43:ILE:HG12	1:B:55:VAL:HG13	1.92	0.50
1:B:148:ILE:N	1:B:149:PRO:HD2	2.26	0.50
1:B:359:VAL:HG23	1:B:363:GLU:CG	2.41	0.50
1:A:156:LEU:HB3	1:A:209:ILE:CD1	2.41	0.50
1:B:117:PHE:O	1:B:118:THR:C	2.49	0.50
1:B:176:HIS:O	1:B:177:VAL:C	2.50	0.50
1:A:223:LEU:N	1:A:223:LEU:HD12	2.27	0.50
1:A:397:PRO:HG2	4:A:527:HOH:O	2.10	0.50
1:B:353:ILE:HG23	1:B:354:ARG:N	2.27	0.50
1:A:164:GLY:HA3	1:A:168:ARG:HH22	1.77	0.50
1:A:203:THR:C	1:A:205:PRO:HD3	2.32	0.50
1:B:102:ARG:O	1:B:104:LEU:N	2.42	0.50
1:B:243:THR:HG23	1:B:353:ILE:CD1	2.41	0.50
1:B:122:ARG:O	1:B:122:ARG:HG2	2.10	0.49
1:A:108:PRO:HG3	1:A:212:ARG:HD3	1.94	0.49
1:A:292:THR:C	1:A:304:PRO:HB3	2.33	0.49
1:A:95:ASP:OD1	1:A:98:HIS:HB3	2.12	0.49
1:A:269:GLU:HG2	1:A:270:LEU:HD13	1.95	0.49
1:A:351:HIS:O	1:A:355:VAL:HG23	2.11	0.49
1:B:159:LEU:HB3	1:B:167:TYR:OH	2.13	0.49
1:B:237:LEU:HD23	1:B:237:LEU:O	2.12	0.49
1:A:86:PHE:HE2	1:A:226:ASP:HA	1.78	0.49
1:A:129:ILE:HD12	1:A:129:ILE:C	2.33	0.49
1:A:156:LEU:O	1:A:209:ILE:HG13	2.11	0.49
1:B:122:ARG:HD2	4:B:503:HOH:O	2.12	0.49
1:B:124:SER:O	1:B:128:LEU:HG	2.13	0.49
1:B:67:ASN:ND2	1:B:70:ALA:H	2.11	0.49
1:B:162:GLU:CD	1:B:162:GLU:H	2.16	0.49
1:B:216:SER:C	1:B:217:LYS:HG3	2.32	0.49
1:B:271:ILE:O	1:B:275:VAL:HG23	2.11	0.49
1:A:171:VAL:HA	1:A:174:ILE:HD12	1.95	0.49
1:B:375:PRO:CD	1:B:395:ILE:HD13	2.39	0.49
1:B:101:TYR:HA	1:B:104:LEU:HD12	1.95	0.48
1:B:174:ILE:O	1:B:176:HIS:N	2.46	0.48
1:B:377:LYS:HB3	1:B:393:PRO:HG3	1.94	0.48
1:A:198:ILE:HD11	1:A:229:ILE:HG12	1.94	0.48
1:A:245:ARG:NE	1:A:245:ARG:HA	2.28	0.48
1:B:56:ALA:HB1	1:B:314:ILE:HG21	1.95	0.48
1:B:89:MET:HG3	1:B:90:MET:HG3	1.95	0.48
1:B:109:PHE:HA	1:B:114:THR:CG2	2.42	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:10:LEU:HB2	1:A:34:LEU:HD13	1.94	0.48
1:A:102:ARG:O	1:A:104:LEU:N	2.47	0.48
1:A:130:ASP:OD1	1:A:401:ARG:HB2	2.12	0.48
1:B:73:ASN:HB3	1:B:91:ALA:O	2.13	0.48
1:B:129:ILE:O	1:B:131:ALA:N	2.43	0.48
1:B:329:VAL:CG1	1:B:331:GLU:HG2	2.44	0.48
1:B:110:SER:O	1:B:112:GLU:N	2.46	0.48
1:A:261:ARG:HG3	1:A:261:ARG:HH11	1.78	0.48
1:A:201:ARG:C	1:A:203:THR:H	2.16	0.48
1:A:235:LEU:C	1:A:237:LEU:H	2.16	0.48
1:A:263:ARG:NH2	1:B:326:ASP:HB3	2.29	0.48
1:B:12:THR:HG23	1:B:13:THR:HG23	1.95	0.48
1:B:130:ASP:O	1:B:130:ASP:OD2	2.32	0.48
1:B:228:LEU:C	1:B:230:GLY:N	2.65	0.48
1:B:274:ALA:C	1:B:276:ASP:N	2.66	0.47
1:A:152:LEU:HD11	1:A:156:LEU:HD21	1.95	0.47
1:B:241:ASP:O	1:B:242:ALA:C	2.51	0.47
1:B:361:ILE:O	1:B:364:PHE:N	2.47	0.47
1:B:217:LYS:HE3	1:B:222:SER:OG	2.15	0.47
1:A:154:ALA:O	1:A:159:LEU:N	2.46	0.47
1:A:235:LEU:C	1:A:237:LEU:N	2.68	0.47
1:A:357:ALA:O	1:A:358:ARG:C	2.53	0.47
1:B:346:ARG:CZ	1:B:350:ALA:HB1	2.44	0.47
1:A:163:ASP:O	1:A:164:GLY:C	2.53	0.47
1:A:361:ILE:HG23	1:A:362:THR:N	2.29	0.47
1:A:365:LEU:O	1:A:369:PRO:HG3	2.14	0.47
1:B:43:ILE:HG22	1:B:44:GLY:N	2.30	0.47
1:B:20:PRO:HD2	1:B:30:PHE:CD2	2.50	0.47
1:A:11:PHE:CG	1:A:44:GLY:HA3	2.48	0.47
1:A:55:VAL:HG12	1:A:61:ILE:CG1	2.45	0.47
1:A:126:ASN:C	1:A:129:ILE:HG13	2.35	0.47
1:A:187:PHE:O	1:A:191:VAL:HG23	2.15	0.47
1:B:45:TRP:CZ2	1:B:51:GLY:HA3	2.50	0.47
1:B:153:THR:O	1:B:154:ALA:C	2.53	0.47
1:B:195:ARG:HD3	1:B:225:GLU:OE2	2.14	0.47
1:B:218:ILE:C	1:B:220:GLY:H	2.18	0.47
1:B:234:ILE:HG13	2:B:450:HEM:HMD1	1.94	0.47
1:B:272:PRO:C	1:B:274:ALA:H	2.18	0.47
1:A:112:GLU:OE1	1:A:112:GLU:N	2.45	0.47
1:B:41:THR:N	1:B:42:PRO:HD3	2.30	0.47
1:B:271:ILE:HB	1:B:272:PRO:HD3	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:269:GLU:HG2	1:A:270:LEU:N	2.30	0.47
1:A:370:GLU:CD	4:A:549:HOH:O	2.50	0.47
1:B:41:THR:HG22	1:B:41:THR:O	2.14	0.47
1:B:98:HIS:CE1	1:B:344:ILE:HB	2.50	0.47
1:B:110:SER:C	1:B:112:GLU:H	2.18	0.47
1:B:156:LEU:O	1:B:208:ASP:HB2	2.15	0.47
1:A:56:ALA:HB1	1:A:314:ILE:HG21	1.96	0.46
1:B:354:ARG:HH11	1:B:354:ARG:HG2	1.78	0.46
1:A:345:HIS:O	2:A:450:HEM:HAA2	2.15	0.46
1:A:12:THR:CG2	1:A:13:THR:N	2.79	0.46
1:A:155:ILE:HD11	1:A:161:PRO:HG3	1.96	0.46
1:A:264:LEU:CD1	1:A:361:ILE:HD11	2.40	0.46
1:B:12:THR:HG23	1:B:13:THR:N	2.29	0.46
1:B:100:LYS:HB3	1:B:218:ILE:HD13	1.98	0.46
1:B:361:ILE:O	1:B:363:GLU:N	2.49	0.46
1:A:78:PHE:HA	1:A:79:PRO:C	2.35	0.46
1:B:304:PRO:C	1:B:306:GLN:H	2.19	0.46
1:B:376:ASN:O	1:B:377:LYS:HG2	2.16	0.46
1:A:354:ARG:NH1	1:A:354:ARG:HG2	2.30	0.46
1:B:237:LEU:HD21	4:B:507:HOH:O	2.16	0.46
1:B:179:ASN:ND2	1:B:180:PRO:HD2	2.31	0.46
1:B:361:ILE:CG2	1:B:365:LEU:HD12	2.46	0.46
1:A:126:ASN:HA	1:A:129:ILE:HG12	1.98	0.46
1:A:177:VAL:O	1:A:179:ASN:N	2.49	0.46
1:B:201:ARG:O	1:B:214:ILE:HD12	2.16	0.46
1:A:212:ARG:HG3	1:A:213:VAL:N	2.31	0.46
1:A:278:LEU:HD23	1:A:278:LEU:HA	1.68	0.46
1:A:77:THR:HB	1:A:81:TYR:CD1	2.51	0.45
1:A:176:HIS:CD2	1:A:178:GLU:H	2.34	0.45
1:A:123:GLN:O	1:A:127:ASP:N	2.49	0.45
1:A:129:ILE:HD13	1:A:367:ARG:NE	2.30	0.45
1:A:352:LEU:O	1:A:356:GLU:HG3	2.16	0.45
1:B:254:LEU:HB3	1:B:371:PHE:HZ	1.81	0.45
1:A:102:ARG:C	1:A:104:LEU:N	2.69	0.45
1:A:274:ALA:HB2	1:A:330:ILE:HB	1.98	0.45
1:B:78:PHE:HA	1:B:80:ARG:N	2.32	0.45
1:B:217:LYS:HE2	1:B:220:GLY:O	2.16	0.45
1:B:67:ASN:HD21	1:B:70:ALA:H	1.63	0.45
1:B:363:GLU:OE1	1:B:363:GLU:HA	2.16	0.45
1:B:403:SER:O	1:B:404:GLU:CB	2.63	0.45
1:A:121:LEU:HD11	1:A:152:LEU:CD2	2.47	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:345:HIS:HB3	2:A:450:HEM:CGA	2.47	0.45
1:A:141:ALA:HA	1:A:145:ALA:HB3	1.99	0.45
1:B:80:ARG:HD3	1:B:80:ARG:C	2.37	0.45
1:B:109:PHE:HA	1:B:114:THR:HG21	1.98	0.45
1:A:157:LEU:HB2	1:A:159:LEU:CD1	2.43	0.45
1:A:181:GLU:C	1:A:183:GLY:N	2.70	0.45
1:A:402:LEU:O	4:A:528:HOH:O	2.21	0.45
1:B:42:PRO:HB3	1:B:60:GLU:CD	2.36	0.45
1:B:88:LEU:O	1:B:89:MET:HB3	2.16	0.45
1:A:172:TRP:O	1:A:175:THR:HG22	2.17	0.45
1:B:79:PRO:O	1:B:80:ARG:C	2.54	0.45
1:B:111:PRO:O	1:B:115:ASP:HB2	2.15	0.45
1:B:359:VAL:HA	1:B:362:THR:HB	1.98	0.45
1:B:371:PHE:CB	1:B:396:PHE:HB3	2.47	0.45
1:A:109:PHE:CG	1:A:348:LEU:HD11	2.51	0.45
1:A:118:THR:O	1:A:120:GLN:N	2.50	0.45
1:A:130:ASP:HB3	1:A:401:ARG:NE	2.31	0.45
1:B:198:ILE:CG2	1:B:228:LEU:HD13	2.47	0.45
1:A:30:PHE:N	4:A:512:HOH:O	2.39	0.44
1:A:236:LEU:HD12	1:A:240:ILE:CD1	2.48	0.44
1:B:122:ARG:O	1:B:122:ARG:CG	2.65	0.44
1:B:202:ARG:O	1:B:202:ARG:HG3	2.16	0.44
1:B:337:HIS:HD2	1:B:339:SER:CB	2.28	0.44
1:B:90:MET:CE	1:B:102:ARG:HA	2.47	0.44
1:A:177:VAL:C	1:A:179:ASN:N	2.70	0.44
1:A:248:SER:CB	1:A:389:MET:O	2.65	0.44
1:B:42:PRO:HB3	1:B:60:GLU:CG	2.47	0.44
1:B:303:LYS:HB3	1:B:304:PRO:CD	2.48	0.44
1:A:71:PHE:HB3	1:A:289:ARG:HB3	1.99	0.44
1:A:170:TRP:O	1:A:174:ILE:HG13	2.17	0.44
1:A:170:TRP:CE3	1:A:236:LEU:HD21	2.53	0.44
1:A:330:ILE:HG12	4:A:503:HOH:O	2.17	0.44
1:B:195:ARG:HG2	1:B:229:ILE:HD11	1.99	0.44
1:A:181:GLU:C	1:A:183:GLY:H	2.21	0.44
1:A:381:TRP:NE1	1:A:382:LEU:O	2.51	0.44
1:B:9:SER:HB2	1:B:37:GLU:OE2	2.17	0.44
1:B:133:ILE:HD13	1:B:367:ARG:NH2	2.33	0.44
1:B:108:PRO:HB2	1:B:209:ILE:HD11	2.00	0.44
1:B:221:GLU:OE2	1:B:221:GLU:HA	2.18	0.44
1:A:255:ALA:HA	1:A:371:PHE:CE1	2.53	0.44
1:B:132:ARG:HG3	1:B:143:TRP:NE1	2.33	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:158:GLY:C	1:B:159:LEU:HD12	2.39	0.44
1:B:217:LYS:HA	1:B:223:LEU:CD1	2.47	0.44
1:A:168:ARG:NH1	1:A:168:ARG:HG3	2.33	0.43
1:A:217:LYS:HG2	1:A:222:SER:N	2.32	0.43
1:A:170:TRP:HE3	1:A:236:LEU:HD21	1.82	0.43
1:B:80:ARG:HD2	1:B:81:TYR:O	2.17	0.43
1:B:275:VAL:HG11	1:B:357:ALA:HB3	2.00	0.43
1:A:79:PRO:O	1:A:80:ARG:C	2.57	0.43
1:A:212:ARG:HH11	1:A:212:ARG:CB	2.26	0.43
1:A:381:TRP:CD1	1:A:382:LEU:O	2.71	0.43
1:B:123:GLN:C	1:B:125:THR:N	2.69	0.43
1:B:262:ARG:HG2	1:B:262:ARG:HH11	1.83	0.43
1:A:55:VAL:HG12	1:A:61:ILE:HG13	2.00	0.43
1:A:129:ILE:HD13	1:A:367:ARG:HH21	1.82	0.43
1:A:137:GLU:HB2	1:A:394:ILE:O	2.19	0.43
1:A:245:ARG:HD2	1:A:382:LEU:CD2	2.48	0.43
1:A:269:GLU:CG	1:A:270:LEU:HD13	2.48	0.43
1:B:155:ILE:HD11	1:B:161:PRO:HG3	1.99	0.43
1:B:270:LEU:O	1:B:271:ILE:C	2.56	0.43
1:A:9:SER:O	1:A:12:THR:HG22	2.19	0.43
1:A:166:THR:O	1:A:169:ARG:HB3	2.18	0.43
1:B:93:GLN:HG3	1:B:97:VAL:CG1	2.49	0.43
1:B:109:PHE:CE1	2:B:450:HEM:HBC1	2.53	0.43
1:A:218:ILE:O	1:A:219:ASP:CB	2.66	0.43
1:B:11:PHE:HD2	1:B:54:VAL:HB	1.82	0.43
1:B:191:VAL:HG23	1:B:229:ILE:HG21	2.00	0.43
1:A:126:ASN:HA	1:A:129:ILE:CG1	2.48	0.43
1:B:379:CYS:HB3	1:B:389:MET:CE	2.49	0.43
1:A:143:TRP:NE1	1:A:144:LEU:HD21	2.34	0.43
1:B:119:GLU:C	1:B:121:LEU:N	2.71	0.43
1:A:98:HIS:HE1	1:A:344:ILE:O	2.02	0.43
1:B:122:ARG:CG	1:B:363:GLU:OE2	2.66	0.43
1:A:26:THR:OG1	1:A:28:HIS:HB2	2.19	0.42
1:A:104:LEU:HD11	1:A:218:ILE:CD1	2.46	0.42
1:A:221:GLU:O	1:A:222:SER:O	2.37	0.42
1:B:11:PHE:CD2	1:B:54:VAL:HB	2.54	0.42
1:B:42:PRO:CB	1:B:60:GLU:HG2	2.49	0.42
1:A:58:TYR:HB3	4:A:519:HOH:O	2.19	0.42
1:A:139:ASP:O	1:A:143:TRP:HB3	2.18	0.42
1:A:361:ILE:HG23	1:A:362:THR:H	1.84	0.42
1:A:382:LEU:HG	1:A:383:MET:N	2.34	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:25:GLY:HA3	4:B:519:HOH:O	2.19	0.42
1:B:54:VAL:HG13	1:B:311:TRP:CD1	2.55	0.42
1:B:82:GLU:O	1:B:84:GLY:N	2.46	0.42
1:B:108:PRO:O	1:B:114:THR:HG22	2.18	0.42
1:B:228:LEU:O	1:B:230:GLY:N	2.53	0.42
1:A:243:THR:HG21	1:A:356:GLU:OE1	2.19	0.42
1:A:126:ASN:O	1:A:129:ILE:HD11	2.19	0.42
1:B:132:ARG:HD2	1:B:135:LEU:HD12	2.00	0.42
1:A:225:GLU:O	1:A:229:ILE:HG13	2.19	0.42
1:B:122:ARG:HG3	1:B:363:GLU:OE2	2.19	0.42
1:B:145:ALA:O	1:B:149:PRO:CD	2.67	0.42
1:B:374:ASP:HA	1:B:375:PRO:HD3	1.75	0.42
1:B:69:LYS:HD2	1:B:293:GLN:OE1	2.20	0.42
1:B:395:ILE:O	1:B:395:ILE:HG13	2.20	0.42
1:A:109:PHE:CD1	1:A:348:LEU:HD11	2.55	0.42
1:A:202:ARG:NH1	1:A:214:ILE:HG23	2.34	0.42
1:B:61:ILE:O	1:B:64:VAL:HB	2.19	0.42
1:A:24:ASP:HB3	1:B:262:ARG:HD3	2.02	0.42
1:A:76:VAL:CG1	1:A:77:THR:N	2.82	0.42
1:A:157:LEU:O	1:A:158:GLY:C	2.58	0.42
1:B:43:ILE:HB	1:B:300:ILE:HD12	2.00	0.42
1:B:175:THR:O	1:B:176:HIS:HB3	2.20	0.42
1:B:188:ALA:O	1:B:191:VAL:HG12	2.20	0.42
1:B:218:ILE:C	1:B:220:GLY:N	2.73	0.42
1:B:276:ASP:O	1:B:279:LEU:HB2	2.20	0.42
1:B:274:ALA:C	1:B:276:ASP:H	2.23	0.42
1:B:372:SER:O	1:B:395:ILE:N	2.45	0.42
1:A:174:ILE:HD11	1:A:190:LEU:HD13	2.01	0.41
1:B:145:ALA:O	1:B:149:PRO:HD2	2.19	0.41
1:A:173:ALA:HB1	1:A:183:GLY:HA2	2.02	0.41
1:A:245:ARG:HD2	1:A:382:LEU:HD22	2.01	0.41
1:A:390:LEU:HG	1:A:391:HIS:CE1	2.55	0.41
1:B:58:TYR:HA	1:B:315:ALA:HB1	2.01	0.41
1:B:79:PRO:O	1:B:80:ARG:O	2.38	0.41
1:A:170:TRP:CB	1:A:190:LEU:HD12	2.50	0.41
1:A:371:PHE:O	1:A:372:SER:HB3	2.20	0.41
1:B:60:GLU:OE1	1:B:60:GLU:N	2.51	0.41
1:B:76:VAL:CG1	1:B:77:THR:N	2.82	0.41
1:A:108:PRO:HG3	1:A:212:ARG:CD	2.49	0.41
1:A:397:PRO:O	1:A:398:LYS:C	2.59	0.41
1:B:354:ARG:HG2	1:B:354:ARG:NH1	2.36	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:132:ARG:C	1:A:134:GLU:N	2.74	0.41
1:A:313:PRO:O	1:A:317:ARG:NH1	2.52	0.41
1:B:78:PHE:CD2	1:B:307:THR:HG21	2.56	0.41
1:B:365:LEU:O	1:B:369:PRO:HD3	2.20	0.41
1:A:236:LEU:O	1:A:240:ILE:HD12	2.21	0.41
1:A:257:ASP:O	1:A:260:LEU:N	2.53	0.41
1:B:179:ASN:C	1:B:181:GLU:N	2.59	0.41
1:A:284:PRO:CB	1:A:387:ALA:O	2.68	0.41
1:B:68:THR:CG2	1:B:344:ILE:HD11	2.50	0.41
1:B:304:PRO:O	1:B:306:GLN:N	2.54	0.41
1:A:122:ARG:HD3	1:A:363:GLU:CD	2.40	0.41
1:A:159:LEU:HA	1:A:160:PRO:HD3	1.87	0.41
1:A:191:VAL:O	1:A:195:ARG:HG3	2.21	0.41
1:A:203:THR:O	1:A:205:PRO:HD3	2.21	0.41
1:A:273:ASN:HB2	4:A:517:HOH:O	2.20	0.41
1:A:293:GLN:NE2	1:A:294:GLU:O	2.53	0.41
1:B:61:ILE:HD12	1:B:315:ALA:HB2	2.03	0.41
1:A:56:ALA:HB1	1:A:314:ILE:CG2	2.50	0.41
1:B:88:LEU:O	1:B:89:MET:CB	2.69	0.41
1:B:192:ALA:O	1:B:195:ARG:HB2	2.21	0.41
1:B:346:ARG:HG2	1:B:346:ARG:HH11	1.86	0.41
1:A:109:PHE:CE1	2:A:450:HEM:HBC2	2.56	0.40
1:A:132:ARG:HD3	1:A:143:TRP:CD2	2.56	0.40
1:A:401:ARG:NH2	1:A:403:SER:HB3	2.31	0.40
1:B:194:ALA:O	1:B:198:ILE:CG1	2.66	0.40
1:B:312:PHE:N	1:B:313:PRO:HD2	2.36	0.40
1:B:392:VAL:HG23	1:B:392:VAL:O	2.21	0.40
1:A:21:LEU:CD2	1:A:27:PRO:HB3	2.51	0.40
1:A:231:PHE:O	1:A:232:PHE:C	2.59	0.40
1:A:404:GLU:O	1:A:404:GLU:OE1	2.39	0.40
1:B:272:PRO:C	1:B:274:ALA:N	2.74	0.40
1:B:384:GLY:O	1:B:385:GLN:C	2.60	0.40
1:B:125:THR:HG23	1:B:148:ILE:CD1	2.47	0.40
1:B:132:ARG:HB2	1:B:143:TRP:CE2	2.57	0.40
1:B:154:ALA:O	1:B:158:GLY:N	2.55	0.40
1:A:209:ILE:O	1:A:210:MET:C	2.59	0.40
1:A:254:LEU:O	1:A:261:ARG:NH1	2.55	0.40
1:A:353:ILE:HG21	2:A:450:HEM:CBB	2.52	0.40
1:B:77:THR:HG21	1:B:81:TYR:CD2	2.56	0.40
1:B:129:ILE:C	1:B:131:ALA:H	2.24	0.40
1:A:160:PRO:HB2	1:A:163:ASP:OD1	2.22	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:93:GLN:HG3	1:B:97:VAL:HG12	2.03	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:366:LYS:NZ	4:A:530:HOH:O[1_556]	2.06	0.14

## 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	395/397 (100%)	313 (79%)	68 (17%)	14 (4%)	3	17
1	B	395/397 (100%)	298 (75%)	69 (18%)	28 (7%)	1	5
All	All	790/794 (100%)	611 (77%)	137 (17%)	42 (5%)	2	10

All (42) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	80	ARG
1	A	118	THR
1	A	180	PRO
1	A	205	PRO
1	A	222	SER
1	B	80	ARG
1	B	83	THR
1	B	118	THR
1	B	175	THR
1	B	178	GLU
1	B	362	THR
1	B	398	LYS

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Mol	Chain	Res	Type
1	A	119	GLU
1	A	178	GLU
1	A	337	HIS
1	B	67	ASN
1	B	177	VAL
1	B	208	ASP
1	B	273	ASN
1	A	82	GLU
1	A	103	GLN
1	A	321	ALA
1	B	63	ALA
1	B	103	GLN
1	B	111	PRO
1	B	272	PRO
1	B	305	GLY
1	B	361	ILE
1	B	42	PRO
1	B	143	TRP
1	B	236	LEU
1	B	298	GLY
1	B	321	ALA
1	A	139	ASP
1	A	208	ASP
1	B	132	ARG
1	A	116	LEU
1	B	158	GLY
1	B	180	PRO
1	B	339	SER
1	B	179	ASN
1	B	375	PRO

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	332/332 (100%)	307 (92%)	25 (8%)	13 39

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	332/332 (100%)	310 (93%)	22 (7%)	16	43
All	All	664/664 (100%)	617 (93%)	47 (7%)	14	41

All (47) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	THR
1	A	27	PRO
1	A	32	GLU
1	A	73	ASN
1	A	78	PHE
1	A	89	MET
1	A	127	ASP
1	A	152	LEU
1	A	166	THR
1	A	181	GLU
1	A	209	ILE
1	A	212	ARG
1	A	226	ASP
1	A	234	ILE
1	A	243	THR
1	A	270	LEU
1	A	275	VAL
1	A	276	ASP
1	A	293	GLN
1	A	331	GLU
1	A	346	ARG
1	A	348	LEU
1	A	353	ILE
1	A	379	CYS
1	A	404	GLU
1	B	42	PRO
1	B	80	ARG
1	B	85	GLU
1	B	93	GLN
1	B	123	GLN
1	B	137	GLU
1	B	168	ARG
1	B	182	GLU
1	B	203	THR
1	B	235	LEU
1	B	269	GLU

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Mol	Chain	Res	Type
1	B	292	THR
1	B	342	HIS
1	B	344	ILE
1	B	346	ARG
1	B	347	CYS
1	B	358	ARG
1	B	359	VAL
1	B	371	PHE
1	B	377	LYS
1	B	398	LYS
1	B	404	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	28	HIS
1	A	52	HIS
1	A	66	GLN
1	A	103	GLN
1	A	146	ASN
1	A	176	HIS
1	A	293	GLN
1	A	335	ASN
1	A	351	HIS
1	A	391	HIS
1	B	66	GLN
1	B	67	ASN
1	B	103	GLN
1	B	179	ASN
1	B	327	ASN

### 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 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
3	CNL	A	500	-	12,12,12	2.59	7 (58%)	19,20,20	1.23	1 (5%)
2	HEM	A	450	1	41,50,50	1.40	5 (12%)	45,82,82	1.17	4 (8%)
2	HEM	B	450	1	41,50,50	1.34	5 (12%)	45,82,82	1.74	6 (13%)
3	CNL	B	500	-	12,12,12	2.45	7 (58%)	19,20,20	1.23	1 (5%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	CNL	A	500	-	-	-	0/3/2/2
2	HEM	A	450	1	-	4/12/54/54	-
2	HEM	B	450	1	-	9/12/54/54	-
3	CNL	B	500	-	-	-	0/3/2/2

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	450	HEM	C3C-C2C	-4.38	1.34	1.40
2	A	450	HEM	C3C-CAC	-4.28	1.39	1.47
2	B	450	HEM	C3C-CAC	-3.60	1.40	1.47
3	A	500	CNL	C2-C3	3.51	1.60	1.53
3	A	500	CNL	C6-C5	3.44	1.60	1.53
3	A	500	CNL	O-C1	3.42	1.51	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	500	CNL	C2-C3	3.29	1.60	1.53
3	B	500	CNL	C6-C5	3.26	1.60	1.53
3	B	500	CNL	O-C1	3.21	1.51	1.45
3	A	500	CNL	O-C8	3.17	1.51	1.45
3	A	500	CNL	C5-C4	3.03	1.60	1.53
2	B	450	HEM	CHA-C4D	2.93	1.42	1.35
3	B	500	CNL	O-C8	2.91	1.51	1.45
3	B	500	CNL	C3-C4	2.81	1.60	1.53
3	B	500	CNL	C5-C4	2.77	1.60	1.53
2	A	450	HEM	CAB-C3B	-2.66	1.40	1.47
3	A	500	CNL	C3-C4	2.62	1.59	1.53
2	B	450	HEM	CHB-C1B	2.59	1.41	1.35
2	B	450	HEM	C1A-NA	2.58	1.41	1.36
2	A	450	HEM	CHB-C1B	2.51	1.41	1.35
2	B	450	HEM	CAB-C3B	-2.39	1.40	1.47
3	A	500	CNL	C6-C1	2.32	1.60	1.53
2	A	450	HEM	CHA-C4D	2.19	1.40	1.35
3	B	500	CNL	C2-C1	2.15	1.59	1.53

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	450	HEM	CBA-CAA-C2A	8.33	126.83	112.62
3	B	500	CNL	C10-C8-C9	-4.26	103.26	110.51
3	A	500	CNL	C10-C8-C9	-4.22	103.33	110.51
2	B	450	HEM	C4A-C3A-C2A	3.35	109.33	107.00
2	A	450	HEM	CBA-CAA-C2A	3.34	118.33	112.62
2	B	450	HEM	CAA-C2A-C3A	-3.17	118.13	127.25
2	A	450	HEM	CAD-C3D-C4D	2.72	129.42	124.66
2	A	450	HEM	C4C-CHD-C1D	2.71	126.13	122.56
2	B	450	HEM	CAD-C3D-C4D	2.51	129.05	124.66
2	B	450	HEM	CBD-CAD-C3D	2.26	118.92	112.63
2	A	450	HEM	C4B-CHC-C1C	2.23	125.50	122.56
2	B	450	HEM	C4B-CHC-C1C	2.05	125.27	122.56

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	450	HEM	C1A-C2A-CAA-CBA
2	B	450	HEM	C3A-C2A-CAA-CBA
2	B	450	HEM	C4D-C3D-CAD-CBD

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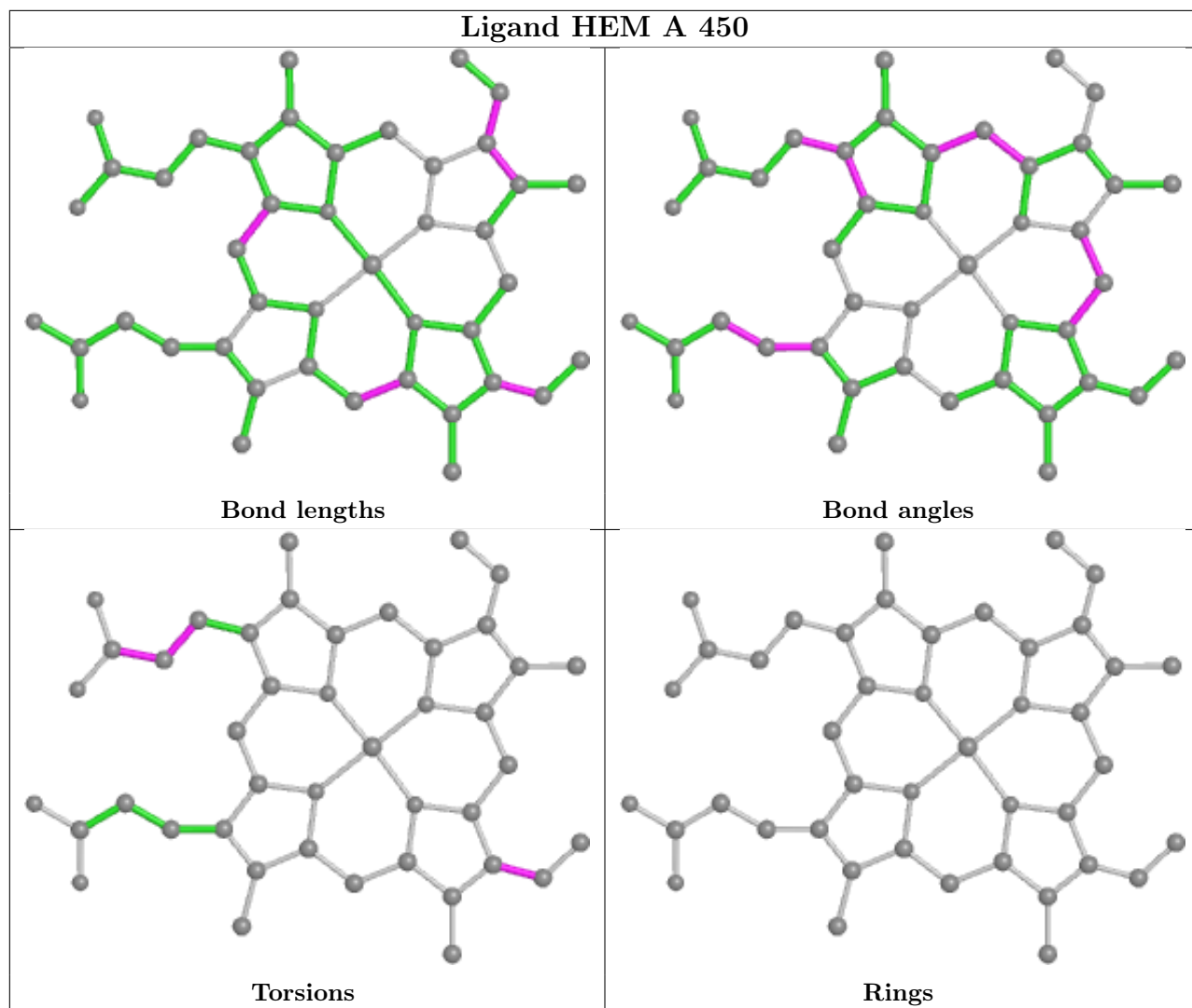
Mol	Chain	Res	Type	Atoms
2	B	450	HEM	C2D-C3D-CAD-CBD
2	A	450	HEM	C3D-CAD-CBD-CGD
2	B	450	HEM	C2B-C3B-CAB-CBB
2	A	450	HEM	CAD-CBD-CGD-O2D
2	A	450	HEM	C2B-C3B-CAB-CBB
2	A	450	HEM	CAD-CBD-CGD-O1D
2	B	450	HEM	CAD-CBD-CGD-O2D
2	B	450	HEM	CAD-CBD-CGD-O1D
2	B	450	HEM	CAA-CBA-CGA-O2A
2	B	450	HEM	CAA-CBA-CGA-O1A

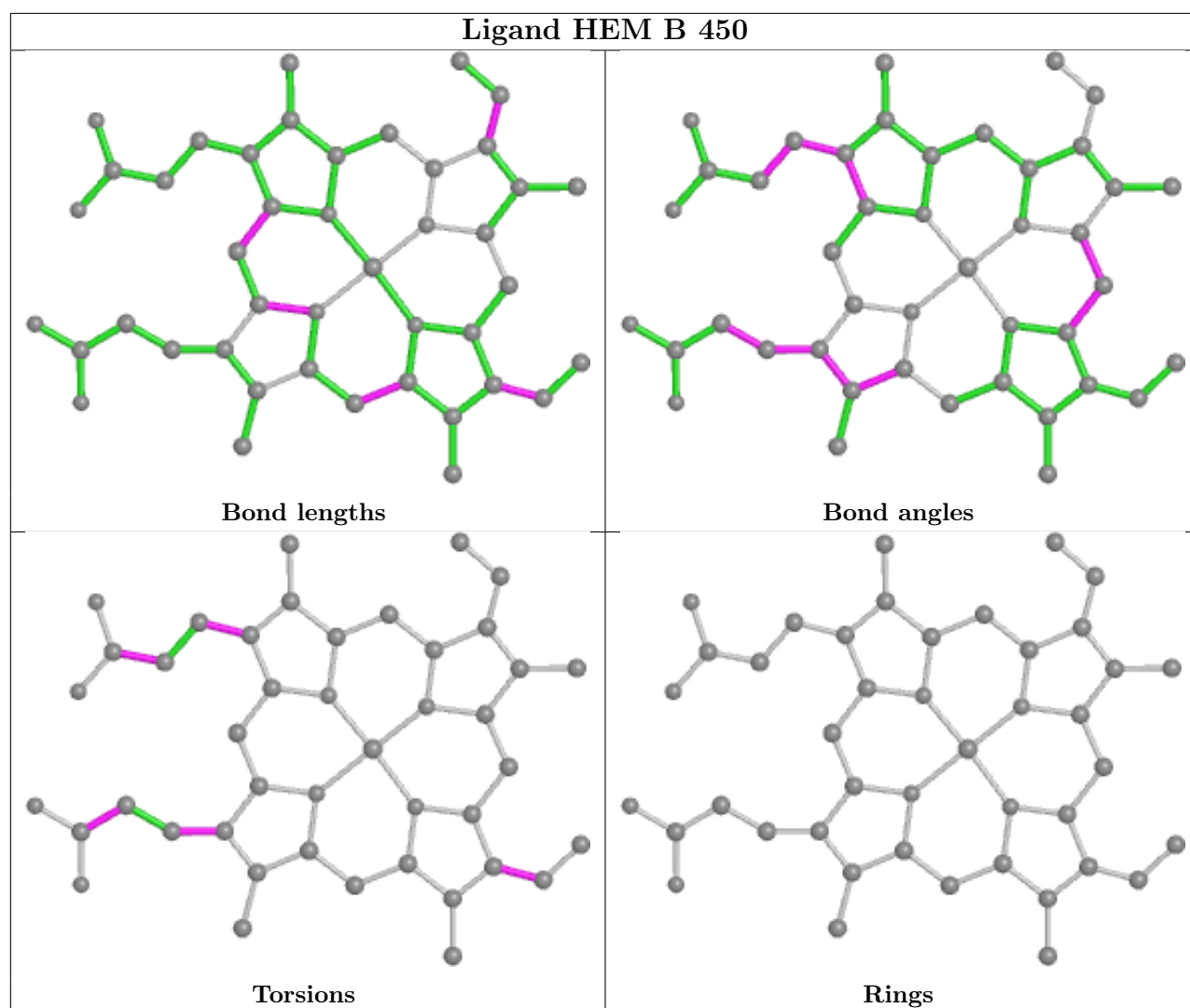
There are no ring outliers.

2 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	450	HEM	7	0
2	B	450	HEM	5	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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	397/397 (100%)	-0.03	7 (1%) 68 45	25, 59, 90, 120	0
1	B	397/397 (100%)	-0.02	11 (2%) 53 28	24, 58, 90, 117	0
All	All	794/794 (100%)	-0.03	18 (2%) 60 36	24, 58, 90, 120	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	219	ASP	3.7
1	B	219	ASP	2.9
1	B	404	GLU	2.8
1	B	179	ASN	2.8
1	B	301	THR	2.8
1	B	215	MET	2.7
1	B	218	ILE	2.7
1	A	138	GLY	2.7
1	A	134	GLU	2.6
1	A	136	GLY	2.5
1	A	137	GLU	2.5
1	A	218	ILE	2.4
1	B	403	SER	2.4
1	B	163	ASP	2.3
1	A	70	ALA	2.3
1	B	8	THR	2.3
1	B	300	ILE	2.2
1	B	376	ASN	2.2

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

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

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

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

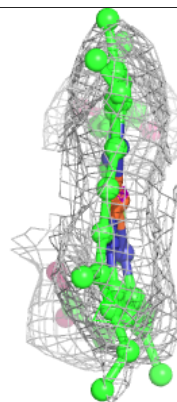
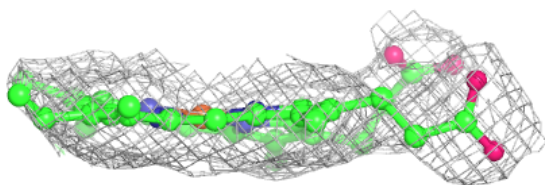
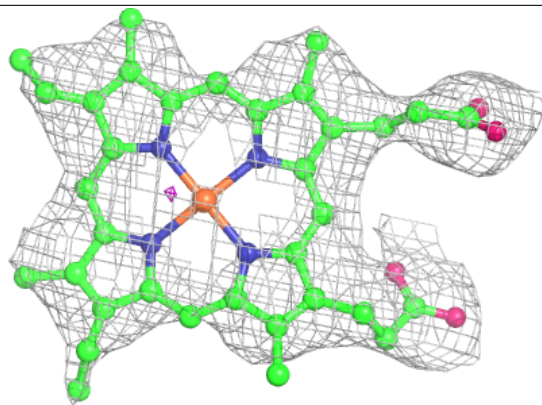
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	CNL	B	500	11/11	0.90	0.36	53,55,56,56	0
3	CNL	A	500	11/11	0.92	0.29	58,59,60,61	0
2	HEM	A	450	43/43	0.95	0.21	46,50,56,60	0
2	HEM	B	450	43/43	0.95	0.19	37,49,61,63	0

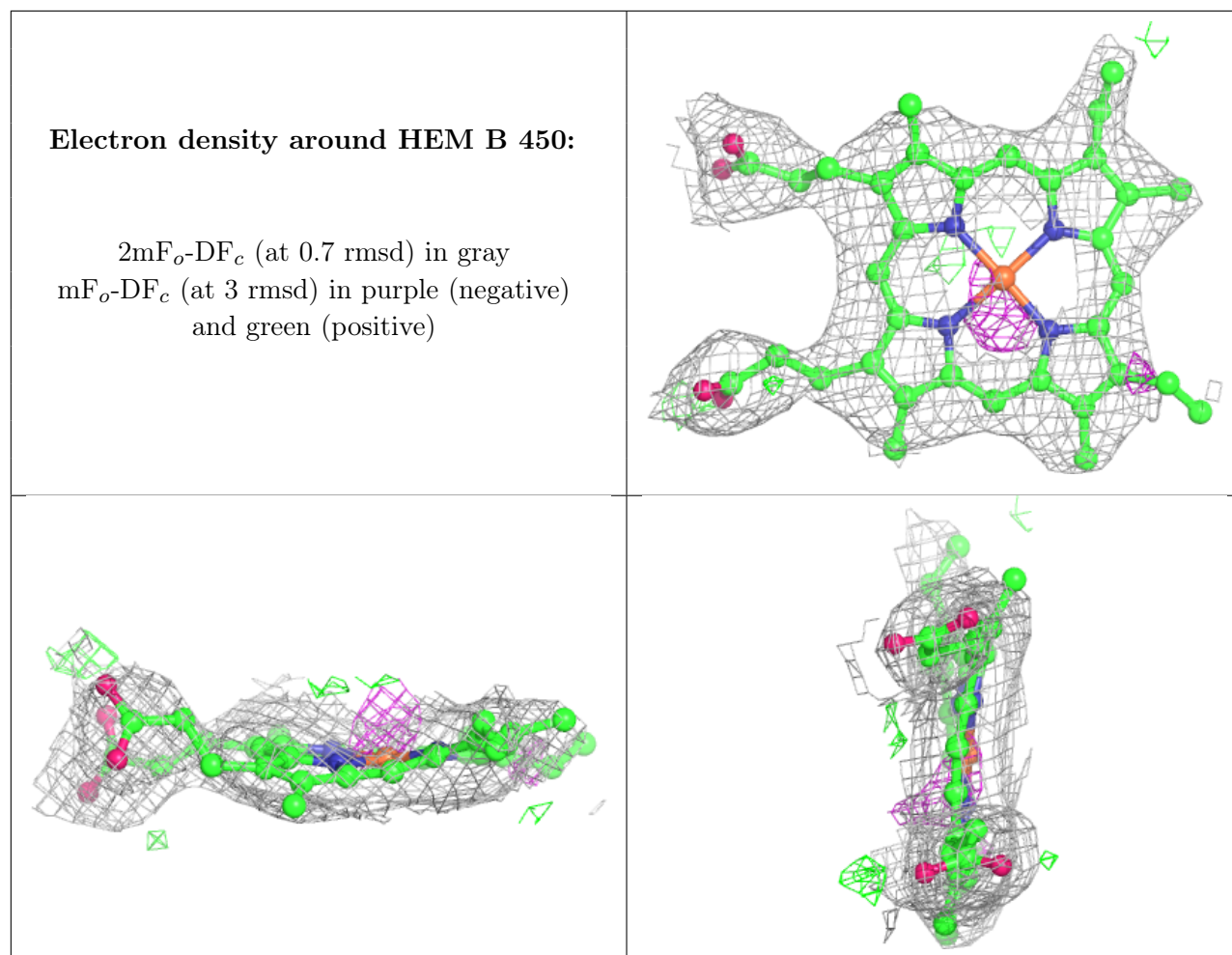
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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



**Electron density around HEM A 450:**

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





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

There are no such residues in this entry.