Full wwPDB X-ray Structure Validation Report (i)

May 16, 2020 – 02:23 pm BST

PDB ID	:	1DTQ
Title	:	CRYSTAL STRUCTURE OF HIV-1 REVERSE TRANSCRIPTASE IN COMPLEX WITH PETT-1 (PETT131A94)
Authors	:	Ren, J.; Diprose, J.; Warren, J.; Esnouf, R.M.; Bird, L.E.; Ikemizu, S.; Slater, M.; Milton, J.; Balzarini, J.; Stuart, D.I.; Stammers, D.K.
Deposited on	:	2000-01-13
Resolution	:	2.80 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 (i) symbol.

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

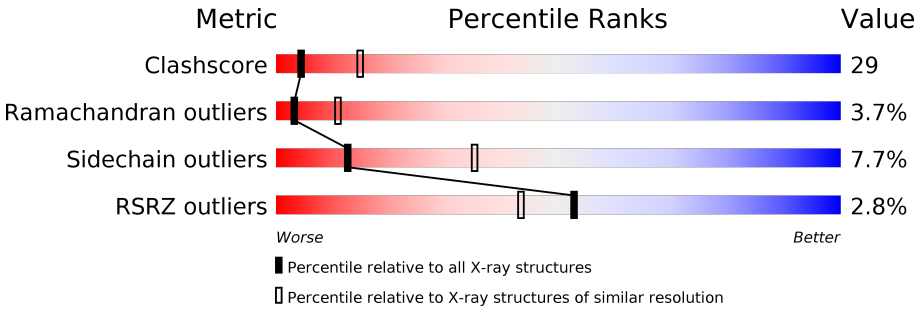
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.80 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% 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	3% 44% 42% 8% 6%
2	B	440	3% 48% 39% 5% 9%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	CSD	A	280	-	-	X	-

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 7687 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.

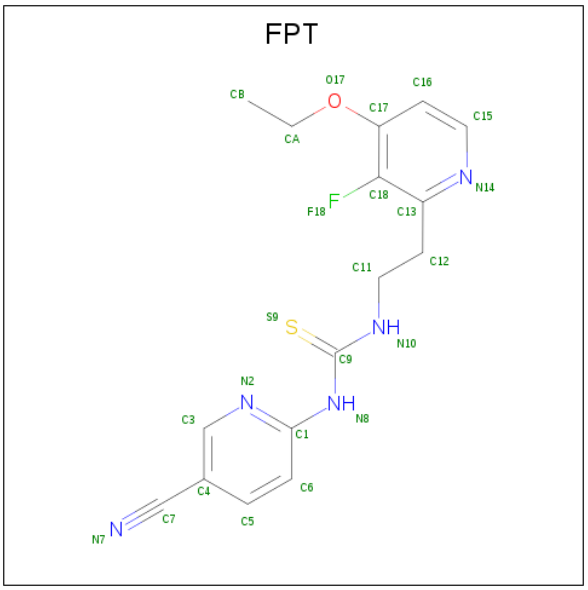
- Molecule 1 is a protein called HIV-1 RT A-CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	525	4310	2792	714	796	8	0	0	0

- Molecule 2 is a protein called HIV-1 RT B-CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	402	3327	2166	550	605	6	0	0	0

- Molecule 3 is N-[[3-FLUORO-4-ETHOXY-PYRID-2-YL]ETHYL]-N'-[5-NITRILOMETHYL-PYRIDYL]-THIOUREA (three-letter code: FPT) (formula: $C_{16}H_{16}FN_5OS$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	F	N	O	S		
3	A	1	24	16	1	5	1	1	0	0

- Molecule 4 is water.

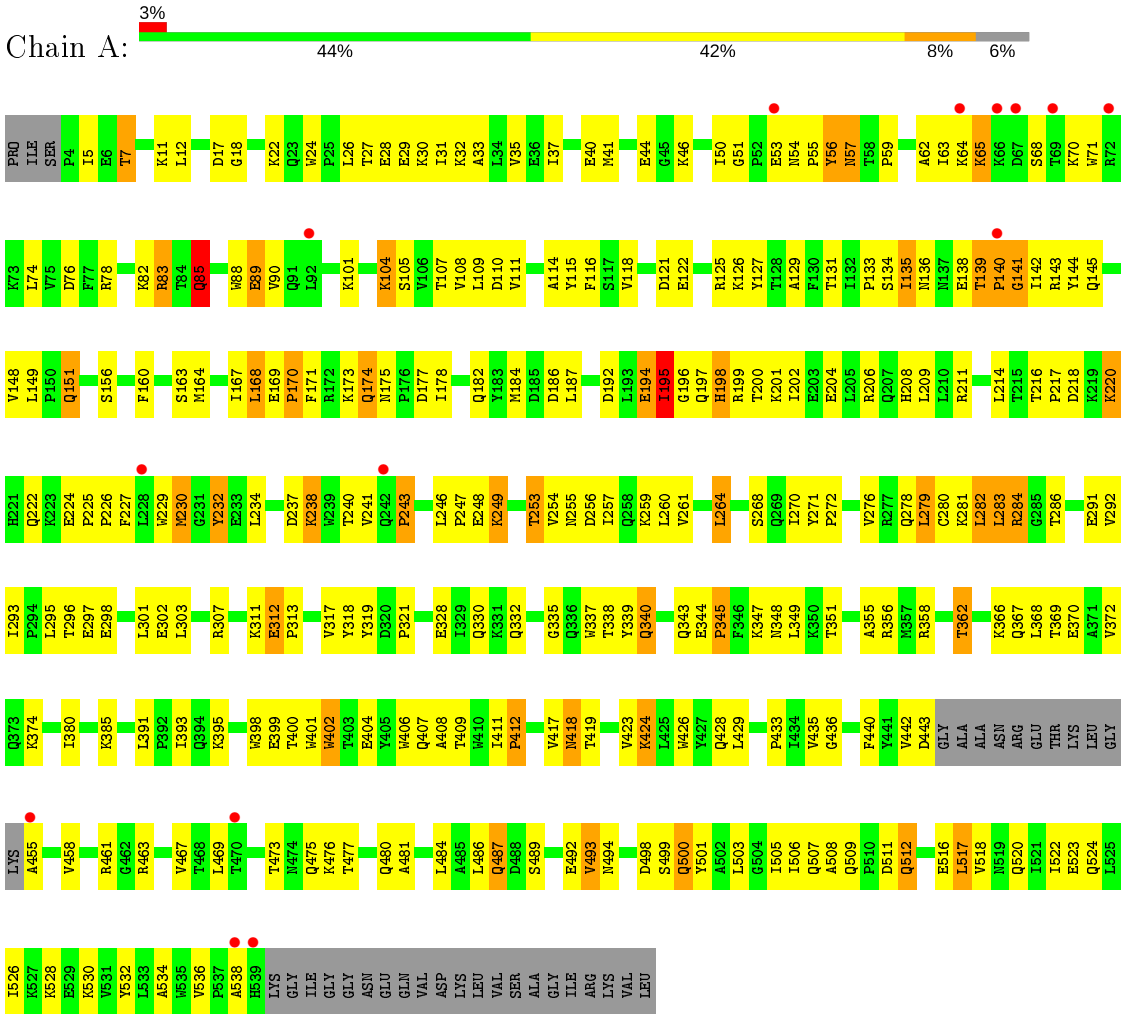
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	18	Total O 18 18	0	0
4	B	8	Total O 8 8	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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.

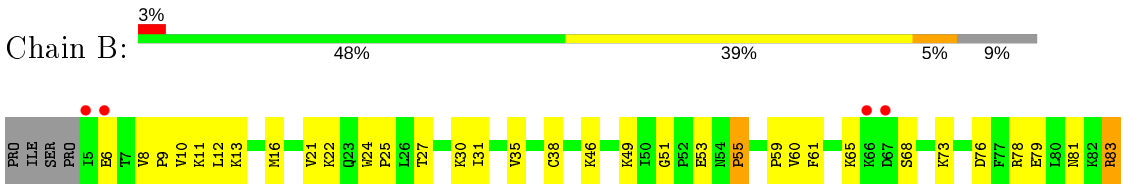
- Molecule 1: HIV-1 RT A-CHAIN

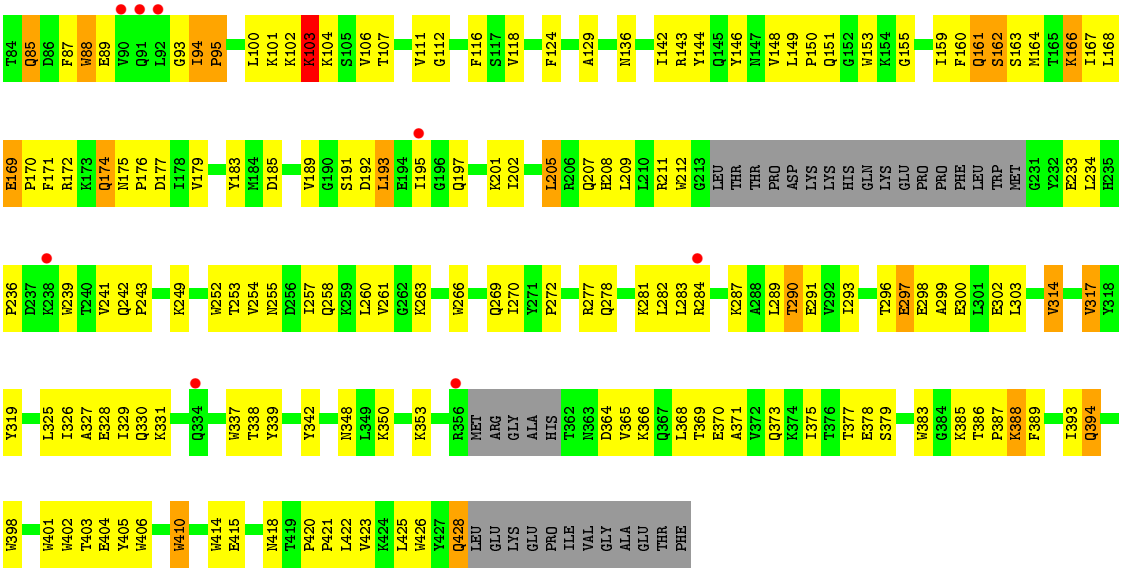
Chain A:



- Molecule 2: HIV-1 RT B-CHAIN

Chain B:




T84 Q85 D86 F87 W88 E89 V90 Q91 L92 G93 I94 P95 L100 K101 K102 K103 K104 S105 V106 T107 V111 G112 F116 S117 V118 F124 A129 N136 I142 R143 Y144 Q145 Y146 N147 V148 L149 P150 Q151 G152 W153 K154 G155 I159 F160 Q161 S162 S163 M164 T165 K166 I167 L168
E169 P170 F171 R172 K173 Q174 N175 P176 D177 I178 V179 Y183 M184 D185 V189 G190 S191 D192 L193 E194 I195 G196 Q197 K201 I202 L205 R206 Q207 H208 L209 L210 R211 W212 G213 LEU THR THR PRO ASP LYS LYS HIS GLN LYS GLU PRO PRO PHE LEU TRP MET G231 Y232 E233 L234 H235
P236 D237 K238 W239 T240 V241 Q242 P243 K249 W252 T253 V254 N255 D256 I257 Q258 K259 L260 V261 G262 K263 W266 Q269 I270 Y271 P272 R277 Q278 K281 L282 L283 R284 K287 A288 L289 T290 E291 V292 I293 T296 E297 E298 A299 E300 L301 E302 L303 V314 V317 Y318
Y319 L325 I326 A327 E328 I329 Q330 K331 Q334 W337 T338 Y339 Y342 N348 L349 K350 K353 R356 MET ARG GLY ALA HIS T362 N363 D364 V365 K366 Q367 L368 T369 E370 A371 V372 Q373 K374 I375 T376 T377 E378 S379 W383 G384 K385 T386 P387 K388 F389 I393 Q394
W398 W401 W402 T403 E404 Y405 W406 W410 W414 E415 N418 T419 P420 P421 L422 V423 K424 L425 W426 Y427 Q428 LEU GLU LYS GLU PRO ILE VAL GLY ALA GLU THR PHE

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	137.10Å 115.00Å 65.60Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.80 24.18 – 2.77	Depositor EDS
% Data completeness (in resolution range)	95.0 (30.00-2.80) 93.9 (24.18-2.77)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.43 (at 2.76Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.224 , 0.295 0.212 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å^2)	54.4	Xtriage
Anisotropy	0.108	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 74.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	7687	wwPDB-VP
Average B, all atoms (Å^2)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.76% 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: FPT, CSD

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	0.45	0/4416	0.66	1/6002 (0.0%)
2	B	0.45	0/3420	0.67	0/4646
All	All	0.45	0/7836	0.67	1/10648 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	141	GLY	N-CA-C	-5.16	100.20	113.10

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	4310	0	4342	272	0
2	B	3327	0	3355	179	0
3	A	24	0	16	1	0
4	A	18	0	0	3	0
4	B	8	0	0	2	0
All	All	7687	0	7713	442	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 29.

All (442) 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:139:THR:HB	1:A:140:PRO:HD2	1.21	1.11
1:A:408:ALA:HB1	2:B:364:ASP:HB3	1.36	1.04
1:A:337:TRP:HE1	1:A:367:GLN:HE21	1.06	1.02
1:A:139:THR:HB	1:A:140:PRO:CD	1.99	0.93
1:A:435:VAL:HG22	2:B:290:THR:HG21	1.55	0.87
2:B:393:ILE:HG12	2:B:394:GLN:H	1.40	0.86
2:B:94:ILE:HB	2:B:95:PRO:HA	1.55	0.86
1:A:57:ASN:HD22	1:A:143:ARG:HH12	1.25	0.85
1:A:237:ASP:HB2	1:A:238:LYS:HD3	1.58	0.84
1:A:57:ASN:HD22	1:A:143:ARG:NH1	1.74	0.83
2:B:270:ILE:O	2:B:272:PRO:HD3	1.78	0.82
1:A:400:THR:HG22	1:A:404:GLU:OE2	1.79	0.82
2:B:103:LYS:HB2	2:B:103:LYS:NZ	1.95	0.82
1:A:337:TRP:HE1	1:A:367:GLN:NE2	1.77	0.82
1:A:65:LYS:HB3	1:A:68:SER:HB3	1.62	0.81
2:B:161:GLN:HA	2:B:161:GLN:HE21	1.44	0.81
1:A:224:GLU:HB2	1:A:225:PRO:HD2	1.61	0.80
1:A:393:ILE:HB	1:A:423:VAL:HG22	1.63	0.80
1:A:280:CSD:C	1:A:281:LYS:N	2.45	0.80
1:A:395:LYS:HD3	1:A:395:LYS:H	1.48	0.79
1:A:12:LEU:HD11	1:A:127:TYR:CE1	2.20	0.77
1:A:343:GLN:HG3	1:A:349:LEU:HD11	1.65	0.77
2:B:13:LYS:HB2	2:B:16:MET:HG3	1.66	0.77
1:A:169:GLU:HB3	1:A:170:PRO:HD3	1.66	0.77
2:B:266:TRP:O	2:B:269:GLN:HG2	1.86	0.76
1:A:27:THR:HG22	1:A:29:GLU:H	1.52	0.74
2:B:22:LYS:HA	4:B:1016:HOH:O	1.88	0.74
2:B:163:SER:O	2:B:167:ILE:HG22	1.87	0.73
1:A:33:ALA:O	1:A:37:ILE:HG12	1.89	0.72
2:B:326:ILE:N	2:B:326:ILE:HD12	2.04	0.72
1:A:368:LEU:O	1:A:372:VAL:HG23	1.90	0.72
1:A:197:GLN:O	1:A:200:THR:HB	1.91	0.71
2:B:142:ILE:HD12	2:B:142:ILE:N	2.04	0.71
2:B:107:THR:O	2:B:189:VAL:HG22	1.91	0.71
2:B:31:ILE:O	2:B:35:VAL:HG23	1.90	0.71
2:B:239:TRP:CZ3	2:B:378:GLU:HG2	2.26	0.71
1:A:195:ILE:HD13	1:A:195:ILE:N	2.05	0.71
2:B:189:VAL:HG21	2:B:202:ILE:HD12	1.74	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:220:LYS:NZ	1:A:220:LYS:HB3	2.06	0.70
1:A:279:LEU:HD13	1:A:302:GLU:OE1	1.91	0.70
2:B:393:ILE:HG12	2:B:394:GLN:N	2.06	0.70
1:A:57:ASN:HA	1:A:129:ALA:O	1.91	0.70
2:B:242:GLN:HE21	2:B:353:LYS:HD3	1.55	0.70
1:A:406:TRP:CH2	2:B:418:ASN:HA	2.27	0.70
1:A:442:VAL:HB	1:A:481:ALA:HB1	1.73	0.69
2:B:388:LYS:C	2:B:388:LYS:HD3	2.12	0.69
1:A:11:LYS:O	1:A:85:GLN:HG2	1.93	0.69
1:A:65:LYS:HA	1:A:65:LYS:HE2	1.72	0.69
1:A:114:ALA:HB1	1:A:160:PHE:CE2	2.28	0.69
2:B:94:ILE:HB	2:B:95:PRO:CA	2.23	0.69
2:B:142:ILE:HD12	2:B:142:ILE:H	1.56	0.68
1:A:167:ILE:O	1:A:170:PRO:HD2	1.93	0.68
2:B:46:LYS:HE2	2:B:116:PHE:HB3	1.76	0.68
1:A:393:ILE:HB	1:A:423:VAL:CG2	2.24	0.68
1:A:253:THR:HG23	1:A:255:ASN:H	1.59	0.68
2:B:319:TYR:OH	2:B:385:LYS:HE2	1.93	0.68
1:A:164:MET:HG3	1:A:168:LEU:HD22	1.74	0.68
2:B:103:LYS:HB2	2:B:103:LYS:HZ3	1.58	0.67
1:A:56:TYR:O	1:A:143:ARG:NH2	2.27	0.67
2:B:79:GLU:HG3	2:B:83:ARG:HD3	1.75	0.67
1:A:428:GLN:HA	1:A:509:GLN:NE2	2.11	0.66
2:B:278:GLN:HB3	2:B:299:ALA:HA	1.76	0.66
1:A:264:LEU:HD23	1:A:276:VAL:HG12	1.77	0.66
1:A:110:ASP:O	1:A:217:PRO:HD3	1.95	0.66
1:A:27:THR:HB	1:A:30:LYS:HG3	1.76	0.66
2:B:371:ALA:O	2:B:375:ILE:HG13	1.95	0.66
1:A:195:ILE:H	1:A:195:ILE:HD13	1.59	0.66
1:A:395:LYS:CD	1:A:395:LYS:H	2.08	0.65
2:B:27:THR:OG1	2:B:30:LYS:HD3	1.96	0.65
2:B:103:LYS:HG2	2:B:191:SER:N	2.10	0.65
2:B:422:LEU:O	2:B:425:LEU:HB3	1.97	0.65
1:A:26:LEU:HB2	1:A:31:ILE:HD11	1.79	0.64
1:A:70:LYS:HG2	1:A:71:TRP:H	1.61	0.64
2:B:393:ILE:CG1	2:B:394:GLN:H	2.10	0.64
1:A:358:ARG:HD3	1:A:370:GLU:CD	2.17	0.64
1:A:296:THR:HG22	1:A:297:GLU:N	2.12	0.64
1:A:126:LYS:HE2	1:A:127:TYR:CZ	2.33	0.64
1:A:484:LEU:O	1:A:487:GLN:HB2	1.98	0.63
2:B:104:LYS:HB2	2:B:192:ASP:HA	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:277:ARG:O	2:B:281:LYS:HG3	1.98	0.63
1:A:281:LYS:HD2	1:A:284:ARG:NH1	2.14	0.63
1:A:46:LYS:HD3	1:A:116:PHE:CD2	2.34	0.63
1:A:337:TRP:CZ3	1:A:368:LEU:HD23	2.34	0.63
1:A:31:ILE:O	1:A:35:VAL:HG23	1.97	0.63
2:B:89:GLU:C	2:B:93:GLY:HA3	2.19	0.63
2:B:175:ASN:HD21	2:B:201:LYS:CE	2.13	0.62
1:A:30:LYS:HD3	1:A:62:ALA:HB3	1.81	0.62
1:A:195:ILE:HG12	1:A:196:GLY:H	1.65	0.62
1:A:517:LEU:HA	1:A:520:GLN:NE2	2.15	0.62
2:B:266:TRP:CZ3	2:B:426:TRP:HB3	2.35	0.61
1:A:418:ASN:HD22	1:A:418:ASN:C	2.02	0.61
1:A:356:ARG:HG3	1:A:356:ARG:HH11	1.65	0.61
1:A:412:PRO:HG3	2:B:401:TRP:CZ2	2.34	0.61
2:B:104:LYS:O	2:B:236:PRO:HD2	1.99	0.61
2:B:169:GLU:N	2:B:170:PRO:HD2	2.15	0.61
2:B:103:LYS:HG2	2:B:191:SER:CA	2.30	0.61
1:A:372:VAL:HG11	1:A:411:ILE:HG23	1.82	0.60
2:B:365:VAL:O	2:B:369:THR:HG23	2.01	0.60
1:A:362:THR:HG22	1:A:366:LYS:HD3	1.84	0.59
1:A:57:ASN:ND2	1:A:143:ARG:HH12	1.99	0.59
1:A:516:GLU:N	1:A:516:GLU:OE1	2.35	0.59
2:B:160:PHE:HD1	2:B:164:MET:HB2	1.67	0.59
1:A:59:PRO:HG2	1:A:76:ASP:HB3	1.83	0.59
1:A:279:LEU:O	1:A:282:LEU:HB2	2.03	0.59
2:B:350:LYS:HE2	2:B:378:GLU:OE1	2.03	0.59
1:A:340:GLN:HA	1:A:351:THR:HA	1.85	0.59
1:A:46:LYS:HD3	1:A:116:PHE:HD2	1.66	0.59
2:B:168:LEU:C	2:B:170:PRO:HD2	2.23	0.59
1:A:57:ASN:HB2	1:A:143:ARG:HH12	1.67	0.59
2:B:166:LYS:HA	2:B:166:LYS:HZ1	1.67	0.59
1:A:136:ASN:HB3	1:A:139:THR:HG21	1.85	0.58
1:A:469:LEU:N	1:A:469:LEU:HD23	2.19	0.58
1:A:332:GLN:HB2	1:A:338:THR:HG23	1.85	0.58
2:B:205:LEU:O	2:B:209:LEU:HG	2.04	0.58
1:A:380:ILE:HD12	2:B:27:THR:HG22	1.84	0.58
1:A:5:ILE:H	1:A:5:ILE:HD12	1.68	0.58
1:A:198:HIS:O	1:A:200:THR:N	2.36	0.58
1:A:114:ALA:O	1:A:118:VAL:HG23	2.03	0.57
2:B:205:LEU:HD22	2:B:209:LEU:HG	1.85	0.57
1:A:116:PHE:HA	1:A:148:VAL:HG21	1.85	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:348:ASN:ND2	1:A:351:THR:HG22	2.19	0.57
1:A:455:ALA:O	1:A:467:VAL:HG22	2.05	0.57
1:A:395:LYS:HD3	1:A:395:LYS:N	2.19	0.57
1:A:56:TYR:O	1:A:57:ASN:HB2	2.04	0.57
2:B:116:PHE:HD1	2:B:148:VAL:HG21	1.69	0.57
2:B:369:THR:O	2:B:373:GLN:HG3	2.04	0.57
1:A:37:ILE:O	1:A:41:MET:HG3	2.05	0.56
1:A:5:ILE:HD12	1:A:5:ILE:N	2.20	0.56
1:A:175:ASN:HB3	1:A:178:ILE:HG12	1.88	0.56
1:A:62:ALA:C	1:A:63:ILE:HD12	2.25	0.56
1:A:126:LYS:HE2	1:A:127:TYR:CE2	2.40	0.56
2:B:401:TRP:O	2:B:404:GLU:HB2	2.05	0.56
1:A:31:ILE:HD12	1:A:133:PRO:HB2	1.87	0.56
1:A:201:LYS:HD3	1:A:204:GLU:CD	2.25	0.56
1:A:335:GLY:O	1:A:355:ALA:HA	2.06	0.56
1:A:391:LEU:C	1:A:417:VAL:HG12	2.25	0.56
2:B:369:THR:HG22	2:B:398:TRP:CZ3	2.40	0.56
2:B:207:GLN:O	2:B:211:ARG:HG2	2.05	0.56
1:A:489:SER:HB2	1:A:493:VAL:HG13	1.87	0.56
2:B:278:GLN:HB3	2:B:299:ALA:CA	2.37	0.55
2:B:89:GLU:O	2:B:93:GLY:HA3	2.07	0.55
2:B:366:LYS:O	2:B:370:GLU:HG3	2.07	0.55
2:B:103:LYS:HG3	2:B:192:ASP:OD1	2.06	0.55
2:B:118:VAL:HB	2:B:149:LEU:HG	1.89	0.55
2:B:174:GLN:C	2:B:176:PRO:HD3	2.27	0.55
1:A:31:ILE:CD1	1:A:133:PRO:HB2	2.37	0.55
2:B:342:TYR:HB3	2:B:348:ASN:HA	1.89	0.55
2:B:193:LEU:HD23	2:B:197:GLN:HG2	1.88	0.54
2:B:420:PRO:HG2	2:B:423:VAL:CG2	2.37	0.54
1:A:26:LEU:HD12	1:A:133:PRO:HD2	1.89	0.54
2:B:172:ARG:O	2:B:176:PRO:HG3	2.07	0.54
2:B:420:PRO:HG2	2:B:423:VAL:HG23	1.90	0.54
2:B:65:LYS:HB2	2:B:68:SER:HB3	1.88	0.54
1:A:225:PRO:HA	1:A:226:PRO:C	2.28	0.54
1:A:401:TRP:HA	1:A:404:GLU:OE2	2.07	0.54
1:A:63:ILE:N	1:A:63:ILE:HD12	2.22	0.54
2:B:164:MET:O	2:B:167:ILE:HG23	2.08	0.54
2:B:171:PHE:HD1	2:B:208:HIS:ND1	2.06	0.54
2:B:61:PHE:CD2	2:B:403:THR:HG21	2.42	0.54
1:A:122:GLU:HA	1:A:125:ARG:HD2	1.90	0.54
1:A:115:TYR:O	1:A:149:LEU:HB2	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:170:PRO:O	1:A:173:LYS:HB3	2.08	0.54
1:A:296:THR:HG22	1:A:297:GLU:H	1.73	0.54
2:B:175:ASN:HD21	2:B:201:LYS:HE3	1.71	0.54
1:A:247:PRO:O	1:A:307:ARG:NH2	2.41	0.54
1:A:368:LEU:C	1:A:368:LEU:HD13	2.28	0.54
2:B:326:ILE:HD12	2:B:326:ILE:H	1.71	0.54
1:A:260:LEU:HD22	1:A:264:LEU:HD13	1.89	0.53
2:B:175:ASN:HD21	2:B:201:LYS:NZ	2.06	0.53
1:A:516:GLU:HG2	1:A:517:LEU:N	2.22	0.53
1:A:17:ASP:O	1:A:83:ARG:NE	2.41	0.53
1:A:253:THR:HG22	1:A:256:ASP:H	1.72	0.53
1:A:328:GLU:O	1:A:339:TYR:HA	2.08	0.53
1:A:63:ILE:HG22	1:A:64:LYS:N	2.22	0.53
2:B:423:VAL:HA	2:B:426:TRP:CE3	2.43	0.53
1:A:246:LEU:HB2	1:A:307:ARG:NH1	2.24	0.53
2:B:189:VAL:O	2:B:189:VAL:HG23	2.09	0.53
1:A:209:LEU:O	1:A:214:LEU:HB2	2.09	0.53
1:A:115:TYR:CD1	1:A:156:SER:HB3	2.44	0.52
1:A:312:GLU:HG2	1:A:312:GLU:O	2.09	0.52
1:A:348:ASN:ND2	1:A:351:THR:CG2	2.71	0.52
2:B:163:SER:O	2:B:166:LYS:HB3	2.07	0.52
1:A:260:LEU:HD13	1:A:264:LEU:HD22	1.92	0.52
1:A:424:LYS:NZ	1:A:426:TRP:CE3	2.76	0.52
2:B:284:ARG:O	2:B:287:LYS:NZ	2.42	0.52
2:B:328:GLU:O	2:B:339:TYR:HA	2.08	0.52
1:A:208:HIS:HA	1:A:211:ARG:HG3	1.92	0.52
1:A:206:ARG:NH1	1:A:218:ASP:HA	2.24	0.52
1:A:503:LEU:O	1:A:507:GLN:HG3	2.10	0.52
1:A:518:VAL:O	1:A:522:ILE:HG13	2.10	0.52
1:A:280:CSD:O	1:A:281:LYS:HA	2.10	0.52
1:A:440:PHE:CE1	1:A:489:SER:HB3	2.45	0.52
2:B:387:PRO:HG2	2:B:389:PHE:CE1	2.45	0.52
2:B:60:VAL:HG21	2:B:73:LYS:HZ1	1.75	0.51
1:A:280:CSD:C	1:A:281:LYS:CA	2.88	0.51
1:A:78:ARG:O	1:A:82:LYS:HG3	2.10	0.51
2:B:142:ILE:CD1	2:B:142:ILE:H	2.23	0.51
1:A:31:ILE:HG23	1:A:133:PRO:O	2.11	0.51
1:A:142:ILE:HD12	1:A:144:TYR:OH	2.10	0.51
1:A:253:THR:HG22	1:A:256:ASP:CG	2.30	0.51
2:B:388:LYS:CE	2:B:415:GLU:HB2	2.40	0.51
1:A:368:LEU:O	1:A:368:LEU:HD13	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:40:GLU:HG3	1:A:44:GLU:OE1	2.11	0.51
2:B:100:LEU:HB2	2:B:179:VAL:HG11	1.92	0.51
1:A:57:ASN:ND2	1:A:143:ARG:NH1	2.53	0.51
1:A:57:ASN:ND2	1:A:131:THR:OG1	2.44	0.51
2:B:326:ILE:HG22	2:B:327:ALA:N	2.26	0.51
2:B:314:VAL:O	2:B:317:VAL:HG22	2.11	0.50
1:A:337:TRP:NE1	1:A:367:GLN:HG2	2.27	0.50
2:B:9:PRO:HB2	4:B:1014:HOH:O	2.11	0.50
1:A:50:ILE:HD12	1:A:54:ASN:HB3	1.94	0.50
1:A:5:ILE:HG21	1:A:163:SER:HB3	1.93	0.50
2:B:166:LYS:HB2	2:B:166:LYS:HZ2	1.75	0.50
1:A:503:LEU:HD13	1:A:507:GLN:HG3	1.94	0.50
1:A:125:ARG:HB3	1:A:145:GLN:NE2	2.27	0.50
1:A:134:SER:HB3	1:A:141:GLY:N	2.27	0.50
1:A:151:GLN:H	1:A:151:GLN:CD	2.13	0.50
1:A:253:THR:HG22	1:A:256:ASP:OD2	2.11	0.50
2:B:208:HIS:HA	2:B:211:ARG:HG3	1.93	0.50
2:B:234:LEU:HD11	2:B:377:THR:CG2	2.42	0.50
1:A:28:GLU:O	1:A:32:LYS:HG3	2.11	0.50
1:A:344:GLU:O	1:A:347:LYS:HB2	2.12	0.50
1:A:399:GLU:O	1:A:402:TRP:HB3	2.12	0.50
2:B:49:LYS:HA	2:B:143:ARG:O	2.11	0.50
1:A:400:THR:O	1:A:404:GLU:HG3	2.12	0.49
1:A:317:VAL:HG22	1:A:318:TYR:H	1.76	0.49
2:B:142:ILE:N	2:B:142:ILE:CD1	2.74	0.49
1:A:412:PRO:HG3	2:B:401:TRP:CH2	2.48	0.49
1:A:428:GLN:HA	1:A:509:GLN:HE22	1.78	0.49
2:B:208:HIS:CD2	2:B:212:TRP:HZ3	2.30	0.49
2:B:263:LYS:HE3	2:B:426:TRP:HA	1.95	0.49
2:B:277:ARG:HG3	2:B:277:ARG:HH11	1.76	0.49
1:A:406:TRP:O	2:B:331:LYS:HB3	2.12	0.49
2:B:89:GLU:CA	2:B:93:GLY:HA3	2.43	0.49
1:A:260:LEU:CD1	1:A:264:LEU:HD22	2.42	0.49
2:B:151:GLN:CD	2:B:151:GLN:H	2.16	0.49
1:A:70:LYS:HG2	1:A:71:TRP:N	2.27	0.49
2:B:24:TRP:CD1	2:B:25:PRO:HD2	2.47	0.49
2:B:278:GLN:HB3	2:B:299:ALA:CB	2.43	0.49
1:A:164:MET:CG	1:A:182:GLN:HE21	2.25	0.48
2:B:189:VAL:HG21	2:B:202:ILE:CD1	2.42	0.48
1:A:40:GLU:HG2	4:A:1022:HOH:O	2.13	0.48
1:A:88:TRP:CE3	1:A:88:TRP:HA	2.48	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:325:LEU:HD21	2:B:383:TRP:CE3	2.48	0.48
1:A:458:VAL:O	1:A:458:VAL:HG23	2.14	0.48
1:A:307:ARG:O	1:A:311:LYS:HG3	2.14	0.48
2:B:162:SER:OG	2:B:163:SER:N	2.47	0.48
1:A:134:SER:HB3	1:A:140:PRO:HG2	1.95	0.48
1:A:126:LYS:HA	1:A:145:GLN:OE1	2.14	0.48
1:A:170:PRO:O	1:A:171:PHE:C	2.51	0.48
2:B:234:LEU:HD11	2:B:377:THR:HG21	1.95	0.48
2:B:388:LYS:HE2	2:B:415:GLU:HB2	1.96	0.48
1:A:131:THR:OG1	1:A:143:ARG:HG2	2.14	0.48
1:A:499:SER:HA	4:A:1013:HOH:O	2.13	0.48
2:B:174:GLN:C	2:B:174:GLN:HE21	2.16	0.48
2:B:326:ILE:CD1	2:B:326:ILE:N	2.75	0.47
1:A:475:GLN:HB3	1:A:501:TYR:CE2	2.48	0.47
2:B:239:TRP:CH2	2:B:378:GLU:HG2	2.49	0.47
1:A:337:TRP:HE1	1:A:367:GLN:HG2	1.78	0.47
1:A:429:LEU:H	1:A:509:GLN:HE21	1.62	0.47
2:B:175:ASN:ND2	2:B:201:LYS:CE	2.78	0.47
2:B:107:THR:HB	2:B:189:VAL:CG2	2.44	0.47
2:B:153:TRP:CZ2	2:B:155:GLY:HA3	2.48	0.47
2:B:169:GLU:OE1	2:B:170:PRO:HD3	2.15	0.47
2:B:278:GLN:CB	2:B:299:ALA:HA	2.42	0.47
1:A:492:GLU:CD	1:A:530:LYS:HE2	2.35	0.47
2:B:151:GLN:HB3	2:B:185:ASP:OD1	2.15	0.47
1:A:500:GLN:CD	1:A:500:GLN:H	2.18	0.47
2:B:21:VAL:HB	2:B:59:PRO:HD3	1.96	0.47
2:B:76:ASP:OD2	2:B:78:ARG:HB2	2.15	0.47
1:A:129:ALA:HB1	1:A:143:ARG:NH2	2.30	0.47
1:A:429:LEU:H	1:A:509:GLN:NE2	2.12	0.47
1:A:254:VAL:HG23	1:A:291:GLU:O	2.14	0.47
1:A:224:GLU:HA	1:A:227:PHE:CZ	2.50	0.47
2:B:330:GLN:HB2	2:B:338:THR:OG1	2.15	0.47
2:B:83:ARG:HG2	2:B:83:ARG:H	1.55	0.47
1:A:109:LEU:O	1:A:186:ASP:HA	2.15	0.46
1:A:206:ARG:HH12	1:A:218:ASP:HA	1.80	0.46
1:A:28:GLU:OE2	1:A:135:ILE:HG12	2.14	0.46
1:A:55:PRO:HG2	1:A:56:TYR:H	1.81	0.46
1:A:108:VAL:HA	1:A:187:LEU:O	2.15	0.46
1:A:374:LYS:HD3	1:A:374:LYS:C	2.36	0.46
1:A:151:GLN:NE2	1:A:151:GLN:H	2.12	0.46
1:A:225:PRO:HD3	1:A:227:PHE:CE2	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:511:ASP:OD1	1:A:512:GLN:HG2	2.15	0.46
2:B:253:THR:O	2:B:257:ILE:HG12	2.16	0.46
1:A:220:LYS:HZ3	1:A:220:LYS:HB3	1.77	0.46
1:A:27:THR:HG22	1:A:29:GLU:HB3	1.97	0.46
1:A:280:CSD:C	1:A:281:LYS:HA	2.44	0.46
1:A:291:GLU:HG2	1:A:293:ILE:HD12	1.96	0.46
1:A:332:GLN:HG2	1:A:332:GLN:O	2.16	0.46
1:A:522:ILE:O	1:A:526:ILE:HG13	2.15	0.46
2:B:102:LYS:O	2:B:104:LYS:N	2.43	0.46
1:A:435:VAL:CG2	2:B:290:THR:HG21	2.37	0.46
1:A:234:LEU:HD12	3:A:999:FPT:HB1	1.97	0.46
1:A:18:GLY:HA3	1:A:56:TYR:CD1	2.51	0.46
2:B:160:PHE:CD1	2:B:164:MET:HB2	2.50	0.46
2:B:254:VAL:HG23	2:B:291:GLU:O	2.16	0.46
1:A:136:ASN:HB3	1:A:139:THR:CG2	2.44	0.46
2:B:104:LYS:CB	2:B:192:ASP:HA	2.46	0.46
1:A:270:ILE:O	1:A:272:PRO:HD3	2.16	0.46
1:A:477:THR:O	1:A:480:GLN:HB3	2.15	0.46
1:A:101:LYS:HG2	1:A:321:PRO:HD3	1.97	0.46
1:A:198:HIS:C	1:A:200:THR:N	2.69	0.46
1:A:344:GLU:O	1:A:347:LYS:N	2.35	0.46
2:B:183:TYR:OH	2:B:386:THR:HG23	2.16	0.46
1:A:469:LEU:HD23	1:A:469:LEU:H	1.81	0.45
2:B:81:ASN:OD1	2:B:153:TRP:HA	2.16	0.45
1:A:500:GLN:N	1:A:500:GLN:OE1	2.49	0.45
2:B:100:LEU:O	2:B:102:LYS:N	2.49	0.45
1:A:369:THR:O	1:A:372:VAL:HB	2.16	0.45
1:A:494:ASN:OD1	1:A:532:TYR:HB3	2.16	0.45
2:B:365:VAL:HG11	2:B:401:TRP:HB2	1.98	0.45
1:A:107:THR:OG1	1:A:202:ILE:HD12	2.17	0.45
2:B:166:LYS:O	2:B:169:GLU:HG3	2.16	0.45
1:A:54:ASN:ND2	1:A:126:LYS:HB2	2.31	0.45
1:A:88:TRP:O	1:A:89:GLU:HB2	2.17	0.45
1:A:169:GLU:HB3	1:A:170:PRO:CD	2.40	0.45
2:B:146:TYR:CD2	2:B:150:PRO:HB3	2.52	0.45
2:B:406:TRP:HZ2	2:B:410:TRP:O	1.99	0.45
1:A:201:LYS:HA	1:A:204:GLU:HG3	1.99	0.44
1:A:257:ILE:O	1:A:261:VAL:HG23	2.17	0.44
2:B:146:TYR:CG	2:B:150:PRO:HB3	2.52	0.44
1:A:65:LYS:HB3	1:A:68:SER:CB	2.41	0.44
2:B:12:LEU:HD12	2:B:124:PHE:CE1	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:VAL:C	1:A:109:LEU:HD12	2.38	0.44
1:A:182:GLN:HB3	4:A:1026:HOH:O	2.17	0.44
1:A:291:GLU:HG2	1:A:293:ILE:CD1	2.47	0.44
1:A:64:LYS:HG2	1:A:70:LYS:O	2.18	0.44
2:B:249:LYS:HG3	2:B:252:TRP:CE2	2.52	0.44
1:A:319:TYR:OH	1:A:385:LYS:HE2	2.18	0.44
1:A:198:HIS:C	1:A:200:THR:H	2.20	0.44
2:B:168:LEU:O	2:B:172:ARG:HG3	2.17	0.44
2:B:282:LEU:HD22	2:B:293:ILE:CG2	2.48	0.44
2:B:296:THR:O	2:B:299:ALA:N	2.51	0.44
2:B:388:LYS:C	2:B:388:LYS:CD	2.86	0.44
2:B:402:TRP:CE2	2:B:403:THR:HG23	2.52	0.44
1:A:296:THR:CG2	1:A:297:GLU:N	2.80	0.44
1:A:46:LYS:HE2	1:A:116:PHE:HB3	1.99	0.44
2:B:255:ASN:O	2:B:258:GLN:HB2	2.18	0.44
1:A:406:TRP:CE3	1:A:407:GLN:N	2.86	0.43
1:A:65:LYS:CA	1:A:65:LYS:HE2	2.45	0.43
2:B:38:CYS:SG	2:B:73:LYS:NZ	2.76	0.43
1:A:160:PHE:HE1	1:A:184:MET:O	2.01	0.43
1:A:174:GLN:HB2	1:A:174:GLN:HE21	1.52	0.43
1:A:505:ILE:O	1:A:508:ALA:HB3	2.18	0.43
2:B:103:LYS:O	2:B:191:SER:O	2.36	0.43
1:A:88:TRP:HE3	1:A:88:TRP:HA	1.83	0.43
1:A:22:LYS:NZ	1:A:24:TRP:HA	2.34	0.43
1:A:408:ALA:HB2	2:B:337:TRP:HH2	1.84	0.43
1:A:469:LEU:N	1:A:469:LEU:CD2	2.82	0.43
2:B:87:PHE:O	2:B:89:GLU:N	2.52	0.43
1:A:248:GLU:O	1:A:248:GLU:HG3	2.19	0.43
1:A:7:THR:HG21	1:A:121:ASP:HA	2.00	0.43
2:B:379:SER:CB	2:B:387:PRO:HD3	2.48	0.43
1:A:283:LEU:O	1:A:286:THR:HG23	2.20	0.42
1:A:280:CSD:O	1:A:281:LYS:CA	2.68	0.42
1:A:246:LEU:HD12	1:A:307:ARG:HG2	2.01	0.42
1:A:356:ARG:HG3	1:A:356:ARG:NH1	2.32	0.42
1:A:293:ILE:HD12	1:A:293:ILE:N	2.34	0.42
1:A:486:LEU:HD13	1:A:524:GLN:HB2	2.01	0.42
2:B:103:LYS:NZ	2:B:103:LYS:CB	2.77	0.42
2:B:175:ASN:ND2	2:B:201:LYS:HE3	2.34	0.42
1:A:253:THR:HG23	1:A:254:VAL:N	2.35	0.42
1:A:298:GLU:HA	1:A:301:LEU:HB2	2.02	0.42
1:A:429:LEU:HD11	1:A:506:ILE:HG22	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:51:GLY:C	1:A:53:GLU:H	2.21	0.42
2:B:94:ILE:HG12	2:B:161:GLN:OE1	2.19	0.42
1:A:187:LEU:HA	1:A:187:LEU:HD23	1.73	0.42
1:A:229:TRP:O	1:A:230:MET:C	2.58	0.42
1:A:330:GLN:NE2	1:A:340:GLN:OE1	2.53	0.42
1:A:232:TYR:CD1	1:A:232:TYR:N	2.87	0.42
1:A:401:TRP:CH2	1:A:409:THR:HG21	2.55	0.42
1:A:104:LYS:CB	1:A:192:ASP:HA	2.49	0.42
1:A:195:ILE:CD1	1:A:195:ILE:N	2.74	0.42
1:A:253:THR:HG23	1:A:255:ASN:N	2.31	0.42
2:B:278:GLN:HB3	2:B:299:ALA:HB2	2.02	0.42
2:B:51:GLY:HA3	2:B:53:GLU:OE1	2.19	0.42
1:A:344:GLU:CB	1:A:347:LYS:HD2	2.50	0.42
2:B:169:GLU:N	2:B:170:PRO:CD	2.81	0.42
2:B:175:ASN:N	2:B:176:PRO:HD3	2.35	0.42
2:B:284:ARG:HH11	2:B:284:ARG:HG3	1.84	0.42
1:A:194:GLU:O	1:A:195:ILE:C	2.58	0.42
1:A:247:PRO:HB2	1:A:249:LYS:HG2	2.01	0.42
1:A:282:LEU:HA	1:A:282:LEU:HD12	1.92	0.42
1:A:63:ILE:HG22	1:A:64:LYS:H	1.85	0.42
2:B:257:ILE:O	2:B:260:LEU:HB3	2.19	0.42
2:B:296:THR:O	2:B:298:GLU:N	2.53	0.42
1:A:138:GLU:O	1:A:139:THR:HG23	2.20	0.41
1:A:279:LEU:CD1	1:A:279:LEU:N	2.83	0.41
1:A:104:LYS:HA	1:A:104:LYS:HZ2	1.86	0.41
1:A:417:VAL:O	1:A:419:THR:N	2.52	0.41
1:A:136:ASN:OD1	1:A:139:THR:HG23	2.20	0.41
1:A:356:ARG:HE	1:A:358:ARG:NH1	2.18	0.41
2:B:263:LYS:HG3	2:B:426:TRP:CD1	2.56	0.41
2:B:16:MET:HE3	2:B:83:ARG:HA	2.02	0.41
1:A:417:VAL:O	1:A:417:VAL:HG13	2.20	0.41
1:A:54:ASN:OD1	1:A:56:TYR:HB2	2.20	0.41
2:B:241:VAL:O	2:B:243:PRO:HD3	2.20	0.41
2:B:296:THR:O	2:B:297:GLU:C	2.59	0.41
1:A:317:VAL:HG22	1:A:318:TYR:N	2.36	0.41
1:A:516:GLU:O	1:A:517:LEU:C	2.58	0.41
2:B:166:LYS:NZ	2:B:166:LYS:CB	2.84	0.41
1:A:164:MET:HB3	1:A:182:GLN:HE21	1.85	0.41
1:A:253:THR:HA	1:A:292:VAL:HA	2.02	0.41
1:A:28:GLU:OE2	1:A:135:ILE:HG23	2.21	0.41
2:B:428:GLN:C	2:B:428:GLN:NE2	2.74	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:53:GLU:O	2:B:55:PRO:HD3	2.21	0.41
1:A:12:LEU:HD11	1:A:127:TYR:CD1	2.55	0.41
1:A:27:THR:CG2	1:A:29:GLU:HB3	2.50	0.41
1:A:433:PRO:HA	1:A:532:TYR:CG	2.55	0.41
2:B:160:PHE:O	2:B:161:GLN:C	2.59	0.41
2:B:166:LYS:CA	2:B:166:LYS:HZ1	2.33	0.41
2:B:257:ILE:O	2:B:261:VAL:HG23	2.21	0.41
2:B:379:SER:HA	2:B:383:TRP:CE3	2.56	0.41
1:A:111:VAL:O	1:A:111:VAL:HG23	2.20	0.41
1:A:520:GLN:O	1:A:523:GLU:HB3	2.21	0.41
2:B:175:ASN:C	2:B:177:ASP:H	2.24	0.41
2:B:201:LYS:HD3	2:B:201:LYS:HA	1.81	0.41
1:A:240:THR:OG1	1:A:241:VAL:N	2.53	0.41
1:A:271:TYR:OH	1:A:313:PRO:HA	2.21	0.41
1:A:436:GLY:O	1:A:461:ARG:NH2	2.53	0.41
1:A:473:THR:H	1:A:476:LYS:HB3	1.85	0.41
2:B:106:VAL:HG13	2:B:189:VAL:C	2.41	0.41
2:B:11:LYS:O	2:B:85:GLN:HG2	2.20	0.41
1:A:32:LYS:CG	1:A:135:ILE:HD11	2.51	0.41
1:A:278:GLN:HA	1:A:278:GLN:NE2	2.36	0.41
2:B:153:TRP:CH2	2:B:155:GLY:HA3	2.56	0.41
2:B:161:GLN:O	2:B:164:MET:HB3	2.22	0.41
2:B:299:ALA:O	2:B:302:GLU:N	2.54	0.41
1:A:532:TYR:CE2	1:A:534:ALA:HB2	2.56	0.40
1:A:281:LYS:O	1:A:284:ARG:HG3	2.20	0.40
1:A:398:TRP:CE2	1:A:411:ILE:HD12	2.56	0.40
2:B:329:ILE:HG22	2:B:330:GLN:N	2.36	0.40
2:B:16:MET:CE	2:B:83:ARG:HA	2.52	0.40
2:B:8:VAL:HG11	2:B:159:ILE:HG12	2.03	0.40
1:A:498:ASP:HA	1:A:536:VAL:O	2.20	0.40
2:B:129:ALA:HA	2:B:144:TYR:O	2.20	0.40
1:A:282:LEU:HD21	1:A:295:LEU:HD22	2.02	0.40
1:A:473:THR:HB	1:A:476:LYS:HB2	2.02	0.40
2:B:111:VAL:O	2:B:112:GLY:C	2.60	0.40
2:B:142:ILE:CG2	2:B:144:TYR:CE2	3.04	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 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	519/560 (93%)	451 (87%)	47 (9%)	21 (4%)	3 9
2	B	396/440 (90%)	342 (86%)	41 (10%)	13 (3%)	4 13
All	All	915/1000 (92%)	793 (87%)	88 (10%)	34 (4%)	3 11

All (34) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	90	VAL
1	A	140	PRO
1	A	195	ILE
1	A	402	TRP
1	A	412	PRO
1	A	538	ALA
2	B	94	ILE
2	B	95	PRO
1	A	199	ARG
1	A	345	PRO
2	B	101	LYS
2	B	297	GLU
1	A	222	GLN
1	A	230	MET
1	A	528	LYS
2	B	85	GLN
2	B	88	TRP
2	B	103	LYS
2	B	136	ASN
2	B	162	SER
2	B	193	LEU
2	B	233	GLU
1	A	56	TYR
1	A	57	ASN
1	A	139	THR

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Mol	Chain	Res	Type
1	A	198	HIS
1	A	243	PRO
1	A	487	GLN
1	A	170	PRO
1	A	85	GLN
1	A	135	ILE
1	A	268	SER
2	B	195	ILE
2	B	421	PRO

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	473/499 (95%)	433 (92%)	40 (8%)	10 31
2	B	366/400 (92%)	341 (93%)	25 (7%)	16 42
All	All	839/899 (93%)	774 (92%)	65 (8%)	13 35

All (65) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	THR
1	A	65	LYS
1	A	74	LEU
1	A	83	ARG
1	A	85	GLN
1	A	89	GLU
1	A	104	LYS
1	A	105	SER
1	A	151	GLN
1	A	168	LEU
1	A	174	GLN
1	A	177	ASP
1	A	194	GLU
1	A	195	ILE

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Mol	Chain	Res	Type
1	A	216	THR
1	A	220	LYS
1	A	232	TYR
1	A	238	LYS
1	A	243	PRO
1	A	249	LYS
1	A	253	THR
1	A	259	LYS
1	A	264	LEU
1	A	279	LEU
1	A	282	LEU
1	A	283	LEU
1	A	284	ARG
1	A	303	LEU
1	A	312	GLU
1	A	340	GLN
1	A	345	PRO
1	A	362	THR
1	A	418	ASN
1	A	424	LYS
1	A	443	ASP
1	A	463	ARG
1	A	493	VAL
1	A	500	GLN
1	A	512	GLN
1	A	517	LEU
2	B	6	GLU
2	B	10	VAL
2	B	55	PRO
2	B	83	ARG
2	B	88	TRP
2	B	103	LYS
2	B	161	GLN
2	B	166	LYS
2	B	169	GLU
2	B	174	GLN
2	B	205	LEU
2	B	283	LEU
2	B	289	LEU
2	B	290	THR
2	B	300	GLU
2	B	303	LEU

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Mol	Chain	Res	Type
2	B	314	VAL
2	B	317	VAL
2	B	368	LEU
2	B	388	LYS
2	B	394	GLN
2	B	405	TYR
2	B	410	TRP
2	B	414	TRP
2	B	428	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	147	ASN
1	A	151	GLN
1	A	174	GLN
1	A	182	GLN
1	A	197	GLN
1	A	207	GLN
1	A	222	GLN
1	A	278	GLN
1	A	348	ASN
1	A	367	GLN
1	A	418	ASN
1	A	475	GLN
1	A	509	GLN
1	A	512	GLN
1	A	520	GLN
2	B	57	ASN
2	B	91	GLN
2	B	137	ASN
2	B	147	ASN
2	B	161	GLN
2	B	174	GLN
2	B	175	ASN
2	B	197	GLN
2	B	242	GLN
2	B	255	ASN
2	B	269	GLN
2	B	336	GLN
2	B	428	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue 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	$\#\|Z\| > 2$
1	CSD	A	280	1	3,7,8	0.75	0	1,8,10	5.84	1 (100%)

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
1	CSD	A	280	1	-	2/2/6/8	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	280	CSD	OD1-SG-CB	5.84	116.65	105.54

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	280	CSD	N-CA-CB-SG
1	A	280	CSD	CA-CB-SG-OD1

There are no ring outliers.

1 monomer is involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	280	CSD	5	0

5.5 Carbohydrates (i)

There are no carbohydrates in this entry.

5.6 Ligand geometry (i)

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	FPT	A	999	-	25,25,25	1.58	6 (24%)	29,32,32	1.92	9 (31%)

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	FPT	A	999	-	-	9/15/15/15	0/2/2/2

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	999	FPT	C13-N14	3.25	1.38	1.34
3	A	999	FPT	C17-C18	2.86	1.42	1.39
3	A	999	FPT	C1-N2	2.64	1.39	1.34
3	A	999	FPT	C18-C13	2.40	1.42	1.38
3	A	999	FPT	C1-N8	-2.39	1.35	1.40
3	A	999	FPT	C9-N8	-2.06	1.31	1.35

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	999	FPT	C15-N14-C13	4.06	122.91	117.81
3	A	999	FPT	C16-C15-N14	-3.72	119.34	123.96
3	A	999	FPT	C3-N2-C1	3.69	121.56	117.82
3	A	999	FPT	C4-C3-N2	-3.16	118.83	123.51
3	A	999	FPT	O17-C17-C18	3.09	120.61	115.89
3	A	999	FPT	O17-C17-C16	-2.83	117.85	123.97
3	A	999	FPT	N8-C1-N2	2.45	122.67	115.06
3	A	999	FPT	C6-C1-N8	-2.29	116.22	123.06
3	A	999	FPT	C16-C17-C18	2.27	121.29	117.72

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	999	FPT	N2-C1-N8-C9
3	A	999	FPT	C6-C1-N8-C9
3	A	999	FPT	S9-C9-N8-C1
3	A	999	FPT	N10-C9-N8-C1
3	A	999	FPT	N8-C9-N10-C11
3	A	999	FPT	S9-C9-N10-C11
3	A	999	FPT	N10-C11-C12-C13
3	A	999	FPT	C18-C17-O17-CA
3	A	999	FPT	C16-C17-O17-CA

There are no ring outliers.

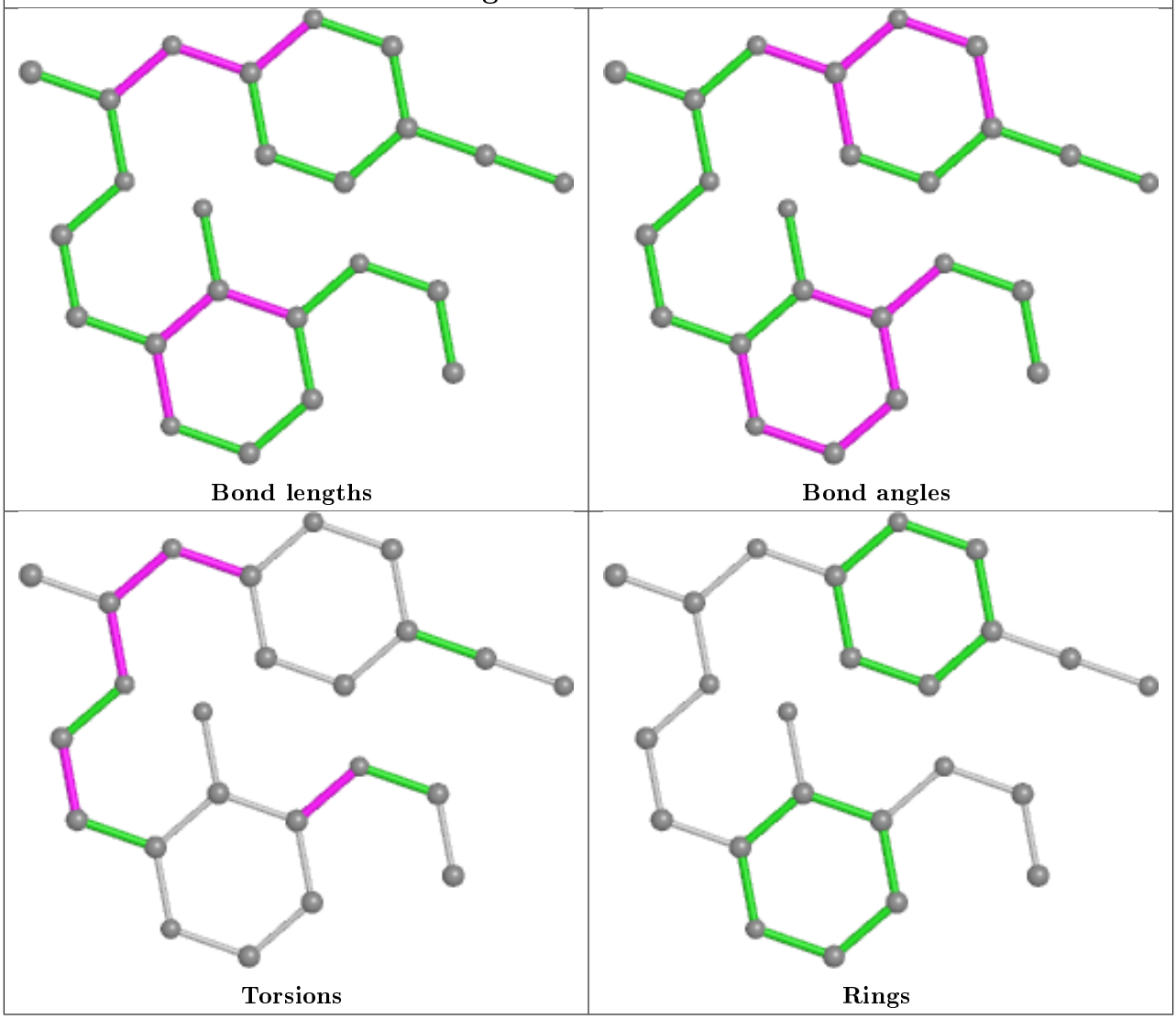
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	999	FPT	1	0

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

equivalents in the CSD to analyse the geometry.

Ligand FPT A 999



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	280:CSD	C	281:LYS	N	2.45

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	524/560 (93%)	-0.19	14 (2%) 54 44	23, 62, 104, 140	0
2	B	402/440 (91%)	-0.30	12 (2%) 50 40	26, 57, 103, 144	0
All	All	926/1000 (92%)	-0.23	26 (2%) 53 43	23, 59, 104, 144	0

All (26) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	5	ILE	7.9
1	A	67	ASP	6.4
2	B	92	LEU	5.1
2	B	91	GLN	5.0
2	B	90	VAL	4.3
1	A	140	PRO	3.0
1	A	64	LYS	3.0
1	A	53	GLU	2.9
2	B	67	ASP	2.8
1	A	228	LEU	2.8
1	A	455	ALA	2.7
1	A	66	LYS	2.6
2	B	195	ILE	2.6
2	B	66	LYS	2.5
2	B	356	ARG	2.5
2	B	284	ARG	2.5
1	A	69	THR	2.4
1	A	470	THR	2.4
1	A	539	HIS	2.4
1	A	538	ALA	2.3
1	A	242	GLN	2.2
1	A	92	LEU	2.2
2	B	238	LYS	2.1
2	B	334	GLN	2.0

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Mol	Chain	Res	Type	RSRZ
2	B	6	GLU	2.0
1	A	72	ARG	2.0

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

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	CSD	A	280	8/9	0.94	0.17	39,49,63,63	0

6.3 Carbohydrates (i)

There are no carbohydrates in this entry.

6.4 Ligands (i)

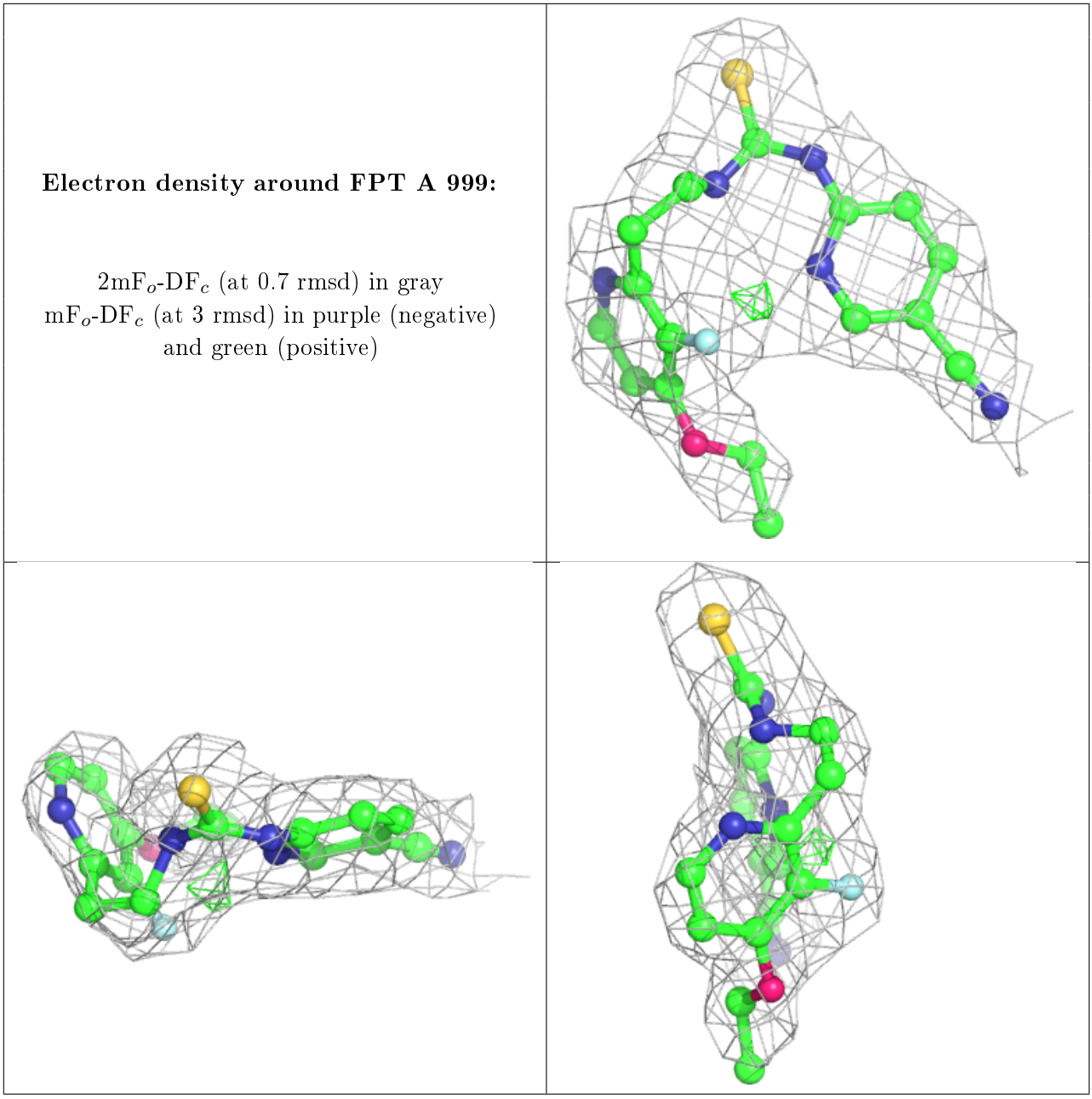
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	FPT	A	999	24/24	0.94	0.19	36,45,66,67	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 FPT A 999:

$2mF_o$-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.