# Full wwPDB EM Validation Report

Aug 21, 2025 – 06:57 pm BST

| | | |
|---|---|---|
| PDB ID | : | 9H4P / pdb_00009h4p |
| EMDB ID | : | EMD-51866 |
| Title | : | Tail of full Haloferax tailed virus 1 |
| Authors | : | Zhang, D.; Daum, B.; Isupov, M.N.; McLaren, M. |
| Deposited on | : | 2024-10-21 |
| Resolution | : | 2.44 Å(reported) |

This is a Full wwPDB EM 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/EMValidationReportHelp
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.

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

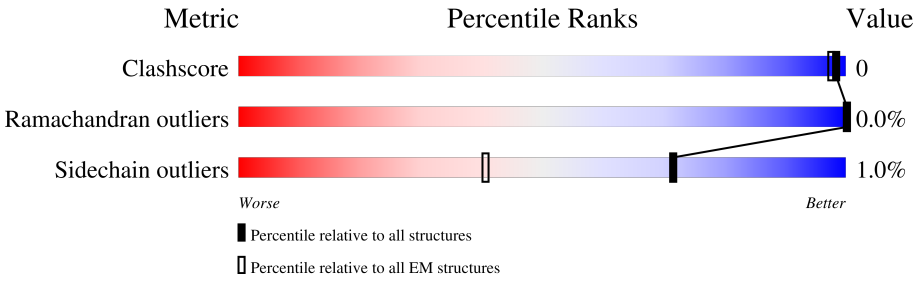
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev126 |
| Mogul | : | 1.8.4, CSD as541be (2020) |
| MolProbity | : | 4-5-2 with Phenix2.0rc1 |
| Percentile statistics | : | 20231227.v01 (using entries in the PDB archive December 27th 2023) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.45.1 |

# 1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.44 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) | EM structures (#Entries) |
|---|---|---|
| Clashscore | 210492 | 15764 |
| Ramachandran outliers | 207382 | 16835 |
| Sidechain outliers | 206894 | 16415 |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | BD | 954 | 97% |
| 1 | BE | 954 | 96% |
| 1 | BF | 954 | 17% 96% |
| 2 | QE | 341 | 16% 93% 6% |
| 2 | QF | 341 | 18% 88% 7% 5% |
| 2 | QG | 341 | 17% 94% |
| 2 | QH | 341 | 16% 88% 7% 5% |
| 2 | QI | 341 | 16% 92% 7% |

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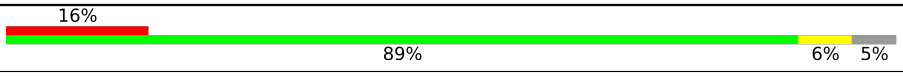
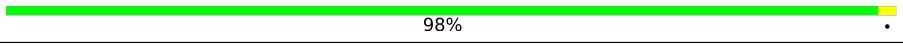
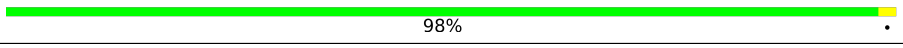
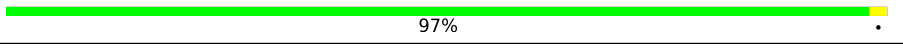
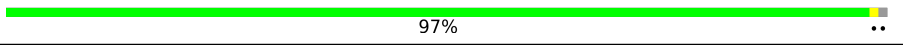
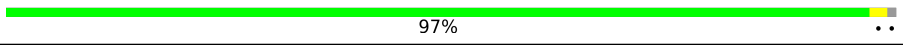
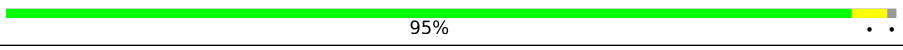
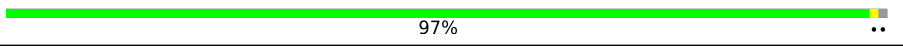
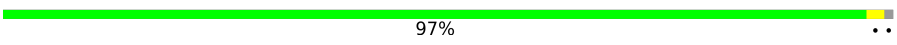
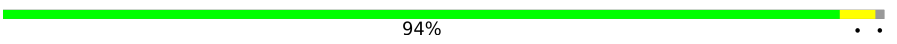
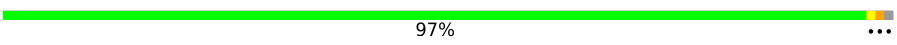
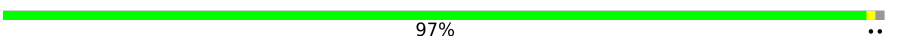
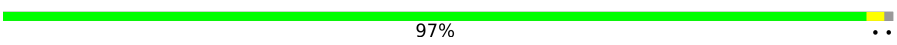
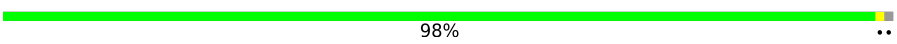
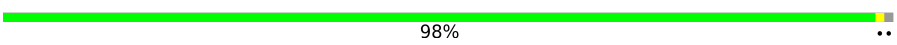
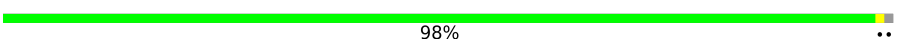
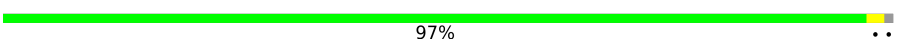
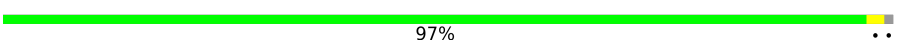
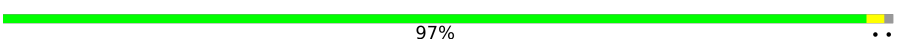
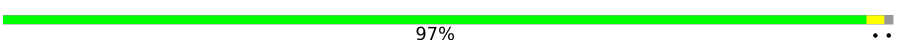
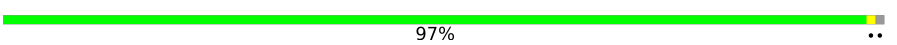
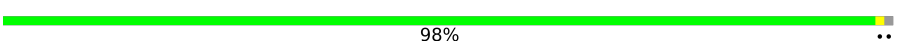
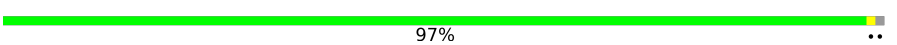
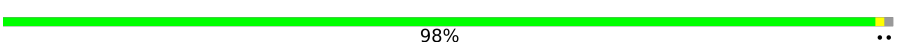
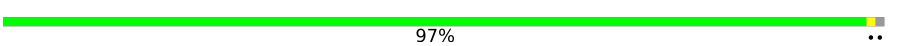
| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 2 | QJ | 341 |   |
| 3 | BA | 285 |   |
| 3 | BB | 285 |   |
| 3 | BC | 285 |   |
| 4 | B1 | 158 |   |
| 4 | B2 | 158 |   |
| 4 | B3 | 158 |   |
| 4 | B4 | 158 |   |
| 4 | B5 | 158 |   |
| 4 | B6 | 158 |   |
| 4 | P1 | 158 |   |
| 4 | P2 | 158 |   |
| 4 | P3 | 158 |   |
| 4 | P4 | 158 |   |
| 4 | P5 | 158 |   |
| 4 | P6 | 158 |   |
| 4 | S1 | 158 |   |
| 4 | S2 | 158 |   |
| 4 | SA | 158 |   |
| 4 | SB | 158 |   |
| 4 | SC | 158 |   |
| 4 | SD | 158 |   |
| 4 | SE | 158 |   |
| 4 | SF | 158 |   |
| 4 | SG | 158 |   |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 4 | SH | 158 | 97% |
| 4 | SI | 158 | 97% |
| 4 | SJ | 158 | 97% |
| 4 | SK | 158 | 99% |
| 4 | SL | 158 | 97% |
| 4 | SM | 158 | 98% |
| 4 | SN | 158 | 96% |
| 4 | SO | 158 | 98% |
| 4 | SP | 158 | 99% |
| 4 | SQ | 158 | 97% |
| 4 | SR | 158 | 97% |
| 4 | SS | 158 | 98% |
| 4 | ST | 158 | 96% |
| 4 | SU | 158 | 99% |
| 4 | SV | 158 | 97% |
| 4 | SW | 158 | 98% |
| 4 | SX | 158 | 96% |
| 4 | SY | 158 | 96% |
| 4 | SZ | 158 | 97% |
| 4 | Sa | 158 | 96% |
| 4 | Sb | 158 | 96% |
| 4 | Sc | 158 | 96% |
| 4 | Sd | 158 | 96% |
| 4 | Se | 158 | 97% |
| 4 | Sf | 158 | 97% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 4 | Sg | 158 | 97% |
| 4 | Sh | 158 | 97% |
| 4 | Si | 158 | 97% |
| 4 | Sj | 158 | 97% |
| 4 | Sk | 158 | 98% |
| 4 | Sl | 158 | 97% |
| 4 | Sm | 158 | 96% |
| 4 | Sn | 158 | 98% |
| 4 | So | 158 | 97% |
| 4 | Sp | 158 | 97% |
| 4 | Sq | 158 | 97% |
| 4 | Sr | 158 | 97% |
| 4 | Ss | 158 | 97% |
| 4 | St | 158 | 98% |
| 4 | Su | 158 | 97% |
| 4 | Sv | 158 | 97% |
| 4 | Sw | 158 | 97% |
| 4 | Sx | 158 | 98% |
| 4 | Sy | 158 | 97% |
| 4 | Sz | 158 | 98% |
| 5 | Pa | 157 | 98% |
| 5 | Pb | 157 | 98% |
| 5 | Pc | 157 | 97% |
| 5 | Pd | 157 | 98% |
| 5 | Pe | 157 | 97% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 5 | Pf | 157 | 99% |
| 6 | PM | 141 | 98% |
| 6 | PN | 141 | 97% |
| 6 | PO | 141 | 97% |
| 6 | PP | 141 | 97% |
| 6 | PQ | 141 | 97% |
| 6 | PR | 141 | 97% |
| 6 | PS | 141 | 98% |
| 6 | PT | 141 | 97% |
| 6 | PU | 141 | 98% |
| 6 | PV | 141 | 96% |
| 6 | PW | 141 | 98% |
| 6 | PX | 141 | 98% |
| 7 | PA | 675 | 9% 58% 41% |
| 7 | PB | 675 | 9% 58% 41% |
| 7 | PC | 675 | 9% 58% 41% |
| 7 | PD | 675 | 10% 58% 41% |
| 7 | PE | 675 | 10% 58% 41% |
| 7 | PF | 675 | 9% 58% 41% |
| 7 | PG | 675 | 9% 58% 41% |
| 7 | PH | 675 | 10% 58% 41% |
| 7 | PI | 675 | 10% 58% 41% |
| 7 | PJ | 675 | 10% 58% 41% |
| 7 | PK | 675 | 10% 58% 41% |
| 7 | PL | 675 | 11% 58% 41% |

# 2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 179352 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Baseplate hub.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 1 | BD | 953 | Total | C | N | O | S | 0 | 0 |
| | | | 7212 | 4427 | 1207 | 1573 | 5 | | |
| 1 | BE | 953 | Total | C | N | O | S | 0 | 0 |
| | | | 7212 | 4427 | 1207 | 1573 | 5 | | |
| 1 | BF | 953 | Total | C | N | O | S | 0 | 0 |
| | | | 7212 | 4427 | 1207 | 1573 | 5 | | |

- Molecule 2 is a protein called Phate tail tape measure protein.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 2 | QG | 337 | Total | C | N | O | S | 0 | 0 |
| | | | 2498 | 1541 | 427 | 522 | 8 | | |
| 2 | QH | 324 | Total | C | N | O | S | 0 | 0 |
| | | | 2409 | 1485 | 411 | 505 | 8 | | |
| 2 | QI | 337 | Total | C | N | O | S | 0 | 0 |
| | | | 2498 | 1541 | 427 | 522 | 8 | | |
| 2 | QJ | 324 | Total | C | N | O | S | 0 | 0 |
| | | | 2409 | 1485 | 411 | 505 | 8 | | |
| 2 | QE | 337 | Total | C | N | O | S | 0 | 0 |
| | | | 2498 | 1541 | 427 | 522 | 8 | | |
| 2 | QF | 324 | Total | C | N | O | S | 0 | 0 |
| | | | 2409 | 1485 | 411 | 505 | 8 | | |

- Molecule 3 is a protein called Baseplate to tube adapter protein gp41.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 3 | BA | 284 | Total | C | N | O | 0 | 0 |
| | | | 2136 | 1332 | 375 | 429 | | |
| 3 | BB | 284 | Total | C | N | O | 0 | 0 |
| | | | 2136 | 1332 | 375 | 429 | | |
| 3 | BC | 284 | Total | C | N | O | 0 | 0 |
| | | | 2136 | 1332 | 375 | 429 | | |

- Molecule 4 is a protein called Tail tube protein.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 4 | SG | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SH | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SI | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SJ | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SK | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SL | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SS | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | ST | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SU | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SV | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SW | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SX | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SM | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SN | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SO | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SP | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SQ | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SR | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SB | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SA | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SC | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SD | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |

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| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 4 | SE | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SF | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sk | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sl | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sm | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sn | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | So | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sp | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Se | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sf | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sg | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sh | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Si | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sj | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SY | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | SZ | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sa | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sb | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sc | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sd | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | B1 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |

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| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 4 | B2 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | B3 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | B4 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | B5 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | B6 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sw | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sx | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sy | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sz | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | S1 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | S2 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sq | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sr | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Ss | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | St | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Su | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | Sv | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | P1 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | P2 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | P3 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | P4 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |

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| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 4 | P5 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |
| 4 | P6 | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1196 | 747 | 189 | 259 | 1 | | |

- Molecule 5 is a protein called SPP1 gp17-like tail completion protein.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 5 | Pa | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1220 | 753 | 200 | 264 | 3 | | |
| 5 | Pb | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1220 | 753 | 200 | 264 | 3 | | |
| 5 | Pc | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1220 | 753 | 200 | 264 | 3 | | |
| 5 | Pd | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1220 | 753 | 200 | 264 | 3 | | |
| 5 | Pe | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1220 | 753 | 200 | 264 | 3 | | |
| 5 | Pf | 156 | Total | C | N | O | S | 0 | 0 |
| | | | 1220 | 753 | 200 | 264 | 3 | | |

- Molecule 6 is a protein called HK97 gp6-like/SPP1 gp15-like head-tail connector.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 6 | PT | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PM | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PN | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PO | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PP | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PQ | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PR | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PS | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PU | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |

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| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 6 | PV | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PW | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |
| 6 | PX | 140 | Total | C | N | O | S | 0 | 0 |
| | | | 1087 | 666 | 184 | 235 | 2 | | |

- Molecule 7 is a protein called Portal protein.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | PA | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PB | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PC | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PD | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PE | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PF | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PG | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PH | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PI | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PJ | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PK | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |
| 7 | PL | 396 | Total | C | N | O | P | S | 0 | 0 |
| | | | 3106 | 1925 | 528 | 640 | 3 | 10 | | |

- Molecule 8 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

| Mol | Chain | Residues | Atoms | | AltConf |
|---|---|---|---|---|---|
| 8 | BD | 1 | Total | Mg | 0 |
| | | | 1 | 1 | |
| 8 | BE | 1 | Total | Mg | 0 |
| | | | 1 | 1 | |

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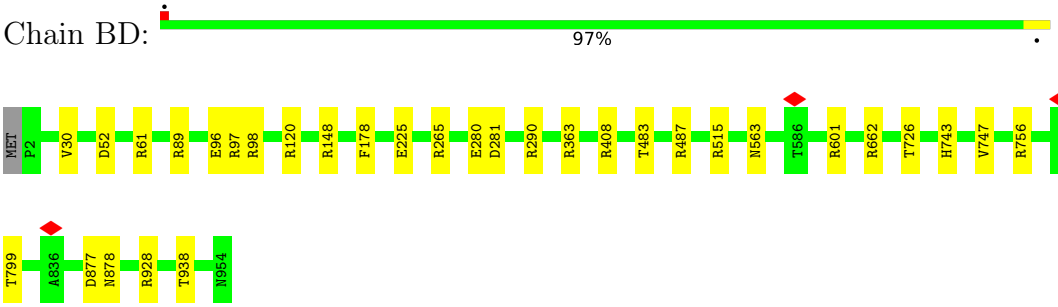
| Mol | Chain | Residues | Atoms | AltConf |
|---|---|---|---|---|
| 8 | BF | 1 | Total Mg<br>1 1 | 0 |
| 8 | PT | 1 | Total Mg<br>1 1 | 0 |
| 8 | PM | 1 | Total Mg<br>1 1 | 0 |
| 8 | PN | 1 | Total Mg<br>1 1 | 0 |
| 8 | PO | 1 | Total Mg<br>1 1 | 0 |
| 8 | PP | 1 | Total Mg<br>1 1 | 0 |
| 8 | PQ | 1 | Total Mg<br>1 1 | 0 |
| 8 | PR | 1 | Total Mg<br>1 1 | 0 |
| 8 | PS | 1 | Total Mg<br>1 1 | 0 |
| 8 | PU | 2 | Total Mg<br>2 2 | 0 |
| 8 | PV | 1 | Total Mg<br>1 1 | 0 |
| 8 | PW | 1 | Total Mg<br>1 1 | 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 atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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.

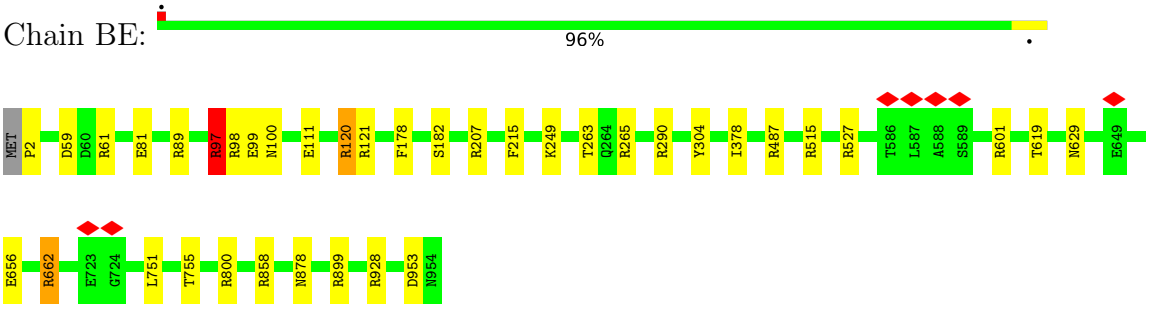
• Molecule 1: Baseplate hub

Chain BD:



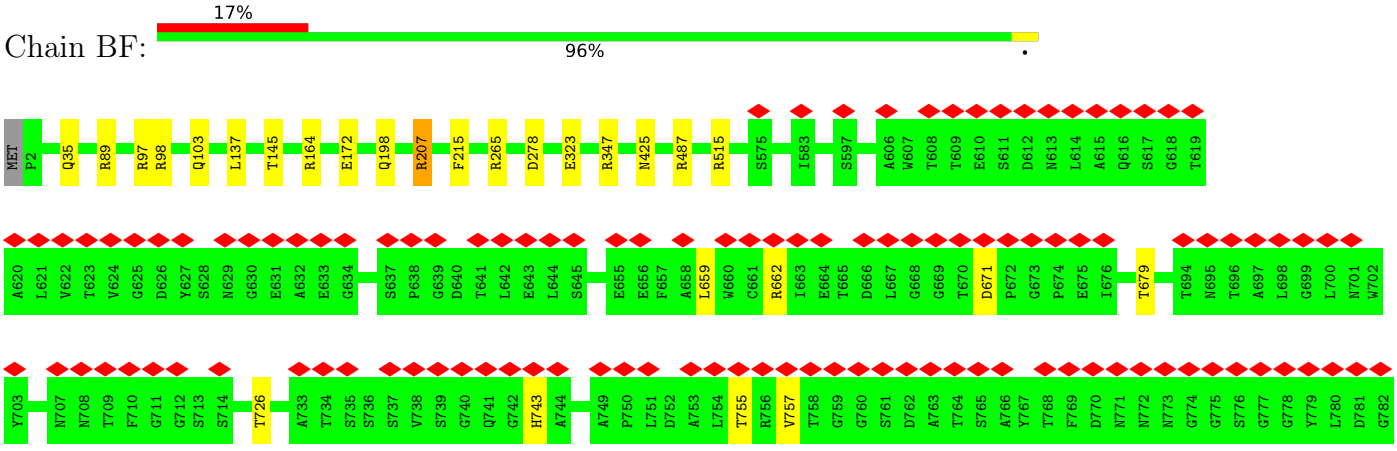

• Molecule 1: Baseplate hub

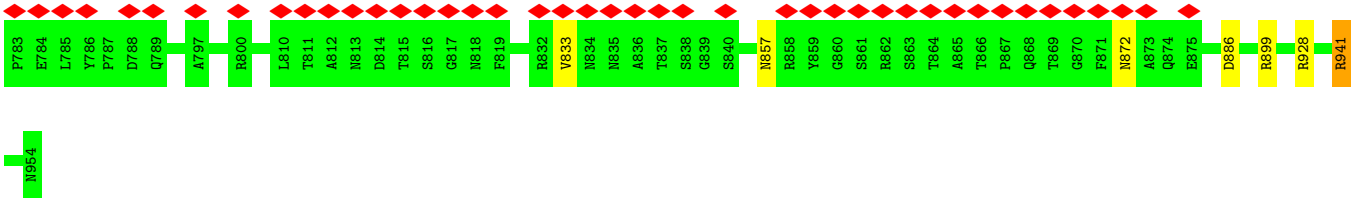
Chain BE:




• Molecule 1: Baseplate hub

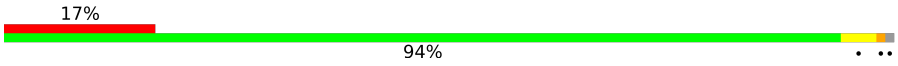
Chain BF:

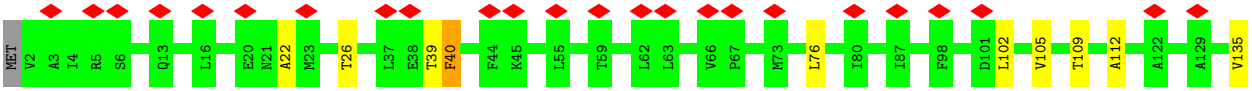


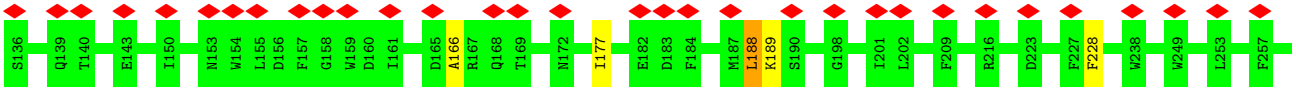



• Molecule 2: Phate tail tape measure protein

Chain QG:



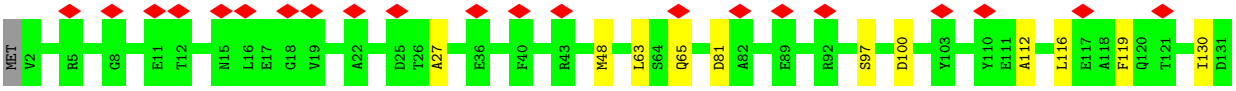



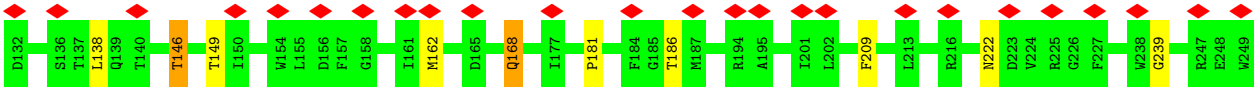



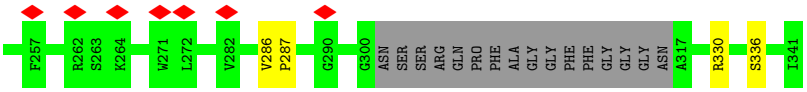


• Molecule 2: Phate tail tape measure protein

Chain QH:

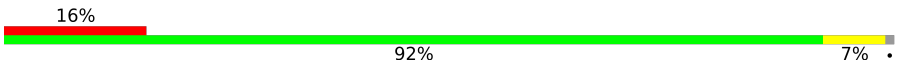



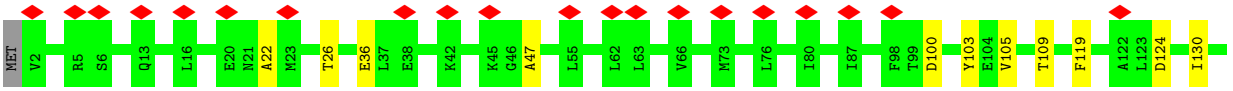



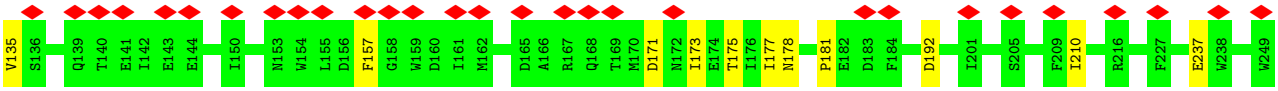



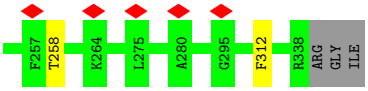

• Molecule 2: Phate tail tape measure protein

Chain QI:



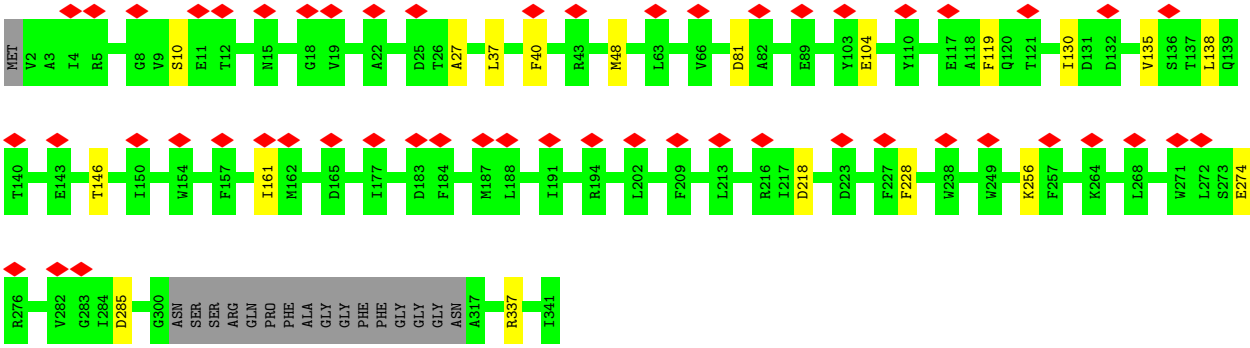





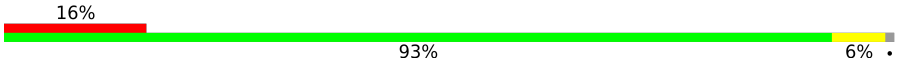

• Molecule 2: Phate tail tape measure protein

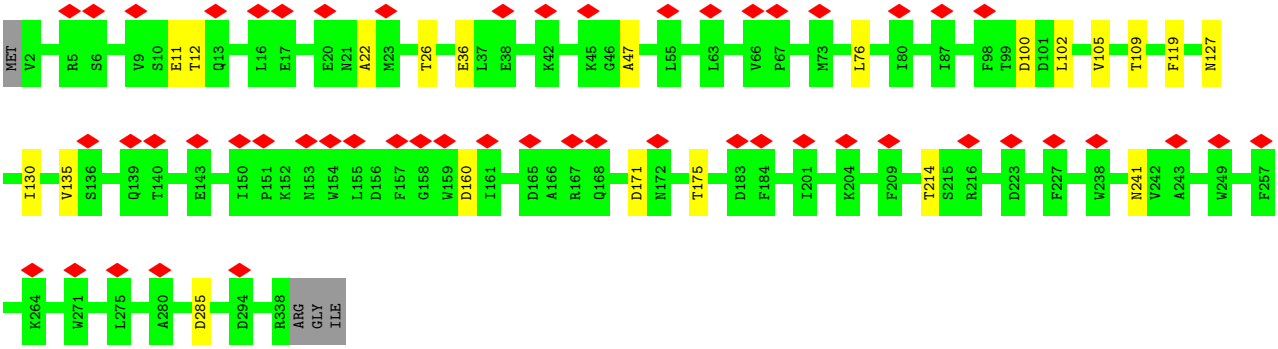
Chain QJ:


• Molecule 2: Phate tail tape measure protein

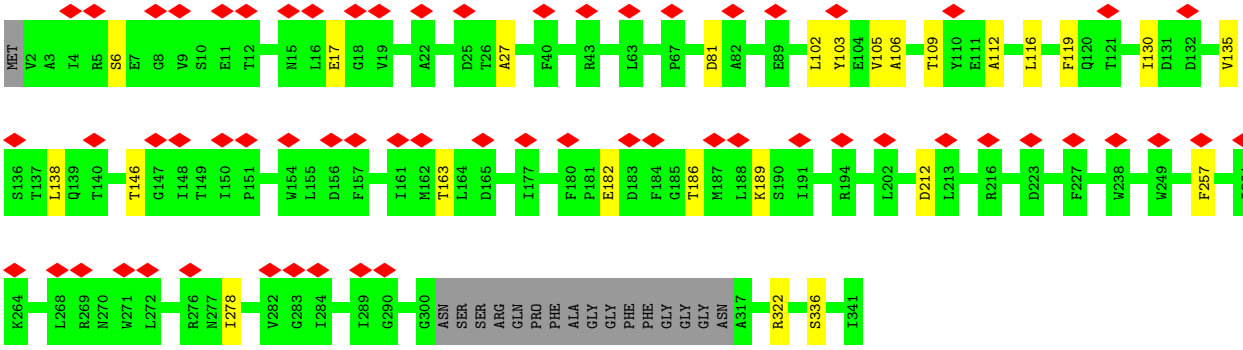
Chain QE:



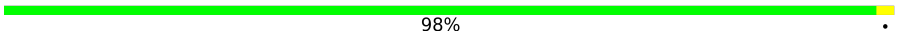

• Molecule 2: Phate tail tape measure protein

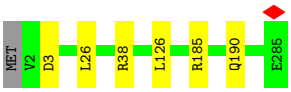
Chain QF:


• Molecule 3: Baseplate to tube adapter protein gp41

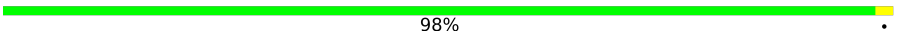
Chain BA:

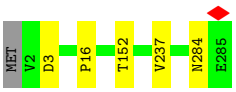



• Molecule 3: Baseplate to tube adapter protein gp41

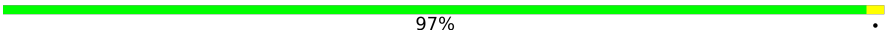
Chain BB:




• Molecule 3: Baseplate to tube adapter protein gp41

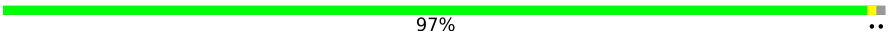
Chain BC:





• Molecule 4: Tail tube protein

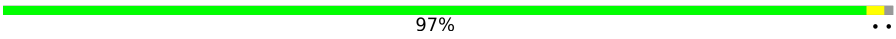
Chain SG:

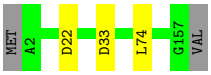




• Molecule 4: Tail tube protein

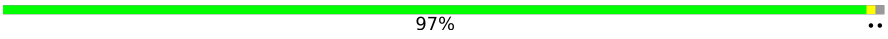
Chain SH:




• Molecule 4: Tail tube protein

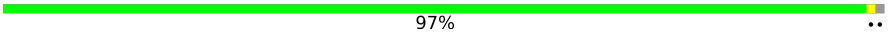
Chain SI:





• Molecule 4: Tail tube protein

Chain SJ:



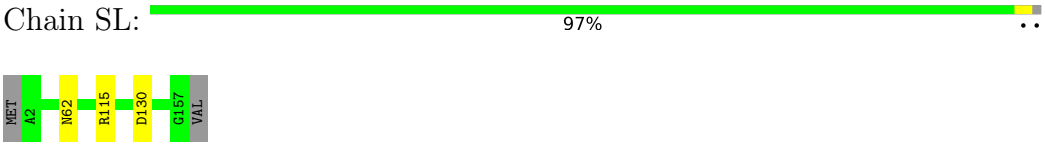


• Molecule 4: Tail tube protein

Chain SK:

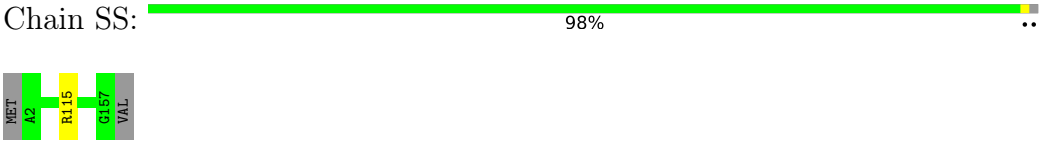

• Molecule 4: Tail tube protein

Chain SL:



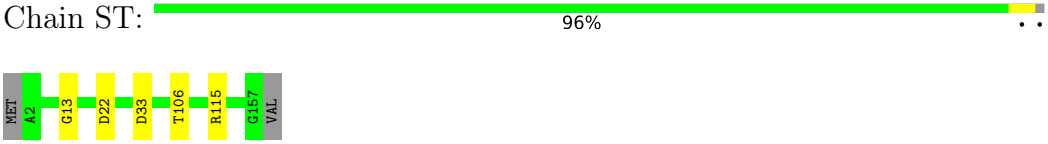

• Molecule 4: Tail tube protein

Chain SS:




• Molecule 4: Tail tube protein

Chain ST:

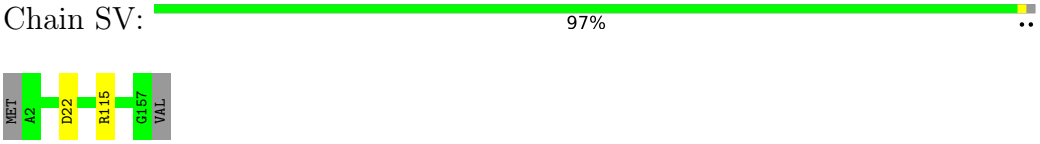



• Molecule 4: Tail tube protein

Chain SU:

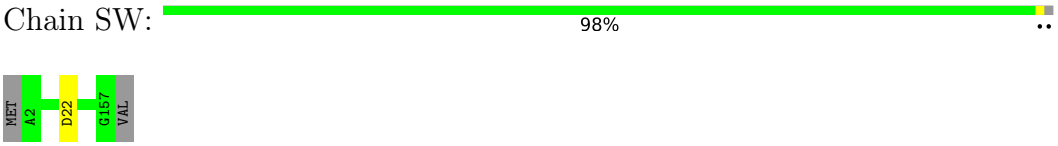

• Molecule 4: Tail tube protein

Chain SV:



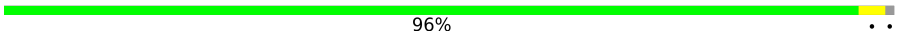

• Molecule 4: Tail tube protein

Chain SW:




• Molecule 4: Tail tube protein

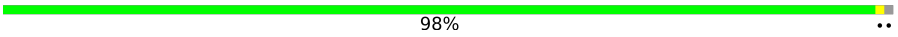
Chain SX:





• Molecule 4: Tail tube protein

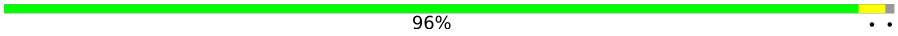
Chain SM:





• Molecule 4: Tail tube protein

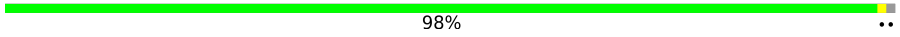
Chain SN:





• Molecule 4: Tail tube protein

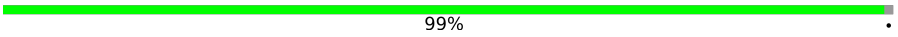
Chain SO:





• Molecule 4: Tail tube protein

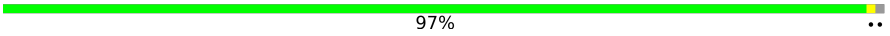
Chain SP:





• Molecule 4: Tail tube protein

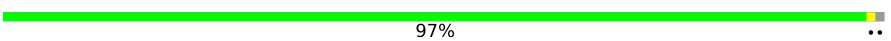
Chain SQ:





• Molecule 4: Tail tube protein

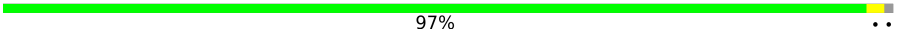
Chain SR:

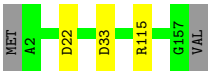




• Molecule 4: Tail tube protein

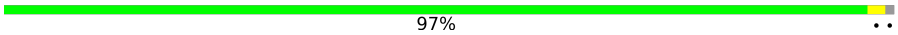
Chain SB:




• Molecule 4: Tail tube protein

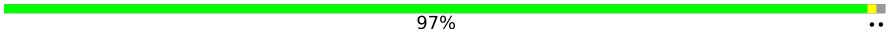
Chain SA:





• Molecule 4: Tail tube protein

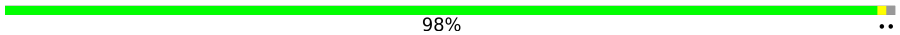
Chain SC:





• Molecule 4: Tail tube protein

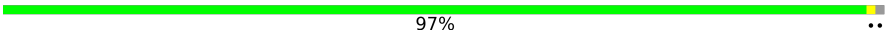
Chain SD:





• Molecule 4: Tail tube protein

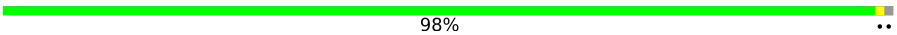
Chain SE:

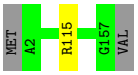




• Molecule 4: Tail tube protein

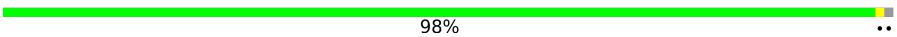
Chain SF:




• Molecule 4: Tail tube protein

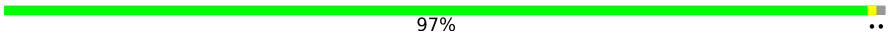
Chain Sk:





• Molecule 4: Tail tube protein

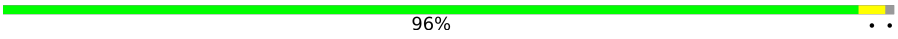
Chain Sl:





• Molecule 4: Tail tube protein

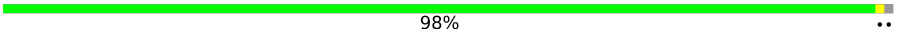
Chain Sm:

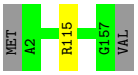




• Molecule 4: Tail tube protein

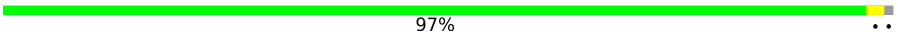
Chain Sn:

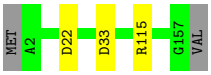



• Molecule 4: Tail tube protein

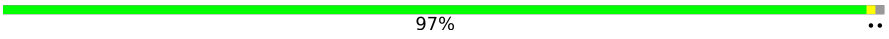
Chain So:




• Molecule 4: Tail tube protein

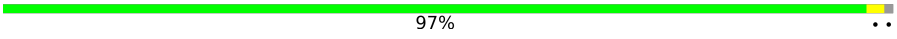
Chain Sp:

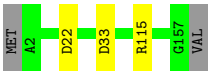




• Molecule 4: Tail tube protein

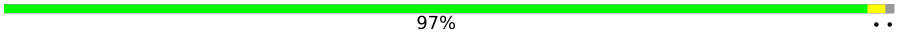
Chain Se:

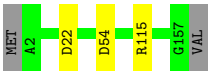



• Molecule 4: Tail tube protein

Chain Sf:




• Molecule 4: Tail tube protein

Chain Sg:


• Molecule 4: Tail tube protein

Chain Sh:


• Molecule 4: Tail tube protein

Chain Si:


• Molecule 4: Tail tube protein

Chain Sj:


• Molecule 4: Tail tube protein

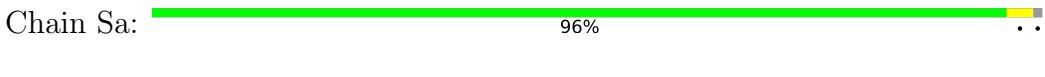
Chain SY:


• Molecule 4: Tail tube protein

Chain SZ:

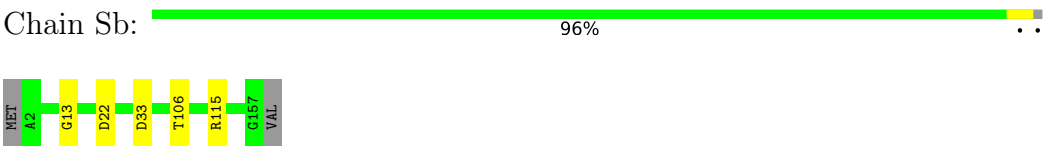

• Molecule 4: Tail tube protein

Chain Sa:



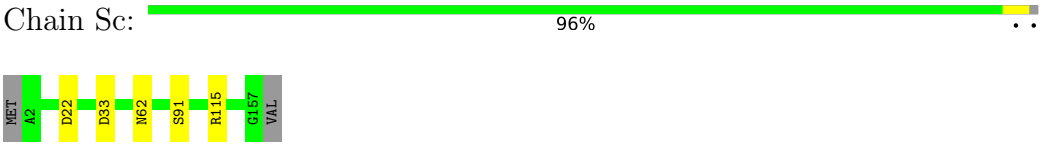

• Molecule 4: Tail tube protein

Chain Sb:



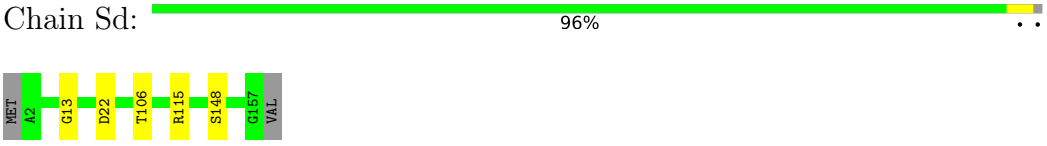

• Molecule 4: Tail tube protein

Chain Sc:



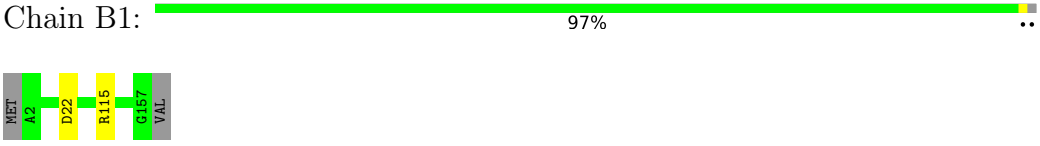

• Molecule 4: Tail tube protein

Chain Sd:



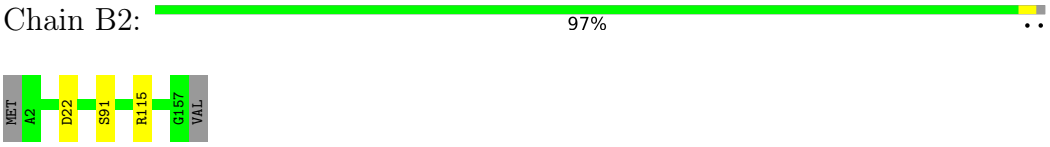

• Molecule 4: Tail tube protein

Chain B1:



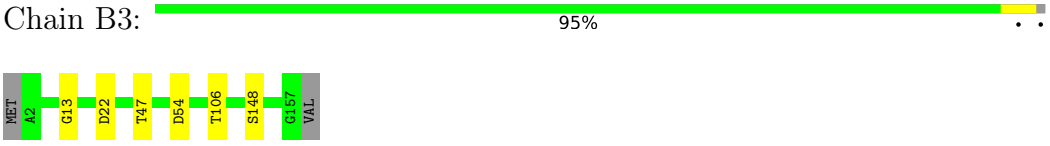

• Molecule 4: Tail tube protein

Chain B2:



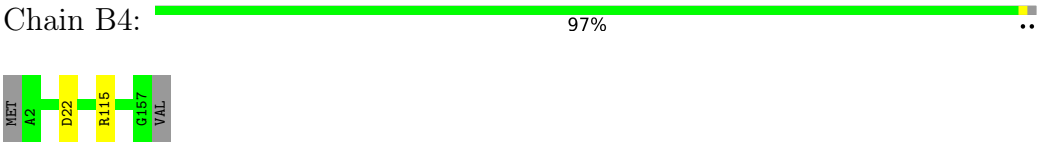

• Molecule 4: Tail tube protein

Chain B3:



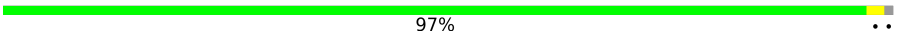

• Molecule 4: Tail tube protein

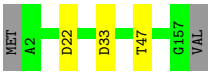
Chain B4:




• Molecule 4: Tail tube protein

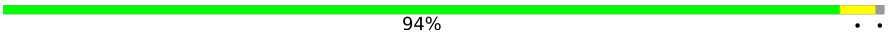
Chain B5:

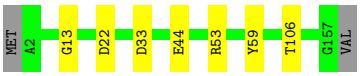



• Molecule 4: Tail tube protein

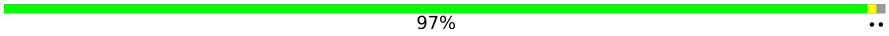
Chain B6:

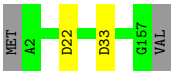



• Molecule 4: Tail tube protein

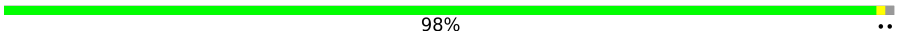
Chain Sw:

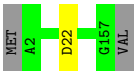



• Molecule 4: Tail tube protein

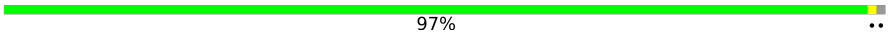
Chain Sx:

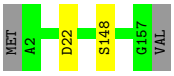



• Molecule 4: Tail tube protein

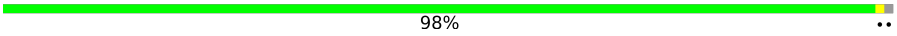
Chain Sy:

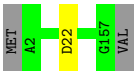



• Molecule 4: Tail tube protein

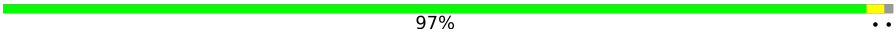
Chain Sz:

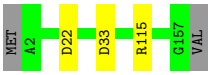



• Molecule 4: Tail tube protein

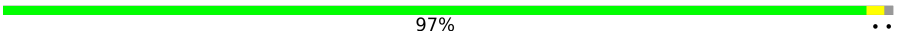
Chain S1:

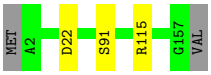



• Molecule 4: Tail tube protein

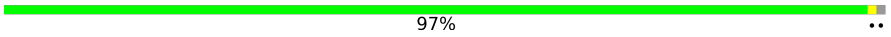
Chain S2:




• Molecule 4: Tail tube protein

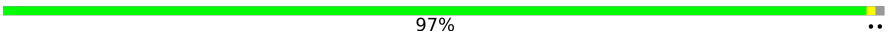
Chain Sq:





• Molecule 4: Tail tube protein

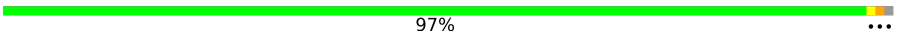
Chain Sr:

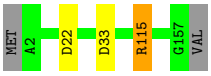




• Molecule 4: Tail tube protein

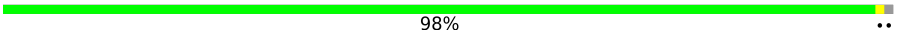
Chain Ss:




• Molecule 4: Tail tube protein

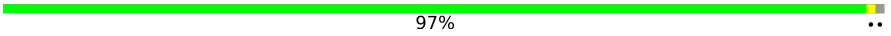
Chain St:





• Molecule 4: Tail tube protein

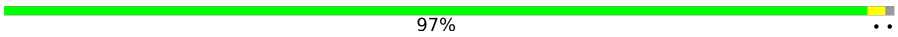
Chain Su:

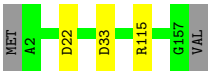




• Molecule 4: Tail tube protein

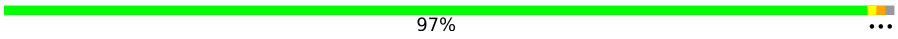
Chain Sv:




• Molecule 4: Tail tube protein

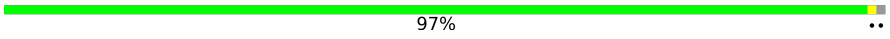
Chain P1:

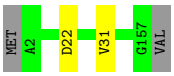




• Molecule 4: Tail tube protein

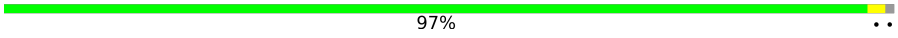
Chain P2:

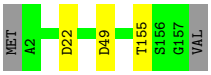



• Molecule 4: Tail tube protein

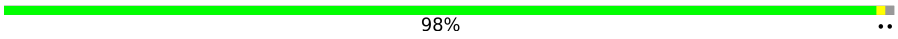
Chain P3:

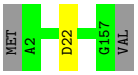



• Molecule 4: Tail tube protein

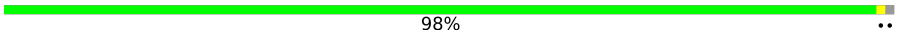
Chain P4:

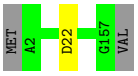



• Molecule 4: Tail tube protein

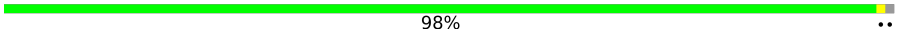
Chain P5:

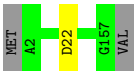



• Molecule 4: Tail tube protein

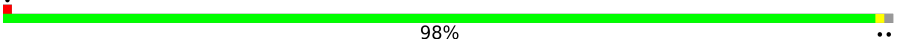
Chain P6:

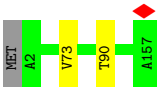



• Molecule 5: SPP1 gp17-like tail completion protein

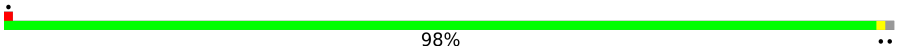
Chain Pa:




• Molecule 5: SPP1 gp17-like tail completion protein

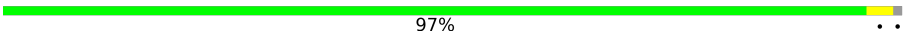
Chain Pb:

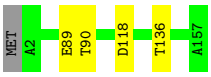




• Molecule 5: SPP1 gp17-like tail completion protein

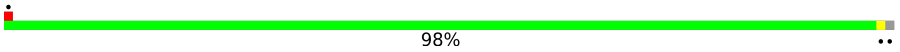
Chain Pc:

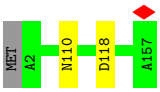



• Molecule 5: SPP1 gp17-like tail completion protein

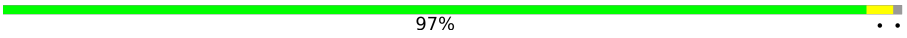
Chain Pd:

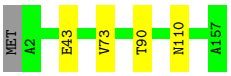



• Molecule 5: SPP1 gp17-like tail completion protein

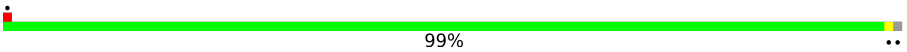
Chain Pe:

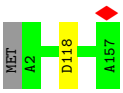



• Molecule 5: SPP1 gp17-like tail completion protein

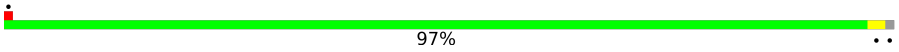
Chain Pf:

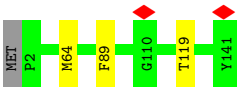



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

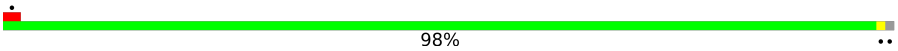
Chain PT:

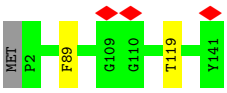



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

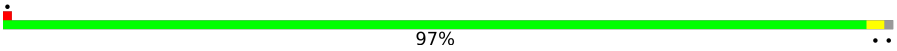
Chain PM:

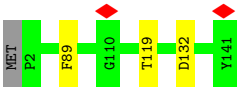


• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

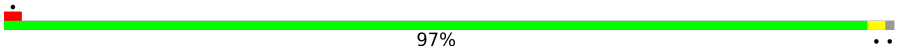
Chain PN:

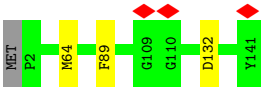



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

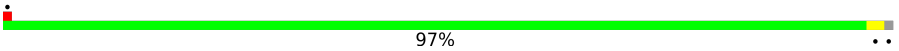
Chain PO:

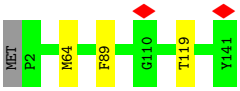



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

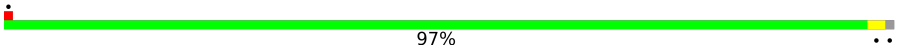
Chain PP:

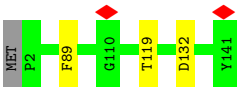



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

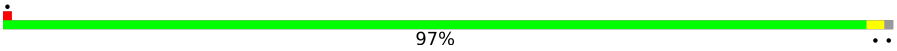
Chain PQ:

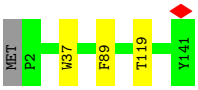



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

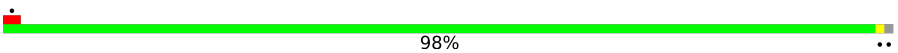
Chain PR:

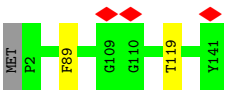



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

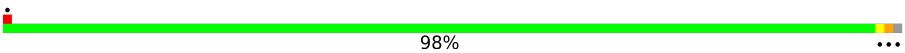
Chain PS:

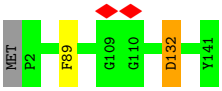



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

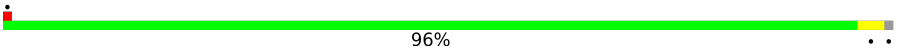
Chain PU:

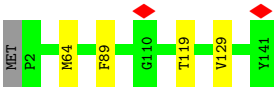





• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

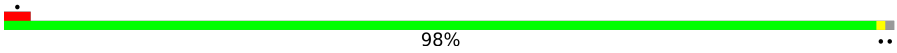
Chain PV:

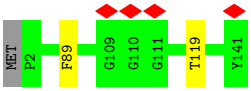



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

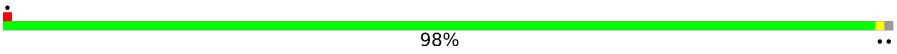
Chain PW:

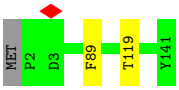



• Molecule 6: HK97 gp6-like/SPP1 gp15-like head-tail connector

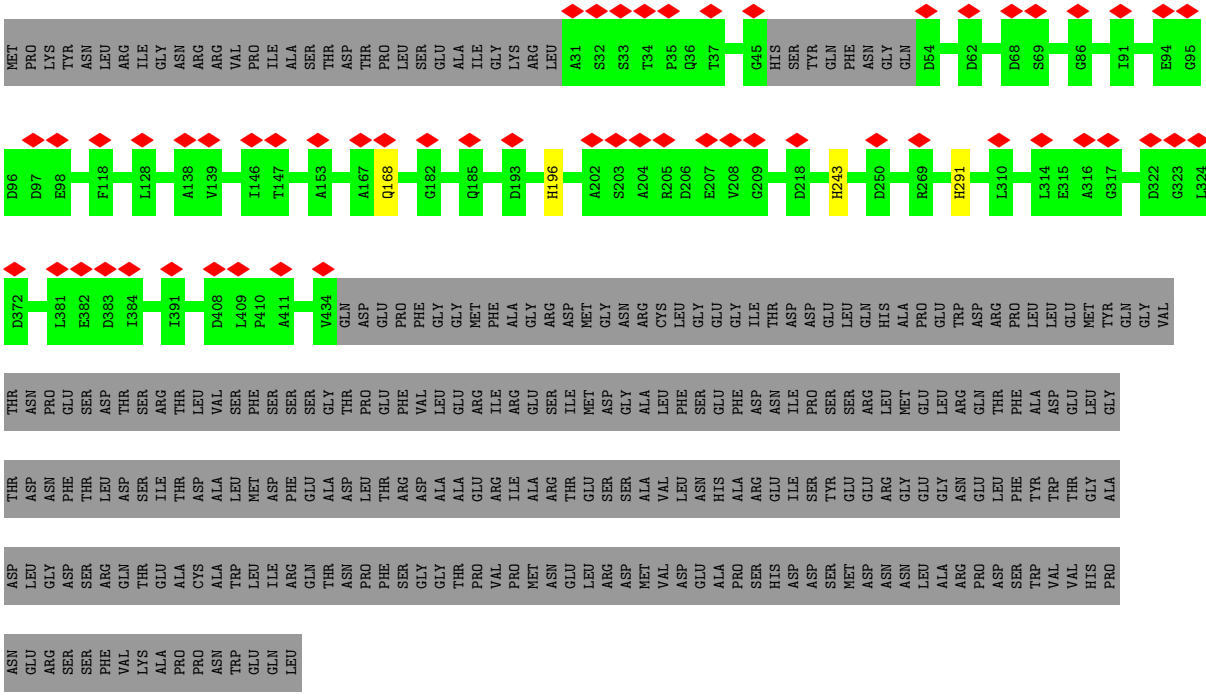
Chain PX:



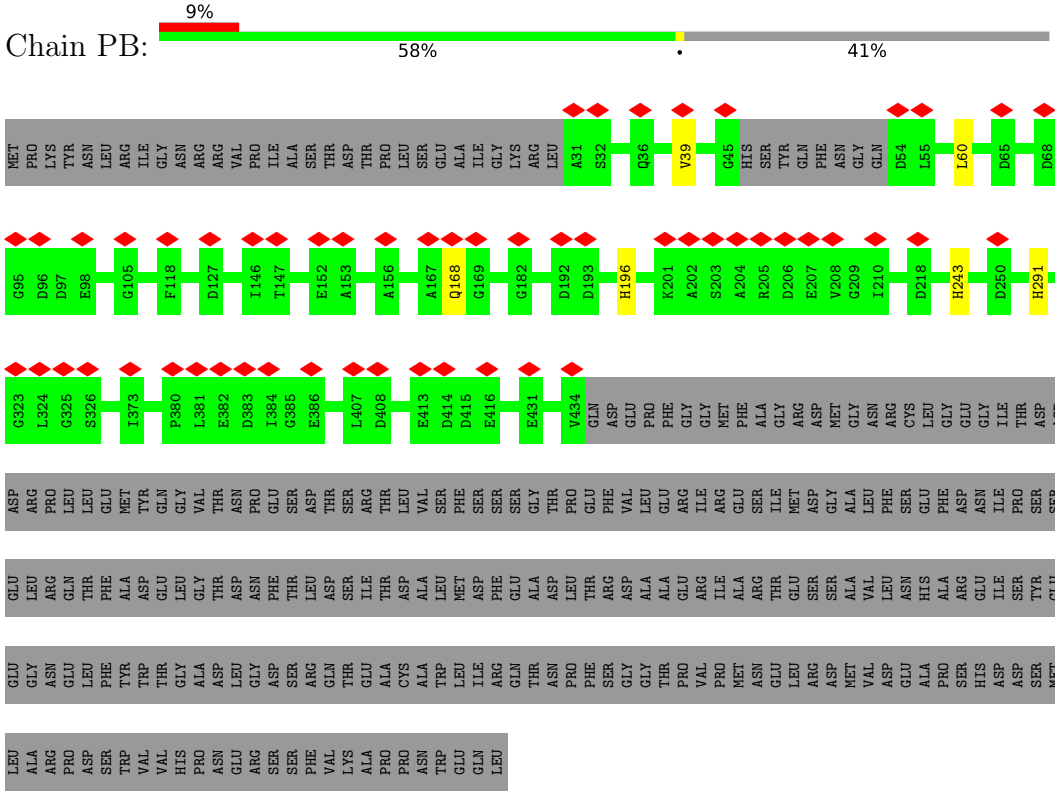

• Molecule 7: Portal protein

Chain PA:

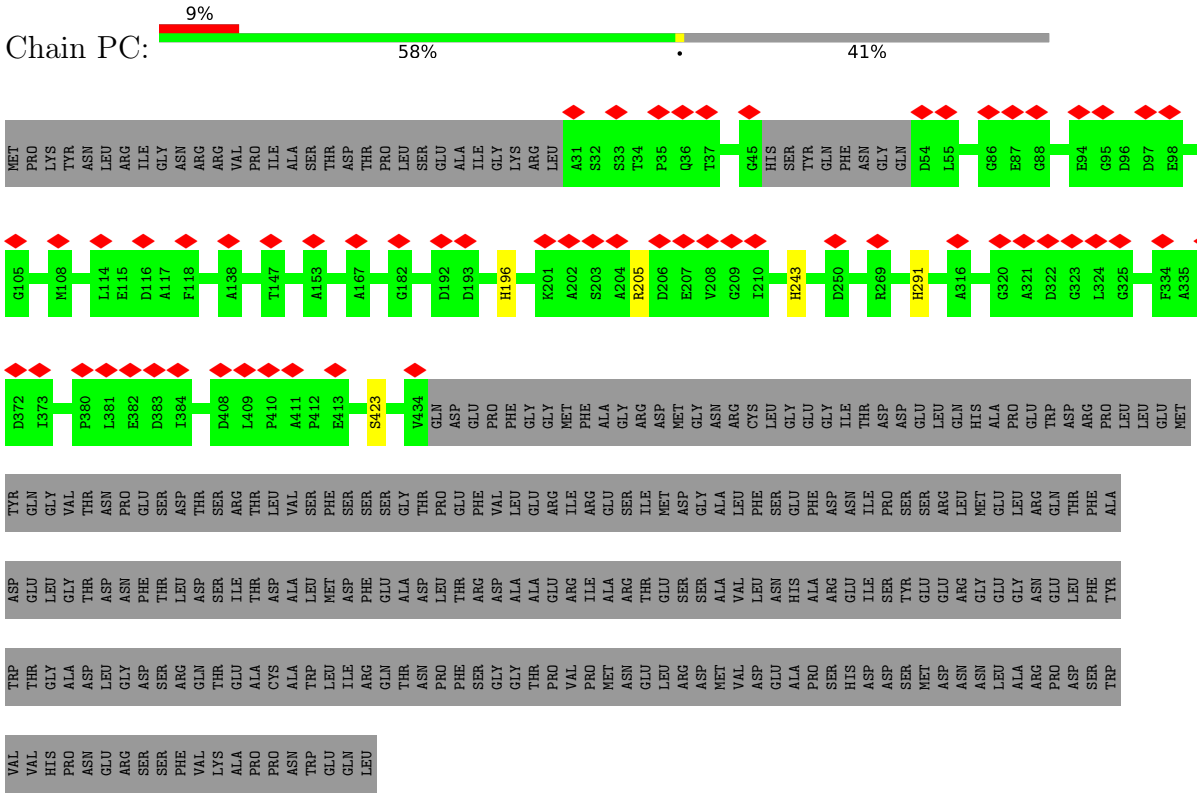
• Molecule 7: Portal protein

Chain PB:



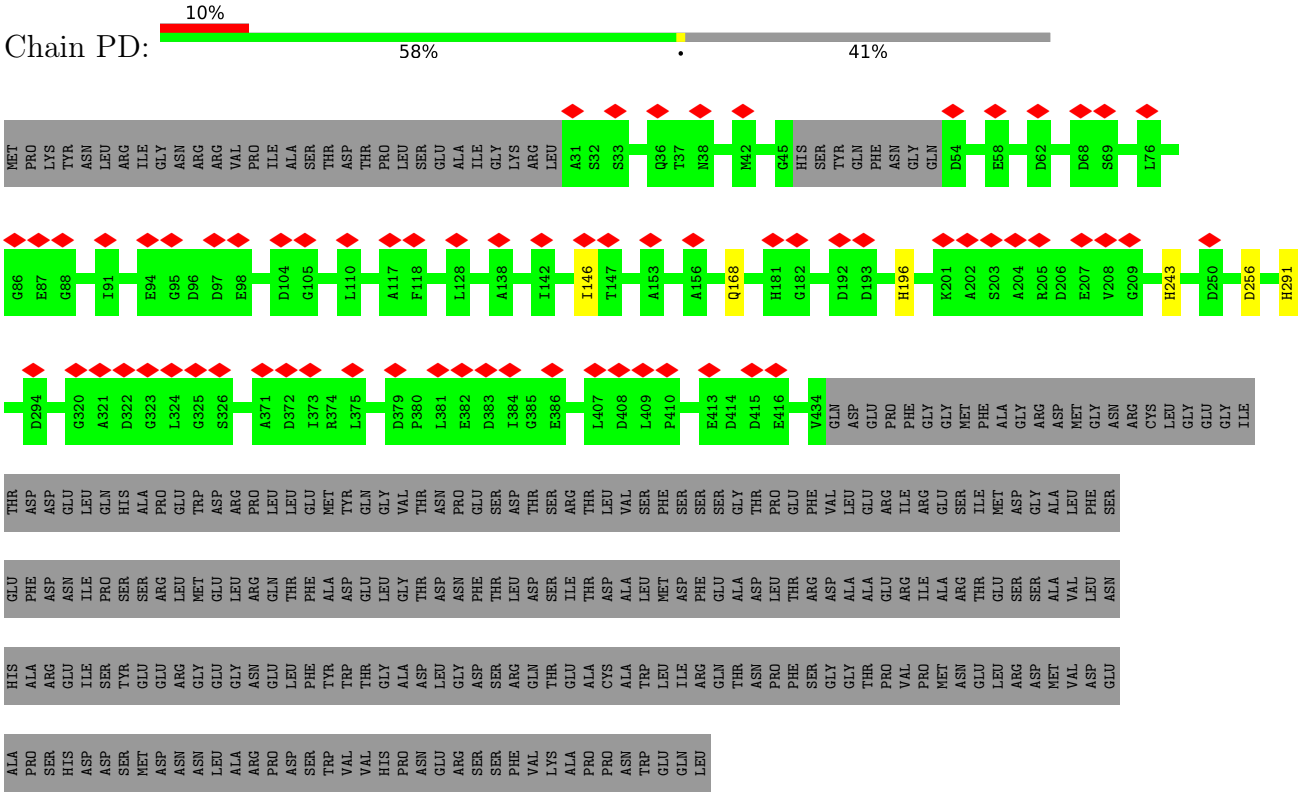

• Molecule 7: Portal protein

Chain PC:



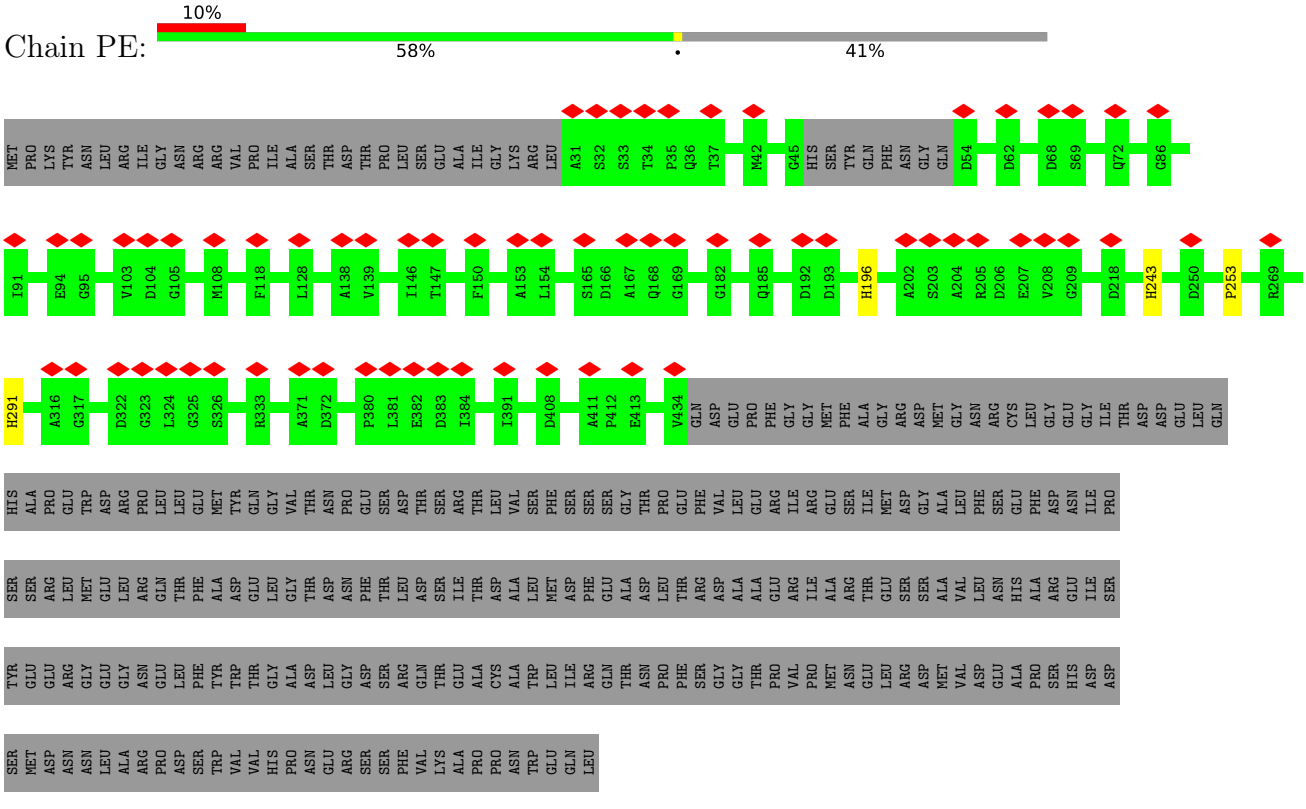

• Molecule 7: Portal protein

Chain PD:



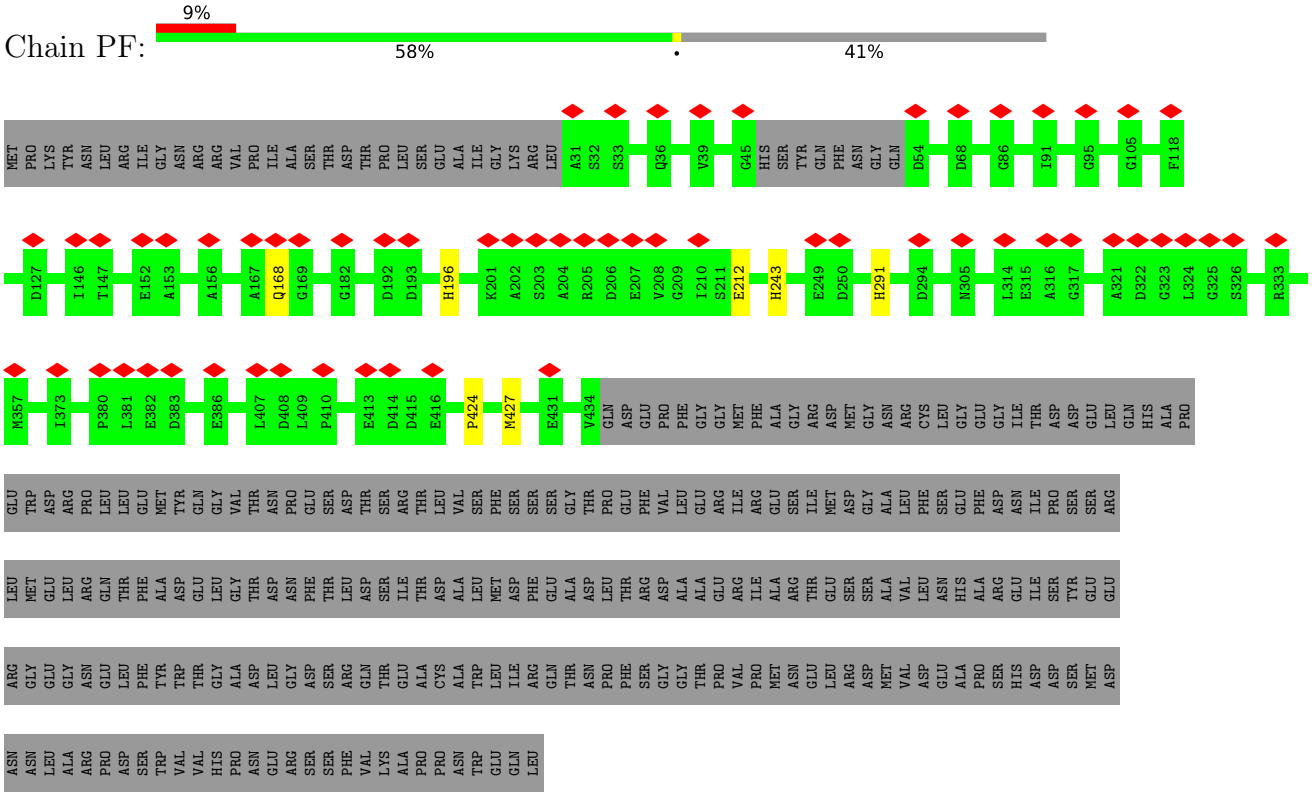

• Molecule 7: Portal protein

Chain PE:



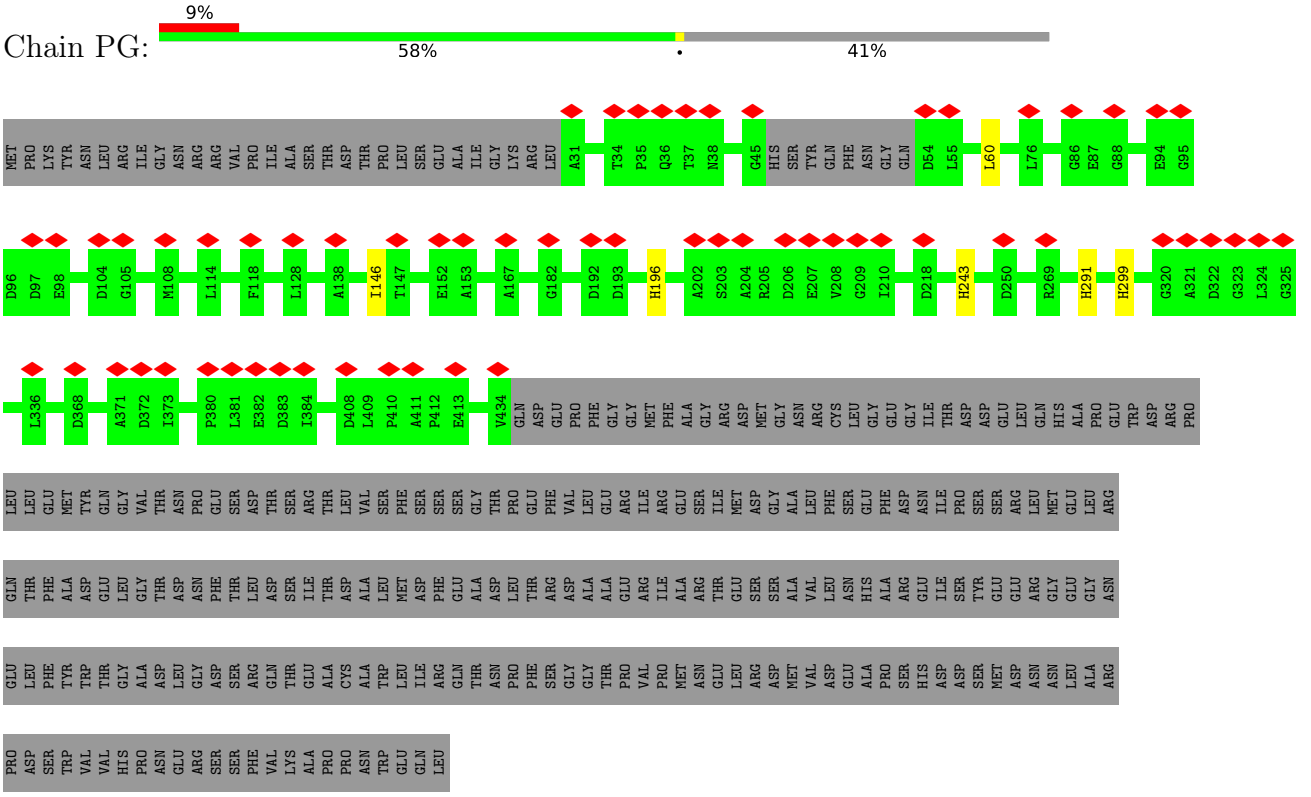

• Molecule 7: Portal protein

Chain PF:



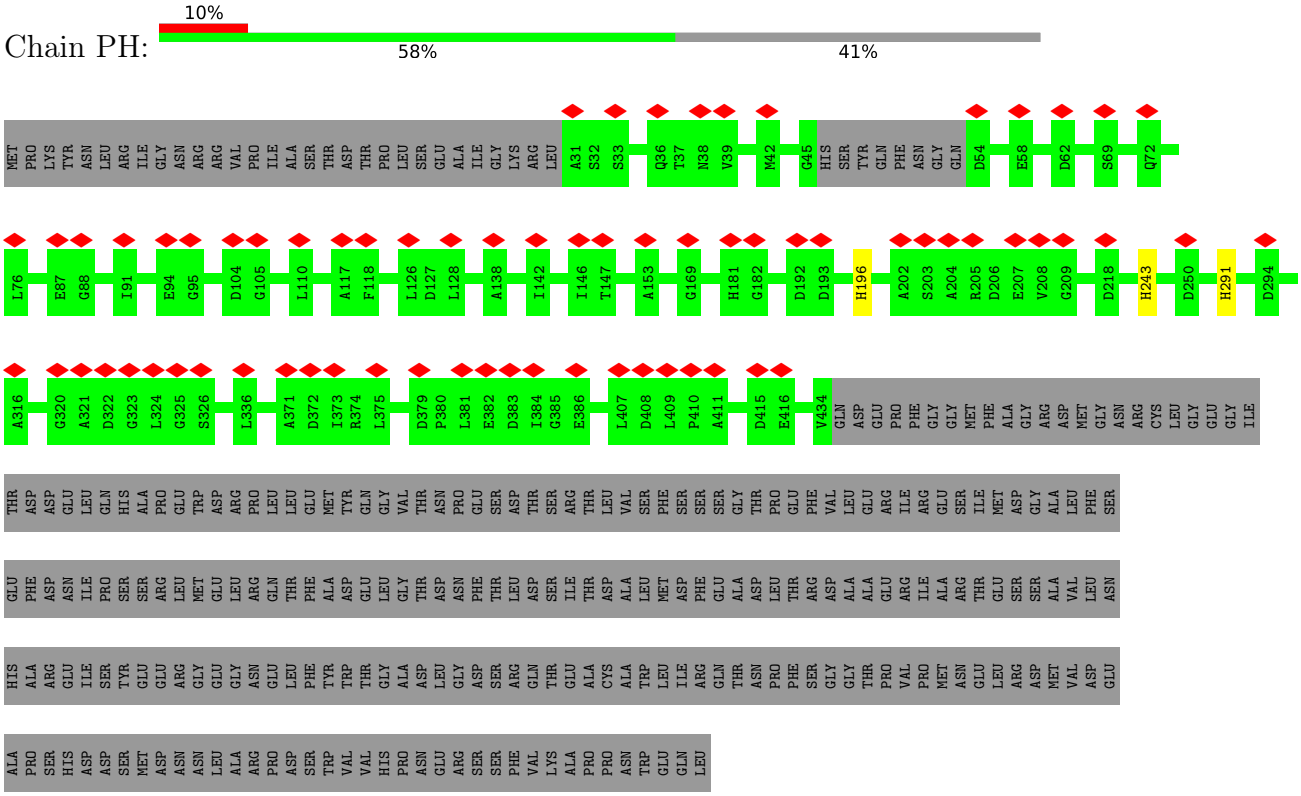

• Molecule 7: Portal protein

Chain PG:



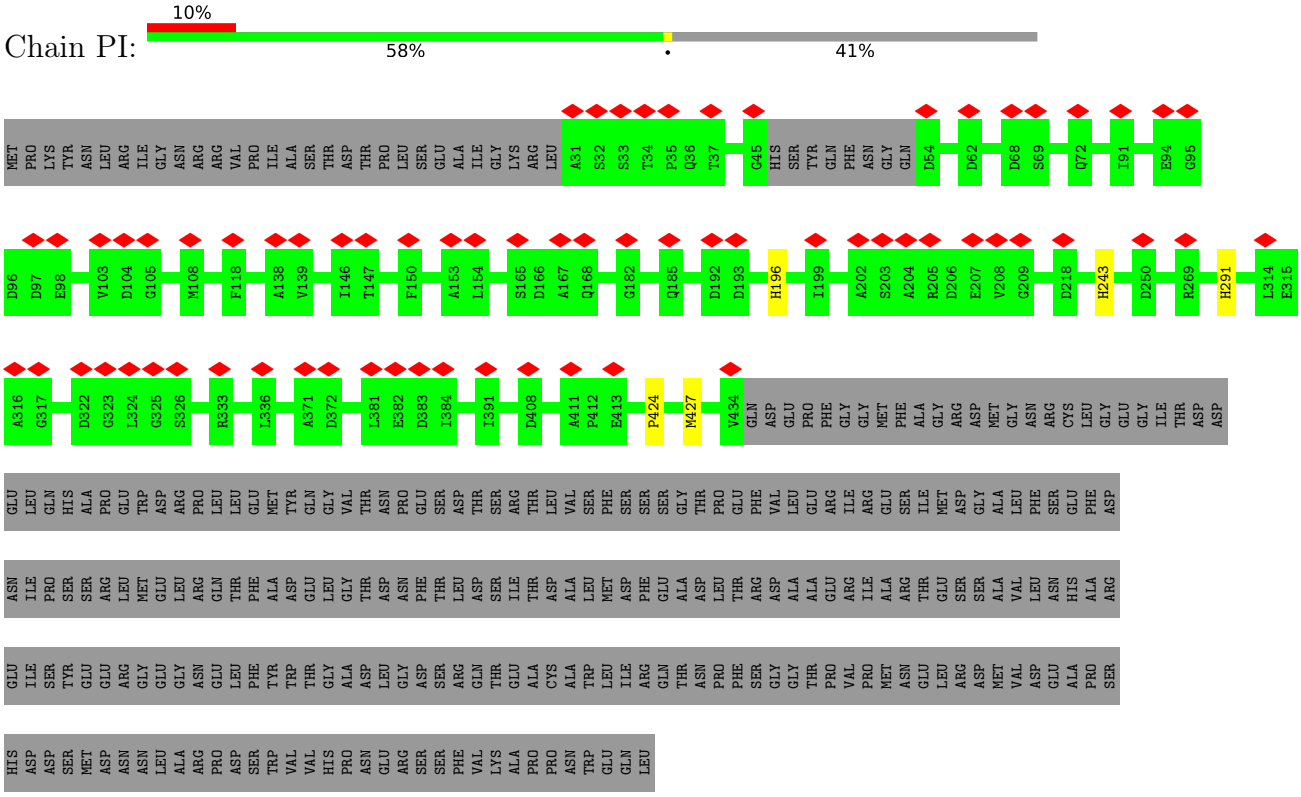

• Molecule 7: Portal protein

Chain PH:



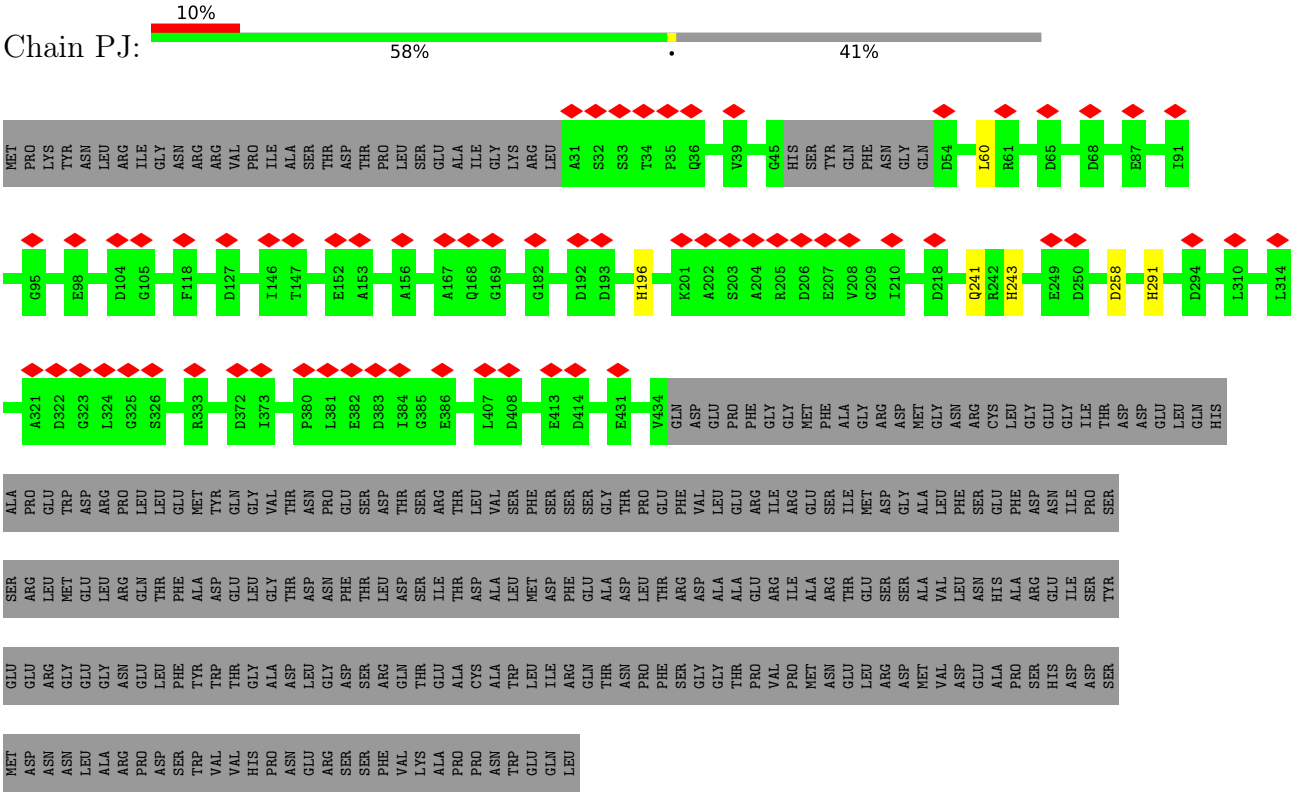

• Molecule 7: Portal protein

Chain PI:



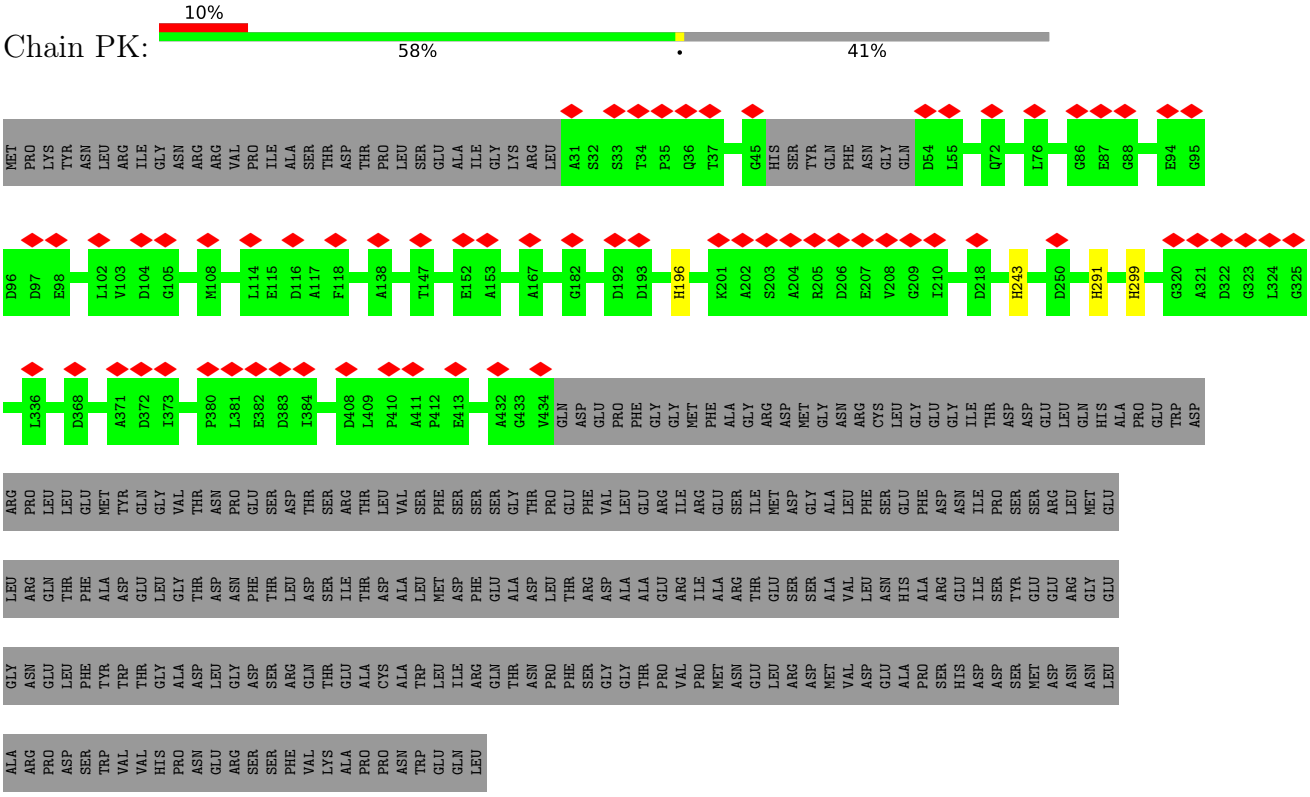

• Molecule 7: Portal protein

Chain PJ:



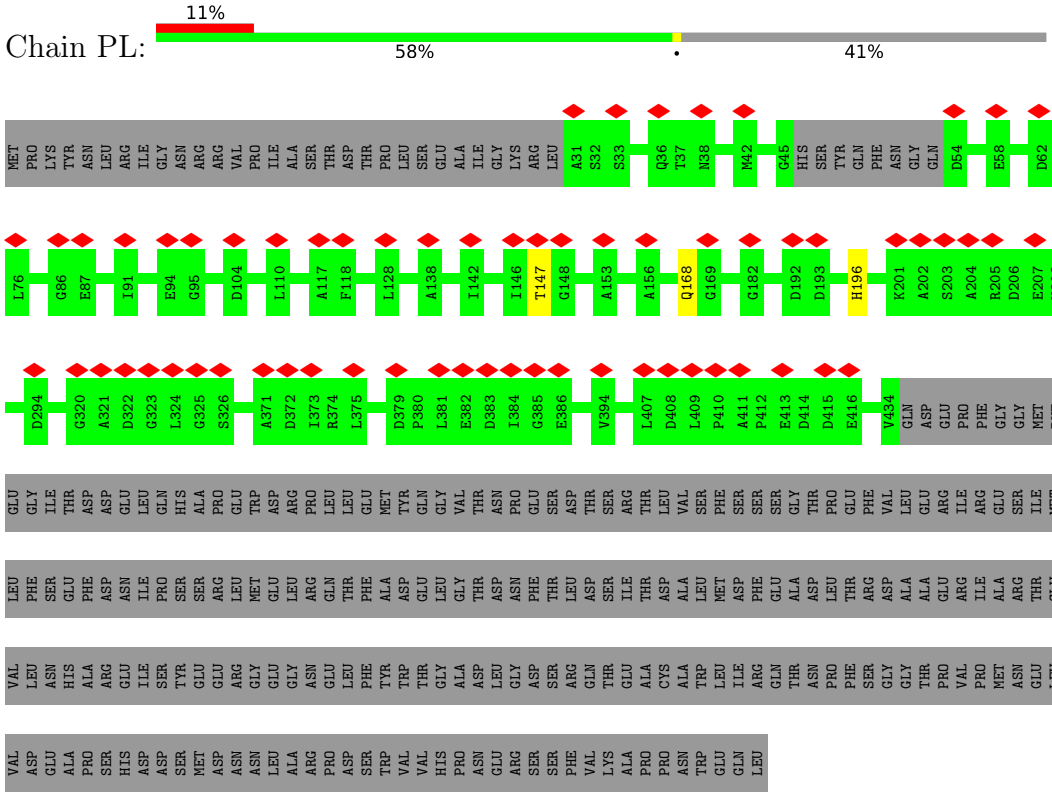

• Molecule 7: Portal protein

Chain PK:




• Molecule 7: Portal protein

Chain PL:


11%
58%
41%
MET PRO LYS TYR ASN LEU ARG ILE GLY ASN ARG ARG VAL PRO ILE ALA SER THR ASP THR PRO LEU SER GLU ALA ILE GLY LYS ARG LEU A31 S32 S33 Q36 T37 N38 M42 G45 HIS SER TYR GLN PHE ASN GLY GLN D54 E58 D62 D68 S69 Q72
L76 G86 E87 I91 E94 G95 D104 L110 A117 F118 L128 A138 T142 T146 T147 G148 A153 A156 Q168 G169 G182 D192 D193 H196 K201 A202 S203 A204 R205 D206 E207 V208 G209 L214 D218 H243 D250 H291
D294 G320 A321 D322 G323 L324 G325 S326 A371 D372 I373 R374 L375 D379 P380 L381 E382 D383 I384 G385 E386 V394 L407 D408 L409 P410 A411 P412 E413 D414 D415 E416 V434 GLN ASP GLU PRO PHE GLY GLY MET PHE ALA GLY ARG ASP MET GLY ASN ARG CYS LEU GLY
GLU GLY ILE THR ASP ASP GLU LEU GLN HIS ALA PRO GLU TRP ASP ARG PRO LEU LEU GLU MET TYR GLN GLY VAL THR ASN PRO GLU SER ASP THR SER ARG THR LEU VAL SER PHE SER SER SER GLY THR PRO GLU PHE VAL LEU GLU GLU ARG ILE ARG GLU SER ILE MET ASP GLY ALA
LEU PHE SER GLU PHE ASP ASN ILE PRO SER SER ARG LEU MET GLU LEU ARG GLN THR PHE ALA ASP GLU LEU GLY THR ASP ASN PHE THR LEU ASP SER ILE THR ASP ALA LEU MET ASP PHE GLU ALA ASP LEU THR ARG ASP ALA ALA GLU ARG ILE ALA ARG THR GLU SER SER ALA
VAL LEU ASN HIS ALA ARG GLU ILE SER TYR GLU GLU ARG GLY GLU GLY ASN GLU LEU PHE TYR TRP THR GLY ALA ASP LEU GLY ASP SER ARG GLN THR GLU ALA CYS ALA TRP LEU ILE ARG GLN THR ASN PRO PHE SER GLY GLY THR PRO VAL PRO MET ASN GLU LEU ARG ASP MET
VAL ASP GLU ALA PRO SER HIS ASP ASP SER MET ASP ASN ASN LEU ALA ARG PRO ASP SER TRP VAL VAL HIS PRO ASN GLU ARG SER SER PHE VAL LYS ALA PRO PRO ASN TRP GLU GLN LEU

# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 116880 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | TFS KRIOS | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/Å^2$) | 50, 54.6 | Depositor |
| Minimum defocus (nm) | 800 | Depositor |
| Maximum defocus (nm) | 2000 | Depositor |
| Magnification | Not provided | |
| Image detector | TFS FALCON 4i (4k x 4k), GATAN K3 (6k x 4k) | Depositor |
| Maximum map value | 0.073 | Depositor |
| Minimum map value | -0.025 | Depositor |
| Average map value | 0.000 | Depositor |
| Map value standard deviation | 0.002 | Depositor |
| Recommended contour level | 0.006 | Depositor |
| Map size (Å) | 899.328, 899.328, 899.328 | wwPDB |
| Map dimensions | 768, 768, 768 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.171, 1.171, 1.171 | Depositor |

# 5 Model quality

## 5.1 Standard geometry

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

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 | BD | 0.70 | 0/7332 | 1.25 | 21/10023 (0.2%) |
| 1 | BE | 0.71 | 0/7332 | 1.26 | 22/10023 (0.2%) |
| 1 | BF | 0.75 | 0/7332 | 1.30 | 17/10023 (0.2%) |
| 2 | QE | 0.54 | 0/2534 | 1.28 | 3/3428 (0.1%) |
| 2 | QF | 0.53 | 0/2440 | 1.29 | 5/3299 (0.2%) |
| 2 | QG | 0.53 | 0/2534 | 1.29 | 1/3428 (0.0%) |
| 2 | QH | 0.53 | 0/2440 | 1.29 | 9/3299 (0.3%) |
| 2 | QI | 0.54 | 0/2534 | 1.27 | 3/3428 (0.1%) |
| 2 | QJ | 0.53 | 0/2440 | 1.29 | 8/3299 (0.2%) |
| 3 | BA | 0.58 | 0/2175 | 0.95 | 0/2970 |
| 3 | BB | 0.59 | 0/2175 | 0.97 | 2/2970 (0.1%) |
| 3 | BC | 0.58 | 0/2175 | 0.97 | 0/2970 |
| 4 | B1 | 0.57 | 0/1224 | 0.88 | 1/1672 (0.1%) |
| 4 | B2 | 0.58 | 0/1224 | 0.92 | 1/1672 (0.1%) |
| 4 | B3 | 0.57 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | B4 | 0.57 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | B5 | 0.58 | 0/1224 | 0.92 | 4/1672 (0.2%) |
| 4 | B6 | 0.58 | 0/1224 | 0.93 | 3/1672 (0.2%) |
| 4 | P1 | 0.57 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | P2 | 0.57 | 0/1224 | 0.92 | 1/1672 (0.1%) |
| 4 | P3 | 0.57 | 0/1224 | 0.94 | 1/1672 (0.1%) |
| 4 | P4 | 0.57 | 0/1224 | 0.93 | 1/1672 (0.1%) |
| 4 | P5 | 0.57 | 0/1224 | 0.92 | 1/1672 (0.1%) |
| 4 | P6 | 0.57 | 0/1224 | 0.93 | 1/1672 (0.1%) |
| 4 | S1 | 0.59 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | S2 | 0.58 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | SA | 0.57 | 0/1224 | 0.93 | 2/1672 (0.1%) |
| 4 | SB | 0.58 | 0/1224 | 0.93 | 2/1672 (0.1%) |
| 4 | SC | 0.58 | 0/1224 | 0.93 | 1/1672 (0.1%) |
| 4 | SD | 0.57 | 0/1224 | 0.92 | 0/1672 |
| 4 | SE | 0.57 | 0/1224 | 0.92 | 1/1672 (0.1%) |
| 4 | SF | 0.57 | 0/1224 | 0.91 | 0/1672 |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 4 | SG | 0.58 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | SH | 0.58 | 0/1224 | 0.91 | 2/1672 (0.1%) |
| 4 | SI | 0.58 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | SJ | 0.58 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | SK | 0.58 | 0/1224 | 0.90 | 0/1672 |
| 4 | SL | 0.58 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | SM | 0.59 | 0/1224 | 0.90 | 0/1672 |
| 4 | SN | 0.58 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | SO | 0.58 | 0/1224 | 0.89 | 1/1672 (0.1%) |
| 4 | SP | 0.59 | 0/1224 | 0.90 | 0/1672 |
| 4 | SQ | 0.59 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | SR | 0.58 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | SS | 0.58 | 0/1224 | 0.91 | 0/1672 |
| 4 | ST | 0.58 | 0/1224 | 0.90 | 2/1672 (0.1%) |
| 4 | SU | 0.58 | 0/1224 | 0.89 | 0/1672 |
| 4 | SV | 0.58 | 0/1224 | 0.89 | 1/1672 (0.1%) |
| 4 | SW | 0.58 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | SX | 0.58 | 0/1224 | 0.90 | 2/1672 (0.1%) |
| 4 | SY | 0.58 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | SZ | 0.58 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | Sa | 0.58 | 0/1224 | 0.89 | 1/1672 (0.1%) |
| 4 | Sb | 0.58 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | Sc | 0.59 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | Sd | 0.58 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | Se | 0.58 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | Sf | 0.58 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | Sg | 0.58 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | Sh | 0.58 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | Si | 0.58 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | Sj | 0.57 | 0/1224 | 0.93 | 1/1672 (0.1%) |
| 4 | Sk | 0.58 | 0/1224 | 0.91 | 1/1672 (0.1%) |
| 4 | Sl | 0.59 | 0/1224 | 0.92 | 1/1672 (0.1%) |
| 4 | Sm | 0.57 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | Sn | 0.58 | 0/1224 | 0.91 | 0/1672 |
| 4 | So | 0.58 | 0/1224 | 0.91 | 2/1672 (0.1%) |
| 4 | Sp | 0.59 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | Sq | 0.59 | 0/1224 | 0.92 | 1/1672 (0.1%) |
| 4 | Sr | 0.58 | 0/1224 | 0.92 | 0/1672 |
| 4 | Ss | 0.59 | 0/1224 | 0.95 | 3/1672 (0.2%) |
| 4 | St | 0.59 | 0/1224 | 0.90 | 0/1672 |
| 4 | Su | 0.59 | 0/1224 | 0.92 | 1/1672 (0.1%) |
| 4 | Sv | 0.59 | 0/1224 | 0.92 | 2/1672 (0.1%) |
| 4 | Sw | 0.59 | 0/1224 | 0.93 | 2/1672 (0.1%) |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 4 | Sx | 0.59 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 4 | Sy | 0.58 | 0/1224 | 0.89 | 1/1672 (0.1%) |
| 4 | Sz | 0.58 | 0/1224 | 0.90 | 1/1672 (0.1%) |
| 5 | Pa | 0.55 | 0/1248 | 1.04 | 0/1709 |
| 5 | Pb | 0.55 | 0/1248 | 1.06 | 1/1709 (0.1%) |
| 5 | Pc | 0.56 | 0/1248 | 1.04 | 1/1709 (0.1%) |
| 5 | Pd | 0.56 | 0/1248 | 1.05 | 1/1709 (0.1%) |
| 5 | Pe | 0.56 | 0/1248 | 1.07 | 0/1709 |
| 5 | Pf | 0.55 | 0/1248 | 1.05 | 1/1709 (0.1%) |
| 6 | PM | 0.53 | 0/1105 | 1.15 | 1/1492 (0.1%) |
| 6 | PN | 0.54 | 0/1105 | 1.14 | 1/1492 (0.1%) |
| 6 | PO | 0.54 | 0/1105 | 1.13 | 1/1492 (0.1%) |
| 6 | PP | 0.56 | 0/1105 | 1.15 | 1/1492 (0.1%) |
| 6 | PQ | 0.54 | 0/1105 | 1.15 | 1/1492 (0.1%) |
| 6 | PR | 0.54 | 0/1105 | 1.13 | 1/1492 (0.1%) |
| 6 | PS | 0.53 | 0/1105 | 1.11 | 1/1492 (0.1%) |
| 6 | PT | 0.55 | 0/1105 | 1.14 | 1/1492 (0.1%) |
| 6 | PU | 0.54 | 0/1105 | 1.14 | 1/1492 (0.1%) |
| 6 | PV | 0.55 | 0/1105 | 1.14 | 1/1492 (0.1%) |
| 6 | PW | 0.53 | 0/1105 | 1.12 | 1/1492 (0.1%) |
| 6 | PX | 0.54 | 0/1105 | 1.15 | 1/1492 (0.1%) |
| 7 | PA | 0.56 | 0/3117 | 1.14 | 0/4226 |
| 7 | PB | 0.56 | 0/3117 | 1.15 | 0/4226 |
| 7 | PC | 0.56 | 0/3117 | 1.13 | 0/4226 |
| 7 | PD | 0.56 | 0/3117 | 1.14 | 1/4226 (0.0%) |
| 7 | PE | 0.56 | 0/3117 | 1.14 | 0/4226 |
| 7 | PF | 0.56 | 0/3117 | 1.15 | 0/4226 |
| 7 | PG | 0.56 | 0/3117 | 1.13 | 0/4226 |
| 7 | PH | 0.56 | 0/3117 | 1.14 | 0/4226 |
| 7 | PI | 0.57 | 0/3117 | 1.14 | 0/4226 |
| 7 | PJ | 0.56 | 0/3117 | 1.14 | 0/4226 |
| 7 | PK | 0.56 | 0/3117 | 1.13 | 0/4226 |
| 7 | PL | 0.56 | 0/3117 | 1.15 | 0/4226 |
| All | All | 0.59 | 0/182379 | 1.07 | 188/248382 (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 | BD | 0 | 1 |

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| Mol | Chain | #Chirality outliers | #Planarity outliers |
|---|---|---|---|
| 1 | BE | 0 | 3 |
| 1 | BF | 0 | 3 |
| 6 | PO | 0 | 1 |
| 6 | PT | 0 | 1 |
| 6 | PV | 0 | 1 |
| All | All | 0 | 10 |

There are no bond length outliers.

All (188) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 2 | QH | 81 | ASP | CA-CB-CG | 7.31 | 119.91 | 112.60 |
| 2 | QJ | 285 | ASP | CA-C-N | 7.06 | 125.98 | 120.33 |
| 2 | QJ | 285 | ASP | C-N-CA | 7.06 | 125.98 | 120.33 |
| 1 | BD | 756 | ARG | NE-CZ-NH2 | 6.91 | 125.42 | 119.20 |
| 1 | BF | 662 | ARG | NE-CZ-NH2 | 6.86 | 125.37 | 119.20 |
| 1 | BF | 198 | GLN | N-CA-C | 6.72 | 114.27 | 108.22 |
| 2 | QJ | 81 | ASP | CA-CB-CG | 6.56 | 119.16 | 112.60 |
| 1 | BD | 877 | ASP | CA-CB-CG | 6.55 | 119.15 | 112.60 |
| 2 | QJ | 119 | PHE | CA-CB-CG | 6.47 | 120.27 | 113.80 |
| 2 | QF | 119 | PHE | CA-CB-CG | 6.47 | 120.27 | 113.80 |
| 1 | BE | 120 | ARG | NE-CZ-NH2 | 6.39 | 124.95 | 119.20 |
| 1 | BE | 858 | ARG | NE-CZ-NH2 | 6.20 | 124.78 | 119.20 |
| 6 | PX | 89 | PHE | CA-CB-CG | 6.16 | 119.96 | 113.80 |
| 1 | BF | 857 | ASN | CA-CB-CG | 6.11 | 118.71 | 112.60 |
| 1 | BD | 928 | ARG | NE-CZ-NH2 | 6.06 | 124.66 | 119.20 |
| 2 | QH | 119 | PHE | CA-CB-CG | 6.06 | 119.86 | 113.80 |
| 1 | BF | 98 | ARG | NE-CZ-NH2 | 6.05 | 124.65 | 119.20 |
| 6 | PO | 89 | PHE | CA-CB-CG | 6.04 | 119.84 | 113.80 |
| 1 | BF | 265 | ARG | NE-CZ-NH2 | 6.03 | 124.63 | 119.20 |
| 6 | PR | 89 | PHE | CA-CB-CG | 6.01 | 119.81 | 113.80 |
| 2 | QF | 212 | ASP | CA-CB-CG | 6.01 | 118.61 | 112.60 |
| 1 | BD | 265 | ARG | NE-CZ-NH2 | 6.01 | 124.61 | 119.20 |
| 4 | P3 | 22 | ASP | CA-CB-CG | 5.94 | 118.54 | 112.60 |
| 6 | PP | 89 | PHE | CA-CB-CG | 5.93 | 119.73 | 113.80 |
| 1 | BD | 662 | ARG | NE-CZ-NH2 | 5.89 | 124.50 | 119.20 |
| 1 | BE | 97 | ARG | NE-CZ-NH2 | 5.89 | 124.50 | 119.20 |
| 6 | PT | 89 | PHE | CA-CB-CG | 5.88 | 119.68 | 113.80 |
| 4 | P6 | 22 | ASP | CA-CB-CG | 5.88 | 118.47 | 112.60 |
| 1 | BE | 265 | ARG | NE-CZ-NH2 | 5.87 | 124.49 | 119.20 |
| 1 | BD | 290 | ARG | NE-CZ-NH2 | 5.87 | 124.48 | 119.20 |
| 4 | Sc | 33 | ASP | CA-CB-CG | 5.85 | 118.45 | 112.60 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | BE | 2 | PRO | CA-N-CD | -5.84 | 103.82 | 112.00 |
| 4 | P4 | 22 | ASP | CA-CB-CG | 5.83 | 118.43 | 112.60 |
| 4 | Ss | 33 | ASP | CA-CB-CG | 5.82 | 118.42 | 112.60 |
| 2 | QG | 228 | PHE | CA-CB-CG | 5.81 | 119.61 | 113.80 |
| 1 | BD | 601 | ARG | NE-CZ-NH2 | 5.80 | 124.42 | 119.20 |
| 2 | QF | 81 | ASP | CA-CB-CG | 5.80 | 118.40 | 112.60 |
| 1 | BF | 928 | ARG | NE-CZ-NH2 | 5.77 | 124.39 | 119.20 |
| 6 | PV | 89 | PHE | CA-CB-CG | 5.77 | 119.57 | 113.80 |
| 1 | BD | 89 | ARG | NE-CZ-NH2 | 5.76 | 124.38 | 119.20 |
| 4 | B6 | 33 | ASP | CA-CB-CG | 5.71 | 118.31 | 112.60 |
| 1 | BF | 886 | ASP | CA-CB-CG | 5.71 | 118.31 | 112.60 |
| 4 | Sy | 22 | ASP | CA-CB-CG | 5.68 | 118.28 | 112.60 |
| 1 | BE | 290 | ARG | NE-CZ-NH2 | 5.66 | 124.30 | 119.20 |
| 2 | QF | 257 | PHE | CA-CB-CG | 5.66 | 119.45 | 113.80 |
| 4 | B3 | 22 | ASP | CA-CB-CG | 5.64 | 118.24 | 112.60 |
| 2 | QI | 157 | PHE | CA-CB-CG | 5.63 | 119.43 | 113.80 |
| 4 | Sx | 22 | ASP | CA-CB-CG | 5.62 | 118.22 | 112.60 |
| 4 | Sm | 33 | ASP | CA-CB-CG | 5.62 | 118.22 | 112.60 |
| 4 | ST | 22 | ASP | CA-CB-CG | 5.62 | 118.22 | 112.60 |
| 1 | BE | 928 | ARG | NE-CZ-NH2 | 5.60 | 124.24 | 119.20 |
| 1 | BF | 347 | ARG | NE-CZ-NH2 | 5.60 | 124.24 | 119.20 |
| 4 | Ss | 115 | ARG | CG-CD-NE | 5.59 | 124.30 | 112.00 |
| 1 | BE | 89 | ARG | NE-CZ-NH2 | 5.59 | 124.23 | 119.20 |
| 1 | BF | 487 | ARG | NE-CZ-NH2 | 5.59 | 124.23 | 119.20 |
| 6 | PN | 89 | PHE | CA-CB-CG | 5.59 | 119.39 | 113.80 |
| 1 | BF | 164 | ARG | NE-CZ-NH2 | 5.55 | 124.19 | 119.20 |
| 4 | SO | 33 | ASP | CA-CB-CG | 5.55 | 118.15 | 112.60 |
| 4 | So | 33 | ASP | CA-CB-CG | 5.54 | 118.14 | 112.60 |
| 1 | BF | 515 | ARG | CA-C-N | 5.54 | 126.35 | 121.58 |
| 1 | BF | 515 | ARG | C-N-CA | 5.54 | 126.35 | 121.58 |
| 4 | P2 | 22 | ASP | CA-CB-CG | 5.54 | 118.14 | 112.60 |
| 1 | BD | 363 | ARG | NE-CZ-NH2 | 5.53 | 124.17 | 119.20 |
| 4 | SQ | 33 | ASP | CA-CB-CG | 5.53 | 118.13 | 112.60 |
| 4 | Sg | 33 | ASP | CA-CB-CG | 5.52 | 118.12 | 112.60 |
| 4 | SX | 22 | ASP | CA-CB-CG | 5.52 | 118.12 | 112.60 |
| 4 | SC | 22 | ASP | CA-CB-CG | 5.52 | 118.12 | 112.60 |
| 1 | BE | 487 | ARG | NE-CZ-NH2 | 5.52 | 124.16 | 119.20 |
| 4 | Sb | 22 | ASP | CA-CB-CG | 5.51 | 118.11 | 112.60 |
| 1 | BE | 953 | ASP | CA-CB-CG | 5.50 | 118.10 | 112.60 |
| 4 | SE | 22 | ASP | CA-CB-CG | 5.50 | 118.10 | 112.60 |
| 1 | BD | 515 | ARG | NE-CZ-NH2 | 5.49 | 124.14 | 119.20 |
| 4 | SB | 33 | ASP | CA-CB-CG | 5.49 | 118.09 | 112.60 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 4 | Sq | 22 | ASP | CA-CB-CG | 5.49 | 118.09 | 112.60 |
| 1 | BD | 515 | ARG | CA-C-N | 5.47 | 126.29 | 121.58 |
| 1 | BD | 515 | ARG | C-N-CA | 5.47 | 126.29 | 121.58 |
| 4 | SA | 22 | ASP | CA-CB-CG | 5.46 | 118.06 | 112.60 |
| 4 | Sm | 22 | ASP | CA-CB-CG | 5.46 | 118.06 | 112.60 |
| 1 | BF | 89 | ARG | NE-CZ-NH2 | 5.45 | 124.11 | 119.20 |
| 2 | QE | 285 | ASP | CA-C-N | 5.45 | 124.69 | 120.33 |
| 2 | QE | 285 | ASP | C-N-CA | 5.45 | 124.69 | 120.33 |
| 4 | SR | 33 | ASP | CA-CB-CG | 5.44 | 118.04 | 112.60 |
| 4 | B5 | 22 | ASP | CA-CB-CG | 5.44 | 118.04 | 112.60 |
| 4 | SZ | 22 | ASP | CA-CB-CG | 5.43 | 118.03 | 112.60 |
| 4 | Sw | 22 | ASP | CA-CB-CG | 5.42 | 118.02 | 112.60 |
| 2 | QJ | 40 | PHE | CA-CB-CG | 5.42 | 119.22 | 113.80 |
| 4 | SY | 22 | ASP | CA-CB-CG | 5.42 | 118.02 | 112.60 |
| 4 | SW | 22 | ASP | CA-CB-CG | 5.41 | 118.01 | 112.60 |
| 1 | BD | 487 | ARG | NE-CZ-NH2 | 5.40 | 124.06 | 119.20 |
| 2 | QJ | 104 | GLU | CB-CG-CD | 5.39 | 121.77 | 112.60 |
| 4 | Ss | 22 | ASP | CA-CB-CG | 5.38 | 117.98 | 112.60 |
| 4 | P1 | 22 | ASP | CA-CB-CG | 5.38 | 117.98 | 112.60 |
| 4 | Su | 22 | ASP | CA-CB-CG | 5.37 | 117.97 | 112.60 |
| 4 | Sj | 54 | ASP | CB-CA-C | 5.37 | 118.07 | 109.27 |
| 4 | P5 | 22 | ASP | CA-CB-CG | 5.37 | 117.97 | 112.60 |
| 4 | S1 | 22 | ASP | CA-CB-CG | 5.36 | 117.96 | 112.60 |
| 4 | B6 | 22 | ASP | CA-CB-CG | 5.36 | 117.96 | 112.60 |
| 4 | Sv | 33 | ASP | CA-CB-CG | 5.35 | 117.95 | 112.60 |
| 1 | BE | 98 | ARG | NE-CZ-NH2 | 5.35 | 124.01 | 119.20 |
| 3 | BB | 3 | ASP | CA-CB-CG | 5.35 | 117.95 | 112.60 |
| 4 | Sz | 22 | ASP | CA-CB-CG | 5.35 | 117.95 | 112.60 |
| 4 | SB | 22 | ASP | CA-CB-CG | 5.34 | 117.94 | 112.60 |
| 4 | S2 | 22 | ASP | CA-CB-CG | 5.33 | 117.94 | 112.60 |
| 4 | So | 22 | ASP | CA-CB-CG | 5.32 | 117.92 | 112.60 |
| 4 | Si | 22 | ASP | CA-CB-CG | 5.30 | 117.90 | 112.60 |
| 4 | SV | 22 | ASP | CA-CB-CG | 5.29 | 117.89 | 112.60 |
| 6 | PM | 89 | PHE | CA-CB-CG | 5.29 | 119.09 | 113.80 |
| 4 | Sc | 22 | ASP | CA-CB-CG | 5.28 | 117.88 | 112.60 |
| 1 | BE | 515 | ARG | CA-C-N | 5.28 | 125.67 | 121.61 |
| 1 | BE | 515 | ARG | C-N-CA | 5.28 | 125.67 | 121.61 |
| 4 | Sg | 22 | ASP | CA-CB-CG | 5.27 | 117.87 | 112.60 |
| 4 | Se | 33 | ASP | CA-CB-CG | 5.27 | 117.87 | 112.60 |
| 1 | BD | 408 | ARG | NE-CZ-NH2 | 5.27 | 123.94 | 119.20 |
| 1 | BE | 662 | ARG | NE-CZ-NH2 | 5.27 | 123.94 | 119.20 |
| 4 | Sf | 22 | ASP | CA-CB-CG | 5.26 | 117.86 | 112.60 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 6 | PW | 89 | PHE | CA-CB-CG | 5.26 | 119.06 | 113.80 |
| 4 | S1 | 33 | ASP | CA-CB-CG | 5.26 | 117.86 | 112.60 |
| 2 | QI | 119 | PHE | CA-CB-CG | 5.25 | 119.05 | 113.80 |
| 4 | SJ | 22 | ASP | CA-CB-CG | 5.25 | 117.85 | 112.60 |
| 4 | Se | 22 | ASP | CA-CB-CG | 5.25 | 117.85 | 112.60 |
| 1 | BE | 178 | PHE | CA-CB-CG | 5.24 | 119.04 | 113.80 |
| 1 | BF | 425 | ASN | CA-CB-CG | 5.24 | 117.84 | 112.60 |
| 5 | Pd | 118 | ASP | CA-CB-CG | 5.24 | 117.84 | 112.60 |
| 4 | SH | 33 | ASP | CA-CB-CG | 5.23 | 117.83 | 112.60 |
| 4 | SH | 22 | ASP | CA-CB-CG | 5.23 | 117.83 | 112.60 |
| 2 | QI | 192 | ASP | CA-CB-CG | 5.23 | 117.83 | 112.60 |
| 1 | BF | 97 | ARG | NE-CZ-NH2 | 5.22 | 123.90 | 119.20 |
| 4 | Sk | 33 | ASP | CA-CB-CG | 5.21 | 117.81 | 112.60 |
| 4 | SZ | 33 | ASP | CA-CB-CG | 5.21 | 117.81 | 112.60 |
| 4 | Sw | 33 | ASP | CA-CB-CG | 5.21 | 117.81 | 112.60 |
| 5 | Pb | 118 | ASP | CA-CB-CG | 5.20 | 117.80 | 112.60 |
| 4 | B5 | 33 | ASP | CA-CB-CG | 5.20 | 117.80 | 112.60 |
| 5 | Pf | 118 | ASP | CA-CB-CG | 5.20 | 117.80 | 112.60 |
| 4 | Sv | 22 | ASP | CA-CB-CG | 5.20 | 117.80 | 112.60 |
| 1 | BE | 527 | ARG | NE-CZ-NH2 | 5.19 | 123.87 | 119.20 |
| 1 | BD | 938 | THR | N-CA-C | 5.19 | 119.10 | 112.87 |
| 2 | QE | 119 | PHE | CA-CB-CG | 5.19 | 118.99 | 113.80 |
| 6 | PU | 89 | PHE | CA-CB-CG | 5.18 | 118.98 | 113.80 |
| 4 | B4 | 22 | ASP | CA-CB-CG | 5.18 | 117.78 | 112.60 |
| 4 | Sa | 22 | ASP | CA-CB-CG | 5.18 | 117.78 | 112.60 |
| 2 | QJ | 228 | PHE | CA-CB-CG | 5.17 | 118.97 | 113.80 |
| 5 | Pc | 118 | ASP | CA-CB-CG | 5.17 | 117.77 | 112.60 |
| 1 | BF | 743 | HIS | CB-CG-CD2 | -5.16 | 124.49 | 131.20 |
| 2 | QH | 100 | ASP | CA-C-N | 5.16 | 127.51 | 120.54 |
| 2 | QH | 100 | ASP | C-N-CA | 5.16 | 127.51 | 120.54 |
| 2 | QF | 278 | ILE | CB-CA-C | 5.16 | 118.95 | 111.88 |
| 4 | SN | 33 | ASP | CA-CB-CG | 5.16 | 117.76 | 112.60 |
| 4 | B5 | 47 | THR | CA-C-N | 5.15 | 128.60 | 120.47 |
| 4 | B5 | 47 | THR | C-N-CA | 5.15 | 128.60 | 120.47 |
| 2 | QJ | 218 | ASP | CA-CB-CG | 5.15 | 117.75 | 112.60 |
| 6 | PQ | 89 | PHE | CA-CB-CG | 5.14 | 118.94 | 113.80 |
| 1 | BD | 178 | PHE | CA-CB-CG | 5.14 | 118.94 | 113.80 |
| 1 | BE | 878 | ASN | CA-CB-CG | 5.13 | 117.73 | 112.60 |
| 1 | BE | 120 | ARG | CD-NE-CZ | 5.13 | 131.58 | 124.40 |
| 1 | BE | 121 | ARG | NE-CZ-NH2 | 5.13 | 123.81 | 119.20 |
| 4 | B6 | 59 | TYR | CB-CA-C | 5.12 | 120.60 | 110.42 |
| 4 | SG | 22 | ASP | CA-CB-CG | 5.11 | 117.71 | 112.60 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 4 | SI | 22 | ASP | CA-CB-CG | 5.11 | 117.71 | 112.60 |
| 1 | BE | 601 | ARG | NE-CZ-NH2 | 5.10 | 123.79 | 119.20 |
| 1 | BD | 98 | ARG | NE-CZ-NH2 | 5.10 | 123.79 | 119.20 |
| 4 | Sh | 22 | ASP | CA-CB-CG | 5.10 | 117.70 | 112.60 |
| 1 | BE | 207 | ARG | NE-CZ-NH2 | 5.08 | 123.77 | 119.20 |
| 2 | QH | 209 | PHE | CA-CB-CG | 5.08 | 118.88 | 113.80 |
| 4 | Sd | 22 | ASP | CA-CB-CG | 5.08 | 117.68 | 112.60 |
| 4 | P1 | 33 | ASP | CA-CB-CG | 5.08 | 117.68 | 112.60 |
| 1 | BD | 52 | ASP | CA-CB-CG | 5.08 | 117.68 | 112.60 |
| 2 | QH | 162 | MET | CA-C-N | 5.07 | 127.04 | 120.44 |
| 2 | QH | 162 | MET | C-N-CA | 5.07 | 127.04 | 120.44 |
| 4 | B1 | 22 | ASP | CA-CB-CG | 5.07 | 117.67 | 112.60 |
| 6 | PS | 89 | PHE | CA-CB-CG | 5.06 | 118.86 | 113.80 |
| 1 | BD | 97 | ARG | NE-CZ-NH2 | 5.06 | 123.75 | 119.20 |
| 1 | BD | 120 | ARG | NE-CZ-NH2 | 5.06 | 123.75 | 119.20 |
| 7 | PD | 256 | ASP | CA-CB-CG | 5.06 | 117.66 | 112.60 |
| 1 | BF | 103 | GLN | OE1-CD-NE2 | -5.05 | 117.55 | 122.60 |
| 4 | ST | 33 | ASP | CA-CB-CG | 5.05 | 117.65 | 112.60 |
| 3 | BB | 16 | PRO | N-CA-C | 5.05 | 122.87 | 112.47 |
| 2 | QH | 65 | GLN | CA-C-N | 5.04 | 124.36 | 120.33 |
| 2 | QH | 65 | GLN | C-N-CA | 5.04 | 124.36 | 120.33 |
| 4 | SL | 130 | ASP | CA-CB-CG | 5.04 | 117.64 | 112.60 |
| 4 | SX | 33 | ASP | CA-CB-CG | 5.04 | 117.64 | 112.60 |
| 4 | SA | 130 | ASP | CA-CB-CG | 5.04 | 117.64 | 112.60 |
| 4 | B2 | 22 | ASP | CA-CB-CG | 5.03 | 117.63 | 112.60 |
| 1 | BE | 515 | ARG | NE-CZ-NH2 | 5.03 | 123.72 | 119.20 |
| 4 | Sl | 22 | ASP | CA-CB-CG | 5.02 | 117.62 | 112.60 |
| 4 | Si | 33 | ASP | CA-CB-CG | 5.01 | 117.61 | 112.60 |
| 4 | Sb | 33 | ASP | CA-CB-CG | 5.01 | 117.61 | 112.60 |
| 4 | Sp | 33 | ASP | CA-CB-CG | 5.00 | 117.60 | 112.60 |
| 1 | BD | 61 | ARG | NE-CZ-NH2 | 5.00 | 123.70 | 119.20 |

There are no chirality outliers.

All (10) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 1 | BD | 148 | ARG | Sidechain |
| 1 | BE | 304 | TYR | Sidechain |
| 1 | BE | 662 | ARG | Sidechain |
| 1 | BE | 97 | ARG | Sidechain |
| 1 | BF | 207 | ARG | Sidechain |
| 1 | BF | 899 | ARG | Sidechain |

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| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 1 | BF | 941 | ARG | Sidechain |
| 6 | PO | 64 | MET | Peptide |
| 6 | PT | 64 | MET | Peptide |
| 6 | PV | 64 | MET | Peptide |

## 5.2 Too-close contacts (i)

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 1 | BD | 7212 | 0 | 6782 | 4 | 0 |
| 1 | BE | 7212 | 0 | 6784 | 11 | 0 |
| 1 | BF | 7212 | 0 | 6784 | 1 | 0 |
| 2 | QE | 2498 | 0 | 2395 | 9 | 0 |
| 2 | QF | 2409 | 0 | 2324 | 10 | 0 |
| 2 | QG | 2498 | 0 | 2395 | 11 | 0 |
| 2 | QH | 2409 | 0 | 2322 | 14 | 0 |
| 2 | QI | 2498 | 0 | 2395 | 11 | 0 |
| 2 | QJ | 2409 | 0 | 2324 | 6 | 0 |
| 3 | BA | 2136 | 0 | 2127 | 2 | 0 |
| 3 | BB | 2136 | 0 | 2127 | 0 | 0 |
| 3 | BC | 2136 | 0 | 2127 | 3 | 0 |
| 4 | B1 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | B2 | 1196 | 0 | 1094 | 1 | 0 |
| 4 | B3 | 1196 | 0 | 1094 | 3 | 0 |
| 4 | B4 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | B5 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | B6 | 1196 | 0 | 1094 | 2 | 0 |
| 4 | P1 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | P2 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | P3 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | P4 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | P5 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | P6 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | S1 | 1196 | 0 | 1094 | 0 | 0 |
| 4 | S2 | 1196 | 0 | 1094 | 1 | 0 |
| 4 | SA | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SB | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SC | 1196 | 0 | 1094 | 0 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 4 | SD | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SE | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SF | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SG | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SH | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SI | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SJ | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SK | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SL | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SM | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SN | 1196 | 0 | 1094 | 1 | 0 |
| 4 | SO | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SP | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SQ | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SR | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SS | 1196 | 0 | 1094 | 0 | 0 |
| 4 | ST | 1196 | 0 | 1094 | 1 | 0 |
| 4 | SU | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SV | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SW | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SX | 1196 | 0 | 1094 | 0 | 0 |
| 4 | SY | 1196 | 0 | 1094 | 1 | 0 |
| 4 | SZ | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sa | 1196 | 0 | 1094 | 1 | 0 |
| 4 | Sb | 1196 | 0 | 1094 | 1 | 0 |
| 4 | Sc | 1196 | 0 | 1094 | 1 | 0 |
| 4 | Sd | 1196 | 0 | 1094 | 2 | 0 |
| 4 | Se | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sf | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sg | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sh | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Si | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sj | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sk | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sl | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sm | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sn | 1196 | 0 | 1094 | 0 | 0 |
| 4 | So | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sp | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sq | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sr | 1196 | 0 | 1094 | 2 | 0 |
| 4 | Ss | 1196 | 0 | 1094 | 2 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 4 | St | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Su | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sv | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sw | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sx | 1196 | 0 | 1094 | 0 | 0 |
| 4 | Sy | 1196 | 0 | 1094 | 1 | 0 |
| 4 | Sz | 1196 | 0 | 1094 | 0 | 0 |
| 5 | Pa | 1220 | 0 | 1118 | 0 | 0 |
| 5 | Pb | 1220 | 0 | 1118 | 0 | 0 |
| 5 | Pc | 1220 | 0 | 1118 | 1 | 0 |
| 5 | Pd | 1220 | 0 | 1118 | 0 | 0 |
| 5 | Pe | 1220 | 0 | 1118 | 0 | 0 |
| 5 | Pf | 1220 | 0 | 1118 | 0 | 0 |
| 6 | PM | 1087 | 0 | 1018 | 0 | 0 |
| 6 | PN | 1087 | 0 | 1018 | 0 | 0 |
| 6 | PO | 1087 | 0 | 1018 | 0 | 0 |
| 6 | PP | 1087 | 0 | 1018 | 0 | 0 |
| 6 | PQ | 1087 | 0 | 1018 | 0 | 0 |
| 6 | PR | 1087 | 0 | 1018 | 1 | 0 |
| 6 | PS | 1087 | 0 | 1018 | 0 | 0 |
| 6 | PT | 1087 | 0 | 1018 | 0 | 0 |
| 6 | PU | 1087 | 0 | 1018 | 1 | 0 |
| 6 | PV | 1087 | 0 | 1018 | 1 | 0 |
| 6 | PW | 1087 | 0 | 1018 | 0 | 0 |
| 6 | PX | 1087 | 0 | 1018 | 0 | 0 |
| 7 | PA | 3106 | 0 | 2943 | 0 | 0 |
| 7 | PB | 3106 | 0 | 2943 | 0 | 0 |
| 7 | PC | 3106 | 0 | 2943 | 0 | 0 |
| 7 | PD | 3106 | 0 | 2943 | 0 | 0 |
| 7 | PE | 3106 | 0 | 2943 | 1 | 0 |
| 7 | PF | 3106 | 0 | 2943 | 1 | 0 |
| 7 | PG | 3106 | 0 | 2943 | 0 | 0 |
| 7 | PH | 3106 | 0 | 2943 | 0 | 0 |
| 7 | PI | 3106 | 0 | 2943 | 1 | 0 |
| 7 | PJ | 3106 | 0 | 2943 | 0 | 0 |
| 7 | PK | 3106 | 0 | 2943 | 0 | 0 |
| 7 | PL | 3106 | 0 | 2943 | 0 | 0 |
| 8 | BD | 1 | 0 | 0 | 0 | 0 |
| 8 | BE | 1 | 0 | 0 | 0 | 0 |
| 8 | BF | 1 | 0 | 0 | 0 | 0 |
| 8 | PM | 1 | 0 | 0 | 0 | 0 |
| 8 | PN | 1 | 0 | 0 | 0 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 8 | PO | 1 | 0 | 0 | 0 | 0 |
| 8 | PP | 1 | 0 | 0 | 0 | 0 |
| 8 | PQ | 1 | 0 | 0 | 0 | 0 |
| 8 | PR | 1 | 0 | 0 | 0 | 0 |
| 8 | PS | 1 | 0 | 0 | 0 | 0 |
| 8 | PT | 1 | 0 | 0 | 0 | 0 |
| 8 | PU | 2 | 0 | 0 | 0 | 0 |
| 8 | PV | 1 | 0 | 0 | 0 | 0 |
| 8 | PW | 1 | 0 | 0 | 0 | 0 |
| All | All | 179352 | 0 | 167330 | 72 | 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 0.

All (72) 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:BD:225:GLU:OE2 | 2:QJ:337:ARG:NH1 | 1.91 | 1.03 |
| 1:BD:96:GLU:OE2 | 2:QH:330:ARG:NH1 | 2.32 | 0.63 |
| 5:Pc:136:THR:HG21 | 6:PR:37:TRP:HA | 1.79 | 0.63 |
| 2:QG:166:ALA:HB2 | 2:QH:168:GLN:HG2 | 1.84 | 0.59 |
| 1:BD:281:ASP:OD2 | 1:BE:800:ARG:NH1 | 2.33 | 0.59 |
| 2:QE:130:ILE:HG23 | 2:QF:135:VAL:CG2 | 2.32 | 0.59 |
| 2:QI:130:ILE:HG23 | 2:QJ:135:VAL:CG2 | 2.34 | 0.57 |
| 2:QI:105:VAL:O | 2:QI:109:THR:HG23 | 2.07 | 0.55 |
| 2:QJ:48:MET:HG2 | 2:QE:47:ALA:HB2 | 1.88 | 0.54 |
| 2:QG:188:LEU:HD21 | 2:QH:186:THR:HB | 1.89 | 0.54 |
| 1:BD:280:GLU:HG3 | 1:BE:378:ILE:HG13 | 1.91 | 0.53 |
| 2:QE:105:VAL:O | 2:QE:109:THR:HG23 | 2.10 | 0.52 |
| 2:QH:27:ALA:HA | 2:QI:26:THR:HG22 | 1.92 | 0.51 |
| 2:QE:171:ASP:O | 2:QE:175:THR:HG23 | 2.11 | 0.51 |
| 2:QE:22:ALA:O | 2:QE:26:THR:HG23 | 2.12 | 0.50 |
| 1:BE:111:GLU:CD | 2:QF:322:ARG:HH12 | 2.20 | 0.50 |
| 4:Sr:130:ASP:HA | 4:Ss:115:ARG:NH1 | 2.27 | 0.49 |
| 2:QH:181:PRO:HG2 | 2:QI:175:THR:HG22 | 1.95 | 0.49 |
| 4:Sd:13:GLY:HA2 | 4:Sd:106:THR:HG22 | 1.94 | 0.49 |
| 2:QG:22:ALA:O | 2:QG:26:THR:HG23 | 2.13 | 0.48 |
| 2:QG:105:VAL:O | 2:QG:109:THR:HG23 | 2.12 | 0.48 |
| 4:B6:44:GLU:HG3 | 4:B6:53:ARG:HD2 | 1.96 | 0.47 |
| 2:QI:171:ASP:O | 2:QI:175:THR:HG23 | 2.15 | 0.47 |
| 2:QF:112:ALA:O | 2:QF:116:LEU:HG | 2.15 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 4:B3:47:THR:HG23 | 4:B3:54:ASP:HB2 | 1.96 | 0.47 |
| 1:BE:215:PHE:CE1 | 3:BA:38:ARG:HG3 | 2.50 | 0.46 |
| 2:QH:146:THR:HA | 2:QH:149:THR:HG23 | 1.96 | 0.46 |
| 2:QI:22:ALA:O | 2:QI:26:THR:HG23 | 2.16 | 0.46 |
| 1:BE:656:GLU:OE1 | 1:BE:755:THR:HG22 | 2.15 | 0.45 |
| 2:QG:166:ALA:CB | 2:QH:168:GLN:HG2 | 2.47 | 0.45 |
| 2:QE:241:ASN:HD22 | 2:QE:241:ASN:C | 2.25 | 0.45 |
| 1:BE:249:LYS:CE | 1:BE:263:THR:HG22 | 2.47 | 0.45 |
| 4:Sa:13:GLY:HA2 | 4:Sa:106:THR:HG22 | 1.98 | 0.45 |
| 6:PU:132:ASP:OD2 | 7:PE:253:PRO:HD3 | 2.16 | 0.45 |
| 1:BE:59:ASP:OD1 | 3:BA:185:ARG:NH2 | 2.49 | 0.45 |
| 7:PF:424:PRO:HA | 7:PF:427:MET:HE3 | 1.98 | 0.44 |
| 1:BE:81:GLU:OE1 | 3:BC:234:ARG:NH1 | 2.47 | 0.44 |
| 1:BE:111:GLU:OE1 | 2:QF:322:ARG:NH1 | 2.50 | 0.44 |
| 2:QH:48:MET:HG2 | 2:QI:47:ALA:HB2 | 2.00 | 0.44 |
| 4:Sr:130:ASP:HA | 4:Ss:115:ARG:HH11 | 1.82 | 0.44 |
| 2:QI:258:THR:HG21 | 2:QJ:256:LYS:O | 2.18 | 0.43 |
| 2:QH:97:SER:HB2 | 2:QI:100:ASP:OD2 | 2.19 | 0.43 |
| 2:QJ:37:LEU:HD21 | 2:QE:36:GLU:H | 1.83 | 0.43 |
| 2:QJ:27:ALA:HA | 2:QE:26:THR:HG22 | 2.01 | 0.43 |
| 2:QG:135:VAL:O | 2:QG:135:VAL:HG12 | 2.18 | 0.42 |
| 2:QH:239:GLY:HA2 | 2:QI:237:GLU:HG3 | 2.01 | 0.42 |
| 2:QG:112:ALA:HB3 | 2:QH:116:LEU:HD13 | 2.02 | 0.42 |
| 6:PV:129:VAL:HG12 | 6:PV:129:VAL:O | 2.20 | 0.42 |
| 3:BC:157:VAL:HG13 | 3:BC:237:VAL:HG11 | 2.02 | 0.42 |
| 4:ST:13:GLY:HA2 | 4:ST:106:THR:HG22 | 2.01 | 0.42 |
| 4:B6:13:GLY:HA2 | 4:B6:106:THR:HG22 | 2.01 | 0.42 |
| 2:QH:286:VAL:N | 2:QH:287:PRO:HD3 | 2.35 | 0.41 |
| 7:PI:424:PRO:HA | 7:PI:427:MET:HE3 | 2.01 | 0.41 |
| 2:QG:112:ALA:CB | 2:QH:116:LEU:HD13 | 2.49 | 0.41 |
| 2:QE:102:LEU:HD13 | 2:QF:106:ALA:HB2 | 2.01 | 0.41 |
| 2:QF:103:TYR:O | 2:QF:106:ALA:HB3 | 2.20 | 0.41 |
| 2:QF:105:VAL:O | 2:QF:109:THR:HG23 | 2.20 | 0.41 |
| 1:BE:99:GLU:C | 1:BE:100:ASN:HD22 | 2.28 | 0.41 |
| 2:QG:26:THR:HG22 | 2:QF:27:ALA:HA | 2.03 | 0.41 |
| 1:BE:111:GLU:CD | 2:QF:322:ARG:NH1 | 2.79 | 0.41 |
| 2:QH:112:ALA:O | 2:QH:116:LEU:HG | 2.20 | 0.41 |
| 4:Sc:91:SER:HB2 | 4:Sd:148:SER:HB2 | 2.03 | 0.41 |
| 4:Sb:13:GLY:HA2 | 4:Sb:106:THR:HG22 | 2.01 | 0.41 |
| 4:B2:91:SER:HB2 | 4:B3:148:SER:HB2 | 2.03 | 0.41 |
| 4:Sy:148:SER:HB2 | 4:S2:91:SER:HB2 | 2.02 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:BF:215:PHE:CD1 | 3:BC:38:ARG:HG2 | 2.56 | 0.41 |
| 4:B3:13:GLY:HA2 | 4:B3:106:THR:HG22 | 2.03 | 0.40 |
| 2:QG:189:LYS:HE3 | 2:QF:189:LYS:HD3 | 2.03 | 0.40 |
| 2:QI:177:ILE:O | 2:QI:181:PRO:HD2 | 2.20 | 0.40 |
| 4:SY:13:GLY:HA2 | 4:SY:106:THR:HG22 | 2.04 | 0.40 |
| 2:QG:40:PHE:CD1 | 2:QG:40:PHE:C | 2.99 | 0.40 |
| 4:SN:13:GLY:HA2 | 4:SN:106:THR:HG22 | 2.04 | 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 PDB entries followed by that with respect to all EM entries.

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 | BD | 951/954 (100%) | 895 (94%) | 56 (6%) | 0 | 100 | 100 |
| 1 | BE | 951/954 (100%) | 911 (96%) | 40 (4%) | 0 | 100 | 100 |
| 1 | BF | 951/954 (100%) | 893 (94%) | 58 (6%) | 0 | 100 | 100 |
| 2 | QE | 335/341 (98%) | 323 (96%) | 11 (3%) | 1 (0%) | 37 | 44 |
| 2 | QF | 320/341 (94%) | 296 (92%) | 24 (8%) | 0 | 100 | 100 |
| 2 | QG | 335/341 (98%) | 317 (95%) | 18 (5%) | 0 | 100 | 100 |
| 2 | QH | 320/341 (94%) | 302 (94%) | 18 (6%) | 0 | 100 | 100 |
| 2 | QI | 335/341 (98%) | 318 (95%) | 17 (5%) | 0 | 100 | 100 |
| 2 | QJ | 320/341 (94%) | 300 (94%) | 20 (6%) | 0 | 100 | 100 |
| 3 | BA | 282/285 (99%) | 272 (96%) | 10 (4%) | 0 | 100 | 100 |
| 3 | BB | 282/285 (99%) | 272 (96%) | 10 (4%) | 0 | 100 | 100 |
| 3 | BC | 282/285 (99%) | 273 (97%) | 9 (3%) | 0 | 100 | 100 |
| 4 | B1 | 154/158 (98%) | 153 (99%) | 1 (1%) | 0 | 100 | 100 |
| 4 | B2 | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 4 | B3 | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | B4 | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | B5 | 154/158 (98%) | 149 (97%) | 5 (3%) | 0 | 100 | 100 |
| 4 | B6 | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | P1 | 154/158 (98%) | 153 (99%) | 1 (1%) | 0 | 100 | 100 |
| 4 | P2 | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | P3 | 154/158 (98%) | 153 (99%) | 1 (1%) | 0 | 100 | 100 |
| 4 | P4 | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | P5 | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | P6 | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | S1 | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | S2 | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SA | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | SB | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SC | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SD | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | SE | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SF | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | SG | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SH | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | SI | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | SJ | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SK | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SL | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SM | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SN | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | SO | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | SP | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | SQ | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SR | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | SS | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 4 | ST | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | SU | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | SV | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SW | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SX | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | SY | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | SZ | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | Sa | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | Sb | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Sc | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Sd | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Se | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Sf | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Sg | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Sh | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Si | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Sj | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Sk | 154/158 (98%) | 149 (97%) | 5 (3%) | 0 | 100 | 100 |
| 4 | Sl | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Sm | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Sn | 154/158 (98%) | 153 (99%) | 1 (1%) | 0 | 100 | 100 |
| 4 | So | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Sp | 154/158 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 4 | Sq | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Sr | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Ss | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | St | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Su | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Sv | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Sw | 154/158 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 4 | Sx | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 4 | Sy | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 4 | Sz | 154/158 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 5 | Pa | 154/157 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 5 | Pb | 154/157 (98%) | 149 (97%) | 5 (3%) | 0 | 100 | 100 |
| 5 | Pc | 154/157 (98%) | 150 (97%) | 4 (3%) | 0 | 100 | 100 |
| 5 | Pd | 154/157 (98%) | 152 (99%) | 2 (1%) | 0 | 100 | 100 |
| 5 | Pe | 154/157 (98%) | 149 (97%) | 5 (3%) | 0 | 100 | 100 |
| 5 | Pf | 154/157 (98%) | 151 (98%) | 3 (2%) | 0 | 100 | 100 |
| 6 | PM | 138/141 (98%) | 133 (96%) | 5 (4%) | 0 | 100 | 100 |
| 6 | PN | 138/141 (98%) | 134 (97%) | 4 (3%) | 0 | 100 | 100 |
| 6 | PO | 138/141 (98%) | 131 (95%) | 7 (5%) | 0 | 100 | 100 |
| 6 | PP | 138/141 (98%) | 133 (96%) | 5 (4%) | 0 | 100 | 100 |
| 6 | PQ | 138/141 (98%) | 134 (97%) | 4 (3%) | 0 | 100 | 100 |
| 6 | PR | 138/141 (98%) | 132 (96%) | 6 (4%) | 0 | 100 | 100 |
| 6 | PS | 138/141 (98%) | 131 (95%) | 7 (5%) | 0 | 100 | 100 |
| 6 | PT | 138/141 (98%) | 131 (95%) | 7 (5%) | 0 | 100 | 100 |
| 6 | PU | 138/141 (98%) | 133 (96%) | 5 (4%) | 0 | 100 | 100 |
| 6 | PV | 138/141 (98%) | 133 (96%) | 5 (4%) | 0 | 100 | 100 |
| 6 | PW | 138/141 (98%) | 132 (96%) | 6 (4%) | 0 | 100 | 100 |
| 6 | PX | 138/141 (98%) | 129 (94%) | 9 (6%) | 0 | 100 | 100 |
| 7 | PA | 389/675 (58%) | 379 (97%) | 10 (3%) | 0 | 100 | 100 |
| 7 | PB | 389/675 (58%) | 382 (98%) | 7 (2%) | 0 | 100 | 100 |
| 7 | PC | 389/675 (58%) | 376 (97%) | 13 (3%) | 0 | 100 | 100 |
| 7 | PD | 389/675 (58%) | 380 (98%) | 9 (2%) | 0 | 100 | 100 |
| 7 | PE | 389/675 (58%) | 379 (97%) | 10 (3%) | 0 | 100 | 100 |
| 7 | PF | 389/675 (58%) | 377 (97%) | 12 (3%) | 0 | 100 | 100 |
| 7 | PG | 389/675 (58%) | 377 (97%) | 12 (3%) | 0 | 100 | 100 |
| 7 | PH | 389/675 (58%) | 377 (97%) | 12 (3%) | 0 | 100 | 100 |
| 7 | PI | 389/675 (58%) | 377 (97%) | 12 (3%) | 0 | 100 | 100 |
| 7 | PJ | 389/675 (58%) | 379 (97%) | 10 (3%) | 0 | 100 | 100 |
| 7 | PK | 389/675 (58%) | 375 (96%) | 14 (4%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 7 | PL | 389/675 (58%) | 381 (98%) | 8 (2%) | 0 | 100 | 100 |
| All | All | 23076/26925 (86%) | 22362 (97%) | 713 (3%) | 1 (0%) | 100 | 100 |

All (1) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | QE | 127 | ASN |

### 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 PDB entries followed by that with respect to all EM entries.

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 | BD | 799/800 (100%) | 791 (99%) | 8 (1%) | 73 | 82 |
| 1 | BE | 799/800 (100%) | 791 (99%) | 8 (1%) | 73 | 82 |
| 1 | BF | 799/800 (100%) | 783 (98%) | 16 (2%) | 50 | 63 |
| 2 | QE | 259/262 (99%) | 252 (97%) | 7 (3%) | 40 | 52 |
| 2 | QF | 251/262 (96%) | 241 (96%) | 10 (4%) | 27 | 36 |
| 2 | QG | 259/262 (99%) | 251 (97%) | 8 (3%) | 35 | 47 |
| 2 | QH | 251/262 (96%) | 244 (97%) | 7 (3%) | 38 | 51 |
| 2 | QI | 259/262 (99%) | 251 (97%) | 8 (3%) | 35 | 47 |
| 2 | QJ | 251/262 (96%) | 245 (98%) | 6 (2%) | 44 | 57 |
| 3 | BA | 238/239 (100%) | 234 (98%) | 4 (2%) | 56 | 69 |
| 3 | BB | 238/239 (100%) | 235 (99%) | 3 (1%) | 65 | 77 |
| 3 | BC | 238/239 (100%) | 235 (99%) | 3 (1%) | 65 | 77 |
| 4 | B1 | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | B2 | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | B3 | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | B4 | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | B5 | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 4 | B6 | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | P1 | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | P2 | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | P3 | 129/131 (98%) | 127 (98%) | 2 (2%) | 58 | 71 |
| 4 | P4 | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | P5 | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | P6 | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | S1 | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | S2 | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SA | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SB | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SC | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SD | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SE | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SF | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SG | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SH | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SI | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SJ | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SK | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | SL | 129/131 (98%) | 127 (98%) | 2 (2%) | 58 | 71 |
| 4 | SM | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SN | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SO | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | SP | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | SQ | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SR | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SS | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | ST | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | SU | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | SV | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 4 | SW | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | SX | 129/131 (98%) | 127 (98%) | 2 (2%) | 58 | 71 |
| 4 | SY | 129/131 (98%) | 127 (98%) | 2 (2%) | 58 | 71 |
| 4 | SZ | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sa | 129/131 (98%) | 127 (98%) | 2 (2%) | 58 | 71 |
| 4 | Sb | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sc | 129/131 (98%) | 127 (98%) | 2 (2%) | 58 | 71 |
| 4 | Sd | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Se | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sf | 129/131 (98%) | 127 (98%) | 2 (2%) | 58 | 71 |
| 4 | Sg | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sh | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Si | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sj | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sk | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | Sl | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sm | 129/131 (98%) | 127 (98%) | 2 (2%) | 58 | 71 |
| 4 | Sn | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | So | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sp | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sq | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sr | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Ss | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | St | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Su | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sv | 129/131 (98%) | 128 (99%) | 1 (1%) | 79 | 87 |
| 4 | Sw | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | Sx | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | Sy | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 4 | Sz | 129/131 (98%) | 129 (100%) | 0 | 100 | 100 |
| 5 | Pa | 135/136 (99%) | 133 (98%) | 2 (2%) | 60 | 73 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 5 | Pb | 135/136 (99%) | 134 (99%) | 1 (1%) | 81 89 |
| 5 | Pc | 135/136 (99%) | 133 (98%) | 2 (2%) | 60 73 |
| 5 | Pd | 135/136 (99%) | 134 (99%) | 1 (1%) | 81 89 |
| 5 | Pe | 135/136 (99%) | 131 (97%) | 4 (3%) | 36 48 |
| 5 | Pf | 135/136 (99%) | 135 (100%) | 0 | 100 100 |
| 6 | PM | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 6 | PN | 116/117 (99%) | 114 (98%) | 2 (2%) | 56 69 |
| 6 | PO | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 6 | PP | 116/117 (99%) | 114 (98%) | 2 (2%) | 56 69 |
| 6 | PQ | 116/117 (99%) | 114 (98%) | 2 (2%) | 56 69 |
| 6 | PR | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 6 | PS | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 6 | PT | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 6 | PU | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 6 | PV | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 6 | PW | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 6 | PX | 116/117 (99%) | 115 (99%) | 1 (1%) | 75 85 |
| 7 | PA | 327/568 (58%) | 326 (100%) | 1 (0%) | 91 95 |
| 7 | PB | 327/568 (58%) | 323 (99%) | 4 (1%) | 67 79 |
| 7 | PC | 327/568 (58%) | 325 (99%) | 2 (1%) | 84 90 |
| 7 | PD | 327/568 (58%) | 325 (99%) | 2 (1%) | 84 90 |
| 7 | PE | 327/568 (58%) | 327 (100%) | 0 | 100 100 |
| 7 | PF | 327/568 (58%) | 325 (99%) | 2 (1%) | 84 90 |
| 7 | PG | 327/568 (58%) | 324 (99%) | 3 (1%) | 75 85 |
| 7 | PH | 327/568 (58%) | 327 (100%) | 0 | 100 100 |
| 7 | PI | 327/568 (58%) | 327 (100%) | 0 | 100 100 |
| 7 | PJ | 327/568 (58%) | 324 (99%) | 3 (1%) | 75 85 |
| 7 | PK | 327/568 (58%) | 326 (100%) | 1 (0%) | 91 95 |
| 7 | PL | 327/568 (58%) | 325 (99%) | 2 (1%) | 84 90 |
| All | All | 19281/22371 (86%) | 19091 (99%) | 190 (1%) | 71 82 |

All (190) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | BD | 30 | VAL |
| 1 | BD | 483 | THR |
| 1 | BD | 563 | ASN |
| 1 | BD | 726 | THR |
| 1 | BD | 743 | HIS |
| 1 | BD | 747 | VAL |
| 1 | BD | 799 | THR |
| 1 | BD | 878 | ASN |
| 1 | BE | 61 | ARG |
| 1 | BE | 97 | ARG |
| 1 | BE | 120 | ARG |
| 1 | BE | 182 | SER |
| 1 | BE | 619 | THR |
| 1 | BE | 629 | ASN |
| 1 | BE | 751 | LEU |
| 1 | BE | 899 | ARG |
| 1 | BF | 35 | GLN |
| 1 | BF | 137 | LEU |
| 1 | BF | 145 | THR |
| 1 | BF | 172 | GLU |
| 1 | BF | 207 | ARG |
| 1 | BF | 278 | ASP |
| 1 | BF | 323 | GLU |
| 1 | BF | 659 | LEU |
| 1 | BF | 671 | ASP |
| 1 | BF | 679 | THR |
| 1 | BF | 726 | THR |
| 1 | BF | 755 | THR |
| 1 | BF | 757 | VAL |
| 1 | BF | 833 | VAL |
| 1 | BF | 872 | ASN |
| 1 | BF | 941 | ARG |
| 2 | QG | 39 | THR |
| 2 | QG | 40 | PHE |
| 2 | QG | 76 | LEU |
| 2 | QG | 102 | LEU |
| 2 | QG | 177 | ILE |
| 2 | QG | 188 | LEU |
| 2 | QG | 281 | GLU |
| 2 | QG | 312 | PHE |
| 2 | QH | 63 | LEU |
| 2 | QH | 130 | ILE |
| 2 | QH | 138 | LEU |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | QH | 146 | THR |
| 2 | QH | 168 | GLN |
| 2 | QH | 222 | ASN |
| 2 | QH | 336 | SER |
| 2 | QI | 36 | GLU |
| 2 | QI | 103 | TYR |
| 2 | QI | 124 | ASP |
| 2 | QI | 135 | VAL |
| 2 | QI | 173 | ILE |
| 2 | QI | 178 | ASN |
| 2 | QI | 210 | ILE |
| 2 | QI | 312 | PHE |
| 2 | QJ | 10 | SER |
| 2 | QJ | 130 | ILE |
| 2 | QJ | 138 | LEU |
| 2 | QJ | 146 | THR |
| 2 | QJ | 161 | ILE |
| 2 | QJ | 274 | GLU |
| 2 | QE | 11 | GLU |
| 2 | QE | 12 | THR |
| 2 | QE | 76 | LEU |
| 2 | QE | 100 | ASP |
| 2 | QE | 135 | VAL |
| 2 | QE | 160 | ASP |
| 2 | QE | 214 | THR |
| 2 | QF | 6 | SER |
| 2 | QF | 17 | GLU |
| 2 | QF | 102 | LEU |
| 2 | QF | 130 | ILE |
| 2 | QF | 138 | LEU |
| 2 | QF | 146 | THR |
| 2 | QF | 163 | THR |
| 2 | QF | 182 | GLU |
| 2 | QF | 186 | THR |
| 2 | QF | 336 | SER |
| 3 | BA | 3 | ASP |
| 3 | BA | 26 | LEU |
| 3 | BA | 126 | LEU |
| 3 | BA | 190 | GLN |
| 3 | BB | 152 | THR |
| 3 | BB | 237 | VAL |
| 3 | BB | 284 | ASN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 3 | BC | 3 | ASP |
| 3 | BC | 68 | SER |
| 3 | BC | 152 | THR |
| 4 | SG | 115 | ARG |
| 4 | SH | 74 | LEU |
| 4 | SI | 115 | ARG |
| 4 | SJ | 115 | ARG |
| 4 | SL | 62 | ASN |
| 4 | SL | 115 | ARG |
| 4 | SS | 115 | ARG |
| 4 | ST | 115 | ARG |
| 4 | SV | 115 | ARG |
| 4 | SX | 62 | ASN |
| 4 | SX | 115 | ARG |
| 4 | SM | 115 | ARG |
| 4 | SN | 115 | ARG |
| 4 | SQ | 115 | ARG |
| 4 | SR | 115 | ARG |
| 4 | SB | 115 | ARG |
| 4 | SA | 115 | ARG |
| 4 | SC | 115 | ARG |
| 4 | SD | 115 | ARG |
| 4 | SE | 115 | ARG |
| 4 | SF | 115 | ARG |
| 4 | Sl | 115 | ARG |
| 4 | Sm | 66 | GLU |
| 4 | Sm | 115 | ARG |
| 4 | Sn | 115 | ARG |
| 4 | So | 115 | ARG |
| 4 | Sp | 115 | ARG |
| 4 | Se | 115 | ARG |
| 4 | Sf | 54 | ASP |
| 4 | Sf | 115 | ARG |
| 4 | Sg | 115 | ARG |
| 4 | Sh | 115 | ARG |
| 4 | Si | 115 | ARG |
| 4 | Sj | 115 | ARG |
| 4 | SY | 33 | ASP |
| 4 | SY | 115 | ARG |
| 4 | SZ | 115 | ARG |
| 4 | Sa | 62 | ASN |
| 4 | Sa | 115 | ARG |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 4 | Sb | 115 | ARG |
| 4 | Sc | 62 | ASN |
| 4 | Sc | 115 | ARG |
| 4 | Sd | 115 | ARG |
| 4 | B1 | 115 | ARG |
| 4 | B2 | 115 | ARG |
| 4 | B4 | 115 | ARG |
| 4 | S1 | 115 | ARG |
| 4 | S2 | 115 | ARG |
| 4 | Sq | 115 | ARG |
| 4 | Sr | 115 | ARG |
| 4 | St | 115 | ARG |
| 4 | Su | 115 | ARG |
| 4 | Sv | 115 | ARG |
| 4 | P1 | 33 | ASP |
| 4 | P2 | 31 | VAL |
| 4 | P3 | 49 | ASP |
| 4 | P3 | 155 | THR |
| 5 | Pa | 73 | VAL |
| 5 | Pa | 90 | THR |
| 5 | Pb | 93 | GLU |
| 5 | Pc | 89 | GLU |
| 5 | Pc | 90 | THR |
| 5 | Pd | 110 | ASN |
| 5 | Pe | 43 | GLU |
| 5 | Pe | 73 | VAL |
| 5 | Pe | 90 | THR |
| 5 | Pe | 110 | ASN |
| 6 | PT | 119 | THR |
| 6 | PM | 119 | THR |
| 6 | PN | 119 | THR |
| 6 | PN | 132 | ASP |
| 6 | PO | 132 | ASP |
| 6 | PP | 64 | MET |
| 6 | PP | 119 | THR |
| 6 | PQ | 119 | THR |
| 6 | PQ | 132 | ASP |
| 6 | PR | 119 | THR |
| 6 | PS | 119 | THR |
| 6 | PU | 132 | ASP |
| 6 | PV | 119 | THR |
| 6 | PW | 119 | THR |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 6 | PX | 119 | THR |
| 7 | PA | 168 | GLN |
| 7 | PB | 39 | VAL |
| 7 | PB | 60 | LEU |
| 7 | PB | 168 | GLN |
| 7 | PB | 299 | HIS |
| 7 | PC | 205 | ARG |
| 7 | PC | 423 | SER |
| 7 | PD | 146 | ILE |
| 7 | PD | 168 | GLN |
| 7 | PF | 168 | GLN |
| 7 | PF | 212 | GLU |
| 7 | PG | 60 | LEU |
| 7 | PG | 146 | ILE |
| 7 | PG | 299 | HIS |
| 7 | PJ | 60 | LEU |
| 7 | PJ | 241 | GLN |
| 7 | PJ | 258 | ASP |
| 7 | PK | 299 | HIS |
| 7 | PL | 147 | THR |
| 7 | PL | 168 | GLN |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (196) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | BD | 37 | ASN |
| 1 | BD | 103 | GLN |
| 1 | BD | 204 | HIS |
| 1 | BD | 253 | GLN |
| 1 | BD | 367 | GLN |
| 1 | BD | 382 | ASN |
| 1 | BD | 425 | ASN |
| 1 | BD | 581 | ASN |
| 1 | BD | 695 | ASN |
| 1 | BD | 802 | ASN |
| 1 | BD | 835 | ASN |
| 1 | BD | 868 | GLN |
| 1 | BE | 100 | ASN |
| 1 | BE | 103 | GLN |
| 1 | BE | 160 | GLN |
| 1 | BE | 173 | ASN |
| 1 | BE | 198 | GLN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | BE | 409 | ASN |
| 1 | BE | 420 | ASN |
| 1 | BE | 425 | ASN |
| 1 | BE | 572 | GLN |
| 1 | BE | 789 | GLN |
| 1 | BE | 868 | GLN |
| 1 | BE | 954 | ASN |
| 1 | BF | 36 | ASN |
| 1 | BF | 37 | ASN |
| 1 | BF | 131 | ASN |
| 1 | BF | 198 | GLN |
| 1 | BF | 420 | ASN |
| 1 | BF | 741 | GLN |
| 1 | BF | 772 | ASN |
| 1 | BF | 802 | ASN |
| 1 | BF | 818 | ASN |
| 1 | BF | 857 | ASN |
| 2 | QG | 178 | ASN |
| 2 | QG | 316 | ASN |
| 2 | QG | 323 | GLN |
| 2 | QH | 14 | GLN |
| 2 | QI | 120 | GLN |
| 2 | QI | 153 | ASN |
| 2 | QI | 241 | ASN |
| 2 | QI | 270 | ASN |
| 2 | QI | 316 | ASN |
| 2 | QI | 323 | GLN |
| 2 | QJ | 13 | GLN |
| 2 | QJ | 139 | GLN |
| 2 | QJ | 270 | ASN |
| 2 | QJ | 277 | ASN |
| 2 | QE | 13 | GLN |
| 2 | QE | 211 | ASN |
| 2 | QE | 241 | ASN |
| 2 | QF | 65 | GLN |
| 2 | QF | 139 | GLN |
| 3 | BA | 36 | ASN |
| 3 | BA | 181 | ASN |
| 3 | BA | 203 | ASN |
| 3 | BA | 221 | ASN |
| 3 | BA | 262 | GLN |
| 3 | BB | 181 | ASN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 3 | BB | 190 | GLN |
| 3 | BB | 203 | ASN |
| 3 | BB | 262 | GLN |
| 3 | BC | 262 | GLN |
| 4 | SH | 104 | ASN |
| 4 | SI | 104 | ASN |
| 4 | SK | 104 | ASN |
| 4 | SL | 104 | ASN |
| 4 | SS | 62 | ASN |
| 4 | SS | 64 | ASN |
| 4 | SS | 151 | ASN |
| 4 | SU | 104 | ASN |
| 4 | SU | 151 | ASN |
| 4 | SV | 151 | ASN |
| 4 | SM | 104 | ASN |
| 4 | SN | 104 | ASN |
| 4 | SN | 151 | ASN |
| 4 | SO | 62 | ASN |
| 4 | SO | 104 | ASN |
| 4 | SO | 151 | ASN |
| 4 | SP | 104 | ASN |
| 4 | SQ | 104 | ASN |
| 4 | SR | 62 | ASN |
| 4 | SA | 104 | ASN |
| 4 | SC | 104 | ASN |
| 4 | SD | 104 | ASN |
| 4 | SE | 104 | ASN |
| 4 | SF | 104 | ASN |
| 4 | Sk | 104 | ASN |
| 4 | Sl | 62 | ASN |
| 4 | Sl | 64 | ASN |
| 4 | Sl | 104 | ASN |
| 4 | Sm | 104 | ASN |
| 4 | Sn | 104 | ASN |
| 4 | So | 104 | ASN |
| 4 | Sp | 104 | ASN |
| 4 | Se | 104 | ASN |
| 4 | Sf | 104 | ASN |
| 4 | Sg | 104 | ASN |
| 4 | Sh | 104 | ASN |
| 4 | Si | 104 | ASN |
| 4 | Sj | 104 | ASN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 4 | SY | 104 | ASN |
| 4 | SZ | 104 | ASN |
| 4 | Sa | 62 | ASN |
| 4 | Sa | 151 | ASN |
| 4 | Sb | 104 | ASN |
| 4 | Sc | 62 | ASN |
| 4 | Sc | 104 | ASN |
| 4 | B1 | 104 | ASN |
| 4 | B2 | 104 | ASN |
| 4 | B5 | 104 | ASN |
| 4 | Sw | 104 | ASN |
| 4 | Sw | 151 | ASN |
| 4 | Sx | 151 | ASN |
| 4 | Sy | 151 | ASN |
| 4 | Sz | 104 | ASN |
| 4 | S1 | 62 | ASN |
| 4 | S1 | 64 | ASN |
| 4 | S1 | 151 | ASN |
| 4 | S2 | 151 | ASN |
| 4 | Sq | 104 | ASN |
| 4 | Ss | 62 | ASN |
| 4 | St | 62 | ASN |
| 4 | St | 64 | ASN |
| 4 | St | 104 | ASN |
| 4 | St | 151 | ASN |
| 4 | Sv | 151 | ASN |
| 4 | P1 | 104 | ASN |
| 4 | P2 | 104 | ASN |
| 4 | P5 | 104 | ASN |
| 4 | P6 | 151 | ASN |
| 5 | Pa | 77 | ASN |
| 5 | Pa | 113 | GLN |
| 5 | Pa | 156 | ASN |
| 5 | Pc | 77 | ASN |
| 5 | Pd | 29 | GLN |
| 5 | Pd | 77 | ASN |
| 5 | Pd | 110 | ASN |
| 5 | Pe | 11 | GLN |
| 5 | Pe | 110 | ASN |
| 6 | PT | 28 | GLN |
| 6 | PN | 28 | GLN |
| 6 | PN | 133 | ASN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 6 | PO | 28 | GLN |
| 6 | PP | 133 | ASN |
| 6 | PR | 28 | GLN |
| 6 | PR | 95 | GLN |
| 6 | PR | 133 | ASN |
| 6 | PU | 28 | GLN |
| 6 | PU | 95 | GLN |
| 6 | PV | 133 | ASN |
| 6 | PW | 28 | GLN |
| 6 | PX | 63 | ASN |
| 6 | PX | 133 | ASN |
| 7 | PA | 392 | GLN |
| 7 | PA | 393 | GLN |
| 7 | PB | 400 | ASN |
| 7 | PC | 72 | GLN |
| 7 | PC | 168 | GLN |
| 7 | PC | 185 | GLN |
| 7 | PC | 281 | GLN |
| 7 | PC | 392 | GLN |
| 7 | PC | 393 | GLN |
| 7 | PC | 400 | ASN |
| 7 | PD | 168 | GLN |
| 7 | PD | 185 | GLN |
| 7 | PE | 185 | GLN |
| 7 | PE | 392 | GLN |
| 7 | PE | 393 | GLN |
| 7 | PE | 400 | ASN |
| 7 | PF | 72 | GLN |
| 7 | PF | 181 | HIS |
| 7 | PF | 305 | ASN |
| 7 | PG | 72 | GLN |
| 7 | PG | 181 | HIS |
| 7 | PG | 185 | GLN |
| 7 | PG | 392 | GLN |
| 7 | PH | 185 | GLN |
| 7 | PH | 274 | ASN |
| 7 | PH | 392 | GLN |
| 7 | PI | 392 | GLN |
| 7 | PI | 393 | GLN |
| 7 | PI | 400 | ASN |
| 7 | PJ | 72 | GLN |
| 7 | PJ | 185 | GLN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 7 | PJ | 400 | ASN |
| 7 | PK | 72 | GLN |
| 7 | PK | 75 | GLN |
| 7 | PK | 274 | ASN |
| 7 | PK | 305 | ASN |
| 7 | PK | 392 | GLN |
| 7 | PL | 168 | GLN |
| 7 | PL | 200 | ASN |
| 7 | PL | 305 | ASN |
| 7 | PL | 392 | GLN |
| 7 | PL | 393 | GLN |

### 5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

36 non-standard protein/DNA/RNA residues 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 | $\#\|Z\| > 2$ |
| 7 | HIP | PB | 196 | 7 | 10,14,15 | 1.53 | 3 (30%) | 6,20,22 | 1.71 | 2 (33%) |
| 7 | HIP | PA | 243 | 7 | 10,14,15 | 1.70 | 4 (40%) | 6,20,22 | 1.57 | 2 (33%) |
| 7 | HIP | PC | 196 | 7 | 10,14,15 | 1.50 | 3 (30%) | 6,20,22 | 1.74 | 2 (33%) |
| 7 | HIP | PG | 243 | 7 | 10,14,15 | 1.72 | 4 (40%) | 6,20,22 | 1.57 | 2 (33%) |
| 7 | HIP | PK | 196 | 7 | 10,14,15 | 1.59 | 3 (30%) | 6,20,22 | 1.68 | 2 (33%) |
| 7 | HIP | PE | 196 | 7 | 10,14,15 | 1.55 | 3 (30%) | 6,20,22 | 1.81 | 3 (50%) |
| 7 | HIP | PB | 291 | 7 | 10,14,15 | 1.50 | 3 (30%) | 6,20,22 | 1.56 | 2 (33%) |
| 7 | HIP | PD | 196 | 7 | 10,14,15 | 1.51 | 3 (30%) | 6,20,22 | 1.73 | 2 (33%) |
| 7 | HIP | PC | 243 | 7 | 10,14,15 | 1.74 | 4 (40%) | 6,20,22 | 1.55 | 2 (33%) |
| 7 | HIP | PJ | 196 | 7 | 10,14,15 | 1.49 | 3 (30%) | 6,20,22 | 1.77 | 2 (33%) |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\|>2$ | Counts | RMSZ | $\#\|Z\|>2$ |
| 7 | HIP | PF | 196 | 7 | 10,14,15 | 1.54 | 3 (30%) | 6,20,22 | 1.72 | 2 (33%) |
| 7 | HIP | PG | 291 | 7 | 10,14,15 | 1.49 | 3 (30%) | 6,20,22 | 1.66 | 3 (50%) |
| 7 | HIP | PD | 243 | 7 | 10,14,15 | 1.72 | 4 (40%) | 6,20,22 | 1.52 | 2 (33%) |
| 7 | HIP | PI | 243 | 7 | 10,14,15 | 1.73 | 4 (40%) | 6,20,22 | 1.55 | 2 (33%) |
| 7 | HIP | PI | 291 | 7 | 10,14,15 | 1.58 | 3 (30%) | 6,20,22 | 1.77 | 2 (33%) |
| 7 | HIP | PJ | 243 | 7 | 10,14,15 | 1.73 | 4 (40%) | 6,20,22 | 1.51 | 2 (33%) |
| 7 | HIP | PJ | 291 | 7 | 10,14,15 | 1.60 | 3 (30%) | 6,20,22 | 1.53 | 1 (16%) |
| 7 | HIP | PH | 243 | 7 | 10,14,15 | 1.71 | 4 (40%) | 6,20,22 | 1.57 | 2 (33%) |
| 7 | HIP | PH | 291 | 7 | 10,14,15 | 1.45 | 3 (30%) | 6,20,22 | 1.53 | 2 (33%) |
| 7 | HIP | PF | 243 | 7 | 10,14,15 | 1.72 | 4 (40%) | 6,20,22 | 1.50 | 2 (33%) |
| 7 | HIP | PF | 291 | 7 | 10,14,15 | 1.59 | 3 (30%) | 6,20,22 | 1.59 | 2 (33%) |
| 7 | HIP | PK | 291 | 7 | 10,14,15 | 1.58 | 3 (30%) | 6,20,22 | 1.57 | 2 (33%) |
| 7 | HIP | PI | 196 | 7 | 10,14,15 | 1.56 | 3 (30%) | 6,20,22 | 1.70 | 2 (33%) |
| 7 | HIP | PL | 243 | 7 | 10,14,15 | 1.70 | 4 (40%) | 6,20,22 | 1.52 | 2 (33%) |
| 7 | HIP | PL | 291 | 7 | 10,14,15 | 1.58 | 3 (30%) | 6,20,22 | 1.68 | 2 (33%) |
| 7 | HIP | PH | 196 | 7 | 10,14,15 | 1.56 | 3 (30%) | 6,20,22 | 1.65 | 2 (33%) |
| 7 | HIP | PD | 291 | 7 | 10,14,15 | 1.59 | 3 (30%) | 6,20,22 | 1.78 | 2 (33%) |
| 7 | HIP | PC | 291 | 7 | 10,14,15 | 1.56 | 3 (30%) | 6,20,22 | 1.71 | 3 (50%) |
| 7 | HIP | PK | 243 | 7 | 10,14,15 | 1.78 | 4 (40%) | 6,20,22 | 1.58 | 2 (33%) |
| 7 | HIP | PB | 243 | 7 | 10,14,15 | 1.72 | 4 (40%) | 6,20,22 | 1.55 | 2 (33%) |
| 7 | HIP | PE | 291 | 7 | 10,14,15 | 1.65 | 4 (40%) | 6,20,22 | 1.69 | 3 (50%) |
| 7 | HIP | PL | 196 | 7 | 10,14,15 | 1.52 | 3 (30%) | 6,20,22 | 1.68 | 3 (50%) |
| 7 | HIP | PA | 196 | 7 | 10,14,15 | 1.53 | 3 (30%) | 6,20,22 | 1.72 | 2 (33%) |
| 7 | HIP | PE | 243 | 7 | 10,14,15 | 1.77 | 4 (40%) | 6,20,22 | 1.55 | 2 (33%) |
| 7 | HIP | PA | 291 | 7 | 10,14,15 | 1.62 | 3 (30%) | 6,20,22 | 1.73 | 2 (33%) |
| 7 | HIP | PG | 196 | 7 | 10,14,15 | 1.52 | 3 (30%) | 6,20,22 | 1.87 | 3 (50%) |

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 |
|---|---|---|---|---|---|---|---|
| 7 | HIP | PB | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PA | 243 | 7 | - | 3/5/12/14 | 0/1/1/1 |
| 7 | HIP | PC | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 7 | HIP | PG | 243 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PK | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PE | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PB | 291 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PD | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PC | 243 | 7 | - | 3/5/12/14 | 0/1/1/1 |
| 7 | HIP | PJ | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PF | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PG | 291 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PD | 243 | 7 | - | 3/5/12/14 | 0/1/1/1 |
| 7 | HIP | PI | 243 | 7 | - | 0/5/12/14 | 0/1/1/1 |
| 7 | HIP | PI | 291 | 7 | - | 0/5/12/14 | 0/1/1/1 |
| 7 | HIP | PJ | 243 | 7 | - | 1/5/12/14 | 0/1/1/1 |
| 7 | HIP | PJ | 291 | 7 | - | 0/5/12/14 | 0/1/1/1 |
| 7 | HIP | PH | 243 | 7 | - | 3/5/12/14 | 0/1/1/1 |
| 7 | HIP | PH | 291 | 7 | - | 0/5/12/14 | 0/1/1/1 |
| 7 | HIP | PF | 243 | 7 | - | 3/5/12/14 | 0/1/1/1 |
| 7 | HIP | PF | 291 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PK | 291 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PI | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PL | 243 | 7 | - | 3/5/12/14 | 0/1/1/1 |
| 7 | HIP | PL | 291 | 7 | - | 0/5/12/14 | 0/1/1/1 |
| 7 | HIP | PH | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PD | 291 | 7 | - | 0/5/12/14 | 0/1/1/1 |
| 7 | HIP | PC | 291 | 7 | - | 1/5/12/14 | 0/1/1/1 |
| 7 | HIP | PK | 243 | 7 | - | 3/5/12/14 | 0/1/1/1 |
| 7 | HIP | PB | 243 | 7 | - | 3/5/12/14 | 0/1/1/1 |
| 7 | HIP | PE | 291 | 7 | - | 0/5/12/14 | 0/1/1/1 |
| 7 | HIP | PL | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PA | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |
| 7 | HIP | PE | 243 | 7 | - | 1/5/12/14 | 0/1/1/1 |
| 7 | HIP | PA | 291 | 7 | - | 0/5/12/14 | 0/1/1/1 |
| 7 | HIP | PG | 196 | 7 | - | 2/5/12/14 | 0/1/1/1 |

All (121) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 7 | PK | 243 | HIP | P-O1P | 3.83 | 1.50 | 1.47 |
| 7 | PE | 243 | HIP | P-O1P | 3.81 | 1.50 | 1.47 |
| 7 | PB | 243 | HIP | P-O1P | 3.62 | 1.50 | 1.47 |
| 7 | PJ | 243 | HIP | P-O1P | 3.52 | 1.50 | 1.47 |
| 7 | PI | 243 | HIP | P-O1P | 3.51 | 1.50 | 1.47 |
| 7 | PH | 243 | HIP | P-O1P | 3.50 | 1.50 | 1.47 |
| 7 | PC | 243 | HIP | P-O1P | 3.47 | 1.50 | 1.47 |
| 7 | PF | 291 | HIP | P-O1P | 3.42 | 1.50 | 1.47 |
| 7 | PD | 243 | HIP | P-O1P | 3.41 | 1.50 | 1.47 |
| 7 | PF | 243 | HIP | P-O1P | 3.40 | 1.50 | 1.47 |
| 7 | PA | 243 | HIP | P-O1P | 3.39 | 1.50 | 1.47 |
| 7 | PG | 243 | HIP | P-O1P | 3.35 | 1.50 | 1.47 |
| 7 | PL | 243 | HIP | P-O1P | 3.31 | 1.50 | 1.47 |
| 7 | PC | 291 | HIP | P-O1P | 3.17 | 1.50 | 1.47 |
| 7 | PK | 291 | HIP | P-O1P | 3.12 | 1.50 | 1.47 |
| 7 | PJ | 291 | HIP | P-O1P | 3.09 | 1.50 | 1.47 |
| 7 | PL | 291 | HIP | P-O1P | 3.09 | 1.50 | 1.47 |
| 7 | PK | 196 | HIP | P-O1P | 3.07 | 1.50 | 1.47 |
| 7 | PE | 291 | HIP | P-O1P | 3.01 | 1.49 | 1.47 |
| 7 | PI | 291 | HIP | P-O1P | 2.98 | 1.49 | 1.47 |
| 7 | PI | 196 | HIP | P-O1P | 2.98 | 1.49 | 1.47 |
| 7 | PA | 291 | HIP | P-O1P | 2.94 | 1.49 | 1.47 |
| 7 | PB | 291 | HIP | P-O1P | 2.92 | 1.49 | 1.47 |
| 7 | PH | 196 | HIP | P-O1P | 2.91 | 1.49 | 1.47 |
| 7 | PD | 291 | HIP | P-O1P | 2.84 | 1.49 | 1.47 |
| 7 | PG | 291 | HIP | P-O1P | 2.79 | 1.49 | 1.47 |
| 7 | PL | 196 | HIP | P-O1P | 2.75 | 1.49 | 1.47 |
| 7 | PE | 196 | HIP | P-O1P | 2.73 | 1.49 | 1.47 |
| 7 | PA | 196 | HIP | P-O1P | 2.70 | 1.49 | 1.47 |
| 7 | PD | 196 | HIP | P-O1P | 2.66 | 1.49 | 1.47 |
| 7 | PF | 196 | HIP | P-O1P | 2.65 | 1.49 | 1.47 |
| 7 | PB | 196 | HIP | P-O1P | 2.63 | 1.49 | 1.47 |
| 7 | PH | 291 | HIP | P-O1P | 2.60 | 1.49 | 1.47 |
| 7 | PG | 196 | HIP | P-O1P | 2.54 | 1.49 | 1.47 |
| 7 | PG | 243 | HIP | CG-ND1 | 2.49 | 1.40 | 1.37 |
| 7 | PF | 196 | HIP | P-O3P | -2.46 | 1.49 | 1.54 |
| 7 | PA | 291 | HIP | P-O3P | -2.46 | 1.49 | 1.54 |
| 7 | PE | 291 | HIP | P-O3P | -2.45 | 1.49 | 1.54 |
| 7 | PI | 291 | HIP | P-O3P | -2.45 | 1.49 | 1.54 |
| 7 | PJ | 196 | HIP | P-O1P | 2.45 | 1.49 | 1.47 |
| 7 | PD | 291 | HIP | P-O3P | -2.44 | 1.49 | 1.54 |
| 7 | PC | 243 | HIP | CG-ND1 | 2.42 | 1.40 | 1.37 |
| 7 | PB | 196 | HIP | P-O3P | -2.42 | 1.49 | 1.54 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 7 | PC | 196 | HIP | P-O3P | -2.39 | 1.49 | 1.54 |
| 7 | PC | 196 | HIP | P-O1P | 2.39 | 1.49 | 1.47 |
| 7 | PG | 196 | HIP | P-O3P | -2.38 | 1.49 | 1.54 |
| 7 | PJ | 196 | HIP | P-O3P | -2.37 | 1.50 | 1.54 |
| 7 | PD | 243 | HIP | CG-ND1 | 2.37 | 1.40 | 1.37 |
| 7 | PG | 196 | HIP | P-O2P | -2.35 | 1.50 | 1.54 |
| 7 | PE | 196 | HIP | P-O3P | -2.34 | 1.50 | 1.54 |
| 7 | PD | 196 | HIP | P-O3P | -2.33 | 1.50 | 1.54 |
| 7 | PA | 196 | HIP | P-O3P | -2.33 | 1.50 | 1.54 |
| 7 | PL | 196 | HIP | P-O3P | -2.32 | 1.50 | 1.54 |
| 7 | PL | 243 | HIP | CG-ND1 | 2.32 | 1.40 | 1.37 |
| 7 | PA | 196 | HIP | P-O2P | -2.32 | 1.50 | 1.54 |
| 7 | PH | 196 | HIP | P-O3P | -2.31 | 1.50 | 1.54 |
| 7 | PJ | 196 | HIP | P-O2P | -2.31 | 1.50 | 1.54 |
| 7 | PI | 243 | HIP | CG-ND1 | 2.30 | 1.40 | 1.37 |
| 7 | PJ | 291 | HIP | P-O3P | -2.30 | 1.50 | 1.54 |
| 7 | PL | 291 | HIP | P-O3P | -2.30 | 1.50 | 1.54 |
| 7 | PF | 243 | HIP | CG-ND1 | 2.29 | 1.40 | 1.37 |
| 7 | PK | 291 | HIP | P-O2P | -2.28 | 1.50 | 1.54 |
| 7 | PG | 291 | HIP | P-O2P | -2.28 | 1.50 | 1.54 |
| 7 | PI | 196 | HIP | P-O3P | -2.28 | 1.50 | 1.54 |
| 7 | PD | 196 | HIP | P-O2P | -2.27 | 1.50 | 1.54 |
| 7 | PE | 243 | HIP | CG-ND1 | 2.26 | 1.40 | 1.37 |
| 7 | PK | 291 | HIP | P-O3P | -2.26 | 1.50 | 1.54 |
| 7 | PK | 243 | HIP | CG-ND1 | 2.26 | 1.40 | 1.37 |
| 7 | PA | 243 | HIP | CG-ND1 | 2.25 | 1.40 | 1.37 |
| 7 | PH | 243 | HIP | CG-ND1 | 2.25 | 1.40 | 1.37 |
| 7 | PF | 243 | HIP | P-O2P | -2.24 | 1.50 | 1.54 |
| 7 | PG | 291 | HIP | P-O3P | -2.24 | 1.50 | 1.54 |
| 7 | PC | 196 | HIP | P-O2P | -2.24 | 1.50 | 1.54 |
| 7 | PL | 243 | HIP | P-O2P | -2.24 | 1.50 | 1.54 |
| 7 | PE | 196 | HIP | P-O2P | -2.24 | 1.50 | 1.54 |
| 7 | PH | 291 | HIP | P-O2P | -2.23 | 1.50 | 1.54 |
| 7 | PC | 291 | HIP | P-O3P | -2.23 | 1.50 | 1.54 |
| 7 | PJ | 291 | HIP | P-O2P | -2.23 | 1.50 | 1.54 |
| 7 | PK | 196 | HIP | P-O3P | -2.22 | 1.50 | 1.54 |
| 7 | PD | 243 | HIP | P-O2P | -2.22 | 1.50 | 1.54 |
| 7 | PD | 291 | HIP | P-O2P | -2.22 | 1.50 | 1.54 |
| 7 | PJ | 243 | HIP | P-O3P | -2.22 | 1.50 | 1.54 |
| 7 | PA | 243 | HIP | P-O2P | -2.21 | 1.50 | 1.54 |
| 7 | PJ | 243 | HIP | P-O2P | -2.21 | 1.50 | 1.54 |
| 7 | PB | 291 | HIP | P-O2P | -2.21 | 1.50 | 1.54 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 7 | PF | 196 | HIP | P-O2P | -2.20 | 1.50 | 1.54 |
| 7 | PF | 243 | HIP | P-O3P | -2.20 | 1.50 | 1.54 |
| 7 | PB | 243 | HIP | P-O3P | -2.19 | 1.50 | 1.54 |
| 7 | PA | 291 | HIP | P-O2P | -2.19 | 1.50 | 1.54 |
| 7 | PC | 243 | HIP | P-O3P | -2.19 | 1.50 | 1.54 |
| 7 | PI | 196 | HIP | P-O2P | -2.19 | 1.50 | 1.54 |
| 7 | PK | 196 | HIP | P-O2P | -2.19 | 1.50 | 1.54 |
| 7 | PH | 196 | HIP | P-O2P | -2.18 | 1.50 | 1.54 |
| 7 | PB | 196 | HIP | P-O2P | -2.18 | 1.50 | 1.54 |
| 7 | PJ | 243 | HIP | CG-ND1 | 2.17 | 1.40 | 1.37 |
| 7 | PC | 291 | HIP | P-O2P | -2.16 | 1.50 | 1.54 |
| 7 | PI | 243 | HIP | P-O2P | -2.16 | 1.50 | 1.54 |
| 7 | PL | 196 | HIP | P-O2P | -2.16 | 1.50 | 1.54 |
| 7 | PL | 243 | HIP | P-O3P | -2.16 | 1.50 | 1.54 |
| 7 | PC | 243 | HIP | P-O2P | -2.15 | 1.50 | 1.54 |
| 7 | PG | 243 | HIP | P-O3P | -2.15 | 1.50 | 1.54 |
| 7 | PE | 291 | HIP | P-O2P | -2.15 | 1.50 | 1.54 |
| 7 | PE | 243 | HIP | P-O3P | -2.15 | 1.50 | 1.54 |
| 7 | PA | 243 | HIP | P-O3P | -2.15 | 1.50 | 1.54 |
| 7 | PK | 243 | HIP | P-O3P | -2.15 | 1.50 | 1.54 |
| 7 | PG | 243 | HIP | P-O2P | -2.13 | 1.50 | 1.54 |
| 7 | PB | 291 | HIP | P-O3P | -2.13 | 1.50 | 1.54 |
| 7 | PD | 243 | HIP | P-O3P | -2.13 | 1.50 | 1.54 |
| 7 | PI | 243 | HIP | P-O3P | -2.13 | 1.50 | 1.54 |
| 7 | PB | 243 | HIP | CG-ND1 | 2.12 | 1.40 | 1.37 |
| 7 | PF | 291 | HIP | P-O2P | -2.12 | 1.50 | 1.54 |
| 7 | PE | 291 | HIP | CG-ND1 | 2.12 | 1.40 | 1.37 |
| 7 | PH | 243 | HIP | P-O3P | -2.11 | 1.50 | 1.54 |
| 7 | PH | 243 | HIP | P-O2P | -2.10 | 1.50 | 1.54 |
| 7 | PF | 291 | HIP | P-O3P | -2.08 | 1.50 | 1.54 |
| 7 | PH | 291 | HIP | P-O3P | -2.08 | 1.50 | 1.54 |
| 7 | PL | 291 | HIP | P-O2P | -2.06 | 1.50 | 1.54 |
| 7 | PI | 291 | HIP | P-O2P | -2.06 | 1.50 | 1.54 |
| 7 | PE | 243 | HIP | P-O2P | -2.05 | 1.50 | 1.54 |
| 7 | PK | 243 | HIP | P-O2P | -2.05 | 1.50 | 1.54 |
| 7 | PB | 243 | HIP | P-O2P | -2.04 | 1.50 | 1.54 |

All (77) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 7 | PD | 291 | HIP | CB-CA-C | 2.80 | 116.73 | 111.47 |
| 7 | PI | 291 | HIP | CB-CA-C | 2.80 | 116.71 | 111.47 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 7 | PK | 196 | HIP | CD2-NE2-CE1 | 2.65 | 109.92 | 105.78 |
| 7 | PG | 196 | HIP | CD2-NE2-CE1 | 2.65 | 109.91 | 105.78 |
| 7 | PK | 243 | HIP | CD2-NE2-CE1 | 2.65 | 109.91 | 105.78 |
| 7 | PH | 243 | HIP | CD2-NE2-CE1 | 2.64 | 109.89 | 105.78 |
| 7 | PC | 196 | HIP | CD2-NE2-CE1 | 2.62 | 109.87 | 105.78 |
| 7 | PA | 291 | HIP | CB-CA-C | 2.61 | 116.36 | 111.47 |
| 7 | PE | 243 | HIP | CD2-NE2-CE1 | 2.60 | 109.84 | 105.78 |
| 7 | PH | 196 | HIP | CD2-NE2-CE1 | 2.59 | 109.83 | 105.78 |
| 7 | PA | 243 | HIP | CD2-NE2-CE1 | 2.59 | 109.82 | 105.78 |
| 7 | PD | 243 | HIP | CD2-NE2-CE1 | 2.58 | 109.80 | 105.78 |
| 7 | PJ | 243 | HIP | CD2-NE2-CE1 | 2.57 | 109.79 | 105.78 |
| 7 | PB | 196 | HIP | CD2-NE2-CE1 | 2.57 | 109.78 | 105.78 |
| 7 | PG | 243 | HIP | CD2-NE2-CE1 | 2.56 | 109.78 | 105.78 |
| 7 | PE | 196 | HIP | CD2-NE2-CE1 | 2.55 | 109.76 | 105.78 |
| 7 | PB | 243 | HIP | CD2-NE2-CE1 | 2.55 | 109.76 | 105.78 |
| 7 | PJ | 196 | HIP | CD2-NE2-CE1 | 2.54 | 109.74 | 105.78 |
| 7 | PL | 196 | HIP | CD2-NE2-CE1 | 2.54 | 109.74 | 105.78 |
| 7 | PF | 196 | HIP | CD2-NE2-CE1 | 2.53 | 109.73 | 105.78 |
| 7 | PL | 291 | HIP | CD2-NE2-CE1 | 2.53 | 109.72 | 105.78 |
| 7 | PG | 291 | HIP | CD2-NE2-CE1 | 2.51 | 109.70 | 105.78 |
| 7 | PA | 196 | HIP | CD2-NE2-CE1 | 2.51 | 109.70 | 105.78 |
| 7 | PC | 291 | HIP | CD2-NE2-CE1 | 2.51 | 109.69 | 105.78 |
| 7 | PD | 196 | HIP | CD2-NE2-CE1 | 2.50 | 109.68 | 105.78 |
| 7 | PI | 196 | HIP | CD2-NE2-CE1 | 2.50 | 109.68 | 105.78 |
| 7 | PI | 291 | HIP | CD2-NE2-CE1 | 2.50 | 109.68 | 105.78 |
| 7 | PF | 291 | HIP | CD2-NE2-CE1 | 2.50 | 109.67 | 105.78 |
| 7 | PI | 243 | HIP | CD2-NE2-CE1 | 2.47 | 109.64 | 105.78 |
| 7 | PI | 243 | HIP | O2P-P-O1P | -2.47 | 108.10 | 113.44 |
| 7 | PL | 291 | HIP | CB-CA-C | 2.45 | 116.07 | 111.47 |
| 7 | PH | 291 | HIP | CD2-NE2-CE1 | 2.43 | 109.57 | 105.78 |
| 7 | PF | 243 | HIP | O2P-P-O1P | -2.43 | 108.19 | 113.44 |
| 7 | PL | 243 | HIP | CD2-NE2-CE1 | 2.42 | 109.56 | 105.78 |
| 7 | PE | 291 | HIP | CB-CA-C | 2.42 | 116.01 | 111.47 |
| 7 | PB | 291 | HIP | CD2-NE2-CE1 | 2.42 | 109.56 | 105.78 |
| 7 | PC | 243 | HIP | CD2-NE2-CE1 | 2.40 | 109.53 | 105.78 |
| 7 | PC | 243 | HIP | O2P-P-O1P | -2.40 | 108.25 | 113.44 |
| 7 | PH | 243 | HIP | O2P-P-O1P | -2.40 | 108.25 | 113.44 |
| 7 | PB | 243 | HIP | O2P-P-O1P | -2.39 | 108.27 | 113.44 |
| 7 | PD | 291 | HIP | CD2-NE2-CE1 | 2.39 | 109.51 | 105.78 |
| 7 | PJ | 291 | HIP | CD2-NE2-CE1 | 2.39 | 109.51 | 105.78 |
| 7 | PA | 291 | HIP | CD2-NE2-CE1 | 2.38 | 109.50 | 105.78 |
| 7 | PF | 243 | HIP | CD2-NE2-CE1 | 2.38 | 109.50 | 105.78 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 7 | PL | 243 | HIP | O2P-P-O1P | -2.38 | 108.29 | 113.44 |
| 7 | PE | 243 | HIP | O2P-P-O1P | -2.38 | 108.30 | 113.44 |
| 7 | PE | 291 | HIP | CD2-NE2-CE1 | 2.38 | 109.49 | 105.78 |
| 7 | PK | 291 | HIP | CD2-NE2-CE1 | 2.35 | 109.44 | 105.78 |
| 7 | PA | 243 | HIP | O2P-P-O1P | -2.33 | 108.40 | 113.44 |
| 7 | PC | 291 | HIP | CB-CA-C | 2.32 | 115.82 | 111.47 |
| 7 | PG | 196 | HIP | CB-CA-C | 2.31 | 115.80 | 111.47 |
| 7 | PJ | 243 | HIP | O2P-P-O1P | -2.29 | 108.49 | 113.44 |
| 7 | PD | 243 | HIP | O2P-P-O1P | -2.28 | 108.50 | 113.44 |
| 7 | PK | 243 | HIP | O2P-P-O1P | -2.28 | 108.52 | 113.44 |
| 7 | PK | 196 | HIP | O2P-P-O1P | -2.28 | 108.52 | 113.44 |
| 7 | PG | 243 | HIP | O2P-P-O1P | -2.26 | 108.56 | 113.44 |
| 7 | PJ | 196 | HIP | O2P-P-O1P | -2.26 | 108.56 | 113.44 |
| 7 | PA | 196 | HIP | O2P-P-O1P | -2.25 | 108.59 | 113.44 |
| 7 | PC | 291 | HIP | O2P-P-O1P | -2.22 | 108.65 | 113.44 |
| 7 | PG | 291 | HIP | CB-CA-C | 2.20 | 115.60 | 111.47 |
| 7 | PL | 196 | HIP | O2P-P-O1P | -2.20 | 108.69 | 113.44 |
| 7 | PH | 291 | HIP | O2P-P-O1P | -2.19 | 108.71 | 113.44 |
| 7 | PE | 196 | HIP | CB-CA-C | 2.19 | 115.57 | 111.47 |
| 7 | PF | 291 | HIP | O2P-P-O1P | -2.19 | 108.71 | 113.44 |
| 7 | PF | 196 | HIP | O2P-P-O1P | -2.18 | 108.72 | 113.44 |
| 7 | PG | 196 | HIP | O2P-P-O1P | -2.18 | 108.74 | 113.44 |
| 7 | PB | 291 | HIP | O2P-P-O1P | -2.17 | 108.75 | 113.44 |
| 7 | PI | 196 | HIP | O2P-P-O1P | -2.17 | 108.75 | 113.44 |
| 7 | PB | 196 | HIP | O2P-P-O1P | -2.14 | 108.81 | 113.44 |
| 7 | PG | 291 | HIP | O2P-P-O1P | -2.13 | 108.83 | 113.44 |
| 7 | PK | 291 | HIP | O2P-P-O1P | -2.13 | 108.84 | 113.44 |
| 7 | PD | 196 | HIP | O2P-P-O1P | -2.12 | 108.85 | 113.44 |
| 7 | PC | 196 | HIP | O2P-P-O1P | -2.09 | 108.92 | 113.44 |
| 7 | PH | 196 | HIP | O2P-P-O1P | -2.08 | 108.95 | 113.44 |
| 7 | PE | 196 | HIP | O2P-P-O1P | -2.08 | 108.95 | 113.44 |
| 7 | PE | 291 | HIP | O2P-P-O1P | -2.07 | 108.96 | 113.44 |
| 7 | PL | 196 | HIP | O3P-P-O1P | -2.02 | 109.08 | 113.44 |

There are no chirality outliers.

All (61) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 7 | PA | 243 | HIP | O-C-CA-CB |
| 7 | PB | 243 | HIP | O-C-CA-CB |
| 7 | PC | 243 | HIP | O-C-CA-CB |
| 7 | PD | 243 | HIP | O-C-CA-CB |

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| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 7 | PE | 243 | HIP | O-C-CA-CB |
| 7 | PF | 243 | HIP | O-C-CA-CB |
| 7 | PG | 243 | HIP | O-C-CA-CB |
| 7 | PH | 243 | HIP | O-C-CA-CB |
| 7 | PJ | 196 | HIP | C-CA-CB-CG |
| 7 | PJ | 243 | HIP | O-C-CA-CB |
| 7 | PK | 243 | HIP | O-C-CA-CB |
| 7 | PL | 243 | HIP | O-C-CA-CB |
| 7 | PB | 243 | HIP | CA-CB-CG-CD2 |
| 7 | PC | 291 | HIP | CA-CB-CG-CD2 |
| 7 | PL | 243 | HIP | CA-CB-CG-CD2 |
| 7 | PA | 243 | HIP | CA-CB-CG-ND1 |
| 7 | PB | 243 | HIP | CA-CB-CG-ND1 |
| 7 | PC | 243 | HIP | CA-CB-CG-ND1 |
| 7 | PF | 243 | HIP | CA-CB-CG-ND1 |
| 7 | PH | 243 | HIP | CA-CB-CG-ND1 |
| 7 | PK | 243 | HIP | CA-CB-CG-ND1 |
| 7 | PL | 243 | HIP | CA-CB-CG-ND1 |
| 7 | PA | 196 | HIP | C-CA-CB-CG |
| 7 | PB | 196 | HIP | C-CA-CB-CG |
| 7 | PC | 196 | HIP | C-CA-CB-CG |
| 7 | PD | 196 | HIP | C-CA-CB-CG |
| 7 | PE | 196 | HIP | C-CA-CB-CG |
| 7 | PF | 196 | HIP | C-CA-CB-CG |
| 7 | PG | 196 | HIP | C-CA-CB-CG |
| 7 | PH | 196 | HIP | C-CA-CB-CG |
| 7 | PI | 196 | HIP | C-CA-CB-CG |
| 7 | PK | 196 | HIP | C-CA-CB-CG |
| 7 | PL | 196 | HIP | C-CA-CB-CG |
| 7 | PA | 196 | HIP | N-CA-CB-CG |
| 7 | PB | 196 | HIP | N-CA-CB-CG |
| 7 | PC | 196 | HIP | N-CA-CB-CG |
| 7 | PD | 196 | HIP | N-CA-CB-CG |
| 7 | PE | 196 | HIP | N-CA-CB-CG |
| 7 | PF | 196 | HIP | N-CA-CB-CG |
| 7 | PG | 196 | HIP | N-CA-CB-CG |
| 7 | PH | 196 | HIP | N-CA-CB-CG |
| 7 | PI | 196 | HIP | N-CA-CB-CG |
| 7 | PJ | 196 | HIP | N-CA-CB-CG |
| 7 | PK | 196 | HIP | N-CA-CB-CG |
| 7 | PL | 196 | HIP | N-CA-CB-CG |
| 7 | PA | 243 | HIP | CA-CB-CG-CD2 |

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| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 7 | PB | 291 | HIP | CA-CB-CG-CD2 |
| 7 | PC | 243 | HIP | CA-CB-CG-CD2 |
| 7 | PD | 243 | HIP | CA-CB-CG-CD2 |
| 7 | PF | 243 | HIP | CA-CB-CG-CD2 |
| 7 | PF | 291 | HIP | CA-CB-CG-CD2 |
| 7 | PG | 243 | HIP | CA-CB-CG-CD2 |
| 7 | PG | 291 | HIP | CA-CB-CG-CD2 |
| 7 | PH | 243 | HIP | CA-CB-CG-CD2 |
| 7 | PK | 243 | HIP | CA-CB-CG-CD2 |
| 7 | PK | 291 | HIP | CA-CB-CG-CD2 |
| 7 | PB | 291 | HIP | CA-CB-CG-ND1 |
| 7 | PD | 243 | HIP | CA-CB-CG-ND1 |
| 7 | PF | 291 | HIP | CA-CB-CG-ND1 |
| 7 | PG | 291 | HIP | CA-CB-CG-ND1 |
| 7 | PK | 291 | HIP | CA-CB-CG-ND1 |

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry (i)

Of 15 ligands modelled in this entry, 15 are monoatomic - leaving 0 for Mogul analysis.

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.

No monomer is involved in short contacts.

## 5.7 Other polymers (i)

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

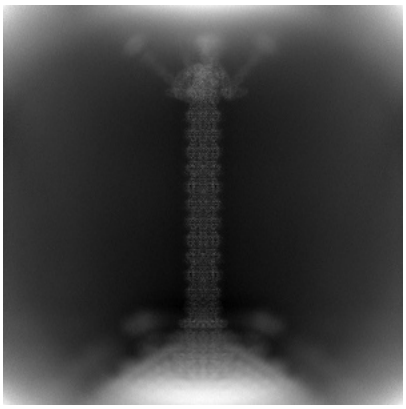
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-51866. These allow visual inspection of the internal detail of the map and identification of artifacts.

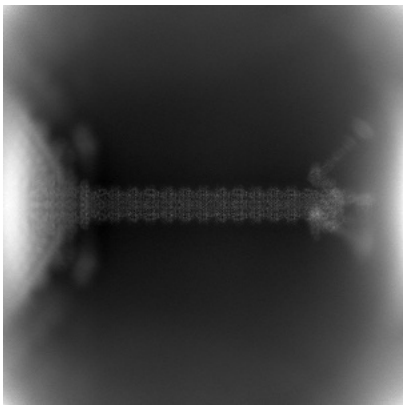
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

## 6.1 Orthogonal projections

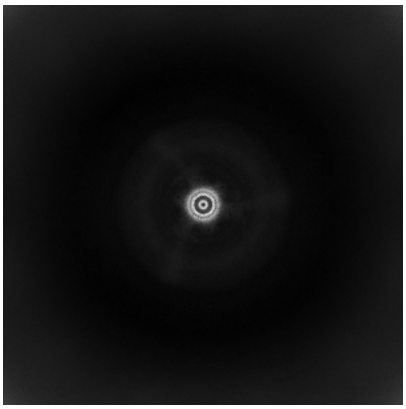
### 6.1.1 Primary map



X

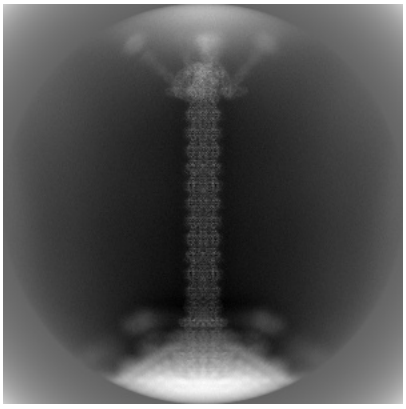


Y

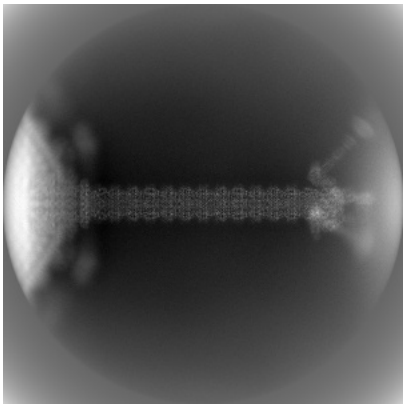


Z

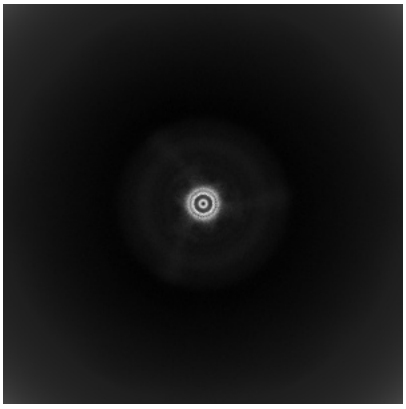
### 6.1.2 Raw map



X



Y

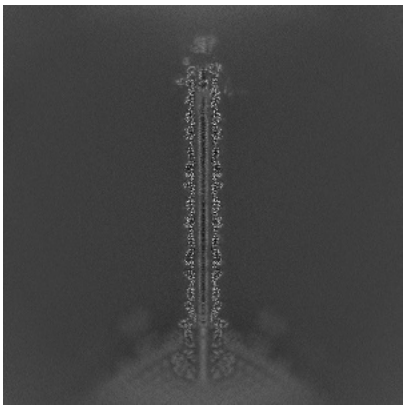


Z

The images above show the map projected in three orthogonal directions.

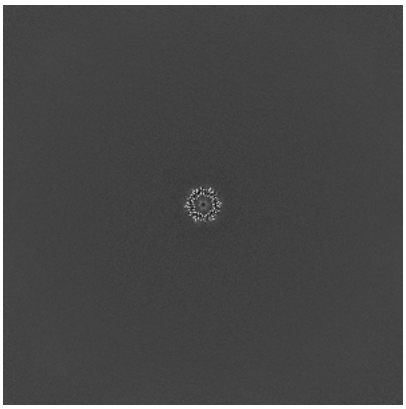
## 6.2 Central slices (i)

### 6.2.1 Primary map



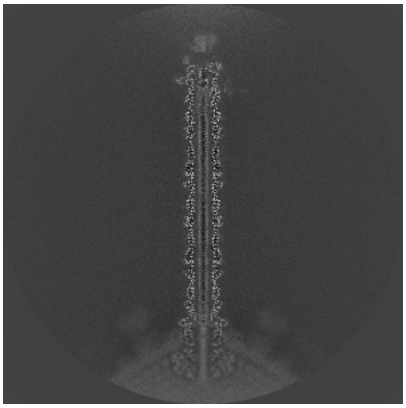
X Index: 384

Y Index: 384



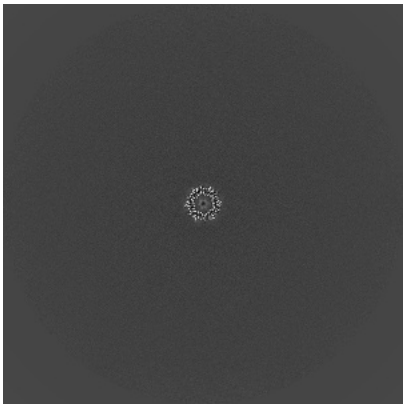
Z Index: 384

### 6.2.2 Raw map



X Index: 384

Y Index: 384

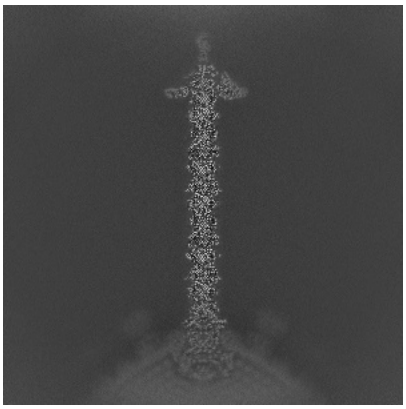


Z Index: 384

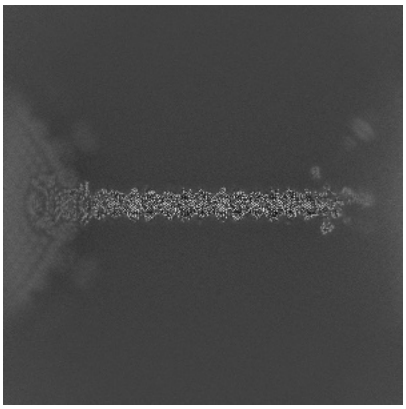
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

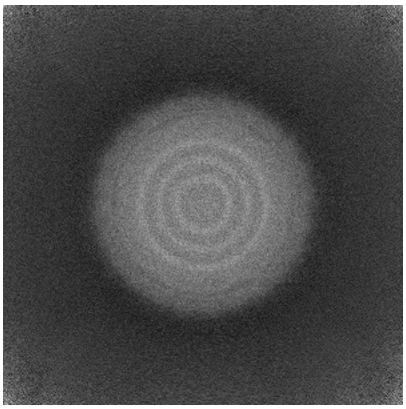
### 6.3.1 Primary map



X Index: 365

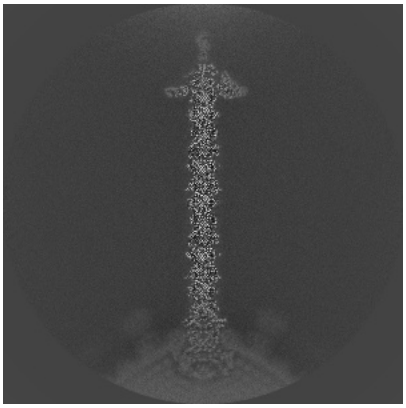


Y Index: 403

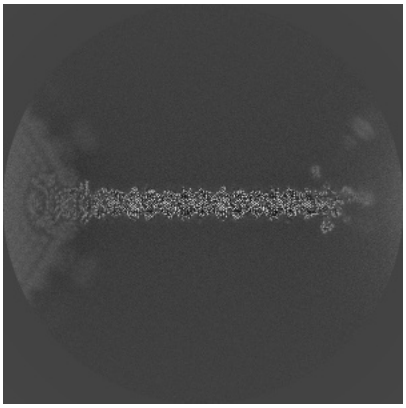


Z Index: 24

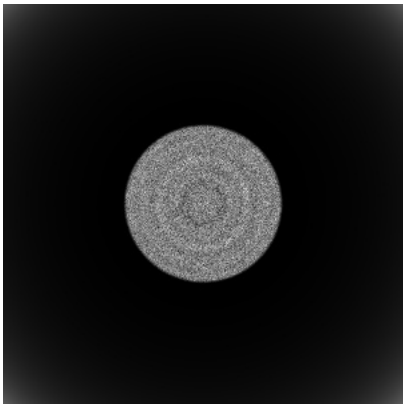
### 6.3.2 Raw map



X Index: 365



Y Index: 403

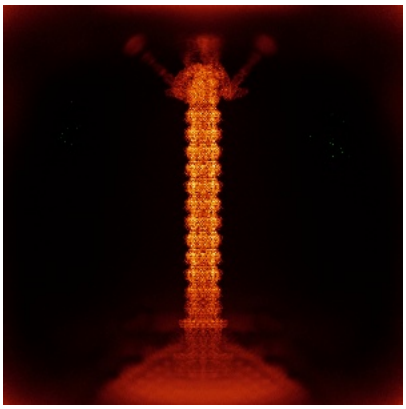


Z Index: 29

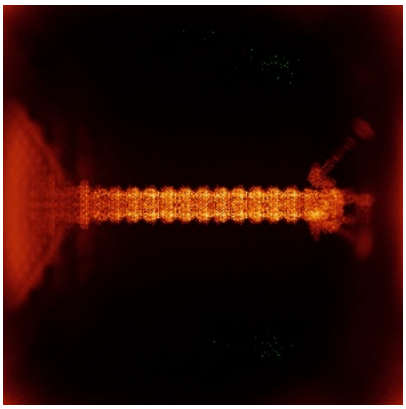
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) (i)

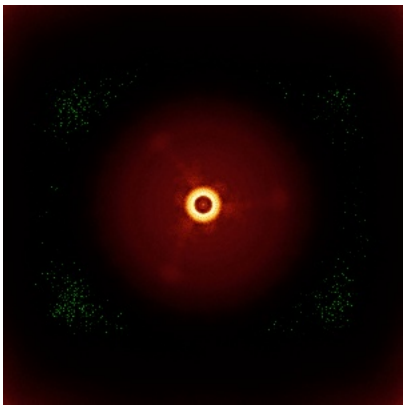
### 6.4.1 Primary map



X

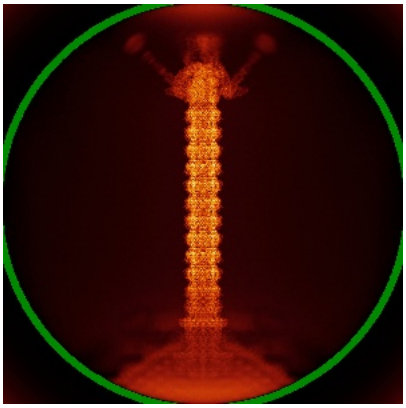


Y

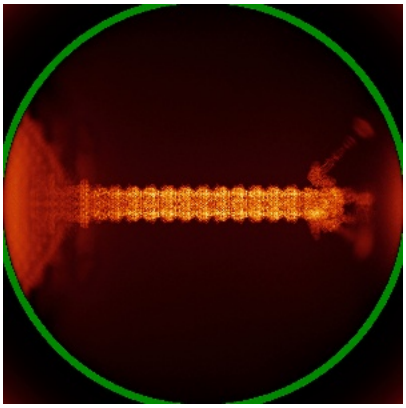


Z

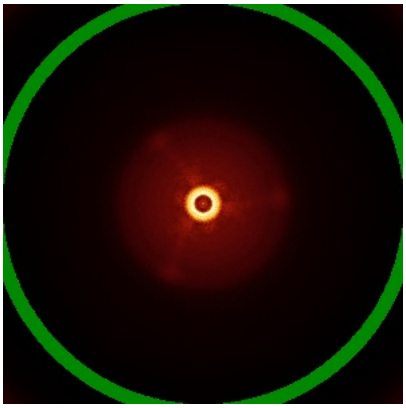
### 6.4.2 Raw map



X



Y

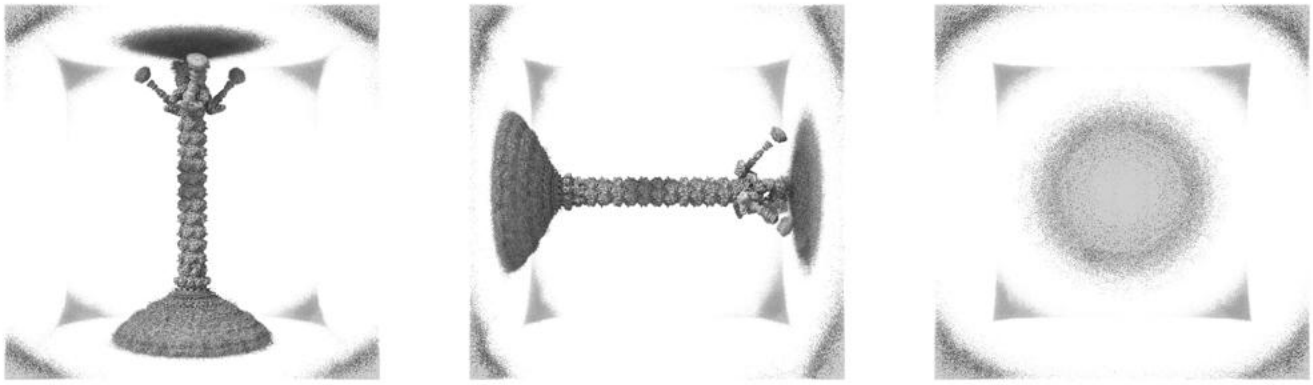


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views (i)

### 6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.006. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map

X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

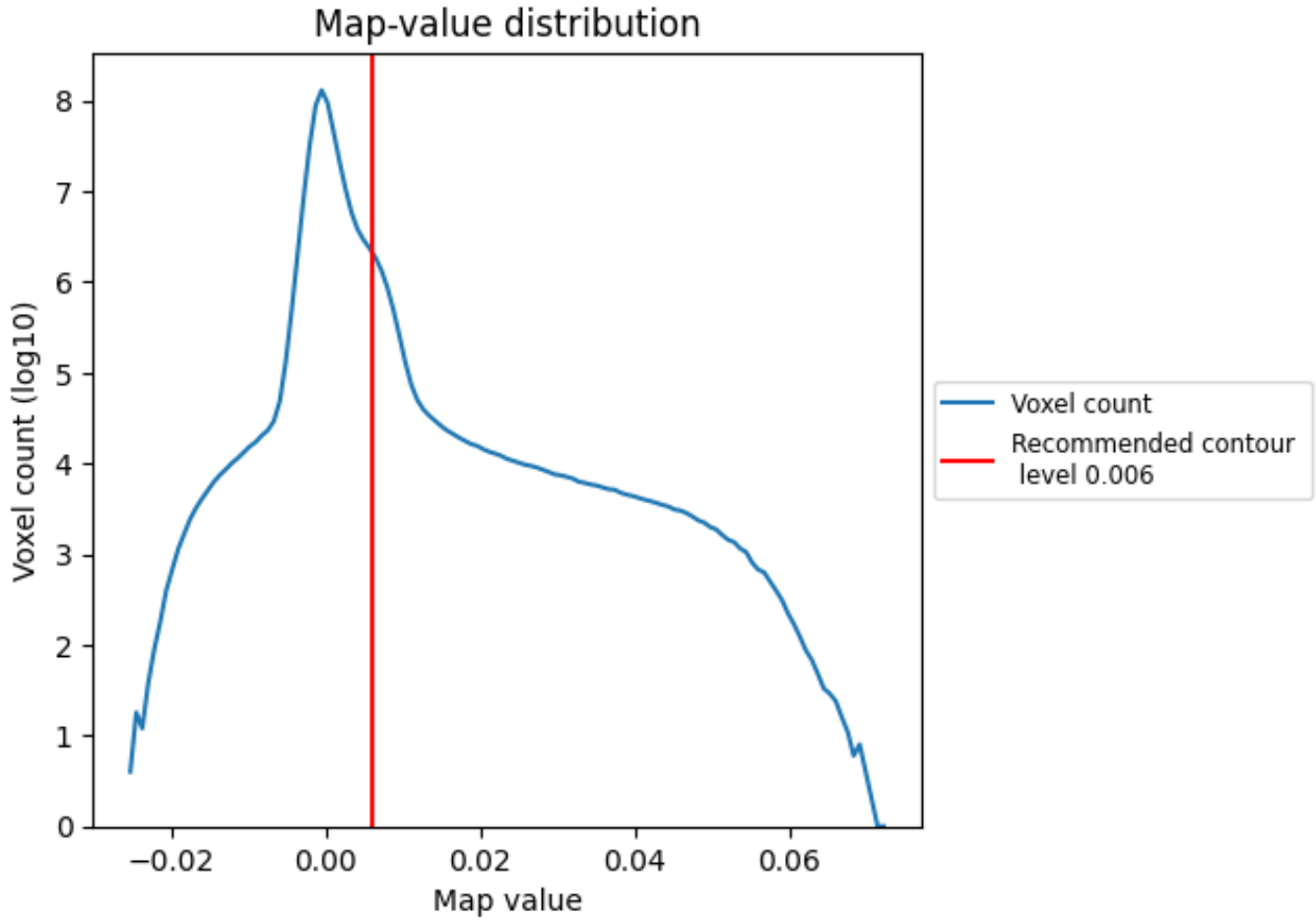
## 6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.

# 7 Map analysis

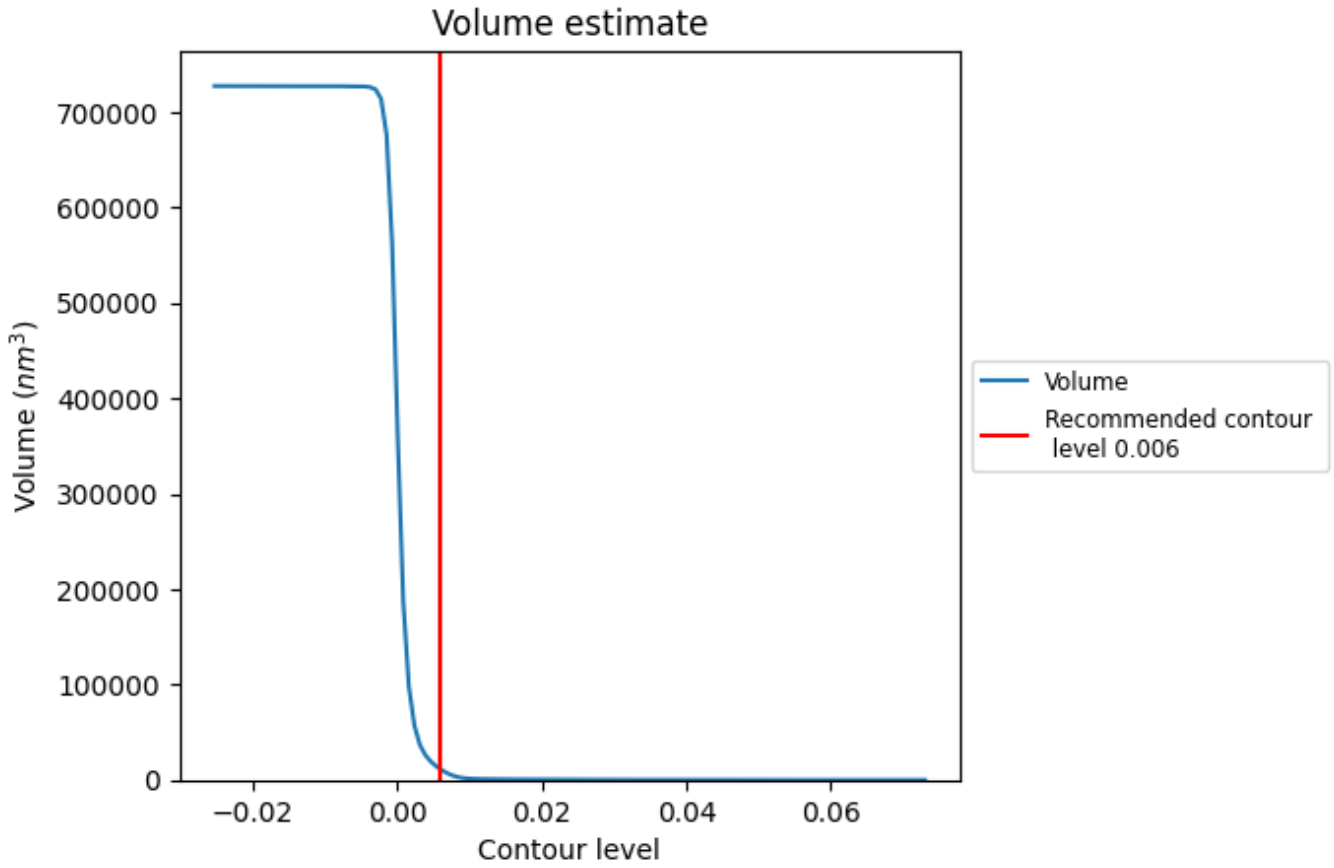
This section contains the results of statistical analysis of the map.

## 7.1 Map-value distribution




The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

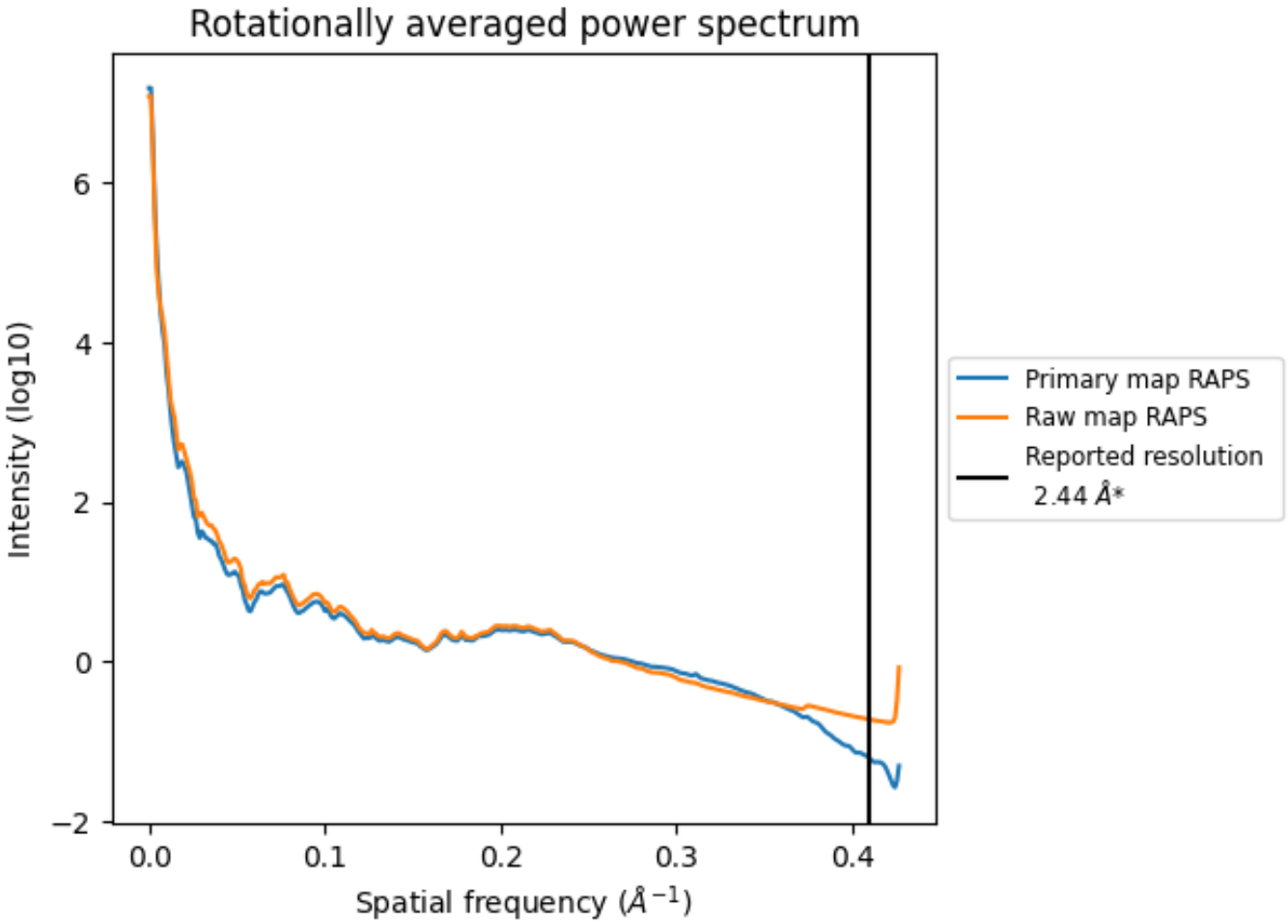
## 7.2 Volume estimate




The volume at the recommended contour level is 11001 $nm^3$; this corresponds to an approximate mass of 9938 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

## 7.3 Rotationally averaged power spectrum (i)

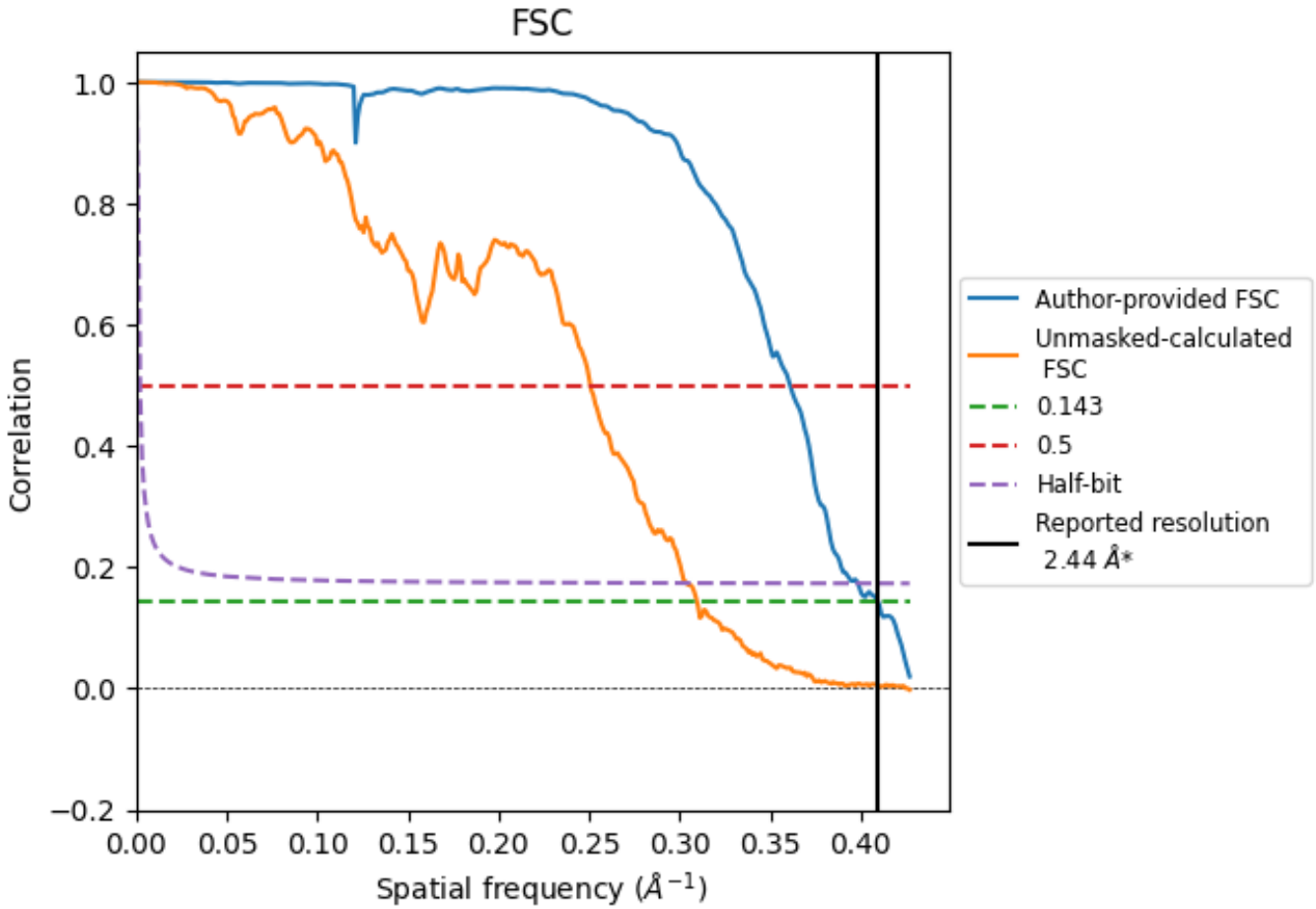



*Reported resolution corresponds to spatial frequency of 0.410 $Å^{-1}$

# 8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

## 8.1 FSC




*Reported resolution corresponds to spatial frequency of 0.410 Å$^{-1}$

## 8.2 Resolution estimates (i)

| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 2.44 | - | - |
| Author-provided FSC curve | 2.44 | 2.77 | 2.51 |
| Unmasked-calculated* | 3.23 | 3.99 | 3.29 |

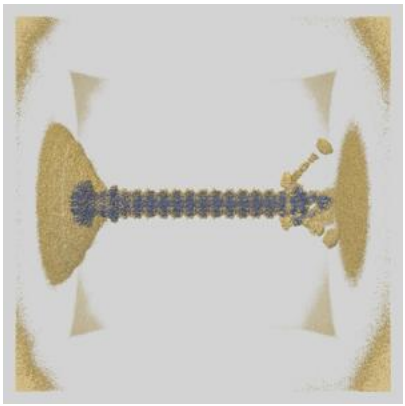
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.23 differs from the reported value 2.44 by more than 10 %

# 9 Map-model fit

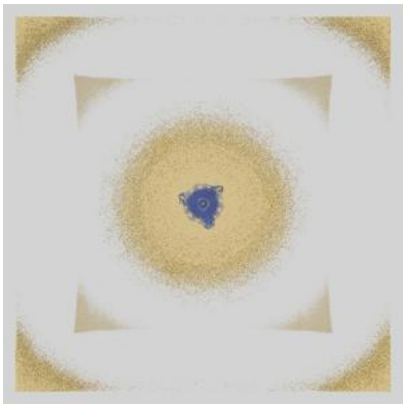
This section contains information regarding the fit between EMDB map EMD-51866 and PDB model 9H4P. Per-residue inclusion information can be found in section 3 on page 14.

## 9.1 Map-model overlay

X



Y



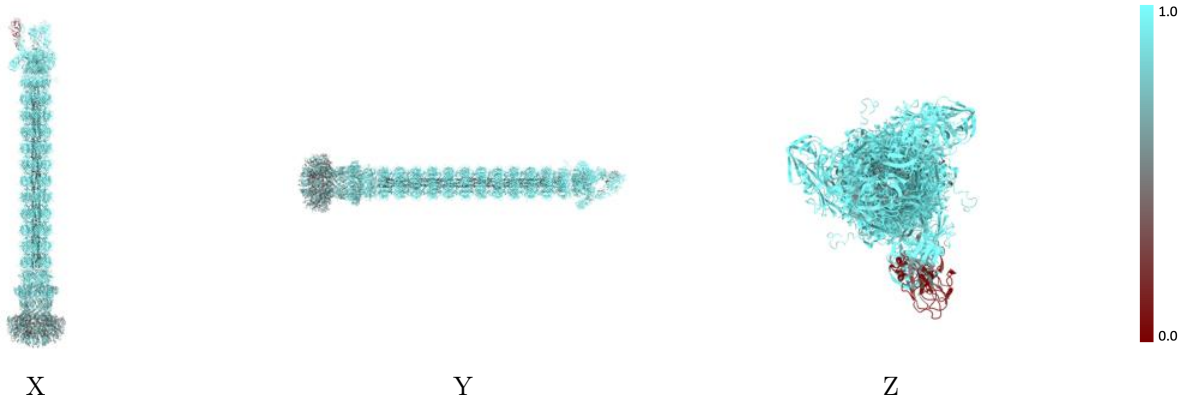
Z

The images above show the 3D surface view of the map at the recommended contour level 0.006 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model (i)

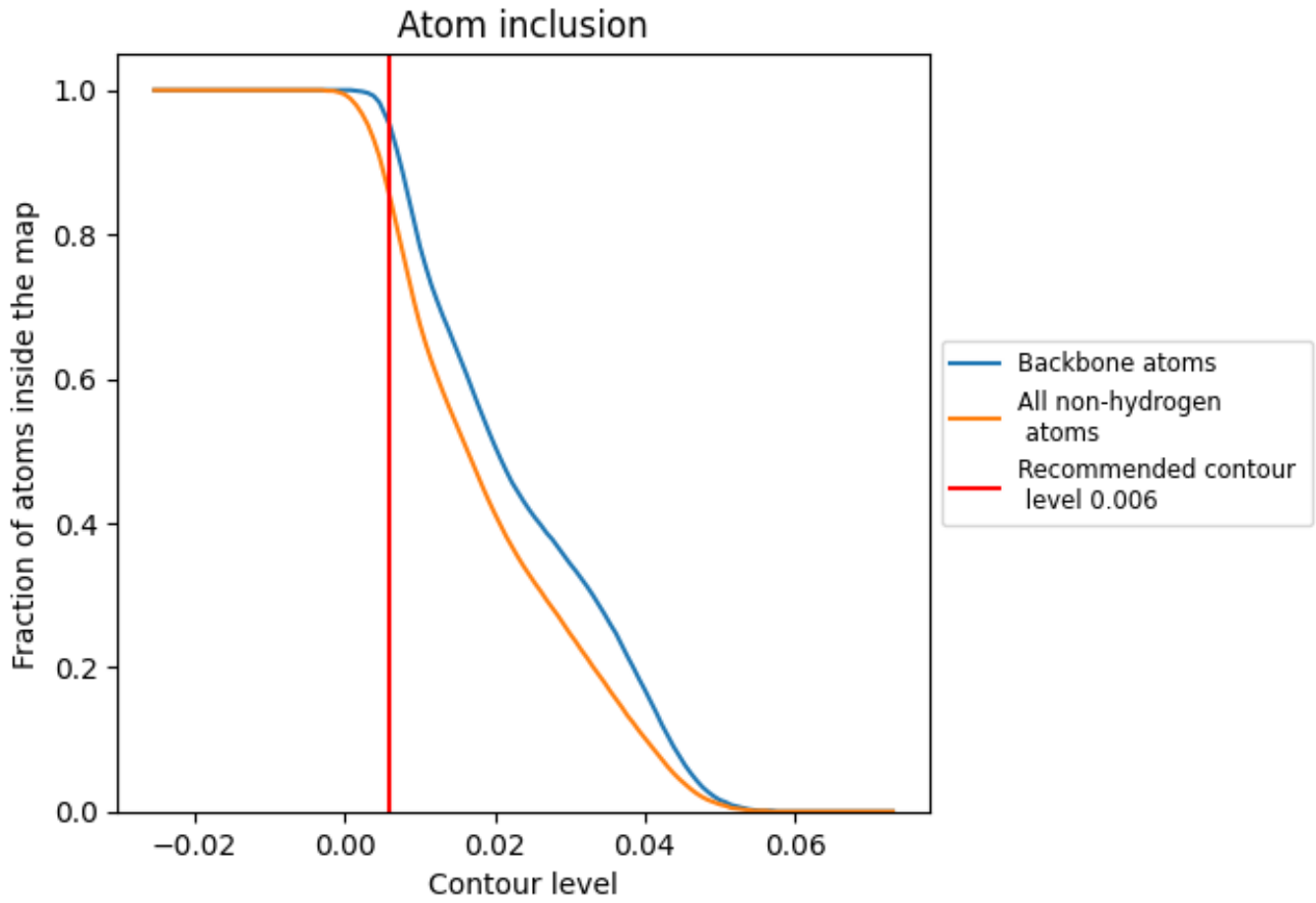

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model (i)




The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.006).

## 9.4 Atom inclusion (i)




At the recommended contour level, 95% of all backbone atoms, 85% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.006) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.8540 | 0.4710 |
| B1 | 0.9670 | 0.6070 |
| B2 | 0.9670 | 0.6060 |
| B3 | 0.9620 | 0.6040 |
| B4 | 0.9660 | 0.6050 |
| B5 | 0.9670 | 0.6070 |
| B6 | 0.9600 | 0.6020 |
| BA | 0.9600 | 0.5820 |
| BB | 0.9590 | 0.5790 |
| BC | 0.9560 | 0.5800 |
| BD | 0.9410 | 0.4300 |
| BE | 0.9320 | 0.4390 |
| BF | 0.7990 | 0.3740 |
| P1 | 0.9450 | 0.5830 |
| P2 | 0.9470 | 0.5820 |
| P3 | 0.9470 | 0.5810 |
| P4 | 0.9490 | 0.5860 |
| P5 | 0.9470 | 0.5800 |
| P6 | 0.9490 | 0.5810 |
| PA | 0.6330 | 0.2710 |
| PB | 0.6410 | 0.2690 |
| PC | 0.6250 | 0.2740 |
| PD | 0.6320 | 0.2670 |
| PE | 0.6320 | 0.2700 |
| PF | 0.6450 | 0.2710 |
| PG | 0.6300 | 0.2770 |
| PH | 0.6320 | 0.2700 |
| PI | 0.6320 | 0.2660 |
| PJ | 0.6430 | 0.2690 |
| PK | 0.6270 | 0.2700 |
| PL | 0.6270 | 0.2650 |
| PM | 0.8400 | 0.4800 |
| PN | 0.8500 | 0.4800 |
| PO | 0.8490 | 0.4740 |
| PP | 0.8440 | 0.4690 |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| Chain | Atom inclusion | Q-score |
|---|---|---|
| PQ | 0.8510 | 0.4760 |
| PR | 0.8430 | 0.4720 |
| PS | 0.8460 | 0.4780 |
| PT | 0.8490 | 0.4790 |
| PU | 0.8440 | 0.4700 |
| PV | 0.8410 | 0.4710 |
| PW | 0.8400 | 0.4740 |
| PX | 0.8510 | 0.4780 |
| Pa | 0.9170 | 0.5390 |
| Pb | 0.9240 | 0.5450 |
| Pc | 0.9210 | 0.5430 |
| Pd | 0.9240 | 0.5460 |
| Pe | 0.9200 | 0.5420 |
| Pf | 0.9250 | 0.5420 |
| QE | 0.6750 | 0.2290 |
| QF | 0.6690 | 0.2400 |
| QG | 0.6770 | 0.2340 |
| QH | 0.6850 | 0.2450 |
| QI | 0.6720 | 0.2270 |
| QJ | 0.6860 | 0.2450 |
| S1 | 0.9680 | 0.6140 |
| S2 | 0.9690 | 0.6160 |
| SA | 0.9610 | 0.6010 |
| SB | 0.9640 | 0.5990 |
| SC | 0.9610 | 0.5990 |
| SD | 0.9590 | 0.6010 |
| SE | 0.9610 | 0.6000 |
| SF | 0.9630 | 0.5990 |
| SG | 0.9680 | 0.6100 |
| SH | 0.9690 | 0.6090 |
| SI | 0.9680 | 0.6090 |
| SJ | 0.9710 | 0.6110 |
| SK | 0.9680 | 0.6080 |
| SL | 0.9640 | 0.6100 |
| SM | 0.9690 | 0.6130 |
| SN | 0.9670 | 0.6130 |
| SO | 0.9680 | 0.6110 |
| SP | 0.9680 | 0.6120 |
| SQ | 0.9720 | 0.6110 |
| SR | 0.9650 | 0.6100 |
| SS | 0.9740 | 0.6160 |
| ST | 0.9690 | 0.6160 |

*Continued on next page...*

*Continued from previous page...*

| Chain | Atom inclusion | Q-score |
|---|---|---|
| SU | 0.9750 | 0.6150 |
| SV | 0.9680 | 0.6150 |
| SW | 0.9750 | 0.6130 |
| SX | 0.9700 | 0.6140 |
| SY | 0.9720 | 0.6110 |
| SZ | 0.9720 | 0.6150 |
| Sa | 0.9720 | 0.6140 |
| Sb | 0.9720 | 0.6150 |
| Sc | 0.9730 | 0.6150 |
| Sd | 0.9690 | 0.6130 |
| Se | 0.9720 | 0.6140 |
| Sf | 0.9750 | 0.6140 |
| Sg | 0.9690 | 0.6120 |
| Sh | 0.9730 | 0.6140 |
| Si | 0.9730 | 0.6140 |
| Sj | 0.9730 | 0.6120 |
| Sk | 0.9740 | 0.6130 |
| Sl | 0.9700 | 0.6140 |
| Sm | 0.9690 | 0.6140 |
| Sn | 0.9690 | 0.6150 |
| So | 0.9710 | 0.6110 |
| Sp | 0.9700 | 0.6150 |
| Sq | 0.9720 | 0.6150 |
| Sr | 0.9710 | 0.6130 |
| Ss | 0.9680 | 0.6130 |
| St | 0.9700 | 0.6150 |
| Su | 0.9690 | 0.6140 |
| Sv | 0.9690 | 0.6140 |
| Sw | 0.9670 | 0.6150 |
| Sx | 0.9690 | 0.6140 |
| Sy | 0.9720 | 0.6150 |
| Sz | 0.9680 | 0.6130 |