# Full wwPDB X-ray Structure Validation Report (i)

Aug 15, 2023 – 10:36 PM EDT

| | | |
|---|---|---|
| PDB ID | : | 1XVD |
| Title | : | Soluble methane monooxygenase hydroxylase: 4-fluorophenol soaked structure |
| Authors | : | Sazinsky, M.H.; Lippard, S.J. |
| Deposited on | : | 2004-10-27 |
| Resolution | : | 2.30 Å(reported) |

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) 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 (1)) were used in the production of this report:

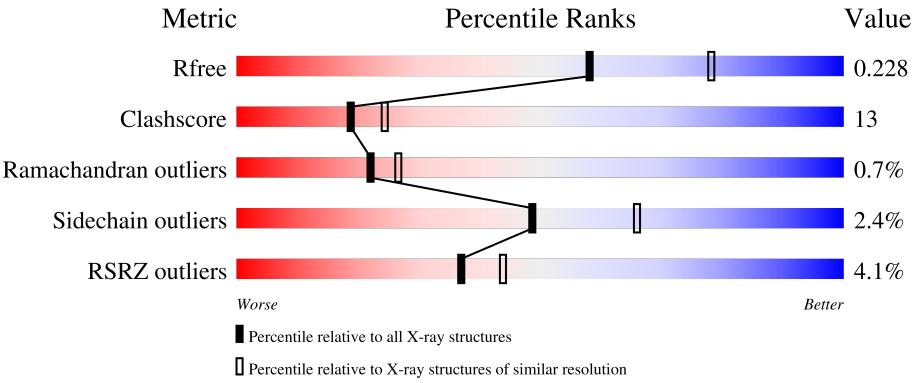
| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.35 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac | : | 5.8.0158 |
| CCP4 | : | 7.0.044 (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 (i)

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

The reported resolution of this entry is 2.30 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)) |
|---|---|---|
| $R_{free}$ | 130704 | 5042 (2.30-2.30) |
| Clashscore | 141614 | 5643 (2.30-2.30) |
| Ramachandran outliers | 138981 | 5575 (2.30-2.30) |
| Sidechain outliers | 138945 | 5575 (2.30-2.30) |
| RSRZ outliers | 127900 | 4938 (2.30-2.30) |

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 | 527 | 5% 70% 25% |
| 1 | B | 527 | 4% 68% 27% |
| 2 | C | 389 | 83% 16% |
| 2 | D | 389 | 6% 63% 36% |
| 3 | E | 170 | 86% 11% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 3 | F | 170 | |

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

| Mol | Type | Chain | Res | Chirality | Geometry | Clashes | Electron density |
|---|---|---|---|---|---|---|---|
| 5 | FPN | A | 2666 | - | X | - | - |
| 5 | FPN | B | 2667 | - | X | - | - |

# 2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 18293 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 Methane monooxygenase component A alpha chain.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 510 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 4148 | 2655 | 713 | 762 | 18 | | | |
| 1 | B | 510 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 4137 | 2646 | 711 | 762 | 18 | | | |

- Molecule 2 is a protein called Methane monooxygenase component A beta chain.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | C | 388 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 3163 | 2036 | 545 | 574 | 8 | | | |
| 2 | D | 388 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 3151 | 2028 | 543 | 572 | 8 | | | |

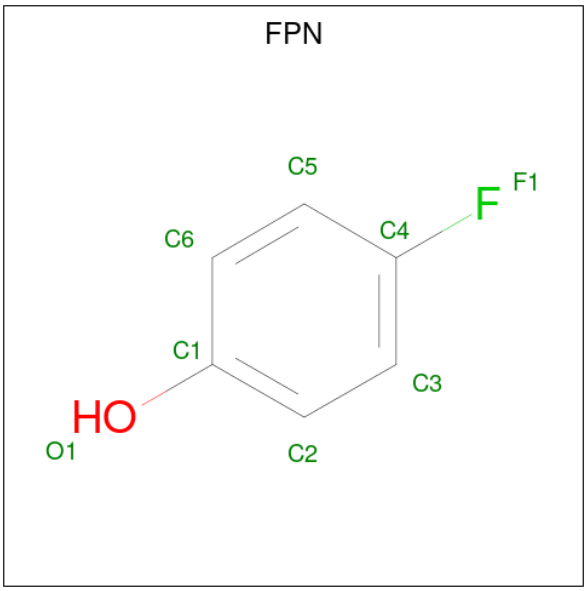
- Molecule 3 is a protein called Methane monooxygenase component A gamma chain.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | E | 166 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 1364 | 864 | 245 | 250 | 5 | | | |
| 3 | F | 166 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 1358 | 860 | 243 | 250 | 5 | | | |

- Molecule 4 is FE (III) ION (three-letter code: FE) (formula: Fe).

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 4 | A | 2 | Total | Fe | 0 | 0 |
| | | | 2 | 2 | | |
| 4 | B | 2 | Total | Fe | 0 | 0 |
| | | | 2 | 2 | | |

- Molecule 5 is 4-FLUOROPHENOL (three-letter code: FPN) (formula: $C_6H_5FO$).




| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 5 | A | 1 | Total C F O<br>8 6 1 1 | 0 | 0 |
| 5 | B | 1 | Total C F O<br>8 6 1 1 | 0 | 0 |

- Molecule 6 is water.

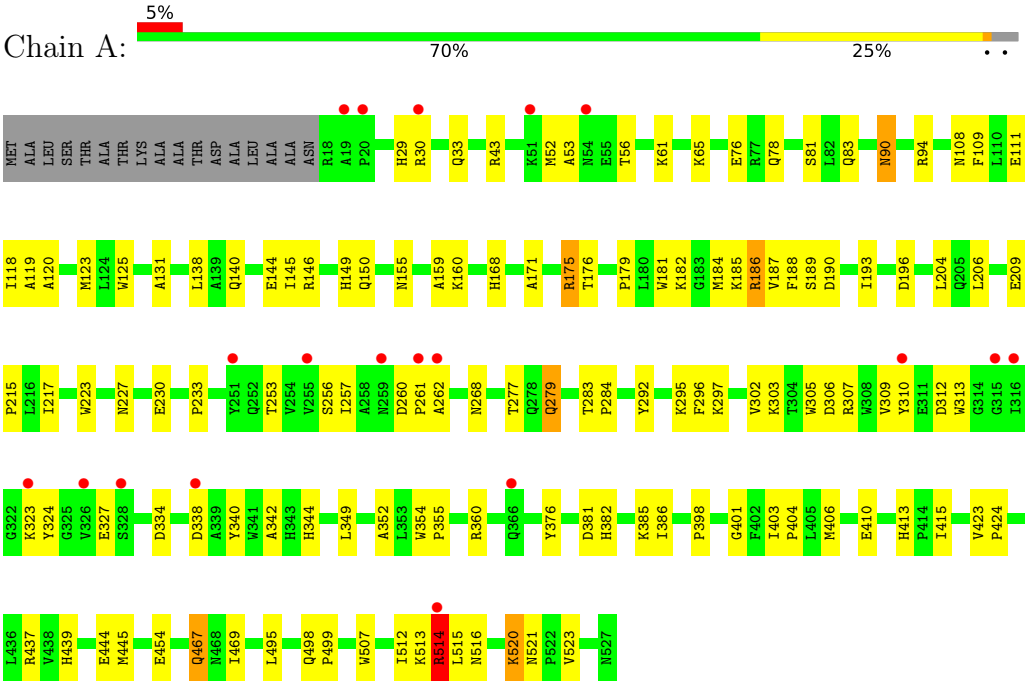
| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 6 | A | 200 | Total O<br>200 200 | 0 | 0 |
| 6 | B | 198 | Total O<br>198 198 | 0 | 0 |
| 6 | C | 277 | Total O<br>277 277 | 0 | 0 |
| 6 | D | 105 | Total O<br>105 105 | 0 | 0 |
| 6 | E | 124 | Total O<br>124 124 | 0 | 0 |
| 6 | F | 48 | Total O<br>48 48 | 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.

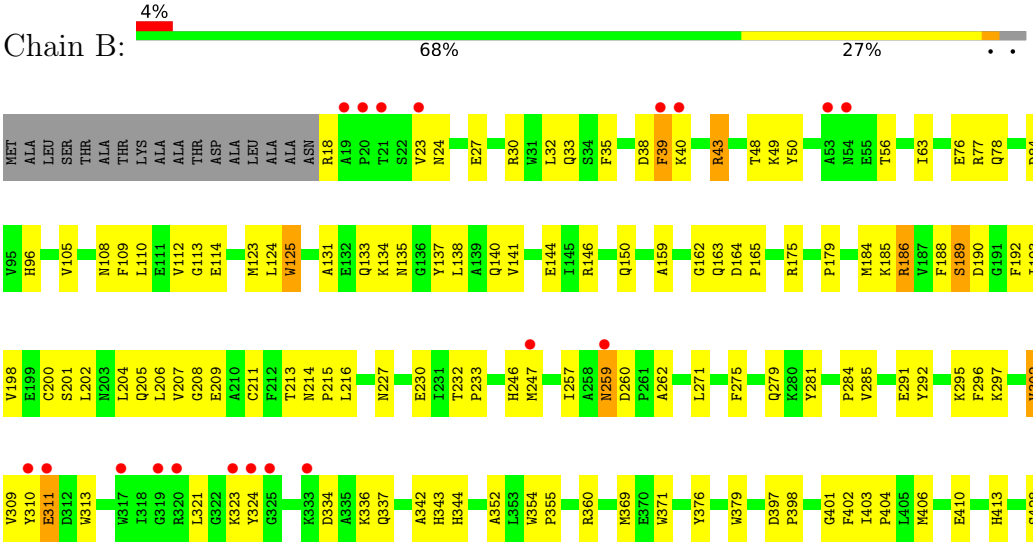
• Molecule 1: Methane monooxygenase component A alpha chain

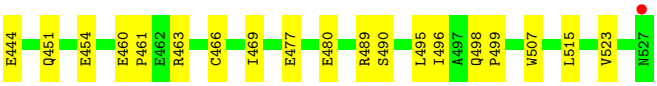
Chain A:



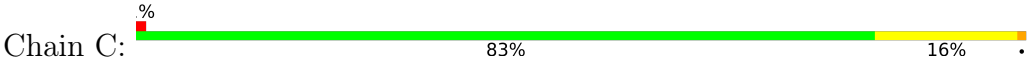

• Molecule 1: Methane monooxygenase component A alpha chain

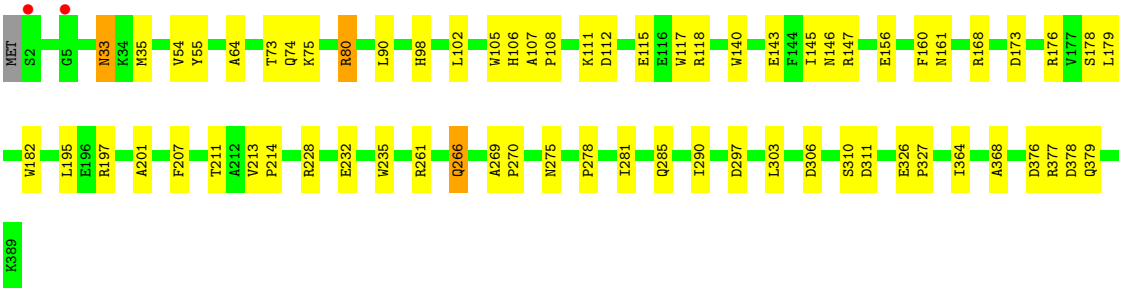
Chain B:



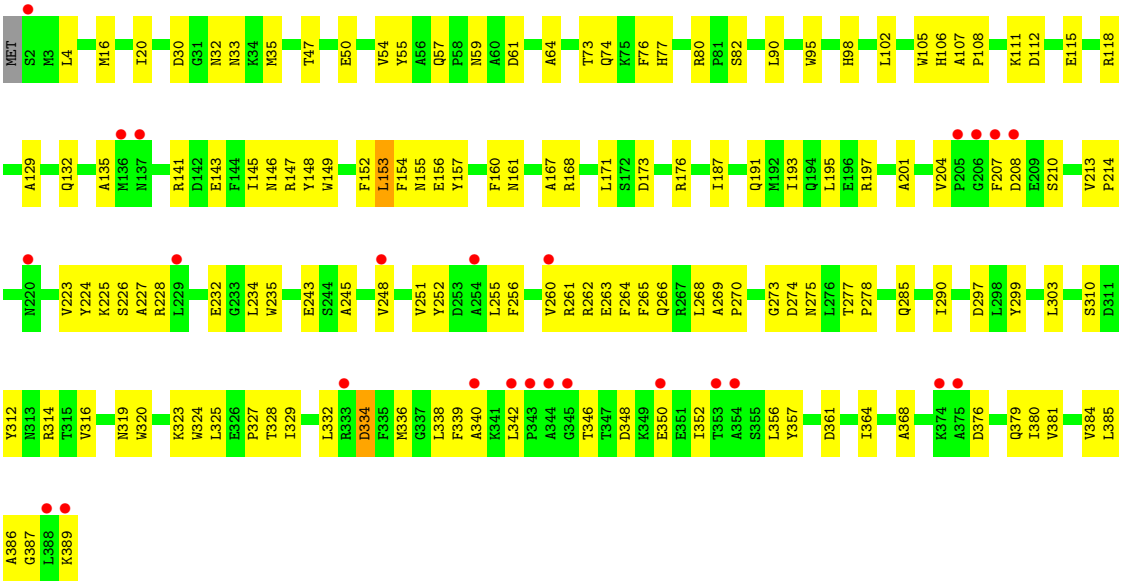



• Molecule 2: Methane monooxygenase component A beta chain

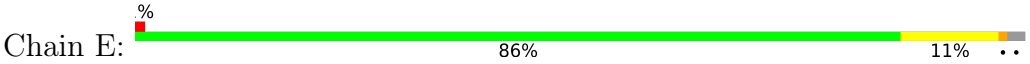


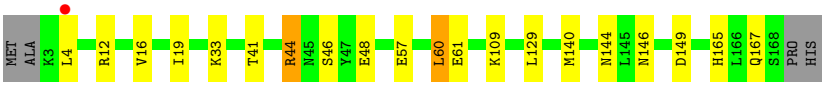




• Molecule 2: Methane monooxygenase component A beta chain

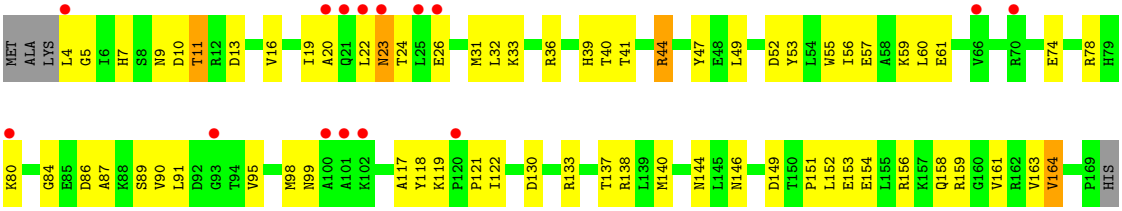



• Molecule 3: Methane monooxygenase component A gamma chain




• Molecule 3: Methane monooxygenase component A gamma chain


MET ALA LYS L4 G5 I6 H7 S8 N9 D10 T11 R12 D13 V16 I19 A20 Q21 L22 N23 T24 L25 E26 M31 L32 K33 R36 H39 T40 T41 R44 Y47 E48 L49 D52 Y53 L54 W55 I56 E57 A58 K59 L60 E61 V66 R70 E74 R78 H79
K80 G84 E85 D86 A87 K88 S89 V90 L91 D92 G93 T94 V95 M98 N99 A100 A101 K102 A117 Y118 K119 P120 P121 I122 D130 R133 T137 R138 L139 M140 N144 L145 N146 D149 T150 P151 L152 E153 E154 L155 R156 K157 Q158 R159 G160 V161 R162 V163 V164 P169 HIS

# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | P 21 21 21 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 71.18Å 171.50Å 221.30Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 29.94 – 2.30<br>29.94 – 2.30 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 94.2 (29.94-2.30)<br>94.3 (29.94-2.30) | Depositor<br>EDS |
| $R_{merge}$ | 0.09 | Depositor |
| $R_{sym}$ | 0.09 | Depositor |
| $< I/\sigma(I) >$ [1] | 3.90 (at 2.31Å) | Xtriage |
| Refinement program | CNS 1.0 | Depositor |
| R, $R_{free}$ | 0.194 , 0.229<br>0.193 , 0.228 | Depositor<br>DCC |
| $R_{free}$ test set | 4028 reflections (3.37%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 32.1 | Xtriage |
| Anisotropy | 0.066 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.34 , 46.7 | EDS |
| L-test for twinning[2] | $< \|L\| > = 0.49$, $< L^2 > = 0.32$ | Xtriage |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| $F_o$,$F_c$ correlation | 0.95 | EDS |
| Total number of atoms | 18293 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 40.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.47% 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

## 5.1 Standard geometry

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | $\#\|Z\| > 5$ | RMSZ | $\#\|Z\| > 5$ |
| 1 | A | 0.36 | 0/4273 | 0.58 | 1/5808 (0.0%) |
| 1 | B | 0.35 | 0/4262 | 0.55 | 0/5796 |
| 2 | C | 0.39 | 0/3259 | 0.58 | 0/4430 |
| 2 | D | 0.34 | 0/3247 | 0.53 | 0/4417 |
| 3 | E | 0.37 | 0/1392 | 0.60 | 0/1876 |
| 3 | F | 0.30 | 0/1387 | 0.53 | 0/1873 |
| All | All | 0.36 | 0/17820 | 0.56 | 1/24200 (0.0%) |

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|---|---|---|---|
| 1 | A | 0 | 1 |

There are no bond length outliers.

All (1) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | A | 514 | ARG | NE-CZ-NH2 | -5.33 | 117.64 | 120.30 |

There are no chirality outliers.

All (1) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 1 | A | 514 | ARG | Mainchain |

## 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 | 4148 | 0 | 3919 | 114 | 0 |
| 1 | B | 4137 | 0 | 3888 | 140 | 0 |
| 2 | C | 3163 | 0 | 2986 | 60 | 0 |
| 2 | D | 3151 | 0 | 2960 | 114 | 0 |
| 3 | E | 1364 | 0 | 1352 | 17 | 0 |
| 3 | F | 1358 | 0 | 1335 | 57 | 0 |
| 4 | A | 2 | 0 | 0 | 0 | 0 |
| 4 | B | 2 | 0 | 0 | 0 | 0 |
| 5 | A | 8 | 0 | 5 | 0 | 0 |
| 5 | B | 8 | 0 | 5 | 0 | 0 |
| 6 | A | 200 | 0 | 0 | 4 | 0 |
| 6 | B | 198 | 0 | 0 | 5 | 0 |
| 6 | C | 277 | 0 | 0 | 1 | 0 |
| 6 | D | 105 | 0 | 0 | 0 | 0 |
| 6 | E | 124 | 0 | 0 | 2 | 0 |
| 6 | F | 48 | 0 | 0 | 0 | 0 |
| All | All | 18293 | 0 | 16450 | 441 | 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 13.

All (441) 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) |
|---|---|---|---|
| 2:C:270:PRO:HB3 | 2:D:270:PRO:HB3 | 1.31 | 1.07 |
| 1:A:78:GLN:HE22 | 1:A:150:GLN:HE21 | 1.03 | 1.01 |
| 2:D:340:ALA:HA | 2:D:389:LYS:HE2 | 1.47 | 0.96 |
| 1:A:338:ASP:OD2 | 1:A:433:ALA:HB2 | 1.70 | 0.91 |
| 3:F:41:THR:O | 3:F:44:ARG:HD2 | 1.71 | 0.90 |
| 2:C:261:ARG:HE | 2:C:285:GLN:HE22 | 1.17 | 0.89 |
| 1:A:352:ALA:HA | 1:A:404:PRO:HB2 | 1.55 | 0.87 |
| 1:A:467:GLN:HG3 | 6:A:2865:HOH:O | 1.76 | 0.85 |
| 1:A:209:GLU:HA | 1:A:213:THR:HB | 1.58 | 0.82 |
| 1:A:155:ASN:HD22 | 1:A:168:HIS:HD2 | 1.25 | 0.82 |
| 1:B:78:GLN:HE22 | 1:B:150:GLN:HE21 | 1.28 | 0.82 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:78:GLN:NE2 | 1:A:150:GLN:HE21 | 1.77 | 0.82 |
| 2:C:146:ASN:HD21 | 2:C:197:ARG:HH21 | 1.28 | 0.82 |
| 1:B:352:ALA:HA | 1:B:404:PRO:HB2 | 1.64 | 0.79 |
| 3:F:80:LYS:HE2 | 3:F:84:GLY:HA2 | 1.64 | 0.79 |
| 3:F:13:ASP:O | 3:F:16:VAL:HG22 | 1.83 | 0.77 |
| 1:B:209:GLU:HA | 1:B:213:THR:OG1 | 1.85 | 0.76 |
| 1:A:435:THR:CG2 | 1:A:437:ARG:HE | 1.99 | 0.76 |
| 2:C:105:TRP:O | 2:C:108:PRO:HD2 | 1.86 | 0.76 |
| 2:D:319:ASN:OD1 | 3:F:78:ARG:HD3 | 1.85 | 0.76 |
| 3:F:4:LEU:HD11 | 3:F:10:ASP:OD2 | 1.88 | 0.73 |
| 2:C:146:ASN:ND2 | 2:C:197:ARG:HH21 | 1.86 | 0.73 |
| 1:A:227:ASN:HD21 | 1:A:295:LYS:H | 1.36 | 0.73 |
| 2:C:102:LEU:CD1 | 2:C:290:ILE:HG23 | 2.19 | 0.72 |
| 1:B:406:MET:O | 1:B:410:GLU:HG3 | 1.88 | 0.72 |
| 1:A:435:THR:HG21 | 1:A:437:ARG:HE | 1.55 | 0.72 |
| 2:C:326:GLU:HB3 | 2:C:327:PRO:HD3 | 1.71 | 0.71 |
| 1:B:477:GLU:OE2 | 1:B:480:GLU:HG2 | 1.91 | 0.70 |
| 3:F:80:LYS:CE | 3:F:84:GLY:HA2 | 2.22 | 0.70 |
| 1:B:49:LYS:HD3 | 3:F:140:MET:HB3 | 1.74 | 0.70 |
| 2:C:261:ARG:HE | 2:C:285:GLN:NE2 | 1.90 | 0.70 |
| 3:F:91:LEU:O | 3:F:95:VAL:HG23 | 1.92 | 0.68 |
| 1:A:204:LEU:O | 1:A:209:GLU:HG3 | 1.93 | 0.68 |
| 2:D:107:ALA:HB3 | 2:D:108:PRO:HD3 | 1.76 | 0.68 |
| 1:A:513:LYS:O | 1:A:514:ARG:C | 2.33 | 0.67 |
| 3:E:165:HIS:HE1 | 3:E:167:GLN:HE21 | 1.43 | 0.67 |
| 2:D:102:LEU:HD12 | 2:D:290:ILE:HG23 | 1.76 | 0.67 |
| 1:B:196:ASP:HB2 | 3:F:140:MET:SD | 2.35 | 0.67 |
| 1:B:33:GLN:HA | 1:B:131:ALA:HB3 | 1.77 | 0.67 |
| 2:D:102:LEU:CD1 | 2:D:290:ILE:HG23 | 2.26 | 0.66 |
| 3:F:52:ASP:O | 3:F:56:ILE:HG12 | 1.96 | 0.66 |
| 1:A:401:GLY:HA2 | 1:A:515:LEU:HD21 | 1.78 | 0.66 |
| 2:D:325:LEU:O | 2:D:329:ILE:HG12 | 1.95 | 0.66 |
| 3:F:36:ARG:NH1 | 3:F:119:LYS:HB3 | 2.11 | 0.66 |
| 3:E:57:GLU:O | 3:E:61:GLU:HG3 | 1.96 | 0.66 |
| 1:A:184:MET:HE2 | 1:A:188:PHE:HB2 | 1.78 | 0.65 |
| 1:A:292:TYR:OH | 1:A:344:HIS:HD2 | 1.79 | 0.65 |
| 2:D:256:PHE:HA | 2:D:332:LEU:HD21 | 1.79 | 0.65 |
| 1:B:439:HIS:HD2 | 3:F:163:VAL:HA | 1.60 | 0.65 |
| 1:A:349:LEU:HD22 | 1:A:415:ILE:HD12 | 1.78 | 0.65 |
| 3:F:153:GLU:H | 3:F:153:GLU:CD | 1.99 | 0.65 |
| 1:A:109:PHE:O | 1:A:112:VAL:HG12 | 1.97 | 0.65 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:186:ARG:HA | 2:C:73:THR:OG1 | 1.97 | 0.65 |
| 1:A:213:THR:O | 1:A:217:ILE:HG12 | 1.96 | 0.65 |
| 1:B:489:ARG:HD2 | 1:B:495:LEU:O | 1.96 | 0.65 |
| 1:A:175:ARG:HG3 | 1:A:181:TRP:CD2 | 2.32 | 0.64 |
| 1:A:227:ASN:ND2 | 1:A:295:LYS:H | 1.95 | 0.64 |
| 3:F:19:ILE:HD12 | 3:F:20:ALA:N | 2.13 | 0.64 |
| 1:A:144:GLU:HA | 1:A:144:GLU:OE2 | 1.98 | 0.64 |
| 1:B:49:LYS:CE | 3:F:144:ASN:HD22 | 2.11 | 0.64 |
| 2:D:153:LEU:C | 2:D:153:LEU:HD12 | 2.18 | 0.64 |
| 1:B:38:ASP:O | 1:B:39:PHE:HB3 | 1.97 | 0.64 |
| 2:D:153:LEU:HD12 | 2:D:154:PHE:N | 2.12 | 0.64 |
| 1:B:23:VAL:HB | 2:D:195:LEU:HD11 | 1.80 | 0.63 |
| 1:B:108:ASN:HD21 | 1:B:175:ARG:HH11 | 1.46 | 0.63 |
| 1:A:76:GLU:OE1 | 1:B:76:GLU:HG3 | 1.98 | 0.63 |
| 1:B:227:ASN:HD21 | 1:B:295:LYS:H | 1.45 | 0.63 |
| 1:B:18:ARG:O | 2:D:129:ALA:HA | 1.98 | 0.63 |
| 1:B:179:PRO:HB3 | 1:B:469:ILE:HD13 | 1.82 | 0.62 |
| 1:B:193:ILE:HD11 | 2:D:82:SER:HB3 | 1.80 | 0.62 |
| 1:B:292:TYR:OH | 1:B:344:HIS:HD2 | 1.83 | 0.62 |
| 1:B:489:ARG:HH11 | 1:B:496:ILE:HA | 1.65 | 0.62 |
| 2:D:348:ASP:OD2 | 2:D:350:GLU:HB2 | 2.00 | 0.62 |
| 2:D:245:ALA:HB3 | 2:D:299:TYR:OH | 2.00 | 0.62 |
| 3:F:61:GLU:O | 3:F:121:PRO:HG2 | 2.00 | 0.61 |
| 1:A:160:LYS:HE3 | 6:A:2857:HOH:O | 2.01 | 0.61 |
| 1:B:78:GLN:NE2 | 1:B:150:GLN:HE21 | 1.96 | 0.61 |
| 1:B:214:ASN:HB3 | 1:B:215:PRO:HD3 | 1.82 | 0.61 |
| 1:A:108:ASN:HD21 | 1:A:175:ARG:HE | 1.48 | 0.61 |
| 2:D:255:LEU:HD12 | 2:D:328:THR:HG21 | 1.83 | 0.61 |
| 2:D:135:ALA:O | 2:D:273:GLY:HA3 | 2.01 | 0.60 |
| 1:A:33:GLN:HA | 1:A:131:ALA:HB3 | 1.83 | 0.60 |
| 1:B:185:LYS:O | 1:B:189:SER:HB2 | 2.02 | 0.60 |
| 2:C:201:ALA:HA | 2:C:207:PHE:HB3 | 1.83 | 0.60 |
| 2:D:261:ARG:HE | 2:D:285:GLN:NE2 | 2.00 | 0.60 |
| 3:F:90:VAL:HG11 | 3:F:118:TYR:CE2 | 2.37 | 0.60 |
| 1:A:401:GLY:HA2 | 1:A:515:LEU:CD2 | 2.32 | 0.59 |
| 1:A:260:ASP:OD2 | 1:A:262:ALA:HB3 | 2.03 | 0.59 |
| 1:B:439:HIS:HE1 | 1:B:454:GLU:OE1 | 1.85 | 0.59 |
| 2:D:261:ARG:HE | 2:D:285:GLN:HE22 | 1.49 | 0.59 |
| 3:F:57:GLU:O | 3:F:61:GLU:HG3 | 2.02 | 0.59 |
| 2:D:364:ILE:HA | 2:D:368:ALA:HB3 | 1.83 | 0.59 |
| 1:B:49:LYS:HE3 | 3:F:144:ASN:HD22 | 1.67 | 0.59 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:D:275:ASN:C | 2:D:278:PRO:HD2 | 2.21 | 0.59 |
| 1:B:402:PHE:C | 1:B:403:ILE:HD12 | 2.23 | 0.59 |
| 3:E:41:THR:O | 3:E:44:ARG:HD2 | 2.03 | 0.58 |
| 2:C:118:ARG:NH2 | 2:D:112:ASP:OD1 | 2.36 | 0.58 |
| 1:B:134:LYS:HD3 | 2:D:161:ASN:HD21 | 1.69 | 0.58 |
| 2:D:57:GLN:NE2 | 2:D:59:ASN:HD21 | 2.02 | 0.58 |
| 2:D:269:ALA:HB1 | 2:D:274:ASP:OD2 | 2.04 | 0.57 |
| 3:E:41:THR:O | 3:E:44:ARG:CD | 2.52 | 0.57 |
| 1:A:108:ASN:ND2 | 1:A:175:ARG:HH21 | 2.01 | 0.57 |
| 1:B:188:PHE:HZ | 1:B:213:THR:HG22 | 1.69 | 0.57 |
| 1:A:108:ASN:HD21 | 1:A:175:ARG:HH21 | 1.51 | 0.57 |
| 2:D:148:TYR:HE2 | 2:D:223:VAL:HG21 | 1.69 | 0.57 |
| 2:D:336:MET:CE | 2:D:356:LEU:HD11 | 2.34 | 0.57 |
| 1:A:406:MET:O | 1:A:410:GLU:HG3 | 2.05 | 0.57 |
| 1:A:185:LYS:O | 1:A:189:SER:HB2 | 2.04 | 0.57 |
| 1:A:140:GLN:O | 1:A:144:GLU:HG2 | 2.05 | 0.56 |
| 1:A:190:ASP:HB3 | 2:C:74:GLN:O | 2.05 | 0.56 |
| 2:C:98:HIS:HE1 | 2:C:178:SER:OG | 1.88 | 0.56 |
| 3:F:9:ASN:OD1 | 3:F:11:THR:HG23 | 2.05 | 0.56 |
| 1:B:23:VAL:HB | 2:D:195:LEU:CD1 | 2.35 | 0.56 |
| 1:B:398:PRO:HG3 | 1:B:507:TRP:CD1 | 2.40 | 0.56 |
| 1:A:413:HIS:HD2 | 1:A:428:SER:OG | 1.88 | 0.56 |
| 2:D:105:TRP:O | 2:D:108:PRO:HD2 | 2.04 | 0.56 |
| 3:F:130:ASP:OD1 | 3:F:133:ARG:NH1 | 2.39 | 0.56 |
| 1:A:284:PRO:HB3 | 1:A:342:ALA:HB1 | 1.88 | 0.56 |
| 1:B:144:GLU:OE2 | 1:B:144:GLU:HA | 2.06 | 0.56 |
| 1:B:123:MET:HB2 | 2:D:168:ARG:HD3 | 1.87 | 0.56 |
| 1:A:184:MET:CE | 1:A:188:PHE:HB2 | 2.35 | 0.56 |
| 3:F:98:MET:HG3 | 3:F:138:ARG:HG2 | 1.88 | 0.56 |
| 3:F:44:ARG:HD3 | 3:F:47:TYR:CZ | 2.40 | 0.56 |
| 1:B:43:ARG:HD2 | 1:B:43:ARG:C | 2.26 | 0.55 |
| 3:F:146:ASN:HB3 | 3:F:149:ASP:OD2 | 2.06 | 0.55 |
| 1:A:171:ALA:O | 1:A:175:ARG:HB3 | 2.06 | 0.55 |
| 2:C:213:VAL:HB | 2:C:214:PRO:HD3 | 1.88 | 0.55 |
| 2:D:262:ARG:HA | 2:D:266:GLN:HB3 | 1.87 | 0.55 |
| 1:B:109:PHE:O | 1:B:112:VAL:HG12 | 2.07 | 0.55 |
| 1:A:116:ASN:CG | 1:A:189:SER:HA | 2.27 | 0.55 |
| 1:B:403:ILE:HD13 | 1:B:515:LEU:HD13 | 1.89 | 0.55 |
| 1:A:302:VAL:HG13 | 1:A:376:TYR:HE2 | 1.71 | 0.55 |
| 1:A:435:THR:HG22 | 1:A:437:ARG:HE | 1.71 | 0.55 |
| 1:A:214:ASN:HB3 | 1:A:215:PRO:HD3 | 1.89 | 0.55 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:C:211:THR:O | 2:C:214:PRO:HD2 | 2.07 | 0.55 |
| 1:A:435:THR:HG21 | 1:A:437:ARG:HH21 | 1.73 | 0.54 |
| 1:B:137:TYR:O | 1:B:141:VAL:HG23 | 2.08 | 0.54 |
| 1:B:291:GLU:OE1 | 1:B:343:HIS:HE1 | 1.90 | 0.54 |
| 2:C:269:ALA:HB3 | 2:C:270:PRO:HD3 | 1.88 | 0.54 |
| 1:B:302:VAL:HG13 | 1:B:376:TYR:HE2 | 1.72 | 0.54 |
| 1:B:403:ILE:HD11 | 1:B:507:TRP:CZ3 | 2.43 | 0.54 |
| 3:E:4:LEU:O | 3:E:4:LEU:HG | 2.07 | 0.54 |
| 2:D:157:TYR:O | 2:D:160:PHE:HB3 | 2.07 | 0.54 |
| 1:B:227:ASN:ND2 | 1:B:295:LYS:H | 2.05 | 0.54 |
| 2:D:336:MET:HE1 | 2:D:356:LEU:HD11 | 1.89 | 0.54 |
| 1:A:185:LYS:HA | 1:A:189:SER:HB2 | 1.89 | 0.54 |
| 2:C:270:PRO:HB3 | 2:D:270:PRO:CB | 2.21 | 0.54 |
| 1:A:155:ASN:HD22 | 1:A:168:HIS:CD2 | 2.16 | 0.54 |
| 2:D:143:GLU:O | 2:D:147:ARG:HB3 | 2.08 | 0.54 |
| 2:D:262:ARG:O | 2:D:266:GLN:HB3 | 2.08 | 0.54 |
| 1:B:402:PHE:O | 1:B:403:ILE:HD12 | 2.08 | 0.53 |
| 2:D:224:TYR:O | 2:D:227:ALA:N | 2.42 | 0.53 |
| 1:B:110:LEU:O | 1:B:114:GLU:HG2 | 2.09 | 0.53 |
| 2:C:146:ASN:O | 2:C:214:PRO:HG3 | 2.09 | 0.53 |
| 3:E:46:SER:OG | 3:E:48:GLU:HG2 | 2.09 | 0.53 |
| 1:A:382:HIS:O | 1:A:386:ILE:HG12 | 2.08 | 0.53 |
| 1:B:208:GLY:O | 1:B:213:THR:HG23 | 2.08 | 0.53 |
| 1:A:160:LYS:HA | 2:C:33:ASN:HB2 | 1.90 | 0.53 |
| 1:B:205:GLN:HA | 1:B:209:GLU:HB2 | 1.91 | 0.53 |
| 2:D:54:VAL:O | 2:D:55:TYR:HB2 | 2.09 | 0.53 |
| 2:D:141:ARG:HD2 | 2:D:204:VAL:HG21 | 1.91 | 0.53 |
| 1:B:403:ILE:HD13 | 1:B:515:LEU:CD1 | 2.39 | 0.53 |
| 2:C:146:ASN:HD21 | 2:C:197:ARG:NH2 | 2.01 | 0.53 |
| 3:E:19:ILE:HG12 | 3:E:60:LEU:HD13 | 1.90 | 0.53 |
| 2:C:140:TRP:NE1 | 2:C:145:ILE:HD11 | 2.25 | 0.52 |
| 1:B:206:LEU:HD11 | 1:B:321:LEU:HD11 | 1.91 | 0.52 |
| 1:A:118:ILE:HD13 | 1:A:145:ILE:HG12 | 1.91 | 0.52 |
| 2:D:323:LYS:HB2 | 3:F:78:ARG:HH11 | 1.75 | 0.52 |
| 1:B:310:TYR:CZ | 1:B:336:LYS:HD2 | 2.45 | 0.52 |
| 2:D:332:LEU:HB3 | 2:D:384:VAL:HG13 | 1.91 | 0.52 |
| 3:E:109:LYS:HE2 | 6:E:274:HOH:O | 2.09 | 0.52 |
| 1:B:48:THR:O | 3:F:137:THR:HG23 | 2.10 | 0.52 |
| 1:B:96:HIS:HB2 | 2:D:20:ILE:CD1 | 2.39 | 0.52 |
| 3:E:146:ASN:HB3 | 3:E:149:ASP:OD2 | 2.10 | 0.52 |
| 1:B:439:HIS:HB3 | 3:F:161:VAL:HG21 | 1.91 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:D:61:ASP:OD1 | 3:F:7:HIS:HD2 | 1.92 | 0.51 |
| 6:A:2832:HOH:O | 3:E:144:ASN:HB3 | 2.10 | 0.51 |
| 2:D:156:GLU:HA | 2:D:156:GLU:OE2 | 2.09 | 0.51 |
| 1:B:490:SER:OG | 2:D:32:ASN:HB2 | 2.10 | 0.51 |
| 1:A:146:ARG:HB2 | 2:C:106:HIS:CE1 | 2.45 | 0.51 |
| 2:C:228:ARG:O | 2:C:232:GLU:HG3 | 2.10 | 0.51 |
| 2:C:306:ASP:O | 2:C:310:SER:HB2 | 2.10 | 0.51 |
| 2:C:377:ARG:HG2 | 6:C:593:HOH:O | 2.09 | 0.51 |
| 3:F:130:ASP:O | 3:F:133:ARG:HG2 | 2.10 | 0.51 |
| 1:A:108:ASN:HD21 | 1:A:175:ARG:NE | 2.08 | 0.51 |
| 1:A:355:PRO:HG2 | 1:A:403:ILE:HD13 | 1.91 | 0.51 |
| 1:B:146:ARG:HB2 | 2:D:106:HIS:CE1 | 2.46 | 0.51 |
| 1:B:202:LEU:HD22 | 1:B:206:LEU:CD2 | 2.40 | 0.51 |
| 1:B:216:LEU:HA | 1:B:308:TRP:CH2 | 2.46 | 0.51 |
| 2:D:98:HIS:HD2 | 2:D:297:ASP:OD1 | 1.93 | 0.51 |
| 1:B:230:GLU:C | 1:B:233:PRO:HD2 | 2.32 | 0.51 |
| 2:D:324:TRP:C | 2:D:327:PRO:HD2 | 2.30 | 0.51 |
| 1:A:29:HIS:CD2 | 1:A:61:LYS:HA | 2.47 | 0.50 |
| 1:A:108:ASN:HD21 | 1:A:175:ARG:NH2 | 2.09 | 0.50 |
| 1:B:403:ILE:HD11 | 1:B:507:TRP:HZ3 | 1.76 | 0.50 |
| 2:D:77:HIS:CG | 3:F:140:MET:HG2 | 2.46 | 0.50 |
| 2:D:167:ALA:O | 2:D:176:ARG:NH1 | 2.44 | 0.50 |
| 3:F:19:ILE:HD12 | 3:F:19:ILE:C | 2.32 | 0.50 |
| 1:A:83:GLN:HB3 | 1:B:77:ARG:HH12 | 1.76 | 0.50 |
| 1:A:138:LEU:HD22 | 2:C:160:PHE:CZ | 2.46 | 0.50 |
| 2:C:102:LEU:HD13 | 2:C:290:ILE:HG23 | 1.91 | 0.50 |
| 1:B:192:PHE:O | 1:B:200:CYS:HB3 | 2.12 | 0.50 |
| 1:B:206:LEU:HD23 | 1:B:271:LEU:HD13 | 1.93 | 0.50 |
| 1:B:198:VAL:O | 1:B:202:LEU:HG | 2.11 | 0.50 |
| 1:B:461:PRO:HG2 | 3:F:159:ARG:CZ | 2.41 | 0.50 |
| 2:C:179:LEU:HD12 | 2:C:182:TRP:CZ3 | 2.45 | 0.50 |
| 1:A:65:LYS:HD2 | 2:C:117:TRP:HB2 | 1.94 | 0.50 |
| 1:B:202:LEU:HD22 | 1:B:206:LEU:HD22 | 1.94 | 0.50 |
| 2:C:102:LEU:HD12 | 2:C:290:ILE:HG23 | 1.91 | 0.50 |
| 1:A:182:LYS:O | 2:C:73:THR:HG21 | 2.12 | 0.50 |
| 1:B:360:ARG:HG2 | 1:B:498:GLN:HB2 | 1.94 | 0.50 |
| 2:D:145:ILE:O | 2:D:149:TRP:HB3 | 2.12 | 0.50 |
| 2:D:260:VAL:O | 2:D:265:PHE:HD1 | 1.94 | 0.50 |
| 2:D:323:LYS:HB2 | 3:F:78:ARG:NH1 | 2.25 | 0.50 |
| 2:D:152:PHE:O | 2:D:155:ASN:HB3 | 2.12 | 0.50 |
| 1:A:439:HIS:HE1 | 1:A:454:GLU:OE1 | 1.95 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:186:ARG:HA | 2:D:73:THR:OG1 | 2.12 | 0.49 |
| 2:D:90:LEU:HD13 | 2:D:303:LEU:HD13 | 1.92 | 0.49 |
| 2:D:329:ILE:CD1 | 2:D:380:ILE:HG23 | 2.43 | 0.49 |
| 2:D:357:TYR:CE2 | 2:D:381:VAL:HG21 | 2.47 | 0.49 |
| 1:B:344:HIS:HE1 | 1:B:376:TYR:CD2 | 2.30 | 0.49 |
| 3:F:61:GLU:HB3 | 3:F:121:PRO:HD3 | 1.94 | 0.49 |
| 1:A:53:ALA:HB3 | 1:A:56:THR:OG1 | 2.13 | 0.49 |
| 2:C:156:GLU:OE2 | 2:C:156:GLU:HA | 2.13 | 0.49 |
| 3:F:22:LEU:HD11 | 3:F:31:MET:SD | 2.52 | 0.49 |
| 1:B:204:LEU:HG | 1:B:205:GLN:HG3 | 1.94 | 0.49 |
| 2:D:339:PHE:CE2 | 2:D:352:ILE:HD12 | 2.48 | 0.49 |
| 2:D:340:ALA:HB2 | 2:D:389:LYS:HG2 | 1.94 | 0.49 |
| 2:D:277:THR:HB | 2:D:278:PRO:HD3 | 1.95 | 0.49 |
| 1:B:354:TRP:CG | 1:B:355:PRO:HD3 | 2.48 | 0.48 |
| 2:C:107:ALA:HB3 | 2:C:108:PRO:HD3 | 1.94 | 0.48 |
| 2:D:243:GLU:HB2 | 2:D:320:TRP:CZ2 | 2.48 | 0.48 |
| 1:B:50:TYR:CD2 | 1:B:257:ILE:HD12 | 2.48 | 0.48 |
| 1:B:401:GLY:HA2 | 1:B:515:LEU:HD21 | 1.95 | 0.48 |
| 2:D:228:ARG:HG2 | 2:D:228:ARG:HH11 | 1.78 | 0.48 |
| 1:A:521:ASN:OD1 | 1:A:523:VAL:HG12 | 2.13 | 0.48 |
| 3:F:24:THR:HG22 | 3:F:26:GLU:HB3 | 1.95 | 0.48 |
| 1:A:81:SER:OG | 1:B:84:ASP:HB3 | 2.14 | 0.48 |
| 1:A:381:ASP:HA | 1:A:385:LYS:HE2 | 1.95 | 0.48 |
| 3:E:12:ARG:O | 3:E:16:VAL:HG23 | 2.14 | 0.48 |
| 3:F:95:VAL:HG12 | 3:F:99:ASN:ND2 | 2.29 | 0.48 |
| 1:B:211:CYS:HB2 | 1:B:313:TRP:CD1 | 2.49 | 0.48 |
| 2:C:111:LYS:O | 2:C:115:GLU:HG3 | 2.13 | 0.48 |
| 2:C:266:GLN:NE2 | 2:D:132:GLN:OE1 | 2.47 | 0.48 |
| 1:B:162:GLY:HA3 | 6:B:2789:HOH:O | 2.14 | 0.47 |
| 3:F:55:TRP:CZ2 | 3:F:59:LYS:HE2 | 2.49 | 0.47 |
| 1:B:439:HIS:HB3 | 3:F:161:VAL:CG2 | 2.44 | 0.47 |
| 2:C:211:THR:C | 2:C:214:PRO:HD2 | 2.34 | 0.47 |
| 2:D:376:ASP:OD1 | 2:D:379:GLN:HB2 | 2.14 | 0.47 |
| 1:B:206:LEU:HD11 | 1:B:321:LEU:CD1 | 2.44 | 0.47 |
| 2:D:54:VAL:HG12 | 2:D:55:TYR:CD2 | 2.49 | 0.47 |
| 1:B:515:LEU:HD21 | 6:B:2831:HOH:O | 2.14 | 0.47 |
| 2:D:263:GLU:OE2 | 2:D:263:GLU:HA | 2.15 | 0.47 |
| 1:B:108:ASN:HD21 | 1:B:175:ARG:HD3 | 1.80 | 0.47 |
| 1:B:413:HIS:HD2 | 1:B:428:SER:OG | 1.97 | 0.47 |
| 1:A:120:ALA:HA | 1:A:193:ILE:HG22 | 1.95 | 0.47 |
| 1:B:354:TRP:CH2 | 1:B:499:PRO:HD3 | 2.50 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:159:ALA:O | 2:C:33:ASN:HB2 | 2.14 | 0.47 |
| 1:B:140:GLN:HG3 | 1:B:246:HIS:NE2 | 2.29 | 0.47 |
| 2:D:208:ASP:OD1 | 2:D:210:SER:HB3 | 2.14 | 0.47 |
| 3:F:32:LEU:HD13 | 3:F:60:LEU:HB3 | 1.96 | 0.47 |
| 1:A:206:LEU:HB2 | 6:A:2863:HOH:O | 2.15 | 0.47 |
| 2:D:357:TYR:CD2 | 2:D:381:VAL:HG21 | 2.49 | 0.47 |
| 1:A:230:GLU:C | 1:A:233:PRO:HD2 | 2.35 | 0.47 |
| 1:A:279:GLN:HG2 | 1:A:283:THR:OG1 | 2.15 | 0.47 |
| 1:B:323:LYS:HE2 | 1:B:324:TYR:CZ | 2.50 | 0.47 |
| 3:F:19:ILE:HG21 | 3:F:60:LEU:HD12 | 1.97 | 0.47 |
| 1:A:196:ASP:HB2 | 3:E:140:MET:SD | 2.55 | 0.46 |
| 2:D:161:ASN:HB3 | 2:D:235:TRP:CE2 | 2.50 | 0.46 |
| 1:B:24:ASN:OD1 | 1:B:27:GLU:HG3 | 2.14 | 0.46 |
| 1:B:310:TYR:CE1 | 1:B:336:LYS:HD2 | 2.50 | 0.46 |
| 1:B:466:CYS:HB2 | 2:D:73:THR:HA | 1.96 | 0.46 |
| 2:C:75:LYS:HB3 | 2:C:80:ARG:O | 2.14 | 0.46 |
| 1:A:435:THR:HG23 | 3:E:167:GLN:O | 2.15 | 0.46 |
| 1:B:30:ARG:HG2 | 1:B:30:ARG:HH11 | 1.80 | 0.46 |
| 1:B:190:ASP:HB3 | 2:D:74:GLN:O | 2.16 | 0.46 |
| 1:B:227:ASN:HD21 | 1:B:296:PHE:H | 1.63 | 0.46 |
| 1:A:360:ARG:HG2 | 1:A:498:GLN:HB2 | 1.98 | 0.46 |
| 2:D:310:SER:O | 2:D:314:ARG:HG3 | 2.15 | 0.46 |
| 1:A:185:LYS:CA | 1:A:189:SER:HB2 | 2.45 | 0.46 |
| 1:B:43:ARG:HD2 | 1:B:43:ARG:O | 2.16 | 0.46 |
| 1:B:113:GLY:HA3 | 1:B:188:PHE:CD2 | 2.50 | 0.46 |
| 2:C:98:HIS:CD2 | 2:C:297:ASP:OD1 | 2.68 | 0.46 |
| 2:D:385:LEU:C | 2:D:387:GLY:H | 2.19 | 0.46 |
| 1:A:306:ASP:O | 1:A:310:TYR:HB2 | 2.16 | 0.46 |
| 1:B:56:THR:HG21 | 1:B:133:GLN:OE1 | 2.16 | 0.46 |
| 1:B:146:ARG:HG2 | 1:B:150:GLN:OE1 | 2.14 | 0.46 |
| 2:C:235:TRP:CD1 | 2:C:235:TRP:C | 2.89 | 0.46 |
| 1:A:175:ARG:HG2 | 1:A:176:THR:N | 2.28 | 0.46 |
| 2:D:16:MET:O | 2:D:20:ILE:HG12 | 2.15 | 0.46 |
| 1:B:113:GLY:HA2 | 1:B:188:PHE:HB3 | 1.98 | 0.46 |
| 1:B:302:VAL:HG13 | 1:B:376:TYR:CE2 | 2.51 | 0.46 |
| 2:D:324:TRP:O | 2:D:327:PRO:HD2 | 2.15 | 0.46 |
| 1:A:513:LYS:O | 1:A:515:LEU:N | 2.49 | 0.45 |
| 1:B:140:GLN:HG3 | 1:B:246:HIS:CD2 | 2.51 | 0.45 |
| 3:F:151:PRO:HB2 | 3:F:153:GLU:OE1 | 2.15 | 0.45 |
| 2:C:161:ASN:HB3 | 2:C:235:TRP:CE2 | 2.51 | 0.45 |
| 2:D:77:HIS:CD2 | 3:F:140:MET:HG2 | 2.51 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:F:36:ARG:HA | 3:F:40:THR:HG23 | 1.98 | 0.45 |
| 3:F:39:HIS:CD2 | 3:F:49:LEU:HD12 | 2.51 | 0.45 |
| 1:B:165:PRO:HD2 | 2:D:30:ASP:HB3 | 1.99 | 0.45 |
| 2:C:266:GLN:HB2 | 2:C:281:ILE:HG21 | 1.98 | 0.45 |
| 1:A:83:GLN:HB3 | 1:B:77:ARG:NH1 | 2.31 | 0.45 |
| 1:B:164:ASP:OD1 | 1:B:489:ARG:NH2 | 2.50 | 0.45 |
| 1:B:216:LEU:HA | 1:B:308:TRP:HH2 | 1.81 | 0.45 |
| 2:D:201:ALA:HA | 2:D:207:PHE:HB3 | 1.98 | 0.45 |
| 1:B:438:VAL:HB | 3:F:164:VAL:HG22 | 1.98 | 0.45 |
| 2:C:98:HIS:HD2 | 2:C:297:ASP:OD1 | 1.99 | 0.45 |
| 2:D:47:THR:OG1 | 2:D:50:GLU:HG3 | 2.16 | 0.45 |
| 1:A:186:ARG:HD3 | 1:A:186:ARG:C | 2.37 | 0.45 |
| 1:B:90:ASN:HD22 | 1:B:90:ASN:HA | 1.60 | 0.45 |
| 2:D:339:PHE:O | 2:D:342:LEU:HB2 | 2.16 | 0.45 |
| 2:D:381:VAL:O | 2:D:385:LEU:HB2 | 2.17 | 0.45 |
| 2:C:364:ILE:HA | 2:C:368:ALA:HB3 | 1.98 | 0.45 |
| 1:A:268:ASN:HD21 | 1:A:327:GLU:H | 1.65 | 0.45 |
| 1:B:32:LEU:HD21 | 1:B:135:ASN:HB2 | 1.99 | 0.44 |
| 1:B:292:TYR:OH | 1:B:344:HIS:CD2 | 2.69 | 0.44 |
| 1:A:227:ASN:HD21 | 1:A:296:PHE:H | 1.64 | 0.44 |
| 1:B:164:ASP:CG | 1:B:489:ARG:HH22 | 2.20 | 0.44 |
| 1:A:211:CYS:HB2 | 1:A:313:TRP:CD1 | 2.51 | 0.44 |
| 1:B:323:LYS:HE2 | 1:B:324:TYR:CE1 | 2.52 | 0.44 |
| 2:C:112:ASP:OD1 | 2:D:118:ARG:NH2 | 2.51 | 0.44 |
| 2:D:153:LEU:HB3 | 2:D:193:ILE:HG21 | 1.99 | 0.44 |
| 3:F:86:ASP:O | 3:F:89:SER:HB2 | 2.17 | 0.44 |
| 1:A:206:LEU:HD11 | 1:A:321:LEU:HD11 | 1.98 | 0.44 |
| 2:C:143:GLU:O | 2:C:147:ARG:HB3 | 2.18 | 0.44 |
| 2:D:312:TYR:O | 2:D:316:VAL:HG23 | 2.18 | 0.44 |
| 1:A:113:GLY:HA2 | 1:A:188:PHE:O | 2.18 | 0.44 |
| 1:A:303:LYS:HE3 | 1:A:303:LYS:HB2 | 1.85 | 0.44 |
| 1:A:305:TRP:CE2 | 1:A:309:VAL:HG21 | 2.52 | 0.44 |
| 1:A:354:TRP:CH2 | 1:A:499:PRO:HD3 | 2.53 | 0.44 |
| 1:B:369:MET:HE2 | 1:B:379:TRP:HH2 | 1.83 | 0.44 |
| 1:A:495:LEU:HD11 | 1:A:512:ILE:CG1 | 2.48 | 0.44 |
| 1:B:193:ILE:HB | 2:D:168:ARG:CZ | 2.48 | 0.44 |
| 1:B:397:ASP:HA | 1:B:398:PRO:HD3 | 1.82 | 0.44 |
| 2:D:111:LYS:O | 2:D:115:GLU:HG3 | 2.17 | 0.44 |
| 1:B:460:GLU:OE1 | 1:B:463:ARG:HD3 | 2.18 | 0.43 |
| 2:D:155:ASN:ND2 | 2:D:252:TYR:OH | 2.45 | 0.43 |
| 1:B:50:TYR:CD1 | 1:B:50:TYR:N | 2.86 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:105:VAL:O | 1:B:109:PHE:HB2 | 2.18 | 0.43 |
| 1:B:291:GLU:OE1 | 1:B:343:HIS:CE1 | 2.70 | 0.43 |
| 2:C:90:LEU:HD13 | 2:C:303:LEU:HD13 | 2.00 | 0.43 |
| 1:B:460:GLU:N | 1:B:461:PRO:HD3 | 2.34 | 0.43 |
| 2:D:197:ARG:HB3 | 2:D:197:ARG:NH1 | 2.34 | 0.43 |
| 1:B:184:MET:HE1 | 1:B:188:PHE:CD2 | 2.54 | 0.43 |
| 2:C:54:VAL:O | 2:C:55:TYR:HB2 | 2.18 | 0.43 |
| 1:B:138:LEU:HD22 | 2:D:160:PHE:CZ | 2.54 | 0.43 |
| 1:A:302:VAL:HG13 | 1:A:376:TYR:CE2 | 2.53 | 0.43 |
| 1:B:159:ALA:O | 2:D:33:ASN:HB2 | 2.18 | 0.43 |
| 1:B:209:GLU:HB3 | 1:B:247:MET:HE3 | 2.00 | 0.43 |
| 3:F:23:ASN:H | 3:F:23:ASN:ND2 | 2.17 | 0.43 |
| 2:D:226:SER:HB2 | 2:D:334:ASP:CG | 2.40 | 0.42 |
| 3:F:33:LYS:HE3 | 3:F:117:ALA:CB | 2.48 | 0.42 |
| 1:B:124:LEU:HD21 | 1:B:201:SER:HB2 | 2.00 | 0.42 |
| 1:B:185:LYS:HA | 1:B:189:SER:HB2 | 2.01 | 0.42 |
| 1:B:281:TYR:CZ | 1:B:285:VAL:HG21 | 2.53 | 0.42 |
| 2:D:332:LEU:HB3 | 2:D:384:VAL:CG1 | 2.48 | 0.42 |
| 1:A:113:GLY:HA3 | 1:A:188:PHE:CD2 | 2.55 | 0.42 |
| 2:D:357:TYR:O | 2:D:361:ASP:HB2 | 2.19 | 0.42 |
| 3:E:165:HIS:CE1 | 3:E:167:GLN:HG3 | 2.54 | 0.42 |
| 1:A:179:PRO:HB3 | 1:A:469:ILE:HD13 | 2.00 | 0.42 |
| 1:B:165:PRO:HG3 | 6:B:2823:HOH:O | 2.19 | 0.42 |
| 1:B:207:VAL:HG11 | 1:B:275:PHE:HA | 2.02 | 0.42 |
| 2:C:115:GLU:HB3 | 2:D:115:GLU:HB3 | 2.01 | 0.42 |
| 2:D:340:ALA:CA | 2:D:389:LYS:HE2 | 2.33 | 0.42 |
| 1:A:90:ASN:HD22 | 1:A:90:ASN:HA | 1.56 | 0.42 |
| 1:A:175:ARG:HG3 | 1:A:181:TRP:CG | 2.54 | 0.42 |
| 1:B:49:LYS:HD3 | 3:F:140:MET:CB | 2.47 | 0.42 |
| 2:D:223:VAL:HA | 2:D:334:ASP:O | 2.20 | 0.42 |
| 1:A:187:VAL:HG12 | 1:A:277:THR:HG22 | 2.01 | 0.42 |
| 1:A:223:TRP:CZ3 | 1:A:297:LYS:HA | 2.55 | 0.42 |
| 2:D:269:ALA:N | 2:D:270:PRO:CD | 2.83 | 0.42 |
| 2:D:235:TRP:CD1 | 2:D:235:TRP:C | 2.90 | 0.42 |
| 3:E:33:LYS:NZ | 6:E:229:HOH:O | 2.48 | 0.42 |
| 1:A:302:VAL:HG23 | 1:A:303:LYS:H | 1.85 | 0.42 |
| 1:A:323:LYS:HE2 | 1:A:324:TYR:CZ | 2.54 | 0.42 |
| 1:B:260:ASP:OD2 | 1:B:262:ALA:HB3 | 2.20 | 0.42 |
| 2:C:33:ASN:N | 2:C:33:ASN:HD22 | 2.16 | 0.42 |
| 1:A:108:ASN:O | 1:A:111:GLU:HB3 | 2.20 | 0.42 |
| 1:A:279:GLN:HE21 | 1:A:279:GLN:HB3 | 1.73 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:398:PRO:HG3 | 1:A:507:TRP:CD1 | 2.54 | 0.42 |
| 1:B:451:GLN:HG2 | 6:B:2845:HOH:O | 2.18 | 0.42 |
| 2:C:176:ARG:HB2 | 2:C:176:ARG:NH1 | 2.35 | 0.41 |
| 2:D:336:MET:HE2 | 2:D:356:LEU:HD11 | 2.01 | 0.41 |
| 2:D:342:LEU:HD13 | 2:D:346:THR:HG21 | 2.02 | 0.41 |
| 1:B:63:ILE:HA | 2:D:191:GLN:HE22 | 1.85 | 0.41 |
| 3:F:23:ASN:C | 3:F:23:ASN:HD22 | 2.24 | 0.41 |
| 1:A:149:HIS:CE1 | 2:C:105:TRP:HB2 | 2.56 | 0.41 |
| 1:A:260:ASP:HA | 1:A:261:PRO:HD3 | 1.95 | 0.41 |
| 1:B:108:ASN:ND2 | 1:B:175:ARG:HH11 | 2.14 | 0.41 |
| 2:D:153:LEU:C | 2:D:153:LEU:CD1 | 2.89 | 0.41 |
| 3:F:23:ASN:H | 3:F:23:ASN:HD22 | 1.69 | 0.41 |
| 1:B:259:ASN:HD22 | 1:B:259:ASN:HA | 1.70 | 0.41 |
| 2:D:95:TRP:CE2 | 2:D:171:LEU:HD12 | 2.56 | 0.41 |
| 3:F:36:ARG:CZ | 3:F:119:LYS:HB3 | 2.51 | 0.41 |
| 1:A:118:ILE:HG21 | 2:C:176:ARG:HD3 | 2.02 | 0.41 |
| 1:B:163:GLN:HG2 | 6:B:2675:HOH:O | 2.21 | 0.41 |
| 2:D:146:ASN:HB2 | 2:D:207:PHE:CZ | 2.56 | 0.41 |
| 3:F:154:GLU:HG3 | 3:F:158:GLN:NE2 | 2.35 | 0.41 |
| 1:A:119:ALA:HB1 | 2:C:168:ARG:HD2 | 2.02 | 0.41 |
| 1:A:253:THR:O | 1:A:257:ILE:HG12 | 2.20 | 0.41 |
| 1:A:520:LYS:HB3 | 1:A:520:LYS:NZ | 2.36 | 0.41 |
| 1:B:334:ASP:O | 1:B:337:GLN:HB3 | 2.20 | 0.41 |
| 1:B:444:GLU:HA | 1:B:444:GLU:OE2 | 2.21 | 0.41 |
| 3:F:23:ASN:ND2 | 3:F:23:ASN:N | 2.69 | 0.41 |
| 1:A:52:MET:HA | 1:A:256:SER:O | 2.21 | 0.41 |
| 1:A:123:MET:HB2 | 2:C:168:ARG:HD3 | 2.02 | 0.41 |
| 1:B:413:HIS:CD2 | 1:B:428:SER:OG | 2.74 | 0.41 |
| 2:D:224:TYR:O | 2:D:225:LYS:C | 2.59 | 0.41 |
| 3:E:129:LEU:HD23 | 3:E:129:LEU:HA | 1.90 | 0.41 |
| 1:A:108:ASN:ND2 | 1:A:175:ARG:HE | 2.18 | 0.41 |
| 1:A:109:PHE:HB3 | 1:A:184:MET:SD | 2.61 | 0.41 |
| 1:A:283:THR:HB | 1:A:284:PRO:CD | 2.50 | 0.41 |
| 1:A:435:THR:HG21 | 1:A:437:ARG:NE | 2.28 | 0.41 |
| 1:A:444:GLU:HG3 | 1:A:445:MET:N | 2.35 | 0.41 |
| 1:B:32:LEU:HD12 | 1:B:35:PHE:CD2 | 2.56 | 0.41 |
| 1:B:194:SER:HA | 2:D:76:PHE:CE1 | 2.56 | 0.41 |
| 1:B:202:LEU:CD2 | 1:B:206:LEU:HD22 | 2.51 | 0.41 |
| 1:B:232:THR:N | 1:B:233:PRO:CD | 2.83 | 0.41 |
| 3:F:152:LEU:O | 3:F:156:ARG:HG3 | 2.20 | 0.41 |
| 2:C:275:ASN:C | 2:C:278:PRO:HD2 | 2.41 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:C:376:ASP:HB3 | 2:C:379:GLN:HB2 | 2.02 | 0.41 |
| 2:D:228:ARG:O | 2:D:232:GLU:HG3 | 2.21 | 0.41 |
| 3:E:165:HIS:CE1 | 3:E:167:GLN:HE21 | 2.30 | 0.41 |
| 1:A:65:LYS:HB3 | 2:C:117:TRP:CD2 | 2.56 | 0.40 |
| 1:B:125:TRP:CD1 | 1:B:125:TRP:C | 2.95 | 0.40 |
| 1:B:284:PRO:HB3 | 1:B:342:ALA:HB1 | 2.04 | 0.40 |
| 2:D:385:LEU:HD12 | 2:D:385:LEU:HA | 1.95 | 0.40 |
| 1:A:423:VAL:HA | 1:A:424:PRO:HD3 | 1.91 | 0.40 |
| 1:B:30:ARG:HG2 | 1:B:30:ARG:NH1 | 2.36 | 0.40 |
| 1:B:305:TRP:CE2 | 1:B:309:VAL:HG21 | 2.56 | 0.40 |
| 2:C:146:ASN:ND2 | 2:C:197:ARG:NH2 | 2.62 | 0.40 |
| 2:D:187:ILE:O | 2:D:191:GLN:HG3 | 2.21 | 0.40 |
| 3:F:80:LYS:HE3 | 3:F:84:GLY:HA2 | 2.01 | 0.40 |
| 1:B:297:LYS:HG2 | 1:B:371:TRP:CE2 | 2.56 | 0.40 |
| 1:A:65:LYS:HB3 | 2:C:117:TRP:CG | 2.56 | 0.40 |
| 1:A:307:ARG:HG2 | 1:A:312:ASP:OD2 | 2.20 | 0.40 |
| 2:D:213:VAL:N | 2:D:214:PRO:HD2 | 2.37 | 0.40 |
| 2:D:234:LEU:HD13 | 2:D:248:VAL:HG22 | 2.04 | 0.40 |
| 2:D:264:PHE:O | 2:D:268:LEU:HG | 2.22 | 0.40 |
| 2:D:336:MET:C | 2:D:338:LEU:H | 2.24 | 0.40 |

There are no symmetry-related clashes.

## 5.3 Torsion angles (i)

### 5.3.1 Protein backbone (i)

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

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 1 | A | 508/527 (96%) | 482 (95%) | 24 (5%) | 2 (0%) | 34 | 42 |
| 1 | B | 508/527 (96%) | 479 (94%) | 25 (5%) | 4 (1%) | 19 | 23 |
| 2 | C | 386/389 (99%) | 373 (97%) | 12 (3%) | 1 (0%) | 41 | 50 |
| 2 | D | 386/389 (99%) | 354 (92%) | 29 (8%) | 3 (1%) | 19 | 23 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles |
|---|---|---|---|---|---|---|
| 3 | E | 164/170 (96%) | 161 (98%) | 3 (2%) | 0 | 100 100 |
| 3 | F | 164/170 (96%) | 151 (92%) | 9 (6%) | 4 (2%) | 6 4 |
| All | All | 2116/2172 (97%) | 2000 (94%) | 102 (5%) | 14 (1%) | 22 26 |

All (14) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 40 | LYS |
| 1 | B | 311 | GLU |
| 2 | D | 251 | VAL |
| 1 | B | 39 | PHE |
| 2 | D | 64 | ALA |
| 2 | C | 64 | ALA |
| 3 | F | 74 | GLU |
| 3 | F | 87 | ALA |
| 1 | A | 94 | ARG |
| 1 | A | 340 | TYR |
| 1 | B | 94 | ARG |
| 3 | F | 122 | ILE |
| 2 | D | 386 | ALA |
| 3 | F | 5 | GLY |

### 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 | 425/442 (96%) | 413 (97%) | 12 (3%) | 43 60 |
| 1 | B | 422/442 (96%) | 412 (98%) | 10 (2%) | 49 66 |
| 2 | C | 315/323 (98%) | 307 (98%) | 8 (2%) | 47 65 |
| 2 | D | 312/323 (97%) | 306 (98%) | 6 (2%) | 57 73 |
| 3 | E | 143/147 (97%) | 141 (99%) | 2 (1%) | 67 81 |
| 3 | F | 142/147 (97%) | 137 (96%) | 5 (4%) | 36 50 |
| All | All | 1759/1824 (96%) | 1716 (98%) | 43 (2%) | 49 66 |

All (43) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 30 | ARG |
| 1 | A | 43 | ARG |
| 1 | A | 90 | ASN |
| 1 | A | 125 | TRP |
| 1 | A | 175 | ARG |
| 1 | A | 186 | ARG |
| 1 | A | 279 | GLN |
| 1 | A | 334 | ASP |
| 1 | A | 467 | GLN |
| 1 | A | 514 | ARG |
| 1 | A | 516 | ASN |
| 1 | A | 520 | LYS |
| 1 | B | 43 | ARG |
| 1 | B | 90 | ASN |
| 1 | B | 125 | TRP |
| 1 | B | 186 | ARG |
| 1 | B | 189 | SER |
| 1 | B | 259 | ASN |
| 1 | B | 279 | GLN |
| 1 | B | 302 | VAL |
| 1 | B | 311 | GLU |
| 1 | B | 523 | VAL |
| 2 | C | 33 | ASN |
| 2 | C | 35 | MET |
| 2 | C | 80 | ARG |
| 2 | C | 173 | ASP |
| 2 | C | 195 | LEU |
| 2 | C | 266 | GLN |
| 2 | C | 311 | ASP |
| 2 | C | 378 | ASP |
| 2 | D | 4 | LEU |
| 2 | D | 35 | MET |
| 2 | D | 80 | ARG |
| 2 | D | 153 | LEU |
| 2 | D | 173 | ASP |
| 2 | D | 334 | ASP |
| 3 | E | 44 | ARG |
| 3 | E | 60 | LEU |
| 3 | F | 11 | THR |
| 3 | F | 23 | ASN |
| 3 | F | 44 | ARG |
| 3 | F | 53 | TYR |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 3 | F | 164 | VAL |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (68) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 41 | ASN |
| 1 | A | 54 | ASN |
| 1 | A | 78 | GLN |
| 1 | A | 90 | ASN |
| 1 | A | 100 | ASN |
| 1 | A | 108 | ASN |
| 1 | A | 168 | HIS |
| 1 | A | 214 | ASN |
| 1 | A | 227 | ASN |
| 1 | A | 249 | ASN |
| 1 | A | 259 | ASN |
| 1 | A | 268 | ASN |
| 1 | A | 273 | ASN |
| 1 | A | 278 | GLN |
| 1 | A | 279 | GLN |
| 1 | A | 343 | HIS |
| 1 | A | 344 | HIS |
| 1 | A | 382 | HIS |
| 1 | A | 413 | HIS |
| 1 | A | 439 | HIS |
| 1 | A | 442 | ASN |
| 1 | A | 516 | ASN |
| 1 | B | 33 | GLN |
| 1 | B | 42 | ASN |
| 1 | B | 78 | GLN |
| 1 | B | 90 | ASN |
| 1 | B | 100 | ASN |
| 1 | B | 108 | ASN |
| 1 | B | 155 | ASN |
| 1 | B | 168 | HIS |
| 1 | B | 227 | ASN |
| 1 | B | 249 | ASN |
| 1 | B | 259 | ASN |
| 1 | B | 268 | ASN |
| 1 | B | 273 | ASN |
| 1 | B | 278 | GLN |
| 1 | B | 279 | GLN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 337 | GLN |
| 1 | B | 343 | HIS |
| 1 | B | 344 | HIS |
| 1 | B | 382 | HIS |
| 1 | B | 411 | ASN |
| 1 | B | 413 | HIS |
| 1 | B | 439 | HIS |
| 1 | B | 451 | GLN |
| 1 | B | 527 | ASN |
| 2 | C | 33 | ASN |
| 2 | C | 98 | HIS |
| 2 | C | 146 | ASN |
| 2 | C | 161 | ASN |
| 2 | C | 266 | GLN |
| 2 | C | 285 | GLN |
| 2 | C | 301 | ASN |
| 2 | D | 57 | GLN |
| 2 | D | 98 | HIS |
| 2 | D | 155 | ASN |
| 2 | D | 161 | ASN |
| 2 | D | 285 | GLN |
| 2 | D | 301 | ASN |
| 3 | E | 45 | ASN |
| 3 | E | 144 | ASN |
| 3 | E | 165 | HIS |
| 3 | F | 7 | HIS |
| 3 | F | 23 | ASN |
| 3 | F | 45 | ASN |
| 3 | F | 99 | ASN |
| 3 | F | 144 | ASN |
| 3 | F | 158 | GLN |

### 5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry (i)

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 for Mogul analysis.

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 | $\#\|Z\| > 2$ |
| 5 | FPN | B | 2667 | - | 8,8,8 | 2.35 | 5 (62%) | 10,10,10 | 2.04 | 3 (30%) |
| 5 | FPN | A | 2666 | - | 8,8,8 | 2.49 | 5 (62%) | 10,10,10 | 2.09 | 3 (30%) |

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 |
|---|---|---|---|---|---|---|---|
| 5 | FPN | B | 2667 | - | - | - | 0/1/1/1 |
| 5 | FPN | A | 2666 | - | - | - | 0/1/1/1 |

All (10) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 5 | A | 2666 | FPN | C6-C5 | 3.71 | 1.45 | 1.38 |
| 5 | B | 2667 | FPN | C6-C5 | 3.62 | 1.45 | 1.38 |
| 5 | A | 2666 | FPN | C3-C2 | 3.28 | 1.44 | 1.38 |
| 5 | B | 2667 | FPN | C3-C2 | 2.82 | 1.43 | 1.38 |
| 5 | A | 2666 | FPN | C3-C4 | 2.70 | 1.42 | 1.37 |
| 5 | B | 2667 | FPN | C3-C4 | 2.68 | 1.42 | 1.37 |
| 5 | A | 2666 | FPN | C2-C1 | 2.59 | 1.43 | 1.38 |
| 5 | B | 2667 | FPN | C5-C4 | 2.56 | 1.42 | 1.37 |
| 5 | A | 2666 | FPN | C5-C4 | 2.50 | 1.42 | 1.37 |
| 5 | B | 2667 | FPN | C2-C1 | 2.44 | 1.43 | 1.38 |

All (6) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 5 | A | 2666 | FPN | C3-C2-C1 | -3.50 | 116.03 | 119.88 |
| 5 | B | 2667 | FPN | C3-C2-C1 | -3.43 | 116.12 | 119.88 |
| 5 | B | 2667 | FPN | C6-C1-C2 | 3.39 | 125.48 | 119.77 |
| 5 | A | 2666 | FPN | C6-C1-C2 | 3.35 | 125.41 | 119.77 |
| 5 | A | 2666 | FPN | C5-C6-C1 | -3.09 | 116.48 | 119.88 |
| 5 | B | 2667 | FPN | C5-C6-C1 | -2.99 | 116.59 | 119.88 |

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers (i)

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

# 6 Fit of model and data

## 6.1 Protein, DNA and RNA chains

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 | 510/527 (96%) | 0.05 | 25 (4%) 29 36 | 21, 39, 68, 80 | 0 |
| 1 | B | 510/527 (96%) | -0.09 | 20 (3%) 39 46 | 23, 37, 68, 79 | 0 |
| 2 | C | 388/389 (99%) | -0.52 | 2 (0%) 91 94 | 17, 26, 41, 61 | 0 |
| 2 | D | 388/389 (99%) | 0.28 | 25 (6%) 19 25 | 26, 48, 73, 93 | 0 |
| 3 | E | 166/170 (97%) | -0.44 | 1 (0%) 89 92 | 20, 30, 48, 68 | 0 |
| 3 | F | 166/170 (97%) | 0.67 | 15 (9%) 9 12 | 37, 57, 77, 83 | 0 |
| All | All | 2128/2172 (97%) | -0.03 | 88 (4%) 37 44 | 17, 37, 70, 93 | 0 |

All (88) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 2 | D | 389 | LYS | 5.8 |
| 2 | D | 205 | PRO | 5.7 |
| 2 | C | 2 | SER | 4.3 |
| 2 | D | 375 | ALA | 4.0 |
| 1 | B | 39 | PHE | 4.0 |
| 1 | A | 328 | SER | 4.0 |
| 1 | A | 316 | ILE | 3.9 |
| 2 | D | 344 | ALA | 3.8 |
| 1 | B | 53 | ALA | 3.8 |
| 2 | D | 350 | GLU | 3.7 |
| 1 | A | 19 | ALA | 3.7 |
| 1 | B | 310 | TYR | 3.5 |
| 1 | A | 310 | TYR | 3.4 |
| 1 | A | 318 | ILE | 3.4 |
| 1 | A | 319 | GLY | 3.4 |
| 3 | F | 80 | LYS | 3.3 |
| 1 | A | 54 | ASN | 3.2 |
| 1 | A | 326 | VAL | 3.1 |
| 1 | A | 213 | THR | 3.1 |

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| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | A | 434 | SER | 3.1 |
| 1 | B | 527 | ASN | 3.0 |
| 3 | F | 101 | ALA | 2.9 |
| 2 | D | 136 | MET | 2.9 |
| 1 | A | 251 | TYR | 2.9 |
| 1 | A | 20 | PRO | 2.9 |
| 3 | F | 120 | PRO | 2.9 |
| 2 | D | 388 | LEU | 2.8 |
| 1 | B | 320 | ARG | 2.7 |
| 1 | B | 311 | GLU | 2.7 |
| 1 | B | 20 | PRO | 2.7 |
| 3 | F | 21 | GLN | 2.7 |
| 1 | B | 323 | LYS | 2.7 |
| 2 | D | 220 | ASN | 2.7 |
| 2 | D | 342 | LEU | 2.7 |
| 3 | F | 70 | ARG | 2.7 |
| 3 | F | 22 | LEU | 2.7 |
| 1 | A | 262 | ALA | 2.7 |
| 1 | B | 54 | ASN | 2.7 |
| 2 | D | 206 | GLY | 2.7 |
| 3 | F | 26 | GLU | 2.6 |
| 1 | B | 19 | ALA | 2.6 |
| 1 | A | 212 | PHE | 2.6 |
| 3 | F | 100 | ALA | 2.6 |
| 3 | F | 23 | ASN | 2.6 |
| 2 | D | 354 | ALA | 2.6 |
| 2 | C | 5 | GLY | 2.6 |
| 2 | D | 254 | ALA | 2.6 |
| 2 | D | 2 | SER | 2.6 |
| 1 | A | 255 | VAL | 2.5 |
| 3 | F | 102 | LYS | 2.5 |
| 1 | B | 40 | LYS | 2.5 |
| 2 | D | 260 | VAL | 2.5 |
| 1 | B | 259 | ASN | 2.5 |
| 2 | D | 374 | LYS | 2.4 |
| 1 | A | 315 | GLY | 2.4 |
| 1 | A | 259 | ASN | 2.4 |
| 1 | A | 338 | ASP | 2.4 |
| 2 | D | 343 | PRO | 2.4 |
| 2 | D | 208 | ASP | 2.3 |
| 1 | A | 317 | TRP | 2.3 |
| 1 | B | 21 | THR | 2.3 |

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| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | A | 514 | ARG | 2.3 |
| 2 | D | 353 | THR | 2.3 |
| 1 | A | 30 | ARG | 2.3 |
| 2 | D | 137 | ASN | 2.3 |
| 1 | B | 324 | TYR | 2.3 |
| 1 | A | 366 | GLN | 2.2 |
| 3 | F | 25 | LEU | 2.2 |
| 2 | D | 333 | ARG | 2.2 |
| 1 | A | 323 | LYS | 2.2 |
| 1 | B | 317 | TRP | 2.2 |
| 2 | D | 340 | ALA | 2.2 |
| 1 | B | 333 | LYS | 2.2 |
| 3 | E | 4 | LEU | 2.2 |
| 3 | F | 4 | LEU | 2.2 |
| 1 | B | 247 | MET | 2.2 |
| 2 | D | 345 | GLY | 2.2 |
| 3 | F | 93 | GLY | 2.2 |
| 2 | D | 229 | LEU | 2.1 |
| 1 | B | 325 | GLY | 2.1 |
| 1 | B | 319 | GLY | 2.1 |
| 1 | A | 261 | PRO | 2.1 |
| 2 | D | 248 | VAL | 2.1 |
| 2 | D | 207 | PHE | 2.1 |
| 3 | F | 66 | VAL | 2.0 |
| 1 | A | 51 | LYS | 2.0 |
| 1 | B | 23 | VAL | 2.0 |
| 3 | F | 20 | ALA | 2.0 |

## 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, $95^{th}$ 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(Å$^2$) | Q<0.9 |
|---|---|---|---|---|---|---|---|---|
| 4 | FE | B | 529 | 1/1 | 0.94 | 0.03 | 72,72,72,72 | 0 |
| 5 | FPN | B | 2667 | 8/8 | 0.94 | 0.18 | 34,35,37,41 | 0 |
| 4 | FE | A | 529 | 1/1 | 0.96 | 0.03 | 78,78,78,78 | 0 |
| 4 | FE | B | 528 | 1/1 | 0.96 | 0.06 | 63,63,63,63 | 0 |
| 5 | FPN | A | 2666 | 8/8 | 0.97 | 0.15 | 30,33,36,39 | 0 |
| 4 | FE | A | 528 | 1/1 | 0.98 | 0.05 | 63,63,63,63 | 0 |

## 6.5 Other polymers (i)

There are no such residues in this entry.