# Full wwPDB X-ray Structure Validation Report ⓘ

May 15, 2020 – 07:04 am BST

| | | |
|---|---|---|
| PDB ID | : | 1B0P |
| Title | : | CRYSTAL STRUCTURE OF PYRUVATE-FERREDOXIN OXIDOREDUCTASE FROM DESULFOVIBRIO AFRICANUS |
| Authors | : | Chabriere, E.; Charon, M.H.; Volbeda, A. |
| Deposited on | : | 1998-11-12 |
| Resolution | : | 2.31 Å(reported) |

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

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

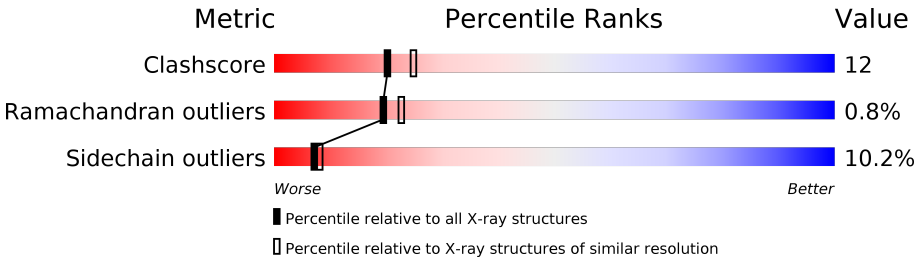
| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | NOT EXECUTED |
| EDS | : | NOT EXECUTED |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.11 |

# 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 2.31 Å.

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




| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|---|---|---|
| Clashscore | 141614 | 6604 (2.34-2.30) |
| Ramachandran outliers | 138981 | 6523 (2.34-2.30) |
| Sidechain outliers | 138945 | 6523 (2.34-2.30) |

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 on 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%

Note EDS was not executed.

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 1231 | 73% 22% 5% |
| 1 | B | 1231 | 71% 24% 5% |

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 19411 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 PROTEIN (PYRUVATE-FERREDOXIN OXIDOREDUCTASE).

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 1231 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 9382 | 5941 | 1599 | 1783 | 59 | | | |
| 1 | B | 1231 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 9382 | 5941 | 1599 | 1783 | 59 | | | |

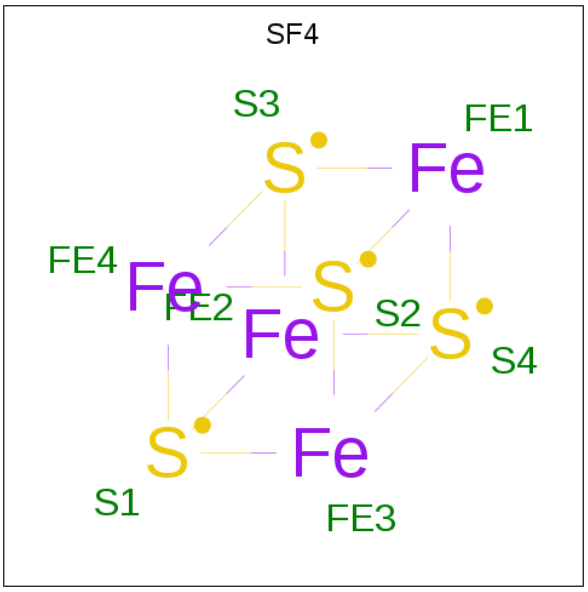
- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 2 | B | 1 | Total | Mg | 0 | 0 |
| | | | 1 | 1 | | |
| 2 | A | 1 | Total | Mg | 0 | 0 |
| | | | 1 | 1 | | |

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

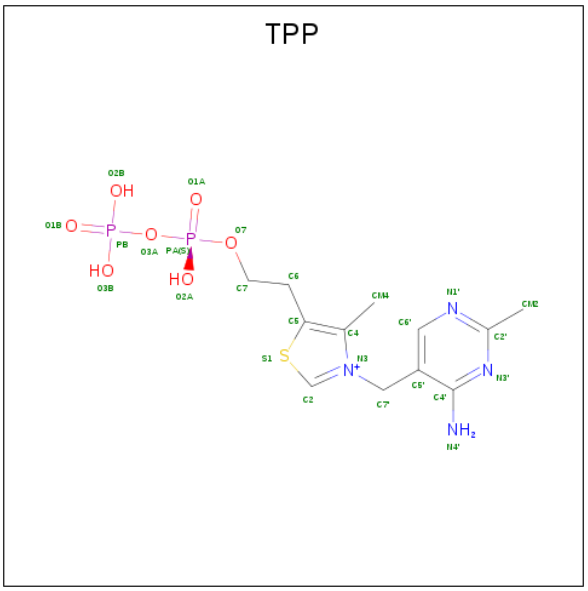
| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 3 | B | 1 | Total | Ca | 0 | 0 |
| | | | 1 | 1 | | |
| 3 | A | 1 | Total | Ca | 0 | 0 |
| | | | 1 | 1 | | |

- Molecule 4 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: $Fe_4S_4$).




| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 4 | A | 1 | Total Fe S<br>8 4 4 | 0 | 0 |
| 4 | A | 1 | Total Fe S<br>8 4 4 | 0 | 0 |
| 4 | A | 1 | Total Fe S<br>8 4 4 | 0 | 0 |
| 4 | B | 1 | Total Fe S<br>8 4 4 | 0 | 0 |
| 4 | B | 1 | Total Fe S<br>8 4 4 | 0 | 0 |
| 4 | B | 1 | Total Fe S<br>8 4 4 | 0 | 0 |

- Molecule 5 is THIAMINE DIPHOSPHATE (three-letter code: TPP) (formula: $C_{12}H_{19}N_4O_7P_2S$).




| Mol | Chain | Residues | Atoms | | | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | A | 1 | Total | C | N | O | P | S | 0 | 0 |
| | | | 26 | 12 | 4 | 7 | 2 | 1 | | |
| 5 | B | 1 | Total | C | N | O | P | S | 0 | 0 |
| | | | 26 | 12 | 4 | 7 | 2 | 1 | | |

- Molecule 6 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 6 | A | 273 | Total | O | 0 | 0 |
| | | | 273 | 273 | | |
| 6 | B | 270 | Total | O | 0 | 0 |
| | | | 270 | 270 | | |

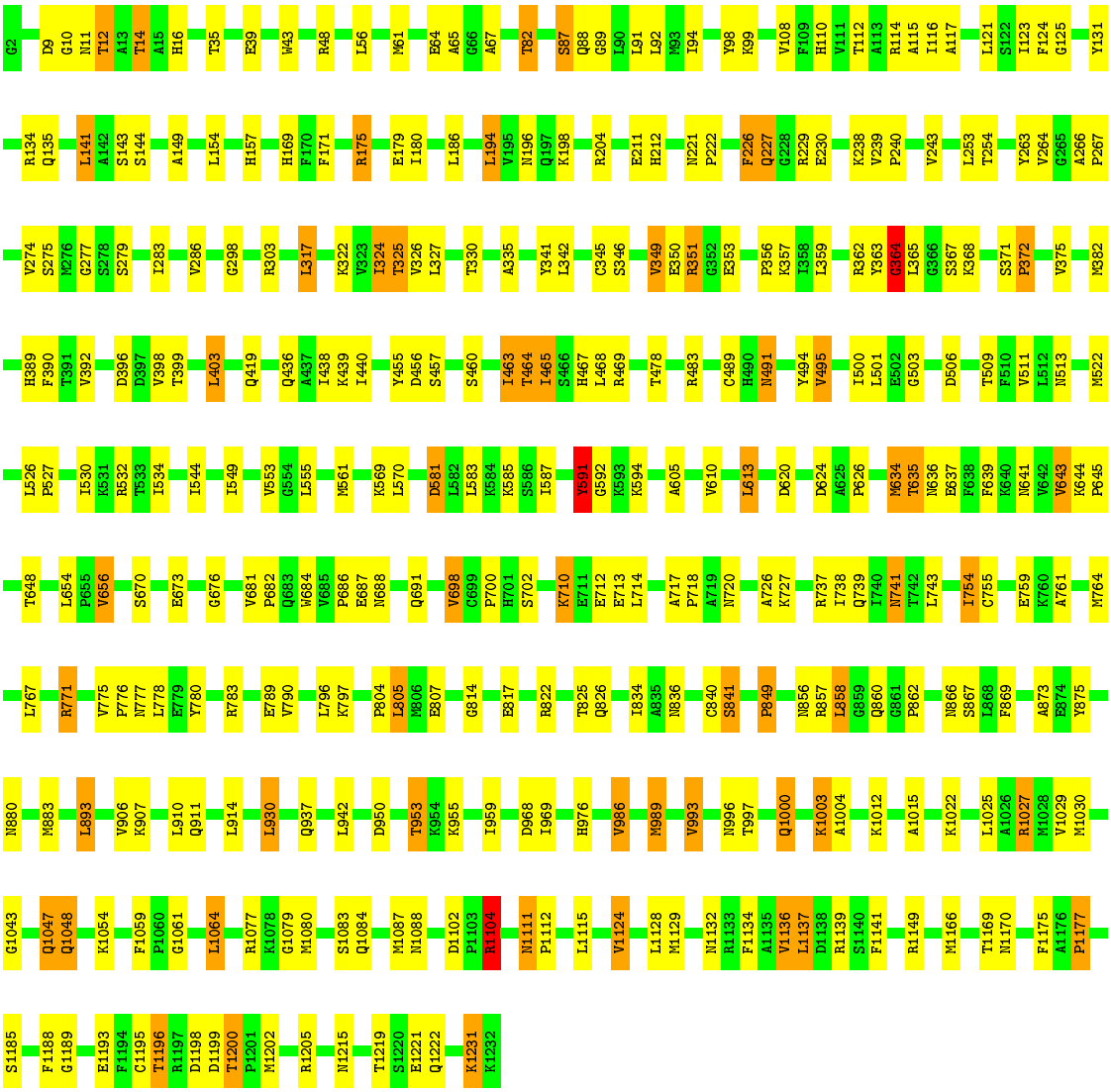
# 3 Residue-property plots (i)

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

Note EDS was not executed.

- Molecule 1: PROTEIN (PYRUVATE-FERREDOXIN OXIDOREDUCTASE)

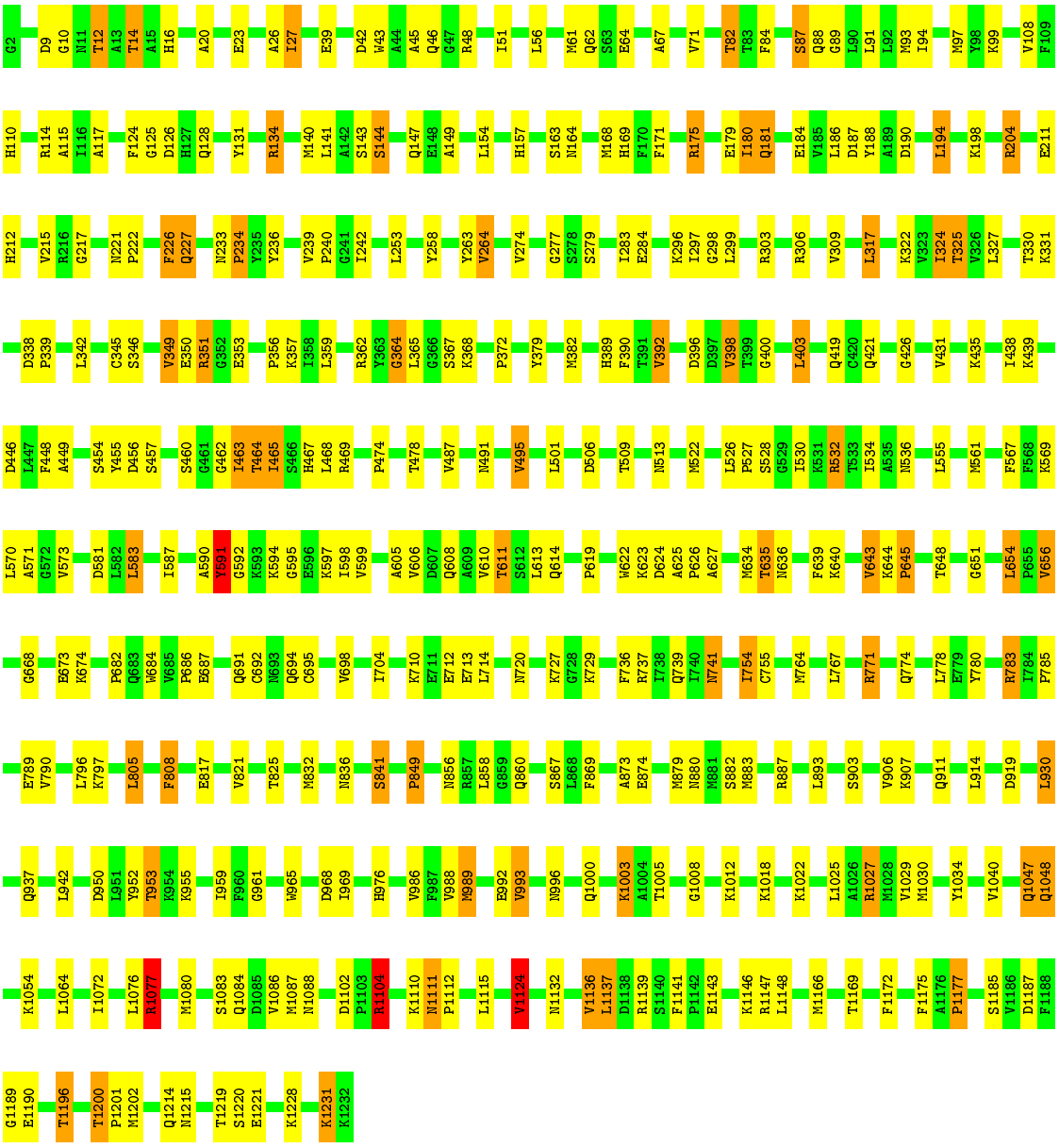
Chain A:


- Molecule 1: PROTEIN (PYRUVATE-FERREDOXIN OXIDOREDUCTASE)

Chain B:


71%
24%
5%


G2 D9 G10 N11 T12 A13 T14 A15 H16 A20 E23 A26 I27 E39 D42 W43 A44 A45 Q46 G47 R48 I51 L56 M61 Q62 S63 E64 A67 V71 T82 T83 F84 S87 Q88 G89 L90 L91 L92 M93 I94 N97 Y98 K99 V108 F109
H110 R114 A115 I116 A117 F124 G125 D126 H127 Q128 Y131 R134 M140 L141 A142 S143 S144 Q147 E148 A149 L154 H157 S163 N164 M168 H169 F170 F171 R175 E179 I180 Q181 E184 V185 L186 D187 Y188 A189 D190 L194 K198 R204 E211
H212 V215 R216 G217 N221 P222 F226 Q227 N233 P234 Y235 Y236 V239 P240 G241 I242 L253 Y258 Y263 V264 V274 G277 S278 S279 I283 E284 K296 I297 G298 L299 R303 R306 V309 L317 K322 V323 I324 T325 V326 L327 T330 K331
D338 P339 L342 C345 S346 V349 E350 R351 G352 E353 P356 K357 I358 L359 R362 Y363 G364 L365 G366 S367 K368 P372 Y379 M382 H389 F390 T391 V392 D396 D397 V398 T399 G400 L403 Q419 C420 Q421 G426 V431 K435 I438 K439
D446 L447 F448 A449 S454 Y455 D456 S457 S460 G461 G462 I463 T464 I465 S466 H467 L468 R469 P474 T478 V487 N491 V495 L501 D506 T509 N513 M522 L526 P527 S528 G529 I530 K531 R532 T533 I534 A535 N536 L555 M561 F567 F568 K569
L570 A571 G572 V573 D581 L582 L583 I587 A590 Y591 G592 K593 K594 G595 E596 K597 I598 V599 A605 V606 D607 Q608 A609 V610 T611 S612 L613 Q614 P619 W622 K623 D624 A625 P626 A627 M634 T635 N636 F639 K640 V643 K644 P645 T648 G651 L654 P655 V656
G668 E673 K674 P682 Q683 W684 V685 P686 E687 Q691 C692 N693 Q694 C695 V698 I704 K710 E711 E712 E713 L714 N720 K727 G728 K729 F736 R737 I738 Q739 I740 N741 I754 C755 M764 L767 R771 Q774 L778 E779 Y780 R783 I784 P785
E789 V790 L796 K797 L805 F808 E817 V821 T825 M832 N836 S841 P849 N856 R857 L858 G859 Q860 S867 L868 F869 A873 E874 M879 N880 M881 S882 M883 R887 L893 S903 V906 K907 Q911 L914 D919 L930
Q937 L942 D950 I951 Y952 T953 K954 K955 I959 F960 G961 W965 D968 I969 H976 V986 F987 V988 M989 E992 V993 N996 Q1000 K1003 A1004 T1005 G1008 K1012 K1018 K1022 L1025 A1026 R1027 M1028 V1029 M1030 Y1034 V1040 Q1047 Q1048
K1054 L1064 I1072 L1076 R1077 M1080 S1083 Q1084 D1085 V1086 M1087 N1088 D1102 P1103 R1104 K1110 N1111 P1112 L1115 V1124 N1132 V1136 L1137 D1138 R1139 S1140 F1141 P1142 E1143 K1146 R1147 L1148 M1166 T1169 F1172 F1175 A1176 P1177 S1185 V1186 D1187 F1188
G1189 E1190 T1196 T1200 P1201 M1202 Q1214 N1215 T1219 S1220 E1221 K1228 K1231 K1232

# 4 Data and refinement statistics (i)

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

| Property | Value | Source |
|---|---|---|
| Space group | P 21 21 21 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 84.80Å 144.90Å 203.00Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 6.00 – 2.31 | Depositor |
| % Data completeness<br>(in resolution range) | 68.6 (6.00-2.31) | Depositor |
| $R_{merge}$ | (Not available) | Depositor |
| $R_{sym}$ | 0.08 | Depositor |
| Refinement program | X-PLOR 3.854 | Depositor |
| R, $R_{free}$ | 0.199 , 0.271 | Depositor |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| Total number of atoms | 19411 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 6.0 | wwPDB-VP |

# 5 Model quality

## 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, CA, SF4, TPP

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 | 0.77 | 1/9584 (0.0%) | 0.92 | 9/12954 (0.1%) |
| 1 | B | 0.77 | 0/9584 | 0.92 | 14/12954 (0.1%) |
| All | All | 0.77 | 1/19168 (0.0%) | 0.92 | 23/25908 (0.1%) |

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 |
| 1 | B | 0 | 2 |
| All | All | 0 | 3 |

All (1) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 1 | A | 489 | CYS | CB-SG | -5.80 | 1.72 | 1.81 |

All (23) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | A | 317 | LEU | CA-CB-CG | 6.78 | 130.90 | 115.30 |
| 1 | A | 822 | ARG | NE-CZ-NH2 | -6.65 | 116.98 | 120.30 |
| 1 | B | 317 | LEU | CA-CB-CG | 6.56 | 130.39 | 115.30 |
| 1 | B | 1077 | ARG | NE-CZ-NH1 | 6.48 | 123.54 | 120.30 |
| 1 | A | 1104 | ARG | NE-CZ-NH2 | -6.24 | 117.18 | 120.30 |
| 1 | B | 125 | GLY | N-CA-C | 6.16 | 128.49 | 113.10 |
| 1 | B | 591 | TYR | CA-CB-CG | -6.04 | 101.93 | 113.40 |
| 1 | A | 125 | GLY | N-CA-C | 6.01 | 128.14 | 113.10 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | B | 1104 | ARG | NE-CZ-NH1 | 5.91 | 123.26 | 120.30 |
| 1 | A | 56 | LEU | CA-CB-CG | 5.80 | 128.65 | 115.30 |
| 1 | B | 832 | MET | N-CA-C | 5.77 | 126.57 | 111.00 |
| 1 | B | 591 | TYR | N-CA-C | 5.65 | 126.25 | 111.00 |
| 1 | A | 141 | LEU | CA-CB-CG | 5.63 | 128.25 | 115.30 |
| 1 | B | 919 | ASP | CB-CG-OD1 | 5.62 | 123.36 | 118.30 |
| 1 | B | 1110 | LYS | CD-CE-NZ | 5.57 | 124.51 | 111.70 |
| 1 | A | 1124 | VAL | CB-CA-C | -5.44 | 101.06 | 111.40 |
| 1 | B | 668 | GLY | N-CA-C | 5.42 | 126.64 | 113.10 |
| 1 | B | 1124 | VAL | CB-CA-C | -5.37 | 101.21 | 111.40 |
| 1 | B | 56 | LEU | CA-CB-CG | 5.36 | 127.64 | 115.30 |
| 1 | B | 613 | LEU | CA-CB-CG | 5.32 | 127.54 | 115.30 |
| 1 | A | 364 | GLY | N-CA-C | 5.20 | 126.09 | 113.10 |
| 1 | B | 1104 | ARG | NE-CZ-NH2 | -5.19 | 117.71 | 120.30 |
| 1 | A | 591 | TYR | N-CA-C | 5.07 | 124.69 | 111.00 |

There are no chirality outliers.

All (3) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 1 | A | 591 | TYR | Sidechain |
| 1 | B | 1034 | TYR | Sidechain |
| 1 | B | 591 | TYR | Sidechain |

## 5.2 Too-close contacts

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 1 | A | 9382 | 0 | 9262 | 235 | 0 |
| 1 | B | 9382 | 0 | 9262 | 255 | 0 |
| 2 | A | 1 | 0 | 0 | 0 | 0 |
| 2 | B | 1 | 0 | 0 | 0 | 0 |
| 3 | A | 1 | 0 | 0 | 0 | 0 |
| 3 | B | 1 | 0 | 0 | 0 | 0 |
| 4 | A | 24 | 0 | 0 | 1 | 0 |
| 4 | B | 24 | 0 | 0 | 1 | 0 |
| 5 | A | 26 | 0 | 16 | 1 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 5 | B | 26 | 0 | 16 | 1 | 0 |
| 6 | A | 273 | 0 | 0 | 14 | 0 |
| 6 | B | 270 | 0 | 0 | 20 | 0 |
| All | All | 19411 | 0 | 18556 | 459 | 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 12.

All (459) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:639:PHE:HA | 1:A:643:VAL:HG13 | 1.41 | 1.00 |
| 1:A:64:GLU:HG3 | 1:A:89:GLY:HA2 | 1.46 | 0.95 |
| 1:B:635:THR:HG23 | 1:B:639:PHE:HB3 | 1.48 | 0.95 |
| 1:B:64:GLU:HG3 | 1:B:89:GLY:HA2 | 1.49 | 0.93 |
| 6:A:1639:HOH:O | 1:B:874:GLU:HB3 | 1.76 | 0.85 |
| 1:B:737:ARG:HH11 | 1:B:739:GLN:NE2 | 1.72 | 0.85 |
| 1:B:1132:ASN:O | 1:B:1136:VAL:HG22 | 1.77 | 0.85 |
| 1:B:351:ARG:HD2 | 1:B:353:GLU:HB2 | 1.59 | 0.84 |
| 1:B:64:GLU:HG3 | 1:B:89:GLY:CA | 2.09 | 0.82 |
| 1:A:43:TRP:HB3 | 1:A:48:ARG:HD3 | 1.62 | 0.82 |
| 1:A:398:VAL:HG13 | 1:A:656:VAL:HG22 | 1.60 | 0.82 |
| 1:B:396:ASP:HA | 1:B:656:VAL:HG13 | 1.62 | 0.81 |
| 1:B:639:PHE:HA | 1:B:643:VAL:HG13 | 1.61 | 0.81 |
| 1:A:64:GLU:HG3 | 1:A:89:GLY:CA | 2.10 | 0.81 |
| 1:A:1199:ASP:HB3 | 6:B:1784:HOH:O | 1.82 | 0.80 |
| 1:A:841:SER:HB2 | 6:A:1543:HOH:O | 1.82 | 0.79 |
| 1:B:841:SER:HB2 | 6:B:1666:HOH:O | 1.81 | 0.78 |
| 1:B:198:LYS:H | 1:B:198:LYS:HE2 | 1.49 | 0.77 |
| 1:B:144:SER:HB3 | 1:B:277:GLY:O | 1.85 | 0.76 |
| 1:A:817:GLU:HB3 | 1:A:989:MET:CE | 2.15 | 0.76 |
| 1:A:1102:ASP:OD1 | 1:A:1104:ARG:HD3 | 1.86 | 0.76 |
| 1:A:330:THR:O | 1:A:362:ARG:HD3 | 1.86 | 0.75 |
| 1:A:561:MET:HE1 | 1:A:587:ILE:HD11 | 1.69 | 0.74 |
| 1:A:737:ARG:HH11 | 1:A:739:GLN:NE2 | 1.86 | 0.73 |
| 1:A:82:THR:HG22 | 1:A:108:VAL:O | 1.88 | 0.73 |
| 1:B:110:HIS:HD2 | 1:B:169:HIS:HD2 | 1.34 | 0.73 |
| 1:B:398:VAL:HG13 | 1:B:656:VAL:HG22 | 1.70 | 0.73 |
| 1:A:817:GLU:HB3 | 1:A:989:MET:HE2 | 1.71 | 0.71 |
| 1:A:856:ASN:HD21 | 1:A:860:GLN:HE21 | 1.37 | 0.71 |
| 1:B:561:MET:HE2 | 1:B:587:ILE:HD11 | 1.73 | 0.71 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:643:VAL:HB | 1:B:849:PRO:HB2 | 1.72 | 0.71 |
| 1:B:1166:MET:O | 1:B:1169:THR:HG22 | 1.90 | 0.71 |
| 1:B:1132:ASN:ND2 | 1:B:1139:ARG:HH22 | 1.87 | 0.71 |
| 1:B:330:THR:O | 1:B:362:ARG:HD3 | 1.91 | 0.70 |
| 1:A:1132:ASN:ND2 | 1:A:1139:ARG:HH22 | 1.89 | 0.70 |
| 1:B:856:ASN:HD21 | 1:B:860:GLN:HE21 | 1.39 | 0.70 |
| 1:A:110:HIS:HD2 | 1:A:169:HIS:HD2 | 1.37 | 0.70 |
| 1:A:676:GLY:HA2 | 6:A:1339:HOH:O | 1.92 | 0.69 |
| 1:A:1132:ASN:O | 1:A:1136:VAL:HG22 | 1.92 | 0.69 |
| 1:B:10:GLY:O | 1:B:14:THR:HG23 | 1.91 | 0.69 |
| 1:B:43:TRP:HB3 | 1:B:48:ARG:HD3 | 1.72 | 0.69 |
| 1:A:635:THR:HG23 | 1:A:636:ASN:N | 2.07 | 0.69 |
| 1:B:227:GLN:HE21 | 1:B:227:GLN:H | 1.39 | 0.69 |
| 1:A:10:GLY:O | 1:A:14:THR:HG23 | 1.93 | 0.69 |
| 1:B:82:THR:HG22 | 1:B:108:VAL:O | 1.91 | 0.69 |
| 1:A:937:GLN:HG2 | 1:A:942:LEU:HB3 | 1.75 | 0.69 |
| 1:B:737:ARG:NH1 | 1:B:739:GLN:NE2 | 2.40 | 0.69 |
| 1:B:1147:ARG:HB3 | 6:B:1623:HOH:O | 1.92 | 0.68 |
| 1:B:817:GLU:HB3 | 1:B:989:MET:CE | 2.23 | 0.68 |
| 1:A:143:SER:OG | 1:A:169:HIS:HE1 | 1.76 | 0.68 |
| 1:B:737:ARG:NH1 | 1:B:739:GLN:HE22 | 1.92 | 0.68 |
| 1:A:274:VAL:HG23 | 1:A:324:ILE:HD11 | 1.77 | 0.66 |
| 1:B:175:ARG:HD3 | 1:B:175:ARG:O | 1.95 | 0.66 |
| 1:A:227:GLN:H | 1:A:227:GLN:HE21 | 1.44 | 0.66 |
| 1:A:1200:THR:HG23 | 1:A:1202:MET:H | 1.60 | 0.66 |
| 1:A:396:ASP:HA | 1:A:656:VAL:HG13 | 1.78 | 0.65 |
| 1:B:110:HIS:HD2 | 1:B:169:HIS:CD2 | 2.14 | 0.65 |
| 1:A:325:THR:CG2 | 1:A:382:MET:SD | 2.85 | 0.65 |
| 1:A:643:VAL:HB | 1:A:849:PRO:HB2 | 1.76 | 0.65 |
| 1:B:274:VAL:HG23 | 1:B:324:ILE:HD11 | 1.78 | 0.65 |
| 1:A:873:ALA:HA | 1:A:959:ILE:HD13 | 1.78 | 0.64 |
| 1:A:1189:GLY:HA3 | 1:A:1196:THR:HG21 | 1.79 | 0.64 |
| 1:A:907:LYS:O | 1:A:911:GLN:HG3 | 1.97 | 0.64 |
| 1:B:274:VAL:HG23 | 1:B:324:ILE:CD1 | 2.26 | 0.64 |
| 1:A:398:VAL:HG13 | 1:A:656:VAL:CG2 | 2.27 | 0.64 |
| 1:B:1102:ASP:OD1 | 1:B:1104:ARG:HD3 | 1.97 | 0.64 |
| 1:B:817:GLU:HB3 | 1:B:989:MET:HE3 | 1.79 | 0.64 |
| 1:A:131:TYR:O | 1:A:134:ARG:HB2 | 1.97 | 0.64 |
| 1:B:233:ASN:HB2 | 1:B:234:PRO:HD3 | 1.78 | 0.64 |
| 1:B:264:VAL:HG11 | 1:B:284:GLU:HG3 | 1.80 | 0.64 |
| 1:A:212:HIS:HE1 | 1:B:950:ASP:OD2 | 1.79 | 0.63 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:279:SER:O | 1:B:283:ILE:HG13 | 1.98 | 0.63 |
| 1:B:635:THR:HG22 | 1:B:636:ASN:O | 1.97 | 0.63 |
| 1:A:196:ASN:OD1 | 1:A:198:LYS:HE2 | 1.98 | 0.63 |
| 1:A:263:TYR:OH | 1:A:298:GLY:HA3 | 1.99 | 0.63 |
| 1:B:635:THR:CG2 | 1:B:639:PHE:HB3 | 2.26 | 0.63 |
| 1:A:867:SER:O | 1:B:99:LYS:HE3 | 1.99 | 0.63 |
| 1:B:1005:THR:HB | 1:B:1018:LYS:HD3 | 1.81 | 0.62 |
| 1:B:364:GLY:HA2 | 1:B:368:LYS:HB3 | 1.81 | 0.62 |
| 1:B:131:TYR:O | 1:B:134:ARG:HB2 | 2.00 | 0.62 |
| 1:B:14:THR:HG22 | 1:B:149:ALA:HB1 | 1.82 | 0.62 |
| 1:B:606:VAL:O | 1:B:610:VAL:HG23 | 1.99 | 0.62 |
| 1:B:530:ILE:O | 1:B:534:ILE:HG13 | 1.99 | 0.61 |
| 1:A:390:PHE:HB2 | 1:A:403:LEU:HD13 | 1.81 | 0.61 |
| 1:A:1189:GLY:CA | 1:A:1196:THR:HG21 | 2.30 | 0.61 |
| 1:A:986:VAL:HG22 | 1:A:1064:LEU:HD23 | 1.81 | 0.61 |
| 1:B:1189:GLY:HA3 | 1:B:1196:THR:HG21 | 1.81 | 0.61 |
| 1:B:907:LYS:O | 1:B:911:GLN:HG3 | 2.00 | 0.61 |
| 1:A:463:ILE:HG12 | 1:A:464:THR:N | 2.16 | 0.61 |
| 1:B:1083:SER:O | 1:B:1087:MET:HG3 | 2.01 | 0.60 |
| 1:A:325:THR:HG23 | 1:A:382:MET:SD | 2.41 | 0.60 |
| 1:A:836:ASN:OD1 | 1:A:841:SER:HB3 | 2.01 | 0.60 |
| 1:A:227:GLN:H | 1:A:227:GLN:NE2 | 2.00 | 0.60 |
| 1:A:64:GLU:CG | 1:A:89:GLY:HA2 | 2.26 | 0.60 |
| 1:B:561:MET:HE1 | 1:B:583:LEU:HD21 | 1.83 | 0.60 |
| 1:A:1080:MET:H | 1:B:1215:ASN:ND2 | 1.98 | 0.60 |
| 1:A:274:VAL:HG23 | 1:A:324:ILE:CD1 | 2.32 | 0.60 |
| 1:A:1215:ASN:ND2 | 1:B:1080:MET:H | 2.00 | 0.60 |
| 1:A:356:PRO:O | 1:A:357:LYS:HB3 | 2.02 | 0.60 |
| 1:B:163:SER:O | 1:B:164:ASN:HB2 | 2.01 | 0.60 |
| 1:B:883:MET:CE | 1:B:955:LYS:HG3 | 2.32 | 0.60 |
| 1:A:279:SER:O | 1:A:283:ILE:HG13 | 2.02 | 0.59 |
| 1:A:636:ASN:HB3 | 1:A:639:PHE:H | 1.67 | 0.59 |
| 1:B:465:ILE:HG13 | 1:B:467:HIS:CE1 | 2.37 | 0.59 |
| 1:A:634:MET:SD | 1:A:635:THR:N | 2.75 | 0.59 |
| 1:B:463:ILE:HG12 | 1:B:464:THR:N | 2.16 | 0.59 |
| 1:B:1025:LEU:O | 1:B:1029:VAL:HG13 | 2.03 | 0.59 |
| 1:A:1003:LYS:NZ | 1:B:976:HIS:HD2 | 2.01 | 0.59 |
| 1:A:61:MET:HG3 | 1:A:67:ALA:HA | 1.83 | 0.59 |
| 1:B:124:PHE:HB3 | 1:B:367:SER:HB2 | 1.84 | 0.59 |
| 1:A:221:ASN:HB3 | 1:A:222:PRO:CD | 2.33 | 0.59 |
| 1:B:396:ASP:HA | 1:B:656:VAL:CG1 | 2.32 | 0.59 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:968:ASP:OD1 | 1:B:1003:LYS:HB2 | 2.02 | 0.59 |
| 1:A:221:ASN:HB3 | 1:A:222:PRO:HD2 | 1.85 | 0.58 |
| 1:A:99:LYS:HE3 | 1:B:867:SER:O | 2.03 | 0.58 |
| 1:A:817:GLU:HB3 | 1:A:989:MET:HE3 | 1.85 | 0.58 |
| 1:B:883:MET:HE1 | 1:B:955:LYS:HG3 | 1.86 | 0.58 |
| 1:A:710:LYS:HG2 | 1:A:713:GLU:OE1 | 2.04 | 0.57 |
| 1:B:456:ASP:OD2 | 1:B:463:ILE:HG22 | 2.04 | 0.57 |
| 1:A:326:VAL:HG11 | 1:A:341:TYR:HA | 1.84 | 0.57 |
| 1:B:9:ASP:OD1 | 1:B:12:THR:HG23 | 2.04 | 0.57 |
| 1:A:14:THR:HG22 | 1:A:149:ALA:HB1 | 1.86 | 0.57 |
| 1:A:110:HIS:HD2 | 1:A:169:HIS:CD2 | 2.19 | 0.57 |
| 1:A:322:LYS:O | 1:A:356:PRO:O | 2.22 | 0.57 |
| 1:A:635:THR:HG23 | 1:A:636:ASN:H | 1.68 | 0.57 |
| 1:B:419:GLN:OE1 | 1:B:469:ARG:NH1 | 2.37 | 0.57 |
| 1:A:698:VAL:HG22 | 1:A:1084:GLN:CD | 2.25 | 0.57 |
| 1:B:64:GLU:CG | 1:B:89:GLY:HA2 | 2.31 | 0.57 |
| 1:A:117:ALA:HB1 | 1:B:99:LYS:HE2 | 1.86 | 0.57 |
| 1:A:438:ILE:HD11 | 1:A:468:LEU:HD22 | 1.87 | 0.57 |
| 1:A:968:ASP:OD1 | 1:A:1003:LYS:HB2 | 2.05 | 0.56 |
| 1:A:1083:SER:O | 1:A:1087:MET:HG3 | 2.05 | 0.56 |
| 1:A:691:GLN:HE22 | 1:A:727:LYS:H | 1.53 | 0.56 |
| 1:B:873:ALA:HA | 1:B:959:ILE:HD13 | 1.87 | 0.56 |
| 1:B:9:ASP:HA | 1:B:179:GLU:O | 2.05 | 0.56 |
| 1:A:1004:ALA:O | 1:A:1022:LYS:HG3 | 2.05 | 0.56 |
| 1:A:239:VAL:CG1 | 1:A:240:PRO:HD3 | 2.35 | 0.56 |
| 1:A:682:PRO:HB3 | 1:A:764:MET:HE1 | 1.87 | 0.56 |
| 1:A:544:ILE:HD12 | 1:A:613:LEU:HD13 | 1.87 | 0.56 |
| 1:B:1137:LEU:HD22 | 1:B:1141:PHE:HD2 | 1.71 | 0.56 |
| 1:A:12:THR:HB | 1:A:39:GLU:OE2 | 2.04 | 0.56 |
| 1:A:238:LYS:NZ | 6:A:1773:HOH:O | 2.39 | 0.56 |
| 1:A:9:ASP:HA | 1:A:179:GLU:O | 2.06 | 0.56 |
| 1:A:906:VAL:O | 1:A:910:LEU:HB2 | 2.06 | 0.56 |
| 1:B:1027:ARG:HG3 | 1:B:1030:MET:HE3 | 1.87 | 0.56 |
| 1:B:698:VAL:HG22 | 1:B:1084:GLN:CD | 2.27 | 0.55 |
| 1:B:396:ASP:O | 1:B:400:GLY:HA2 | 2.05 | 0.55 |
| 1:B:61:MET:HG3 | 1:B:67:ALA:HA | 1.88 | 0.55 |
| 1:B:1029:VAL:HG12 | 6:B:1629:HOH:O | 2.06 | 0.55 |
| 1:B:91:LEU:HA | 1:B:94:ILE:HD12 | 1.88 | 0.55 |
| 1:B:1132:ASN:HD22 | 1:B:1139:ARG:HH22 | 1.55 | 0.55 |
| 1:A:455:TYR:HB2 | 1:B:1201:PRO:HG3 | 1.89 | 0.54 |
| 1:B:227:GLN:NE2 | 1:B:227:GLN:H | 2.05 | 0.54 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:1000:GLN:HA | 1:B:1012:LYS:HB2 | 1.88 | 0.54 |
| 1:B:1189:GLY:CA | 1:B:1196:THR:HG21 | 2.38 | 0.54 |
| 1:B:619:PRO:HG2 | 1:B:622:TRP:CD1 | 2.42 | 0.54 |
| 1:A:436:GLN:O | 1:A:440:ILE:HG13 | 2.07 | 0.54 |
| 1:A:691:GLN:NE2 | 1:A:727:LYS:H | 2.06 | 0.54 |
| 1:A:1132:ASN:HD22 | 1:A:1139:ARG:HH22 | 1.55 | 0.53 |
| 1:B:1137:LEU:CD2 | 1:B:1141:PHE:HD2 | 2.20 | 0.53 |
| 1:A:1027:ARG:HG3 | 1:A:1030:MET:HE3 | 1.90 | 0.53 |
| 1:A:364:GLY:HA2 | 1:A:368:LYS:HB3 | 1.89 | 0.53 |
| 1:A:456:ASP:OD2 | 1:A:463:ILE:HG22 | 2.09 | 0.53 |
| 1:B:12:THR:HB | 1:B:39:GLU:OE2 | 2.08 | 0.53 |
| 1:B:1047:GLN:NE2 | 6:B:1590:HOH:O | 2.42 | 0.53 |
| 1:A:737:ARG:HH11 | 1:A:739:GLN:HE22 | 1.55 | 0.53 |
| 1:A:124:PHE:HB3 | 1:A:367:SER:HB2 | 1.91 | 0.53 |
| 1:A:755:CYS:SG | 1:A:761:ALA:HB3 | 2.48 | 0.53 |
| 1:B:639:PHE:CD1 | 1:B:643:VAL:HG22 | 2.44 | 0.53 |
| 1:B:390:PHE:HB2 | 1:B:403:LEU:HD13 | 1.91 | 0.53 |
| 1:B:691:GLN:O | 1:B:797:LYS:HE3 | 2.09 | 0.53 |
| 1:B:767:LEU:O | 1:B:771:ARG:HG2 | 2.09 | 0.53 |
| 1:A:1137:LEU:CD2 | 1:A:1141:PHE:HD2 | 2.22 | 0.52 |
| 1:A:350:GLU:OE1 | 1:B:389:HIS:HE1 | 1.92 | 0.52 |
| 1:A:175:ARG:HD2 | 1:A:478:THR:HB | 1.91 | 0.52 |
| 1:B:644:LYS:HB3 | 1:B:645:PRO:HD3 | 1.90 | 0.52 |
| 1:B:438:ILE:HD11 | 1:B:468:LEU:HD22 | 1.91 | 0.52 |
| 1:A:389:HIS:HE1 | 1:B:350:GLU:OE1 | 1.92 | 0.52 |
| 1:A:780:TYR:HA | 1:A:783:ARG:HH11 | 1.75 | 0.52 |
| 1:A:1132:ASN:HD21 | 1:A:1139:ARG:HH12 | 1.58 | 0.52 |
| 1:A:1175:PHE:CZ | 1:A:1177:PRO:HA | 2.45 | 0.52 |
| 1:A:1202:MET:O | 1:A:1205:ARG:NH2 | 2.42 | 0.52 |
| 1:A:325:THR:HG21 | 6:A:1560:HOH:O | 2.08 | 0.52 |
| 1:B:639:PHE:CE1 | 1:B:643:VAL:HG22 | 2.45 | 0.52 |
| 1:B:780:TYR:O | 1:B:783:ARG:HG3 | 2.10 | 0.52 |
| 1:B:1219:THR:HG22 | 1:B:1221:GLU:H | 1.75 | 0.51 |
| 1:A:682:PRO:HB3 | 1:A:764:MET:CE | 2.41 | 0.51 |
| 1:B:495:VAL:HG13 | 1:B:527:PRO:HD3 | 1.92 | 0.51 |
| 1:B:691:GLN:HE22 | 1:B:727:LYS:H | 1.58 | 0.51 |
| 1:B:817:GLU:HB3 | 1:B:989:MET:HE2 | 1.91 | 0.51 |
| 1:B:1147:ARG:CB | 6:B:1623:HOH:O | 2.52 | 0.51 |
| 1:A:419:GLN:OE1 | 1:A:469:ARG:NH1 | 2.43 | 0.51 |
| 1:B:16:HIS:HE1 | 1:B:186:LEU:O | 1.94 | 0.51 |
| 1:B:953:THR:HG22 | 6:B:1425:HOH:O | 2.10 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:390:PHE:CD1 | 1:B:403:LEU:HD22 | 2.46 | 0.51 |
| 1:B:115:ALA:HB2 | 1:B:126:ASP:OD2 | 2.10 | 0.51 |
| 1:B:351:ARG:CD | 1:B:353:GLU:HB2 | 2.36 | 0.51 |
| 1:B:555:LEU:HD12 | 1:B:605:ALA:HB2 | 1.93 | 0.51 |
| 1:B:684:TRP:CE3 | 1:B:686:PRO:HG3 | 2.45 | 0.51 |
| 1:B:869:PHE:CD2 | 1:B:969:ILE:HG21 | 2.46 | 0.51 |
| 1:A:1166:MET:O | 1:A:1169:THR:HG22 | 2.11 | 0.51 |
| 1:A:227:GLN:HE21 | 1:A:227:GLN:N | 2.07 | 0.51 |
| 1:B:1219:THR:HG22 | 1:B:1221:GLU:N | 2.26 | 0.51 |
| 1:A:1025:LEU:O | 1:A:1029:VAL:HG13 | 2.11 | 0.50 |
| 1:A:1111:ASN:HD22 | 1:A:1112:PRO:HD2 | 1.75 | 0.50 |
| 1:B:14:THR:HG21 | 1:B:171:PHE:CE1 | 2.46 | 0.50 |
| 1:A:691:GLN:HE22 | 1:A:726:ALA:HA | 1.77 | 0.50 |
| 1:B:573:VAL:HG22 | 6:B:1532:HOH:O | 2.11 | 0.50 |
| 1:B:1146:LYS:HD3 | 6:B:1649:HOH:O | 2.10 | 0.50 |
| 1:B:140:MET:HG2 | 1:B:168:MET:HE3 | 1.93 | 0.50 |
| 1:A:702:SER:CB | 1:A:807:GLU:HG2 | 2.42 | 0.50 |
| 1:A:976:HIS:HD2 | 1:B:1003:LYS:NZ | 2.10 | 0.50 |
| 1:B:1008:GLY:HA2 | 1:B:1148:LEU:HD13 | 1.92 | 0.50 |
| 1:B:1200:THR:HG23 | 1:B:1202:MET:H | 1.76 | 0.50 |
| 1:B:421:GLN:HE21 | 1:B:487:VAL:HG22 | 1.77 | 0.50 |
| 1:B:239:VAL:CG1 | 1:B:240:PRO:HD3 | 2.40 | 0.50 |
| 1:B:258:TYR:HD2 | 6:B:1635:HOH:O | 1.94 | 0.50 |
| 1:B:23:GLU:OE1 | 1:B:204:ARG:NH2 | 2.45 | 0.50 |
| 1:B:754:ILE:HG12 | 6:B:1410:HOH:O | 2.12 | 0.50 |
| 1:B:1132:ASN:HD21 | 1:B:1139:ARG:HH12 | 1.60 | 0.50 |
| 1:B:110:HIS:CD2 | 1:B:169:HIS:HD2 | 2.22 | 0.50 |
| 1:B:869:PHE:CE2 | 1:B:969:ILE:HG21 | 2.47 | 0.50 |
| 1:B:1175:PHE:CZ | 1:B:1177:PRO:HA | 2.47 | 0.49 |
| 1:A:254:THR:HG22 | 6:A:1738:HOH:O | 2.12 | 0.49 |
| 1:B:992:GLU:O | 1:B:993:VAL:HB | 2.12 | 0.49 |
| 1:A:1000:GLN:HA | 1:A:1012:LYS:HB2 | 1.92 | 0.49 |
| 1:B:522:MET:O | 1:B:526:LEU:HB2 | 2.11 | 0.49 |
| 1:A:345:CYS:O | 1:A:349:VAL:HG13 | 2.13 | 0.49 |
| 1:A:522:MET:O | 1:A:526:LEU:HB2 | 2.13 | 0.49 |
| 1:B:1040:VAL:HG12 | 1:B:1048:GLN:HE22 | 1.78 | 0.49 |
| 1:A:1015:ALA:HB1 | 1:B:1185:SER:HB2 | 1.94 | 0.49 |
| 1:A:1215:ASN:HA | 6:A:1641:HOH:O | 2.11 | 0.49 |
| 1:B:20:ALA:HB2 | 1:B:188:TYR:CZ | 2.47 | 0.49 |
| 1:A:950:ASP:OD2 | 1:B:212:HIS:HE1 | 1.95 | 0.49 |
| 1:A:230:GLU:OE2 | 1:B:331:LYS:HE3 | 2.12 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:448:PHE:CZ | 1:B:474:PRO:HG3 | 2.47 | 0.49 |
| 1:B:571:ALA:HB3 | 6:B:1532:HOH:O | 2.12 | 0.49 |
| 1:A:144:SER:HB3 | 1:A:277:GLY:O | 2.12 | 0.49 |
| 1:B:595:GLY:C | 1:B:597:LYS:H | 2.16 | 0.49 |
| 1:A:194:LEU:HD21 | 1:A:253:LEU:HD12 | 1.94 | 0.48 |
| 1:A:239:VAL:HG13 | 1:A:240:PRO:HD3 | 1.94 | 0.48 |
| 1:A:867:SER:HB2 | 1:A:875:TYR:CD2 | 2.47 | 0.48 |
| 1:A:530:ILE:O | 1:A:534:ILE:HG13 | 2.14 | 0.48 |
| 1:B:93:MET:O | 1:B:97:MET:HG3 | 2.12 | 0.48 |
| 1:B:691:GLN:HG2 | 1:B:736:PHE:CD1 | 2.48 | 0.48 |
| 1:B:1147:ARG:CG | 6:B:1623:HOH:O | 2.61 | 0.48 |
| 1:A:390:PHE:CB | 1:A:403:LEU:HD13 | 2.44 | 0.48 |
| 1:A:702:SER:OG | 1:A:807:GLU:HG2 | 2.14 | 0.48 |
| 1:A:1129:MET:HE1 | 1:A:1149:ARG:NH1 | 2.28 | 0.48 |
| 1:A:494:TYR:HB3 | 1:A:500:ILE:HD11 | 1.96 | 0.48 |
| 1:B:345:CYS:O | 1:B:349:VAL:HG13 | 2.14 | 0.48 |
| 1:A:1048:GLN:NE2 | 6:A:1370:HOH:O | 2.47 | 0.48 |
| 1:A:691:GLN:O | 1:A:797:LYS:HE3 | 2.13 | 0.47 |
| 1:A:644:LYS:HB3 | 1:A:645:PRO:HD3 | 1.95 | 0.47 |
| 1:A:99:LYS:HE2 | 1:B:117:ALA:HB1 | 1.95 | 0.47 |
| 1:B:147:GLN:HE22 | 1:B:184:GLU:H | 1.62 | 0.47 |
| 1:A:1137:LEU:HD22 | 1:A:1141:PHE:HD2 | 1.79 | 0.47 |
| 1:B:961:GLY:HA3 | 1:B:965:TRP:CE3 | 2.49 | 0.47 |
| 1:A:16:HIS:HE1 | 1:A:186:LEU:O | 1.97 | 0.47 |
| 1:B:755:CYS:HA | 4:B:1233:SF4:S1 | 2.54 | 0.47 |
| 1:A:737:ARG:NH1 | 1:A:739:GLN:HE22 | 2.12 | 0.47 |
| 1:B:239:VAL:HG13 | 1:B:240:PRO:HD3 | 1.95 | 0.47 |
| 1:B:263:TYR:OH | 1:B:298:GLY:HA3 | 2.15 | 0.47 |
| 1:B:836:ASN:OD1 | 1:B:841:SER:HB3 | 2.15 | 0.47 |
| 1:A:569:LYS:HD2 | 1:A:610:VAL:HG13 | 1.95 | 0.47 |
| 1:A:365:LEU:HD22 | 1:B:226:PHE:CD1 | 2.50 | 0.47 |
| 1:B:1147:ARG:HD2 | 6:B:1689:HOH:O | 2.14 | 0.47 |
| 5:B:1236:TPP:H2 | 5:B:1236:TPP:HN42 | 1.78 | 0.47 |
| 1:B:20:ALA:HB2 | 1:B:188:TYR:CE1 | 2.50 | 0.47 |
| 1:B:463:ILE:HG12 | 1:B:464:THR:H | 1.78 | 0.47 |
| 1:A:1185:SER:HB3 | 1:B:45:ALA:HB1 | 1.96 | 0.47 |
| 1:A:644:LYS:O | 1:A:648:THR:HG23 | 2.15 | 0.47 |
| 1:B:695:CYS:HB2 | 1:B:704:ILE:HD13 | 1.97 | 0.47 |
| 1:A:483:ARG:HA | 1:A:503:GLY:O | 2.15 | 0.46 |
| 1:B:426:GLY:N | 1:B:462:GLY:O | 2.49 | 0.46 |
| 1:A:1185:SER:HB3 | 1:B:45:ALA:CB | 2.44 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:713:GLU:OE1 | 1:B:785:PRO:HD2 | 2.16 | 0.46 |
| 1:A:620:ASP:HB3 | 6:A:1653:HOH:O | 2.15 | 0.46 |
| 1:B:1196:THR:HB | 6:B:1583:HOH:O | 2.14 | 0.46 |
| 1:B:635:THR:HG21 | 1:B:639:PHE:HD2 | 1.81 | 0.46 |
| 1:A:143:SER:HB2 | 1:A:171:PHE:HB3 | 1.96 | 0.46 |
| 1:A:495:VAL:HG13 | 1:A:527:PRO:HD3 | 1.97 | 0.46 |
| 1:A:637:GLU:HG2 | 1:A:641:ASN:ND2 | 2.31 | 0.46 |
| 1:A:419:GLN:HG2 | 1:A:469:ARG:HG2 | 1.97 | 0.46 |
| 1:A:114:ARG:HG2 | 1:A:115:ALA:N | 2.31 | 0.46 |
| 1:A:87:SER:HB2 | 1:A:116:ILE:HD13 | 1.96 | 0.46 |
| 1:A:110:HIS:HE1 | 1:A:157:HIS:NE2 | 2.13 | 0.46 |
| 1:B:1048:GLN:NE2 | 6:B:1507:HOH:O | 2.48 | 0.46 |
| 1:A:266:ALA:HA | 1:A:267:PRO:HD3 | 1.83 | 0.46 |
| 1:B:325:THR:CG2 | 1:B:382:MET:SD | 3.04 | 0.46 |
| 1:A:1003:LYS:HZ2 | 1:B:976:HIS:HD2 | 1.64 | 0.46 |
| 1:B:163:SER:HB3 | 1:B:242:ILE:HD12 | 1.98 | 0.46 |
| 1:A:1043:GLY:HA3 | 1:A:1084:GLN:O | 2.15 | 0.45 |
| 1:A:635:THR:CG2 | 1:A:636:ASN:N | 2.74 | 0.45 |
| 1:A:857:ARG:HG3 | 1:A:858:LEU:HD13 | 1.98 | 0.45 |
| 1:B:42:ASP:O | 1:B:46:GLN:HG3 | 2.15 | 0.45 |
| 1:A:286:VAL:HG21 | 1:A:372:PRO:HA | 1.97 | 0.45 |
| 1:B:635:THR:CG2 | 1:B:636:ASN:N | 2.79 | 0.45 |
| 1:A:739:GLN:NE2 | 1:A:777:ASN:HB3 | 2.32 | 0.45 |
| 1:A:636:ASN:HB2 | 1:A:639:PHE:HB2 | 1.99 | 0.45 |
| 1:A:805:LEU:HB2 | 1:A:825:THR:HB | 1.98 | 0.45 |
| 1:B:431:VAL:CG1 | 1:B:435:LYS:HE3 | 2.46 | 0.45 |
| 1:A:365:LEU:HD22 | 1:B:226:PHE:CE1 | 2.52 | 0.45 |
| 1:B:26:ALA:HB3 | 1:B:71:VAL:HG23 | 1.99 | 0.45 |
| 1:B:651:GLY:O | 1:B:654:LEU:HB2 | 2.17 | 0.45 |
| 1:B:712:GLU:CD | 1:B:712:GLU:H | 2.20 | 0.45 |
| 1:A:1219:THR:HG22 | 1:A:1222:GLN:H | 1.81 | 0.45 |
| 1:A:367:SER:HB2 | 1:B:222:PRO:HG3 | 1.97 | 0.45 |
| 1:B:1077:ARG:HH22 | 1:B:1139:ARG:HH21 | 1.65 | 0.45 |
| 1:A:869:PHE:CD2 | 1:A:969:ILE:HG21 | 2.52 | 0.44 |
| 1:B:325:THR:HG21 | 6:B:1645:HOH:O | 2.17 | 0.44 |
| 1:B:20:ALA:O | 1:B:51:ILE:HG12 | 2.16 | 0.44 |
| 1:B:692:CYS:SG | 1:B:694:GLN:HG3 | 2.57 | 0.44 |
| 1:B:887:ARG:NH2 | 1:B:952:TYR:O | 2.48 | 0.44 |
| 1:A:555:LEU:HD12 | 1:A:605:ALA:HB2 | 1.98 | 0.44 |
| 1:B:1111:ASN:HD22 | 1:B:1112:PRO:HD2 | 1.83 | 0.44 |
| 1:B:1214:GLN:O | 1:B:1214:GLN:HG2 | 2.18 | 0.44 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:180:ILE:HG13 | 1:B:181:GLN:N | 2.30 | 0.44 |
| 1:B:879:MET:O | 1:B:882:SER:HB3 | 2.18 | 0.44 |
| 1:A:229:ARG:HE | 1:B:128:GLN:HE22 | 1.64 | 0.44 |
| 1:A:1200:THR:HG21 | 6:B:1702:HOH:O | 2.17 | 0.44 |
| 1:A:134:ARG:HD2 | 6:A:1659:HOH:O | 2.18 | 0.44 |
| 1:B:236:TYR:O | 1:B:239:VAL:HG12 | 2.18 | 0.44 |
| 1:A:11:ASN:HD21 | 1:A:112:THR:HG21 | 1.83 | 0.44 |
| 1:B:10:GLY:O | 1:B:14:THR:CG2 | 2.63 | 0.44 |
| 1:A:10:GLY:O | 1:A:14:THR:CG2 | 2.64 | 0.44 |
| 1:B:1072:ILE:HA | 6:B:1662:HOH:O | 2.17 | 0.44 |
| 1:B:390:PHE:CE1 | 1:B:403:LEU:HD22 | 2.52 | 0.44 |
| 1:A:1047:GLN:NE2 | 1:A:1047:GLN:H | 2.15 | 0.44 |
| 1:A:1198:ASP:OD1 | 1:A:1200:THR:HG22 | 2.16 | 0.44 |
| 1:A:9:ASP:OD1 | 1:A:12:THR:CG2 | 2.66 | 0.44 |
| 1:A:738:ILE:HA | 1:A:738:ILE:HD13 | 1.93 | 0.44 |
| 1:A:741:ASN:HA | 1:A:778:LEU:HG | 1.99 | 0.44 |
| 1:B:883:MET:HE2 | 1:B:955:LYS:HG3 | 1.99 | 0.44 |
| 1:A:670:SER:HA | 1:A:673:GLU:HG3 | 1.99 | 0.43 |
| 1:A:717:ALA:HA | 1:A:718:PRO:HD3 | 1.91 | 0.43 |
| 1:A:866:ASN:HB3 | 1:B:217:GLY:O | 2.18 | 0.43 |
| 1:B:23:GLU:CD | 1:B:204:ARG:HH22 | 2.21 | 0.43 |
| 1:B:1076:LEU:HD13 | 1:B:1086:VAL:HG21 | 1.99 | 0.43 |
| 1:A:390:PHE:CD1 | 1:A:403:LEU:HD22 | 2.53 | 0.43 |
| 1:A:396:ASP:HA | 1:A:656:VAL:CG1 | 2.48 | 0.43 |
| 1:B:1187:ASP:O | 1:B:1190:GLU:HB2 | 2.18 | 0.43 |
| 1:B:322:LYS:O | 1:B:356:PRO:O | 2.35 | 0.43 |
| 1:A:997:THR:OG1 | 1:A:1000:GLN:NE2 | 2.49 | 0.43 |
| 1:B:640:LYS:HE2 | 1:B:640:LYS:HB2 | 1.79 | 0.43 |
| 1:A:356:PRO:O | 1:A:357:LYS:CB | 2.65 | 0.43 |
| 1:B:1124:VAL:HG22 | 6:B:1263:HOH:O | 2.18 | 0.43 |
| 1:B:221:ASN:HB3 | 1:B:222:PRO:CD | 2.48 | 0.43 |
| 1:B:87:SER:OG | 1:B:88:GLN:N | 2.52 | 0.43 |
| 1:B:937:GLN:HG2 | 1:B:942:LEU:HB3 | 2.00 | 0.43 |
| 1:A:561:MET:CE | 1:A:587:ILE:HD11 | 2.45 | 0.43 |
| 1:A:739:GLN:HE22 | 1:A:777:ASN:HB3 | 1.84 | 0.43 |
| 1:B:930:LEU:HD12 | 1:B:930:LEU:HA | 1.85 | 0.43 |
| 1:A:755:CYS:HA | 4:A:1233:SF4:S1 | 2.59 | 0.43 |
| 1:A:549:ILE:O | 1:A:553:VAL:HG22 | 2.19 | 0.43 |
| 1:A:684:TRP:CE3 | 1:A:686:PRO:HG3 | 2.54 | 0.43 |
| 1:A:87:SER:OG | 1:A:88:GLN:N | 2.51 | 0.43 |
| 1:B:569:LYS:HD2 | 1:B:610:VAL:HG13 | 2.00 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:808:PHE:CD1 | 1:B:808:PHE:N | 2.86 | 0.43 |
| 1:A:121:LEU:C | 1:A:121:LEU:HD23 | 2.39 | 0.43 |
| 1:A:1219:THR:HG22 | 1:A:1221:GLU:N | 2.33 | 0.43 |
| 5:A:1236:TPP:N4' | 5:A:1236:TPP:H2 | 2.34 | 0.43 |
| 1:A:325:THR:HG22 | 1:A:382:MET:SD | 2.57 | 0.43 |
| 1:A:398:VAL:HG23 | 1:A:399:THR:HG23 | 2.01 | 0.43 |
| 1:B:390:PHE:CE1 | 1:B:392:VAL:HG22 | 2.54 | 0.43 |
| 1:A:953:THR:HG22 | 6:A:1288:HOH:O | 2.18 | 0.43 |
| 1:A:1193:GLU:OE1 | 1:B:1077:ARG:HB2 | 2.18 | 0.43 |
| 1:B:14:THR:CG2 | 1:B:149:ALA:HB1 | 2.46 | 0.43 |
| 1:B:263:TYR:HA | 1:B:299:LEU:O | 2.19 | 0.43 |
| 1:A:513:ASN:HA | 1:A:544:ILE:O | 2.19 | 0.42 |
| 1:A:581:ASP:O | 1:A:585:LYS:HG3 | 2.20 | 0.42 |
| 1:A:771:ARG:O | 1:A:775:VAL:HG23 | 2.19 | 0.42 |
| 1:B:187:ASP:HB2 | 1:B:190:ASP:OD1 | 2.19 | 0.42 |
| 1:A:351:ARG:HD2 | 1:A:353:GLU:HB2 | 2.01 | 0.42 |
| 1:B:532:ARG:HD2 | 1:B:625:ALA:H | 1.83 | 0.42 |
| 1:B:741:ASN:C | 1:B:741:ASN:HD22 | 2.23 | 0.42 |
| 1:A:467:HIS:HE1 | 6:A:1671:HOH:O | 2.02 | 0.42 |
| 1:B:194:LEU:HD21 | 1:B:253:LEU:HD12 | 2.01 | 0.42 |
| 1:A:9:ASP:OD1 | 1:A:12:THR:HG23 | 2.19 | 0.42 |
| 1:A:780:TYR:HA | 1:A:783:ARG:HD2 | 2.01 | 0.42 |
| 1:A:930:LEU:HA | 1:A:930:LEU:HD12 | 1.74 | 0.42 |
| 1:B:240:PRO:HB3 | 1:B:309:VAL:HG21 | 2.01 | 0.42 |
| 1:B:438:ILE:HG23 | 1:B:449:ALA:HB1 | 2.01 | 0.42 |
| 1:B:754:ILE:O | 1:B:755:CYS:C | 2.58 | 0.42 |
| 1:B:805:LEU:HB2 | 1:B:825:THR:HB | 2.02 | 0.42 |
| 1:B:528:SER:HB3 | 1:B:626:PRO:O | 2.20 | 0.42 |
| 1:A:35:THR:O | 1:A:39:GLU:HG3 | 2.20 | 0.42 |
| 1:A:65:ALA:HB2 | 1:A:92:LEU:HB3 | 2.02 | 0.42 |
| 1:A:754:ILE:HA | 1:A:754:ILE:HD12 | 1.76 | 0.42 |
| 1:A:700:PRO:HG2 | 1:A:814:GLY:HA2 | 2.02 | 0.42 |
| 1:B:454:SER:HB2 | 1:B:465:ILE:HG23 | 2.01 | 0.42 |
| 1:A:239:VAL:O | 1:A:243:VAL:HG23 | 2.19 | 0.42 |
| 1:B:264:VAL:CG1 | 1:B:284:GLU:HG3 | 2.46 | 0.42 |
| 1:B:297:ILE:HB | 1:B:379:TYR:CE1 | 2.55 | 0.42 |
| 1:A:684:TRP:CH2 | 1:A:737:ARG:HA | 2.54 | 0.42 |
| 1:B:108:VAL:HG21 | 1:B:157:HIS:HA | 2.02 | 0.42 |
| 1:B:114:ARG:HG2 | 1:B:115:ALA:N | 2.35 | 0.42 |
| 1:B:739:GLN:OE1 | 1:B:774:GLN:NE2 | 2.53 | 0.42 |
| 1:A:1188:PHE:CE1 | 1:A:1196:THR:HG23 | 2.54 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:682:PRO:HB3 | 1:B:764:MET:CE | 2.50 | 0.42 |
| 1:A:365:LEU:HB2 | 1:B:226:PHE:CG | 2.55 | 0.41 |
| 1:A:555:LEU:CD1 | 1:A:605:ALA:HB2 | 2.50 | 0.41 |
| 1:A:775:VAL:N | 1:A:776:PRO:HD2 | 2.35 | 0.41 |
| 1:B:536:ASN:ND2 | 1:B:623:LYS:HG2 | 2.35 | 0.41 |
| 1:B:1219:THR:CG2 | 1:B:1220:SER:N | 2.83 | 0.41 |
| 1:B:296:LYS:HA | 1:B:296:LYS:HD3 | 1.80 | 0.41 |
| 1:A:226:PHE:CD1 | 1:B:365:LEU:HD22 | 2.55 | 0.41 |
| 1:B:567:PHE:CD1 | 1:B:571:ALA:HB2 | 2.56 | 0.41 |
| 1:A:1195:CYS:HB2 | 6:A:1541:HOH:O | 2.19 | 0.41 |
| 1:A:123:ILE:HD11 | 1:B:1201:PRO:HB2 | 2.03 | 0.41 |
| 1:A:229:ARG:HE | 1:B:128:GLN:NE2 | 2.18 | 0.41 |
| 1:A:279:SER:HB3 | 1:A:363:TYR:HE2 | 1.85 | 0.41 |
| 1:A:910:LEU:HD12 | 1:A:930:LEU:HD21 | 2.01 | 0.41 |
| 1:B:9:ASP:OD1 | 1:B:12:THR:CG2 | 2.67 | 0.41 |
| 1:A:688:ASN:HB3 | 1:A:759:GLU:O | 2.20 | 0.41 |
| 1:B:532:ARG:HG3 | 1:B:623:LYS:O | 2.19 | 0.41 |
| 1:A:465:ILE:HG13 | 1:A:467:HIS:CE1 | 2.56 | 0.41 |
| 1:A:681:VAL:HG11 | 1:A:767:LEU:HD13 | 2.03 | 0.41 |
| 1:B:20:ALA:HB2 | 1:B:188:TYR:CE2 | 2.55 | 0.41 |
| 1:B:274:VAL:CG2 | 1:B:324:ILE:HD11 | 2.49 | 0.41 |
| 1:A:976:HIS:CG | 1:B:62:GLN:HB3 | 2.56 | 0.41 |
| 1:A:491:ASN:HD22 | 1:A:491:ASN:C | 2.24 | 0.41 |
| 1:A:91:LEU:HA | 1:A:94:ILE:HD12 | 2.02 | 0.41 |
| 1:A:335:ALA:HA | 1:B:306:ARG:NE | 2.35 | 0.41 |
| 1:B:338:ASP:HB3 | 1:B:339:PRO:CD | 2.50 | 0.41 |
| 1:A:858:LEU:HD12 | 1:A:858:LEU:HA | 1.86 | 0.41 |
| 1:A:883:MET:CE | 1:A:955:LYS:HG3 | 2.50 | 0.41 |
| 1:B:356:PRO:O | 1:B:357:LYS:HB3 | 2.21 | 0.41 |
| 1:B:644:LYS:O | 1:B:648:THR:HG23 | 2.20 | 0.41 |
| 1:B:673:GLU:O | 1:B:674:LYS:C | 2.59 | 0.41 |
| 1:B:27:ILE:HD11 | 1:B:84:PHE:CD2 | 2.56 | 0.41 |
| 1:B:992:GLU:HG2 | 1:B:1022:LYS:NZ | 2.35 | 0.41 |
| 1:A:1129:MET:HE3 | 1:A:1149:ARG:HD3 | 2.03 | 0.41 |
| 1:A:1199:ASP:O | 1:B:455:TYR:HB3 | 2.20 | 0.41 |
| 1:A:834:ILE:HD12 | 1:A:862:PRO:HB3 | 2.02 | 0.41 |
| 1:A:743:LEU:HD23 | 1:A:743:LEU:HA | 1.75 | 0.41 |
| 1:B:695:CYS:HB2 | 1:B:704:ILE:CD1 | 2.51 | 0.41 |
| 1:A:1059:PHE:CE2 | 1:A:1061:GLY:HA3 | 2.55 | 0.41 |
| 1:A:1079:GLY:HA2 | 1:B:1215:ASN:HD21 | 1.85 | 0.41 |
| 1:B:227:GLN:N | 1:B:227:GLN:HE21 | 2.11 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:338:ASP:HB3 | 1:B:339:PRO:HD2 | 2.03 | 0.41 |
| 1:B:131:TYR:CE1 | 1:B:339:PRO:HB2 | 2.56 | 0.41 |
| 1:A:1128:LEU:O | 1:A:1134:PHE:HB2 | 2.21 | 0.41 |
| 1:A:227:GLN:HE22 | 1:B:368:LYS:HZ3 | 1.69 | 0.41 |
| 1:A:804:PRO:HA | 1:A:826:GLN:HG3 | 2.03 | 0.41 |
| 1:B:1143:GLU:HB2 | 1:B:1147:ARG:NH2 | 2.36 | 0.41 |
| 1:B:608:GLN:HA | 1:B:611:THR:OG1 | 2.20 | 0.41 |
| 1:B:961:GLY:O | 1:B:988:VAL:HA | 2.21 | 0.40 |
| 1:A:893:LEU:HD12 | 1:A:893:LEU:HA | 1.84 | 0.40 |
| 1:B:175:ARG:HD2 | 1:B:478:THR:HB | 2.03 | 0.40 |
| 1:B:639:PHE:CE1 | 1:B:643:VAL:CG2 | 3.05 | 0.40 |
| 1:A:98:TYR:OH | 1:A:135:GLN:HG2 | 2.21 | 0.40 |
| 1:B:1012:LYS:HD2 | 1:B:1012:LYS:HA | 1.76 | 0.40 |
| 1:A:14:THR:CG2 | 1:A:149:ALA:HB1 | 2.52 | 0.40 |
| 1:B:1111:ASN:HA | 1:B:1172:PHE:CE1 | 2.56 | 0.40 |
| 1:B:598:ILE:O | 1:B:599:VAL:C | 2.60 | 0.40 |
| 1:A:371:SER:O | 1:A:375:VAL:HG23 | 2.21 | 0.40 |
| 1:A:61:MET:CE | 6:A:1639:HOH:O | 2.69 | 0.40 |
| 1:B:903:SER:OG | 1:B:906:VAL:HG23 | 2.22 | 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 | 1229/1231 (100%) | 1177 (96%) | 43 (4%) | 9 (1%) | 22 | 26 |
| 1 | B | 1229/1231 (100%) | 1184 (96%) | 35 (3%) | 10 (1%) | 19 | 23 |
| All | All | 2458/2462 (100%) | 2361 (96%) | 78 (3%) | 19 (1%) | 19 | 23 |

All (19) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 87 | SER |
| 1 | A | 1231 | LYS |
| 1 | B | 87 | SER |
| 1 | B | 594 | LYS |
| 1 | B | 1231 | LYS |
| 1 | A | 594 | LYS |
| 1 | A | 1177 | PRO |
| 1 | B | 590 | ALA |
| 1 | B | 592 | GLY |
| 1 | B | 627 | ALA |
| 1 | B | 993 | VAL |
| 1 | A | 591 | TYR |
| 1 | A | 592 | GLY |
| 1 | A | 626 | PRO |
| 1 | B | 591 | TYR |
| 1 | B | 1177 | PRO |
| 1 | B | 364 | GLY |
| 1 | A | 364 | GLY |
| 1 | A | 993 | VAL |

### 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 | 978/978 (100%) | 883 (90%) | 95 (10%) | 8 9 |
| 1 | B | 978/978 (100%) | 873 (89%) | 105 (11%) | 6 7 |
| All | All | 1956/1956 (100%) | 1756 (90%) | 200 (10%) | 7 8 |

All (200) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 12 | THR |
| 1 | A | 14 | THR |
| 1 | A | 82 | THR |
| 1 | A | 141 | LEU |
| 1 | A | 154 | LEU |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 175 | ARG |
| 1 | A | 180 | ILE |
| 1 | A | 194 | LEU |
| 1 | A | 204 | ARG |
| 1 | A | 211 | GLU |
| 1 | A | 226 | PHE |
| 1 | A | 227 | GLN |
| 1 | A | 264 | VAL |
| 1 | A | 275 | SER |
| 1 | A | 303 | ARG |
| 1 | A | 317 | LEU |
| 1 | A | 324 | ILE |
| 1 | A | 325 | THR |
| 1 | A | 327 | LEU |
| 1 | A | 342 | LEU |
| 1 | A | 346 | SER |
| 1 | A | 349 | VAL |
| 1 | A | 351 | ARG |
| 1 | A | 359 | LEU |
| 1 | A | 372 | PRO |
| 1 | A | 392 | VAL |
| 1 | A | 403 | LEU |
| 1 | A | 439 | LYS |
| 1 | A | 457 | SER |
| 1 | A | 460 | SER |
| 1 | A | 463 | ILE |
| 1 | A | 464 | THR |
| 1 | A | 465 | ILE |
| 1 | A | 491 | ASN |
| 1 | A | 495 | VAL |
| 1 | A | 501 | LEU |
| 1 | A | 506 | ASP |
| 1 | A | 509 | THR |
| 1 | A | 511 | VAL |
| 1 | A | 532 | ARG |
| 1 | A | 570 | LEU |
| 1 | A | 581 | ASP |
| 1 | A | 583 | LEU |
| 1 | A | 613 | LEU |
| 1 | A | 624 | ASP |
| 1 | A | 634 | MET |
| 1 | A | 635 | THR |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 643 | VAL |
| 1 | A | 654 | LEU |
| 1 | A | 656 | VAL |
| 1 | A | 687 | GLU |
| 1 | A | 698 | VAL |
| 1 | A | 710 | LYS |
| 1 | A | 712 | GLU |
| 1 | A | 714 | LEU |
| 1 | A | 720 | ASN |
| 1 | A | 741 | ASN |
| 1 | A | 754 | ILE |
| 1 | A | 771 | ARG |
| 1 | A | 789 | GLU |
| 1 | A | 790 | VAL |
| 1 | A | 796 | LEU |
| 1 | A | 805 | LEU |
| 1 | A | 840 | CYS |
| 1 | A | 841 | SER |
| 1 | A | 849 | PRO |
| 1 | A | 858 | LEU |
| 1 | A | 880 | ASN |
| 1 | A | 893 | LEU |
| 1 | A | 914 | LEU |
| 1 | A | 930 | LEU |
| 1 | A | 953 | THR |
| 1 | A | 986 | VAL |
| 1 | A | 989 | MET |
| 1 | A | 993 | VAL |
| 1 | A | 996 | ASN |
| 1 | A | 1000 | GLN |
| 1 | A | 1003 | LYS |
| 1 | A | 1027 | ARG |
| 1 | A | 1047 | GLN |
| 1 | A | 1048 | GLN |
| 1 | A | 1054 | LYS |
| 1 | A | 1064 | LEU |
| 1 | A | 1077 | ARG |
| 1 | A | 1088 | ASN |
| 1 | A | 1104 | ARG |
| 1 | A | 1111 | ASN |
| 1 | A | 1115 | LEU |
| 1 | A | 1124 | VAL |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 1136 | VAL |
| 1 | A | 1137 | LEU |
| 1 | A | 1170 | ASN |
| 1 | A | 1196 | THR |
| 1 | A | 1200 | THR |
| 1 | A | 1231 | LYS |
| 1 | B | 12 | THR |
| 1 | B | 14 | THR |
| 1 | B | 27 | ILE |
| 1 | B | 82 | THR |
| 1 | B | 134 | ARG |
| 1 | B | 141 | LEU |
| 1 | B | 143 | SER |
| 1 | B | 144 | SER |
| 1 | B | 154 | LEU |
| 1 | B | 175 | ARG |
| 1 | B | 180 | ILE |
| 1 | B | 181 | GLN |
| 1 | B | 194 | LEU |
| 1 | B | 204 | ARG |
| 1 | B | 211 | GLU |
| 1 | B | 215 | VAL |
| 1 | B | 226 | PHE |
| 1 | B | 227 | GLN |
| 1 | B | 234 | PRO |
| 1 | B | 264 | VAL |
| 1 | B | 303 | ARG |
| 1 | B | 317 | LEU |
| 1 | B | 324 | ILE |
| 1 | B | 325 | THR |
| 1 | B | 327 | LEU |
| 1 | B | 342 | LEU |
| 1 | B | 346 | SER |
| 1 | B | 349 | VAL |
| 1 | B | 351 | ARG |
| 1 | B | 359 | LEU |
| 1 | B | 372 | PRO |
| 1 | B | 392 | VAL |
| 1 | B | 398 | VAL |
| 1 | B | 403 | LEU |
| 1 | B | 439 | LYS |
| 1 | B | 446 | ASP |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 457 | SER |
| 1 | B | 460 | SER |
| 1 | B | 463 | ILE |
| 1 | B | 464 | THR |
| 1 | B | 465 | ILE |
| 1 | B | 491 | ASN |
| 1 | B | 495 | VAL |
| 1 | B | 501 | LEU |
| 1 | B | 506 | ASP |
| 1 | B | 509 | THR |
| 1 | B | 513 | ASN |
| 1 | B | 532 | ARG |
| 1 | B | 570 | LEU |
| 1 | B | 581 | ASP |
| 1 | B | 583 | LEU |
| 1 | B | 611 | THR |
| 1 | B | 614 | GLN |
| 1 | B | 624 | ASP |
| 1 | B | 634 | MET |
| 1 | B | 635 | THR |
| 1 | B | 643 | VAL |
| 1 | B | 645 | PRO |
| 1 | B | 654 | LEU |
| 1 | B | 656 | VAL |
| 1 | B | 687 | GLU |
| 1 | B | 710 | LYS |
| 1 | B | 714 | LEU |
| 1 | B | 720 | ASN |
| 1 | B | 729 | LYS |
| 1 | B | 741 | ASN |
| 1 | B | 754 | ILE |
| 1 | B | 771 | ARG |
| 1 | B | 778 | LEU |
| 1 | B | 783 | ARG |
| 1 | B | 789 | GLU |
| 1 | B | 790 | VAL |
| 1 | B | 796 | LEU |
| 1 | B | 805 | LEU |
| 1 | B | 808 | PHE |
| 1 | B | 821 | VAL |
| 1 | B | 841 | SER |
| 1 | B | 849 | PRO |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 858 | LEU |
| 1 | B | 880 | ASN |
| 1 | B | 893 | LEU |
| 1 | B | 914 | LEU |
| 1 | B | 930 | LEU |
| 1 | B | 953 | THR |
| 1 | B | 986 | VAL |
| 1 | B | 989 | MET |
| 1 | B | 996 | ASN |
| 1 | B | 1003 | LYS |
| 1 | B | 1027 | ARG |
| 1 | B | 1047 | GLN |
| 1 | B | 1048 | GLN |
| 1 | B | 1054 | LYS |
| 1 | B | 1064 | LEU |
| 1 | B | 1077 | ARG |
| 1 | B | 1088 | ASN |
| 1 | B | 1104 | ARG |
| 1 | B | 1111 | ASN |
| 1 | B | 1115 | LEU |
| 1 | B | 1124 | VAL |
| 1 | B | 1136 | VAL |
| 1 | B | 1137 | LEU |
| 1 | B | 1196 | THR |
| 1 | B | 1200 | THR |
| 1 | B | 1228 | LYS |
| 1 | B | 1231 | LYS |

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (89) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 11 | ASN |
| 1 | A | 16 | HIS |
| 1 | A | 96 | ASN |
| 1 | A | 110 | HIS |
| 1 | A | 128 | GLN |
| 1 | A | 147 | GLN |
| 1 | A | 164 | ASN |
| 1 | A | 169 | HIS |
| 1 | A | 212 | HIS |
| 1 | A | 220 | GLN |
| 1 | A | 227 | GLN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 233 | ASN |
| 1 | A | 288 | ASN |
| 1 | A | 389 | HIS |
| 1 | A | 421 | GLN |
| 1 | A | 434 | ASN |
| 1 | A | 467 | HIS |
| 1 | A | 491 | ASN |
| 1 | A | 513 | ASN |
| 1 | A | 536 | ASN |
| 1 | A | 588 | HIS |
| 1 | A | 602 | ASN |
| 1 | A | 650 | GLN |
| 1 | A | 691 | GLN |
| 1 | A | 693 | ASN |
| 1 | A | 720 | ASN |
| 1 | A | 739 | GLN |
| 1 | A | 741 | ASN |
| 1 | A | 750 | ASN |
| 1 | A | 765 | GLN |
| 1 | A | 774 | GLN |
| 1 | A | 777 | ASN |
| 1 | A | 860 | GLN |
| 1 | A | 866 | ASN |
| 1 | A | 880 | ASN |
| 1 | A | 918 | ASN |
| 1 | A | 976 | HIS |
| 1 | A | 1000 | GLN |
| 1 | A | 1047 | GLN |
| 1 | A | 1048 | GLN |
| 1 | A | 1084 | GLN |
| 1 | A | 1088 | ASN |
| 1 | A | 1108 | GLN |
| 1 | A | 1111 | ASN |
| 1 | A | 1132 | ASN |
| 1 | A | 1215 | ASN |
| 1 | B | 11 | ASN |
| 1 | B | 16 | HIS |
| 1 | B | 110 | HIS |
| 1 | B | 128 | GLN |
| 1 | B | 147 | GLN |
| 1 | B | 169 | HIS |
| 1 | B | 212 | HIS |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 220 | GLN |
| 1 | B | 221 | ASN |
| 1 | B | 227 | GLN |
| 1 | B | 233 | ASN |
| 1 | B | 288 | ASN |
| 1 | B | 389 | HIS |
| 1 | B | 421 | GLN |
| 1 | B | 434 | ASN |
| 1 | B | 467 | HIS |
| 1 | B | 491 | ASN |
| 1 | B | 513 | ASN |
| 1 | B | 536 | ASN |
| 1 | B | 588 | HIS |
| 1 | B | 602 | ASN |
| 1 | B | 691 | GLN |
| 1 | B | 693 | ASN |
| 1 | B | 720 | ASN |
| 1 | B | 739 | GLN |
| 1 | B | 741 | ASN |
| 1 | B | 750 | ASN |
| 1 | B | 774 | GLN |
| 1 | B | 777 | ASN |
| 1 | B | 860 | GLN |
| 1 | B | 866 | ASN |
| 1 | B | 880 | ASN |
| 1 | B | 918 | ASN |
| 1 | B | 976 | HIS |
| 1 | B | 1000 | GLN |
| 1 | B | 1047 | GLN |
| 1 | B | 1048 | GLN |
| 1 | B | 1073 | ASN |
| 1 | B | 1084 | GLN |
| 1 | B | 1088 | ASN |
| 1 | B | 1111 | ASN |
| 1 | B | 1132 | ASN |
| 1 | B | 1215 | ASN |

### 5.3.3 RNA

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 carbohydrates in this entry.

## 5.6 Ligand geometry (i)

Of 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 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 | TPP | A | 1236 | 2 | 22,27,27 | 2.31 | 4 (18%) | 29,40,40 | 1.79 | 7 (24%) |
| 5 | TPP | B | 1236 | 2 | 22,27,27 | 2.28 | 5 (22%) | 29,40,40 | 1.64 | 7 (24%) |
| 4 | SF4 | A | 1235 | 1 | 0,12,12 | 0.00 | - | - | | |
| 4 | SF4 | B | 1233 | 1 | 0,12,12 | 0.00 | - | - | | |
| 4 | SF4 | A | 1233 | 1 | 0,12,12 | 0.00 | - | - | | |
| 4 | SF4 | A | 1234 | 1 | 0,12,12 | 0.00 | - | - | | |
| 4 | SF4 | B | 1234 | 1 | 0,12,12 | 0.00 | - | - | | |
| 4 | SF4 | B | 1235 | 1 | 0,12,12 | 0.00 | - | - | | |

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 | TPP | A | 1236 | 2 | - | 5/16/17/17 | 0/2/2/2 |
| 5 | TPP | B | 1236 | 2 | - | 5/16/17/17 | 0/2/2/2 |
| 4 | SF4 | A | 1235 | 1 | - | - | 0/6/5/5 |
| 4 | SF4 | B | 1233 | 1 | - | - | 0/6/5/5 |
| 4 | SF4 | A | 1233 | 1 | - | - | 0/6/5/5 |
| 4 | SF4 | A | 1234 | 1 | - | - | 0/6/5/5 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 4 | SF4 | B | 1234 | 1 | - | - | 0/6/5/5 |
| 4 | SF4 | B | 1235 | 1 | - | - | 0/6/5/5 |

All (9) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 5 | A | 1236 | TPP | C6-C5 | -9.32 | 1.46 | 1.50 |
| 5 | B | 1236 | TPP | C6-C5 | -7.74 | 1.47 | 1.50 |
| 5 | B | 1236 | TPP | PB-O3B | -3.70 | 1.40 | 1.54 |
| 5 | B | 1236 | TPP | C4'-N3' | 3.37 | 1.39 | 1.35 |
| 5 | B | 1236 | TPP | C7'-N3 | 2.78 | 1.53 | 1.48 |
| 5 | A | 1236 | TPP | C7'-N3 | 2.41 | 1.53 | 1.48 |
| 5 | A | 1236 | TPP | PA-O2A | -2.39 | 1.44 | 1.55 |
| 5 | B | 1236 | TPP | C2'-N1' | 2.39 | 1.38 | 1.34 |
| 5 | A | 1236 | TPP | PB-O3B | -2.23 | 1.46 | 1.54 |

All (14) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 5 | B | 1236 | TPP | C7'-N3-C2 | -3.70 | 118.67 | 125.35 |
| 5 | A | 1236 | TPP | C7'-N3-C2 | -3.62 | 118.81 | 125.35 |
| 5 | A | 1236 | TPP | O3B-PB-O2B | 3.55 | 121.19 | 107.64 |
| 5 | A | 1236 | TPP | C5'-C7'-N3 | -3.53 | 107.40 | 113.28 |
| 5 | B | 1236 | TPP | O3B-PB-O2B | 3.49 | 120.96 | 107.64 |
| 5 | B | 1236 | TPP | C6-C5-C4 | 3.22 | 130.02 | 127.43 |
| 5 | B | 1236 | TPP | CM2-C2'-N1' | 2.91 | 120.34 | 117.14 |
| 5 | A | 1236 | TPP | CM2-C2'-N1' | 2.88 | 120.30 | 117.14 |
| 5 | A | 1236 | TPP | N1'-C2'-N3' | -2.65 | 120.98 | 125.54 |
| 5 | B | 1236 | TPP | PA-O7-C7 | 2.63 | 134.54 | 121.59 |
| 5 | A | 1236 | TPP | C6-C5-C4 | 2.50 | 129.44 | 127.43 |
| 5 | A | 1236 | TPP | PA-O7-C7 | 2.44 | 133.62 | 121.59 |
| 5 | B | 1236 | TPP | N1'-C2'-N3' | -2.33 | 121.54 | 125.54 |
| 5 | B | 1236 | TPP | O3A-PB-O1B | -2.12 | 99.43 | 111.19 |

There are no chirality outliers.

All (10) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 5 | A | 1236 | TPP | C5-C6-C7-O7 |
| 5 | B | 1236 | TPP | C5-C6-C7-O7 |
| 5 | B | 1236 | TPP | C7-O7-PA-O1A |

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| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 5 | A | 1236 | TPP | C7-O7-PA-O3A |
| 5 | B | 1236 | TPP | C7-O7-PA-O3A |
| 5 | A | 1236 | TPP | C4-C5-C6-C7 |
| 5 | B | 1236 | TPP | C4-C5-C6-C7 |
| 5 | A | 1236 | TPP | PA-O3A-PB-O2B |
| 5 | B | 1236 | TPP | PA-O3A-PB-O2B |
| 5 | A | 1236 | TPP | C7-O7-PA-O1A |

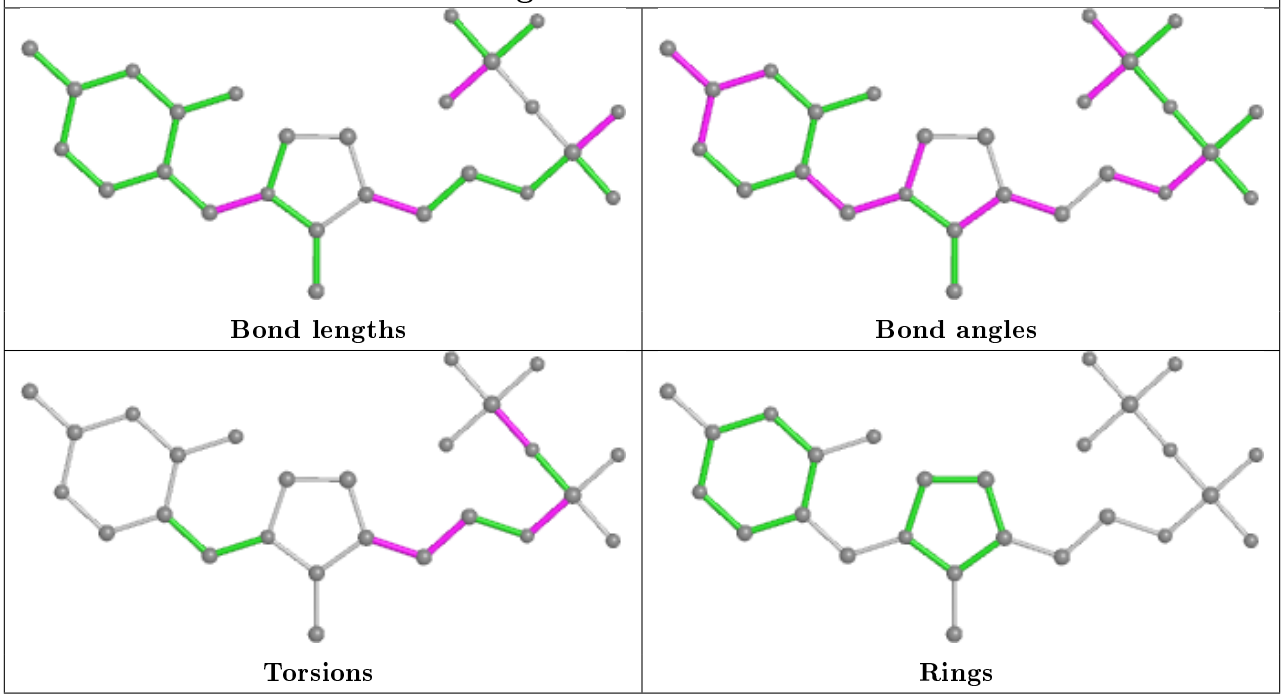
There are no ring outliers.

4 monomers are involved in 4 short contacts:

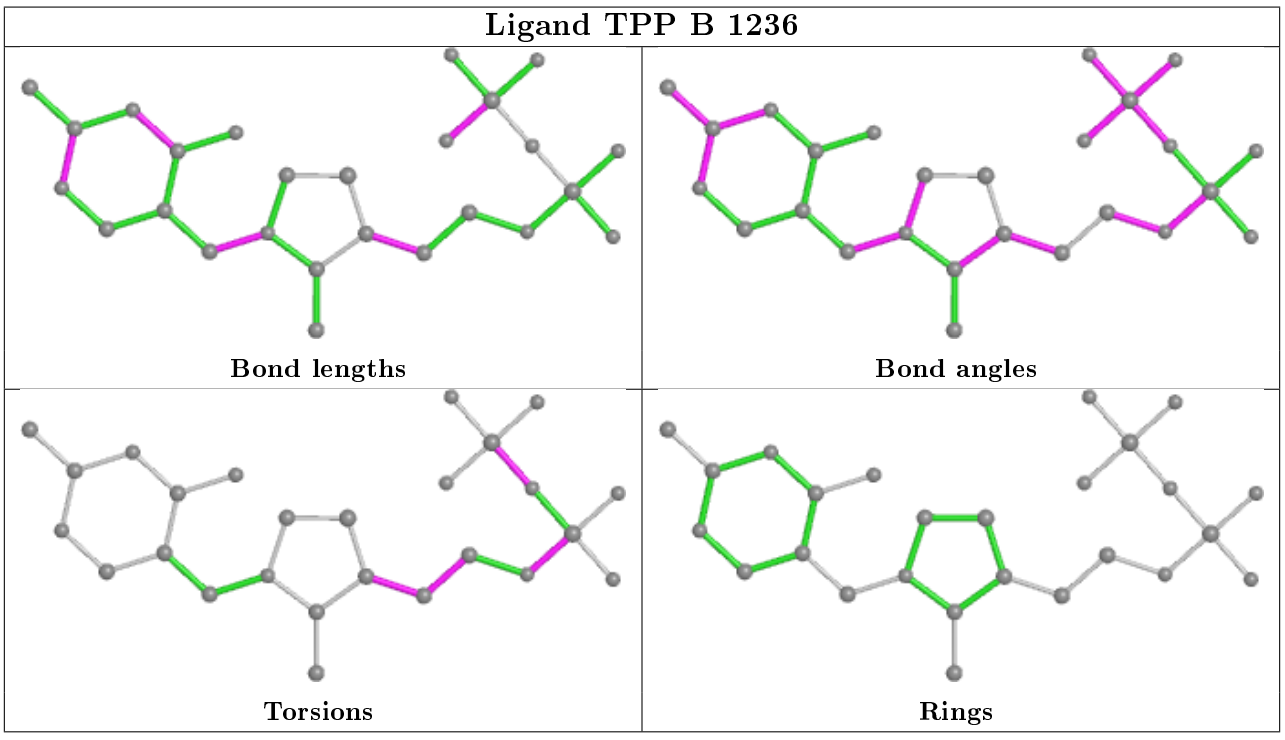
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 5 | A | 1236 | TPP | 1 | 0 |
| 5 | B | 1236 | TPP | 1 | 0 |
| 4 | B | 1233 | SF4 | 1 | 0 |
| 4 | A | 1233 | SF4 | 1 | 0 |

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

**Ligand TPP A 1236**




**Ligand TPP B 1236**




## 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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

## 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

## 6.4 Ligands

EDS was not executed - this section is therefore empty.

## 6.5 Other polymers

EDS was not executed - this section is therefore empty.