# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 24, 2024 – 02:12 PM EDT

| | | |
|---|---|---|
| PDB ID | : | 6AC6 |
| Title | : | Ab initio crystal structure of Selenomethionine labelled Mycobacterium smegmatis Mfd |
| Authors | : | Putta, S.; Fox, G.C.; Walsh, M.A.; Rao, D.N.; Nagaraja, V.; Natesh, R. |
| Deposited on | : | 2018-07-25 |
| Resolution | : | 2.99 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 types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

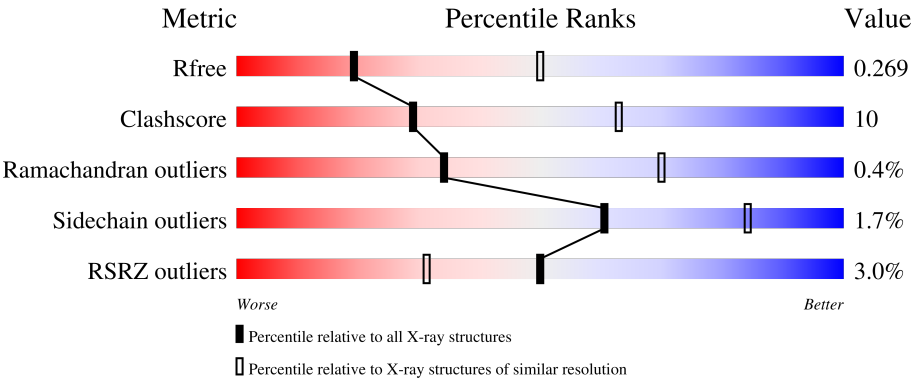
| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.37.1 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac | : | 5.8.0158 |
| CCP4 | : | 7.0.044 (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 (i)

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

The reported resolution of this entry is 2.99 Å.

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




| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|---|---|---|
| $R_{free}$ | 130704 | 2754 (3.00-2.96) |
| Clashscore | 141614 | 3103 (3.00-2.96) |
| Ramachandran outliers | 138981 | 2993 (3.00-2.96) |
| Sidechain outliers | 138945 | 2996 (3.00-2.96) |
| RSRZ outliers | 127900 | 2644 (3.00-2.96) |

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 | 1235 | 3% 75% 18% 7% |
| 1 | B | 1235 | 3% 71% 21% 7% |

## 2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 16853 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 Mycobacterium smegmatis Mfd.

| Mol | Chain | Residues | Atoms | | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 1154 | Total | C | N | O | S | Se | 0 | 0 | 0 |
| | | | 8417 | 5293 | 1487 | 1606 | 6 | 25 | | | |
| 1 | B | 1153 | Total | C | N | O | S | Se | 0 | 0 | 0 |
| | | | 8337 | 5253 | 1473 | 1580 | 6 | 25 | | | |

There are 40 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | -19 | MSE | - | initiating methionine | UNP I7G7M2 |
| A | -18 | GLY | - | expression tag | UNP I7G7M2 |
| A | -17 | SER | - | expression tag | UNP I7G7M2 |
| A | -16 | SER | - | expression tag | UNP I7G7M2 |
| A | -15 | HIS | - | expression tag | UNP I7G7M2 |
| A | -14 | HIS | - | expression tag | UNP I7G7M2 |
| A | -13 | HIS | - | expression tag | UNP I7G7M2 |
| A | -12 | HIS | - | expression tag | UNP I7G7M2 |
| A | -11 | HIS | - | expression tag | UNP I7G7M2 |
| A | -10 | HIS | - | expression tag | UNP I7G7M2 |
| A | -9 | SER | - | expression tag | UNP I7G7M2 |
| A | -8 | SER | - | expression tag | UNP I7G7M2 |
| A | -7 | GLY | - | expression tag | UNP I7G7M2 |
| A | -6 | LEU | - | expression tag | UNP I7G7M2 |
| A | -5 | VAL | - | expression tag | UNP I7G7M2 |
| A | -4 | PRO | - | expression tag | UNP I7G7M2 |
| A | -3 | ARG | - | expression tag | UNP I7G7M2 |
| A | -2 | GLY | - | expression tag | UNP I7G7M2 |
| A | -1 | SER | - | expression tag | UNP I7G7M2 |
| A | 0 | HIS | - | expression tag | UNP I7G7M2 |
| B | -19 | MSE | - | initiating methionine | UNP I7G7M2 |
| B | -18 | GLY | - | expression tag | UNP I7G7M2 |
| B | -17 | SER | - | expression tag | UNP I7G7M2 |
| B | -16 | SER | - | expression tag | UNP I7G7M2 |
| B | -15 | HIS | - | expression tag | UNP I7G7M2 |

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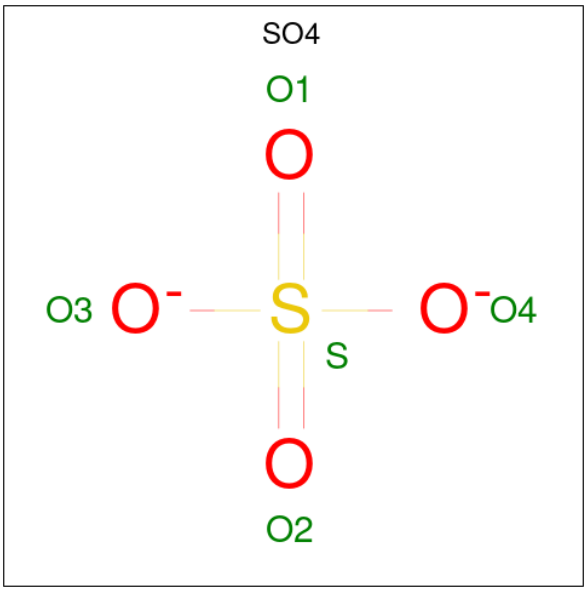
| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| B | -14 | HIS | - | expression tag | UNP I7G7M2 |
| B | -13 | HIS | - | expression tag | UNP I7G7M2 |
| B | -12 | HIS | - | expression tag | UNP I7G7M2 |
| B | -11 | HIS | - | expression tag | UNP I7G7M2 |
| B | -10 | HIS | - | expression tag | UNP I7G7M2 |
| B | -9 | SER | - | expression tag | UNP I7G7M2 |
| B | -8 | SER | - | expression tag | UNP I7G7M2 |
| B | -7 | GLY | - | expression tag | UNP I7G7M2 |
| B | -6 | LEU | - | expression tag | UNP I7G7M2 |
| B | -5 | VAL | - | expression tag | UNP I7G7M2 |
| B | -4 | PRO | - | expression tag | UNP I7G7M2 |
| B | -3 | ARG | - | expression tag | UNP I7G7M2 |
| B | -2 | GLY | - | expression tag | UNP I7G7M2 |
| B | -1 | SER | - | expression tag | UNP I7G7M2 |
| B | 0 | HIS | - | expression tag | UNP I7G7M2 |

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: $O_4S$).




| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 2 | A | 1 | Total O S<br>5 4 1 | 0 | 0 |
| 2 | A | 1 | Total O S<br>5 4 1 | 0 | 0 |
| 2 | A | 1 | Total O S<br>5 4 1 | 0 | 0 |
| 2 | B | 1 | Total O S<br>5 4 1 | 0 | 0 |

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| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 2 | B | 1 | Total O S<br>5 4 1 | 0 | 0 |

- Molecule 3 is water.

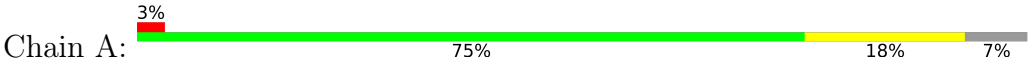
| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 3 | A | 37 | Total O<br>37 37 | 0 | 0 |
| 3 | B | 37 | Total O<br>37 37 | 0 | 0 |

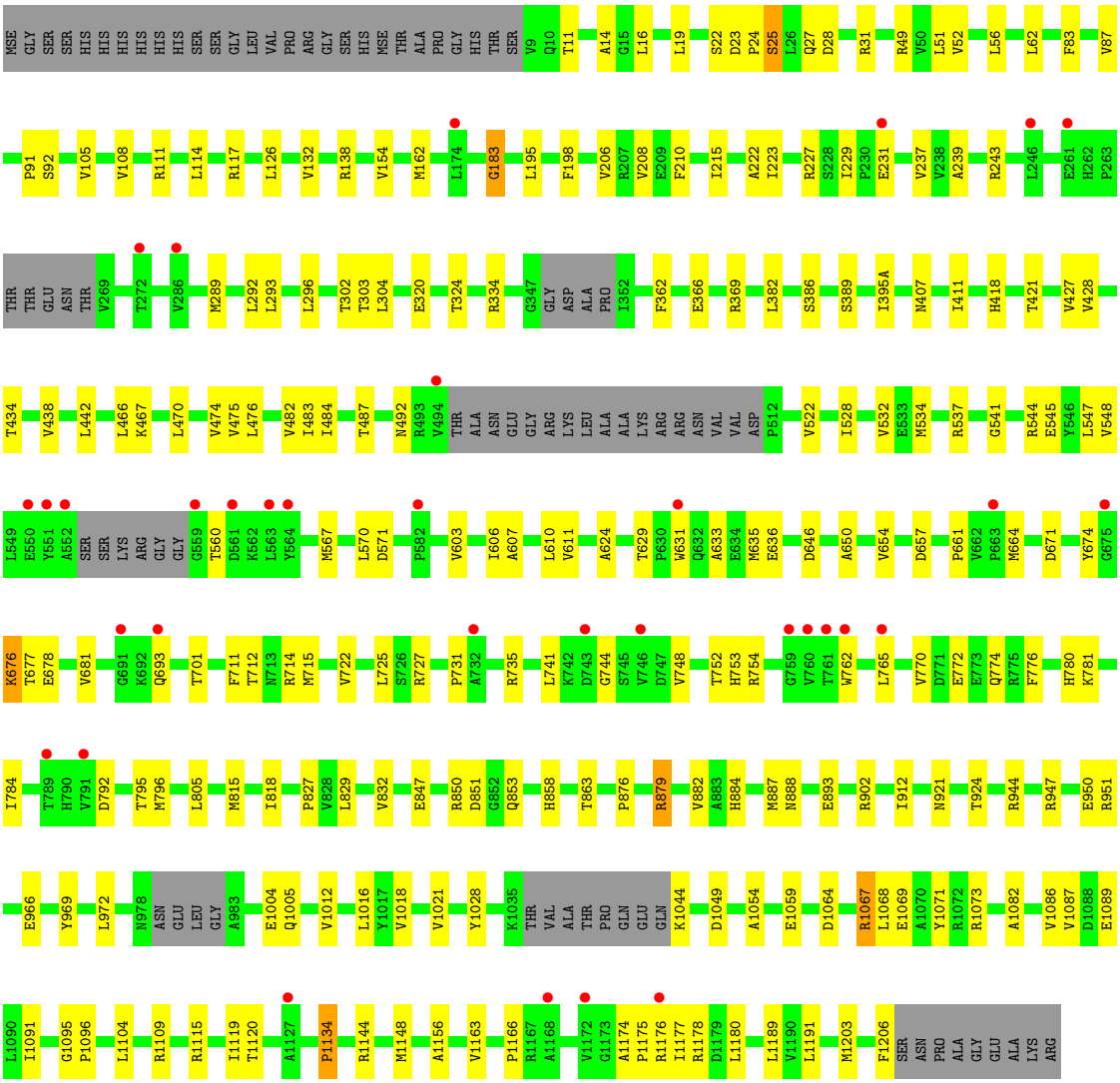
# 3 Residue-property plots (i)

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

• Molecule 1: Mycobacterium smegmatis Mfd

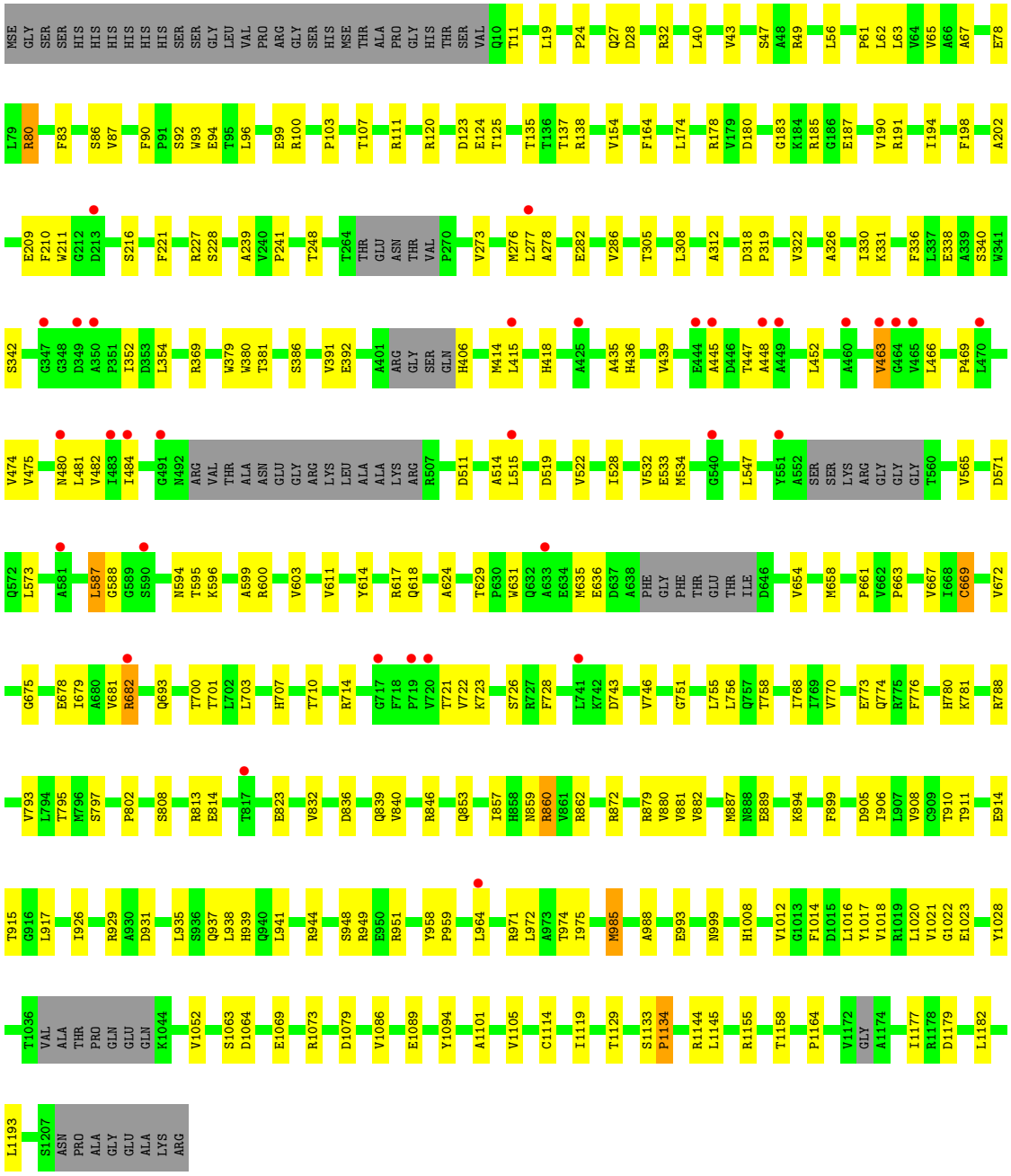
Chain A:




• Molecule 1: Mycobacterium smegmatis Mfd

Chain B:


MSE GLY SER SER HIS HIS HIS HIS HIS SER SER GLY LEU VAL PRO ARG GLY SER HIS MSE THR ALA PRO GLY HIS THR SER VAL Q10 T11 L19 P24 Q27 D28 R32 L40 V43 S47 A48 R49 L56 P61 L62 L63 V64 V65 A66 A67 E78
L79 R80 F83 S86 V87 F90 P91 S92 W93 E94 T95 L96 E99 R100 P103 T107 R111 R120 D123 E124 T125 T135 T136 T137 R138 V154 F164 L174 R178 V179 D180 G183 K184 R185 G186 E187 V190 R191 I194 F198 A202
E209 F210 W211 G212 D213 S216 F221 R227 S228 A239 V240 P241 T248 T264 THR GLU ASN THR VAL P270 V273 M276 L277 A278 E282 V286 T305 L308 A312 D318 P319 V322 A326 I330 K331 F336 L337 E338 A339 S340 W341
S342 G347 G348 D349 A350 P351 I352 D353 L354 R369 W379 W380 T381 S386 V391 E392 A401 ARG GLY SER GLN H406 M414 L415 H418 A425 A435 H436 V439 E444 A445 D446 T447 A448 A449 L452 A460 V463 G464 V465 L466 P469 L470
V474 V475 N480 L481 V482 I483 I484 G491 N492 ARG VAL THR ALA ASN GLU GLY ARG LYS LEU ALA ALA LYS ARG R507 D511 A514 L515 D519 V522 I528 V532 E533 M534 G540 L547 Y551 A552 SER SER LYS ARG GLY GLY GLY T560 V565 D571
Q572 L573 A581 L587 G588 G589 S590 N594 T595 K596 A599 R600 V603 V611 Y614 R617 Q618 A624 T629 P630 W631 Q632 A633 E634 M635 E636 D637 A638 PHE GLY PHE THR GLU THR ILE D646 V654 M658 P661 V662 P663 V667 I668 C669 V672
G675 E678 I679 A680 V681 R682 Q693 T700 T701 L702 L703 H707 T710 R714 G717 F718 P719 V720 T721 V722 K723 S726 R727 F728 L741 K742 D743 V746 G751 L755 L756 Q757 T758 I768 I769 V770 E773 Q774 R775 F776 H780 K781 R788
V793 L794 T795 M796 S797 P802 S808 R813 E814 T817 E823 V832 D836 Q839 V840 R846 Q853 I857 H858 N859 R860 V861 R862 R872 R879 V880 V881 V882 M887 N888 E889 K894 F899 D905 I906 L907 V908 C909 T910 T911 E914
T915 G916 L917 I926 R929 A930 D931 L935 S936 Q937 L938 H939 Q940 L941 R944 S948 R949 E950 R951 Y958 P959 L964 R971 L972 A973 T974 I975 M985 A988 E993 N999 H1008 V1012 G1013 F1014 D1015 L1016 Y1017 V1018 R1019 L1020 V1021 G1022 E1023 Y1028
T1036 VAL ALA THR PRO GLN GLU GLN K1044 V1052 S1063 D1064 E1069 R1073 D1079 V1086 E1089 Y1094 A1101 V1105 C1114 I1119 T1129 S1133 P1134 R1144 L1145 R1155 T1158 P1164 V1172 GLY A1174 I1177 R1178 D1179 L1182
L1193 S1207 ASN PRO ALA GLY GLU ALA LYS ARG

# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | P 21 21 21 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 82.71Å 158.87Å 207.94Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 47.19 – 2.99<br>47.19 – 2.99 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 99.0 (47.19-2.99)<br>96.5 (47.19-2.99) | Depositor<br>EDS |
| $R_{merge}$ | 0.13 | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 1.69 (at 3.01Å) | Xtriage |
| Refinement program | PHENIX (1.11.1_2575: ???) | Depositor |
| R, $R_{free}$ | 0.218 , 0.270<br>0.219 , 0.269 | Depositor<br>DCC |
| $R_{free}$ test set | 2788 reflections (5.00%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 78.7 | Xtriage |
| Anisotropy | 0.389 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.29 , 51.0 | EDS |
| L-test for twinning[2] | $< \|L\| > = 0.47$, $< L^2 > = 0.30$ | Xtriage |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| $F_o$,$F_c$ correlation | 0.93 | EDS |
| Total number of atoms | 16853 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 80.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.68% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

# 5 Model quality

## 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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 | 0.26 | 0/8542 | 0.44 | 0/11635 |
| 1 | B | 0.27 | 0/8461 | 0.45 | 2/11529 (0.0%) |
| All | All | 0.26 | 0/17003 | 0.45 | 2/23164 (0.0%) |

There are no bond length outliers.

All (2) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | B | 80 | ARG | NE-CZ-NH1 | 5.86 | 123.23 | 120.30 |
| 1 | B | 80 | ARG | NE-CZ-NH2 | -5.16 | 117.72 | 120.30 |

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 | 8417 | 0 | 8131 | 145 | 0 |
| 1 | B | 8337 | 0 | 8022 | 174 | 0 |
| 2 | A | 15 | 0 | 0 | 2 | 0 |
| 2 | B | 10 | 0 | 0 | 0 | 0 |
| 3 | A | 37 | 0 | 0 | 2 | 0 |
| 3 | B | 37 | 0 | 0 | 2 | 0 |
| All | All | 16853 | 0 | 16153 | 316 | 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 10.

All (316) 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:B:452:LEU:HD13 | 1:B:466:LEU:HG | 1.43 | 0.95 |
| 1:B:330:ILE:HD12 | 1:B:331:LYS:N | 1.91 | 0.86 |
| 1:A:674:TYR:HB3 | 1:A:818:ILE:HD11 | 1.62 | 0.81 |
| 1:B:636:GLU:HG2 | 1:B:682:ARG:HH11 | 1.48 | 0.79 |
| 1:B:532:VAL:HG23 | 1:B:533:GLU:HB3 | 1.64 | 0.77 |
| 1:B:1052:VAL:HG23 | 1:B:1179:ASP:HA | 1.67 | 0.77 |
| 1:B:185:ARG:NH1 | 1:B:202:ALA:O | 2.18 | 0.76 |
| 1:A:635:MSE:HG2 | 1:A:714:ARG:HH21 | 1.51 | 0.75 |
| 1:B:330:ILE:HD12 | 1:B:331:LYS:H | 1.50 | 0.74 |
| 1:A:805:LEU:HD13 | 1:A:1018:VAL:HG23 | 1.71 | 0.73 |
| 1:A:195:LEU:HD23 | 1:A:208:VAL:HB | 1.71 | 0.71 |
| 1:B:862:ARG:H | 1:B:862:ARG:HD2 | 1.55 | 0.71 |
| 1:B:880:VAL:HG22 | 1:B:906:ILE:HB | 1.71 | 0.71 |
| 1:B:617:ARG:NH1 | 1:B:663:PRO:O | 2.25 | 0.70 |
| 1:B:185:ARG:NH2 | 1:B:823:GLU:O | 2.25 | 0.70 |
| 1:B:587:LEU:H | 1:B:587:LEU:HD23 | 1.58 | 0.69 |
| 1:A:92:SER:HB2 | 1:A:138:ARG:HD2 | 1.76 | 0.68 |
| 1:B:931:ASP:O | 1:B:971:ARG:NH2 | 2.27 | 0.67 |
| 1:A:701:THR:HG21 | 1:A:727:ARG:HB3 | 1.76 | 0.67 |
| 1:A:52:VAL:HG21 | 1:A:382:LEU:HD22 | 1.76 | 0.66 |
| 1:B:92:SER:HB3 | 1:B:138:ARG:HD2 | 1.77 | 0.66 |
| 1:B:1145:LEU:HD13 | 1:B:1193:LEU:HD11 | 1.78 | 0.66 |
| 1:A:28:ASP:OD1 | 1:A:31:ARG:NH2 | 2.29 | 0.66 |
| 1:A:770:VAL:HB | 1:A:795:THR:HG22 | 1.78 | 0.66 |
| 1:A:541:GLY:O | 1:A:1178:ARG:NH1 | 2.28 | 0.66 |
| 1:A:243:ARG:HD3 | 1:A:289:MSE:HE1 | 1.76 | 0.66 |
| 1:B:599:ALA:O | 1:B:603:VAL:HG23 | 1.96 | 0.66 |
| 1:B:209:GLU:O | 1:B:216:SER:N | 2.29 | 0.64 |
| 1:B:1144:ARG:NH2 | 3:B:1402:HOH:O | 2.30 | 0.64 |
| 1:B:305:THR:HA | 1:B:308:LEU:HD12 | 1.79 | 0.63 |
| 1:B:452:LEU:HB2 | 1:B:466:LEU:HD21 | 1.81 | 0.63 |
| 1:B:840:VAL:HG13 | 1:B:926:ILE:HD13 | 1.80 | 0.63 |
| 1:A:850:ARG:HH21 | 1:A:950:GLU:HG2 | 1.64 | 0.62 |
| 1:B:452:LEU:HB2 | 1:B:466:LEU:CG | 2.30 | 0.62 |
| 1:B:860:ARG:CZ | 1:B:862:ARG:HD3 | 2.29 | 0.62 |
| 1:B:154:VAL:HB | 1:B:239:ALA:HB3 | 1.82 | 0.61 |
| 1:B:415:LEU:HD11 | 1:B:484:ILE:HG13 | 1.82 | 0.61 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:452:LEU:HB2 | 1:B:466:LEU:HG | 1.82 | 0.61 |
| 1:B:701:THR:HG23 | 1:B:726:SER:HB3 | 1.82 | 0.61 |
| 1:B:452:LEU:HB2 | 1:B:466:LEU:CD2 | 2.30 | 0.61 |
| 1:A:138:ARG:NH2 | 2:A:1302:SO4:O1 | 2.33 | 0.61 |
| 1:B:164:PHE:HZ | 1:B:190:VAL:HG23 | 1.65 | 0.61 |
| 1:A:117:ARG:HG2 | 1:A:126:LEU:HB3 | 1.83 | 0.60 |
| 1:B:452:LEU:CD1 | 1:B:466:LEU:HG | 2.24 | 0.60 |
| 1:B:678:GLU:HA | 1:B:681:VAL:HG22 | 1.83 | 0.60 |
| 1:A:944:ARG:NH2 | 3:A:1401:HOH:O | 2.32 | 0.59 |
| 1:A:611:VAL:HG21 | 1:A:1028:TYR:HB3 | 1.83 | 0.59 |
| 1:B:522:VAL:HG12 | 1:B:528:ILE:HG13 | 1.85 | 0.59 |
| 1:A:532:VAL:HB | 1:A:548:VAL:HG23 | 1.83 | 0.58 |
| 1:B:802:PRO:HD3 | 1:B:993:GLU:HB3 | 1.83 | 0.58 |
| 1:B:722:VAL:HG23 | 1:B:723:LYS:H | 1.67 | 0.58 |
| 1:B:929:ARG:HG3 | 1:B:959:PRO:HD3 | 1.84 | 0.58 |
| 1:A:1091:ILE:HG22 | 1:A:1096:PRO:HA | 1.84 | 0.58 |
| 1:B:90:PHE:HB3 | 1:B:135:THR:HB | 1.84 | 0.58 |
| 1:B:773:GLU:OE2 | 1:B:788:ARG:NH2 | 2.36 | 0.58 |
| 1:A:206:VAL:HG11 | 1:A:237:VAL:HG11 | 1.85 | 0.58 |
| 1:A:762:TRP:HB3 | 1:A:765:LEU:HB2 | 1.86 | 0.58 |
| 1:A:545:GLU:OE2 | 1:A:1067:ARG:NH1 | 2.36 | 0.58 |
| 1:B:935:LEU:HD11 | 1:B:985:MSE:SE | 2.53 | 0.57 |
| 1:A:56:LEU:HB2 | 1:A:62:LEU:HD22 | 1.85 | 0.57 |
| 1:B:751:GLY:HA3 | 1:B:755:LEU:HD11 | 1.87 | 0.57 |
| 1:A:784:ILE:H | 1:A:784:ILE:HD12 | 1.70 | 0.56 |
| 1:A:772:GLU:OE1 | 1:A:774:GLN:NE2 | 2.36 | 0.56 |
| 1:A:1119:ILE:HA | 1:A:1134:PRO:HG2 | 1.85 | 0.56 |
| 1:B:78:GLU:HA | 1:B:469:PRO:HG2 | 1.87 | 0.56 |
| 1:B:774:GLN:HB3 | 1:B:999:ASN:HD22 | 1.70 | 0.56 |
| 1:A:847:GLU:HG3 | 1:A:924:THR:HB | 1.87 | 0.56 |
| 1:B:49:ARG:NH2 | 1:B:318:ASP:OD2 | 2.37 | 0.56 |
| 1:A:678:GLU:O | 1:A:681:VAL:HG22 | 2.04 | 0.56 |
| 1:A:475:VAL:HG22 | 1:A:482:VAL:HG23 | 1.87 | 0.56 |
| 1:B:614:TYR:O | 1:B:618:GLN:HG2 | 2.06 | 0.56 |
| 1:B:534:MSE:SE | 1:B:547:LEU:HD13 | 2.56 | 0.55 |
| 1:B:1101:ALA:O | 1:B:1105:VAL:HG23 | 2.06 | 0.55 |
| 1:A:780:HIS:O | 1:A:784:ILE:HD12 | 2.05 | 0.55 |
| 1:A:882:VAL:HG23 | 1:A:887:MSE:HE1 | 1.88 | 0.55 |
| 1:A:83:PHE:HB2 | 1:A:87:VAL:HG23 | 1.88 | 0.55 |
| 1:A:847:GLU:O | 1:A:850:ARG:HG2 | 2.06 | 0.55 |
| 1:A:606:ILE:O | 1:A:610:LEU:HG | 2.06 | 0.55 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:650:ALA:O | 1:A:654:VAL:HG13 | 2.07 | 0.55 |
| 1:A:1119:ILE:HG23 | 1:A:1134:PRO:HD2 | 1.89 | 0.55 |
| 1:B:859:ASN:HA | 1:B:910:THR:HG22 | 1.88 | 0.55 |
| 1:A:1012:VAL:HG22 | 1:A:1016:LEU:HD23 | 1.88 | 0.54 |
| 1:A:522:VAL:HG23 | 1:A:528:ILE:HD13 | 1.88 | 0.54 |
| 1:A:1109:ARG:HH21 | 1:A:1206:PHE:HA | 1.71 | 0.54 |
| 1:B:414:MSE:HE1 | 1:B:482:VAL:HG11 | 1.88 | 0.54 |
| 1:B:99:GLU:OE1 | 1:B:846:ARG:NH1 | 2.40 | 0.54 |
| 1:B:629:THR:HG22 | 1:B:631:TRP:H | 1.73 | 0.54 |
| 1:B:1073:ARG:NH2 | 1:B:1086:VAL:HG12 | 2.23 | 0.54 |
| 1:A:544:ARG:NH2 | 1:A:1049:ASP:OD1 | 2.41 | 0.54 |
| 1:B:164:PHE:CZ | 1:B:190:VAL:HG23 | 2.43 | 0.54 |
| 1:B:178:ARG:NH2 | 1:B:190:VAL:HG11 | 2.23 | 0.54 |
| 1:B:938:LEU:HD11 | 1:B:975:ILE:HG21 | 1.88 | 0.54 |
| 1:B:603:VAL:HG13 | 1:B:1021:VAL:HG22 | 1.90 | 0.53 |
| 1:B:32:ARG:NH1 | 1:B:391:VAL:HG21 | 2.22 | 0.53 |
| 1:B:948:SER:OG | 1:B:949:ARG:N | 2.38 | 0.53 |
| 1:A:407:ASN:O | 1:A:411:ILE:HG13 | 2.08 | 0.53 |
| 1:B:28:ASP:O | 1:B:32:ARG:HG3 | 2.08 | 0.53 |
| 1:A:427:VAL:HG11 | 1:A:438:VAL:HG11 | 1.91 | 0.53 |
| 1:B:221:PHE:HA | 1:B:228:SER:HA | 1.90 | 0.53 |
| 1:B:19:LEU:HG | 1:B:481:LEU:HD11 | 1.90 | 0.52 |
| 1:A:884:HIS:CD2 | 1:A:887:MSE:HE3 | 2.44 | 0.52 |
| 1:A:195:LEU:HD22 | 1:A:210:PHE:HE1 | 1.75 | 0.52 |
| 1:A:303:THR:OG1 | 1:A:304:LEU:N | 2.43 | 0.52 |
| 1:B:700:THR:OG1 | 1:B:703:LEU:HD12 | 2.10 | 0.52 |
| 1:B:194:ILE:HG13 | 1:B:209:GLU:HG2 | 1.91 | 0.52 |
| 1:B:624:ALA:HB2 | 1:B:661:PRO:HB3 | 1.92 | 0.52 |
| 1:A:227:ARG:HD3 | 1:A:1089:GLU:HG3 | 1.90 | 0.52 |
| 1:B:100:ARG:HG3 | 1:B:340:SER:HB3 | 1.92 | 0.52 |
| 1:A:1109:ARG:NH2 | 1:A:1206:PHE:HA | 2.26 | 0.51 |
| 1:B:565:VAL:HG11 | 1:B:573:LEU:HD11 | 1.92 | 0.51 |
| 1:B:547:LEU:HB3 | 1:B:565:VAL:HG13 | 1.92 | 0.51 |
| 1:B:533:GLU:HG3 | 1:B:534:MSE:N | 2.25 | 0.51 |
| 1:A:727:ARG:NH2 | 1:A:893:GLU:OE2 | 2.43 | 0.51 |
| 1:B:768:ILE:HB | 1:B:793:VAL:HG22 | 1.91 | 0.51 |
| 1:A:1044:LYS:O | 1:A:1115:ARG:NH1 | 2.44 | 0.51 |
| 1:B:935:LEU:HD23 | 1:B:971:ARG:HG3 | 1.92 | 0.51 |
| 1:B:326:ALA:O | 1:B:330:ILE:HG13 | 2.11 | 0.51 |
| 1:B:93:TRP:CE2 | 1:B:103:PRO:HG3 | 2.46 | 0.51 |
| 1:B:120:ARG:NH1 | 1:B:123:ASP:OD2 | 2.44 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:137:THR:HB | 1:B:322:VAL:HG13 | 1.91 | 0.51 |
| 1:B:594:ASN:ND2 | 3:B:1403:HOH:O | 2.32 | 0.51 |
| 1:A:624:ALA:HB2 | 1:A:661:PRO:HA | 1.92 | 0.50 |
| 1:A:91:PRO:HD2 | 1:A:111:ARG:HG3 | 1.93 | 0.50 |
| 1:A:715:MSE:CE | 1:A:748:VAL:HG11 | 2.42 | 0.50 |
| 1:A:607:ALA:O | 1:A:611:VAL:HG22 | 2.12 | 0.50 |
| 1:A:693:GLN:HE22 | 1:A:744:GLY:HA2 | 1.76 | 0.50 |
| 1:A:847:GLU:OE2 | 1:A:850:ARG:NH1 | 2.44 | 0.50 |
| 1:B:11:THR:O | 1:B:11:THR:OG1 | 2.24 | 0.50 |
| 1:A:701:THR:HG22 | 1:A:752:THR:HG21 | 1.94 | 0.50 |
| 1:B:124:GLU:CD | 1:B:124:GLU:H | 2.15 | 0.50 |
| 1:A:162:MSE:HE1 | 1:A:215:ILE:HD11 | 1.94 | 0.50 |
| 1:B:435:ALA:O | 1:B:439:VAL:HG13 | 2.12 | 0.49 |
| 1:B:917:LEU:C | 1:B:944:ARG:HH21 | 2.16 | 0.49 |
| 1:B:1008:HIS:O | 1:B:1012:VAL:HG12 | 2.11 | 0.49 |
| 1:B:83:PHE:HB2 | 1:B:87:VAL:HG23 | 1.95 | 0.49 |
| 1:B:635:MSE:O | 1:B:714:ARG:NH2 | 2.34 | 0.49 |
| 1:B:180:ASP:HB2 | 1:B:1063:SER:HB2 | 1.95 | 0.49 |
| 1:B:823:GLU:OE2 | 1:B:823:GLU:N | 2.45 | 0.49 |
| 1:A:366:GLU:OE1 | 1:A:369:ARG:NH1 | 2.46 | 0.48 |
| 1:A:829:LEU:HG | 1:A:951:ARG:HD3 | 1.93 | 0.48 |
| 1:A:547:LEU:HD22 | 1:A:1068:LEU:HD11 | 1.94 | 0.48 |
| 1:B:43:VAL:HG21 | 1:B:386:SER:HA | 1.94 | 0.48 |
| 1:B:882:VAL:HA | 1:B:908:VAL:O | 2.12 | 0.48 |
| 1:A:741:LEU:HD12 | 1:A:762:TRP:HA | 1.96 | 0.48 |
| 1:A:853:GLN:OE1 | 1:A:921:ASN:ND2 | 2.47 | 0.48 |
| 1:A:1120:THR:HG23 | 1:A:1134:PRO:HG3 | 1.95 | 0.48 |
| 1:B:971:ARG:O | 1:B:974:THR:OG1 | 2.30 | 0.48 |
| 1:B:635:MSE:HE1 | 1:B:682:ARG:HD3 | 1.96 | 0.48 |
| 1:A:780:HIS:O | 1:A:784:ILE:CD1 | 2.61 | 0.48 |
| 1:A:1166:PRO:HG2 | 1:A:1177:ILE:HD13 | 1.95 | 0.48 |
| 1:B:937:GLN:OE1 | 1:B:937:GLN:N | 2.47 | 0.48 |
| 1:A:154:VAL:HB | 1:A:239:ALA:HB3 | 1.95 | 0.48 |
| 1:A:195:LEU:HD22 | 1:A:210:PHE:CE1 | 2.49 | 0.47 |
| 1:B:63:LEU:HD22 | 1:B:308:LEU:HD11 | 1.96 | 0.47 |
| 1:B:857:ILE:HD11 | 1:B:914:GLU:HG3 | 1.96 | 0.47 |
| 1:A:19:LEU:O | 1:A:22:SER:HB3 | 2.14 | 0.47 |
| 1:A:87:VAL:HG22 | 1:A:132:VAL:HB | 1.95 | 0.47 |
| 1:A:635:MSE:HE2 | 1:A:635:MSE:HB3 | 1.85 | 0.47 |
| 1:B:174:LEU:HD22 | 1:B:241:PRO:HG3 | 1.96 | 0.47 |
| 1:B:1114:CYS:HB3 | 1:B:1119:ILE:HB | 1.95 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:1163:VAL:HG21 | 1:A:1189:LEU:HD11 | 1.97 | 0.47 |
| 1:A:11:THR:HB | 1:A:14:ALA:HB2 | 1.96 | 0.47 |
| 1:A:947:ARG:HD3 | 3:A:1401:HOH:O | 2.14 | 0.47 |
| 1:A:1071:TYR:HE1 | 1:A:1104:LEU:HD11 | 1.80 | 0.47 |
| 1:B:1155:ARG:HB2 | 1:B:1158:THR:OG1 | 2.15 | 0.47 |
| 1:B:164:PHE:HD1 | 1:B:210:PHE:CE2 | 2.33 | 0.47 |
| 1:B:853:GLN:NE2 | 1:B:899:PHE:O | 2.48 | 0.47 |
| 1:B:1129:THR:HG22 | 1:B:1164:PRO:HA | 1.97 | 0.47 |
| 1:A:395(A):ILE:HG12 | 1:A:476:LEU:HD23 | 1.97 | 0.46 |
| 1:B:43:VAL:HG13 | 1:B:392:GLU:HA | 1.97 | 0.46 |
| 1:B:1133:SER:HB3 | 1:B:1134:PRO:HD3 | 1.96 | 0.46 |
| 1:B:278:ALA:O | 1:B:282:GLU:HG3 | 2.15 | 0.46 |
| 1:B:65:VAL:HG22 | 1:B:135:THR:HG23 | 1.97 | 0.46 |
| 1:B:1017:TYR:O | 1:B:1021:VAL:HG23 | 2.14 | 0.46 |
| 1:A:183:GLY:HA2 | 1:A:223:ILE:HD12 | 1.96 | 0.46 |
| 1:B:832:VAL:HG21 | 1:B:972:LEU:HB3 | 1.97 | 0.46 |
| 1:B:958:TYR:CG | 1:B:964:LEU:HD11 | 2.50 | 0.46 |
| 1:B:183:GLY:N | 1:B:187:GLU:OE2 | 2.36 | 0.46 |
| 1:B:1177:ILE:HG13 | 1:B:1182:LEU:HB2 | 1.98 | 0.46 |
| 1:B:40:LEU:HB3 | 1:B:380:TRP:CD1 | 2.51 | 0.46 |
| 1:B:872:ARG:NH2 | 1:B:880:VAL:O | 2.47 | 0.46 |
| 1:B:47:SER:OG | 1:B:474:VAL:HG12 | 2.15 | 0.46 |
| 1:B:369:ARG:HG3 | 1:B:379:TRP:CG | 2.50 | 0.46 |
| 1:B:693:GLN:NE2 | 1:B:743:ASP:O | 2.47 | 0.46 |
| 1:B:728:PHE:HE1 | 1:B:894:LYS:HD3 | 1.81 | 0.46 |
| 1:B:1079:ASP:OD1 | 1:B:1079:ASP:N | 2.48 | 0.46 |
| 1:A:487:THR:HG22 | 1:A:492:ASN:O | 2.15 | 0.46 |
| 1:A:567:MSE:SE | 1:A:570:LEU:HD11 | 2.65 | 0.46 |
| 1:B:352:ILE:O | 1:B:354:LEU:HD12 | 2.16 | 0.46 |
| 1:B:1014:PHE:O | 1:B:1018:VAL:HG22 | 2.16 | 0.46 |
| 1:A:23:ASP:OD2 | 1:A:25:SER:HB3 | 2.16 | 0.46 |
| 1:A:753:HIS:HB2 | 1:A:780:HIS:CE1 | 2.51 | 0.46 |
| 1:A:1120:THR:H | 1:A:1134:PRO:CG | 2.28 | 0.46 |
| 1:B:61:PRO:HB2 | 1:B:312:ALA:HB2 | 1.98 | 0.46 |
| 1:B:338:GLU:O | 1:B:342:SER:HB3 | 2.16 | 0.46 |
| 1:A:676:LYS:HD2 | 1:A:796:MSE:HE3 | 1.98 | 0.45 |
| 1:B:475:VAL:HG13 | 1:B:482:VAL:HG22 | 1.97 | 0.45 |
| 1:B:667:VAL:HG12 | 1:B:795:THR:HB | 1.98 | 0.45 |
| 1:A:49:ARG:HA | 1:A:52:VAL:HG22 | 1.98 | 0.45 |
| 1:B:1012:VAL:CG2 | 1:B:1016:LEU:HD23 | 2.47 | 0.45 |
| 1:A:1071:TYR:CE1 | 1:A:1104:LEU:HD11 | 2.52 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:776:PHE:O | 1:A:781:LYS:NZ | 2.50 | 0.45 |
| 1:A:1156:ALA:N | 2:A:1301:SO4:O1 | 2.46 | 0.45 |
| 1:B:191:ARG:HD2 | 1:B:1094:TYR:HD1 | 1.82 | 0.45 |
| 1:A:657:ASP:OD1 | 1:A:657:ASP:N | 2.49 | 0.45 |
| 1:A:1087:VAL:O | 1:A:1091:ILE:HG13 | 2.16 | 0.45 |
| 1:A:1120:THR:H | 1:A:1134:PRO:HG3 | 1.81 | 0.45 |
| 1:A:712:THR:HG22 | 1:A:722:VAL:HG13 | 1.99 | 0.45 |
| 1:A:851:ASP:O | 1:A:902:ARG:NH2 | 2.49 | 0.45 |
| 1:A:1148:MSE:HE2 | 1:A:1148:MSE:HB2 | 1.84 | 0.45 |
| 1:B:770:VAL:HG22 | 1:B:795:THR:HA | 1.98 | 0.45 |
| 1:B:882:VAL:O | 1:B:887:MSE:HE1 | 2.16 | 0.45 |
| 1:A:320:GLU:O | 1:A:324:THR:HG23 | 2.17 | 0.44 |
| 1:A:571:ASP:N | 1:A:571:ASP:OD1 | 2.50 | 0.44 |
| 1:A:966:GLU:HA | 1:A:969:TYR:CE2 | 2.51 | 0.44 |
| 1:B:83:PHE:HB3 | 1:B:86:SER:HB2 | 1.98 | 0.44 |
| 1:B:276:MSE:HG3 | 1:B:286:VAL:HG11 | 1.98 | 0.44 |
| 1:A:418:HIS:O | 1:A:421:THR:HB | 2.17 | 0.44 |
| 1:A:832:VAL:HG21 | 1:A:972:LEU:HB3 | 2.00 | 0.44 |
| 1:B:938:LEU:HA | 1:B:941:LEU:HD12 | 1.99 | 0.44 |
| 1:A:629:THR:HG22 | 1:A:631:TRP:H | 1.83 | 0.44 |
| 1:A:681:VAL:HG12 | 1:A:711:PHE:CE1 | 2.52 | 0.44 |
| 1:A:162:MSE:HE3 | 1:A:162:MSE:HB2 | 1.63 | 0.44 |
| 1:B:707:HIS:HA | 1:B:710:THR:HG22 | 1.99 | 0.44 |
| 1:A:292:LEU:O | 1:A:296:LEU:N | 2.44 | 0.44 |
| 1:A:195:LEU:CD2 | 1:A:208:VAL:HB | 2.44 | 0.44 |
| 1:B:452:LEU:O | 1:B:466:LEU:HD21 | 2.18 | 0.44 |
| 1:A:428:VAL:HA | 1:A:466:LEU:O | 2.18 | 0.44 |
| 1:A:1069:GLU:OE2 | 1:A:1073:ARG:NH2 | 2.51 | 0.44 |
| 1:B:56:LEU:HB2 | 1:B:62:LEU:HD22 | 2.00 | 0.44 |
| 1:B:80:ARG:HG3 | 1:B:80:ARG:HH11 | 1.83 | 0.44 |
| 1:A:105:VAL:HA | 1:A:108:VAL:HG22 | 1.99 | 0.44 |
| 1:A:302:THR:OG1 | 1:A:303:THR:N | 2.50 | 0.44 |
| 1:A:1004:GLU:HG2 | 1:A:1005:GLN:N | 2.33 | 0.44 |
| 1:A:676:LYS:HG2 | 1:A:796:MSE:SE | 2.68 | 0.43 |
| 1:B:96:LEU:HD12 | 1:B:336:PHE:CG | 2.53 | 0.43 |
| 1:B:935:LEU:HD12 | 1:B:988:ALA:HB2 | 1.99 | 0.43 |
| 1:A:428:VAL:HG21 | 1:A:470:LEU:HD12 | 1.99 | 0.43 |
| 1:A:633:ALA:HA | 1:A:636:GLU:HG3 | 2.00 | 0.43 |
| 1:A:386:SER:HG | 1:B:406:HIS:N | 2.16 | 0.43 |
| 1:A:1059:GLU:OE1 | 1:A:1059:GLU:N | 2.46 | 0.43 |
| 1:B:448:ALA:O | 1:B:463:VAL:HG22 | 2.18 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:16:LEU:HD21 | 1:A:483:ILE:HD13 | 2.00 | 0.43 |
| 1:A:784:ILE:HD12 | 1:A:784:ILE:N | 2.34 | 0.43 |
| 1:A:664:MSE:N | 1:A:792:ASP:OD1 | 2.45 | 0.43 |
| 1:B:319:PRO:HG3 | 1:B:381:THR:HG23 | 2.01 | 0.43 |
| 1:A:534:MSE:HE2 | 1:A:1064:ASP:HB3 | 2.00 | 0.43 |
| 1:A:1191:LEU:HD23 | 1:A:1191:LEU:HA | 1.87 | 0.43 |
| 1:B:24:PRO:HA | 1:B:27:GLN:HB2 | 2.00 | 0.43 |
| 1:A:427:VAL:HA | 1:A:484:ILE:O | 2.19 | 0.43 |
| 1:A:731:PRO:O | 1:A:735:ARG:HB3 | 2.19 | 0.43 |
| 1:B:534:MSE:HE3 | 1:B:534:MSE:HB3 | 1.99 | 0.43 |
| 1:B:669:CYS:HA | 1:B:797:SER:O | 2.19 | 0.43 |
| 1:B:675:GLY:O | 1:B:679:ILE:HD12 | 2.19 | 0.43 |
| 1:B:776:PHE:HB2 | 1:B:781:LYS:HG3 | 2.00 | 0.42 |
| 1:B:436:HIS:O | 1:B:439:VAL:HG22 | 2.19 | 0.42 |
| 1:B:445:ALA:O | 1:B:447:THR:N | 2.52 | 0.42 |
| 1:B:511:ASP:O | 1:B:1069:GLU:HG3 | 2.20 | 0.42 |
| 1:A:863:THR:O | 1:A:863:THR:OG1 | 2.37 | 0.42 |
| 1:A:1082:ALA:O | 1:A:1086:VAL:HG23 | 2.19 | 0.42 |
| 1:B:721:THR:OG1 | 1:B:746:VAL:HA | 2.20 | 0.42 |
| 1:B:1016:LEU:O | 1:B:1020:LEU:HG | 2.20 | 0.42 |
| 1:A:603:VAL:CG1 | 1:A:1021:VAL:HA | 2.50 | 0.42 |
| 1:A:827:PRO:O | 1:A:951:ARG:NH1 | 2.52 | 0.42 |
| 1:B:83:PHE:HB2 | 1:B:87:VAL:CG2 | 2.49 | 0.42 |
| 1:B:571:ASP:OD1 | 1:B:571:ASP:N | 2.53 | 0.42 |
| 1:B:596:LYS:O | 1:B:600:ARG:HB2 | 2.19 | 0.42 |
| 1:B:894:LYS:HE2 | 1:B:894:LYS:HB2 | 1.82 | 0.42 |
| 1:A:51:LEU:HD11 | 1:A:474:VAL:HG11 | 2.01 | 0.42 |
| 1:B:958:TYR:HB2 | 1:B:959:PRO:HD2 | 2.02 | 0.42 |
| 1:A:24:PRO:HA | 1:A:27:GLN:HB2 | 2.02 | 0.42 |
| 1:A:603:VAL:HG11 | 1:A:1021:VAL:HA | 2.01 | 0.42 |
| 1:B:514:ALA:O | 1:B:515:LEU:HD12 | 2.20 | 0.42 |
| 1:B:654:VAL:O | 1:B:658:MSE:HB2 | 2.20 | 0.42 |
| 1:B:123:ASP:CG | 1:B:125:THR:HG22 | 2.40 | 0.42 |
| 1:B:273:VAL:O | 1:B:277:LEU:HD12 | 2.20 | 0.41 |
| 1:B:600:ARG:NH2 | 1:B:1023:GLU:OE1 | 2.52 | 0.41 |
| 1:B:611:VAL:HG21 | 1:B:1028:TYR:HB3 | 2.02 | 0.41 |
| 1:A:676:LYS:HD3 | 1:A:796:MSE:HB3 | 2.01 | 0.41 |
| 1:B:879:ARG:HG2 | 1:B:905:ASP:OD2 | 2.20 | 0.41 |
| 1:B:939:HIS:HB2 | 1:B:975:ILE:HD11 | 2.02 | 0.41 |
| 1:B:1012:VAL:HG21 | 1:B:1016:LEU:HD23 | 2.02 | 0.41 |
| 1:A:428:VAL:HG11 | 1:A:470:LEU:HB2 | 2.02 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:438:VAL:O | 1:A:442:LEU:HG | 2.21 | 0.41 |
| 1:A:1178:ARG:HE | 1:A:1178:ARG:HB2 | 1.57 | 0.41 |
| 1:B:67:ALA:O | 1:B:137:THR:HG22 | 2.19 | 0.41 |
| 1:B:227:ARG:HD3 | 1:B:1089:GLU:HG3 | 2.00 | 0.41 |
| 1:B:418:HIS:NE2 | 1:B:480:ASN:OD1 | 2.38 | 0.41 |
| 1:A:222:ALA:HB2 | 1:A:229:ILE:HD11 | 2.01 | 0.41 |
| 1:A:879:ARG:HD3 | 1:B:879:ARG:HD3 | 2.02 | 0.41 |
| 1:B:814:GLU:OE2 | 1:B:814:GLU:N | 2.53 | 0.41 |
| 1:A:293:LEU:H | 1:A:293:LEU:HD22 | 1.84 | 0.41 |
| 1:B:107:THR:O | 1:B:111:ARG:HG3 | 2.21 | 0.41 |
| 1:B:836:ASP:HB3 | 1:B:839:GLN:HB2 | 2.03 | 0.41 |
| 1:A:677:THR:O | 1:A:681:VAL:HG13 | 2.20 | 0.41 |
| 1:A:725:LEU:HD21 | 1:A:754:ARG:HE | 1.85 | 0.41 |
| 1:A:876:PRO:HB2 | 1:B:881:VAL:HG12 | 2.02 | 0.41 |
| 1:B:911:THR:O | 1:B:915:THR:HG23 | 2.21 | 0.41 |
| 1:A:858:HIS:NE2 | 1:A:863:THR:HG23 | 2.35 | 0.41 |
| 1:A:1054:ALA:HB1 | 1:A:1104:LEU:HA | 2.03 | 0.41 |
| 1:A:1064:ASP:OD1 | 1:A:1067:ARG:NH2 | 2.54 | 0.41 |
| 1:A:1091:ILE:HA | 1:A:1095:GLY:O | 2.21 | 0.41 |
| 1:B:94:GLU:HG2 | 1:B:951:ARG:HD2 | 2.03 | 0.41 |
| 1:B:879:ARG:HG2 | 1:B:879:ARG:H | 1.69 | 0.41 |
| 1:B:889:GLU:CD | 1:B:889:GLU:H | 2.23 | 0.41 |
| 1:A:671:ASP:OD1 | 1:A:671:ASP:N | 2.47 | 0.40 |
| 1:A:138:ARG:HG3 | 1:A:362:PHE:CE1 | 2.56 | 0.40 |
| 1:A:434:THR:O | 1:A:434:THR:OG1 | 2.36 | 0.40 |
| 1:A:912:ILE:H | 1:A:912:ILE:HD12 | 1.86 | 0.40 |
| 1:A:1174:ALA:HB3 | 1:A:1175:PRO:HD3 | 2.02 | 0.40 |
| 1:A:544:ARG:HH22 | 1:A:1049:ASP:HA | 1.87 | 0.40 |
| 1:B:191:ARG:HD2 | 1:B:1094:TYR:CD1 | 2.56 | 0.40 |
| 1:B:594:ASN:OD1 | 1:B:595:THR:N | 2.54 | 0.40 |
| 1:B:808:SER:HB3 | 1:B:1022:GLY:HA2 | 2.03 | 0.40 |
| 1:B:756:LEU:HD11 | 1:B:780:HIS:HA | 2.03 | 0.40 |
| 1:B:788:ARG:NH1 | 1:B:813:ARG:HH12 | 2.19 | 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 | 1140/1235 (92%) | 1081 (95%) | 56 (5%) | 3 (0%) | 41 | 74 |
| 1 | B | 1137/1235 (92%) | 1070 (94%) | 61 (5%) | 6 (0%) | 29 | 66 |
| All | All | 2277/2470 (92%) | 2151 (94%) | 117 (5%) | 9 (0%) | 34 | 70 |

All (9) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 1134 | PRO |
| 1 | B | 588 | GLY |
| 1 | A | 560 | THR |
| 1 | A | 1134 | PRO |
| 1 | B | 248 | THR |
| 1 | B | 758 | THR |
| 1 | B | 463 | VAL |
| 1 | B | 672 | VAL |
| 1 | A | 183 | GLY |

### 5.3.2 Protein sidechains (i)

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

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

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 1 | A | 827/961 (86%) | 809 (98%) | 18 (2%) | 52 | 80 |
| 1 | B | 807/961 (84%) | 798 (99%) | 9 (1%) | 73 | 90 |
| All | All | 1634/1922 (85%) | 1607 (98%) | 27 (2%) | 60 | 84 |

All (27) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 25 | SER |
| 1 | A | 114 | LEU |
| 1 | A | 198 | PHE |
| 1 | A | 231 | GLU |
| 1 | A | 334 | ARG |
| 1 | A | 389 | SER |
| 1 | A | 467 | LYS |
| 1 | A | 537 | ARG |
| 1 | A | 646 | ASP |
| 1 | A | 676 | LYS |
| 1 | A | 815 | MSE |
| 1 | A | 879 | ARG |
| 1 | A | 888 | ASN |
| 1 | A | 1067 | ARG |
| 1 | A | 1144 | ARG |
| 1 | A | 1176 | ARG |
| 1 | A | 1180 | LEU |
| 1 | A | 1203 | MSE |
| 1 | B | 198 | PHE |
| 1 | B | 211 | TRP |
| 1 | B | 519 | ASP |
| 1 | B | 587 | LEU |
| 1 | B | 669 | CYS |
| 1 | B | 682 | ARG |
| 1 | B | 860 | ARG |
| 1 | B | 985 | MSE |
| 1 | B | 1064 | ASP |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 594 | ASN |

### 5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry (i)

5 ligands are modelled in this entry.

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

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\| > 2$ | Counts | RMSZ | $\#\|Z\| > 2$ |
| 2 | SO4 | A | 1301 | - | 4,4,4 | 0.14 | 0 | 6,6,6 | 0.08 | 0 |
| 2 | SO4 | A | 1303 | - | 4,4,4 | 0.15 | 0 | 6,6,6 | 0.06 | 0 |
| 2 | SO4 | B | 1301 | - | 4,4,4 | 0.14 | 0 | 6,6,6 | 0.11 | 0 |
| 2 | SO4 | A | 1302 | - | 4,4,4 | 0.14 | 0 | 6,6,6 | 0.11 | 0 |
| 2 | SO4 | B | 1302 | - | 4,4,4 | 0.13 | 0 | 6,6,6 | 0.06 | 0 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 2 | A | 1301 | SO4 | 1 | 0 |
| 2 | A | 1302 | SO4 | 1 | 0 |

## 5.7 Other polymers (i)

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 | 1129/1235 (91%) | 0.11 | 34 (3%) | 50 | 31 | 43, 76, 115, 138 | 0 |
| 1 | B | 1128/1235 (91%) | 0.10 | 33 (2%) | 51 | 32 | 46, 82, 116, 153 | 0 |
| All | All | 2257/2470 (91%) | 0.11 | 67 (2%) | 50 | 31 | 43, 78, 115, 153 | 0 |

All (67) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | B | 717 | GLY | 4.6 |
| 1 | B | 463 | VAL | 4.5 |
| 1 | A | 552 | ALA | 4.3 |
| 1 | B | 540 | GLY | 4.2 |
| 1 | B | 349 | ASP | 4.1 |
| 1 | A | 551 | TYR | 3.8 |
| 1 | B | 682 | ARG | 3.5 |
| 1 | A | 746 | VAL | 3.5 |
| 1 | A | 1172 | VAL | 3.3 |
| 1 | B | 213 | ASP | 3.2 |
| 1 | B | 633 | ALA | 3.2 |
| 1 | B | 491 | GLY | 3.2 |
| 1 | B | 964 | LEU | 3.2 |
| 1 | A | 762 | TRP | 3.1 |
| 1 | B | 445 | ALA | 3.0 |
| 1 | A | 550 | GLU | 3.0 |
| 1 | A | 563 | LEU | 2.9 |
| 1 | B | 581 | ALA | 2.9 |
| 1 | A | 743 | ASP | 2.9 |
| 1 | B | 444 | GLU | 2.9 |
| 1 | B | 515 | LEU | 2.8 |
| 1 | A | 1127 | ALA | 2.8 |
| 1 | A | 559 | GLY | 2.8 |
| 1 | A | 691 | GLY | 2.7 |

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| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | A | 765 | LEU | 2.7 |
| 1 | B | 720 | VAL | 2.7 |
| 1 | B | 551 | TYR | 2.7 |
| 1 | B | 480 | ASN | 2.7 |
| 1 | A | 561 | ASP | 2.7 |
| 1 | A | 261 | GLU | 2.7 |
| 1 | A | 789 | THR | 2.7 |
| 1 | B | 464 | GLY | 2.6 |
| 1 | A | 791 | VAL | 2.6 |
| 1 | B | 425 | ALA | 2.5 |
| 1 | A | 582 | PRO | 2.5 |
| 1 | A | 246 | LEU | 2.5 |
| 1 | A | 286 | VAL | 2.4 |
| 1 | A | 631 | TRP | 2.4 |
| 1 | A | 663 | PRO | 2.4 |
| 1 | B | 817 | THR | 2.4 |
| 1 | A | 174 | LEU | 2.4 |
| 1 | B | 347 | GLY | 2.3 |
| 1 | A | 693 | GLN | 2.3 |
| 1 | B | 350 | ALA | 2.3 |
| 1 | B | 460 | ALA | 2.3 |
| 1 | A | 760 | VAL | 2.3 |
| 1 | B | 719 | PRO | 2.3 |
| 1 | A | 761 | THR | 2.3 |
| 1 | A | 494 | VAL | 2.2 |
| 1 | B | 277 | LEU | 2.2 |
| 1 | A | 732 | ALA | 2.2 |
| 1 | A | 675 | GLY | 2.2 |
| 1 | A | 1176 | ARG | 2.2 |
| 1 | B | 483 | ILE | 2.1 |
| 1 | B | 465 | VAL | 2.1 |
| 1 | B | 415 | LEU | 2.1 |
| 1 | B | 484 | ILE | 2.1 |
| 1 | B | 449 | ALA | 2.1 |
| 1 | A | 564 | TYR | 2.1 |
| 1 | A | 1168 | ALA | 2.0 |
| 1 | B | 448 | ALA | 2.0 |
| 1 | A | 231 | GLU | 2.0 |
| 1 | B | 470 | LEU | 2.0 |
| 1 | A | 759 | GLY | 2.0 |
| 1 | B | 741 | LEU | 2.0 |
| 1 | B | 590 | SER | 2.0 |

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| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | A | 272 | THR | 2.0 |

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

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

## 6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

## 6.4 Ligands (i)

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

| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å$^2$) | Q<0.9 |
|---|---|---|---|---|---|---|---|---|
| 2 | SO4 | B | 1302 | 5/5 | 0.81 | 0.16 | 121,128,130,135 | 0 |
| 2 | SO4 | A | 1303 | 5/5 | 0.97 | 0.17 | 78,81,90,90 | 0 |
| 2 | SO4 | A | 1302 | 5/5 | 0.97 | 0.18 | 63,63,64,64 | 0 |
| 2 | SO4 | B | 1301 | 5/5 | 0.98 | 0.15 | 61,66,69,76 | 0 |
| 2 | SO4 | A | 1301 | 5/5 | 0.98 | 0.13 | 63,69,78,79 | 0 |

## 6.5 Other polymers (i)

There are no such residues in this entry.