# WORLDWIDE PDB
## PROTEIN DATA BANK

# Full wwPDB X-ray Structure Validation Report  ⓘ

Sep 5, 2023 – 05:12 AM EDT

|  |  |  |
|---|---|---|
| PDB ID | : | 3TK3 |
| Title | : | Cytochrome P450 2B4 mutant L437A in complex with 4-(4-chlorophenyl)imidazole |
| Authors | : | Gay, S.C.; Jang, H.H.; Wilderman, P.R.; Zhang, Q.; Stout, C.D.; Halpert, J.R. |
| Deposited on | : | 2011-08-25 |
| Resolution | : | 2.80 Å(reported) |

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

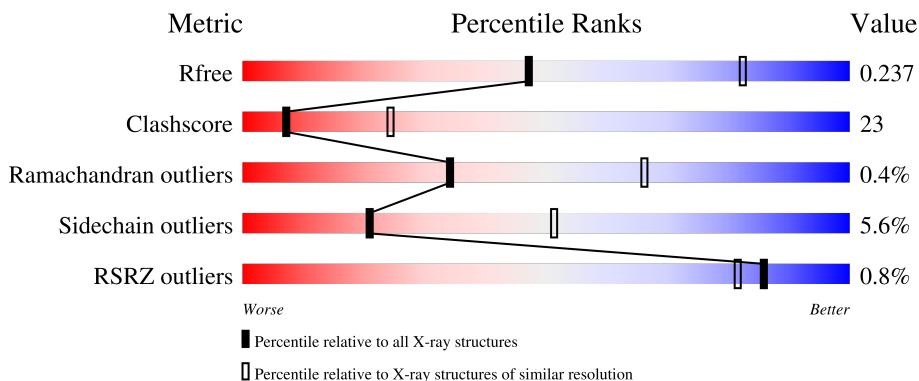|  |  |  |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.35 |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac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

# 1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.80 Å.

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

| Metric | Percentile Ranks | Value |
|---|---|---|
| Rfree | | 0.237 |
| Clashscore | | 23 |
| Ramachandran outliers | | 0.4% |
| Sidechain outliers | | 5.6% |
| RSRZ outliers | | 0.8% |

*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 | 3140 (2.80-2.80) |
| Clashscore | 141614 | 3569 (2.80-2.80) |
| Ramachandran outliers | 138981 | 3498 (2.80-2.80) |
| Sidechain outliers | 138945 | 3500 (2.80-2.80) |
| RSRZ outliers | 127900 | 3078 (2.80-2.80) |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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 | 476 | 63%    30% |
| 1 | B | 476 | 63%    30% |
| 1 | C | 476 | 64%    31% |
| 1 | D | 476 | 68%    26% |

# 2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 15257 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 Cytochrome P450 2B4.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-------|-------|-------|-------|---------|---------|-------|
| 1 | A | 465 | Total | C | N | O | S | 2 | 2 | 0 |
| | | | 3688 | 2377 | 631 | 669 | 11 | | | |
| 1 | B | 465 | Total | C | N | O | S | 1 | 2 | 0 |
| | | | 3685 | 2371 | 634 | 669 | 11 | | | |
| 1 | C | 465 | Total | C | N | O | S | 3 | 2 | 0 |
| | | | 3688 | 2377 | 636 | 664 | 11 | | | |
| 1 | D | 465 | Total | C | N | O | S | 4 | 3 | 0 |
| | | | 3686 | 2377 | 630 | 668 | 11 | | | |

There are 136 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| A | 21 | ALA | GLU | engineered mutation | UNP P00178 |
| A | ? | - | PHE | deletion | UNP P00178 |
| A | ? | - | SER | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | ALA | deletion | UNP P00178 |
| A | ? | - | PHE | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | ALA | deletion | UNP P00178 |
| A | ? | - | GLY | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | LEU | deletion | UNP P00178 |
| A | ? | - | PHE | deletion | UNP P00178 |
| A | ? | - | ARG | deletion | UNP P00178 |
| A | 22 | LYS | GLY | engineered mutation | UNP P00178 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| A | 23 | LYS | HIS | engineered mutation | UNP P00178 |
| A | 24 | THR | PRO | engineered mutation | UNP P00178 |
| A | 25 | SER | LYS | engineered mutation | UNP P00178 |
| A | 26 | SER | ALA | engineered mutation | UNP P00178 |
| A | 27 | LYS | HIS | engineered mutation | UNP P00178 |
| A | 29 | LYS | ARG | engineered mutation | UNP P00178 |
| A | 221 | SER | PRO | SEE REMARK 999 | UNP P00178 |
| A | 226 | TYR | HIS | engineered mutation | UNP P00178 |
| A | 437 | ALA | LEU | engineered mutation | UNP P00178 |
| A | 492 | HIS | - | expression tag | UNP P00178 |
| A | 493 | HIS | - | expression tag | UNP P00178 |
| A | 494 | HIS | - | expression tag | UNP P00178 |
| A | 495 | HIS | - | expression tag | UNP P00178 |
| B | 21 | ALA | GLU | engineered mutation | UNP P00178 |
| B | ? | - | PHE | deletion | UNP P00178 |
| B | ? | - | SER | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | ALA | deletion | UNP P00178 |
| B | ? | - | PHE | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | ALA | deletion | UNP P00178 |
| B | ? | - | GLY | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | LEU | deletion | UNP P00178 |
| B | ? | - | PHE | deletion | UNP P00178 |
| B | ? | - | ARG | deletion | UNP P00178 |
| B | 22 | LYS | GLY | engineered mutation | UNP P00178 |
| B | 23 | LYS | HIS | engineered mutation | UNP P00178 |
| B | 24 | THR | PRO | engineered mutation | UNP P00178 |
| B | 25 | SER | LYS | engineered mutation | UNP P00178 |
| B | 26 | SER | ALA | engineered mutation | UNP P00178 |
| B | 27 | LYS | HIS | engineered mutation | UNP P00178 |
| B | 29 | LYS | ARG | engineered mutation | UNP P00178 |
| B | 221 | SER | PRO | SEE REMARK 999 | UNP P00178 |
| B | 226 | TYR | HIS | engineered mutation | UNP P00178 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| B | 437 | ALA | LEU | engineered mutation | UNP P00178 |
| B | 492 | HIS | - | expression tag | UNP P00178 |
| B | 493 | HIS | - | expression tag | UNP P00178 |
| B | 494 | HIS | - | expression tag | UNP P00178 |
| B | 495 | HIS | - | expression tag | UNP P00178 |
| C | 21 | ALA | GLU | engineered mutation | UNP P00178 |
| C | ? | - | PHE | deletion | UNP P00178 |
| C | ? | - | SER | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | ALA | deletion | UNP P00178 |
| C | ? | - | PHE | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | ALA | deletion | UNP P00178 |
| C | ? | - | GLY | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | LEU | deletion | UNP P00178 |
| C | ? | - | PHE | deletion | UNP P00178 |
| C | ? | - | ARG | deletion | UNP P00178 |
| C | 22 | LYS | GLY | engineered mutation | UNP P00178 |
| C | 23 | LYS | HIS | engineered mutation | UNP P00178 |
| C | 24 | THR | PRO | engineered mutation | UNP P00178 |
| C | 25 | SER | LYS | engineered mutation | UNP P00178 |
| C | 26 | SER | ALA | engineered mutation | UNP P00178 |
| C | 27 | LYS | HIS | engineered mutation | UNP P00178 |
| C | 29 | LYS | ARG | engineered mutation | UNP P00178 |
| C | 221 | SER | PRO | SEE REMARK 999 | UNP P00178 |
| C | 226 | TYR | HIS | engineered mutation | UNP P00178 |
| C | 437 | ALA | LEU | engineered mutation | UNP P00178 |
| C | 492 | HIS | - | expression tag | UNP P00178 |
| C | 493 | HIS | - | expression tag | UNP P00178 |
| C | 494 | HIS | - | expression tag | UNP P00178 |
| C | 495 | HIS | - | expression tag | UNP P00178 |
| D | 21 | ALA | GLU | engineered mutation | UNP P00178 |
| D | ? | - | PHE | deletion | UNP P00178 |
| D | ? | - | SER | deletion | UNP P00178 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | ALA | deletion | UNP P00178 |
| D | ? | - | PHE | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | ALA | deletion | UNP P00178 |
| D | ? | - | GLY | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | LEU | deletion | UNP P00178 |
| D | ? | - | PHE | deletion | UNP P00178 |
| D | ? | - | ARG | deletion | UNP P00178 |
| D | 22 | LYS | GLY | engineered mutation | UNP P00178 |
| D | 23 | LYS | HIS | engineered mutation | UNP P00178 |
| D | 24 | THR | PRO | engineered mutation | UNP P00178 |
| D | 25 | SER | LYS | engineered mutation | UNP P00178 |
| D | 26 | SER | ALA | engineered mutation | UNP P00178 |
| D | 27 | LYS | HIS | engineered mutation | UNP P00178 |
| D | 29 | LYS | ARG | engineered mutation | UNP P00178 |
| D | 221 | SER | PRO | SEE REMARK 999 | UNP P00178 |
| D | 226 | TYR | HIS | engineered mutation | UNP P00178 |
| D | 437 | ALA | LEU | engineered mutation | UNP P00178 |
| D | 492 | HIS | - | expression tag | UNP P00178 |
| D | 493 | HIS | - | expression tag | UNP P00178 |
| D | 494 | HIS | - | expression tag | UNP P00178 |
| D | 495 | HIS | - | expression tag | UNP P00178 |

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).
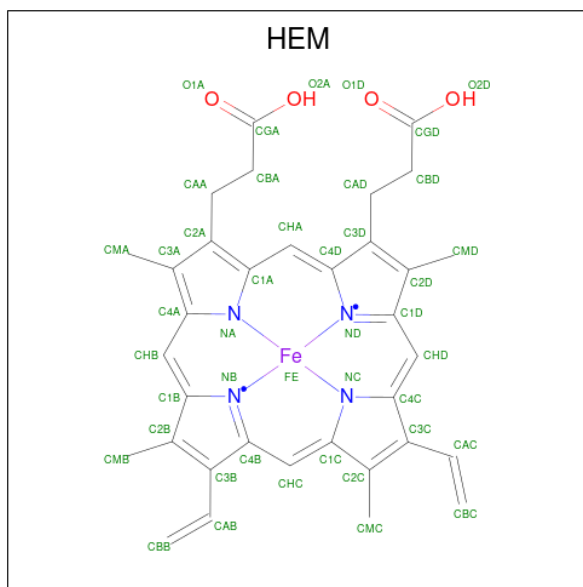
| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|----|---|---|---------|---------|
| 2 | A | 1 | Total | C | Fe | N | O | 0 | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | | |
| 2 | B | 1 | Total | C | Fe | N | O | 0 | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | | |
| 2 | C | 1 | Total | C | Fe | N | O | 0 | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | | |
| 2 | D | 1 | Total | C | Fe | N | O | 0 | 0 |
| | | | 43 | 34 | 1 | 4 | 4 | | |

- Molecule 3 is 4-(4-CHLOROPHENYL)IMIDAZOLE (three-letter code: CPZ) (formula: $C_9H_7ClN_2$).
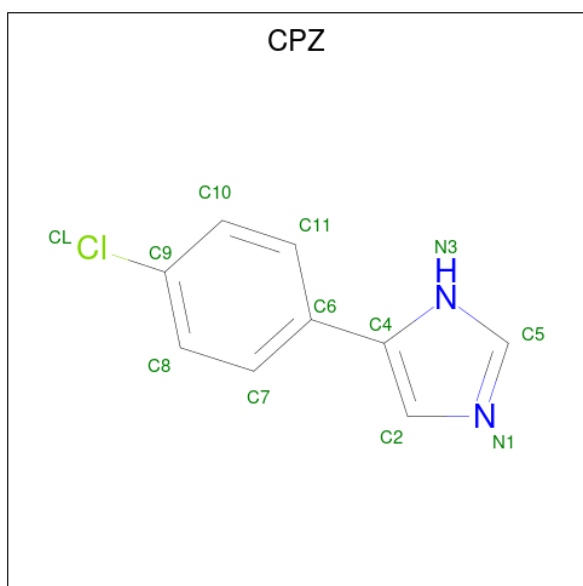
| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|
| 3 | A | 1 | Total 12 | C 9 | Cl 1 | N 2 | 0 | 0 |
| 3 | B | 1 | Total 12 | C 9 | Cl 1 | N 2 | 0 | 0 |
| 3 | C | 1 | Total 12 | C 9 | Cl 1 | N 2 | 0 | 0 |
| 3 | D | 1 | Total 12 | C 9 | Cl 1 | N 2 | 0 | 0 |

- Molecule 4 is water.

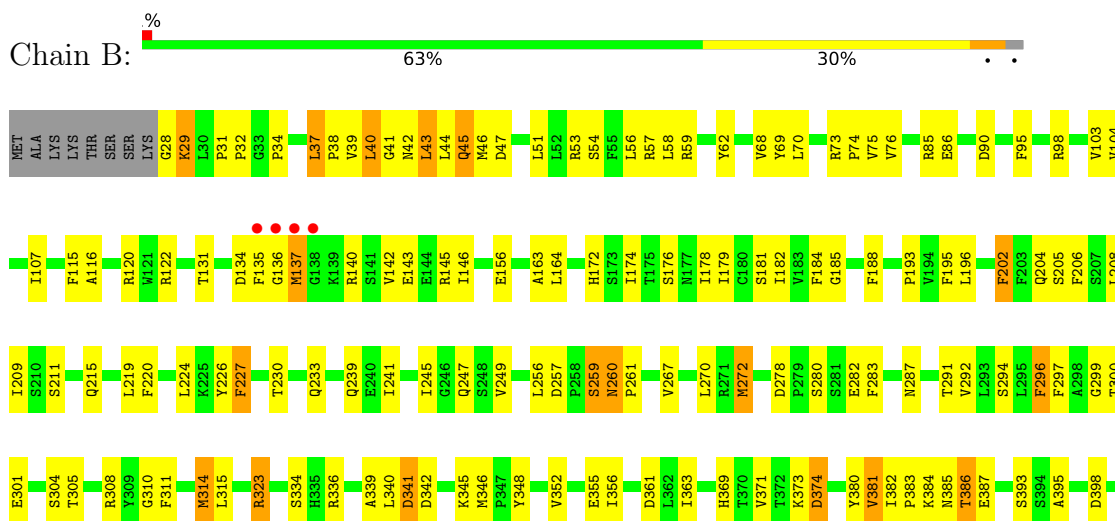| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 4 | A | 64 | Total 64 | O 64 | 0 | 0 |
| 4 | B | 82 | Total 82 | O 82 | 0 | 0 |
| 4 | C | 73 | Total 73 | O 73 | 0 | 0 |
| 4 | D | 71 | Total 71 | O 71 | 0 | 0 |

# 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.

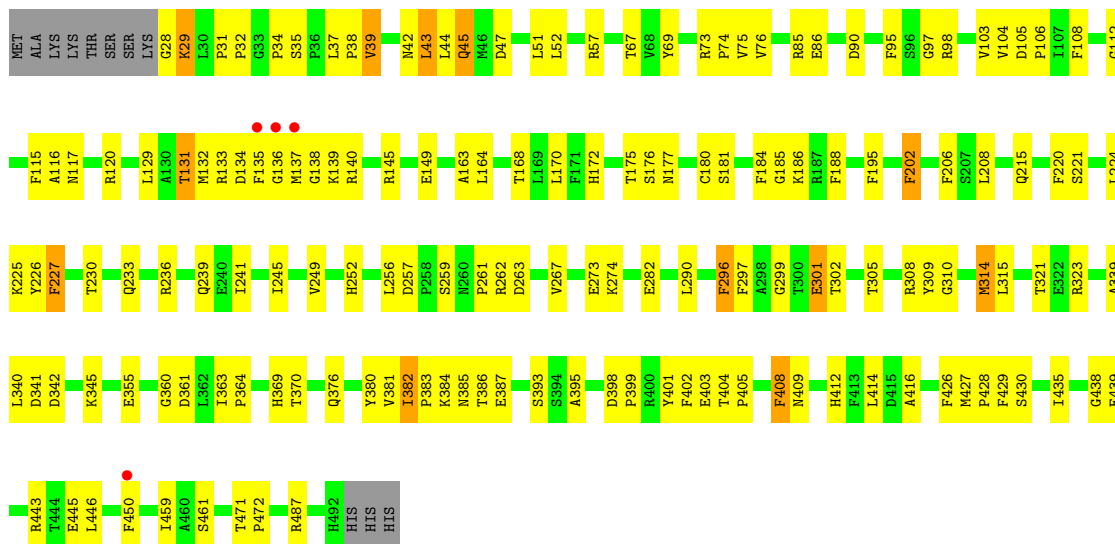• Molecule 1: Cytochrome P450 2B4
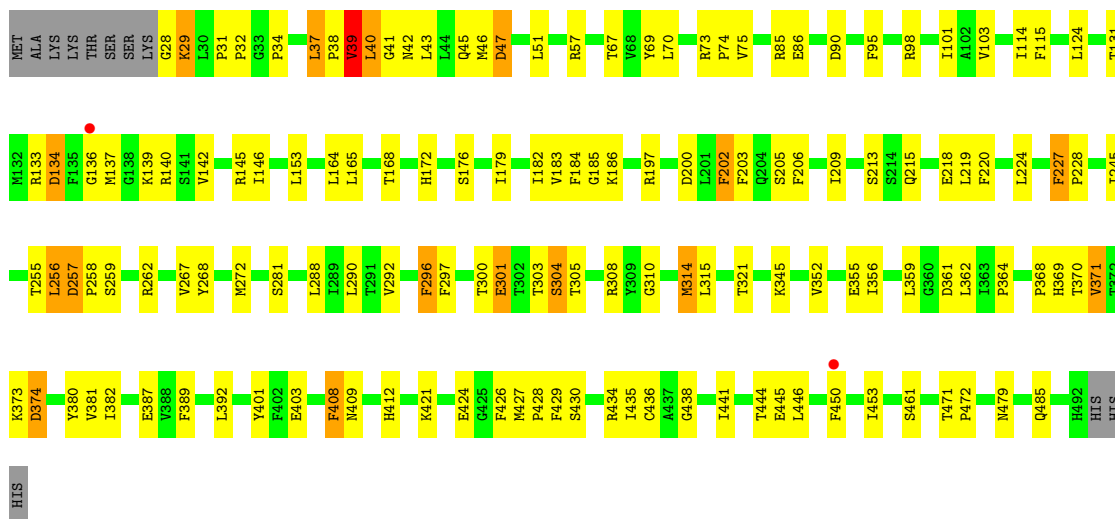


• Molecule 1: Cytochrome P450 2B4

Y401 F402 E403 T404 F408 K421 E424 M427 S430 C436 T444 F449 F450 I453 S461 P462 Q485 H492 HIS HIS HIS

• Molecule 1: Cytochrome P450 2B4

%

Chain C:

64% 31%

MET ALA LYS LYS THR SER SER LYS G28 K29 L30 P31 P32 G33 P34 S35 P36 L37 P38 V39 N42 L43 L44 Q45 M46 D47 L51 L52 R57 T67 V68 Y69 R73 P74 V75 V76 R85 E86 D90 F95 S96 G97 R98 V103 V104 D105 P106 I107 F108 G112

F115 A116 N117 R120 L129 A130 T131 M132 R133 D134 F135 G136 M137 G138 K139 R140 R145 E149 A163 L164 T168 L169 L170 F171 H172 T175 S176 N177 C180 S181 F184 G185 K186 R187 F188 F195 F202 P206 S207 L208 Q215 F220 S221 L224

K225 Y226 F227 T230 Q233 R236 Q239 E240 I241 I245 V249 H252 L256 D257 P258 S259 N260 P261 R262 D263 V267 E273 K274 E282 L290 F296 F297 A298 G299 T300 E301 T302 T305 R308 Y309 G310 M314 L315 T321 E322 R323 A339

L340 D341 D342 K345 E355 G360 D361 L362 I363 P364 H369 T370 Q376 Y380 V381 I382 P383 K384 N385 T386 E387 S393 S394 A395 D398 P399 R400 Y401 F402 E403 T404 P405 F408 N409 H412 F413 L414 D415 A416 F426 M427 P428 F429 S430 I435 G438 E439

R443 T444 E445 L446 F450 I459 A460 S461 T471 P472 R487 H492 HIS HIS HIS

• Molecule 1: Cytochrome P450 2B4

Chain D:

68% 26%

MET ALA LYS LYS THR SER SER LYS G28 K29 L30 P31 P32 G33 P34 L37 P38 V39 L40 G41 N42 L43 L44 Q45 M46 D47 L51 R57 T67 V68 Y69 L70 R73 P74 V75 R85 E86 D90 F95 R98 I101 A102 V103 I114 F115 L124 T131

M132 R133 D134 F135 G136 M137 G138 K139 R140 S141 V142 R145 I146 L153 L164 L165 T168 H172 S176 I179 I182 V183 F184 G185 K186 R197 D200 L201 F202 F203 Q204 S205 F206 I209 S213 S214 Q215 E218 L219 F220 L224 F227 P228 I245

T255 L256 D257 P258 S259 R262 V267 Y268 M272 S281 L288 I289 L290 T291 V292 F296 F297 T300 E301 T302 S303 S304 T305 R308 Y309 G310 M314 L315 T321 K345 V352 E355 I356 L359 G360 D361 L362 I363 P364 P368 H369 T370 V371 T372

K373 D374 Y380 V381 I382 E387 V388 F389 L392 Y401 F402 E403 F408 N409 H412 K421 E424 G425 F426 M427 P428 F429 S430 R434 I435 C436 A437 G438 I441 T444 E445 L446 F450 I453 S461 T471 P472 N479 Q485 H492 HIS HIS

HIS

# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | P 3 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 232.91Å   232.91Å   56.96Å<br>90.00°    90.00°    120.00° | Depositor |
| Resolution (Å) | 50.43   –   2.80<br>76.24   –   2.80 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 98.7 (50.43-2.80)<br>98.8 (76.24-2.80) | Depositor<br>EDS |
| $R_{merge}$ | 0.20 | Depositor |
| $R_{sym}$ | 0.20 | Depositor |
| $< I/\sigma(I) >$ [1] | 1.63 (at 2.82Å) | Xtriage |
| Refinement program | PHENIX 1.6.4_486 | Depositor |
| R, $R_{free}$ | 0.193  ,   0.241<br>0.189  ,   0.237 | Depositor<br>DCC |
| $R_{free}$ test set | 4207 reflections (5.00%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 54.0 | Xtriage |
| Anisotropy | 0.048 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.35 , 43.5 | EDS |
| L-test for twinning[2] | $< |L| > = 0.49, < L^2 > = 0.32$ | Xtriage |
| Estimated twinning fraction | 0.419 for -h,-k,l<br>0.428 for h,-h-k,-l<br>0.428 for -k,-h,-l | Xtriage |
| $F_o,F_c$ correlation | 0.94 | EDS |
| Total number of atoms | 15257 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 52.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.13% of the height of the origin peak. No significant pseudotranslation is detected.*

---

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

# 5 Model quality (i)

## 5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: CPZ, 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 | 0.71 | 0/3788 | 0.65 | 2/5141 (0.0%) |
| 1 | B | 0.76 | 2/3784 (0.1%) | 0.65 | 1/5135 (0.0%) |
| 1 | C | 0.80 | 3/3787 (0.1%) | 0.67 | 2/5136 (0.0%) |
| 1 | D | 0.78 | 2/3789 (0.1%) | 0.67 | 4/5143 (0.1%) |
| All | All | 0.76 | 7/15148 (0.0%) | 0.66 | 9/20555 (0.0%) |

All (7) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|--------|------|---------|-------|-------------|----------|
| 1 | D | 401 | TYR | CD2-CE2 | -5.92 | 1.30 | 1.39 |
| 1 | C | 301[A] | GLU | N-CA | 5.75 | 1.57 | 1.46 |
| 1 | C | 301[B] | GLU | N-CA | 5.75 | 1.57 | 1.46 |
| 1 | B | 143 | GLU | CG-CD | -5.44 | 1.43 | 1.51 |
| 1 | C | 401 | TYR | CD2-CE2 | -5.39 | 1.31 | 1.39 |
| 1 | D | 408 | PHE | CD2-CE2 | -5.37 | 1.28 | 1.39 |
| 1 | B | 401 | TYR | CD2-CE2 | -5.05 | 1.31 | 1.39 |

All (9) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|--------|------|----------|-------|-------------|----------|
| 1 | D | 301[A] | GLU | N-CA-C | 5.80 | 126.67 | 111.00 |
| 1 | D | 301[B] | GLU | N-CA-C | 5.80 | 126.67 | 111.00 |
| 1 | D | 47 | ASP | N-CA-CB | -5.55 | 100.62 | 110.60 |
| 1 | C | 408 | PHE | CB-CA-C | -5.53 | 99.34 | 110.40 |
| 1 | A | 301[A] | GLU | N-CA-C | 5.51 | 125.87 | 111.00 |
| 1 | A | 301[B] | GLU | N-CA-C | 5.51 | 125.87 | 111.00 |
| 1 | C | 409 | ASN | N-CA-CB | -5.50 | 100.70 | 110.60 |
| 1 | D | 46 | MET | CB-CA-C | -5.15 | 100.09 | 110.40 |
| 1 | B | 385 | ASN | N-CA-C | 5.04 | 124.60 | 111.00 |

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | A | 3688 | 0 | 3626 | 177 | 0 |
| 1 | B | 3685 | 0 | 3621 | 166 | 0 |
| 1 | C | 3688 | 0 | 3649 | 163 | 0 |
| 1 | D | 3686 | 0 | 3622 | 160 | 0 |
| 2 | A | 43 | 0 | 30 | 9 | 0 |
| 2 | B | 43 | 0 | 30 | 12 | 0 |
| 2 | C | 43 | 0 | 30 | 10 | 0 |
| 2 | D | 43 | 0 | 30 | 10 | 0 |
| 3 | A | 12 | 0 | 7 | 0 | 0 |
| 3 | B | 12 | 0 | 7 | 0 | 0 |
| 3 | C | 12 | 0 | 7 | 0 | 0 |
| 3 | D | 12 | 0 | 7 | 0 | 0 |
| 4 | A | 64 | 0 | 0 | 7 | 0 |
| 4 | B | 82 | 0 | 0 | 8 | 0 |
| 4 | C | 73 | 0 | 0 | 5 | 0 |
| 4 | D | 71 | 0 | 0 | 4 | 0 |
| All | All | 15257 | 0 | 14666 | 670 | 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 23.

All (670) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|-------------------|
| 1:D:136:GLY:HA3 | 1:D:145:ARG:CZ | 1.51 | 1.39 |
| 1:D:256:LEU:HD12 | 1:D:257:ASP:N | 1.34 | 1.36 |
| 1:C:34:PRO:HG2 | 1:C:42:ASN:ND2 | 1.47 | 1.27 |
| 1:B:137:MET:HB2 | 1:B:185:GLY:O | 1.36 | 1.26 |
| 1:B:43:LEU:HD12 | 1:B:43:LEU:O | 1.37 | 1.24 |
| 1:C:43:LEU:O | 1:C:43:LEU:HD12 | 1.33 | 1.23 |
| 1:A:43:LEU:O | 1:A:43:LEU:HD12 | 1.38 | 1.18 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:86:GLU:O | 1:A:90:ASP:HB2 | 1.49 | 1.12 |
| 1:A:136:GLY:HA3 | 1:A:145:ARG:CZ | 1.80 | 1.12 |
| 1:A:403:GLU:HG3 | 1:C:403:GLU:HG3 | 1.17 | 1.10 |
| 1:D:136:GLY:CA | 1:D:145:ARG:CZ | 2.31 | 1.08 |
| 1:D:220:PHE:HB2 | 1:D:224:LEU:HD12 | 1.33 | 1.06 |
| 1:A:404:THR:HG23 | 4:A:544:HOH:O | 1.51 | 1.06 |
| 1:D:206:PHE:HE1 | 1:D:297:PHE:CD1 | 1.72 | 1.06 |
| 1:D:86:GLU:O | 1:D:90:ASP:HB2 | 1.58 | 1.03 |
| 1:B:136:GLY:HA3 | 1:B:145:ARG:NH1 | 1.74 | 1.01 |
| 1:D:206:PHE:CE1 | 1:D:297:PHE:CD1 | 2.47 | 1.00 |
| 1:C:86:GLU:O | 1:C:90:ASP:HB2 | 1.60 | 1.00 |
| 1:D:137:MET:HB2 | 1:D:185:GLY:O | 1.61 | 1.00 |
| 1:B:136:GLY:HA3 | 1:B:145:ARG:CZ | 1.93 | 0.98 |
| 1:D:206:PHE:CE1 | 1:D:297:PHE:CE1 | 2.52 | 0.98 |
| 1:D:136:GLY:HA3 | 1:D:145:ARG:NE | 1.78 | 0.97 |
| 1:A:34:PRO:HG2 | 1:A:42:ASN:ND2 | 1.79 | 0.96 |
| 1:D:206:PHE:HE1 | 1:D:297:PHE:CE1 | 1.83 | 0.96 |
| 1:A:82:ASP:O | 1:A:86:GLU:HG3 | 1.67 | 0.94 |
| 1:D:227:PHE:HD2 | 1:D:227:PHE:N | 1.66 | 0.94 |
| 1:C:137:MET:HG2 | 1:C:185:GLY:O | 1.67 | 0.93 |
| 1:A:403:GLU:HG3 | 1:C:403:GLU:CG | 1.98 | 0.93 |
| 1:B:75:VAL:HG12 | 1:B:387:GLU:HB2 | 1.50 | 0.92 |
| 1:D:256:LEU:CD1 | 1:D:257:ASP:N | 2.30 | 0.91 |
| 1:A:136:GLY:C | 1:A:145:ARG:NH2 | 2.23 | 0.91 |
| 1:C:34:PRO:HG2 | 1:C:42:ASN:HD22 | 1.33 | 0.91 |
| 1:A:403:GLU:CG | 1:C:403:GLU:HG3 | 2.02 | 0.90 |
| 2:D:500:HEM:HMB1 | 2:D:500:HEM:HBB2 | 1.53 | 0.90 |
| 1:C:137:MET:SD | 1:C:186:LYS:HA | 2.12 | 0.90 |
| 1:D:256:LEU:HD12 | 1:D:256:LEU:C | 1.88 | 0.89 |
| 1:A:136:GLY:C | 1:A:145:ARG:HH21 | 1.77 | 0.88 |
| 1:A:206:PHE:CE1 | 1:A:297:PHE:HD1 | 1.91 | 0.88 |
| 1:D:137:MET:CB | 1:D:185:GLY:O | 2.22 | 0.87 |
| 1:D:227:PHE:N | 1:D:227:PHE:CD2 | 2.39 | 0.87 |
| 1:D:256:LEU:HD12 | 1:D:257:ASP:H | 1.35 | 0.87 |
| 1:D:206:PHE:CE1 | 1:D:297:PHE:HD1 | 1.93 | 0.87 |
| 1:B:403:GLU:HG3 | 1:D:403:GLU:HG3 | 1.58 | 0.86 |
| 1:B:136:GLY:CA | 1:B:145:ARG:NH1 | 2.38 | 0.86 |
| 1:C:43:LEU:HD12 | 1:C:43:LEU:C | 1.84 | 0.85 |
| 1:A:136:GLY:CA | 1:A:145:ARG:NH2 | 2.38 | 0.85 |
| 1:A:39:VAL:O | 1:A:40:LEU:HD23 | 1.76 | 0.85 |
| 1:D:136:GLY:CA | 1:D:145:ARG:NH2 | 2.41 | 0.84 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:137:MET:N | 1:C:145:ARG:NH1 | 2.25 | 0.84 |
| 1:C:75:VAL:HG12 | 1:C:387:GLU:HB2 | 1.58 | 0.84 |
| 1:B:43:LEU:HD12 | 1:B:43:LEU:C | 1.94 | 0.83 |
| 1:B:32:PRO:HD3 | 1:B:380:TYR:CE1 | 2.13 | 0.83 |
| 1:A:315:LEU:HD13 | 1:A:461:SER:HB2 | 1.60 | 0.83 |
| 1:A:403:GLU:OE2 | 1:C:412:HIS:HD2 | 1.60 | 0.83 |
| 1:A:43:LEU:HD12 | 1:A:43:LEU:C | 1.93 | 0.82 |
| 1:A:314:MET:SD | 1:A:450[B]:PHE:HZ | 2.02 | 0.81 |
| 1:C:76:VAL:HG21 | 1:C:382:ILE:HD13 | 1.60 | 0.81 |
| 1:A:220:PHE:HB2 | 1:A:224:LEU:HD12 | 1.60 | 0.81 |
| 1:B:220:PHE:HB2 | 1:B:224:LEU:HD12 | 1.61 | 0.80 |
| 1:D:136:GLY:HA3 | 1:D:145:ARG:NH2 | 1.95 | 0.80 |
| 1:D:32:PRO:HD3 | 1:D:380:TYR:CE1 | 2.17 | 0.80 |
| 1:B:137:MET:CB | 1:B:185:GLY:O | 2.27 | 0.79 |
| 1:A:206:PHE:CE1 | 1:A:297:PHE:CD1 | 2.70 | 0.79 |
| 1:A:314:MET:SD | 1:A:450[B]:PHE:CZ | 2.76 | 0.79 |
| 1:A:384:LYS:HG2 | 1:A:385:ASN:OD1 | 1.83 | 0.79 |
| 1:B:245:ILE:HD13 | 1:B:292:VAL:HG12 | 1.63 | 0.79 |
| 1:B:363:ILE:O | 1:B:363:ILE:HG22 | 1.81 | 0.78 |
| 1:D:220:PHE:HB2 | 1:D:224:LEU:CD1 | 2.13 | 0.78 |
| 1:B:137:MET:HG2 | 1:B:137:MET:O | 1.83 | 0.78 |
| 2:C:500:HEM:HBB2 | 2:C:500:HEM:HMB2 | 1.65 | 0.78 |
| 2:B:500:HEM:HBB2 | 2:B:500:HEM:HMB2 | 1.65 | 0.78 |
| 1:A:73:ARG:HD2 | 1:A:387:GLU:OE2 | 1.82 | 0.78 |
| 1:B:69:TYR:CE2 | 1:B:74:PRO:HB3 | 2.19 | 0.77 |
| 1:D:69:TYR:CE2 | 1:D:74:PRO:HB3 | 2.19 | 0.77 |
| 1:D:206:PHE:CE1 | 1:D:297:PHE:HE1 | 2.02 | 0.77 |
| 1:A:136:GLY:CA | 1:A:145:ARG:CZ | 2.61 | 0.76 |
| 1:B:142:VAL:O | 1:B:146:ILE:HG13 | 1.85 | 0.76 |
| 1:D:220:PHE:CB | 1:D:224:LEU:HD12 | 2.14 | 0.76 |
| 1:C:137:MET:C | 1:C:145:ARG:HH12 | 1.87 | 0.76 |
| 1:B:256:LEU:HD12 | 1:B:257:ASP:H | 1.51 | 0.76 |
| 1:C:314:MET:HB3 | 1:C:321:THR:OG1 | 1.87 | 0.75 |
| 1:D:31:PRO:HA | 1:D:380:TYR:CE1 | 2.21 | 0.75 |
| 1:A:136:GLY:HA3 | 1:A:145:ARG:NH2 | 2.00 | 0.75 |
| 1:B:39:VAL:HG12 | 1:B:40:LEU:HD23 | 1.66 | 0.75 |
| 1:B:86:GLU:O | 1:B:90:ASP:HB2 | 1.86 | 0.74 |
| 1:C:233:GLN:HG3 | 1:C:236:ARG:HH12 | 1.51 | 0.74 |
| 1:B:145:ARG:HD3 | 1:B:181:SER:OG | 1.87 | 0.74 |
| 1:B:227:PHE:HD2 | 1:B:227:PHE:N | 1.85 | 0.74 |
| 1:C:227:PHE:N | 1:C:227:PHE:CD2 | 2.54 | 0.74 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|-------------------|
| 1:D:75:VAL:HG12 | 1:D:387:GLU:HB2 | 1.69 | 0.74 |
| 1:C:34:PRO:CG | 1:C:42:ASN:ND2 | 2.41 | 0.74 |
| 2:D:500:HEM:HBB2 | 2:D:500:HEM:CMB | 2.18 | 0.73 |
| 1:B:136:GLY:C | 1:B:145:ARG:NH1 | 2.42 | 0.73 |
| 1:D:314:MET:HB2 | 1:D:321:THR:OG1 | 1.86 | 0.73 |
| 1:C:137:MET:O | 1:C:145:ARG:NH1 | 2.21 | 0.73 |
| 1:D:139:LYS:O | 1:D:139:LYS:HG3 | 1.87 | 0.73 |
| 1:D:206:PHE:CD2 | 1:D:301[B]:GLU:OE2 | 2.42 | 0.73 |
| 1:B:314:MET:SD | 1:B:450[B]:PHE:CZ | 2.82 | 0.73 |
| 1:C:256:LEU:HD12 | 1:C:257:ASP:N | 2.03 | 0.72 |
| 1:C:98:ARG:HG2 | 1:C:115:PHE:HA | 1.71 | 0.72 |
| 1:A:43:LEU:O | 1:A:43:LEU:CD1 | 2.30 | 0.72 |
| 1:C:340:LEU:O | 1:C:340:LEU:HD12 | 1.88 | 0.72 |
| 1:A:403:GLU:O | 1:A:404:THR:CG2 | 2.38 | 0.72 |
| 1:B:98:ARG:HG2 | 1:B:115:PHE:HA | 1.70 | 0.72 |
| 1:B:227:PHE:N | 1:B:227:PHE:CD2 | 2.51 | 0.72 |
| 1:D:137:MET:HB3 | 1:D:185:GLY:C | 2.11 | 0.71 |
| 1:A:403:GLU:OE2 | 1:C:412:HIS:CD2 | 2.42 | 0.71 |
| 1:B:202:PHE:CD1 | 1:B:206:PHE:CZ | 2.78 | 0.71 |
| 1:B:40:LEU:HD23 | 1:B:40:LEU:N | 2.03 | 0.71 |
| 1:D:257:ASP:C | 1:D:257:ASP:OD1 | 2.29 | 0.71 |
| 1:A:202:PHE:CD1 | 1:A:206:PHE:CZ | 2.79 | 0.71 |
| 1:A:206:PHE:CD2 | 1:A:301[A]:GLU:OE2 | 2.44 | 0.71 |
| 1:B:43:LEU:O | 1:B:43:LEU:CD1 | 2.29 | 0.71 |
| 1:A:38:PRO:O | 1:A:39:VAL:HB | 1.89 | 0.70 |
| 1:B:257:ASP:OD1 | 1:B:257:ASP:C | 2.29 | 0.70 |
| 1:D:202:PHE:CE2 | 1:D:296:PHE:HD1 | 2.10 | 0.70 |
| 1:A:227:PHE:N | 1:A:227:PHE:CD2 | 2.56 | 0.70 |
| 1:A:75:VAL:HG12 | 1:A:387:GLU:HB2 | 1.72 | 0.70 |
| 1:C:137:MET:CG | 1:C:186:LYS:HA | 2.21 | 0.70 |
| 1:B:403:GLU:HG3 | 1:D:403:GLU:CG | 2.22 | 0.70 |
| 1:A:257:ASP:C | 1:A:257:ASP:OD1 | 2.29 | 0.70 |
| 1:A:137:MET:HG2 | 1:A:140:ARG:HH12 | 1.57 | 0.70 |
| 1:A:44:LEU:C | 1:A:45:GLN:OE1 | 2.30 | 0.69 |
| 1:D:206:PHE:HE1 | 1:D:297:PHE:HD1 | 1.29 | 0.69 |
| 1:D:95:PHE:O | 1:D:369:HIS:HD2 | 1.76 | 0.69 |
| 1:B:44:LEU:C | 1:B:45:GLN:OE1 | 2.29 | 0.69 |
| 1:B:352:VAL:O | 1:B:356:ILE:HG13 | 1.91 | 0.69 |
| 1:D:172:HIS:CG | 1:D:203:PHE:HE1 | 2.09 | 0.69 |
| 1:B:256:LEU:HD12 | 1:B:257:ASP:N | 2.07 | 0.69 |
| 1:B:305:THR:HG22 | 1:B:308:ARG:NH2 | 2.07 | 0.69 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|-------------------|
| 1:A:263:ASP:C | 1:A:263:ASP:OD1 | 2.29 | 0.68 |
| 1:A:403:GLU:C | 1:A:404:THR:HG22 | 2.12 | 0.68 |
| 1:B:42:ASN:O | 1:B:45:GLN:N | 2.24 | 0.68 |
| 1:C:341:ASP:HA | 4:C:550:HOH:O | 1.92 | 0.68 |
| 1:C:44:LEU:HB2 | 1:C:45:GLN:OE1 | 1.93 | 0.68 |
| 1:B:305:THR:HG22 | 1:B:308:ARG:HH21 | 1.57 | 0.68 |
| 1:A:206:PHE:HD2 | 1:A:301[A]:GLU:OE2 | 1.77 | 0.68 |
| 1:A:93:GLU:OE1 | 1:A:433:LYS:NZ | 2.26 | 0.68 |
| 1:D:256:LEU:HD12 | 1:D:257:ASP:CA | 2.23 | 0.68 |
| 1:A:352:VAL:O | 1:A:356:ILE:HG13 | 1.94 | 0.67 |
| 1:B:371:VAL:HG21 | 1:B:382:ILE:HG22 | 1.77 | 0.67 |
| 1:C:136:GLY:HA3 | 1:C:145:ARG:CZ | 2.25 | 0.67 |
| 1:A:220:PHE:HB2 | 1:A:224:LEU:CD1 | 2.24 | 0.67 |
| 1:A:310:GLY:O | 1:A:314:MET:HG2 | 1.94 | 0.67 |
| 1:B:140:ARG:HH21 | 1:B:145:ARG:HG2 | 1.60 | 0.67 |
| 1:A:403:GLU:O | 1:A:404:THR:HG22 | 1.95 | 0.66 |
| 2:C:500:HEM:HBC2 | 2:C:500:HEM:HMC2 | 1.76 | 0.66 |
| 1:D:38:PRO:O | 1:D:39:VAL:HB | 1.94 | 0.66 |
| 2:D:500:HEM:HBC2 | 2:D:500:HEM:HMC2 | 1.76 | 0.66 |
| 1:B:404:THR:HG23 | 4:B:557:HOH:O | 1.95 | 0.65 |
| 1:D:305:THR:HG22 | 1:D:308:ARG:HH21 | 1.60 | 0.65 |
| 1:B:134:ASP:OD1 | 1:B:135:PHE:CD2 | 2.49 | 0.65 |
| 1:B:257:ASP:OD1 | 1:B:259:SER:N | 2.29 | 0.65 |
| 1:D:257:ASP:OD1 | 1:D:259:SER:N | 2.29 | 0.65 |
| 1:A:145:ARG:HD3 | 1:A:181:SER:OG | 1.96 | 0.65 |
| 1:C:44:LEU:C | 1:C:45:GLN:OE1 | 2.35 | 0.65 |
| 1:D:137:MET:O | 1:D:145:ARG:NH1 | 2.29 | 0.65 |
| 1:A:45:GLN:OE1 | 1:A:45:GLN:N | 2.30 | 0.65 |
| 1:A:263:ASP:OD1 | 1:A:265:ILE:N | 2.30 | 0.65 |
| 1:C:45:GLN:OE1 | 1:C:45:GLN:N | 2.29 | 0.65 |
| 1:C:133:ARG:NH1 | 1:C:134:ASP:OD2 | 2.30 | 0.65 |
| 1:A:137:MET:O | 1:A:140:ARG:NH1 | 2.30 | 0.65 |
| 1:B:38:PRO:O | 1:B:39:VAL:HB | 1.96 | 0.65 |
| 1:B:45:GLN:OE1 | 1:B:45:GLN:N | 2.30 | 0.65 |
| 1:B:314:MET:SD | 1:B:450[B]:PHE:HZ | 2.18 | 0.65 |
| 1:A:32:PRO:HD3 | 1:A:380:TYR:CE1 | 2.31 | 0.64 |
| 1:B:103:VAL:HG13 | 4:B:533:HOH:O | 1.97 | 0.64 |
| 1:A:139:LYS:O | 1:A:139:LYS:HG2 | 1.98 | 0.64 |
| 1:C:34:PRO:CG | 1:C:42:ASN:HD22 | 2.06 | 0.64 |
| 1:C:95:PHE:O | 1:C:369:HIS:HD2 | 1.79 | 0.64 |
| 1:D:51:LEU:HG | 1:D:215:GLN:HG2 | 1.79 | 0.64 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:69:TYR:CE2 | 1:A:74:PRO:HB3 | 2.32 | 0.64 |
| 1:A:231:HIS:CD2 | 1:A:232:ARG:HG3 | 2.32 | 0.64 |
| 1:A:257:ASP:OD1 | 1:A:259:SER:N | 2.30 | 0.64 |
| 1:C:32:PRO:HD3 | 1:C:380:TYR:CE1 | 2.33 | 0.64 |
| 1:A:305:THR:HG22 | 1:A:308:ARG:NH2 | 2.13 | 0.64 |
| 1:C:69:TYR:CE2 | 1:C:74:PRO:HB3 | 2.33 | 0.63 |
| 1:C:138:GLY:O | 1:C:139:LYS:C | 2.36 | 0.63 |
| 1:B:208:LEU:HD22 | 1:B:230:THR:HB | 1.79 | 0.63 |
| 1:C:180:CYS:HG | 1:C:296:PHE:HZ | 1.46 | 0.63 |
| 1:D:133:ARG:NH1 | 1:D:134:ASP:OD2 | 2.30 | 0.63 |
| 1:B:145:ARG:CD | 1:B:181:SER:OG | 2.46 | 0.63 |
| 1:A:263:ASP:O | 1:A:267:VAL:HG23 | 1.98 | 0.63 |
| 1:B:202:PHE:HD1 | 1:B:206:PHE:CZ | 2.17 | 0.63 |
| 1:A:31:PRO:HA | 1:A:380:TYR:CE1 | 2.34 | 0.62 |
| 1:A:412:HIS:HD2 | 1:C:403:GLU:OE2 | 1.81 | 0.62 |
| 1:A:51:LEU:HG | 1:A:215:GLN:HG2 | 1.81 | 0.62 |
| 1:C:31:PRO:HD2 | 1:C:67:THR:OG1 | 1.98 | 0.62 |
| 1:D:308:ARG:NH1 | 4:D:533:HOH:O | 2.30 | 0.62 |
| 1:D:371:VAL:HG21 | 1:D:382:ILE:HG22 | 1.79 | 0.62 |
| 2:C:500:HEM:HBC2 | 2:C:500:HEM:CMC | 2.28 | 0.62 |
| 1:C:103:VAL:HG23 | 1:C:104:VAL:HG13 | 1.79 | 0.62 |
| 1:C:427:MET:HG3 | 1:C:427:MET:O | 2.00 | 0.62 |
| 2:C:500:HEM:HBB2 | 2:C:500:HEM:CMB | 2.29 | 0.62 |
| 1:B:202:PHE:CD1 | 1:B:206:PHE:HZ | 2.17 | 0.62 |
| 1:A:39:VAL:O | 1:A:39:VAL:CG1 | 2.47 | 0.62 |
| 1:A:98:ARG:HG2 | 1:A:115:PHE:HA | 1.82 | 0.62 |
| 1:C:137:MET:CE | 1:C:140:ARG:NH2 | 2.63 | 0.62 |
| 1:C:256:LEU:HD12 | 1:C:257:ASP:H | 1.64 | 0.61 |
| 1:D:142:VAL:O | 1:D:146:ILE:HG13 | 2.00 | 0.61 |
| 2:B:500:HEM:HBC2 | 2:B:500:HEM:HMC2 | 1.81 | 0.61 |
| 1:C:220:PHE:HB2 | 1:C:224:LEU:CD1 | 2.31 | 0.61 |
| 2:B:500:HEM:HBC2 | 2:B:500:HEM:CMC | 2.31 | 0.61 |
| 1:C:369:HIS:HE1 | 2:C:500:HEM:O2A | 1.84 | 0.61 |
| 1:B:131:THR:HG23 | 1:B:267:VAL:HG11 | 1.83 | 0.61 |
| 1:C:34:PRO:HG2 | 1:C:42:ASN:HD21 | 1.57 | 0.61 |
| 1:A:202:PHE:HZ | 1:A:296:PHE:HB3 | 1.66 | 0.60 |
| 1:C:32:PRO:HD3 | 1:C:380:TYR:CZ | 2.35 | 0.60 |
| 1:C:137:MET:CE | 1:C:140:ARG:HH22 | 2.14 | 0.60 |
| 1:B:427:MET:O | 1:B:427:MET:HG3 | 1.99 | 0.60 |
| 1:C:137:MET:HE2 | 1:C:140:ARG:HH22 | 1.65 | 0.60 |
| 1:D:364:PRO:HG3 | 1:D:479:ASN:ND2 | 2.15 | 0.60 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:310:GLY:O | 1:B:314:MET:HG2 | 2.01 | 0.60 |
| 1:B:163:ALA:HB2 | 1:C:163:ALA:HB2 | 1.84 | 0.60 |
| 1:D:245:ILE:HD13 | 1:D:292:VAL:HG12 | 1.82 | 0.60 |
| 1:D:314:MET:SD | 1:D:450[B]:PHE:CE1 | 2.95 | 0.60 |
| 1:B:95:PHE:O | 1:B:369:HIS:HD2 | 1.84 | 0.60 |
| 1:C:137:MET:HE2 | 1:C:140:ARG:NH2 | 2.17 | 0.60 |
| 1:C:404:THR:HG23 | 4:C:546:HOH:O | 2.00 | 0.60 |
| 1:A:34:PRO:CG | 1:A:42:ASN:ND2 | 2.62 | 0.59 |
| 1:C:145:ARG:HD3 | 1:C:181:SER:OG | 2.02 | 0.59 |
| 1:C:310:GLY:O | 1:C:314:MET:HG2 | 2.02 | 0.59 |
| 1:A:404:THR:N | 1:A:405:PRO:HD3 | 2.18 | 0.59 |
| 1:B:37:LEU:O | 1:B:41:GLY:N | 2.33 | 0.59 |
| 1:B:403:GLU:CG | 1:D:403:GLU:H | 2.16 | 0.59 |
| 1:D:136:GLY:C | 1:D:145:ARG:CZ | 2.70 | 0.59 |
| 1:B:42:ASN:OD1 | 1:B:69:TYR:N | 2.32 | 0.59 |
| 1:B:299:GLY:HA2 | 2:B:500:HEM:CMC | 2.32 | 0.59 |
| 1:D:103:VAL:HG13 | 4:D:522:HOH:O | 2.03 | 0.59 |
| 1:A:95:PHE:O | 1:A:369:HIS:HD2 | 1.85 | 0.59 |
| 1:D:172:HIS:CD2 | 1:D:203:PHE:HE1 | 2.21 | 0.58 |
| 1:A:158:ARG:HG3 | 1:A:158:ARG:HH11 | 1.68 | 0.58 |
| 1:A:427:MET:O | 1:A:427:MET:HG3 | 2.03 | 0.58 |
| 1:C:137:MET:CA | 1:C:145:ARG:HH12 | 2.15 | 0.58 |
| 1:D:37:LEU:O | 1:D:41:GLY:N | 2.35 | 0.58 |
| 1:D:136:GLY:N | 1:D:145:ARG:NH2 | 2.51 | 0.58 |
| 1:A:402:PHE:O | 1:A:405:PRO:HG3 | 2.03 | 0.58 |
| 1:B:45:GLN:N | 1:B:45:GLN:CD | 2.57 | 0.58 |
| 1:C:86:GLU:HA | 1:C:90:ASP:OD2 | 2.03 | 0.58 |
| 1:D:206:PHE:CD1 | 1:D:297:PHE:HE1 | 2.20 | 0.58 |
| 1:D:369:HIS:HE1 | 2:D:500:HEM:O2A | 1.87 | 0.58 |
| 1:A:227:PHE:N | 1:A:227:PHE:HD2 | 2.00 | 0.58 |
| 1:B:136:GLY:C | 1:B:145:ARG:HH12 | 2.04 | 0.58 |
| 1:C:175:THR:HG22 | 1:C:445:GLU:OE1 | 2.03 | 0.58 |
| 1:A:30:LEU:HD13 | 1:A:67:THR:HG21 | 1.84 | 0.58 |
| 1:B:51:LEU:HG | 1:B:215:GLN:HG2 | 1.84 | 0.58 |
| 2:B:500:HEM:HBB2 | 2:B:500:HEM:CMB | 2.34 | 0.58 |
| 1:D:31:PRO:HA | 1:D:380:TYR:CD1 | 2.38 | 0.58 |
| 1:C:103:VAL:HG13 | 4:C:523:HOH:O | 2.04 | 0.57 |
| 1:C:206:PHE:CD2 | 1:C:301[A]:GLU:OE2 | 2.57 | 0.57 |
| 1:C:314:MET:SD | 1:C:450[B]:PHE:CZ | 2.97 | 0.57 |
| 1:A:245:ILE:HD13 | 1:A:292:VAL:HG12 | 1.84 | 0.57 |
| 1:B:206:PHE:CD2 | 1:B:301[A]:GLU:OE2 | 2.56 | 0.57 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:339:ALA:O | 1:C:342:ASP:HB2 | 2.04 | 0.57 |
| 1:C:429:PHE:O | 1:C:430:SER:HB3 | 2.04 | 0.57 |
| 2:D:500:HEM:HBC2 | 2:D:500:HEM:CMC | 2.34 | 0.57 |
| 1:B:449:PHE:O | 1:B:453:ILE:HG13 | 2.03 | 0.57 |
| 1:D:355:GLU:HG3 | 1:D:408:PHE:CD1 | 2.39 | 0.57 |
| 1:D:31:PRO:HD2 | 1:D:67:THR:OG1 | 2.03 | 0.57 |
| 1:D:202:PHE:CD1 | 1:D:206:PHE:CZ | 2.93 | 0.57 |
| 1:B:259:SER:O | 1:B:260:ASN:ND2 | 2.30 | 0.57 |
| 1:D:373:LYS:HG3 | 1:D:374:ASP:O | 2.05 | 0.57 |
| 1:C:131:THR:HG23 | 1:C:267:VAL:HG11 | 1.86 | 0.57 |
| 1:C:315:LEU:HD13 | 1:C:461:SER:HB2 | 1.86 | 0.57 |
| 1:D:429:PHE:O | 1:D:430:SER:HB3 | 2.04 | 0.57 |
| 1:A:256:LEU:HD12 | 1:A:257:ASP:N | 2.20 | 0.57 |
| 1:D:136:GLY:C | 1:D:145:ARG:NH1 | 2.58 | 0.57 |
| 1:A:362:LEU:HD23 | 4:A:524:HOH:O | 2.04 | 0.57 |
| 1:B:136:GLY:CA | 1:B:145:ARG:HH12 | 2.17 | 0.56 |
| 1:A:39:VAL:O | 1:A:39:VAL:HG13 | 2.03 | 0.56 |
| 1:B:204:GLN:HB2 | 4:B:532:HOH:O | 2.05 | 0.56 |
| 1:C:51:LEU:HD12 | 1:C:215:GLN:HG2 | 1.87 | 0.56 |
| 1:C:443:ARG:HD2 | 4:C:563:HOH:O | 2.05 | 0.56 |
| 1:B:323:ARG:HB3 | 1:B:348:TYR:CE2 | 2.40 | 0.56 |
| 1:B:202:PHE:HZ | 1:B:296:PHE:HB3 | 1.70 | 0.56 |
| 1:B:241:ILE:O | 1:B:245:ILE:HG13 | 2.05 | 0.56 |
| 1:C:34:PRO:O | 1:C:42:ASN:ND2 | 2.36 | 0.56 |
| 1:C:314:MET:HB2 | 1:C:459:ILE:HD11 | 1.88 | 0.56 |
| 1:A:70:LEU:HD22 | 1:A:219:LEU:HD11 | 1.86 | 0.56 |
| 1:B:369:HIS:HE1 | 2:B:500:HEM:O2A | 1.87 | 0.56 |
| 1:C:137:MET:N | 1:C:145:ARG:HH12 | 2.04 | 0.56 |
| 1:C:202:PHE:HZ | 1:C:296:PHE:HB3 | 1.71 | 0.55 |
| 1:A:134:ASP:OD2 | 1:A:134:ASP:N | 2.39 | 0.55 |
| 1:C:184:PHE:CE2 | 1:C:296:PHE:CE2 | 2.94 | 0.55 |
| 1:C:188:PHE:HB2 | 1:C:195:PHE:CD2 | 2.42 | 0.55 |
| 1:D:34:PRO:O | 1:D:34:PRO:HG2 | 2.07 | 0.55 |
| 1:D:427:MET:O | 1:D:427:MET:HG3 | 2.05 | 0.55 |
| 1:A:137:MET:HB3 | 1:A:185:GLY:C | 2.28 | 0.55 |
| 1:D:39:VAL:O | 1:D:40:LEU:HD23 | 2.07 | 0.55 |
| 1:A:202:PHE:CZ | 1:A:296:PHE:HB3 | 2.41 | 0.54 |
| 1:B:43:LEU:HA | 1:B:46:MET:HG2 | 1.89 | 0.54 |
| 1:D:39:VAL:O | 1:D:39:VAL:HG13 | 2.06 | 0.54 |
| 1:A:137:MET:CG | 1:A:140:ARG:HH12 | 2.20 | 0.54 |
| 1:A:296:PHE:O | 1:A:300:THR:HB | 2.06 | 0.54 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|--------------------|
| 1:A:355:GLU:HG3 | 1:A:408:PHE:CD1 | 2.42 | 0.54 |
| 1:D:257:ASP:OD1 | 1:D:258:PRO:N | 2.41 | 0.54 |
| 1:C:73:ARG:HD2 | 1:C:387:GLU:OE2 | 2.07 | 0.54 |
| 1:D:409:ASN:O | 1:D:412:HIS:HD2 | 1.91 | 0.54 |
| 1:A:217:PHE:CE1 | 1:A:231:HIS:ND1 | 2.75 | 0.54 |
| 1:A:403:GLU:C | 1:A:404:THR:CG2 | 2.75 | 0.54 |
| 1:B:174:ILE:O | 1:B:178:ILE:HG12 | 2.08 | 0.54 |
| 1:B:299:GLY:HA2 | 2:B:500:HEM:HMC2 | 1.89 | 0.54 |
| 1:B:315:LEU:HD13 | 1:B:461:SER:HB2 | 1.90 | 0.54 |
| 1:D:28:GLY:O | 1:D:29:LYS:CB | 2.56 | 0.54 |
| 1:A:124:LEU:O | 1:A:128:SER:HB2 | 2.07 | 0.54 |
| 1:A:442:ALA:HB1 | 2:A:500:HEM:CBB | 2.38 | 0.54 |
| 1:D:98:ARG:HG2 | 1:D:115:PHE:HA | 1.90 | 0.54 |
| 1:D:206:PHE:HD2 | 1:D:301[B]:GLU:OE2 | 1.90 | 0.54 |
| 1:A:412:HIS:CE1 | 4:A:544:HOH:O | 2.61 | 0.53 |
| 1:D:303:THR:HG21 | 1:D:445:GLU:OE1 | 2.08 | 0.53 |
| 1:A:373:LYS:HG3 | 1:A:374:ASP:O | 2.09 | 0.53 |
| 1:B:47:ASP:OD2 | 1:B:57:ARG:HD2 | 2.08 | 0.53 |
| 1:B:383:PRO:O | 1:B:384:LYS:C | 2.47 | 0.53 |
| 1:C:323:ARG:NH2 | 4:C:503:HOH:O | 2.40 | 0.53 |
| 1:B:381:VAL:HG12 | 1:B:381:VAL:O | 2.08 | 0.53 |
| 1:D:300:THR:O | 1:D:304:SER:HB2 | 2.08 | 0.53 |
| 1:B:134:ASP:OD1 | 1:B:135:PHE:CE2 | 2.62 | 0.53 |
| 1:C:202:PHE:CD1 | 1:C:206:PHE:CZ | 2.97 | 0.53 |
| 1:B:31:PRO:HA | 1:B:380:TYR:CE1 | 2.44 | 0.53 |
| 1:B:314:MET:CE | 1:B:314:MET:HA | 2.39 | 0.52 |
| 1:B:339:ALA:O | 1:B:342:ASP:HB2 | 2.09 | 0.52 |
| 1:C:438:GLY:HA3 | 2:C:500:HEM:C3C | 2.44 | 0.52 |
| 1:D:137:MET:CB | 1:D:185:GLY:C | 2.72 | 0.52 |
| 1:A:44:LEU:CB | 1:A:45:GLN:OE1 | 2.58 | 0.52 |
| 1:C:446:LEU:O | 1:C:450[A]:PHE:HD2 | 1.93 | 0.52 |
| 1:A:158:ARG:HG3 | 1:A:158:ARG:NH1 | 2.24 | 0.52 |
| 1:B:259:SER:C | 1:B:260:ASN:HD22 | 2.10 | 0.52 |
| 1:B:272:MET:HG3 | 1:B:283:PHE:O | 2.09 | 0.52 |
| 1:C:168:THR:OG1 | 1:C:308:ARG:HD2 | 2.10 | 0.52 |
| 1:B:206:PHE:HD2 | 1:B:301[A]:GLU:OE2 | 1.92 | 0.52 |
| 1:D:70:LEU:HB3 | 1:D:219:LEU:HD12 | 1.92 | 0.52 |
| 1:D:146:ILE:HD13 | 1:D:445:GLU:HG2 | 1.92 | 0.52 |
| 1:C:164:LEU:HD23 | 1:C:487:ARG:HB3 | 1.92 | 0.51 |
| 1:C:395:ALA:HA | 1:C:398:ASP:HB2 | 1.91 | 0.51 |
| 2:A:500:HEM:HMC2 | 2:A:500:HEM:HBC2 | 1.91 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:184:PHE:CE2 | 1:B:296:PHE:CE2 | 2.98 | 0.51 |
| 1:D:137:MET:SD | 1:D:186:LYS:HA | 2.49 | 0.51 |
| 1:A:34:PRO:HG2 | 1:A:42:ASN:HD22 | 1.68 | 0.51 |
| 1:D:436:CYS:HB2 | 2:D:500:HEM:NA | 2.24 | 0.51 |
| 1:A:45:GLN:N | 1:A:45:GLN:CD | 2.64 | 0.51 |
| 1:C:39:VAL:HG13 | 1:C:39:VAL:O | 2.09 | 0.51 |
| 1:C:305:THR:HG22 | 1:C:308:ARG:NH2 | 2.26 | 0.51 |
| 1:A:252:HIS:NE2 | 1:A:263:ASP:OD2 | 2.43 | 0.51 |
| 1:D:202:PHE:HE2 | 1:D:296:PHE:HD1 | 1.56 | 0.51 |
| 1:C:208:LEU:HD22 | 1:C:230:THR:CG2 | 2.41 | 0.51 |
| 2:D:500:HEM:HMB1 | 2:D:500:HEM:CBB | 2.34 | 0.51 |
| 1:B:31:PRO:HA | 1:B:380:TYR:CD1 | 2.46 | 0.51 |
| 1:D:219:LEU:N | 1:D:219:LEU:CD1 | 2.74 | 0.51 |
| 1:A:70:LEU:HA | 1:A:219:LEU:HG | 1.93 | 0.51 |
| 1:D:140:ARG:O | 1:D:145:ARG:NH2 | 2.43 | 0.51 |
| 1:A:412:HIS:CD2 | 1:C:403:GLU:OE2 | 2.63 | 0.50 |
| 1:C:202:PHE:CZ | 1:C:296:PHE:HB3 | 2.46 | 0.50 |
| 1:D:359:LEU:HD22 | 1:D:408:PHE:HB2 | 1.93 | 0.50 |
| 1:D:39:VAL:O | 1:D:39:VAL:CG1 | 2.53 | 0.50 |
| 1:A:231:HIS:HD2 | 1:A:232:ARG:N | 2.09 | 0.50 |
| 1:C:383:PRO:HG2 | 1:C:386:THR:OG1 | 2.11 | 0.50 |
| 1:D:370:THR:HG22 | 1:D:387:GLU:HA | 1.94 | 0.50 |
| 1:B:311:PHE:HA | 1:B:314:MET:HG3 | 1.92 | 0.50 |
| 1:B:436:CYS:HB2 | 2:B:500:HEM:NA | 2.26 | 0.50 |
| 1:C:314:MET:SD | 1:C:450[B]:PHE:HZ | 2.33 | 0.50 |
| 1:D:392:LEU:HD11 | 1:D:430:SER:HB2 | 1.94 | 0.50 |
| 1:B:193:PRO:HA | 1:B:196:LEU:HD12 | 1.92 | 0.50 |
| 1:D:131:THR:HG23 | 1:D:267:VAL:HG11 | 1.92 | 0.50 |
| 1:D:153:LEU:HD21 | 1:D:453:ILE:HD11 | 1.94 | 0.50 |
| 1:A:28:GLY:O | 1:A:29:LYS:CB | 2.60 | 0.50 |
| 1:A:220:PHE:CB | 1:A:224:LEU:HD12 | 2.37 | 0.50 |
| 1:A:369:HIS:HE1 | 2:A:500:HEM:O2A | 1.94 | 0.50 |
| 1:B:44:LEU:CB | 1:B:45:GLN:OE1 | 2.60 | 0.50 |
| 1:B:245:ILE:O | 1:B:249:VAL:HG23 | 2.10 | 0.50 |
| 1:B:403:GLU:OE2 | 1:D:403:GLU:N | 2.45 | 0.50 |
| 1:C:45:GLN:N | 1:C:45:GLN:CD | 2.65 | 0.50 |
| 1:A:341:ASP:HA | 4:A:539:HOH:O | 2.11 | 0.50 |
| 1:B:137:MET:CE | 1:B:181:SER:OG | 2.60 | 0.50 |
| 1:B:373:LYS:HG3 | 1:B:374:ASP:O | 2.12 | 0.50 |
| 1:A:231:HIS:CD2 | 1:A:232:ARG:N | 2.80 | 0.49 |
| 1:D:137:MET:N | 1:D:145:ARG:NH1 | 2.60 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:73:ARG:NH1 | 1:A:387:GLU:OE2 | 2.44 | 0.49 |
| 1:A:183:VAL:HG11 | 1:A:292:VAL:HG13 | 1.92 | 0.49 |
| 1:C:133:ARG:HH11 | 1:C:133:ARG:HG2 | 1.76 | 0.49 |
| 1:A:305:THR:HG22 | 1:A:308:ARG:HH21 | 1.75 | 0.49 |
| 1:A:314:MET:HB2 | 1:A:459:ILE:HD11 | 1.93 | 0.49 |
| 1:B:34:PRO:HD3 | 1:B:62:TYR:CE2 | 2.48 | 0.49 |
| 1:A:183:VAL:HG12 | 1:A:184:PHE:CD1 | 2.47 | 0.49 |
| 1:A:449:PHE:O | 1:A:453:ILE:HG13 | 2.13 | 0.49 |
| 1:C:69:TYR:HA | 1:C:73:ARG:O | 2.13 | 0.49 |
| 1:D:137:MET:C | 1:D:145:ARG:HH12 | 2.15 | 0.49 |
| 1:D:202:PHE:HE2 | 1:D:296:PHE:CD1 | 2.31 | 0.49 |
| 1:A:355:GLU:HG3 | 1:A:408:PHE:CE1 | 2.48 | 0.49 |
| 1:A:85:ARG:NH2 | 1:A:424:GLU:O | 2.46 | 0.49 |
| 1:B:137:MET:HE3 | 1:B:181:SER:OG | 2.13 | 0.48 |
| 1:A:274:LYS:O | 1:A:274:LYS:HG3 | 2.13 | 0.48 |
| 1:D:34:PRO:O | 1:D:34:PRO:CG | 2.61 | 0.48 |
| 1:D:202:PHE:HZ | 1:D:296:PHE:HB3 | 1.78 | 0.48 |
| 1:A:137:MET:HB2 | 1:A:185:GLY:O | 2.13 | 0.48 |
| 1:A:177:ASN:HA | 1:A:180:CYS:HB2 | 1.95 | 0.48 |
| 1:C:44:LEU:CB | 1:C:45:GLN:OE1 | 2.61 | 0.48 |
| 1:C:206:PHE:CE2 | 1:C:301[B]:GLU:HB2 | 2.48 | 0.48 |
| 1:A:290:LEU:N | 1:A:290:LEU:HD22 | 2.28 | 0.48 |
| 1:B:70:LEU:HD11 | 1:B:75:VAL:HG21 | 1.95 | 0.48 |
| 1:D:361:ASP:O | 1:D:479:ASN:ND2 | 2.44 | 0.48 |
| 1:A:51:LEU:CG | 1:A:215:GLN:HG2 | 2.44 | 0.48 |
| 1:B:220:PHE:HB2 | 1:B:224:LEU:CD1 | 2.37 | 0.48 |
| 1:A:76:VAL:HG21 | 1:A:382:ILE:HD13 | 1.96 | 0.48 |
| 1:A:137:MET:CG | 1:A:140:ARG:NH1 | 2.77 | 0.48 |
| 1:B:68:VAL:HG13 | 1:B:75:VAL:HG23 | 1.96 | 0.48 |
| 1:B:70:LEU:HA | 1:B:219:LEU:HG | 1.95 | 0.48 |
| 1:B:76:VAL:HG21 | 1:B:382:ILE:CD1 | 2.44 | 0.48 |
| 1:A:245:ILE:O | 1:A:249:VAL:HG23 | 2.14 | 0.48 |
| 1:D:98:ARG:HB2 | 1:D:434:ARG:CZ | 2.44 | 0.48 |
| 1:D:272:MET:HE3 | 4:D:542:HOH:O | 2.14 | 0.48 |
| 1:A:192:ASP:OD1 | 1:A:194:VAL:HB | 2.13 | 0.48 |
| 1:A:403:GLU:O | 1:A:404:THR:HG23 | 2.13 | 0.48 |
| 1:A:34:PRO:CG | 1:A:42:ASN:HD22 | 2.26 | 0.47 |
| 1:B:164:LEU:HD21 | 1:B:462:PRO:HD3 | 1.96 | 0.47 |
| 1:C:120:ARG:HA | 1:C:282:GLU:HG3 | 1.96 | 0.47 |
| 1:C:361:ASP:OD2 | 1:C:393:SER:HB2 | 2.14 | 0.47 |
| 1:D:145:ARG:HH11 | 1:D:145:ARG:HG2 | 1.79 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|-------------------|
| 1:D:256:LEU:HD12 | 1:D:257:ASP:C | 2.34 | 0.47 |
| 1:A:140:ARG:O | 1:A:145:ARG:NH1 | 2.47 | 0.47 |
| 1:A:255:THR:OG1 | 1:A:262:ARG:NH2 | 2.43 | 0.47 |
| 1:B:140:ARG:NH2 | 1:B:145:ARG:HG2 | 2.26 | 0.47 |
| 1:B:395:ALA:HA | 1:B:398:ASP:HB2 | 1.95 | 0.47 |
| 1:C:206:PHE:HE1 | 1:C:297:PHE:HD1 | 1.61 | 0.47 |
| 1:C:262:ARG:O | 1:C:263:ASP:HB3 | 2.14 | 0.47 |
| 1:C:137:MET:HE3 | 1:C:140:ARG:NH2 | 2.28 | 0.47 |
| 1:C:206:PHE:CE1 | 1:C:297:PHE:HD1 | 2.32 | 0.47 |
| 1:A:139:LYS:O | 1:A:139:LYS:CG | 2.59 | 0.47 |
| 1:A:206:PHE:HB3 | 1:A:301[A]:GLU:CD | 2.35 | 0.47 |
| 1:A:404:THR:CG2 | 4:A:544:HOH:O | 2.33 | 0.47 |
| 1:A:429:PHE:O | 1:A:430:SER:HB3 | 2.14 | 0.47 |
| 1:B:341:ASP:HA | 4:B:572:HOH:O | 2.13 | 0.47 |
| 1:C:137:MET:CA | 1:C:145:ARG:NH1 | 2.75 | 0.47 |
| 1:C:137:MET:HB2 | 1:C:140:ARG:HH21 | 1.80 | 0.47 |
| 1:D:165:LEU:C | 1:D:165:LEU:HD12 | 2.35 | 0.47 |
| 1:D:197:ARG:O | 1:D:200:ASP:HB3 | 2.15 | 0.47 |
| 1:A:274:LYS:HE2 | 4:A:512:HOH:O | 2.14 | 0.47 |
| 1:A:404:THR:HG23 | 1:A:404:THR:O | 2.15 | 0.47 |
| 1:B:311:PHE:HA | 1:B:314:MET:CG | 2.45 | 0.47 |
| 1:C:384:LYS:HG2 | 1:C:385:ASN:OD1 | 2.15 | 0.47 |
| 1:A:136:GLY:O | 1:A:145:ARG:NH2 | 2.46 | 0.47 |
| 1:B:53:ARG:NH1 | 1:B:56:LEU:HD12 | 2.29 | 0.47 |
| 1:D:32:PRO:HD3 | 1:D:380:TYR:CZ | 2.50 | 0.47 |
| 1:B:85:ARG:NH2 | 1:B:424:GLU:O | 2.46 | 0.46 |
| 1:B:164:LEU:HD22 | 1:B:485:GLN:HB3 | 1.97 | 0.46 |
| 1:C:47:ASP:OD2 | 1:C:57:ARG:HD2 | 2.14 | 0.46 |
| 1:C:136:GLY:CA | 1:C:145:ARG:CZ | 2.93 | 0.46 |
| 1:B:179:ILE:HD11 | 2:B:500:HEM:HBC1 | 1.97 | 0.46 |
| 1:C:97:GLY:O | 1:C:369:HIS:HA | 2.15 | 0.46 |
| 1:C:38:PRO:O | 1:C:39:VAL:HB | 2.14 | 0.46 |
| 1:C:206:PHE:HB3 | 1:C:301[B]:GLU:OE1 | 2.15 | 0.46 |
| 1:D:47:ASP:OD2 | 1:D:57:ARG:HD3 | 2.15 | 0.46 |
| 1:D:471:THR:HA | 1:D:472:PRO:HD3 | 1.81 | 0.46 |
| 1:C:149:GLU:OE1 | 1:C:149:GLU:HA | 2.16 | 0.46 |
| 1:D:34:PRO:HG2 | 1:D:42:ASN:ND2 | 2.30 | 0.46 |
| 1:D:172:HIS:CD2 | 1:D:203:PHE:CE1 | 3.03 | 0.46 |
| 1:A:202:PHE:CE1 | 1:A:206:PHE:HZ | 2.34 | 0.46 |
| 1:D:70:LEU:HB3 | 1:D:219:LEU:CD1 | 2.45 | 0.46 |
| 1:A:202:PHE:HD1 | 1:A:206:PHE:CZ | 2.32 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:268:TYR:CG | 1:A:288:LEU:HD13 | 2.51 | 0.46 |
| 1:D:206:PHE:CZ | 1:D:297:PHE:HD1 | 2.32 | 0.46 |
| 1:C:34:PRO:HG2 | 1:C:34:PRO:O | 2.16 | 0.46 |
| 1:C:206:PHE:HE1 | 1:C:297:PHE:CD1 | 2.33 | 0.46 |
| 1:C:206:PHE:CE1 | 1:C:297:PHE:CD1 | 3.04 | 0.46 |
| 1:C:241:ILE:O | 1:C:245:ILE:HG13 | 2.16 | 0.46 |
| 1:C:226:TYR:HB2 | 1:C:227:PHE:CE2 | 2.50 | 0.46 |
| 1:D:43:LEU:HD22 | 1:D:220:PHE:CZ | 2.51 | 0.46 |
| 1:D:73:ARG:NH2 | 1:D:218:GLU:HG3 | 2.31 | 0.46 |
| 1:D:352:VAL:O | 1:D:356:ILE:HG13 | 2.16 | 0.46 |
| 1:A:323:ARG:HB3 | 1:A:348:TYR:CE2 | 2.51 | 0.46 |
| 1:B:51:LEU:CG | 1:B:215:GLN:HG2 | 2.46 | 0.46 |
| 1:C:299:GLY:HA2 | 2:C:500:HEM:CMC | 2.46 | 0.46 |
| 1:D:139:LYS:O | 1:D:139:LYS:CG | 2.56 | 0.46 |
| 1:D:438:GLY:HA3 | 2:D:500:HEM:C3C | 2.51 | 0.46 |
| 1:B:226:TYR:HE2 | 4:B:535:HOH:O | 1.98 | 0.45 |
| 1:D:268:TYR:CG | 1:D:288:LEU:HD13 | 2.50 | 0.45 |
| 1:D:290:LEU:N | 1:D:290:LEU:HD22 | 2.31 | 0.45 |
| 1:B:245:ILE:HG23 | 1:B:292:VAL:HG11 | 1.98 | 0.45 |
| 1:B:430:SER:HB3 | 2:B:500:HEM:HBA1 | 1.98 | 0.45 |
| 1:C:446:LEU:O | 1:C:450[A]:PHE:CD2 | 2.69 | 0.45 |
| 1:C:52:LEU:HD22 | 1:C:364:PRO:HB3 | 1.96 | 0.45 |
| 1:D:172:HIS:CG | 1:D:203:PHE:CE1 | 2.96 | 0.45 |
| 1:C:236:ARG:O | 1:C:239:GLN:HB2 | 2.15 | 0.45 |
| 1:C:314:MET:SD | 1:C:450[B]:PHE:CE1 | 3.09 | 0.45 |
| 1:C:414:LEU:HA | 1:C:414:LEU:HD23 | 1.83 | 0.45 |
| 1:D:220:PHE:O | 1:D:224:LEU:HB2 | 2.16 | 0.45 |
| 1:D:314:MET:SD | 1:D:450[B]:PHE:CZ | 3.09 | 0.45 |
| 1:A:170:LEU:HD23 | 1:A:170:LEU:HA | 1.82 | 0.45 |
| 1:B:283:PHE:CD1 | 1:B:283:PHE:N | 2.85 | 0.45 |
| 1:D:164:LEU:HD22 | 1:D:485:GLN:HB3 | 1.99 | 0.45 |
| 1:A:183:VAL:HG12 | 1:A:184:PHE:CE1 | 2.52 | 0.45 |
| 1:A:231:HIS:CD2 | 1:A:231:HIS:C | 2.90 | 0.45 |
| 1:A:56:LEU:HD23 | 1:A:56:LEU:HA | 1.75 | 0.45 |
| 1:B:188:PHE:HB2 | 1:B:195:PHE:CD2 | 2.51 | 0.45 |
| 1:C:382:ILE:HA | 1:C:383:PRO:HD2 | 1.67 | 0.45 |
| 1:C:370:THR:HG22 | 1:C:387:GLU:HA | 1.98 | 0.45 |
| 1:D:43:LEU:HD22 | 1:D:220:PHE:HZ | 1.81 | 0.45 |
| 1:C:249:VAL:O | 1:C:252:HIS:HB2 | 2.17 | 0.45 |
| 1:A:120:ARG:HA | 1:A:282:GLU:HG3 | 1.99 | 0.44 |
| 1:B:278:ASP:OD1 | 1:B:280:SER:OG | 2.34 | 0.44 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:340:LEU:HD13 | 1:B:444:THR:HG23 | 1.99 | 0.44 |
| 1:D:137:MET:O | 1:D:137:MET:HG3 | 2.17 | 0.44 |
| 1:A:37:LEU:O | 1:A:41:GLY:N | 2.46 | 0.44 |
| 1:A:137:MET:CB | 1:A:185:GLY:O | 2.65 | 0.44 |
| 1:A:202:PHE:CE1 | 1:A:241:ILE:HD13 | 2.52 | 0.44 |
| 1:C:220:PHE:HB2 | 1:C:224:LEU:HD12 | 2.00 | 0.44 |
| 1:C:446:LEU:HD22 | 1:C:450[A]:PHE:HE2 | 1.83 | 0.44 |
| 2:A:500:HEM:HBC2 | 2:A:500:HEM:CMC | 2.47 | 0.44 |
| 1:B:342:ASP:O | 1:B:346:MET:HG3 | 2.17 | 0.44 |
| 1:C:116:ALA:HB1 | 1:C:120:ARG:HG2 | 2.00 | 0.44 |
| 1:D:32:PRO:HD3 | 1:D:380:TYR:HE1 | 1.77 | 0.44 |
| 1:D:202:PHE:CE2 | 1:D:296:PHE:CD1 | 2.98 | 0.44 |
| 1:A:131:THR:HG23 | 1:A:267:VAL:HG11 | 2.00 | 0.44 |
| 1:A:287:ASN:O | 1:A:291:THR:HB | 2.17 | 0.44 |
| 1:B:95:PHE:O | 1:B:369:HIS:CD2 | 2.69 | 0.44 |
| 1:D:421:LYS:NZ | 4:D:506:HOH:O | 2.50 | 0.44 |
| 1:B:202:PHE:CZ | 1:B:296:PHE:HB3 | 2.51 | 0.44 |
| 1:A:421:LYS:O | 1:A:421:LYS:HG2 | 2.18 | 0.44 |
| 1:B:53:ARG:HH12 | 1:B:56:LEU:HD12 | 1.83 | 0.44 |
| 1:A:107:ILE:HD11 | 1:A:239:GLN:HG2 | 2.00 | 0.44 |
| 1:C:51:LEU:HD23 | 1:C:51:LEU:HA | 1.90 | 0.44 |
| 1:C:355:GLU:HG3 | 1:C:408:PHE:CD1 | 2.52 | 0.44 |
| 1:C:376:GLN:HA | 1:C:380:TYR:O | 2.18 | 0.44 |
| 2:C:500:HEM:HMB2 | 2:C:500:HEM:CBB | 2.44 | 0.44 |
| 1:D:136:GLY:HA2 | 1:D:182:ILE:HA | 2.00 | 0.44 |
| 1:D:255:THR:OG1 | 1:D:262:ARG:NH2 | 2.43 | 0.44 |
| 1:B:42:ASN:O | 1:B:43:LEU:C | 2.54 | 0.43 |
| 1:B:136:GLY:HA3 | 1:B:145:ARG:NH2 | 2.32 | 0.43 |
| 1:B:310:GLY:HA2 | 1:B:356:ILE:HD13 | 2.00 | 0.43 |
| 1:B:314:MET:HA | 1:B:314:MET:HE2 | 1.99 | 0.43 |
| 1:A:438:GLY:HA3 | 2:A:500:HEM:C3C | 2.54 | 0.43 |
| 1:B:122:ARG:HD3 | 4:B:506:HOH:O | 2.17 | 0.43 |
| 1:C:135:PHE:CD2 | 1:C:267:VAL:HG21 | 2.53 | 0.43 |
| 1:A:426:PHE:CZ | 1:A:428:PRO:HG3 | 2.54 | 0.43 |
| 1:B:107:ILE:HD11 | 1:B:239:GLN:HG2 | 2.00 | 0.43 |
| 1:B:369:HIS:HE1 | 2:B:500:HEM:CGA | 2.31 | 0.43 |
| 1:C:263:ASP:OD1 | 1:C:263:ASP:C | 2.57 | 0.43 |
| 1:C:430:SER:O | 1:C:435:ILE:HG13 | 2.18 | 0.43 |
| 1:D:205:SER:O | 1:D:209:ILE:HG13 | 2.18 | 0.43 |
| 1:A:132:MET:HB3 | 1:A:132:MET:HE3 | 1.73 | 0.43 |
| 1:B:40:LEU:HD22 | 1:B:40:LEU:HA | 1.70 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:361:ASP:OD2 | 1:B:393:SER:HB2 | 2.18 | 0.43 |
| 1:A:442:ALA:HB1 | 2:A:500:HEM:HBB2 | 1.99 | 0.43 |
| 2:A:500:HEM:HBB2 | 2:A:500:HEM:HHC | 2.01 | 0.43 |
| 1:B:206:PHE:CE1 | 1:B:297:PHE:HD1 | 2.37 | 0.43 |
| 1:B:310:GLY:CA | 1:B:356:ILE:HD13 | 2.49 | 0.43 |
| 1:B:383:PRO:O | 1:B:386:THR:OG1 | 2.34 | 0.43 |
| 1:C:172:HIS:HE1 | 1:C:301[A]:GLU:OE2 | 2.01 | 0.43 |
| 1:B:172:HIS:HE1 | 1:B:301[A]:GLU:OE2 | 2.02 | 0.43 |
| 1:B:205:SER:O | 1:B:209:ILE:HG13 | 2.18 | 0.43 |
| 1:B:314:MET:SD | 1:B:450[B]:PHE:CE1 | 3.11 | 0.43 |
| 1:C:133:ARG:NH1 | 1:C:133:ARG:HG2 | 2.34 | 0.43 |
| 1:D:227:PHE:HB3 | 1:D:228:PRO:CD | 2.48 | 0.43 |
| 1:A:137:MET:SD | 1:A:186:LYS:HA | 2.59 | 0.43 |
| 1:B:28:GLY:O | 1:B:29:LYS:CB | 2.66 | 0.43 |
| 1:C:112:GLY:O | 1:C:116:ALA:HB2 | 2.18 | 0.43 |
| 2:C:500:HEM:HMC2 | 2:C:500:HEM:CBC | 2.46 | 0.43 |
| 1:D:179:ILE:HD12 | 1:D:179:ILE:HG23 | 1.82 | 0.43 |
| 1:A:43:LEU:C | 1:A:43:LEU:CD1 | 2.65 | 0.43 |
| 1:B:374:ASP:N | 1:B:384:LYS:HB2 | 2.34 | 0.43 |
| 1:A:116:ALA:HB1 | 1:A:120:ARG:HG2 | 2.01 | 0.43 |
| 1:B:282:GLU:O | 1:B:287:ASN:ND2 | 2.38 | 0.43 |
| 1:C:31:PRO:HA | 1:C:380:TYR:CE1 | 2.53 | 0.43 |
| 1:C:226:TYR:HB2 | 1:C:227:PHE:CD2 | 2.54 | 0.43 |
| 1:D:136:GLY:C | 1:D:145:ARG:NH2 | 2.72 | 0.43 |
| 1:A:394:SER:O | 1:A:398:ASP:HB2 | 2.18 | 0.43 |
| 1:B:403:GLU:CD | 1:D:403:GLU:H | 2.22 | 0.43 |
| 1:C:202:PHE:CD1 | 1:C:206:PHE:HZ | 2.37 | 0.43 |
| 1:C:398:ASP:HA | 1:C:399:PRO:HD3 | 1.87 | 0.43 |
| 1:A:436:CYS:HB2 | 2:A:500:HEM:NA | 2.34 | 0.42 |
| 1:B:103:VAL:HG23 | 1:B:104:VAL:HG13 | 2.01 | 0.42 |
| 1:C:108:PHE:HA | 1:C:290:LEU:HD12 | 1.99 | 0.42 |
| 1:C:137:MET:H | 1:C:145:ARG:NH1 | 2.11 | 0.42 |
| 1:D:114:ILE:HA | 2:D:500:HEM:HAD1 | 2.01 | 0.42 |
| 1:C:75:VAL:HG12 | 1:C:387:GLU:CB | 2.41 | 0.42 |
| 1:C:302:THR:HG22 | 2:C:500:HEM:CAB | 2.49 | 0.42 |
| 1:A:383:PRO:O | 1:A:386:THR:OG1 | 2.30 | 0.42 |
| 1:C:34:PRO:CG | 1:C:34:PRO:O | 2.68 | 0.42 |
| 1:C:184:PHE:CE2 | 1:C:296:PHE:HE2 | 2.36 | 0.42 |
| 1:D:446:LEU:HD23 | 1:D:446:LEU:HA | 1.86 | 0.42 |
| 1:A:183:VAL:HA | 1:A:264:PHE:HB3 | 2.01 | 0.42 |
| 1:D:314:MET:SD | 1:D:450[B]:PHE:HE1 | 2.40 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:44:LEU:HB2 | 1:A:45:GLN:OE1 | 2.19 | 0.42 |
| 1:C:221:SER:O | 1:C:225:LYS:CB | 2.67 | 0.42 |
| 1:C:426:PHE:CZ | 1:C:428:PRO:HG3 | 2.55 | 0.42 |
| 1:D:172:HIS:HA | 1:D:304:SER:OG | 2.18 | 0.42 |
| 1:D:310:GLY:HA2 | 1:D:356:ILE:HD13 | 2.01 | 0.42 |
| 1:D:430:SER:O | 1:D:435:ILE:HG13 | 2.18 | 0.42 |
| 1:A:355:GLU:OE1 | 1:A:355:GLU:HA | 2.19 | 0.42 |
| 1:B:46:MET:CE | 1:B:54:SER:HB3 | 2.49 | 0.42 |
| 1:A:202:PHE:CE1 | 1:A:206:PHE:CZ | 3.08 | 0.42 |
| 1:A:206:PHE:HE1 | 1:A:297:PHE:CD1 | 2.35 | 0.42 |
| 1:B:382:ILE:HA | 1:B:383:PRO:HD2 | 1.85 | 0.42 |
| 1:A:233:GLN:HG3 | 1:A:236:ARG:HH22 | 1.84 | 0.42 |
| 1:A:299:GLY:HA2 | 2:A:500:HEM:CMC | 2.50 | 0.42 |
| 1:B:32:PRO:HD3 | 1:B:380:TYR:CZ | 2.52 | 0.42 |
| 1:B:291:THR:O | 1:B:294:SER:HB2 | 2.20 | 0.42 |
| 1:C:245:ILE:O | 1:C:249:VAL:HG23 | 2.20 | 0.42 |
| 1:D:134:ASP:OD1 | 1:D:134:ASP:N | 2.51 | 0.42 |
| 1:B:116:ALA:HB1 | 1:B:120:ARG:HG2 | 2.02 | 0.42 |
| 1:B:355:GLU:HG3 | 1:B:408:PHE:CE1 | 2.54 | 0.42 |
| 1:C:273:GLU:O | 1:C:274:LYS:C | 2.57 | 0.42 |
| 1:C:355:GLU:HG3 | 1:C:408:PHE:CE1 | 2.55 | 0.42 |
| 1:A:137:MET:HG3 | 1:A:140:ARG:NH1 | 2.35 | 0.42 |
| 1:A:408:PHE:O | 1:C:416:ALA:HB2 | 2.19 | 0.41 |
| 1:C:471:THR:HA | 1:C:472:PRO:HD3 | 1.91 | 0.41 |
| 1:D:124:LEU:HD23 | 1:D:124:LEU:HA | 1.74 | 0.41 |
| 1:A:136:GLY:HA3 | 1:A:145:ARG:NE | 2.29 | 0.41 |
| 1:B:403:GLU:OE2 | 1:D:403:GLU:HB2 | 2.20 | 0.41 |
| 1:B:179:ILE:HD11 | 2:B:500:HEM:CBC | 2.50 | 0.41 |
| 1:B:206:PHE:CE1 | 1:B:297:PHE:CD1 | 3.08 | 0.41 |
| 1:C:105:ASP:O | 1:C:106:PRO:C | 2.56 | 0.41 |
| 1:A:121:TRP:CD1 | 1:A:434:ARG:NH1 | 2.89 | 0.41 |
| 1:A:382:ILE:HA | 1:A:383:PRO:HD2 | 1.75 | 0.41 |
| 1:C:28:GLY:O | 1:C:29:LYS:CB | 2.69 | 0.41 |
| 1:C:129:LEU:HD23 | 1:C:129:LEU:HA | 1.77 | 0.41 |
| 1:D:202:PHE:CZ | 1:D:296:PHE:HD1 | 2.38 | 0.41 |
| 2:D:500:HEM:HMC2 | 2:D:500:HEM:CBC | 2.48 | 0.41 |
| 1:A:31:PRO:HA | 1:A:32:PRO:HD3 | 1.90 | 0.41 |
| 1:D:310:GLY:CA | 1:D:356:ILE:HD13 | 2.51 | 0.41 |
| 1:D:441:ILE:O | 1:D:445:GLU:HG3 | 2.21 | 0.41 |
| 1:A:73:ARG:NH2 | 1:A:218:GLU:HG3 | 2.36 | 0.41 |
| 1:A:376:GLN:HA | 1:A:380:TYR:O | 2.20 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:184:PHE:CZ | 1:B:296:PHE:HE2 | 2.38 | 0.41 |
| 1:D:42:ASN:HA | 1:D:45:GLN:NE2 | 2.35 | 0.41 |
| 1:D:85:ARG:NH2 | 1:D:424:GLU:O | 2.45 | 0.41 |
| 1:D:168:THR:HA | 1:D:308:ARG:HD2 | 2.03 | 0.41 |
| 1:A:245:ILE:HG23 | 1:A:292:VAL:HG11 | 2.03 | 0.41 |
| 1:B:355:GLU:HG3 | 1:B:408:PHE:CD1 | 2.56 | 0.41 |
| 1:C:31:PRO:HA | 1:C:32:PRO:HD3 | 1.89 | 0.41 |
| 1:C:206:PHE:CD2 | 1:C:301[B]:GLU:HB2 | 2.55 | 0.41 |
| 1:C:309:TYR:CE2 | 1:C:360:GLY:HA2 | 2.56 | 0.41 |
| 1:D:101:ILE:HD13 | 1:D:101:ILE:HA | 1.88 | 0.41 |
| 1:B:184:PHE:CE2 | 1:B:296:PHE:CZ | 3.09 | 0.41 |
| 1:C:170:LEU:HD23 | 1:C:170:LEU:HA | 1.73 | 0.41 |
| 1:D:219:LEU:HD12 | 1:D:219:LEU:N | 2.32 | 0.41 |
| 1:B:58:LEU:O | 1:B:59:ARG:C | 2.58 | 0.41 |
| 1:B:156:GLU:OE1 | 4:B:523:HOH:O | 2.22 | 0.41 |
| 1:B:247:GLN:NE2 | 4:B:539:HOH:O | 2.53 | 0.41 |
| 1:B:296:PHE:O | 1:B:300:THR:HB | 2.20 | 0.41 |
| 1:B:336:ARG:NH1 | 1:B:342:ASP:OD2 | 2.44 | 0.41 |
| 1:C:177:ASN:HA | 1:C:180:CYS:HB2 | 2.03 | 0.41 |
| 1:C:206:PHE:HD2 | 1:C:301[A]:GLU:OE2 | 2.03 | 0.41 |
| 1:D:183:VAL:HG12 | 1:D:184:PHE:CD1 | 2.56 | 0.41 |
| 1:D:315:LEU:HD22 | 1:D:461:SER:HB2 | 2.03 | 0.41 |
| 1:D:409:ASN:O | 1:D:412:HIS:CD2 | 2.71 | 0.41 |
| 1:A:31:PRO:HA | 1:A:380:TYR:CD1 | 2.56 | 0.41 |
| 1:A:58:LEU:O | 1:A:59:ARG:C | 2.60 | 0.41 |
| 1:B:39:VAL:HG12 | 1:B:40:LEU:CD2 | 2.45 | 0.41 |
| 1:B:86:GLU:HA | 1:B:90:ASP:OD2 | 2.21 | 0.41 |
| 1:D:146:ILE:HD12 | 1:D:444:THR:HG22 | 2.03 | 0.41 |
| 1:A:165:LEU:HD12 | 1:A:165:LEU:C | 2.42 | 0.40 |
| 1:C:402:PHE:O | 1:C:405:PRO:HG3 | 2.20 | 0.40 |
| 1:D:256:LEU:CD1 | 1:D:257:ASP:C | 2.89 | 0.40 |
| 1:D:368:PRO:HB3 | 1:D:389:PHE:CE1 | 2.56 | 0.40 |
| 1:D:426:PHE:CZ | 1:D:428:PRO:HG3 | 2.56 | 0.40 |
| 1:A:311:PHE:HA | 1:A:314:MET:HG3 | 2.03 | 0.40 |
| 1:B:224:LEU:C | 1:B:226:TYR:N | 2.75 | 0.40 |
| 1:B:260:ASN:HA | 1:B:261:PRO:HD2 | 1.74 | 0.40 |
| 1:A:429:PHE:O | 1:A:430:SER:CB | 2.69 | 0.40 |
| 1:C:132:MET:HE2 | 1:C:132:MET:HB2 | 1.72 | 0.40 |
| 1:A:164:LEU:HD21 | 1:A:462:PRO:HD3 | 2.03 | 0.40 |
| 1:A:273:GLU:C | 1:A:275:ASP:N | 2.74 | 0.40 |
| 1:B:270:LEU:HA | 1:B:270:LEU:HD23 | 1.84 | 0.40 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:51:LEU:CG | 1:D:215:GLN:HG2 | 2.49 | 0.40 |
| 1:A:422:ARG:HA | 4:A:547:HOH:O | 2.21 | 0.40 |
| 1:B:172:HIS:HA | 1:B:304:SER:OG | 2.21 | 0.40 |
| 1:B:178:ILE:O | 1:B:182:ILE:HG13 | 2.21 | 0.40 |
| 1:C:180:CYS:SG | 1:C:296:PHE:HZ | 2.43 | 0.40 |
| 1:C:363:ILE:O | 1:C:363:ILE:HG22 | 2.22 | 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 | 465/476 (98%) | 438 (94%) | 25 (5%) | 2 (0%) | 34 | 66 |
| 1 | B | 465/476 (98%) | 447 (96%) | 17 (4%) | 1 (0%) | 47 | 78 |
| 1 | C | 465/476 (98%) | 445 (96%) | 18 (4%) | 2 (0%) | 34 | 66 |
| 1 | D | 466/476 (98%) | 449 (96%) | 15 (3%) | 2 (0%) | 34 | 66 |
| All | All | 1861/1904 (98%) | 1779 (96%) | 75 (4%) | 7 (0%) | 34 | 66 |

All (7) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 39 | VAL |
| 1 | C | 39 | VAL |
| 1 | D | 39 | VAL |
| 1 | A | 29 | LYS |
| 1 | D | 29 | LYS |
| 1 | B | 29 | LYS |
| 1 | C | 29 | LYS |

### 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 | 399/420 (95%) | 372 (93%) | 27 (7%) | 16 | 42 |
| 1 | B | 398/420 (95%) | 374 (94%) | 24 (6%) | 19 | 48 |
| 1 | C | 399/420 (95%) | 381 (96%) | 18 (4%) | 27 | 60 |
| 1 | D | 398/420 (95%) | 379 (95%) | 19 (5%) | 25 | 58 |
| All | All | 1594/1680 (95%) | 1506 (94%) | 88 (6%) | 21 | 52 |

All (88) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 39 | VAL |
| 1 | A | 40 | LEU |
| 1 | A | 43 | LEU |
| 1 | A | 45 | GLN |
| 1 | A | 48 | ARG |
| 1 | A | 117 | ASN |
| 1 | A | 128 | SER |
| 1 | A | 132 | MET |
| 1 | A | 158 | ARG |
| 1 | A | 202 | PHE |
| 1 | A | 215 | GLN |
| 1 | A | 224 | LEU |
| 1 | A | 227 | PHE |
| 1 | A | 231 | HIS |
| 1 | A | 233 | GLN |
| 1 | A | 257 | ASP |
| 1 | A | 259 | SER |
| 1 | A | 274 | LYS |
| 1 | A | 303 | THR |
| 1 | A | 314 | MET |
| 1 | A | 334 | SER |
| 1 | A | 345 | LYS |
| 1 | A | 381 | VAL |
| 1 | A | 386 | THR |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 439 | GLU |
| 1 | A | 474 | GLU |
| 1 | A | 477 | VAL |
| 1 | B | 37 | LEU |
| 1 | B | 40 | LEU |
| 1 | B | 43 | LEU |
| 1 | B | 45 | GLN |
| 1 | B | 73 | ARG |
| 1 | B | 137 | MET |
| 1 | B | 176 | SER |
| 1 | B | 202 | PHE |
| 1 | B | 211 | SER |
| 1 | B | 227 | PHE |
| 1 | B | 233 | GLN |
| 1 | B | 259 | SER |
| 1 | B | 260 | ASN |
| 1 | B | 272 | MET |
| 1 | B | 296 | PHE |
| 1 | B | 314 | MET |
| 1 | B | 323 | ARG |
| 1 | B | 334 | SER |
| 1 | B | 341 | ASP |
| 1 | B | 345 | LYS |
| 1 | B | 374 | ASP |
| 1 | B | 381 | VAL |
| 1 | B | 386 | THR |
| 1 | B | 421 | LYS |
| 1 | C | 35 | SER |
| 1 | C | 37 | LEU |
| 1 | C | 43 | LEU |
| 1 | C | 45 | GLN |
| 1 | C | 85 | ARG |
| 1 | C | 117 | ASN |
| 1 | C | 131 | THR |
| 1 | C | 176 | SER |
| 1 | C | 202 | PHE |
| 1 | C | 227 | PHE |
| 1 | C | 259 | SER |
| 1 | C | 261 | PRO |
| 1 | C | 296 | PHE |
| 1 | C | 314 | MET |
| 1 | C | 345 | LYS |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | C | 381 | VAL |
| 1 | C | 382 | ILE |
| 1 | C | 439 | GLU |
| 1 | D | 37 | LEU |
| 1 | D | 39 | VAL |
| 1 | D | 40 | LEU |
| 1 | D | 134 | ASP |
| 1 | D | 176 | SER |
| 1 | D | 202 | PHE |
| 1 | D | 213 | SER |
| 1 | D | 227 | PHE |
| 1 | D | 256 | LEU |
| 1 | D | 257 | ASP |
| 1 | D | 281 | SER |
| 1 | D | 296 | PHE |
| 1 | D | 304 | SER |
| 1 | D | 314 | MET |
| 1 | D | 345 | LYS |
| 1 | D | 362 | LEU |
| 1 | D | 371 | VAL |
| 1 | D | 374 | ASP |
| 1 | D | 381 | VAL |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 204 | GLN |
| 1 | A | 233 | GLN |
| 1 | A | 247 | GLN |
| 1 | A | 369 | HIS |
| 1 | A | 412 | HIS |
| 1 | B | 172 | HIS |
| 1 | B | 233 | GLN |
| 1 | B | 247 | GLN |
| 1 | B | 369 | HIS |
| 1 | C | 172 | HIS |
| 1 | C | 233 | GLN |
| 1 | C | 247 | GLN |
| 1 | C | 369 | HIS |
| 1 | C | 412 | HIS |
| 1 | D | 45 | GLN |
| 1 | D | 172 | HIS |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | D | 233 | GLN |
| 1 | D | 247 | GLN |
| 1 | D | 369 | HIS |
| 1 | D | 412 | HIS |

### 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 ⓘ

8 ligands are modelled in this entry.

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

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|-----|------|--------|------|---------|--------|------|---------|
| | | | | | Counts | RMSZ | $\#|Z| > 2$ | Counts | RMSZ | $\#|Z| > 2$ |
| 3 | CPZ | C | 501 | 2 | 10,13,13 | 2.22 | 2 (20%) | 9,17,17 | 1.04 | 1 (11%) |
| 2 | HEM | A | 500 | 1,3 | 41,50,50 | 1.97 | 6 (14%) | 45,82,82 | 1.96 | 12 (26%) |
| 2 | HEM | D | 500 | 1,3 | 41,50,50 | 1.96 | 7 (17%) | 45,82,82 | 1.68 | 8 (17%) |
| 3 | CPZ | B | 501 | 2 | 10,13,13 | 2.33 | 2 (20%) | 9,17,17 | 0.78 | 0 |
| 2 | HEM | C | 500 | 1,3 | 41,50,50 | 1.94 | 8 (19%) | 45,82,82 | 1.70 | 8 (17%) |
| 2 | HEM | B | 500 | 1,3 | 41,50,50 | 1.86 | 7 (17%) | 45,82,82 | 1.70 | 9 (20%) |
| 3 | CPZ | A | 501 | 2 | 10,13,13 | 2.22 | 2 (20%) | 9,17,17 | 1.09 | 0 |
| 3 | CPZ | D | 501 | 2 | 10,13,13 | 2.13 | 2 (20%) | 9,17,17 | 0.81 | 0 |

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

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|-----|------|-------|-----|------|---------|----------|-------|
| 3 | CPZ | C | 501 | 2 | - | 0/0/4/4 | 0/2/2/2 |
| 2 | HEM | A | 500 | 1,3 | - | 4/12/54/54 | - |
| 2 | HEM | D | 500 | 1,3 | - | 4/12/54/54 | - |
| 3 | CPZ | B | 501 | 2 | - | 0/0/4/4 | 0/2/2/2 |
| 2 | HEM | C | 500 | 1,3 | - | 4/12/54/54 | - |
| 2 | HEM | B | 500 | 1,3 | - | 4/12/54/54 | - |
| 3 | CPZ | A | 501 | 2 | - | 0/0/4/4 | 0/2/2/2 |
| 3 | CPZ | D | 501 | 2 | - | 0/0/4/4 | 0/2/2/2 |

All (36) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|---|-------------|----------|
| 2 | A | 500 | HEM | C3D-C2D | 7.70 | 1.53 | 1.36 |
| 2 | C | 500 | HEM | C3D-C2D | 7.66 | 1.53 | 1.36 |
| 2 | B | 500 | HEM | C3D-C2D | 7.64 | 1.53 | 1.36 |
| 2 | D | 500 | HEM | C3D-C2D | 7.62 | 1.52 | 1.36 |
| 3 | B | 501 | CPZ | C2-N1 | 6.07 | 1.45 | 1.36 |
| 3 | A | 501 | CPZ | C2-N1 | 5.86 | 1.44 | 1.36 |
| 3 | C | 501 | CPZ | C2-N1 | 5.83 | 1.44 | 1.36 |
| 3 | D | 501 | CPZ | C2-N1 | 5.39 | 1.44 | 1.36 |
| 2 | C | 500 | HEM | C3C-C2C | -4.68 | 1.33 | 1.40 |
| 2 | D | 500 | HEM | C3C-C2C | -4.62 | 1.34 | 1.40 |
| 2 | A | 500 | HEM | C3C-C2C | -4.28 | 1.34 | 1.40 |
| 2 | B | 500 | HEM | C3C-C2C | -4.25 | 1.34 | 1.40 |
| 2 | D | 500 | HEM | FE-ND | 4.05 | 2.16 | 1.96 |
| 2 | A | 500 | HEM | C3C-CAC | 3.62 | 1.55 | 1.47 |
| 2 | A | 500 | HEM | FE-ND | 3.59 | 2.14 | 1.96 |
| 2 | D | 500 | HEM | C3C-CAC | 3.47 | 1.54 | 1.47 |
| 2 | C | 500 | HEM | C3C-CAC | 3.32 | 1.54 | 1.47 |
| 3 | D | 501 | CPZ | C2-C4 | -3.09 | 1.34 | 1.40 |
| 2 | A | 500 | HEM | CAB-C3B | 3.06 | 1.55 | 1.47 |
| 3 | B | 501 | CPZ | C2-C4 | -3.05 | 1.34 | 1.40 |
| 2 | C | 500 | HEM | CAB-C3B | 2.94 | 1.55 | 1.47 |
| 2 | B | 500 | HEM | CAB-C3B | 2.89 | 1.55 | 1.47 |
| 3 | C | 501 | CPZ | C2-C4 | -2.88 | 1.34 | 1.40 |
| 2 | B | 500 | HEM | C3C-CAC | 2.87 | 1.53 | 1.47 |
| 2 | D | 500 | HEM | CAB-C3B | 2.82 | 1.55 | 1.47 |
| 2 | B | 500 | HEM | FE-ND | 2.70 | 2.10 | 1.96 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|---|-------------|----------|
| 3 | A | 501 | CPZ | C2-C4 | -2.68 | 1.35 | 1.40 |
| 2 | C | 500 | HEM | FE-ND | 2.53 | 2.09 | 1.96 |
| 2 | D | 500 | HEM | CAA-C2A | 2.40 | 1.55 | 1.52 |
| 2 | C | 500 | HEM | FE-NB | 2.18 | 2.07 | 1.96 |
| 2 | A | 500 | HEM | C3B-C2B | -2.12 | 1.33 | 1.37 |
| 2 | B | 500 | HEM | CAA-C2A | 2.10 | 1.55 | 1.52 |
| 2 | B | 500 | HEM | CMB-C2B | 2.06 | 1.55 | 1.50 |
| 2 | D | 500 | HEM | CMB-C2B | 2.03 | 1.55 | 1.50 |
| 2 | C | 500 | HEM | CMD-C2D | 2.00 | 1.55 | 1.50 |
| 2 | C | 500 | HEM | CMB-C2B | 2.00 | 1.55 | 1.50 |

All (38) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------|---|-------------|----------|
| 2 | C | 500 | HEM | C4D-ND-C1D | 5.85 | 111.12 | 105.07 |
| 2 | B | 500 | HEM | C4D-ND-C1D | 5.84 | 111.10 | 105.07 |
| 2 | D | 500 | HEM | C4D-ND-C1D | 5.33 | 110.58 | 105.07 |
| 2 | A | 500 | HEM | C4D-ND-C1D | 5.27 | 110.51 | 105.07 |
| 2 | A | 500 | HEM | CHC-C4B-C3B | 4.23 | 131.04 | 124.57 |
| 2 | A | 500 | HEM | C4C-CHD-C1D | 3.93 | 127.74 | 122.56 |
| 2 | C | 500 | HEM | C4C-CHD-C1D | 3.77 | 127.54 | 122.56 |
| 2 | A | 500 | HEM | C1B-NB-C4B | 3.44 | 108.63 | 105.07 |
| 2 | D | 500 | HEM | CBD-CAD-C3D | -3.28 | 103.52 | 112.63 |
| 2 | D | 500 | HEM | C1B-NB-C4B | 3.22 | 108.40 | 105.07 |
| 2 | D | 500 | HEM | C4C-CHD-C1D | 3.03 | 126.56 | 122.56 |
| 2 | A | 500 | HEM | C3B-C2B-C1B | 2.99 | 108.70 | 106.49 |
| 2 | C | 500 | HEM | CBD-CAD-C3D | -2.95 | 104.44 | 112.63 |
| 2 | A | 500 | HEM | CAB-C3B-C2B | -2.93 | 118.97 | 128.60 |
| 2 | B | 500 | HEM | C4C-CHD-C1D | 2.92 | 126.41 | 122.56 |
| 2 | A | 500 | HEM | CBA-CAA-C2A | -2.90 | 107.67 | 112.62 |
| 2 | C | 500 | HEM | CAA-CBA-CGA | -2.85 | 105.78 | 113.76 |
| 2 | A | 500 | HEM | CHB-C1B-NB | 2.80 | 127.84 | 124.38 |
| 2 | B | 500 | HEM | CBA-CAA-C2A | -2.64 | 108.12 | 112.62 |
| 3 | C | 501 | CPZ | C11-C6-C7 | 2.59 | 120.95 | 118.65 |
| 2 | C | 500 | HEM | CMD-C2D-C1D | 2.44 | 128.75 | 125.04 |
| 2 | B | 500 | HEM | C1B-NB-C4B | 2.36 | 107.51 | 105.07 |
| 2 | C | 500 | HEM | C1B-NB-C4B | 2.33 | 107.48 | 105.07 |
| 2 | D | 500 | HEM | C3B-C2B-C1B | 2.33 | 108.21 | 106.49 |
| 2 | A | 500 | HEM | CBD-CAD-C3D | -2.30 | 106.25 | 112.63 |
| 2 | B | 500 | HEM | CAD-CBD-CGD | -2.30 | 108.66 | 113.60 |
| 2 | B | 500 | HEM | CMD-C2D-C1D | 2.29 | 128.53 | 125.04 |
| 2 | D | 500 | HEM | CAA-CBA-CGA | -2.27 | 107.39 | 113.76 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|---|----------------|-------------|
| 2 | B | 500 | HEM | CBD-CAD-C3D | -2.27 | 106.32 | 112.63 |
| 2 | D | 500 | HEM | CMA-C3A-C4A | -2.24 | 125.03 | 128.46 |
| 2 | C | 500 | HEM | CAD-C3D-C4D | 2.17 | 128.45 | 124.66 |
| 2 | B | 500 | HEM | C2C-C3C-C4C | 2.15 | 108.40 | 106.90 |
| 2 | B | 500 | HEM | O1A-CGA-CBA | -2.14 | 116.22 | 123.08 |
| 2 | A | 500 | HEM | C4B-CHC-C1C | 2.10 | 125.33 | 122.56 |
| 2 | A | 500 | HEM | O1A-CGA-CBA | -2.07 | 116.44 | 123.08 |
| 2 | A | 500 | HEM | CAD-C3D-C4D | 2.03 | 128.21 | 124.66 |
| 2 | C | 500 | HEM | C3B-C2B-C1B | 2.02 | 107.98 | 106.49 |
| 2 | D | 500 | HEM | C4B-CHC-C1C | 2.01 | 125.21 | 122.56 |

There are no chirality outliers.

All (16) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 2 | A | 500 | HEM | C4B-C3B-CAB-CBB |
| 2 | C | 500 | HEM | CAD-CBD-CGD-O1D |
| 2 | A | 500 | HEM | CAA-CBA-CGA-O1A |
| 2 | C | 500 | HEM | CAD-CBD-CGD-O2D |
| 2 | C | 500 | HEM | CAA-CBA-CGA-O1A |
| 2 | A | 500 | HEM | CAA-CBA-CGA-O2A |
| 2 | C | 500 | HEM | CAA-CBA-CGA-O2A |
| 2 | D | 500 | HEM | CAA-CBA-CGA-O1A |
| 2 | D | 500 | HEM | CAA-CBA-CGA-O2A |
| 2 | B | 500 | HEM | CAA-CBA-CGA-O2A |
| 2 | D | 500 | HEM | CAD-CBD-CGD-O1D |
| 2 | B | 500 | HEM | CAA-CBA-CGA-O1A |
| 2 | D | 500 | HEM | CAD-CBD-CGD-O2D |
| 2 | B | 500 | HEM | CAD-CBD-CGD-O2D |
| 2 | B | 500 | HEM | CAD-CBD-CGD-O1D |
| 2 | A | 500 | HEM | CAD-CBD-CGD-O1D |

There are no ring outliers.

4 monomers are involved in 41 short contacts:

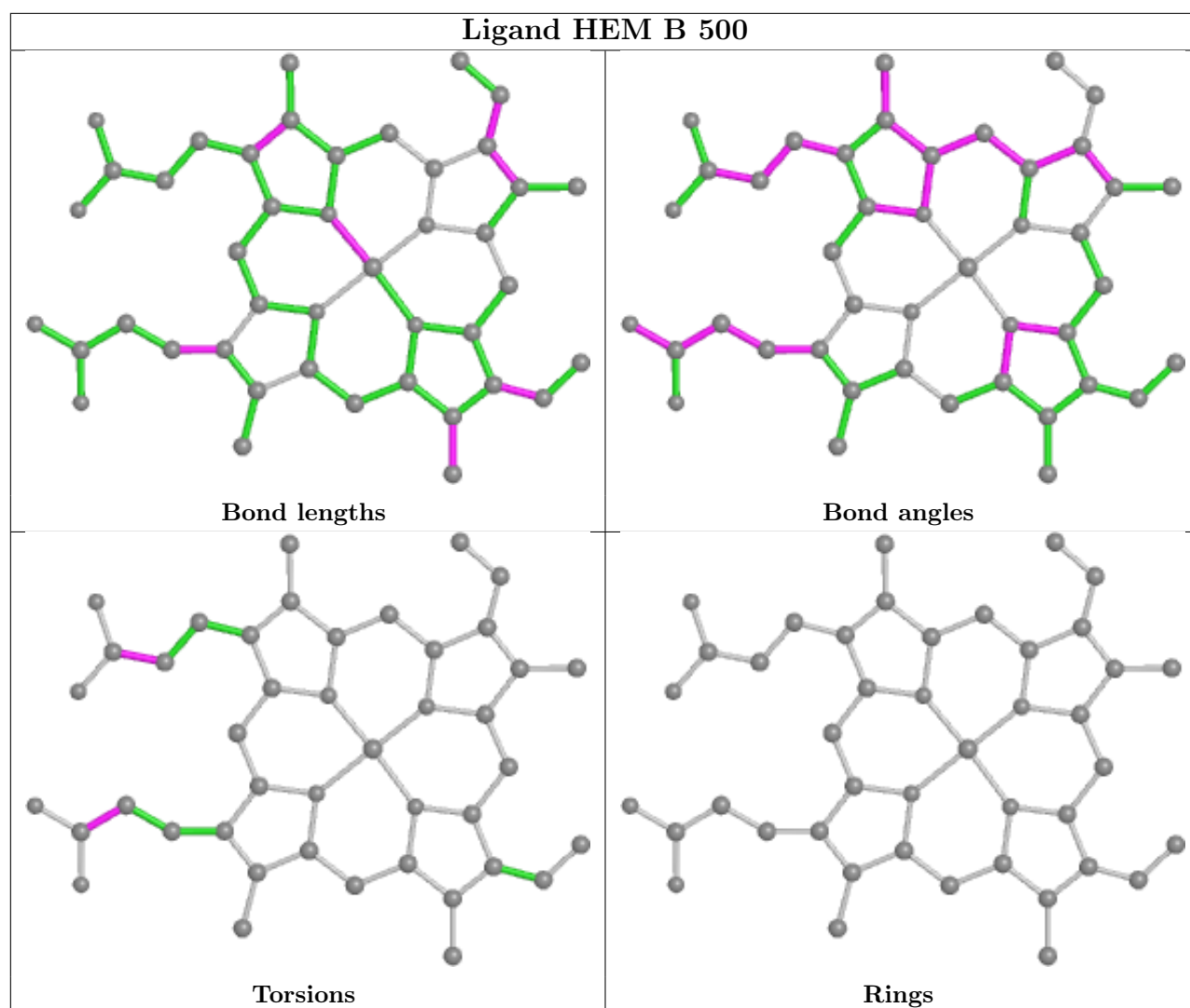| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 2 | A | 500 | HEM | 9 | 0 |
| 2 | D | 500 | HEM | 10 | 0 |
| 2 | C | 500 | HEM | 10 | 0 |
| 2 | B | 500 | HEM | 12 | 0 |

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 HEM A 500**

Bond lengths

Bond angles

Torsions

Rings

## Ligand HEM D 500


Bond lengths


Bond angles


Torsions


Rings

# Ligand HEM C 500



Bond lengths

Bond angles

Torsions

Rings

**Ligand HEM B 500**



Bond lengths



Bond angles



Torsions



Rings
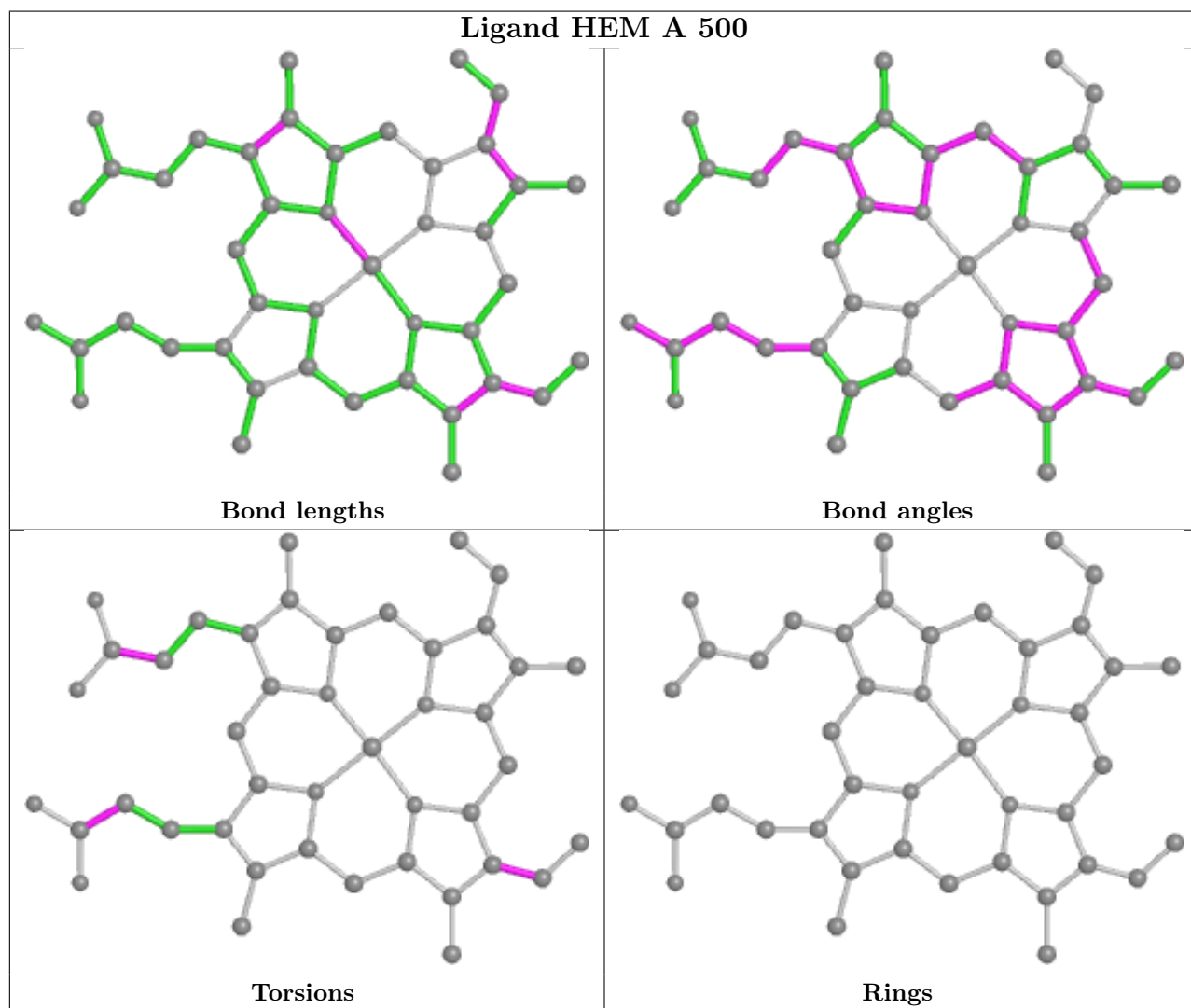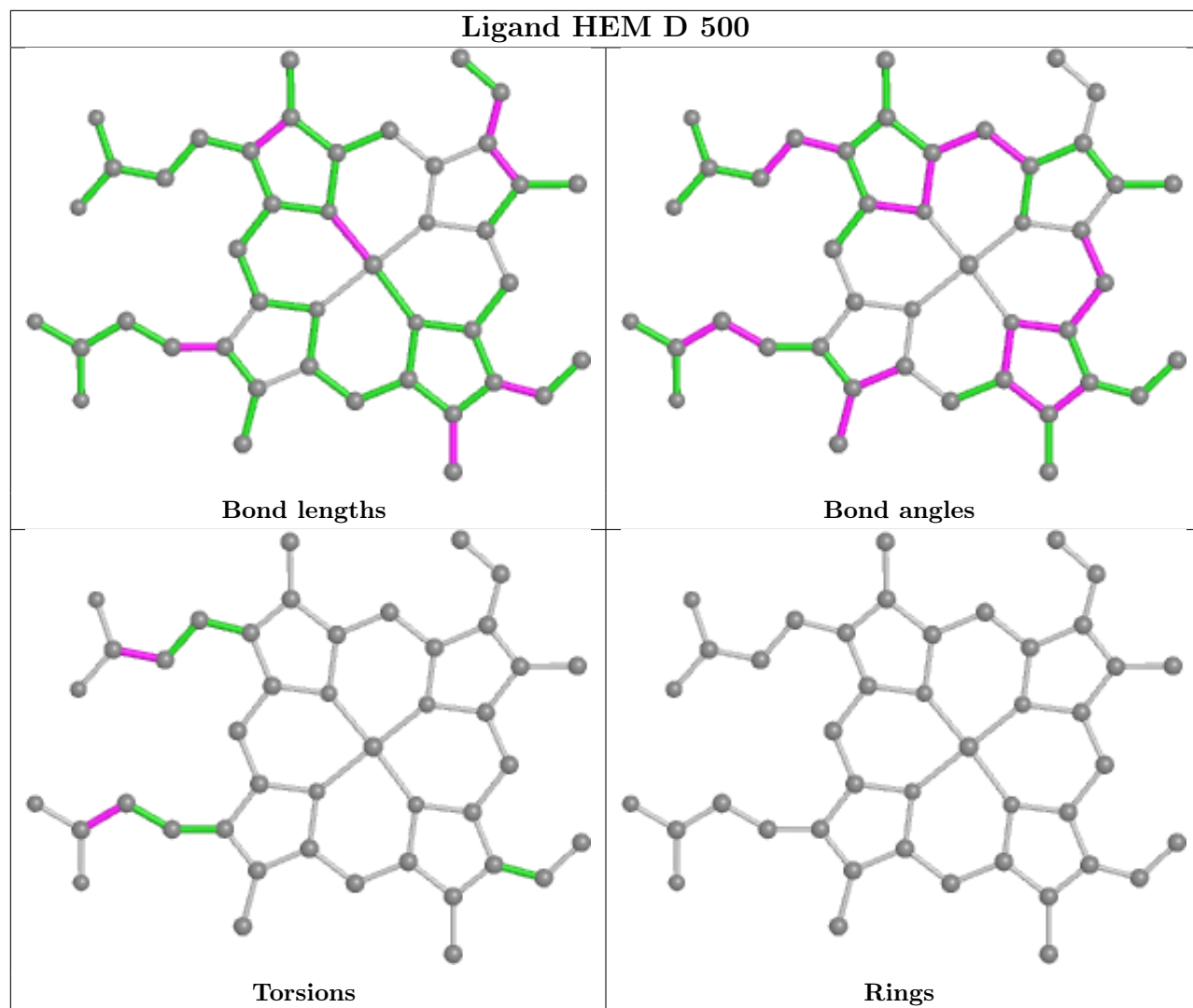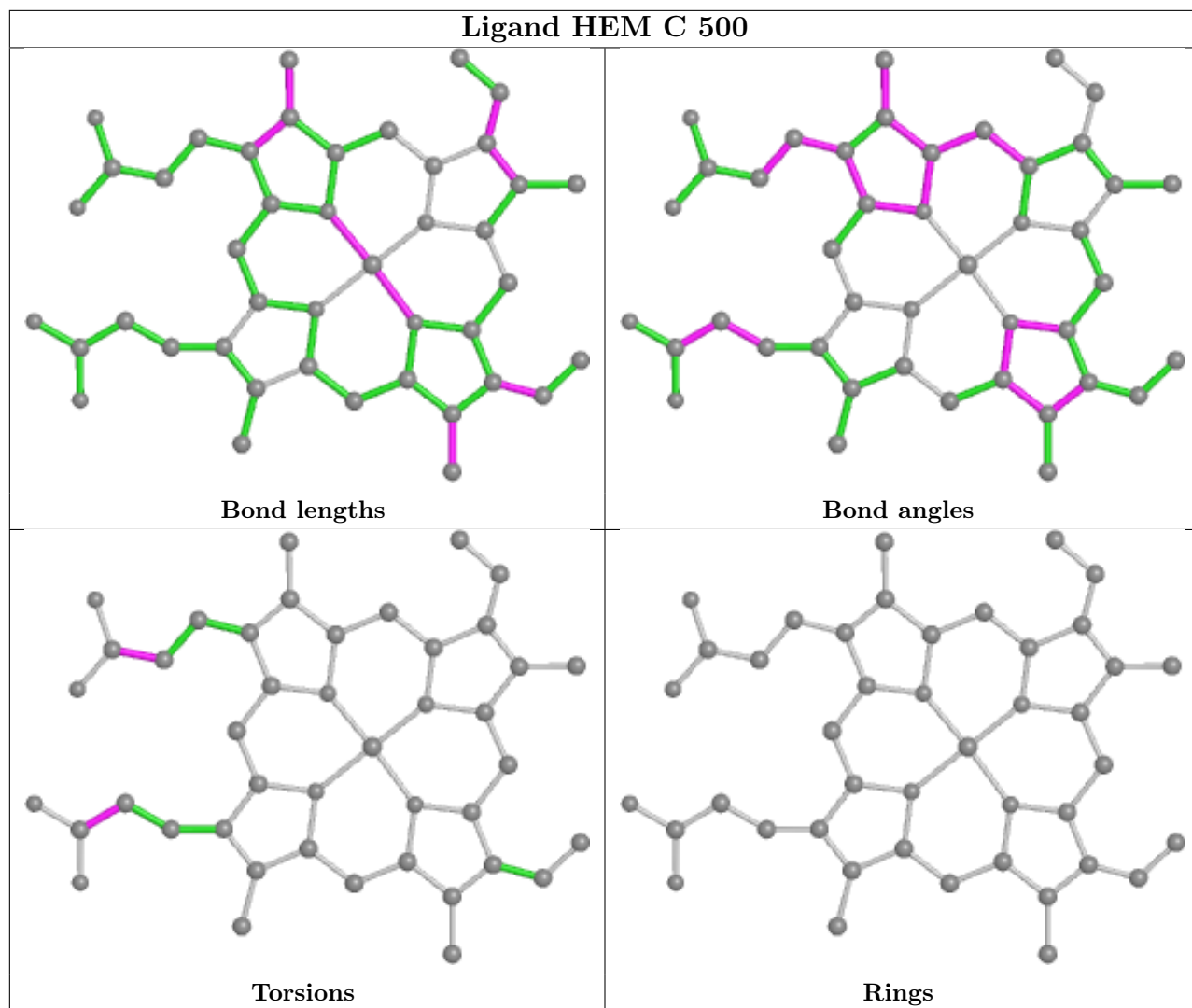
## 5.7 Other polymers ⓘ

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, $95^{th}$ percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

| Mol | Chain | Analysed | <RSRZ> | #RSRZ>2 | | | OWAB(Å$^2$) | Q<0.9 |
|-----|-------|----------|--------|---------|----|----|-------------|-------|
| 1 | A | 465/476 (97%) | -0.08 | 4 (0%) | 84 | 80 | 27, 51, 82, 99 | 9 (1%) |
| 1 | B | 465/476 (97%) | -0.07 | 5 (1%) | 80 | 75 | 26, 51, 82, 99 | 9 (1%) |
| 1 | C | 465/476 (97%) | -0.05 | 4 (0%) | 84 | 80 | 25, 51, 81, 94 | 6 (1%) |
| 1 | D | 465/476 (97%) | -0.06 | 2 (0%) | 92 | 91 | 27, 50, 81, 98 | 8 (1%) |
| All | All | 1860/1904 (97%) | -0.07 | 15 (0%) | 86 | 81 | 25, 51, 82, 99 | 32 (1%) |

All (15) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 1 | C | 136 | GLY | 4.9 |
| 1 | B | 136 | GLY | 4.8 |
| 1 | A | 136 | GLY | 4.1 |
| 1 | D | 136 | GLY | 3.4 |
| 1 | A | 450[A] | PHE | 3.0 |
| 1 | C | 450[A] | PHE | 3.0 |
| 1 | D | 450[A] | PHE | 2.7 |
| 1 | B | 450[A] | PHE | 2.7 |
| 1 | B | 137 | MET | 2.6 |
| 1 | C | 135 | PHE | 2.5 |
| 1 | C | 137 | MET | 2.3 |
| 1 | B | 135 | PHE | 2.3 |
| 1 | A | 137 | MET | 2.2 |
| 1 | A | 138 | GLY | 2.1 |
| 1 | B | 138 | GLY | 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, $95^{th}$ 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($\text{Å}^2$) | Q<0.9 |
|-----|------|-------|-----|-------|------|-----|-------------------------|-------|
| 3 | CPZ | D | 501 | 12/12 | 0.96 | 0.24 | 36,53,57,82 | 0 |
| 3 | CPZ | C | 501 | 12/12 | 0.97 | 0.24 | 35,48,57,77 | 0 |
| 3 | CPZ | A | 501 | 12/12 | 0.97 | 0.25 | 39,50,58,81 | 0 |
| 3 | CPZ | B | 501 | 12/12 | 0.98 | 0.26 | 35,46,60,83 | 0 |
| 2 | HEM | A | 500 | 43/43 | 0.99 | 0.23 | 35,41,46,50 | 0 |
| 2 | HEM | B | 500 | 43/43 | 0.99 | 0.21 | 35,41,48,50 | 0 |
| 2 | HEM | C | 500 | 43/43 | 0.99 | 0.23 | 33,39,44,46 | 0 |
| 2 | HEM | D | 500 | 43/43 | 0.99 | 0.21 | 34,42,46,48 | 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.
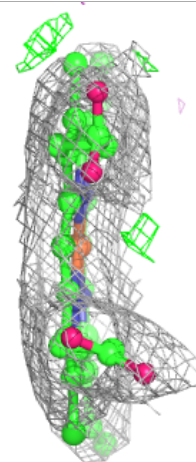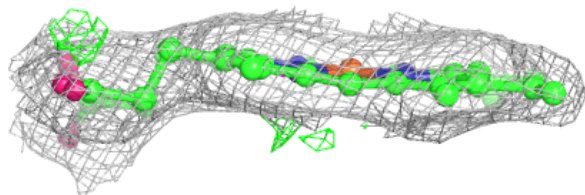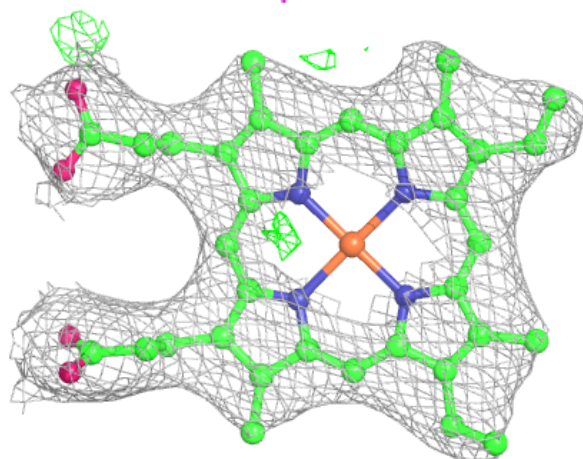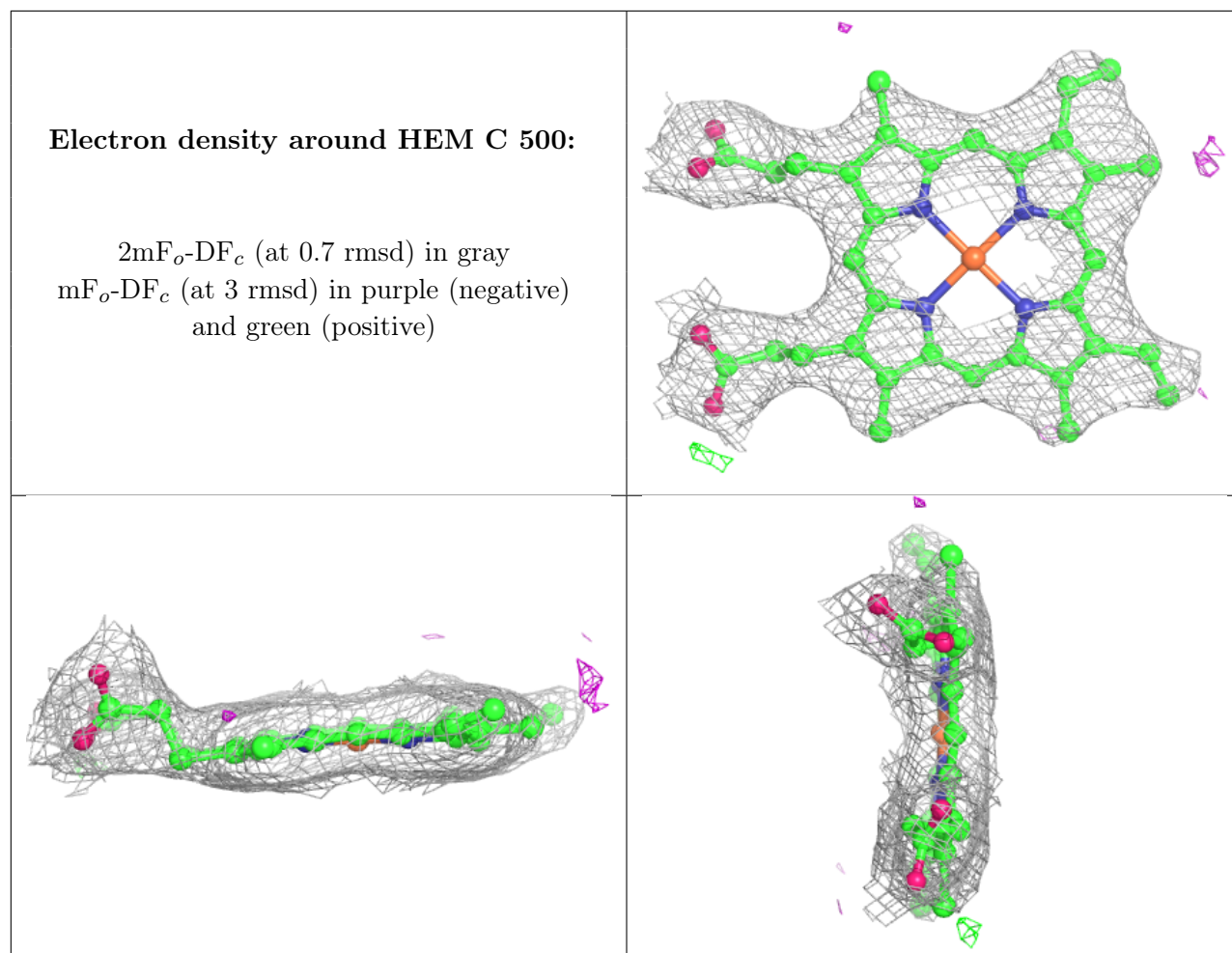
**Electron density around HEM A 500:**

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
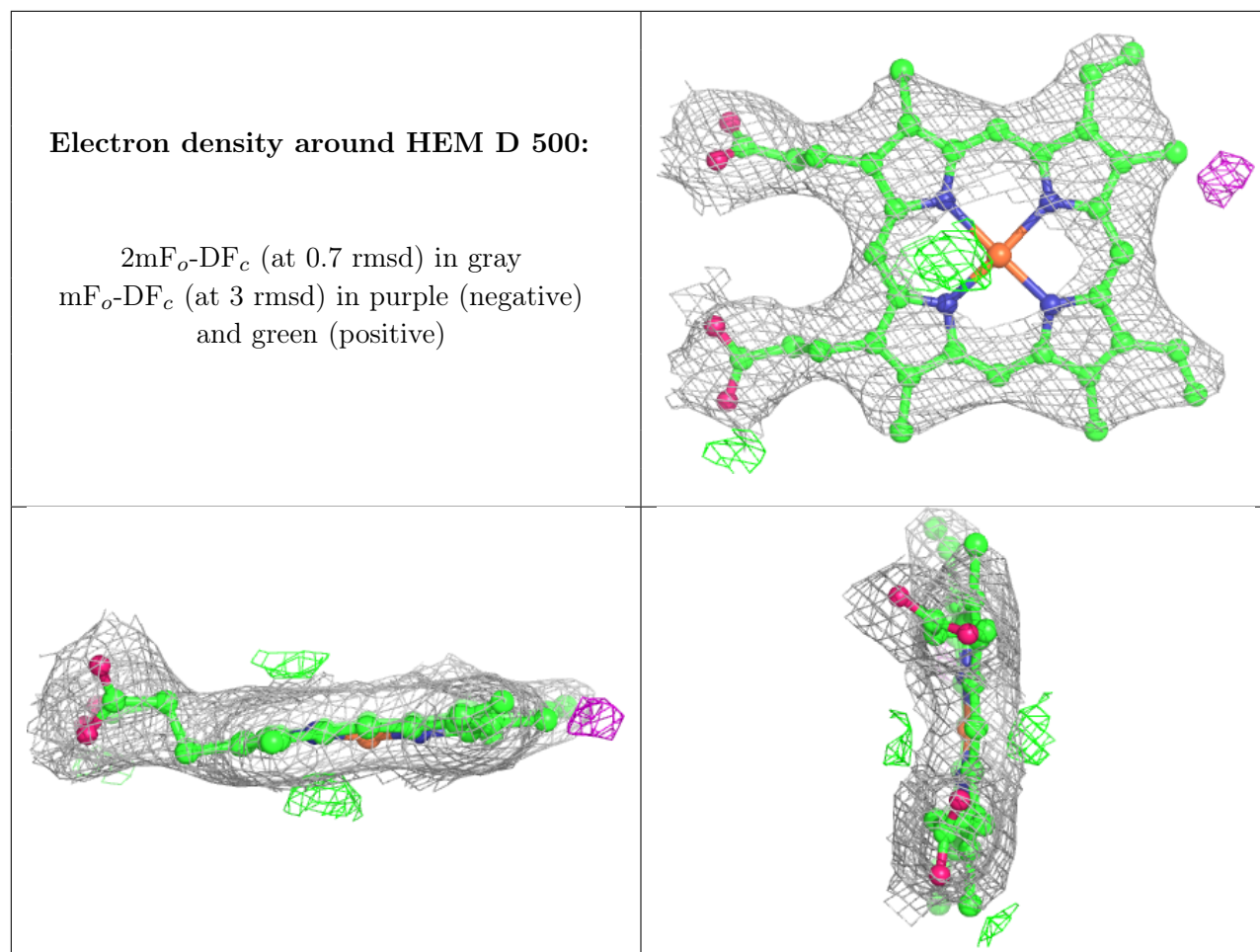$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
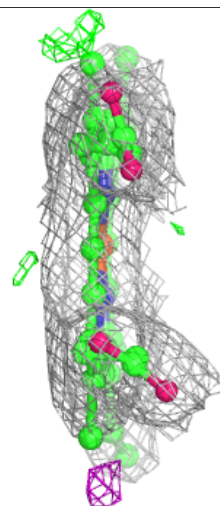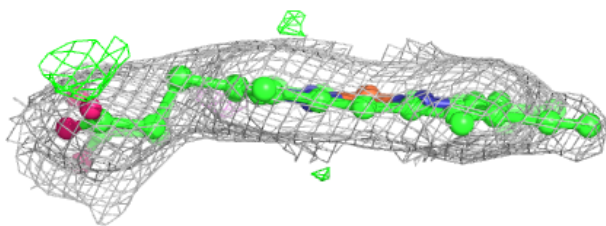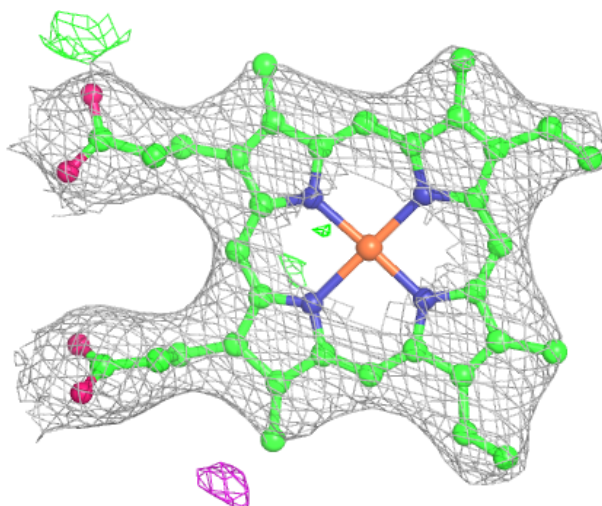
**Electron density around HEM B 500:**

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

Electron density around HEM C 500:

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

**Electron density around HEM D 500:**

$2mF_o$-$DF_c$ (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.