Full wwPDB X-ray Structure Validation Report ⓘ

Oct 17, 2021 – 05:20 AM EDT

PDB ID	:	1IKY
Title	:	HIV-1 Reverse Transcriptase in Complex with the Inhibitor MSC194
Authors	:	Lindberg, J.; Unge, T.
Deposited on	:	2001-05-07
Resolution	:	3.00 Å(reported)

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

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

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

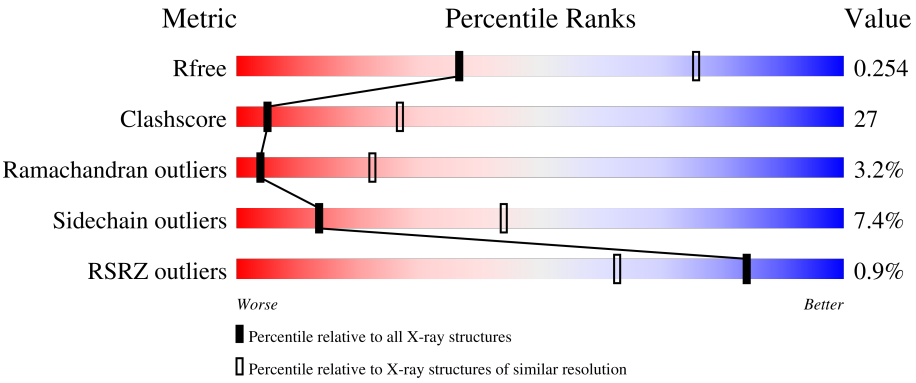
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.23.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.23.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.00 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	560	% 51% 42% 6% ·
2	B	427	52% 37% 6% 5%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 7918 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called POL POLYPROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	557	Total	C	N	O	S	2	0	0
			4522	2925	754	835	8			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	103	ASN	LYS	engineered mutation	UNP P03366
A	478	GLN	GLU	engineered mutation	UNP P03366

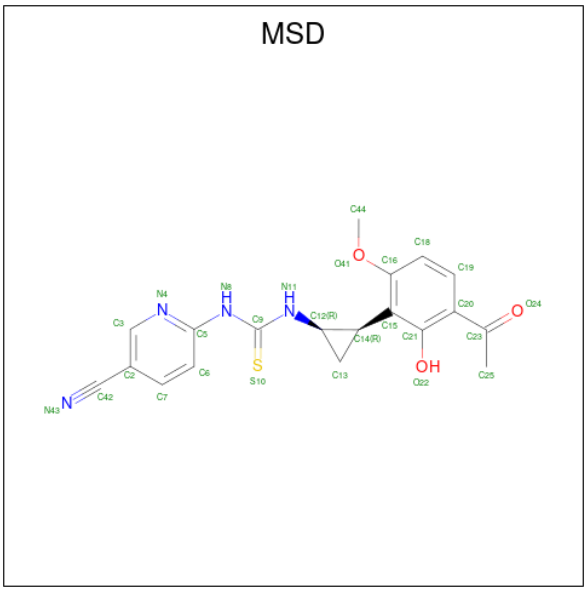
- Molecule 2 is a protein called POL POLYPROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	405	Total	C	N	O	S	30	0	0
			3345	2178	550	611	6			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1103	ASN	LYS	engineered mutation	UNP P03366

- Molecule 3 is 1-[2-(3-ACETYL-2-HYDROXY-6-METHOXY-PHENYL)-CYCLOPROPYL]-3-(5-CYANO-PYRIDIN-2-YL)-THIOUREA (three-letter code: MSD) (formula: $C_{19}H_{18}N_4O_3S$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O S 27 19 4 3 1	0	0

- Molecule 4 is water.

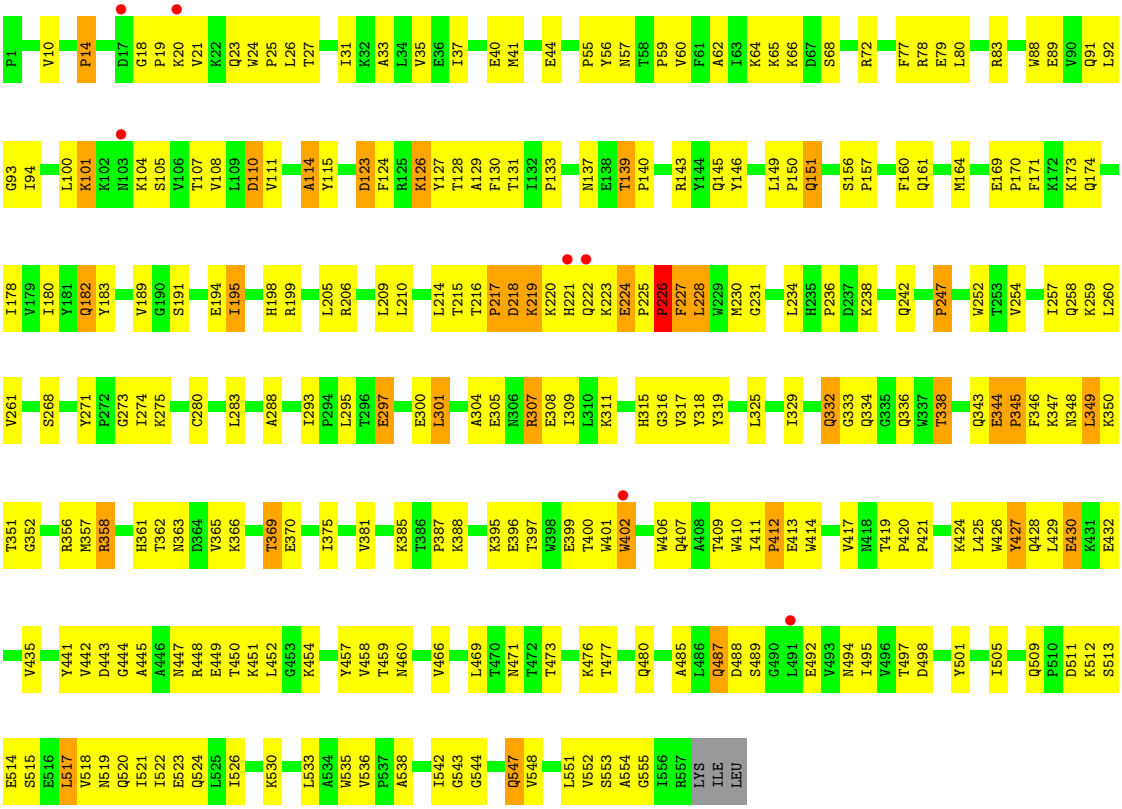
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	8	Total O 8 8	0	0
4	B	16	Total O 16 16	0	0

3 Residue-property plots (i)

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

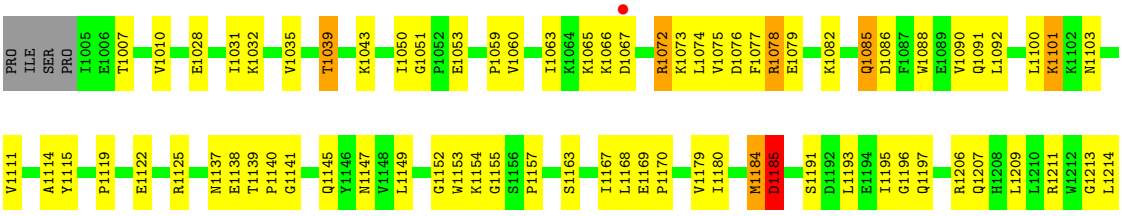
• Molecule 1: POL POLYPROTEIN

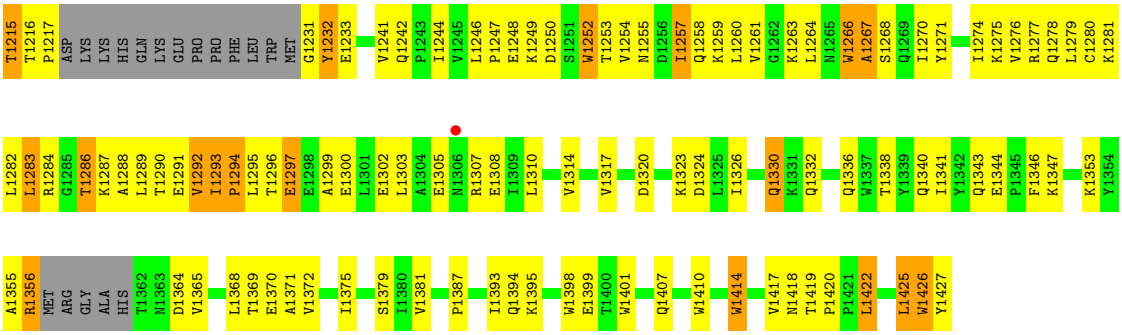
Chain A:



• Molecule 2: POL POLYPROTEIN

Chain B:




T1215 T1216 P1217 ASP LYS LYS HIS GLN LYS GLU PRO PRO PHE LEU TRP MET G1231 Y1232 E1233 V1241 Q1242 P1243 I1244 V1245 L1246 P1247 E1248 K1249 D1250 S1251 W1252 T1253 V1254 N1255 D1256 I1257 Q1258 K1259 L1260 V1261 G1262 K1263 L1264 N1265 W1266 A1267 S1268 Q1269 I1270 Y1271 I1274 K1275 V1276 R1277 Q1278 L1279 C1280 K1281
L1282 L1283 R1284 G1285 T1286 K1287 A1288 L1289 T1290 E1291 V1292 I1293 P1294 L1295 T1296 E1297 E1298 A1299 E1300 L1301 E1302 L1303 A1304 E1305 N1306 R1307 E1308 I1309 L1310 V1314 V1317 D1320 K1323 D1324 L1325 I1326 Q1330 K1331 Q1332 Q1336 W1337 T1338 Y1339 Q1340 I1341 Y1342 Q1343 E1344 P1345 F1346 K1347 K1353 Y1354
A1355 R1356 MET ARG GLY ALA HIS T1362 N1363 D1364 V1365 L1368 T1369 E1370 A1371 V1372 I1375 S1379 I1380 V1381 P1387 I1393 Q1394 K1395 W1398 E1399 T1400 W1401 Q1407 W1410 W1414 V1417 N1418 T1419 P1420 P1421 L1422 L1425 W1426 Y1427

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	120.34Å 156.54Å 156.47Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.78 – 3.00 45.78 – 2.94	Depositor EDS
% Data completeness (in resolution range)	90.8 (45.78-3.00) 86.0 (45.78-2.94)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.26 (at 2.96Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.214 , 0.273 0.200 , 0.254	Depositor DCC
R_{free} test set	1388 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	69.4	Xtriage
Anisotropy	0.216	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 56.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	7918	wwPDB-VP
Average B, all atoms (Å^2)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.13% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	A	0.41	0/4640	0.65	0/6305
2	B	0.41	0/3439	0.65	0/4674
All	All	0.41	0/8079	0.65	0/10979

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4522	0	4572	245	1
2	B	3345	0	3372	193	0
3	A	27	0	17	4	0
4	A	8	0	0	0	0
4	B	16	0	0	1	0
All	All	7918	0	7961	426	1

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 27.

All (426) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:131:THR:HG22	1:A:143:ARG:HG2	1.36	1.03
2:B:1215:THR:HG22	2:B:1216:THR:H	1.24	1.01
1:A:458:VAL:HG21	1:A:547:GLN:HE22	1.32	0.94
1:A:139:THR:HG22	1:A:140:PRO:HD2	1.53	0.90
1:A:435:VAL:HG13	2:B:1290:THR:HG21	1.55	0.89
2:B:1206:ARG:HG2	2:B:1216:THR:HG21	1.55	0.88
1:A:492:GLU:HG2	1:A:530:LYS:HB2	1.56	0.88
1:A:65:LYS:HG3	1:A:66:LYS:H	1.42	0.84
2:B:1283:LEU:HD22	2:B:1293:ILE:HB	1.59	0.84
2:B:1184:MET:O	2:B:1185:ASP:HB2	1.77	0.83
2:B:1314:VAL:O	2:B:1317:VAL:HG22	1.79	0.82
2:B:1060:VAL:HG12	2:B:1075:VAL:HG22	1.61	0.82
1:A:27:THR:O	1:A:31:ILE:HG13	1.80	0.81
1:A:225:PRO:HA	1:A:226:PRO:O	1.82	0.80
2:B:1169:GLU:HB3	2:B:1170:PRO:HD3	1.63	0.78
2:B:1303:LEU:HB3	2:B:1307:ARG:HH12	1.47	0.78
1:A:458:VAL:CG2	1:A:547:GLN:HE22	1.96	0.78
2:B:1280:CYS:HA	2:B:1284:ARG:HH21	1.49	0.78
1:A:178:ILE:HD13	1:A:191:SER:HB3	1.67	0.77
1:A:417:VAL:HG22	1:A:419:THR:HG23	1.67	0.77
2:B:1280:CYS:HA	2:B:1284:ARG:NH2	2.00	0.76
1:A:131:THR:CG2	1:A:143:ARG:HG2	2.14	0.76
2:B:1063:ILE:HD13	2:B:1074:LEU:HD22	1.66	0.75
1:A:89:GLU:HB2	1:A:92:LEU:HD11	1.68	0.75
1:A:64:LYS:HD3	1:A:68:SER:HB3	1.67	0.74
1:A:458:VAL:HB	1:A:548:VAL:HG22	1.68	0.73
1:A:206:ARG:HE	1:A:216:THR:HG23	1.54	0.72
2:B:1215:THR:HG22	2:B:1216:THR:N	2.03	0.72
1:A:466:VAL:HG21	1:A:551:LEU:HD13	1.71	0.71
2:B:1253:THR:O	2:B:1257:ILE:HG22	1.90	0.71
2:B:1332:GLN:HB2	2:B:1336:GLN:HB2	1.71	0.71
1:A:356:ARG:HG2	1:A:356:ARG:HH11	1.54	0.71
1:A:450:THR:O	1:A:451:LYS:HB2	1.90	0.71
2:B:1154:LYS:HE3	2:B:1184:MET:HE1	1.73	0.70
1:A:21:VAL:HB	1:A:59:PRO:HD3	1.73	0.70
1:A:107:THR:HB	1:A:223:LYS:HB3	1.74	0.70
2:B:1282:LEU:HB3	2:B:1283:LEU:HD12	1.72	0.70
2:B:1287:LYS:HD3	2:B:1291:GLU:OE2	1.91	0.69
2:B:1279:LEU:HD12	2:B:1282:LEU:HD22	1.74	0.69
2:B:1296:THR:O	2:B:1300:GLU:HG2	1.93	0.69
2:B:1090:VAL:HG23	2:B:1091:GLN:N	2.08	0.69
1:A:254:VAL:O	1:A:258:GLN:HG3	1.93	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1417:VAL:HG22	2:B:1418:ASN:H	1.59	0.68
1:A:458:VAL:HG21	1:A:547:GLN:NE2	2.08	0.68
1:A:458:VAL:HG11	1:A:547:GLN:OE1	1.93	0.68
2:B:1050:ILE:CG2	2:B:1145:GLN:HG2	2.23	0.68
2:B:1195:ILE:HG23	2:B:1196:GLY:N	2.08	0.68
2:B:1355:ALA:O	2:B:1356:ARG:HB2	1.94	0.68
1:A:396:GLU:O	1:A:400:THR:HG22	1.94	0.67
1:A:93:GLY:O	1:A:94:ILE:HD13	1.94	0.67
1:A:458:VAL:HG23	1:A:548:VAL:HG13	1.76	0.67
2:B:1283:LEU:CD2	2:B:1293:ILE:HB	2.24	0.67
2:B:1283:LEU:HD22	2:B:1293:ILE:CB	2.24	0.67
1:A:305:GLU:O	1:A:309:ILE:HG13	1.95	0.66
1:A:275:LYS:HG2	1:A:336:GLN:HE22	1.58	0.66
2:B:1275:LYS:HE3	2:B:1277:ARG:HB3	1.77	0.66
1:A:114:ALA:HB1	1:A:160:PHE:CE1	2.31	0.66
2:B:1369:THR:HG22	2:B:1398:TRP:CH2	2.31	0.66
1:A:450:THR:HG21	1:A:452:LEU:HD12	1.76	0.66
2:B:1209:LEU:HD22	2:B:1214:LEU:HD23	1.77	0.66
1:A:101:LYS:HE3	1:A:101:LYS:N	2.11	0.65
1:A:219:LYS:CD	1:A:220:LYS:HG2	2.26	0.65
1:A:357:MET:HG3	1:A:358:ARG:H	1.62	0.65
1:A:62:ALA:HA	1:A:72:ARG:O	1.96	0.65
1:A:466:VAL:CG2	1:A:551:LEU:HD13	2.27	0.65
1:A:107:THR:HG23	1:A:198:HIS:NE2	2.12	0.65
2:B:1420:PRO:C	2:B:1422:LEU:H	2.01	0.64
1:A:223:LYS:HG3	1:A:224:GLU:N	2.13	0.64
1:A:301:LEU:O	1:A:304:ALA:HB3	1.97	0.64
2:B:1007:THR:HG22	2:B:1119:PRO:HG2	1.78	0.64
1:A:458:VAL:HG11	1:A:547:GLN:CD	2.17	0.64
2:B:1139:THR:HG23	2:B:1140:PRO:HD2	1.79	0.63
2:B:1280:CYS:CA	2:B:1284:ARG:HH21	2.11	0.63
2:B:1114:ALA:HB2	2:B:1214:LEU:HD11	1.79	0.63
1:A:101:LYS:HE3	1:A:101:LYS:H	1.63	0.63
1:A:307:ARG:HG3	1:A:307:ARG:HH11	1.64	0.63
1:A:343:GLN:HG3	1:A:349:LEU:CD1	2.28	0.63
1:A:441:TYR:O	1:A:548:VAL:HG21	1.99	0.63
2:B:1059:PRO:HG2	2:B:1076:ASP:HB3	1.80	0.63
1:A:234:LEU:HD12	1:A:234:LEU:N	2.14	0.62
1:A:441:TYR:CE2	1:A:544:GLY:HA3	2.34	0.62
2:B:1279:LEU:O	2:B:1282:LEU:HB2	1.98	0.62
2:B:1050:ILE:HG21	2:B:1145:GLN:HG2	1.82	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:457:TYR:CD1	1:A:457:TYR:C	2.74	0.61
1:A:89:GLU:HB2	1:A:92:LEU:CD1	2.30	0.61
1:A:223:LYS:HG3	1:A:224:GLU:H	1.66	0.61
2:B:1252:TRP:HA	2:B:1252:TRP:CE3	2.35	0.61
1:A:139:THR:CG2	1:A:140:PRO:HD2	2.27	0.61
2:B:1091:GLN:O	2:B:1092:LEU:HD23	2.00	0.61
2:B:1257:ILE:O	2:B:1261:VAL:HG23	1.99	0.61
1:A:65:LYS:HG3	1:A:66:LYS:N	2.15	0.61
1:A:72:ARG:HG3	1:A:72:ARG:HH11	1.65	0.61
2:B:1252:TRP:HA	2:B:1252:TRP:HE3	1.66	0.60
1:A:219:LYS:HD2	1:A:220:LYS:HG2	1.82	0.60
1:A:547:GLN:NE2	1:A:548:VAL:N	2.50	0.60
1:A:268:SER:O	1:A:351:THR:HG22	2.01	0.60
2:B:1090:VAL:CG2	2:B:1091:GLN:N	2.64	0.60
2:B:1303:LEU:HB3	2:B:1307:ARG:NH1	2.16	0.60
1:A:447:ASN:OD1	1:A:449:GLU:HG2	2.02	0.60
1:A:64:LYS:HB3	1:A:68:SER:HA	1.83	0.60
1:A:228:LEU:N	1:A:228:LEU:HD23	2.16	0.60
1:A:332:GLN:HG3	1:A:338:THR:HG22	1.84	0.59
1:A:458:VAL:CB	1:A:547:GLN:HE22	2.15	0.59
2:B:1422:LEU:HD23	2:B:1422:LEU:O	2.00	0.59
1:A:156:SER:HB2	1:A:157:PRO:HD3	1.83	0.59
2:B:1154:LYS:HG2	2:B:1184:MET:HE2	1.83	0.59
1:A:219:LYS:HD2	1:A:219:LYS:H	1.66	0.59
1:A:402:TRP:CD1	1:A:402:TRP:C	2.75	0.59
1:A:254:VAL:HG22	1:A:293:ILE:HD11	1.84	0.59
2:B:1191:SER:HB2	2:B:1193:LEU:HD13	1.85	0.58
2:B:1231:GLY:O	2:B:1232:TYR:HB3	2.02	0.58
2:B:1320:ASP:OD2	2:B:1323:LYS:HG3	2.04	0.58
1:A:427:TYR:O	1:A:509:GLN:NE2	2.37	0.58
2:B:1215:THR:O	2:B:1216:THR:HG23	2.03	0.58
1:A:57:ASN:OD1	1:A:131:THR:HG23	2.03	0.58
1:A:420:PRO:HA	1:A:421:PRO:C	2.23	0.58
2:B:1282:LEU:C	2:B:1283:LEU:HD12	2.24	0.58
1:A:308:GLU:O	1:A:311:LYS:HG2	2.04	0.58
2:B:1246:LEU:HD12	2:B:1307:ARG:HB3	1.85	0.57
2:B:1254:VAL:O	2:B:1257:ILE:HG23	2.04	0.57
1:A:238:LYS:HB2	1:A:316:GLY:O	2.04	0.57
1:A:20:LYS:HG2	1:A:55:PRO:O	2.05	0.57
1:A:329:ILE:HD11	1:A:375:ILE:HD12	1.87	0.57
1:A:411:ILE:O	1:A:411:ILE:HG23	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1063:ILE:HD13	2:B:1074:LEU:CD2	2.32	0.57
2:B:1072:ARG:HD3	2:B:1073:LYS:O	2.05	0.57
1:A:356:ARG:HG2	1:A:356:ARG:NH1	2.19	0.57
1:A:428:GLN:HA	1:A:509:GLN:NE2	2.20	0.56
1:A:454:LYS:O	1:A:552:VAL:HG13	2.04	0.56
1:A:543:GLY:H	2:B:1284:ARG:HD2	1.69	0.56
2:B:1344:GLU:O	2:B:1347:LYS:HB2	2.05	0.56
1:A:131:THR:CG2	1:A:143:ARG:NH1	2.68	0.56
2:B:1086:ASP:O	2:B:1090:VAL:HG22	2.04	0.56
2:B:1153:TRP:CE2	2:B:1155:GLY:HA3	2.40	0.56
1:A:410:TRP:HB2	2:B:1365:VAL:HG23	1.87	0.56
1:A:33:ALA:O	1:A:37:ILE:HG13	2.06	0.56
1:A:238:LYS:HD2	1:A:315:HIS:CB	2.35	0.56
1:A:317:VAL:HG22	1:A:318:TYR:N	2.20	0.56
2:B:1266:TRP:HE1	2:B:1346:PHE:HE2	1.53	0.56
1:A:397:THR:HG21	1:A:424:LYS:HA	1.88	0.56
1:A:131:THR:CG2	1:A:143:ARG:HH11	2.19	0.56
1:A:295:LEU:HB3	1:A:300:GLU:HG2	1.87	0.56
1:A:443:ASP:OD1	1:A:444:GLY:N	2.39	0.56
2:B:1271:TYR:O	2:B:1274:ILE:HG12	2.05	0.56
1:A:445:ALA:O	1:A:477:THR:HG21	2.06	0.55
1:A:547:GLN:HE21	1:A:548:VAL:N	2.03	0.55
2:B:1393:ILE:HG12	2:B:1394:GLN:N	2.21	0.55
1:A:513:SER:OG	1:A:514:GLU:N	2.40	0.55
2:B:1090:VAL:CG2	2:B:1091:GLN:H	2.20	0.55
2:B:1193:LEU:HB3	2:B:1197:GLN:HB3	1.88	0.55
1:A:228:LEU:HB3	1:A:242:GLN:HE22	1.72	0.55
1:A:518:VAL:O	1:A:522:ILE:HG13	2.07	0.55
2:B:1241:VAL:HG12	2:B:1242:GLN:H	1.72	0.55
1:A:115:TYR:OH	1:A:157:PRO:HG3	2.06	0.55
1:A:469:LEU:HD21	1:A:480:GLN:HG2	1.89	0.54
1:A:169:GLU:HB3	1:A:170:PRO:HD3	1.89	0.54
3:A:2000:MSD:H132	3:A:2000:MSD:O22	2.07	0.54
2:B:1286:THR:HG22	2:B:1286:THR:O	2.08	0.54
1:A:91:GLN:HE22	1:A:183:TYR:HD1	1.55	0.54
1:A:111:VAL:HG21	1:A:164:MET:HE1	1.88	0.54
1:A:65:LYS:NZ	1:A:72:ARG:HD2	2.22	0.54
1:A:219:LYS:HD2	1:A:220:LYS:N	2.23	0.54
2:B:1085:GLN:HA	2:B:1088:TRP:CE2	2.43	0.54
2:B:1244:ILE:HD13	2:B:1427:TYR:CD2	2.43	0.54
2:B:1066:LYS:O	2:B:1067:ASP:HB2	2.08	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:219:LYS:HD3	1:A:220:LYS:HG2	1.90	0.53
1:A:501:TYR:CZ	1:A:505:ILE:HD11	2.43	0.53
2:B:1122:GLU:CD	2:B:1122:GLU:H	2.10	0.53
1:A:37:ILE:HG22	1:A:41:MET:HE2	1.91	0.53
1:A:252:TRP:HB3	1:A:257:ILE:HD11	1.89	0.53
2:B:1115:TYR:HB3	2:B:1149:LEU:HB2	1.89	0.53
2:B:1249:LYS:HB3	2:B:1252:TRP:CZ3	2.43	0.53
1:A:317:VAL:HG12	1:A:348:ASN:O	2.09	0.53
1:A:128:THR:OG1	1:A:146:TYR:HB2	2.09	0.53
2:B:1060:VAL:CG1	2:B:1075:VAL:HG22	2.35	0.53
1:A:429:LEU:O	1:A:430:GLU:C	2.47	0.53
1:A:458:VAL:CB	1:A:548:VAL:HG22	2.36	0.53
2:B:1195:ILE:HG23	2:B:1196:GLY:H	1.73	0.52
1:A:60:VAL:HG21	1:A:130:PHE:HD2	1.73	0.52
1:A:458:VAL:CG2	1:A:548:VAL:HG22	2.39	0.52
2:B:1280:CYS:C	2:B:1282:LEU:H	2.11	0.52
1:A:257:ILE:HB	1:A:283:LEU:HD21	1.90	0.52
2:B:1077:PHE:HD2	2:B:1152:GLY:HA3	1.74	0.52
1:A:180:ILE:HG12	1:A:189:VAL:HG22	1.92	0.52
1:A:426:TRP:O	1:A:427:TYR:HB3	2.10	0.52
1:A:231:GLY:C	1:A:242:GLN:HG2	2.29	0.52
1:A:88:TRP:HA	1:A:88:TRP:CE3	2.44	0.52
2:B:1267:ALA:HB1	2:B:1310:LEU:HD21	1.91	0.52
1:A:524:GLN:HA	1:A:524:GLN:NE2	2.25	0.52
1:A:131:THR:HG21	1:A:143:ARG:HH11	1.75	0.51
1:A:307:ARG:HG3	1:A:307:ARG:NH1	2.25	0.51
2:B:1254:VAL:O	2:B:1258:GLN:HG3	2.09	0.51
2:B:1195:ILE:CG2	2:B:1196:GLY:N	2.72	0.51
1:A:178:ILE:CD1	1:A:191:SER:HB3	2.37	0.51
2:B:1278:GLN:O	2:B:1282:LEU:HD13	2.11	0.51
2:B:1247:PRO:O	2:B:1248:GLU:HG3	2.11	0.51
1:A:435:VAL:CG1	2:B:1290:THR:HG21	2.34	0.51
2:B:1075:VAL:HG11	2:B:1077:PHE:CZ	2.46	0.51
1:A:412:PRO:HG3	2:B:1401:TRP:CZ2	2.46	0.51
2:B:1296:THR:HG22	2:B:1297:GLU:N	2.26	0.51
1:A:257:ILE:O	1:A:261:VAL:HG23	2.11	0.51
1:A:223:LYS:O	1:A:225:PRO:CD	2.59	0.51
1:A:108:VAL:O	1:A:221:HIS:O	2.28	0.50
1:A:498:ASP:HB2	1:A:538:ALA:HB2	1.92	0.50
2:B:1281:LYS:N	2:B:1284:ARG:HE	2.09	0.50
2:B:1153:TRP:CZ2	2:B:1155:GLY:HA3	2.46	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1254:VAL:HG23	2:B:1291:GLU:O	2.11	0.50
1:A:236:PRO:HA	3:A:2000:MSD:HC7	1.93	0.50
2:B:1270:ILE:O	2:B:1271:TYR:HB2	2.11	0.50
2:B:1425:LEU:HB2	2:B:1427:TYR:CE2	2.47	0.50
1:A:388:LYS:HD2	1:A:413:GLU:OE1	2.10	0.50
1:A:297:GLU:O	1:A:301:LEU:HD22	2.12	0.50
1:A:123:ASP:OD2	1:A:123:ASP:N	2.44	0.50
2:B:1032:LYS:O	2:B:1035:VAL:HG22	2.12	0.50
1:A:515:SER:HB3	1:A:518:VAL:HB	1.93	0.50
2:B:1255:ASN:O	2:B:1259:LYS:HG3	2.12	0.50
1:A:238:LYS:HE2	1:A:315:HIS:CD2	2.47	0.49
2:B:1157:PRO:HG2	2:B:1184:MET:HA	1.93	0.49
2:B:1101:LYS:NZ	2:B:1101:LYS:HB3	2.27	0.49
1:A:517:LEU:O	1:A:520:GLN:N	2.45	0.49
1:A:458:VAL:HG11	1:A:547:GLN:NE2	2.28	0.49
1:A:346:PHE:N	1:A:346:PHE:CD2	2.76	0.49
1:A:365:VAL:HG11	1:A:401:TRP:CG	2.48	0.49
1:A:93:GLY:HA3	2:B:1137:ASN:ND2	2.26	0.49
2:B:1263:LYS:HE2	2:B:1425:LEU:HA	1.94	0.49
2:B:1371:ALA:O	2:B:1375:ILE:HG13	2.13	0.49
2:B:1066:LYS:HZ2	2:B:1217:PRO:HB3	1.76	0.49
2:B:1264:LEU:HB3	2:B:1276:VAL:CG1	2.42	0.49
1:A:350:LYS:HG2	1:A:351:THR:N	2.28	0.49
2:B:1053:GLU:OE1	2:B:1053:GLU:N	2.33	0.49
2:B:1085:GLN:O	2:B:1086:ASP:C	2.51	0.49
1:A:194:GLU:O	1:A:198:HIS:N	2.43	0.49
1:A:227:PHE:C	1:A:228:LEU:HD23	2.33	0.49
1:A:543:GLY:N	2:B:1284:ARG:HD2	2.27	0.49
1:A:79:GLU:O	1:A:83:ARG:HD2	2.13	0.48
1:A:254:VAL:HG21	1:A:288:ALA:O	2.12	0.48
1:A:357:MET:HG3	1:A:358:ARG:N	2.26	0.48
2:B:1154:LYS:O	2:B:1157:PRO:HD2	2.13	0.48
2:B:1283:LEU:HD22	2:B:1293:ILE:CG1	2.43	0.48
2:B:1324:ASP:O	2:B:1343:GLN:HG2	2.12	0.48
1:A:206:ARG:CZ	1:A:217:PRO:O	2.60	0.48
1:A:417:VAL:O	1:A:417:VAL:HG13	2.13	0.48
1:A:410:TRP:CG	1:A:411:ILE:N	2.80	0.48
2:B:1066:LYS:NZ	2:B:1217:PRO:HB3	2.28	0.48
1:A:195:ILE:HG23	1:A:199:ARG:CZ	2.44	0.48
2:B:1195:ILE:HD11	2:B:1233:GLU:OE1	2.13	0.48
1:A:395:LYS:HD3	1:A:414:TRP:CZ2	2.49	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:536:VAL:HG11	2:B:1258:GLN:OE1	2.13	0.48
2:B:1281:LYS:CA	2:B:1284:ARG:HE	2.26	0.48
1:A:19:PRO:HD3	1:A:80:LEU:HD13	1.96	0.48
1:A:115:TYR:O	1:A:149:LEU:HB2	2.14	0.48
2:B:1154:LYS:HE3	2:B:1184:MET:CE	2.43	0.48
2:B:1242:GLN:OE1	2:B:1353:LYS:NZ	2.47	0.48
2:B:1303:LEU:O	2:B:1307:ARG:HG2	2.13	0.48
1:A:254:VAL:HG22	1:A:293:ILE:CD1	2.43	0.47
2:B:1252:TRP:HB3	2:B:1293:ILE:CD1	2.43	0.47
1:A:221:HIS:O	1:A:222:GLN:HB3	2.14	0.47
2:B:1215:THR:CG2	2:B:1216:THR:H	2.07	0.47
2:B:1395:LYS:HG2	2:B:1399:GLU:OE1	2.15	0.47
1:A:225:PRO:HA	1:A:226:PRO:C	2.33	0.47
1:A:23:GLN:HG2	1:A:133:PRO:HG3	1.96	0.47
1:A:497:THR:O	1:A:535:TRP:HA	2.15	0.47
2:B:1305:GLU:O	2:B:1308:GLU:HB3	2.14	0.47
1:A:441:TYR:CD2	1:A:544:GLY:HA3	2.50	0.47
2:B:1274:ILE:O	2:B:1276:VAL:HG13	2.14	0.47
2:B:1393:ILE:CG1	2:B:1394:GLN:N	2.78	0.47
1:A:37:ILE:HG22	1:A:41:MET:CE	2.44	0.47
1:A:219:LYS:CD	1:A:219:LYS:H	2.26	0.47
2:B:1139:THR:HG22	2:B:1141:GLY:N	2.28	0.47
2:B:1168:LEU:HD13	2:B:1180:ILE:HG21	1.96	0.47
2:B:1216:THR:HB	2:B:1217:PRO:HD2	1.97	0.47
1:A:72:ARG:HG3	1:A:72:ARG:NH1	2.30	0.47
1:A:228:LEU:HD13	1:A:242:GLN:OE1	2.15	0.47
1:A:460:ASN:HA	2:B:1286:THR:HG22	1.96	0.47
1:A:519:ASN:O	1:A:523:GLU:HG3	2.14	0.47
1:A:223:LYS:O	1:A:225:PRO:HD3	2.15	0.46
1:A:542:ILE:HG22	1:A:543:GLY:N	2.30	0.46
2:B:1368:LEU:O	2:B:1372:VAL:HG23	2.15	0.46
1:A:126:LYS:NZ	1:A:126:LYS:HB3	2.30	0.46
1:A:209:LEU:HD22	1:A:214:LEU:HD12	1.98	0.46
2:B:1296:THR:HB	2:B:1299:ALA:HB2	1.97	0.46
1:A:238:LYS:HD2	1:A:315:HIS:HB3	1.96	0.46
1:A:363:ASN:HB2	1:A:511:ASP:OD2	2.15	0.46
1:A:547:GLN:NE2	1:A:547:GLN:C	2.69	0.46
2:B:1090:VAL:HG23	2:B:1091:GLN:H	1.79	0.46
1:A:221:HIS:C	1:A:223:LYS:H	2.19	0.46
1:A:223:LYS:O	1:A:225:PRO:N	2.49	0.46
1:A:161:GLN:OE1	1:A:182:GLN:NE2	2.48	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1139:THR:HG23	2:B:1140:PRO:CD	2.44	0.46
1:A:219:LYS:HD2	1:A:220:LYS:H	1.81	0.46
1:A:442:VAL:CG1	1:A:485:ALA:HB2	2.46	0.46
2:B:1266:TRP:C	2:B:1268:SER:H	2.19	0.46
2:B:1379:SER:OG	2:B:1387:PRO:HD3	2.15	0.46
1:A:487:GLN:O	1:A:489:SER:N	2.46	0.46
1:A:501:TYR:CE1	1:A:505:ILE:HD11	2.51	0.46
2:B:1231:GLY:O	2:B:1232:TYR:CB	2.64	0.46
2:B:1139:THR:HG22	2:B:1141:GLY:H	1.81	0.46
2:B:1266:TRP:CE3	2:B:1425:LEU:HD21	2.51	0.46
1:A:209:LEU:HB3	1:A:214:LEU:HB2	1.99	0.45
2:B:1051:GLY:HA3	2:B:1053:GLU:OE1	2.16	0.45
2:B:1296:THR:CG2	2:B:1297:GLU:N	2.79	0.45
2:B:1395:LYS:O	2:B:1399:GLU:HG3	2.16	0.45
1:A:124:PHE:O	1:A:127:TYR:HD2	1.98	0.45
1:A:365:VAL:HG21	1:A:425:LEU:HD21	1.98	0.45
2:B:1414:TRP:HD1	2:B:1414:TRP:O	1.99	0.45
1:A:100:LEU:HD21	3:A:2000:MSD:H443	1.99	0.45
1:A:238:LYS:HD2	1:A:315:HIS:CG	2.52	0.45
1:A:406:TRP:CH2	2:B:1418:ASN:HA	2.52	0.45
2:B:1296:THR:HB	2:B:1299:ALA:CB	2.47	0.45
2:B:1267:ALA:O	2:B:1274:ILE:HG13	2.16	0.45
2:B:1280:CYS:C	2:B:1282:LEU:N	2.69	0.45
2:B:1195:ILE:CG2	2:B:1196:GLY:H	2.29	0.45
2:B:1257:ILE:O	2:B:1257:ILE:HD12	2.16	0.45
1:A:473:THR:OG1	1:A:476:LYS:HG3	2.17	0.45
2:B:1414:TRP:O	2:B:1414:TRP:CD1	2.70	0.45
2:B:1417:VAL:HG22	2:B:1418:ASN:N	2.28	0.45
1:A:275:LYS:HG2	1:A:336:GLN:NE2	2.31	0.45
1:A:410:TRP:HA	1:A:410:TRP:CE3	2.52	0.45
1:A:522:ILE:O	1:A:526:ILE:HG13	2.17	0.45
1:A:524:GLN:HA	1:A:524:GLN:HE21	1.82	0.45
2:B:1100:LEU:HG	2:B:1381:VAL:HG13	1.97	0.45
2:B:1252:TRP:HB3	2:B:1293:ILE:HD13	1.98	0.45
2:B:1365:VAL:O	2:B:1369:THR:HG23	2.17	0.45
1:A:88:TRP:HA	1:A:88:TRP:HE3	1.82	0.44
2:B:1079:GLU:HB2	4:B:3007:HOH:O	2.17	0.44
2:B:1266:TRP:CE2	2:B:1425:LEU:HD11	2.52	0.44
2:B:1280:CYS:C	2:B:1284:ARG:HH21	2.20	0.44
1:A:362:THR:O	1:A:512:LYS:HG2	2.18	0.44
2:B:1085:GLN:HA	2:B:1088:TRP:NE1	2.33	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1420:PRO:C	2:B:1422:LEU:N	2.69	0.44
1:A:24:TRP:CD2	1:A:25:PRO:HD2	2.53	0.44
2:B:1031:ILE:O	2:B:1035:VAL:HG13	2.17	0.44
2:B:1420:PRO:O	2:B:1422:LEU:N	2.48	0.44
2:B:1279:LEU:N	2:B:1302:GLU:OE1	2.50	0.44
1:A:344:GLU:HG2	1:A:347:LYS:HD3	1.99	0.44
2:B:1039:THR:HG23	2:B:1043:LYS:HZ2	1.83	0.44
1:A:77:PHE:O	1:A:78:ARG:C	2.55	0.43
1:A:319:TYR:OH	1:A:385:LYS:HE2	2.17	0.43
1:A:494:ASN:HB3	2:B:1289:LEU:HD12	1.99	0.43
2:B:1294:PRO:O	2:B:1295:LEU:HD23	2.18	0.43
1:A:31:ILE:O	1:A:35:VAL:HG23	2.18	0.43
1:A:409:THR:O	2:B:1364:ASP:HB2	2.17	0.43
1:A:351:THR:CG2	1:A:352:GLY:N	2.81	0.43
1:A:361:HIS:HD2	1:A:513:SER:OG	2.00	0.43
1:A:450:THR:HG22	1:A:452:LEU:HG	1.99	0.43
1:A:410:TRP:HA	1:A:410:TRP:HE3	1.82	0.43
2:B:1326:ILE:O	2:B:1341:ILE:HA	2.18	0.43
2:B:1063:ILE:CD1	2:B:1074:LEU:HD22	2.44	0.43
2:B:1214:LEU:HD12	2:B:1214:LEU:HA	1.87	0.43
1:A:65:LYS:CG	1:A:66:LYS:H	2.21	0.43
2:B:1103:ASN:OD1	2:B:1179:VAL:HG21	2.18	0.43
2:B:1353:LYS:NZ	2:B:1353:LYS:HB3	2.34	0.43
1:A:56:TYR:O	1:A:129:ALA:HB3	2.19	0.42
1:A:93:GLY:C	1:A:94:ILE:HD13	2.39	0.42
1:A:131:THR:HG23	1:A:143:ARG:NH1	2.34	0.42
1:A:252:TRP:HB3	1:A:257:ILE:CD1	2.48	0.42
1:A:273:GLY:HA2	1:A:332:GLN:OE1	2.19	0.42
1:A:401:TRP:HB2	1:A:425:LEU:HD11	2.01	0.42
1:A:548:VAL:O	1:A:552:VAL:HG23	2.20	0.42
1:A:428:GLN:HA	1:A:509:GLN:HE21	1.84	0.42
1:A:447:ASN:HB3	1:A:450:THR:HB	2.00	0.42
2:B:1422:LEU:HD23	2:B:1422:LEU:C	2.39	0.42
2:B:1426:TRP:HA	2:B:1426:TRP:CE3	2.53	0.42
1:A:420:PRO:HA	1:A:421:PRO:O	2.20	0.42
2:B:1028:GLU:HG2	2:B:1032:LYS:HE2	2.00	0.42
1:A:26:LEU:O	1:A:31:ILE:HD11	2.20	0.42
1:A:406:TRP:CD2	1:A:407:GLN:N	2.88	0.42
1:A:406:TRP:CE3	2:B:1419:THR:HB	2.54	0.42
2:B:1282:LEU:CB	2:B:1283:LEU:HD12	2.46	0.42
1:A:107:THR:HA	1:A:223:LYS:CB	2.49	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:218:ASP:OD1	1:A:219:LYS:HE2	2.20	0.42
2:B:1039:THR:HG23	2:B:1043:LYS:NZ	2.34	0.42
2:B:1296:THR:HG22	2:B:1299:ALA:H	1.85	0.42
1:A:553:SER:O	1:A:555:GLY:N	2.53	0.42
2:B:1264:LEU:HB3	2:B:1276:VAL:HG11	2.01	0.42
1:A:517:LEU:HD22	1:A:521:ILE:HD11	2.01	0.42
2:B:1067:ASP:OD2	2:B:1407:GLN:NE2	2.53	0.42
1:A:60:VAL:CG2	1:A:130:PHE:HB2	2.50	0.42
1:A:234:LEU:N	1:A:234:LEU:CD1	2.82	0.42
1:A:495:ILE:HB	1:A:533:LEU:HD23	2.01	0.42
2:B:1252:TRP:O	2:B:1292:VAL:HG23	2.20	0.42
2:B:1280:CYS:SG	2:B:1281:LYS:N	2.92	0.42
2:B:1330:GLN:NE2	2:B:1338:THR:OG1	2.52	0.42
1:A:451:LYS:HB3	1:A:471:ASN:HA	2.02	0.42
2:B:1079:GLU:O	2:B:1082:LYS:HB2	2.20	0.42
1:A:195:ILE:HG23	1:A:199:ARG:HD2	2.02	0.41
1:A:317:VAL:HG22	1:A:318:TYR:H	1.82	0.41
1:A:21:VAL:HB	1:A:59:PRO:CD	2.48	0.41
1:A:40:GLU:O	1:A:44:GLU:HG3	2.21	0.41
2:B:1028:GLU:CG	2:B:1032:LYS:HE2	2.51	0.41
2:B:1254:VAL:HG21	2:B:1288:ALA:O	2.20	0.41
1:A:173:LYS:HD3	1:A:173:LYS:C	2.40	0.41
2:B:1077:PHE:HD2	2:B:1152:GLY:CA	2.32	0.41
2:B:1137:ASN:C	2:B:1139:THR:H	2.24	0.41
2:B:1293:ILE:HD13	2:B:1293:ILE:H	1.86	0.41
1:A:110:ASP:O	1:A:110:ASP:CG	2.59	0.41
1:A:271:TYR:O	1:A:274:ILE:HG12	2.20	0.41
1:A:395:LYS:O	1:A:399:GLU:HB2	2.19	0.41
1:A:65:LYS:HZ3	1:A:72:ARG:HD2	1.85	0.41
1:A:111:VAL:HG21	1:A:164:MET:CE	2.49	0.41
1:A:395:LYS:HD3	1:A:414:TRP:CH2	2.55	0.41
2:B:1077:PHE:O	2:B:1078:ARG:C	2.58	0.41
1:A:24:TRP:O	1:A:26:LEU:HD22	2.21	0.41
1:A:105:SER:HB3	1:A:198:HIS:CD2	2.56	0.41
1:A:222:GLN:O	1:A:223:LYS:C	2.58	0.41
1:A:325:LEU:HB3	1:A:387:PRO:HB3	2.01	0.41
2:B:1073:LYS:HE2	2:B:1075:VAL:HG23	2.02	0.41
2:B:1207:GLN:O	2:B:1211:ARG:HD3	2.21	0.41
2:B:1419:THR:HG22	2:B:1420:PRO:O	2.21	0.41
1:A:171:PHE:CZ	1:A:205:LEU:HB2	2.55	0.41
1:A:366:LYS:O	1:A:370:GLU:HG3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:317:VAL:CG2	1:A:318:TYR:N	2.84	0.40
2:B:1264:LEU:HB3	2:B:1276:VAL:HG12	2.03	0.40
1:A:60:VAL:HG21	1:A:130:PHE:CD2	2.55	0.40
1:A:216:THR:OG1	1:A:217:PRO:HD2	2.21	0.40
2:B:1125:ARG:HD3	2:B:1147:ASN:HA	2.02	0.40
2:B:1163:SER:O	2:B:1167:ILE:HG13	2.21	0.40
1:A:100:LEU:CD2	3:A:2000:MSD:H443	2.51	0.40
1:A:305:GLU:O	1:A:308:GLU:HB3	2.22	0.40
1:A:369:THR:HG22	1:A:370:GLU:N	2.37	0.40
2:B:1271:TYR:CD2	2:B:1310:LEU:HA	2.56	0.40
1:A:149:LEU:HA	1:A:150:PRO:HD3	1.93	0.40
1:A:206:ARG:HE	1:A:216:THR:CG2	2.30	0.40
2:B:1193:LEU:CD1	2:B:1193:LEU:N	2.84	0.40
2:B:1241:VAL:HG12	2:B:1242:GLN:N	2.34	0.40
2:B:1393:ILE:CG1	2:B:1394:GLN:H	2.34	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:448:ARG:NH2	1:A:448:ARG:NH2[3_557]	1.64	0.56

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	555/560 (99%)	475 (86%)	60 (11%)	20 (4%)	3 19
2	B	399/427 (93%)	342 (86%)	46 (12%)	11 (3%)	5 25
All	All	954/987 (97%)	817 (86%)	106 (11%)	31 (3%)	4 22

All (31) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	14	PRO
2	B	1065	LYS
2	B	1085	GLN
2	B	1294	PRO
1	A	18	GLY
1	A	137	ASN
1	A	224	GLU
1	A	430	GLU
1	A	554	ALA
2	B	1267	ALA
1	A	114	ALA
1	A	247	PRO
1	A	332	GLN
1	A	333	GLY
1	A	345	PRO
1	A	412	PRO
2	B	1184	MET
2	B	1215	THR
2	B	1232	TYR
2	B	1286	THR
1	A	226	PRO
1	A	487	GLN
2	B	1185	ASP
1	A	151	GLN
1	A	358	ARG
1	A	427	TYR
2	B	1213	GLY
1	A	230	MET
1	A	217	PRO
2	B	1111	VAL
1	A	381	VAL

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	495/500 (99%)	456 (92%)	39 (8%)	12 41

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	B	369/389 (95%)	344 (93%)	25 (7%)	16 48
All	All	864/889 (97%)	800 (93%)	64 (7%)	13 44

All (64) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	VAL
1	A	14	PRO
1	A	101	LYS
1	A	104	LYS
1	A	110	ASP
1	A	123	ASP
1	A	126	LYS
1	A	139	THR
1	A	145	GLN
1	A	151	GLN
1	A	174	GLN
1	A	182	GLN
1	A	195	ILE
1	A	210	LEU
1	A	215	THR
1	A	218	ASP
1	A	219	LYS
1	A	226	PRO
1	A	227	PHE
1	A	228	LEU
1	A	247	PRO
1	A	259	LYS
1	A	260	LEU
1	A	280	CYS
1	A	297	GLU
1	A	301	LEU
1	A	307	ARG
1	A	334	GLN
1	A	338	THR
1	A	344	GLU
1	A	345	PRO
1	A	349	LEU
1	A	369	THR
1	A	402	TRP
1	A	432	GLU
1	A	459	THR

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Mol	Chain	Res	Type
1	A	488	ASP
1	A	517	LEU
1	A	547	GLN
2	B	1010	VAL
2	B	1039	THR
2	B	1072	ARG
2	B	1078	ARG
2	B	1101	LYS
2	B	1138	GLU
2	B	1185	ASP
2	B	1250	ASP
2	B	1252	TRP
2	B	1257	ILE
2	B	1260	LEU
2	B	1266	TRP
2	B	1283	LEU
2	B	1292	VAL
2	B	1293	ILE
2	B	1297	GLU
2	B	1330	GLN
2	B	1340	GLN
2	B	1356	ARG
2	B	1370	GLU
2	B	1410	TRP
2	B	1414	TRP
2	B	1422	LEU
2	B	1425	LEU
2	B	1426	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	103	ASN
1	A	145	GLN
1	A	151	GLN
1	A	315	HIS
1	A	336	GLN
1	A	361	HIS
1	A	407	GLN
1	A	509	GLN
1	A	524	GLN
1	A	539	HIS

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Mol	Chain	Res	Type
1	A	547	GLN
2	B	1137	ASN
2	B	1161	GLN
2	B	1182	GLN
2	B	1255	ASN
2	B	1306	ASN
2	B	1332	GLN
2	B	1394	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

1 ligand is 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	$\#\|Z\| > 2$
3	MSD	A	2000	-	28,29,29	4.11	19 (67%)	35,41,41	2.25	13 (37%)

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
3	MSD	A	2000	-	-	4/20/25/25	0/3/3/3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	2000	MSD	C9-S10	-15.95	1.29	1.68
3	A	2000	MSD	O41-C44	-5.50	1.26	1.42
3	A	2000	MSD	C21-C15	4.95	1.49	1.40
3	A	2000	MSD	C13-C14	4.72	1.58	1.50
3	A	2000	MSD	C5-N4	3.70	1.41	1.34
3	A	2000	MSD	C20-C21	3.64	1.47	1.41
3	A	2000	MSD	C2-C42	3.43	1.52	1.44
3	A	2000	MSD	C7-C2	3.30	1.46	1.39
3	A	2000	MSD	C13-C12	2.97	1.53	1.49
3	A	2000	MSD	C18-C16	2.96	1.45	1.39
3	A	2000	MSD	C7-C6	2.90	1.44	1.38
3	A	2000	MSD	C19-C20	2.87	1.44	1.39
3	A	2000	MSD	C3-C2	2.82	1.43	1.39
3	A	2000	MSD	C20-C23	2.76	1.54	1.48
3	A	2000	MSD	C15-C14	2.69	1.56	1.52
3	A	2000	MSD	C3-N4	2.44	1.39	1.34
3	A	2000	MSD	C19-C18	2.36	1.43	1.38
3	A	2000	MSD	C16-C15	2.26	1.43	1.39
3	A	2000	MSD	C9-N11	2.22	1.38	1.34

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	2000	MSD	C3-N4-C5	5.88	123.78	117.82
3	A	2000	MSD	C44-O41-C16	4.84	124.84	117.53
3	A	2000	MSD	C3-C2-C42	4.07	124.63	119.99
3	A	2000	MSD	C13-C12-C14	3.85	63.26	60.53
3	A	2000	MSD	C5-N8-C9	-3.72	126.59	130.75
3	A	2000	MSD	O41-C16-C15	3.43	119.15	115.54
3	A	2000	MSD	C2-C3-N4	-3.23	118.72	123.51
3	A	2000	MSD	C13-C14-C15	-3.13	116.03	122.21
3	A	2000	MSD	C12-N11-C9	-2.56	121.22	125.59
3	A	2000	MSD	C25-C23-C20	2.16	123.11	119.91
3	A	2000	MSD	O41-C16-C18	-2.06	120.84	124.37
3	A	2000	MSD	C2-C42-N43	-2.02	172.53	177.85
3	A	2000	MSD	C7-C2-C42	-2.01	116.64	119.99

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	2000	MSD	C14-C12-N11-C9
3	A	2000	MSD	C13-C14-C15-C21
3	A	2000	MSD	C18-C16-O41-C44
3	A	2000	MSD	C15-C16-O41-C44

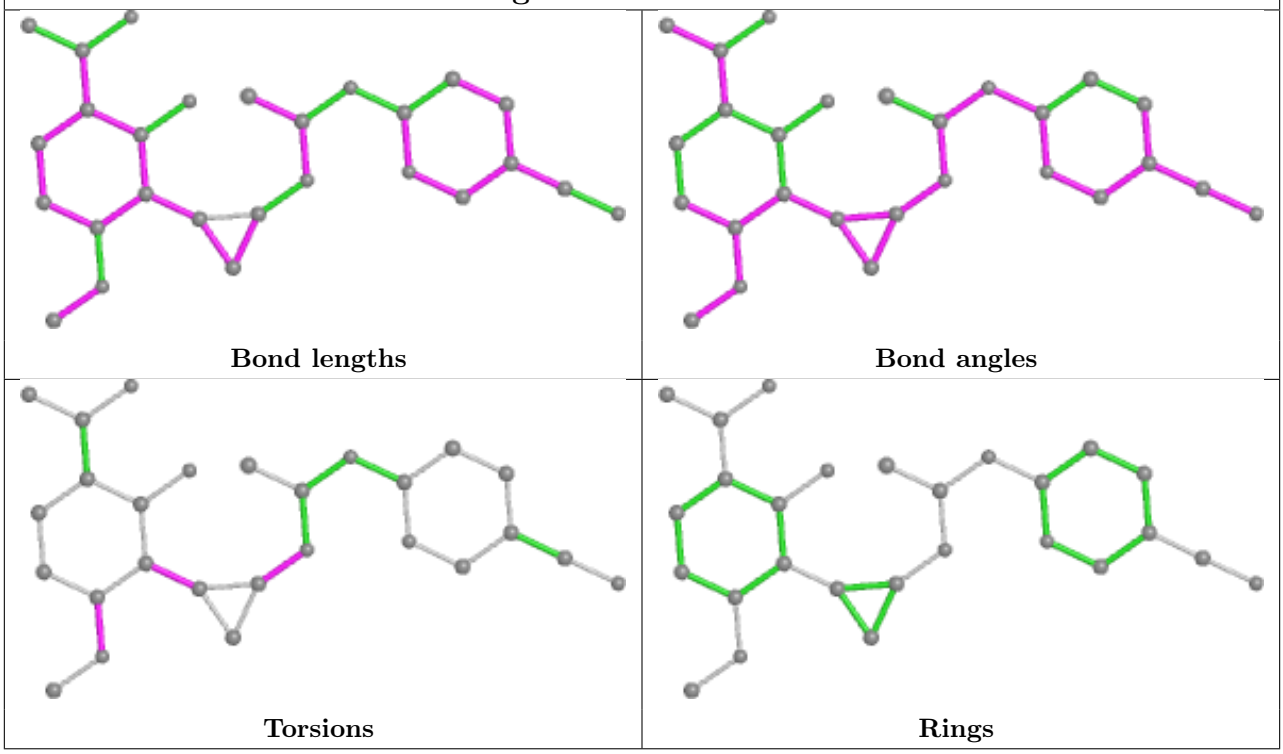
There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	2000	MSD	4	0

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

Ligand MSD A 2000



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	557/560 (99%)	-0.16	7 (1%)	77	51	20, 56, 92, 130	2 (0%)
2	B	405/427 (94%)	-0.38	2 (0%)	91	75	23, 49, 109, 133	9 (2%)
All	All	962/987 (97%)	-0.25	9 (0%)	84	63	20, 54, 105, 133	11 (1%)

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	222	GLN	2.6
2	B	1306	ASN	2.5
1	A	402	TRP	2.4
1	A	221	HIS	2.3
1	A	17	ASP	2.2
2	B	1067	ASP	2.1
1	A	491	LEU	2.0
1	A	103	ASN	2.0
1	A	20	LYS	2.0

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

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

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

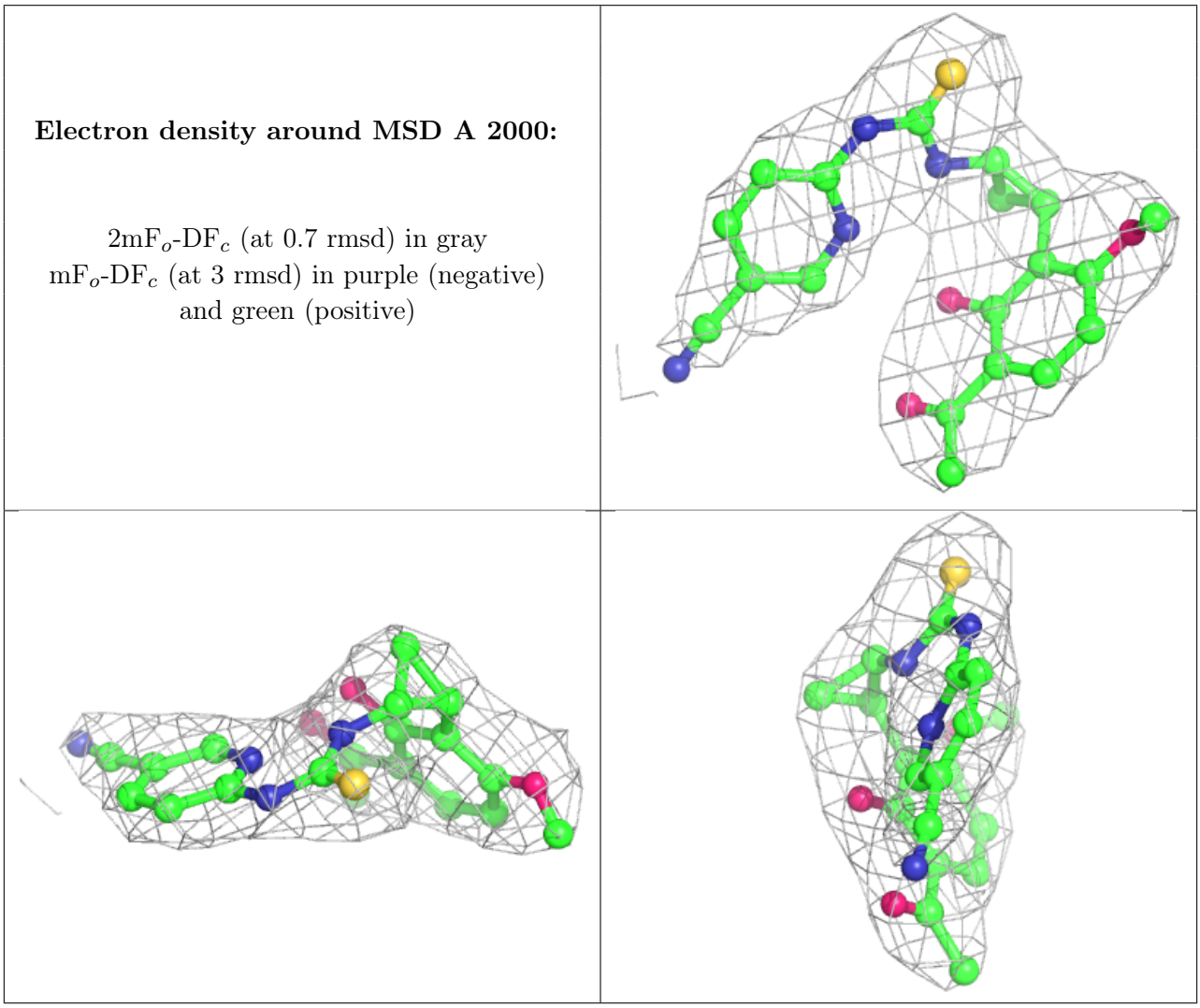
median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	MSD	A	2000	27/27	0.96	0.24	28,34,39,41	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around MSD A 2000:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.