# WORLDWIDE wwPDB PROTEIN DATA BANK

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

Jun 25, 2024 – 11:59 AM EDT

|  |  |  |
|---|---|---|
| PDB ID | : | 5ZQ5 |
| Title | : | SidE-Ubi |
| Authors | : | Wang, Y.; Gao, A.; Gao, P. |
| Deposited on | : | 2018-04-17 |
| Resolution | : | 2.49 Å(reported) |

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

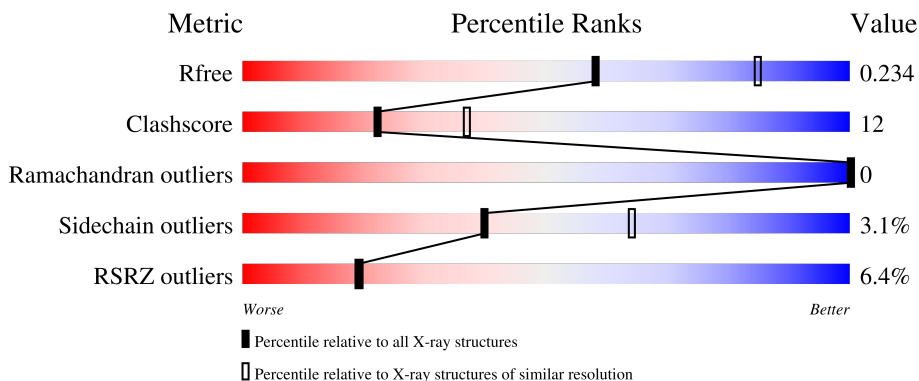|  |  |  |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.37.1 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac | : | 5.8.0158 |
| CCP4 | : | 7.0.044 (Gargrove) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.37.1 |

# 1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.49 Å.

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

| Metric | Percentile Ranks | Value |
|--------|------------------|-------|
| Rfree | | 0.234 |
| Clashscore | | 12 |
| Ramachandran outliers | | 0 |
| Sidechain outliers | | 3.1% |
| RSRZ outliers | | 6.4% |

*Worse*        *Better*

▌Percentile relative to all X-ray structures

▯Percentile relative to X-ray structures of similar resolution

| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|--------|--------------------------|----------------------------------------------------|
| R$_{free}$ | 130704 | 5857 (2.50-2.46) |
| Clashscore | 141614 | 6594 (2.50-2.46) |
| Ramachandran outliers | 138981 | 6469 (2.50-2.46) |
| Sidechain outliers | 138945 | 6471 (2.50-2.46) |
| RSRZ outliers | 127900 | 5738 (2.50-2.46) |

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 | 845 | % — 81% / 17% · |
| 1 | C | 845 | 5% — 74% / 22% ·· |
| 2 | B | 79 | 19% — 78% / 18% · |
| 2 | D | 79 | 57% — 44% / 47% / 5% · |

## 2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 14624 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 SidE.

| Mol | Chain | Residues | Atoms | | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|----|---------|---------|-------|
| 1 | A | 828 | Total | C | N | O | S | Se | 0 | 0 | 0 |
| | | | 6606 | 4164 | 1153 | 1267 | 6 | 16 | | | |
| 1 | C | 824 | Total | C | N | O | S | Se | 0 | 0 | 0 |
| | | | 6578 | 4149 | 1149 | 1258 | 6 | 16 | | | |

There are 18 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| A | 221 | MSE | - | initiating methionine | UNP Q6RCR1 |
| A | 1058 | LEU | - | expression tag | UNP Q6RCR1 |
| A | 1059 | GLU | - | expression tag | UNP Q6RCR1 |
| A | 1060 | HIS | - | expression tag | UNP Q6RCR1 |
| A | 1061 | HIS | - | expression tag | UNP Q6RCR1 |
| A | 1062 | HIS | - | expression tag | UNP Q6RCR1 |
| A | 1063 | HIS | - | expression tag | UNP Q6RCR1 |
| A | 1064 | HIS | - | expression tag | UNP Q6RCR1 |
| A | 1065 | HIS | - | expression tag | UNP Q6RCR1 |
| C | 221 | MSE | - | initiating methionine | UNP Q6RCR1 |
| C | 1058 | LEU | - | expression tag | UNP Q6RCR1 |
| C | 1059 | GLU | - | expression tag | UNP Q6RCR1 |
| C | 1060 | HIS | - | expression tag | UNP Q6RCR1 |
| C | 1061 | HIS | - | expression tag | UNP Q6RCR1 |
| C | 1062 | HIS | - | expression tag | UNP Q6RCR1 |
| C | 1063 | HIS | - | expression tag | UNP Q6RCR1 |
| C | 1064 | HIS | - | expression tag | UNP Q6RCR1 |
| C | 1065 | HIS | - | expression tag | UNP Q6RCR1 |

- Molecule 2 is a protein called Ubiquitin.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|---------|-------|
| 2 | B | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 595 | 375 | 102 | 117 | 1 | | | |

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| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 2 | D | 76 | 595 | 375 | 102 | 117 | 1 | 0 | 0 | 0 |

There are 8 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| B | -2 | GLY | - | expression tag | UNP P0CG48 |
| B | -1 | GLY | - | expression tag | UNP P0CG48 |
| B | 0 | SER | - | expression tag | UNP P0CG48 |
| B | 42 | ALA | ARG | engineered mutation | UNP P0CG48 |
| D | -2 | GLY | - | expression tag | UNP P0CG48 |
| D | -1 | GLY | - | expression tag | UNP P0CG48 |
| D | 0 | SER | - | expression tag | UNP P0CG48 |
| D | 42 | ALA | ARG | engineered mutation | UNP P0CG48 |

- Molecule 3 is water.

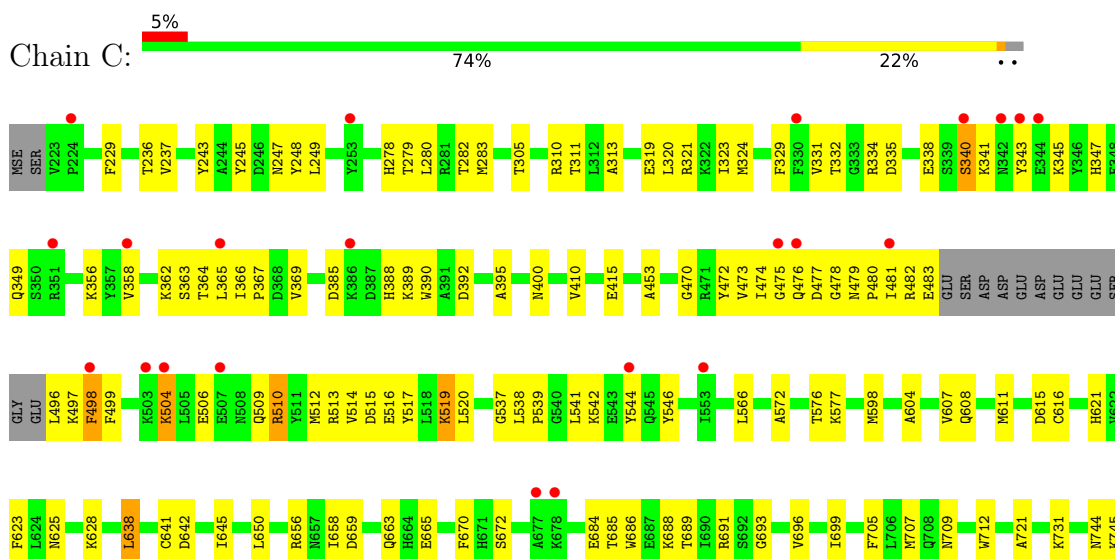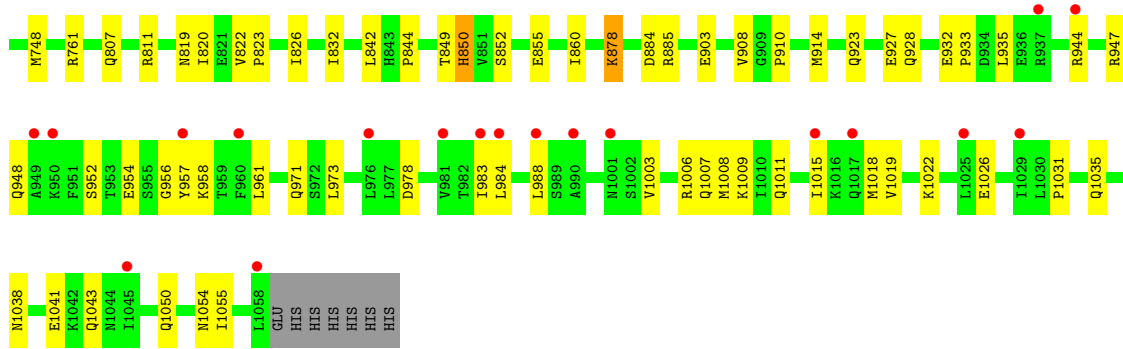| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---------|---------|
| 3 | A | 138 | Total 138 | O 138 | 0 | 0 |
| 3 | B | 3 | Total 3 | O 3 | 0 | 0 |
| 3 | D | 2 | Total 2 | O 2 | 0 | 0 |
| 3 | C | 107 | Total 107 | O 107 | 0 | 0 |

# 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 as grey.
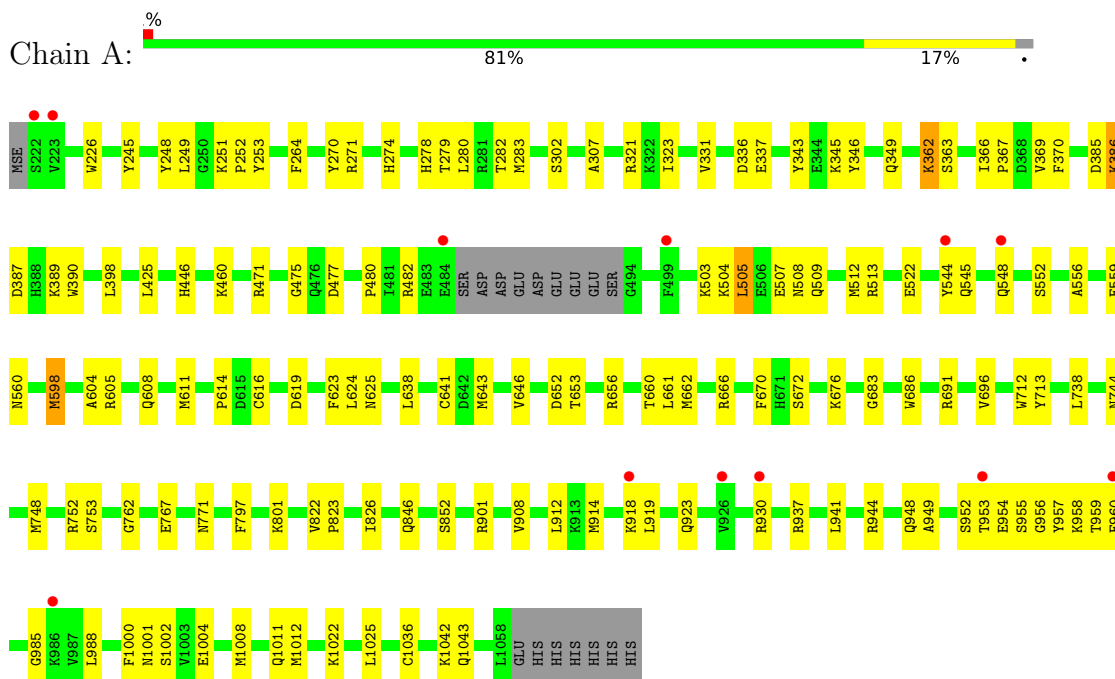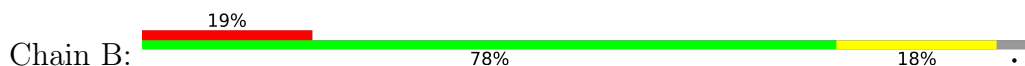
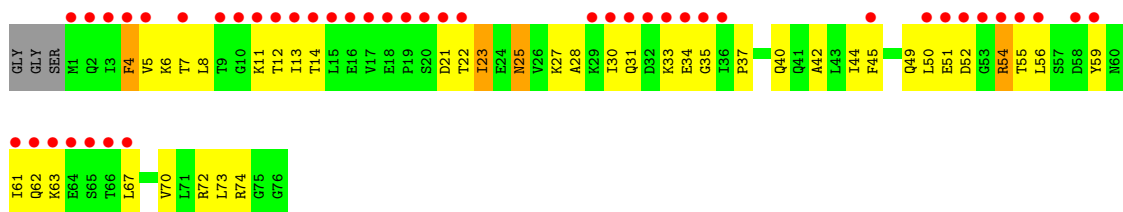- Molecule 1: SidE



- Molecule 1: SidE

M748 R761 Q807 R811 N819 I820 E821 V822 P823 I826 I832 L842 H843 P844 T849 H850 V851 S852 E855 I860 K878 D884 R885 E903 V908 G909 P910 M914 Q923 E927 Q928 E932 P933 D934 L935 E936 R937 R944 R947

Q948 A949 K950 F951 S952 T953 E954 S955 G956 Y957 K958 T959 F960 L961 Q971 S972 L973 L976 L977 D978 V981 T982 I983 L984 L988 S989 A990 N1001 S1002 V1003 R1006 Q1007 M1008 K1009 I1010 Q1011 I1015 K1016 Q1017 M1018 V1019 K1022 L1025 E1026 I1029 L1030 P1031 Q1035

N1038 E1041 K1042 Q1043 N1044 I1045 Q1050 N1054 I1055 L1058 GLU HIS HIS HIS HIS HIS HIS

• Molecule 2: Ubiquitin

Chain B:

19%

78%                                                        18%                 •

GLY GLY SER M1 Q2 I3 F4 V5 L8 T9 G10 K11 T12 I13 T14 L15 E16 V17 E18 T22 I23 E24 N25 I30 K33 P37 P38 D39 L43 D52 Y59 Q62 V70 G76

• Molecule 2: Ubiquitin

Chain D:

57%

44%                                          47%                                5%    •

GLY GLY SER M1 Q2 I3 F4 V5 K6 T7 L8 T9 G10 K11 T12 I13 T14 L15 E16 V17 E18 P19 S20 D21 T22 I23 E24 N25 V26 K27 A28 K29 I30 Q31 D32 K33 E34 G35 I36 P37 Q40 Q41 A42 L43 I44 F45 Q49 L50 E51 D52 G53 R54 T55 L56 S57 D58 Y59 N60

I61 Q62 K63 E64 S65 T66 L67 V70 L71 R72 L73 R74 G75 G76

# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | P 21 21 21 | Depositor |
| Cell constants | 92.67Å   129.08Å   191.51Å | Depositor |
| a, b, c, $\alpha$, $\beta$, $\gamma$ | 90.00°   90.00°   90.00° | |
| Resolution (Å) | 48.69   –   2.49 | Depositor |
| | 48.69   –   2.49 | EDS |
| % Data completeness | 99.5 (48.69-2.49) | Depositor |
| (in resolution range) | 99.5 (48.69-2.49) | EDS |
| $R_{merge}$ | 0.13 | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 2.28 (at 2.48Å) | Xtriage |
| Refinement program | PHENIX 1.11.1_2575 | Depositor |
| R, $R_{free}$ | 0.190   ,   0.233 | Depositor |
| | 0.194   ,   0.234 | DCC |
| $R_{free}$ test set | 4061 reflections (5.02%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 46.1 | Xtriage |
| Anisotropy | 0.334 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.34 , 49.4 | 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 | 14624 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 62.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.48% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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 ⓘ

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

| Mol | Chain | Bond lengths | | Bond angles | |
|-----|-------|------|------------|------|-------------|
| | | RMSZ | #$|Z|$ >5 | RMSZ | #$|Z|$ >5 |
| 1 | A | 0.41 | 0/6720 | 0.50 | 1/9053 (0.0%) |
| 1 | C | 0.46 | 0/6692 | 0.52 | 0/9016 |
| 2 | B | 0.38 | 0/601 | 0.52 | 0/809 |
| 2 | D | 0.53 | 0/601 | 0.70 | 0/809 |
| All | All | 0.44 | 0/14614 | 0.52 | 1/19687 (0.0%) |

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 | 598 | MSE | N-CA-CB | -6.05 | 99.70 | 110.60 |

There are no chirality outliers.

There are no planarity outliers.

### 5.2   Too-close contacts ⓘ

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | A | 6606 | 0 | 6542 | 106 | 0 |
| 1 | C | 6578 | 0 | 6522 | 181 | 0 |
| 2 | B | 595 | 0 | 621 | 9 | 0 |
| 2 | D | 595 | 0 | 621 | 47 | 0 |
| 3 | A | 138 | 0 | 0 | 6 | 0 |
| 3 | B | 3 | 0 | 0 | 0 | 0 |
| 3 | C | 107 | 0 | 0 | 4 | 0 |
| 3 | D | 2 | 0 | 0 | 1 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| All | All | 14624 | 0 | 14306 | 334 | 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 (334) 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:C:474:ILE:HG21 | 1:C:510:ARG:NH2 | 1.35 | 1.39 |
| 1:C:474:ILE:CG2 | 1:C:510:ARG:HG3 | 1.66 | 1.25 |
| 1:C:482:ARG:HB2 | 1:C:496:LEU:HA | 1.18 | 1.18 |
| 2:D:5:VAL:HG12 | 2:D:67:LEU:HB2 | 1.24 | 1.17 |
| 1:C:482:ARG:CB | 1:C:496:LEU:HA | 1.81 | 1.09 |
| 1:C:343:TYR:CE2 | 1:C:347:HIS:CD2 | 2.49 | 1.01 |
| 1:C:474:ILE:HG23 | 1:C:510:ARG:HG3 | 1.41 | 1.01 |
| 1:C:474:ILE:CG2 | 1:C:510:ARG:NH2 | 2.27 | 0.97 |
| 1:C:685:THR:O | 1:C:689:THR:HG22 | 1.68 | 0.93 |
| 2:D:31:GLN:O | 2:D:35:GLY:HA2 | 1.72 | 0.89 |
| 2:D:22:THR:H | 2:D:25:ASN:ND2 | 1.70 | 0.89 |
| 1:C:474:ILE:HG21 | 1:C:510:ARG:HH21 | 1.25 | 0.89 |
| 1:C:343:TYR:CZ | 1:C:347:HIS:NE2 | 2.40 | 0.89 |
| 1:C:474:ILE:HG21 | 1:C:510:ARG:HG3 | 1.54 | 0.89 |
| 1:C:477:ASP:OD1 | 1:C:478:GLY:N | 2.06 | 0.88 |
| 1:A:279:THR:HG22 | 1:A:283:MSE:HE2 | 1.56 | 0.87 |
| 1:A:653:THR:HG22 | 1:A:656:ARG:HH21 | 1.38 | 0.86 |
| 2:D:22:THR:O | 2:D:25:ASN:HB2 | 1.74 | 0.85 |
| 1:A:956:GLY:O | 1:A:959:THR:HG22 | 1.79 | 0.82 |
| 1:C:311:THR:HG22 | 1:C:313:ALA:H | 1.43 | 0.81 |
| 2:D:22:THR:HA | 2:D:55:THR:HA | 1.62 | 0.81 |
| 2:D:22:THR:C | 2:D:25:ASN:HB2 | 2.02 | 0.80 |
| 1:C:476:GLN:HG3 | 1:C:477:ASP:N | 1.95 | 0.80 |
| 2:D:23:ILE:CG2 | 2:D:52:ASP:HA | 2.13 | 0.79 |
| 1:C:475:GLY:HA2 | 1:C:509:GLN:HG2 | 1.65 | 0.79 |
| 1:A:641:CYS:HB2 | 1:A:643:MSE:HE3 | 1.67 | 0.77 |
| 1:C:474:ILE:HG22 | 1:C:510:ARG:O | 1.84 | 0.77 |
| 2:D:31:GLN:O | 2:D:35:GLY:CA | 2.32 | 0.77 |
| 1:C:473:VAL:HG22 | 1:C:499:PHE:CE1 | 2.20 | 0.76 |
| 1:C:279:THR:HG22 | 1:C:283:MSE:HE2 | 1.66 | 0.76 |
| 1:C:343:TYR:CD2 | 1:C:347:HIS:CD2 | 2.73 | 0.76 |
| 1:C:474:ILE:HG23 | 1:C:510:ARG:CG | 2.13 | 0.76 |
| 1:C:820:ILE:O | 1:C:823:PRO:HD2 | 1.86 | 0.75 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:475:GLY:N | 1:C:481:ILE:HD11 | 2.01 | 0.75 |
| 1:C:474:ILE:HD11 | 1:C:478:GLY:O | 1.87 | 0.75 |
| 1:C:482:ARG:HB2 | 1:C:496:LEU:CA | 2.10 | 0.75 |
| 1:A:949:ALA:O | 1:A:958:LYS:HD2 | 1.88 | 0.73 |
| 1:C:984:LEU:HD22 | 1:C:1019:VAL:HG23 | 1.70 | 0.73 |
| 1:A:248:TYR:O | 1:A:271:ARG:NH1 | 2.21 | 0.73 |
| 1:A:611:MSE:HE3 | 1:A:738:LEU:HD22 | 1.68 | 0.73 |
| 1:A:1008:MSE:HE2 | 1:A:1012:MSE:HE2 | 1.70 | 0.73 |
| 2:B:5:VAL:HG22 | 2:B:13:ILE:HB | 1.70 | 0.73 |
| 1:C:343:TYR:CZ | 1:C:347:HIS:CD2 | 2.76 | 0.73 |
| 1:C:498:PHE:HD1 | 1:C:499:PHE:N | 1.89 | 0.71 |
| 1:C:515:ASP:O | 1:C:519:LYS:CG | 2.39 | 0.71 |
| 2:D:22:THR:N | 2:D:25:ASN:ND2 | 2.38 | 0.70 |
| 2:D:6:LYS:HG3 | 2:D:12:THR:HG22 | 1.73 | 0.70 |
| 1:C:474:ILE:CG2 | 1:C:510:ARG:HH21 | 1.93 | 0.70 |
| 2:D:56:LEU:HD12 | 2:D:61:ILE:HD13 | 1.73 | 0.70 |
| 2:D:37:PRO:HG2 | 2:D:40:GLN:HG3 | 1.73 | 0.70 |
| 1:A:643:MSE:HE2 | 1:A:646:VAL:HG21 | 1.74 | 0.69 |
| 2:D:22:THR:O | 2:D:25:ASN:CB | 2.40 | 0.69 |
| 1:A:362:LYS:HG2 | 1:A:366:ILE:HD12 | 1.73 | 0.69 |
| 1:C:482:ARG:HB3 | 1:C:496:LEU:HA | 1.75 | 0.69 |
| 1:C:343:TYR:CD2 | 1:C:347:HIS:HD2 | 2.10 | 0.68 |
| 1:A:672:SER:HB2 | 1:A:712:TRP:HA | 1.76 | 0.68 |
| 1:C:665:GLU:OE1 | 1:C:731:LYS:NZ | 2.26 | 0.68 |
| 1:A:941:LEU:HD11 | 1:A:1008:MSE:HE1 | 1.74 | 0.67 |
| 1:A:949:ALA:O | 1:A:958:LYS:CD | 2.41 | 0.67 |
| 1:C:944:ARG:HG3 | 1:C:1008:MSE:HE3 | 1.75 | 0.67 |
| 1:A:941:LEU:HD21 | 1:A:1008:MSE:HE1 | 1.76 | 0.67 |
| 1:C:672:SER:HB2 | 1:C:712:TRP:HA | 1.77 | 0.67 |
| 2:D:23:ILE:HG22 | 2:D:52:ASP:HA | 1.76 | 0.67 |
| 1:C:362:LYS:O | 1:C:366:ILE:HG22 | 1.95 | 0.66 |
| 1:A:545:GLN:HA | 1:A:548:GLN:HE21 | 1.59 | 0.66 |
| 1:C:472:TYR:CE1 | 1:C:496:LEU:HD11 | 2.31 | 0.65 |
| 1:C:515:ASP:O | 1:C:519:LYS:HG2 | 1.96 | 0.65 |
| 1:C:245:TYR:HA | 1:C:249:LEU:HB2 | 1.79 | 0.64 |
| 1:C:577:LYS:NZ | 3:C:1107:HOH:O | 2.29 | 0.64 |
| 1:C:343:TYR:CE1 | 1:C:347:HIS:NE2 | 2.63 | 0.64 |
| 1:C:473:VAL:HG23 | 1:C:481:ILE:HB | 1.79 | 0.64 |
| 1:C:473:VAL:O | 1:C:481:ILE:HD13 | 1.97 | 0.64 |
| 2:D:5:VAL:HG12 | 2:D:67:LEU:CB | 2.16 | 0.64 |
| 2:D:31:GLN:O | 2:D:35:GLY:N | 2.30 | 0.63 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:957:TYR:HB2 | 1:A:1000:PHE:CD1 | 2.34 | 0.63 |
| 1:C:971:GLN:HG3 | 1:C:983:ILE:HD11 | 1.81 | 0.63 |
| 1:C:479:ASN:HB3 | 1:C:480:PRO:HD2 | 1.81 | 0.62 |
| 1:A:505:LEU:HD23 | 1:A:509:GLN:OE1 | 2.00 | 0.62 |
| 1:C:474:ILE:HD12 | 1:C:479:ASN:O | 1.99 | 0.62 |
| 2:D:13:ILE:HG23 | 2:D:33:LYS:HD3 | 1.81 | 0.61 |
| 1:C:659:ASP:OD1 | 1:C:686:TRP:NE1 | 2.28 | 0.61 |
| 1:C:481:ILE:HD12 | 1:C:481:ILE:N | 2.16 | 0.61 |
| 1:A:280:LEU:HD23 | 1:A:283:MSE:HE3 | 1.82 | 0.61 |
| 1:C:935:LEU:HD23 | 1:C:973:LEU:HD12 | 1.83 | 0.60 |
| 2:D:59:TYR:HB2 | 2:D:61:ILE:CD1 | 2.31 | 0.60 |
| 1:C:319:GLU:O | 1:C:323:ILE:HG12 | 2.01 | 0.60 |
| 1:A:956:GLY:O | 1:A:959:THR:N | 2.34 | 0.60 |
| 1:C:474:ILE:CG2 | 1:C:510:ARG:CG | 2.59 | 0.60 |
| 1:C:472:TYR:CD1 | 1:C:496:LEU:HD11 | 2.37 | 0.60 |
| 1:C:475:GLY:CA | 1:C:481:ILE:HD11 | 2.33 | 0.59 |
| 1:A:251:LYS:O | 1:A:271:ARG:NH1 | 2.36 | 0.59 |
| 1:A:605:ARG:NH1 | 1:C:978:ASP:OD2 | 2.35 | 0.59 |
| 1:A:343:TYR:OH | 1:A:385:ASP:OD2 | 2.20 | 0.59 |
| 1:A:389:LYS:NZ | 3:A:1110:HOH:O | 2.35 | 0.59 |
| 1:C:598:MSE:HG3 | 1:C:908:VAL:HG21 | 1.83 | 0.59 |
| 1:A:762:GLY:HA3 | 1:A:823:PRO:HB3 | 1.85 | 0.58 |
| 1:C:515:ASP:O | 1:C:519:LYS:HG3 | 2.03 | 0.58 |
| 2:B:22:THR:HG23 | 2:B:25:ASN:H | 1.68 | 0.58 |
| 1:A:953:THR:OG1 | 1:A:954:GLU:N | 2.34 | 0.58 |
| 1:C:476:GLN:HG3 | 1:C:477:ASP:H | 1.67 | 0.58 |
| 1:A:767:GLU:O | 1:A:771:ASN:ND2 | 2.36 | 0.57 |
| 2:D:59:TYR:HB2 | 2:D:61:ILE:HD12 | 1.85 | 0.57 |
| 1:A:1008:MSE:HE3 | 1:A:1011:GLN:HB2 | 1.86 | 0.57 |
| 1:C:656:ARG:HG3 | 1:C:696:VAL:HG12 | 1.85 | 0.57 |
| 2:D:49:GLN:NE2 | 1:C:709:ASN:O | 2.35 | 0.57 |
| 1:A:653:THR:HG22 | 1:A:656:ARG:NH2 | 2.16 | 0.57 |
| 1:A:274:HIS:HB3 | 1:A:331:VAL:HG11 | 1.85 | 0.56 |
| 1:A:302:SER:HA | 3:A:1107:HOH:O | 2.04 | 0.56 |
| 1:C:390:TRP:CE3 | 1:C:390:TRP:HA | 2.40 | 0.56 |
| 1:C:1009:LYS:HB3 | 1:C:1009:LYS:HZ2 | 1.70 | 0.56 |
| 1:C:538:LEU:HD23 | 1:C:539:PRO:HD2 | 1.88 | 0.56 |
| 2:D:23:ILE:HG21 | 2:D:51:GLU:C | 2.26 | 0.56 |
| 1:A:948:GLN:NE2 | 1:A:1004:GLU:HB2 | 2.20 | 0.56 |
| 1:C:944:ARG:HD3 | 1:C:947:ARG:NH1 | 2.20 | 0.56 |
| 2:D:73:LEU:HB2 | 1:C:849:THR:CG2 | 2.36 | 0.56 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:472:TYR:CZ | 1:C:496:LEU:HD11 | 2.41 | 0.56 |
| 1:C:237:VAL:HG23 | 1:C:321:ARG:HG3 | 1.88 | 0.56 |
| 1:C:744:ASN:HB3 | 1:C:748:MSE:HE2 | 1.89 | 0.56 |
| 1:C:474:ILE:HG21 | 1:C:510:ARG:HH22 | 1.60 | 0.55 |
| 1:A:1008:MSE:HE3 | 1:A:1008:MSE:HA | 1.88 | 0.55 |
| 1:C:323:ILE:HD12 | 1:C:395:ALA:HA | 1.87 | 0.55 |
| 1:C:510:ARG:NH2 | 1:C:510:ARG:HG3 | 2.22 | 0.55 |
| 1:C:510:ARG:HG3 | 1:C:510:ARG:HH21 | 1.71 | 0.55 |
| 1:C:807:GLN:HB2 | 3:C:1194:HOH:O | 2.07 | 0.55 |
| 2:D:22:THR:HG23 | 2:D:25:ASN:ND2 | 2.22 | 0.55 |
| 1:C:517:TYR:O | 1:C:520:LEU:HG | 2.07 | 0.55 |
| 2:D:23:ILE:HG21 | 2:D:51:GLU:O | 2.06 | 0.55 |
| 1:C:842:LEU:HB3 | 1:C:860:ILE:HD12 | 1.89 | 0.54 |
| 1:A:598:MSE:HG2 | 1:A:908:VAL:HG21 | 1.90 | 0.54 |
| 1:C:470:GLY:HA3 | 1:C:498:PHE:CE1 | 2.42 | 0.54 |
| 1:A:941:LEU:HD21 | 1:A:1008:MSE:CE | 2.37 | 0.54 |
| 1:C:474:ILE:HG21 | 1:C:510:ARG:CZ | 2.26 | 0.53 |
| 1:C:971:GLN:CG | 1:C:983:ILE:HD11 | 2.37 | 0.53 |
| 1:C:338:GLU:OE2 | 1:C:340:SER:OG | 2.26 | 0.53 |
| 1:A:245:TYR:HA | 1:A:249:LEU:HB2 | 1.89 | 0.53 |
| 1:A:323:ILE:HD13 | 1:A:398:LEU:HD12 | 1.89 | 0.53 |
| 1:A:477:ASP:OD1 | 1:A:477:ASP:N | 2.42 | 0.53 |
| 1:A:386:LYS:HE2 | 1:A:387:ASP:OD2 | 2.08 | 0.52 |
| 1:A:826:ILE:HD11 | 2:B:8:LEU:HG | 1.91 | 0.52 |
| 1:C:481:ILE:N | 1:C:481:ILE:CD1 | 2.72 | 0.52 |
| 1:C:954:GLU:OE2 | 1:C:956:GLY:N | 2.43 | 0.52 |
| 1:A:345:LYS:O | 1:A:349:GLN:HG3 | 2.10 | 0.52 |
| 1:C:822:VAL:HB | 1:C:823:PRO:HD3 | 1.91 | 0.52 |
| 1:A:480:PRO:HB3 | 1:A:512:MSE:HE3 | 1.92 | 0.52 |
| 2:D:8:LEU:HG | 1:C:826:ILE:HD11 | 1.91 | 0.52 |
| 1:A:475:GLY:HA2 | 1:A:509:GLN:HG2 | 1.92 | 0.52 |
| 2:D:23:ILE:HG21 | 2:D:52:ASP:HA | 1.90 | 0.51 |
| 1:C:470:GLY:HA3 | 1:C:498:PHE:HE1 | 1.75 | 0.51 |
| 1:C:1006:ARG:HA | 1:C:1009:LYS:NZ | 2.25 | 0.51 |
| 1:C:513:ARG:NE | 1:C:516:GLU:OE2 | 2.44 | 0.51 |
| 1:C:390:TRP:CE3 | 1:C:400:ASN:HB2 | 2.45 | 0.51 |
| 1:A:279:THR:O | 1:A:283:MSE:HG3 | 2.10 | 0.51 |
| 1:A:948:GLN:HE21 | 1:A:1004:GLU:HB2 | 1.76 | 0.51 |
| 1:A:949:ALA:O | 1:A:958:LYS:HD3 | 2.10 | 0.51 |
| 2:D:21:ASP:HB3 | 2:D:25:ASN:OD1 | 2.10 | 0.51 |
| 1:C:237:VAL:HG11 | 1:C:324:MSE:HE3 | 1.91 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:984:LEU:O | 1:C:988:LEU:HD23 | 2.10 | 0.51 |
| 1:C:745:LYS:HA | 1:C:748:MSE:HE3 | 1.93 | 0.51 |
| 1:C:638:LEU:HG | 1:C:721:ALA:HA | 1.94 | 0.50 |
| 1:C:691:ARG:NH1 | 1:C:693:GLY:O | 2.32 | 0.50 |
| 1:C:685:THR:HG22 | 1:C:689:THR:HG21 | 1.93 | 0.50 |
| 1:A:504:LYS:O | 1:A:505:LEU:HD12 | 2.11 | 0.50 |
| 2:D:56:LEU:HD11 | 2:D:61:ILE:HG21 | 1.93 | 0.50 |
| 1:C:475:GLY:N | 1:C:481:ILE:CD1 | 2.73 | 0.50 |
| 1:C:684:GLU:O | 1:C:688:LYS:HG2 | 2.11 | 0.50 |
| 1:C:329:PHE:HA | 1:C:332:THR:HG23 | 1.94 | 0.50 |
| 1:C:1015:ILE:HA | 1:C:1018:MSE:HE2 | 1.94 | 0.49 |
| 1:C:410:VAL:HG12 | 1:C:453:ALA:HB2 | 1.93 | 0.49 |
| 1:C:878:LYS:NZ | 1:C:884:ASP:OD1 | 2.45 | 0.49 |
| 1:C:952:SER:HB3 | 1:C:958:LYS:HG3 | 1.95 | 0.49 |
| 1:A:919:LEU:O | 1:A:923:GLN:HG3 | 2.12 | 0.49 |
| 1:A:446:HIS:HE1 | 3:A:1234:HOH:O | 1.96 | 0.49 |
| 1:C:345:LYS:O | 1:C:349:GLN:HG3 | 2.13 | 0.49 |
| 1:A:937:ARG:HH21 | 1:A:1011:GLN:HE22 | 1.61 | 0.48 |
| 1:C:685:THR:CG2 | 1:C:689:THR:HG21 | 2.43 | 0.48 |
| 1:C:844:PRO:HB3 | 1:C:860:ILE:HD11 | 1.95 | 0.48 |
| 2:D:45:PHE:HB2 | 2:D:67:LEU:HD22 | 1.94 | 0.48 |
| 1:C:933:PRO:HG2 | 1:C:935:LEU:HD11 | 1.93 | 0.48 |
| 1:A:559:GLU:HB3 | 3:A:1112:HOH:O | 2.12 | 0.48 |
| 1:C:358:VAL:HA | 1:C:365:LEU:CD2 | 2.43 | 0.48 |
| 1:C:685:THR:HG22 | 1:C:689:THR:CG2 | 2.43 | 0.48 |
| 1:C:1038:ASN:HA | 1:C:1041:GLU:HG2 | 1.95 | 0.48 |
| 2:D:72:ARG:NH2 | 1:C:855:GLU:OE1 | 2.47 | 0.48 |
| 2:D:42:ALA:HB3 | 2:D:70:VAL:HG23 | 1.96 | 0.48 |
| 1:C:625:ASN:HB2 | 1:C:914:MSE:HB3 | 1.96 | 0.48 |
| 1:A:611:MSE:HE1 | 1:A:738:LEU:HD13 | 1.95 | 0.48 |
| 1:A:937:ARG:HH21 | 1:A:1011:GLN:NE2 | 2.12 | 0.48 |
| 1:A:954:GLU:HG3 | 1:A:1002:SER:HB3 | 1.96 | 0.48 |
| 2:B:24:GLU:HG3 | 2:B:52:ASP:HB3 | 1.95 | 0.48 |
| 2:D:49:GLN:OE1 | 2:D:72:ARG:NH1 | 2.47 | 0.48 |
| 1:C:474:ILE:HD11 | 1:C:478:GLY:C | 2.34 | 0.48 |
| 1:A:643:MSE:CE | 1:A:646:VAL:HG21 | 2.43 | 0.47 |
| 2:D:5:VAL:HA | 2:D:67:LEU:O | 2.14 | 0.47 |
| 1:C:278:HIS:O | 1:C:282:THR:HG23 | 2.15 | 0.47 |
| 1:A:822:VAL:HB | 1:A:823:PRO:HD3 | 1.96 | 0.47 |
| 1:A:611:MSE:CE | 1:A:738:LEU:HD13 | 2.44 | 0.47 |
| 1:A:954:GLU:OE2 | 1:A:1002:SER:N | 2.39 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:279:THR:O | 1:C:283:MSE:HG3 | 2.14 | 0.47 |
| 1:A:652:ASP:HB3 | 1:A:696:VAL:HG11 | 1.96 | 0.47 |
| 1:A:955:SER:HA | 1:A:956:GLY:HA2 | 1.66 | 0.47 |
| 1:A:1042:LYS:HE3 | 1:A:1042:LYS:HB3 | 1.65 | 0.47 |
| 1:A:1043:GLN:OE1 | 1:A:1043:GLN:N | 2.47 | 0.47 |
| 2:D:22:THR:HG23 | 2:D:25:ASN:HD22 | 1.78 | 0.47 |
| 1:A:226:TRP:HB3 | 3:A:1167:HOH:O | 2.14 | 0.47 |
| 1:C:621:HIS:CG | 1:C:628:LYS:HD2 | 2.49 | 0.47 |
| 1:A:604:ALA:O | 1:A:608:GLN:HG3 | 2.14 | 0.47 |
| 1:C:516:GLU:O | 1:C:520:LEU:CD2 | 2.62 | 0.47 |
| 1:C:923:GLN:O | 1:C:927:GLU:HG3 | 2.15 | 0.47 |
| 1:C:1043:GLN:OE1 | 1:C:1043:GLN:N | 2.48 | 0.47 |
| 1:C:482:ARG:HA | 1:C:497:LYS:H | 1.79 | 0.47 |
| 1:C:572:ALA:O | 1:C:576:THR:HG23 | 2.14 | 0.46 |
| 1:A:307:ALA:O | 3:A:1101:HOH:O | 2.20 | 0.46 |
| 1:C:761:ARG:HD2 | 3:C:1118:HOH:O | 2.15 | 0.46 |
| 1:A:274:HIS:ND1 | 1:A:337:GLU:OE2 | 2.32 | 0.46 |
| 1:A:280:LEU:HD23 | 1:A:283:MSE:CE | 2.46 | 0.46 |
| 1:C:243:TYR:OH | 1:C:356:LYS:HG2 | 2.15 | 0.46 |
| 1:C:616:CYS:HB2 | 1:C:623:PHE:O | 2.16 | 0.46 |
| 1:C:305:THR:O | 3:C:1101:HOH:O | 2.21 | 0.46 |
| 1:C:691:ARG:CZ | 1:C:699:ILE:HG12 | 2.46 | 0.46 |
| 1:C:1031:PRO:O | 1:C:1035:GLN:HG3 | 2.16 | 0.46 |
| 1:A:245:TYR:CE1 | 1:A:560:ASN:HA | 2.51 | 0.46 |
| 1:C:537:GLY:HA2 | 1:C:546:TYR:CZ | 2.51 | 0.46 |
| 1:A:662:MSE:HG3 | 1:A:686:TRP:CD1 | 2.51 | 0.46 |
| 1:A:954:GLU:OE2 | 1:A:1001:ASN:N | 2.49 | 0.46 |
| 1:A:624:LEU:HD23 | 1:A:624:LEU:HA | 1.72 | 0.45 |
| 1:A:507:GLU:O | 1:A:508:ASN:HB2 | 2.17 | 0.45 |
| 2:D:34:GLU:OE2 | 2:D:34:GLU:HA | 2.16 | 0.45 |
| 1:C:910:PRO:O | 1:C:914:MSE:HG3 | 2.16 | 0.45 |
| 1:A:545:GLN:HA | 1:A:548:GLN:NE2 | 2.27 | 0.45 |
| 1:C:335:ASP:OD2 | 1:C:349:GLN:NE2 | 2.49 | 0.45 |
| 1:C:607:VAL:O | 1:C:611:MSE:HG2 | 2.17 | 0.45 |
| 1:C:984:LEU:HD13 | 1:C:1022:LYS:HG2 | 1.98 | 0.45 |
| 1:A:1025:LEU:HD23 | 1:A:1025:LEU:HA | 1.75 | 0.45 |
| 2:D:4:PHE:HD1 | 2:D:14:THR:HG1 | 1.60 | 0.45 |
| 2:D:45:PHE:HB3 | 2:D:50:LEU:HD21 | 1.98 | 0.45 |
| 1:A:822:VAL:HA | 1:A:826:ILE:HD13 | 1.99 | 0.45 |
| 1:C:1050:GLN:HG2 | 1:C:1054:ASN:ND2 | 2.32 | 0.45 |
| 1:A:503:LYS:O | 1:A:503:LYS:HG2 | 2.16 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:473:VAL:CG2 | 1:C:481:ILE:HB | 2.46 | 0.45 |
| 2:D:61:ILE:O | 2:D:62:GLN:HG3 | 2.17 | 0.44 |
| 1:C:320:LEU:O | 1:C:324:MSE:HG3 | 2.16 | 0.44 |
| 1:C:1003:VAL:O | 1:C:1007:GLN:HG3 | 2.18 | 0.44 |
| 1:A:280:LEU:HA | 1:A:283:MSE:HE3 | 2.00 | 0.44 |
| 1:C:247:ASN:C | 1:C:248:TYR:CD1 | 2.90 | 0.44 |
| 1:A:366:ILE:CG2 | 1:A:367:PRO:HA | 2.47 | 0.44 |
| 2:D:59:TYR:HB2 | 2:D:61:ILE:HD11 | 2.00 | 0.44 |
| 1:C:480:PRO:HB3 | 1:C:512:MSE:CE | 2.48 | 0.44 |
| 1:A:611:MSE:HE1 | 1:A:661:LEU:HD22 | 2.00 | 0.44 |
| 1:C:516:GLU:O | 1:C:520:LEU:HD23 | 2.18 | 0.43 |
| 1:C:642:ASP:HB3 | 1:C:645:ILE:HD12 | 2.00 | 0.43 |
| 1:A:252:PRO:HG3 | 1:A:270:TYR:CE1 | 2.54 | 0.43 |
| 1:C:472:TYR:CD1 | 1:C:496:LEU:CD1 | 3.01 | 0.43 |
| 1:C:820:ILE:C | 1:C:823:PRO:HD2 | 2.38 | 0.43 |
| 1:C:935:LEU:H | 1:C:935:LEU:HD12 | 1.83 | 0.43 |
| 1:A:503:LYS:HG2 | 1:A:505:LEU:HD13 | 2.00 | 0.43 |
| 1:C:415:GLU:HB2 | 1:C:514:VAL:HG21 | 2.01 | 0.43 |
| 1:C:236:THR:HG21 | 1:C:369:VAL:HG21 | 2.01 | 0.43 |
| 1:C:498:PHE:CD1 | 1:C:499:PHE:N | 2.79 | 0.43 |
| 1:A:744:ASN:O | 1:A:748:MSE:HG3 | 2.19 | 0.43 |
| 1:C:410:VAL:HA | 1:C:453:ALA:HB2 | 2.01 | 0.43 |
| 1:C:510:ARG:NH1 | 1:C:516:GLU:OE2 | 2.51 | 0.43 |
| 1:C:229:PHE:HZ | 1:C:324:MSE:HE2 | 1.84 | 0.43 |
| 1:C:472:TYR:CE2 | 1:C:496:LEU:HD11 | 2.54 | 0.43 |
| 1:C:744:ASN:O | 1:C:748:MSE:HG3 | 2.18 | 0.43 |
| 1:A:482:ARG:NH2 | 1:A:522:GLU:OE2 | 2.50 | 0.43 |
| 1:A:753:SER:OG | 1:A:846:GLN:HB2 | 2.19 | 0.43 |
| 2:D:44:ILE:HD13 | 2:D:49:GLN:HA | 2.01 | 0.43 |
| 2:B:33:LYS:HD3 | 2:B:33:LYS:C | 2.39 | 0.42 |
| 1:C:954:GLU:OE2 | 1:C:957:TYR:N | 2.30 | 0.42 |
| 2:D:52:ASP:O | 2:D:54:ARG:NH2 | 2.52 | 0.42 |
| 1:C:474:ILE:HG12 | 1:C:510:ARG:NH2 | 2.33 | 0.42 |
| 1:C:903:GLU:OE1 | 1:C:903:GLU:HA | 2.19 | 0.42 |
| 1:A:912:LEU:HD13 | 1:C:932:GLU:HB3 | 2.00 | 0.42 |
| 1:C:472:TYR:CG | 1:C:496:LEU:HD11 | 2.53 | 0.42 |
| 1:C:483:GLU:HG2 | 1:C:497:LYS:HB2 | 2.01 | 0.42 |
| 1:A:625:ASN:HB2 | 1:A:914:MSE:HG2 | 2.02 | 0.42 |
| 1:C:280:LEU:HD22 | 1:C:566:LEU:HD21 | 2.00 | 0.42 |
| 1:C:474:ILE:HG23 | 1:C:474:ILE:O | 2.19 | 0.42 |
| 1:C:878:LYS:HZ2 | 1:C:878:LYS:HG2 | 1.75 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:957:TYR:CZ | 1:C:961:LEU:HD11 | 2.54 | 0.42 |
| 1:A:1008:MSE:HE2 | 1:A:1012:MSE:CE | 2.44 | 0.42 |
| 1:C:504:LYS:H | 1:C:504:LYS:HG2 | 1.72 | 0.42 |
| 1:C:541:LEU:HD23 | 1:C:541:LEU:HA | 1.92 | 0.42 |
| 1:A:253:TYR:CZ | 1:A:271:ARG:HG2 | 2.54 | 0.42 |
| 1:C:331:VAL:HG22 | 1:C:334:ARG:HD2 | 2.02 | 0.42 |
| 1:C:641:CYS:O | 1:C:811:ARG:NH1 | 2.47 | 0.42 |
| 1:C:1018:MSE:HE2 | 1:C:1018:MSE:HB3 | 1.89 | 0.42 |
| 2:D:7:THR:HG22 | 2:D:11:LYS:O | 2.19 | 0.42 |
| 1:A:666:ARG:HA | 1:A:683:GLY:HA3 | 2.02 | 0.42 |
| 1:A:941:LEU:HD12 | 1:A:941:LEU:HA | 1.83 | 0.42 |
| 1:C:604:ALA:O | 1:C:608:GLN:HG3 | 2.20 | 0.41 |
| 1:C:832:ILE:HD12 | 1:C:885:ARG:HD2 | 2.02 | 0.41 |
| 2:B:39:ASP:OD1 | 2:B:39:ASP:N | 2.51 | 0.41 |
| 2:D:8:LEU:HD22 | 1:C:819:ASN:HD21 | 1.85 | 0.41 |
| 2:D:74:ARG:HG2 | 1:C:705:PHE:HB2 | 2.02 | 0.41 |
| 1:A:385:ASP:CG | 1:A:390:TRP:HE1 | 2.23 | 0.41 |
| 1:A:762:GLY:CA | 1:A:823:PRO:HB3 | 2.49 | 0.41 |
| 1:A:919:LEU:HD12 | 1:A:919:LEU:H | 1.84 | 0.41 |
| 2:D:5:VAL:HG21 | 2:D:30:ILE:HD13 | 2.01 | 0.41 |
| 2:D:62:GLN:HB3 | 2:D:63:LYS:H | 1.72 | 0.41 |
| 1:C:473:VAL:CG2 | 1:C:499:PHE:CZ | 3.04 | 0.41 |
| 1:A:367:PRO:HA | 1:A:370:PHE:O | 2.21 | 0.41 |
| 3:D:102:HOH:O | 1:C:849:THR:HG22 | 2.19 | 0.41 |
| 1:C:480:PRO:HB3 | 1:C:512:MSE:HE3 | 2.02 | 0.41 |
| 1:A:264:PHE:HB2 | 1:A:556:ALA:HB2 | 2.01 | 0.41 |
| 1:C:366:ILE:HA | 1:C:367:PRO:HA | 1.76 | 0.41 |
| 1:C:611:MSE:HE1 | 1:C:658:ILE:HA | 2.01 | 0.41 |
| 1:C:1007:GLN:O | 1:C:1011:GLN:HG2 | 2.21 | 0.41 |
| 1:C:1022:LYS:NZ | 1:C:1026:GLU:OE1 | 2.54 | 0.41 |
| 1:A:988:LEU:HD23 | 1:A:988:LEU:HA | 1.89 | 0.41 |
| 1:C:849:THR:C | 1:C:850:HIS:HD1 | 2.22 | 0.41 |
| 1:A:278:HIS:O | 1:A:282:THR:HG23 | 2.21 | 0.41 |
| 1:A:712:TRP:CZ3 | 1:A:713:TYR:HB2 | 2.56 | 0.41 |
| 2:D:27:LYS:O | 2:D:28:ALA:C | 2.57 | 0.41 |
| 1:C:366:ILE:HG13 | 1:C:367:PRO:HA | 2.02 | 0.41 |
| 1:A:336:ASP:OD1 | 1:A:346:TYR:OH | 2.24 | 0.41 |
| 1:A:614:PRO:HG2 | 1:A:660:THR:HG22 | 2.02 | 0.41 |
| 1:A:959:THR:CG2 | 1:A:960:PHE:N | 2.84 | 0.41 |
| 1:A:985:GLY:O | 1:A:988:LEU:HB2 | 2.21 | 0.41 |
| 2:B:30:ILE:HD12 | 2:B:43:LEU:HD11 | 2.03 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:37:PRO:HB2 | 2:B:39:ASP:OD1 | 2.21 | 0.41 |
| 1:C:385:ASP:OD1 | 1:C:388:HIS:HA | 2.21 | 0.41 |
| 1:A:321:ARG:HE | 1:A:369:VAL:HG22 | 1.86 | 0.40 |
| 1:C:659:ASP:O | 1:C:663:GLN:HG3 | 2.20 | 0.40 |
| 1:A:1008:MSE:CE | 1:A:1011:GLN:HB2 | 2.50 | 0.40 |
| 2:B:8:LEU:HD12 | 2:B:70:VAL:HG12 | 2.03 | 0.40 |
| 1:A:460:LYS:HB3 | 1:A:513:ARG:HD2 | 2.03 | 0.40 |
| 1:A:616:CYS:HB2 | 1:A:623:PHE:O | 2.21 | 0.40 |
| 1:A:797:PHE:CZ | 1:A:801:LYS:HD2 | 2.57 | 0.40 |
| 1:C:310:ARG:NH2 | 1:C:319:GLU:OE1 | 2.55 | 0.40 |
| 1:C:473:VAL:C | 1:C:481:ILE:HD13 | 2.41 | 0.40 |
| 1:C:280:LEU:HA | 1:C:283:MSE:HE3 | 2.03 | 0.40 |
| 1:C:650:LEU:O | 1:C:745:LYS:HE2 | 2.21 | 0.40 |
| 1:C:707:MSE:HE2 | 1:C:707:MSE:HB3 | 2.01 | 0.40 |

There are no symmetry-related clashes.

## 5.3  Torsion angles ⓘ

### 5.3.1  Protein backbone ⓘ

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

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 1 | A | 824/845 (98%) | 804 (98%) | 20 (2%) | 0 | 100 | 100 |
| 1 | C | 820/845 (97%) | 806 (98%) | 14 (2%) | 0 | 100 | 100 |
| 2 | B | 74/79 (94%) | 73 (99%) | 1 (1%) | 0 | 100 | 100 |
| 2 | D | 74/79 (94%) | 71 (96%) | 3 (4%) | 0 | 100 | 100 |
| All | All | 1792/1848 (97%) | 1754 (98%) | 38 (2%) | 0 | 100 | 100 |

There are no Ramachandran outliers to report.

### 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 | 719/719 (100%) | 697 (97%) | 22 (3%) | 40 | 64 |
| 1 | C | 716/719 (100%) | 694 (97%) | 22 (3%) | 40 | 64 |
| 2 | B | 67/68 (98%) | 66 (98%) | 1 (2%) | 65 | 83 |
| 2 | D | 67/68 (98%) | 63 (94%) | 4 (6%) | 19 | 34 |
| All | All | 1569/1574 (100%) | 1520 (97%) | 49 (3%) | 40 | 64 |

All (49) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 362 | LYS |
| 1 | A | 363 | SER |
| 1 | A | 386 | LYS |
| 1 | A | 425 | LEU |
| 1 | A | 471 | ARG |
| 1 | A | 505 | LEU |
| 1 | A | 544 | TYR |
| 1 | A | 552 | SER |
| 1 | A | 619 | ASP |
| 1 | A | 638 | LEU |
| 1 | A | 670 | PHE |
| 1 | A | 676 | LYS |
| 1 | A | 691 | ARG |
| 1 | A | 752 | ARG |
| 1 | A | 852 | SER |
| 1 | A | 901 | ARG |
| 1 | A | 918 | LYS |
| 1 | A | 930 | ARG |
| 1 | A | 944 | ARG |
| 1 | A | 952 | SER |
| 1 | A | 1022 | LYS |
| 1 | A | 1036 | CYS |
| 2 | B | 62 | GLN |
| 2 | D | 4 | PHE |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | D | 23 | ILE |
| 2 | D | 25 | ASN |
| 2 | D | 54 | ARG |
| 1 | C | 340 | SER |
| 1 | C | 341 | LYS |
| 1 | C | 363 | SER |
| 1 | C | 364 | THR |
| 1 | C | 389 | LYS |
| 1 | C | 392 | ASP |
| 1 | C | 498 | PHE |
| 1 | C | 504 | LYS |
| 1 | C | 506 | GLU |
| 1 | C | 510 | ARG |
| 1 | C | 519 | LYS |
| 1 | C | 542 | LYS |
| 1 | C | 544 | TYR |
| 1 | C | 615 | ASP |
| 1 | C | 638 | LEU |
| 1 | C | 670 | PHE |
| 1 | C | 850 | HIS |
| 1 | C | 852 | SER |
| 1 | C | 878 | LYS |
| 1 | C | 928 | GLN |
| 1 | C | 948 | GLN |
| 1 | C | 1055 | ILE |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 273 | HIS |
| 1 | A | 548 | GLN |
| 1 | A | 609 | GLN |
| 1 | A | 1011 | GLN |
| 2 | D | 25 | ASN |
| 1 | C | 388 | HIS |
| 1 | C | 657 | ASN |
| 1 | C | 843 | HIS |

### 5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

## 5.5    Carbohydrates ⓘ

There are no monosaccharides in this entry.

## 5.6    Ligand geometry ⓘ

There are no ligands in this entry.

## 5.7    Other polymers ⓘ

There are no such residues in this entry.

## 5.8    Polymer linkage issues ⓘ

There are no chain breaks in this entry.

# 6 Fit of model and data ⓘ

## 6.1 Protein, DNA and RNA chains ⓘ

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

| Mol | Chain | Analysed | <RSRZ> | #RSRZ>2 | | | OWAB(Å$^2$) | Q<0.9 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | A | 812/845 (96%) | 0.15 | 12 (1%) | 73 | 75 | 26, 48, 93, 122 | 0 |
| 1 | C | 808/845 (95%) | 0.44 | 41 (5%) | 28 | 29 | 28, 63, 105, 141 | 0 |
| 2 | B | 76/79 (96%) | 1.22 | 15 (19%) | 1 | 0 | 46, 71, 93, 103 | 0 |
| 2 | D | 76/79 (96%) | 2.79 | 45 (59%) | 0 | 0 | 62, 121, 171, 178 | 0 |
| All | All | 1772/1848 (95%) | 0.44 | 113 (6%) | 19 | 19 | 26, 58, 109, 178 | 0 |

All (113) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
| --- | --- | --- | --- | --- |
| 2 | D | 59 | TYR | 8.8 |
| 2 | D | 36 | ILE | 8.0 |
| 2 | D | 53 | GLY | 7.8 |
| 2 | D | 20 | SER | 7.8 |
| 1 | C | 475 | GLY | 6.5 |
| 2 | D | 32 | ASP | 6.1 |
| 2 | D | 66 | THR | 5.5 |
| 2 | D | 15 | LEU | 5.2 |
| 2 | D | 30 | ILE | 5.0 |
| 2 | D | 19 | PRO | 4.9 |
| 2 | D | 55 | THR | 4.9 |
| 2 | B | 4 | PHE | 4.7 |
| 1 | A | 222 | SER | 4.7 |
| 2 | D | 22 | THR | 4.6 |
| 2 | D | 3 | ILE | 4.6 |
| 2 | D | 1 | MET | 4.5 |
| 2 | D | 4 | PHE | 4.5 |
| 2 | B | 33 | LYS | 4.5 |
| 2 | D | 63 | LYS | 4.5 |
| 2 | D | 11 | LYS | 4.4 |
| 2 | D | 13 | ILE | 4.4 |

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| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 1 | C | 1058 | LEU | 4.3 |
| 2 | D | 54 | ARG | 4.3 |
| 2 | D | 21 | ASP | 4.2 |
| 1 | C | 1001 | ASN | 4.2 |
| 2 | B | 15 | LEU | 4.1 |
| 2 | D | 61 | ILE | 4.1 |
| 2 | D | 14 | THR | 4.1 |
| 2 | D | 9 | THR | 4.0 |
| 2 | D | 12 | THR | 4.0 |
| 2 | D | 33 | LYS | 4.0 |
| 1 | C | 481 | ILE | 4.0 |
| 1 | C | 988 | LEU | 3.9 |
| 2 | B | 9 | THR | 3.9 |
| 2 | D | 16 | GLU | 3.9 |
| 2 | D | 64 | GLU | 3.8 |
| 1 | A | 223 | VAL | 3.8 |
| 1 | C | 553 | ILE | 3.8 |
| 2 | B | 3 | ILE | 3.7 |
| 2 | D | 10 | GLY | 3.7 |
| 2 | B | 2 | GLN | 3.6 |
| 2 | D | 17 | VAL | 3.5 |
| 1 | A | 930 | ARG | 3.5 |
| 1 | C | 340 | SER | 3.4 |
| 1 | C | 343 | TYR | 3.4 |
| 1 | C | 949 | ALA | 3.4 |
| 1 | A | 926 | VAL | 3.4 |
| 2 | B | 13 | ILE | 3.3 |
| 2 | D | 34 | GLU | 3.3 |
| 1 | C | 957 | TYR | 3.3 |
| 2 | D | 65 | SER | 3.2 |
| 2 | D | 29 | LYS | 3.2 |
| 1 | C | 476 | GLN | 3.2 |
| 2 | D | 67 | LEU | 3.2 |
| 2 | B | 17 | VAL | 3.2 |
| 1 | C | 1015 | ILE | 3.1 |
| 2 | D | 58 | ASP | 2.9 |
| 2 | D | 51 | GLU | 2.9 |
| 1 | C | 1029 | ILE | 2.9 |
| 2 | B | 14 | THR | 2.9 |
| 2 | D | 50 | LEU | 2.9 |
| 2 | B | 59 | TYR | 2.9 |
| 2 | B | 1 | MET | 2.9 |

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| Mol | Chain | Res | Type | RSRZ |
|:---:|:---:|:---:|:---:|:---:|
| 2 | D | 5 | VAL | 2.9 |
| 2 | D | 2 | GLN | 2.9 |
| 1 | A | 484 | GLU | 2.8 |
| 1 | A | 960 | PHE | 2.8 |
| 2 | D | 56 | LEU | 2.8 |
| 1 | C | 983 | ILE | 2.8 |
| 2 | B | 11 | LYS | 2.8 |
| 1 | C | 984 | LEU | 2.7 |
| 1 | C | 503 | LYS | 2.7 |
| 1 | C | 224 | PRO | 2.7 |
| 1 | A | 953 | THR | 2.7 |
| 1 | C | 1045 | ILE | 2.7 |
| 1 | C | 386 | LYS | 2.7 |
| 2 | D | 52 | ASP | 2.7 |
| 1 | A | 544 | TYR | 2.6 |
| 1 | C | 544 | TYR | 2.6 |
| 1 | C | 976 | LEU | 2.6 |
| 1 | C | 990 | ALA | 2.6 |
| 1 | C | 981 | VAL | 2.6 |
| 1 | C | 351 | ARG | 2.6 |
| 2 | D | 35 | GLY | 2.6 |
| 2 | D | 45 | PHE | 2.5 |
| 1 | A | 499 | PHE | 2.5 |
| 1 | C | 504 | LYS | 2.5 |
| 1 | A | 548 | GLN | 2.5 |
| 1 | C | 344 | GLU | 2.5 |
| 1 | C | 1017 | GLN | 2.4 |
| 2 | D | 62 | GLN | 2.4 |
| 2 | B | 18 | GLU | 2.4 |
| 1 | C | 677 | ALA | 2.4 |
| 1 | C | 498 | PHE | 2.4 |
| 1 | C | 950 | LYS | 2.4 |
| 1 | C | 358 | VAL | 2.4 |
| 2 | D | 18 | GLU | 2.4 |
| 1 | C | 944 | ARG | 2.4 |
| 1 | C | 1025 | LEU | 2.3 |
| 1 | C | 342 | ASN | 2.3 |
| 2 | B | 5 | VAL | 2.3 |
| 1 | C | 960 | PHE | 2.3 |
| 2 | B | 12 | THR | 2.2 |
| 1 | A | 986 | LYS | 2.2 |
| 1 | C | 678 | LYS | 2.2 |

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| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 2 | D | 7 | THR | 2.2 |
| 1 | C | 365 | LEU | 2.2 |
| 1 | C | 507 | GLU | 2.1 |
| 1 | C | 937 | ARG | 2.1 |
| 2 | D | 31 | GLN | 2.0 |
| 1 | C | 330 | PHE | 2.0 |
| 1 | A | 918 | LYS | 2.0 |
| 1 | C | 253 | TYR | 2.0 |

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

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

## 6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

## 6.4 Ligands ⓘ

There are no ligands in this entry.

## 6.5 Other polymers ⓘ

There are no such residues in this entry.