



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 23, 2024 – 04:01 PM EDT

PDB ID : 1FKO  
Title : CRYSTAL STRUCTURE OF NNRTI RESISTANT K103N MUTANT HIV-1 REVERSE TRANSCRIPTASE IN COMPLEX WITH DMP-266(EFAVIRENZ)  
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Deposited on : 2000-08-10  
Resolution : 2.90 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 1.20.1  
EDS : 3.0  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.003 (Gargrove)  
Density-Fitness : 1.0.11  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

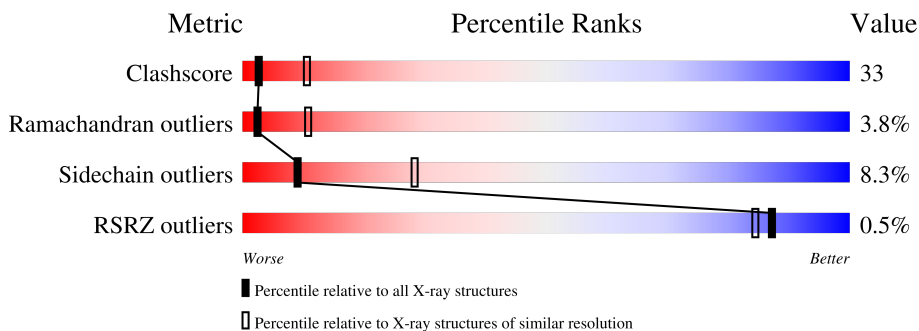
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.90 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	180529	2564 (2.90-2.90)
Ramachandran outliers	177936	2514 (2.90-2.90)
Sidechain outliers	177891	2516 (2.90-2.90)
RSRZ outliers	164620	2337 (2.90-2.90)

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  $\geq 3$ , 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  $\leq 5\%$ . 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	543	 39% 53% 7%
2	B	440	 41% 44% 6% 8%

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 7777 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	543	4434	2867	739	820	8	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	103	ASN	LEU	engineered mutation	UNP P04585

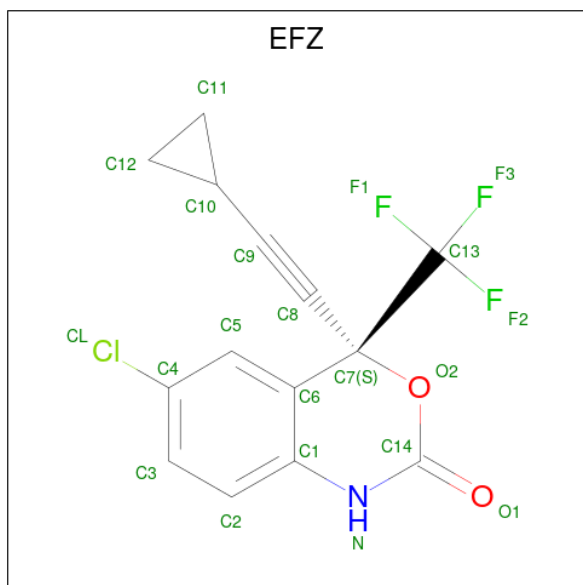
- Molecule 2 is a protein called HIV-1 RT, B-CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	403	3322	2157	554	604	7	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	103	ASN	LEU	engineered mutation	UNP P04585

- Molecule 3 is (-)-6-CHLORO-4-CYCLOPROPYLETHYNYL-4-TRIFLUOROMETHYL-1,4-DIHYDRO-2H-3,1-BENZOXAZIN-2-ONE (three-letter code: EFZ) (formula: C<sub>14</sub>H<sub>9</sub>ClF<sub>3</sub>NO<sub>2</sub>).

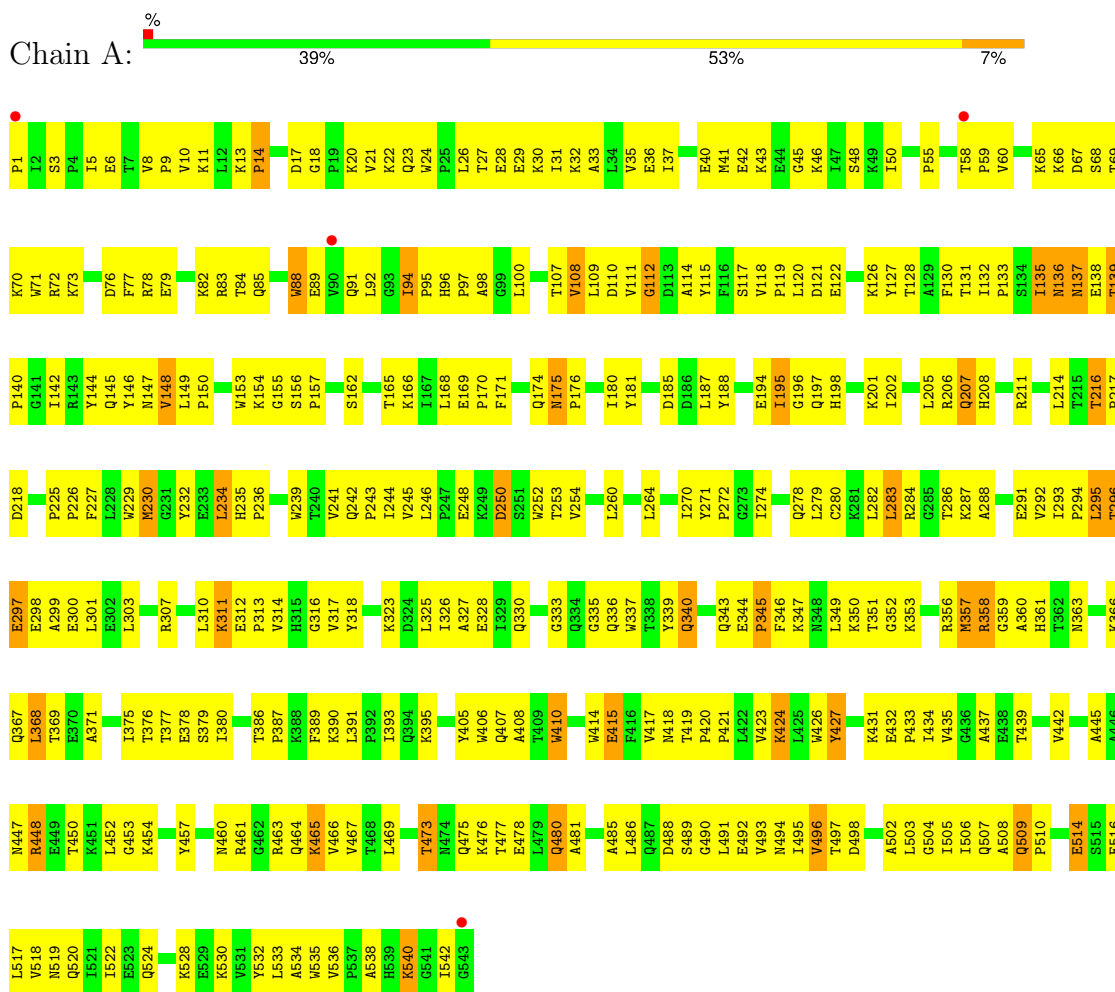


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	Cl	F	N			O
3	A	1	21	14	1	3	1	2	0	0

### 3 Residue-property plots i

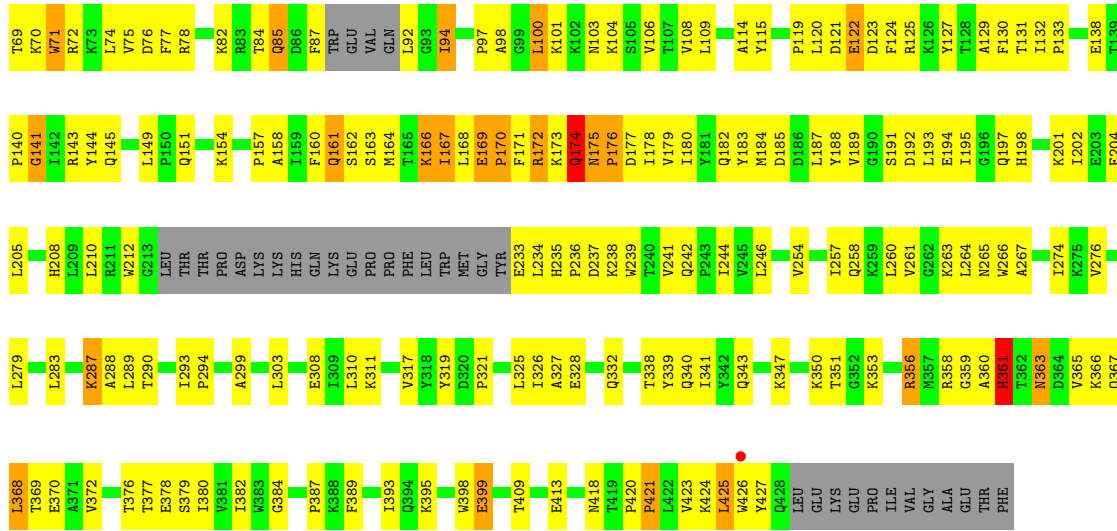
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: HIV-1 RT, A-CHAIN



- Molecule 2: HIV-1 RT, B-CHAIN





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	140.30Å 109.70Å 74.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.90 30.00 – 2.90	Depositor EDS
% Data completeness (in resolution range)	89.2 (30.00-2.90) 89.2 (30.00-2.90)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.77 (at 2.85Å)	Xtrriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.205 , 0.287 0.202 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	61.6	Xtrriage
Anisotropy	0.650	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 85.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	7777	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	82.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.11% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  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: CSD, EFZ

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	0.44	0/4543	0.68	0/6175
2	B	0.43	0/3414	0.69	0/4637
All	All	0.44	0/7957	0.68	0/10812

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	4434	0	4477	305	0
2	B	3322	0	3352	227	0
3	A	21	0	9	0	0
All	All	7777	0	7838	513	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 33.

All (513) 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)
2:B:72:ARG:HH21	2:B:409:THR:HG22	1.16	1.09
2:B:174:GLN:H	2:B:176:PRO:HD3	1.22	1.02
2:B:173:LYS:HD2	2:B:176:PRO:HG2	1.44	0.99
1:A:380:ILE:HD11	1:A:386:THR:HG22	1.46	0.95
1:A:118:VAL:O	1:A:148:VAL:HG22	1.72	0.89
1:A:410:TRP:CE3	2:B:363:ASN:HB2	2.07	0.89
1:A:226:PRO:HB3	1:A:235:HIS:CD2	2.08	0.89
1:A:323:LYS:HB2	1:A:343:GLN:NE2	1.90	0.85
1:A:461:ARG:HG3	1:A:461:ARG:HH11	1.42	0.85
1:A:239:TRP:CZ2	1:A:316:GLY:HA3	2.13	0.83
2:B:363:ASN:ND2	2:B:366:LYS:HB2	1.94	0.83
2:B:175:ASN:HD21	2:B:201:LYS:NZ	1.77	0.82
1:A:206:ARG:HH11	1:A:206:ARG:HG2	1.43	0.82
1:A:439:THR:HG21	2:B:289:LEU:HD13	1.63	0.81
2:B:274:ILE:HD11	2:B:310:LEU:HD21	1.63	0.81
1:A:283:LEU:O	1:A:286:THR:HG23	1.81	0.80
2:B:175:ASN:N	2:B:176:PRO:HD3	1.97	0.80
1:A:227:PHE:HB2	1:A:234:LEU:CD1	2.11	0.80
1:A:270:ILE:O	1:A:272:PRO:HD3	1.81	0.80
2:B:233:GLU:O	2:B:234:LEU:HD12	1.80	0.80
1:A:120:LEU:HD12	1:A:121:ASP:H	1.46	0.79
2:B:163:SER:HA	2:B:166:LYS:HE2	1.64	0.79
2:B:174:GLN:N	2:B:176:PRO:HD3	1.97	0.79
1:A:390:LYS:HE2	1:A:415:GLU:OE2	1.84	0.78
1:A:150:PRO:HG2	1:A:153:TRP:CB	2.15	0.77
1:A:490:GLY:H	1:A:528:LYS:HZ1	1.29	0.77
1:A:9:PRO:HA	1:A:121:ASP:OD2	1.85	0.77
2:B:106:VAL:O	2:B:234:LEU:HB2	1.84	0.76
2:B:267:ALA:HB2	2:B:426:TRP:CH2	2.20	0.76
2:B:244:ILE:HG21	2:B:426:TRP:CZ2	2.19	0.76
2:B:173:LYS:HA	2:B:176:PRO:HG3	1.68	0.76
2:B:163:SER:O	2:B:167:ILE:HG13	1.87	0.75
1:A:457:TYR:CE2	1:A:465:LYS:HB3	2.23	0.74
1:A:50:ILE:HD13	1:A:145:GLN:HB3	1.70	0.74
1:A:317:VAL:HG22	1:A:318:TYR:H	1.52	0.73
1:A:282:LEU:HD12	1:A:293:ILE:CG2	2.18	0.73
2:B:67:ASP:O	2:B:68:SER:HB2	1.88	0.73
2:B:157:PRO:HG2	2:B:184:MET:HA	1.70	0.73
1:A:21:VAL:HG12	1:A:22:LYS:H	1.52	0.72
1:A:206:ARG:HE	1:A:218:ASP:HA	1.54	0.72
2:B:68:SER:OG	2:B:70:LYS:HG2	1.89	0.72
1:A:356:ARG:HB2	1:A:367:GLN:NE2	2.05	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:157:PRO:CG	2:B:184:MET:HA	2.20	0.72
1:A:335:GLY:HA2	1:A:367:GLN:OE1	1.90	0.71
2:B:27:THR:O	2:B:31:ILE:HG12	1.90	0.71
1:A:393:ILE:HB	1:A:423:VAL:HG22	1.73	0.71
1:A:503:LEU:O	1:A:507:GLN:HB2	1.89	0.71
2:B:7:THR:HG22	2:B:119:PRO:HG2	1.73	0.71
2:B:173:LYS:HA	2:B:176:PRO:CG	2.20	0.71
1:A:41:MET:HB2	1:A:46:LYS:HB2	1.73	0.71
1:A:126:LYS:HE3	1:A:127:TYR:CZ	2.26	0.71
1:A:31:ILE:HG12	1:A:133:PRO:HG2	1.72	0.70
1:A:239:TRP:CE2	1:A:316:GLY:HA3	2.27	0.70
1:A:21:VAL:HG12	1:A:22:LYS:N	2.06	0.69
2:B:387:PRO:HG2	2:B:389:PHE:CE1	2.27	0.69
1:A:150:PRO:HG2	1:A:153:TRP:HB2	1.75	0.69
1:A:244:ILE:HG23	1:A:310:LEU:HB3	1.74	0.69
1:A:282:LEU:HD12	1:A:293:ILE:HG21	1.74	0.69
1:A:297:GLU:O	1:A:301:LEU:HD23	1.93	0.69
1:A:460:ASN:HD22	2:B:288:ALA:HB2	1.58	0.69
1:A:13:LYS:HE3	1:A:84:THR:O	1.93	0.68
1:A:540:LYS:HB3	1:A:542:ILE:HD11	1.75	0.68
1:A:21:VAL:HG11	1:A:59:PRO:HD3	1.76	0.68
1:A:235:HIS:HB3	1:A:236:PRO:HD2	1.76	0.68
1:A:278:GLN:HG2	1:A:298:GLU:HB3	1.75	0.68
2:B:356:ARG:NH2	2:B:361:HIS:HB3	2.10	0.67
2:B:72:ARG:NH2	2:B:409:THR:HG22	2.01	0.67
2:B:235:HIS:O	2:B:238:LYS:HB2	1.95	0.67
1:A:100:LEU:O	1:A:318:TYR:HB3	1.95	0.66
1:A:33:ALA:O	1:A:37:ILE:HD13	1.96	0.66
2:B:169:GLU:O	2:B:172:ARG:HB2	1.95	0.66
1:A:366:LYS:O	1:A:369:THR:HB	1.95	0.66
2:B:13:LYS:HB2	2:B:16:MET:HG3	1.75	0.66
1:A:417:VAL:HG13	1:A:419:THR:HG22	1.78	0.65
1:A:225:PRO:HG3	1:A:227:PHE:CE2	2.31	0.65
2:B:266:TRP:HZ3	2:B:426:TRP:CD1	2.14	0.65
2:B:175:ASN:N	2:B:176:PRO:CD	2.58	0.65
1:A:360:ALA:HA	1:A:514:GLU:HG2	1.78	0.65
1:A:445:ALA:H	1:A:477:THR:HG21	1.60	0.65
1:A:130:PHE:CZ	1:A:144:TYR:HB2	2.31	0.65
1:A:490:GLY:H	1:A:528:LYS:NZ	1.93	0.65
2:B:261:VAL:HG13	2:B:276:VAL:HG21	1.78	0.65
1:A:89:GLU:OE2	1:A:92:LEU:HA	1.97	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:171:PHE:HB2	1:A:208:HIS:CE1	2.31	0.64
1:A:23:GLN:HE22	1:A:60:VAL:HB	1.62	0.64
1:A:216:THR:OG1	1:A:217:PRO:HD2	1.98	0.64
1:A:485:ALA:O	1:A:489:SER:HB3	1.96	0.64
2:B:21:VAL:HB	2:B:59:PRO:HD3	1.80	0.64
1:A:122:GLU:H	1:A:122:GLU:CD	1.98	0.64
2:B:350:LYS:HE3	2:B:378:GLU:OE1	1.98	0.64
1:A:181:TYR:CD1	2:B:138:GLU:HA	2.32	0.63
1:A:380:ILE:CD1	1:A:386:THR:HG22	2.25	0.63
2:B:201:LYS:HZ3	2:B:204:GLU:CD	2.01	0.63
1:A:439:THR:CG2	2:B:289:LEU:HD13	2.27	0.63
1:A:156:SER:HB2	1:A:157:PRO:HD3	1.82	0.62
2:B:3:SER:N	2:B:4:PRO:HD3	2.13	0.62
2:B:174:GLN:HG3	2:B:175:ASN:OD1	1.98	0.62
1:A:26:LEU:HD22	1:A:30:LYS:HE3	1.81	0.62
1:A:317:VAL:HG22	1:A:318:TYR:N	2.15	0.62
1:A:330:GLN:NE2	1:A:340:GLN:OE1	2.31	0.62
1:A:248:GLU:HA	1:A:307:ARG:NH2	2.14	0.62
2:B:328:GLU:O	2:B:339:TYR:HA	2.00	0.62
1:A:274:ILE:HD11	1:A:310:LEU:HD21	1.82	0.62
2:B:170:PRO:O	2:B:174:GLN:HB3	2.00	0.61
1:A:206:ARG:HG2	1:A:206:ARG:NH1	2.10	0.61
2:B:120:LEU:HD22	2:B:125:ARG:HG3	1.82	0.61
2:B:175:ASN:H	2:B:176:PRO:HD3	1.64	0.61
2:B:175:ASN:ND2	2:B:201:LYS:NZ	2.47	0.61
1:A:174:GLN:C	1:A:176:PRO:HD3	2.21	0.61
1:A:234:LEU:HD12	1:A:234:LEU:H	1.65	0.61
1:A:260:LEU:HG	1:A:264:LEU:HD23	1.82	0.61
2:B:242:GLN:HE22	2:B:353:LYS:HE3	1.64	0.61
2:B:360:ALA:HB2	2:B:366:LYS:HD2	1.82	0.61
1:A:340:GLN:HB3	1:A:351:THR:HG22	1.83	0.60
1:A:254:VAL:HG22	1:A:293:ILE:HD11	1.82	0.60
1:A:150:PRO:HG2	1:A:153:TRP:HB3	1.82	0.60
1:A:169:GLU:N	1:A:170:PRO:HD2	2.16	0.60
1:A:325:LEU:O	1:A:326:ILE:HD13	2.02	0.60
1:A:79:GLU:O	1:A:83:ARG:HG3	1.99	0.60
2:B:124:PHE:CD1	2:B:127:TYR:HD2	2.20	0.60
2:B:266:TRP:CZ3	2:B:426:TRP:CD1	2.90	0.60
1:A:3:SER:HB3	1:A:119:PRO:HD3	1.83	0.60
2:B:158:ALA:O	2:B:161:GLN:HB2	2.01	0.60
1:A:76:ASP:OD1	1:A:78:ARG:HG3	2.02	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:461:ARG:HH11	1:A:461:ARG:CG	2.15	0.59
1:A:170:PRO:HG2	1:A:171:PHE:H	1.67	0.59
1:A:407:GLN:HG2	2:B:393:ILE:HA	1.85	0.59
2:B:308:GLU:O	2:B:311:LYS:HB2	2.03	0.59
2:B:242:GLN:O	2:B:242:GLN:HG3	2.03	0.59
2:B:267:ALA:CB	2:B:426:TRP:CH2	2.85	0.59
2:B:356:ARG:CZ	2:B:361:HIS:HB3	2.32	0.59
1:A:118:VAL:C	1:A:148:VAL:HG22	2.22	0.59
2:B:114:ALA:HB1	2:B:160:PHE:CZ	2.38	0.59
1:A:408:ALA:O	2:B:393:ILE:HG13	2.04	0.58
1:A:50:ILE:HG23	1:A:145:GLN:HG2	1.85	0.58
1:A:498:ASP:HA	1:A:536:VAL:O	2.03	0.58
1:A:432:GLU:HB2	1:A:433:PRO:HD2	1.86	0.58
2:B:104:LYS:HB3	2:B:192:ASP:HA	1.85	0.58
2:B:237:ASP:C	2:B:239:TRP:N	2.54	0.58
2:B:263:LYS:HE2	2:B:425:LEU:HB3	1.86	0.58
1:A:115:TYR:CE2	1:A:156:SER:HB3	2.38	0.58
2:B:161:GLN:OE1	2:B:161:GLN:HA	2.02	0.58
1:A:139:THR:HB	1:A:140:PRO:HD3	1.85	0.58
2:B:120:LEU:HD21	2:B:124:PHE:HD2	1.68	0.58
1:A:518:VAL:O	1:A:522:ILE:HG13	2.04	0.58
2:B:20:LYS:HE2	2:B:56:TYR:CE1	2.39	0.57
2:B:175:ASN:HD21	2:B:201:LYS:CE	2.17	0.57
1:A:311:LYS:O	1:A:313:PRO:HD3	2.03	0.57
1:A:426:TRP:O	1:A:427:TYR:HB3	2.04	0.57
1:A:454:LYS:HA	1:A:467:VAL:O	2.04	0.57
2:B:120:LEU:HD23	2:B:121:ASP:N	2.20	0.57
2:B:100:LEU:N	2:B:100:LEU:HD23	2.20	0.57
2:B:365:VAL:O	2:B:369:THR:HG23	2.05	0.57
1:A:24:TRP:HD1	1:A:24:TRP:H	1.53	0.56
2:B:369:THR:HG22	2:B:398:TRP:CH2	2.40	0.56
1:A:208:HIS:HA	1:A:211:ARG:HD3	1.88	0.56
2:B:237:ASP:C	2:B:239:TRP:H	2.08	0.56
1:A:270:ILE:HG23	1:A:271:TYR:N	2.21	0.56
2:B:151:GLN:HB3	2:B:185:ASP:OD1	2.06	0.56
1:A:244:ILE:HG21	1:A:310:LEU:HD22	1.88	0.55
1:A:532:TYR:CE2	1:A:534:ALA:HB2	2.42	0.55
2:B:341:ILE:N	2:B:341:ILE:HD12	2.21	0.55
1:A:486:LEU:HB3	1:A:524:GLN:CG	2.35	0.55
1:A:229:TRP:O	1:A:232:TYR:N	2.40	0.55
1:A:287:LYS:HG2	1:A:291:GLU:OE2	2.06	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:214:LEU:N	1:A:214:LEU:HD12	2.22	0.55
2:B:266:TRP:CZ3	2:B:426:TRP:CG	2.95	0.55
2:B:108:VAL:HG22	2:B:188:TYR:CD2	2.42	0.55
1:A:97:PRO:HA	1:A:100:LEU:HG	1.87	0.54
1:A:23:GLN:HG2	1:A:131:THR:O	2.07	0.54
1:A:31:ILE:HD12	1:A:135:ILE:HA	1.87	0.54
2:B:29:GLU:HG3	2:B:71:TRP:CH2	2.42	0.54
1:A:171:PHE:HD1	1:A:208:HIS:HD1	1.55	0.54
1:A:295:LEU:HD23	1:A:299:ALA:HB3	1.89	0.54
2:B:115:TYR:HB3	2:B:149:LEU:HB2	1.87	0.54
2:B:173:LYS:HD2	2:B:176:PRO:CG	2.29	0.54
2:B:246:LEU:HD22	2:B:260:LEU:HD11	1.89	0.54
1:A:226:PRO:HB3	1:A:235:HIS:NE2	2.22	0.54
1:A:434:ILE:HG22	1:A:437:ALA:HB2	1.88	0.54
1:A:17:ASP:O	1:A:83:ARG:NE	2.41	0.54
1:A:229:TRP:O	1:A:230:MET:C	2.46	0.54
1:A:434:ILE:CG2	1:A:437:ALA:HB2	2.38	0.54
2:B:244:ILE:HG21	2:B:426:TRP:CH2	2.43	0.54
2:B:366:LYS:HE2	2:B:370:GLU:OE2	2.07	0.54
1:A:516:GLU:HA	1:A:519:ASN:HD22	1.73	0.53
1:A:246:LEU:HB2	1:A:307:ARG:NH1	2.23	0.53
1:A:21:VAL:CG1	1:A:59:PRO:HD3	2.39	0.53
1:A:241:VAL:HG23	1:A:314:VAL:O	2.08	0.53
2:B:57:ASN:HA	2:B:129:ALA:O	2.08	0.53
2:B:43:LYS:O	2:B:45:GLY:N	2.42	0.53
1:A:356:ARG:HB2	1:A:367:GLN:HE22	1.72	0.53
1:A:395:LYS:HD3	1:A:414:TRP:CZ2	2.43	0.53
1:A:448:ARG:NH2	1:A:473:THR:OG1	2.41	0.53
2:B:176:PRO:C	2:B:178:ILE:H	2.12	0.53
1:A:120:LEU:HD12	1:A:121:ASP:N	2.21	0.53
1:A:465:LYS:HG2	1:A:466:VAL:N	2.22	0.53
1:A:502:ALA:O	1:A:503:LEU:C	2.45	0.53
1:A:78:ARG:O	1:A:82:LYS:HG3	2.09	0.53
1:A:442:VAL:CG1	1:A:485:ALA:HB2	2.38	0.53
2:B:395:LYS:HG2	2:B:399:GLU:HG3	1.90	0.53
1:A:112:GLY:H	1:A:185:ASP:HB3	1.74	0.52
2:B:94:ILE:HG23	2:B:94:ILE:O	2.09	0.52
2:B:191:SER:HB2	2:B:193:LEU:HD13	1.90	0.52
1:A:128:THR:HB	1:A:146:TYR:HB2	1.91	0.52
1:A:410:TRP:CZ3	2:B:363:ASN:HB2	2.42	0.52
2:B:72:ARG:HG3	2:B:72:ARG:HH11	1.74	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:106:VAL:HA	2:B:189:VAL:O	2.08	0.52
1:A:50:ILE:CG2	1:A:145:GLN:HG2	2.40	0.52
2:B:242:GLN:NE2	2:B:353:LYS:HE3	2.24	0.52
2:B:160:PHE:O	2:B:160:PHE:CD1	2.62	0.52
1:A:108:VAL:C	1:A:109:LEU:HD12	2.30	0.52
1:A:122:GLU:N	1:A:122:GLU:OE1	2.43	0.52
1:A:171:PHE:CZ	1:A:205:LEU:HB2	2.45	0.52
1:A:195:ILE:CG1	1:A:196:GLY:N	2.72	0.52
1:A:417:VAL:HG13	1:A:417:VAL:O	2.08	0.52
1:A:460:ASN:ND2	2:B:288:ALA:HB2	2.23	0.52
1:A:503:LEU:HD22	1:A:535:TRP:CB	2.39	0.52
2:B:130:PHE:CZ	2:B:144:TYR:HB2	2.45	0.52
1:A:296:THR:HG23	1:A:299:ALA:CB	2.39	0.52
2:B:54:ASN:O	2:B:143:ARG:NH2	2.42	0.52
1:A:497:THR:O	1:A:535:TRP:HA	2.10	0.52
2:B:205:LEU:HD13	2:B:205:LEU:C	2.30	0.52
2:B:420:PRO:O	2:B:423:VAL:HG22	2.10	0.52
1:A:88:TRP:HA	1:A:88:TRP:CE3	2.45	0.51
1:A:486:LEU:HB3	1:A:524:GLN:HG2	1.93	0.51
2:B:5:ILE:HG22	2:B:6:GLU:N	2.25	0.51
2:B:175:ASN:HD21	2:B:201:LYS:HZ1	1.54	0.51
2:B:179:VAL:C	2:B:180:ILE:HD12	2.31	0.51
2:B:274:ILE:HD11	2:B:310:LEU:CD2	2.38	0.51
1:A:96:HIS:HD1	1:A:97:PRO:HD2	1.75	0.51
1:A:293:ILE:HG23	1:A:294:PRO:HD2	1.91	0.51
1:A:466:VAL:HG22	1:A:467:VAL:N	2.25	0.51
2:B:387:PRO:HG2	2:B:389:PHE:CZ	2.45	0.51
1:A:37:ILE:O	1:A:40:GLU:HB3	2.10	0.51
1:A:96:HIS:ND1	1:A:97:PRO:HD2	2.25	0.51
1:A:296:THR:HG23	1:A:299:ALA:HB2	1.92	0.51
2:B:100:LEU:H	2:B:100:LEU:CD2	2.23	0.51
1:A:1:PRO:H2	1:A:46:LYS:NZ	2.09	0.50
1:A:476:LYS:O	1:A:480:GLN:HB2	2.11	0.50
1:A:350:LYS:HG2	1:A:351:THR:N	2.27	0.50
2:B:40:GLU:O	2:B:44:GLU:HG3	2.12	0.50
2:B:241:VAL:HG13	2:B:351:THR:OG1	2.11	0.50
2:B:122:GLU:HA	2:B:125:ARG:HD2	1.93	0.50
1:A:303:LEU:O	1:A:303:LEU:HD23	2.12	0.50
2:B:326:ILE:O	2:B:341:ILE:HA	2.12	0.50
2:B:43:LYS:C	2:B:45:GLY:H	2.15	0.50
2:B:359:GLY:C	2:B:361:HIS:H	2.16	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:363:ASN:HD21	2:B:366:LYS:HB2	1.74	0.50
2:B:40:GLU:HG2	2:B:44:GLU:OE2	2.12	0.49
2:B:236:PRO:C	2:B:238:LYS:H	2.15	0.49
1:A:21:VAL:CG1	1:A:22:LYS:N	2.75	0.49
1:A:344:GLU:O	1:A:347:LYS:HB2	2.11	0.49
2:B:84:THR:HG22	2:B:154:LYS:HE2	1.94	0.49
2:B:368:LEU:O	2:B:372:VAL:HG23	2.12	0.49
1:A:48:SER:O	1:A:144:TYR:HA	2.13	0.49
1:A:410:TRP:CD2	2:B:363:ASN:HB2	2.46	0.49
2:B:97:PRO:HG2	2:B:100:LEU:CD2	2.42	0.49
2:B:175:ASN:ND2	2:B:201:LYS:HZ2	2.10	0.49
1:A:120:LEU:HD21	1:A:128:THR:HG21	1.93	0.49
1:A:148:VAL:HG13	1:A:149:LEU:N	2.27	0.49
1:A:406:TRP:CH2	2:B:418:ASN:HA	2.46	0.49
2:B:11:LYS:O	2:B:85:GLN:HG2	2.12	0.49
2:B:201:LYS:O	2:B:204:GLU:HB3	2.12	0.49
2:B:423:VAL:O	2:B:427:TYR:HD2	1.95	0.49
1:A:244:ILE:CG2	1:A:310:LEU:HB3	2.42	0.49
2:B:98:ALA:O	2:B:101:LYS:HB3	2.12	0.49
2:B:175:ASN:O	2:B:177:ASP:N	2.45	0.49
2:B:308:GLU:HA	2:B:311:LYS:HD2	1.95	0.49
2:B:356:ARG:HH12	2:B:359:GLY:H	1.60	0.49
1:A:424:LYS:HE3	1:A:426:TRP:CD2	2.48	0.49
2:B:167:ILE:HG23	2:B:212:TRP:CD1	2.48	0.49
2:B:168:LEU:C	2:B:170:PRO:HD2	2.34	0.48
1:A:154:LYS:O	1:A:157:PRO:HD2	2.12	0.48
2:B:72:ARG:HH22	2:B:151:GLN:NE2	2.11	0.48
2:B:350:LYS:HG2	2:B:351:THR:N	2.29	0.48
1:A:516:GLU:O	1:A:520:GLN:HG2	2.12	0.48
1:A:59:PRO:HG2	1:A:76:ASP:HB3	1.94	0.48
1:A:457:TYR:CZ	1:A:465:LYS:HB3	2.49	0.48
2:B:254:VAL:HB	2:B:289:LEU:HA	1.95	0.48
1:A:110:ASP:O	1:A:217:PRO:HD3	2.13	0.48
2:B:197:GLN:O	2:B:201:LYS:HB2	2.13	0.48
2:B:140:PRO:O	2:B:141:GLY:O	2.30	0.48
1:A:8:VAL:O	1:A:10:VAL:HG23	2.13	0.48
1:A:111:VAL:HG23	1:A:112:GLY:N	2.29	0.48
1:A:31:ILE:O	1:A:35:VAL:HG23	2.14	0.48
1:A:111:VAL:CG2	1:A:112:GLY:N	2.76	0.48
1:A:171:PHE:CE1	1:A:205:LEU:HA	2.48	0.48
2:B:205:LEU:HD13	2:B:205:LEU:O	2.14	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:208:HIS:O	1:A:211:ARG:HB2	2.14	0.48
1:A:180:ILE:HA	1:A:188:TYR:O	2.14	0.47
2:B:363:ASN:CG	2:B:366:LYS:HB2	2.34	0.47
1:A:205:LEU:O	1:A:208:HIS:HB3	2.14	0.47
1:A:503:LEU:HD13	1:A:535:TRP:HB2	1.95	0.47
1:A:11:LYS:O	1:A:85:GLN:HB3	2.14	0.47
1:A:21:VAL:CG1	1:A:22:LYS:H	2.22	0.47
2:B:171:PHE:HA	2:B:174:GLN:HG2	1.96	0.47
2:B:201:LYS:NZ	2:B:204:GLU:OE2	2.46	0.47
2:B:317:VAL:HG12	2:B:347:LYS:HB3	1.96	0.47
2:B:339:TYR:C	2:B:340:GLN:NE2	2.67	0.47
1:A:478:GLU:O	1:A:481:ALA:HB3	2.14	0.47
1:A:494:ASN:HB3	2:B:289:LEU:HD22	1.95	0.47
1:A:171:PHE:HB2	1:A:208:HIS:ND1	2.29	0.47
2:B:157:PRO:HG3	2:B:184:MET:HA	1.95	0.47
2:B:166:LYS:O	2:B:168:LEU:N	2.47	0.47
2:B:172:ARG:HG3	2:B:172:ARG:HH11	1.80	0.47
2:B:198:HIS:O	2:B:202:ILE:HG12	2.14	0.47
1:A:254:VAL:HG21	1:A:288:ALA:O	2.14	0.47
1:A:333:GLY:H	1:A:336:GLN:HB3	1.80	0.47
1:A:109:LEU:HD12	1:A:109:LEU:N	2.29	0.47
1:A:162:SER:O	1:A:165:THR:N	2.48	0.47
1:A:174:GLN:O	1:A:176:PRO:HD3	2.14	0.47
1:A:297:GLU:HA	1:A:300:GLU:HB2	1.95	0.47
1:A:461:ARG:HG3	1:A:461:ARG:NH1	2.21	0.47
1:A:498:ASP:HB2	1:A:538:ALA:HB2	1.97	0.47
1:A:516:GLU:HA	1:A:516:GLU:OE2	2.14	0.47
1:A:516:GLU:O	1:A:519:ASN:HB2	2.14	0.47
1:A:60:VAL:CG2	1:A:130:PHE:HB2	2.45	0.47
1:A:114:ALA:O	1:A:117:SER:HB2	2.15	0.47
1:A:345:PRO:HB2	1:A:346:PHE:CD1	2.49	0.47
2:B:72:ARG:NH2	2:B:151:GLN:NE2	2.63	0.47
1:A:20:LYS:HG2	1:A:55:PRO:O	2.14	0.47
1:A:30:LYS:HG2	1:A:71:TRP:CH2	2.50	0.47
1:A:139:THR:HB	1:A:140:PRO:CD	2.44	0.47
1:A:181:TYR:CE1	2:B:138:GLU:HA	2.49	0.47
1:A:300:GLU:OE2	1:A:300:GLU:HA	2.15	0.47
2:B:100:LEU:O	2:B:236:PRO:HG2	2.15	0.47
1:A:445:ALA:N	1:A:477:THR:HG21	2.29	0.46
1:A:207:GLN:O	1:A:211:ARG:HG3	2.15	0.46
1:A:405:TYR:CE2	1:A:407:GLN:HB3	2.50	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:131:THR:OG1	2:B:143:ARG:HD2	2.15	0.46
2:B:178:ILE:HG22	2:B:180:ILE:CD1	2.46	0.46
1:A:340:GLN:CB	1:A:351:THR:HG22	2.45	0.46
2:B:325:LEU:HD12	2:B:343:GLN:CG	2.45	0.46
2:B:35:VAL:O	2:B:39:THR:HG23	2.16	0.46
2:B:78:ARG:O	2:B:82:LYS:HD3	2.16	0.46
1:A:88:TRP:HA	1:A:88:TRP:HE3	1.81	0.46
1:A:187:LEU:HD12	1:A:187:LEU:HA	1.80	0.46
2:B:100:LEU:N	2:B:100:LEU:CD2	2.78	0.46
2:B:377:THR:O	2:B:378:GLU:C	2.53	0.46
1:A:89:GLU:HG3	1:A:89:GLU:O	2.16	0.46
2:B:171:PHE:O	2:B:172:ARG:O	2.34	0.46
1:A:380:ILE:HG22	2:B:25:PRO:HB2	1.96	0.46
2:B:101:LYS:HD2	2:B:382:ILE:HG23	1.97	0.46
1:A:37:ILE:HG21	1:A:73:LYS:HD3	1.98	0.45
1:A:65:LYS:HG3	1:A:68:SER:HB3	1.98	0.45
2:B:7:THR:CG2	2:B:119:PRO:HG2	2.45	0.45
2:B:366:LYS:O	2:B:370:GLU:HG3	2.16	0.45
1:A:447:ASN:HB3	1:A:450:THR:OG1	2.16	0.45
2:B:67:ASP:O	2:B:68:SER:CB	2.58	0.45
2:B:379:SER:CB	2:B:387:PRO:HD3	2.46	0.45
2:B:380:ILE:O	2:B:384:GLY:N	2.48	0.45
1:A:376:THR:O	1:A:379:SER:HB2	2.17	0.45
2:B:5:ILE:HG22	2:B:6:GLU:H	1.81	0.45
1:A:420:PRO:HA	1:A:421:PRO:C	2.36	0.45
1:A:508:ALA:O	1:A:510:PRO:N	2.50	0.45
2:B:64:LYS:HE3	2:B:71:TRP:CZ2	2.52	0.45
2:B:85:GLN:O	2:B:85:GLN:HG3	2.15	0.45
1:A:234:LEU:HD12	1:A:234:LEU:N	2.31	0.45
2:B:100:LEU:HD23	2:B:100:LEU:H	1.81	0.45
1:A:375:ILE:O	1:A:376:THR:C	2.53	0.45
2:B:376:THR:O	2:B:380:ILE:HG13	2.16	0.45
1:A:65:LYS:HB3	1:A:72:ARG:HD3	1.98	0.45
2:B:257:ILE:HB	2:B:283:LEU:HD11	1.97	0.45
2:B:175:ASN:HD21	2:B:201:LYS:HE3	1.81	0.45
1:A:23:GLN:HE22	1:A:60:VAL:CB	2.29	0.45
1:A:253:THR:HA	1:A:292:VAL:HA	1.98	0.45
2:B:359:GLY:HA2	2:B:361:HIS:CE1	2.51	0.45
1:A:496:VAL:HA	1:A:534:ALA:O	2.16	0.44
1:A:508:ALA:O	1:A:509:GLN:C	2.55	0.44
2:B:267:ALA:HB2	2:B:426:TRP:CZ3	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:142:ILE:N	1:A:142:ILE:HD12	2.31	0.44
1:A:350:LYS:HE3	1:A:378:GLU:OE2	2.16	0.44
2:B:61:PHE:N	2:B:61:PHE:CD2	2.85	0.44
1:A:175:ASN:OD1	1:A:201:LYS:HE2	2.18	0.44
1:A:311:LYS:O	1:A:313:PRO:CD	2.64	0.44
1:A:358:ARG:HB2	1:A:358:ARG:NH1	2.32	0.44
1:A:488:ASP:OD2	1:A:488:ASP:N	2.47	0.44
1:A:92:LEU:HD22	2:B:141:GLY:H	1.82	0.44
1:A:328:GLU:O	1:A:339:TYR:HA	2.17	0.44
1:A:505:ILE:HG22	1:A:506:ILE:N	2.31	0.44
2:B:169:GLU:HA	2:B:172:ARG:HB2	1.98	0.44
1:A:23:GLN:NE2	1:A:131:THR:O	2.44	0.44
1:A:69:THR:O	1:A:69:THR:HG22	2.18	0.44
1:A:424:LYS:HE3	1:A:426:TRP:CE3	2.53	0.43
1:A:495:ILE:O	1:A:533:LEU:HD12	2.17	0.43
1:A:66:LYS:HD3	1:A:66:LYS:HA	1.84	0.43
2:B:32:LYS:O	2:B:35:VAL:HG22	2.18	0.43
1:A:31:ILE:HD13	1:A:133:PRO:O	2.17	0.43
1:A:32:LYS:O	1:A:36:GLU:HG3	2.18	0.43
1:A:66:LYS:O	1:A:67:ASP:CB	2.66	0.43
1:A:252:TRP:CD1	1:A:295:LEU:HD12	2.53	0.43
1:A:463:ARG:HG2	1:A:464:GLN:N	2.34	0.43
2:B:319:TYR:CE1	2:B:321:PRO:HG3	2.53	0.43
2:B:356:ARG:HB2	2:B:367:GLN:HG2	2.00	0.43
1:A:248:GLU:HA	1:A:307:ARG:HH22	1.83	0.43
2:B:353:LYS:HE3	2:B:353:LYS:HB2	1.77	0.43
2:B:413:GLU:HA	2:B:413:GLU:OE2	2.17	0.43
1:A:386:THR:HA	1:A:387:PRO:HD3	1.81	0.43
1:A:407:GLN:CG	2:B:393:ILE:HA	2.47	0.43
1:A:536:VAL:HG11	2:B:258:GLN:HG2	2.00	0.43
2:B:19:PRO:O	2:B:56:TYR:HB3	2.19	0.43
2:B:279:LEU:HD23	2:B:299:ALA:HB1	2.00	0.43
1:A:419:THR:HG23	1:A:419:THR:O	2.18	0.43
1:A:175:ASN:N	1:A:175:ASN:ND2	2.66	0.43
1:A:453:GLY:O	1:A:469:LEU:N	2.39	0.43
2:B:129:ALA:HA	2:B:144:TYR:O	2.18	0.43
2:B:182:GLN:HB2	2:B:187:LEU:CD1	2.49	0.43
1:A:77:PHE:O	1:A:78:ARG:C	2.54	0.43
2:B:340:GLN:C	2:B:341:ILE:HD12	2.39	0.43
2:B:395:LYS:HG2	2:B:399:GLU:CG	2.49	0.43
1:A:254:VAL:HG13	1:A:286:THR:HG21	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:282:LEU:N	1:A:282:LEU:HD22	2.34	0.43
2:B:120:LEU:HD22	2:B:125:ARG:CG	2.46	0.43
1:A:339:TYR:CE2	1:A:352:GLY:HA3	2.54	0.43
2:B:37:ILE:O	2:B:41:MET:HG3	2.18	0.43
2:B:183:TYR:HB3	2:B:188:TYR:HE1	1.83	0.43
1:A:23:GLN:NE2	1:A:60:VAL:HB	2.32	0.42
1:A:356:ARG:HG2	1:A:356:ARG:HH11	1.84	0.42
2:B:58:THR:HG23	2:B:76:ASP:O	2.19	0.42
2:B:60:VAL:HG11	2:B:130:PHE:CD1	2.54	0.42
2:B:332:GLN:HG3	2:B:338:THR:HG23	2.01	0.42
1:A:136:ASN:O	1:A:137:ASN:HB3	2.19	0.42
1:A:393:ILE:HB	1:A:423:VAL:CG2	2.44	0.42
1:A:486:LEU:HB3	1:A:524:GLN:HG3	2.01	0.42
1:A:536:VAL:CG1	2:B:258:GLN:HG2	2.50	0.42
2:B:421:PRO:O	2:B:425:LEU:HD22	2.19	0.42
1:A:131:THR:HG22	1:A:132:ILE:N	2.33	0.42
1:A:314:VAL:O	1:A:314:VAL:HG13	2.18	0.42
2:B:178:ILE:HG22	2:B:180:ILE:HD12	2.00	0.42
1:A:337:TRP:O	1:A:353:LYS:HA	2.19	0.42
1:A:356:ARG:NH2	1:A:371:ALA:HA	2.34	0.42
1:A:442:VAL:HG11	1:A:485:ALA:HB2	2.01	0.42
1:A:198:HIS:NE2	1:A:202:ILE:HD11	2.35	0.42
1:A:270:ILE:HG23	1:A:271:TYR:CD2	2.55	0.42
1:A:307:ARG:HH11	1:A:307:ARG:HG2	1.84	0.42
1:A:31:ILE:CD1	1:A:135:ILE:HA	2.49	0.42
1:A:115:TYR:OH	1:A:157:PRO:HA	2.19	0.42
2:B:132:ILE:HA	2:B:133:PRO:HD2	1.80	0.42
2:B:158:ALA:O	2:B:161:GLN:N	2.52	0.42
1:A:41:MET:SD	1:A:73:LYS:HE2	2.59	0.42
1:A:142:ILE:HG22	1:A:144:TYR:CE1	2.55	0.42
2:B:274:ILE:CD1	2:B:310:LEU:HD21	2.42	0.42
1:A:13:LYS:HB3	1:A:14:PRO:HD2	2.02	0.42
1:A:119:PRO:HA	1:A:148:VAL:HG23	2.01	0.42
1:A:517:LEU:O	1:A:520:GLN:HB2	2.20	0.42
2:B:75:VAL:HG11	2:B:77:PHE:CZ	2.55	0.42
2:B:168:LEU:O	2:B:169:GLU:C	2.58	0.42
2:B:63:ILE:HD12	2:B:74:LEU:HD22	2.01	0.42
2:B:201:LYS:HA	2:B:201:LYS:HD2	1.84	0.42
2:B:293:ILE:HG23	2:B:294:PRO:HD2	2.00	0.42
2:B:327:ALA:HA	2:B:340:GLN:O	2.20	0.42
2:B:395:LYS:O	2:B:399:GLU:CG	2.68	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:461:ARG:CG	1:A:461:ARG:NH1	2.78	0.42
2:B:303:LEU:HD23	2:B:303:LEU:C	2.40	0.42
1:A:37:ILE:HD12	1:A:37:ILE:N	2.35	0.41
1:A:297:GLU:O	1:A:300:GLU:HB2	2.19	0.41
2:B:20:LYS:HE2	2:B:56:TYR:HE1	1.84	0.41
2:B:264:LEU:O	2:B:265:ASN:C	2.58	0.41
2:B:287:LYS:HE2	2:B:293:ILE:HD11	2.00	0.41
1:A:5:ILE:HG12	1:A:6:GLU:N	2.35	0.41
1:A:26:LEU:HB2	1:A:31:ILE:CG1	2.50	0.41
2:B:50:ILE:CG2	2:B:145:GLN:HB3	2.51	0.41
1:A:166:LYS:C	1:A:168:LEU:N	2.74	0.41
1:A:227:PHE:O	1:A:234:LEU:HD12	2.21	0.41
1:A:244:ILE:CG2	1:A:310:LEU:HD22	2.50	0.41
1:A:377:THR:O	1:A:378:GLU:C	2.56	0.41
2:B:23:GLN:OE1	2:B:59:PRO:HA	2.19	0.41
1:A:68:SER:C	1:A:70:LYS:H	2.24	0.41
1:A:244:ILE:HD12	1:A:245:VAL:H	1.85	0.41
1:A:3:SER:OG	1:A:5:ILE:HG22	2.19	0.41
1:A:58:THR:CG2	1:A:59:PRO:HD2	2.51	0.41
1:A:253:THR:HA	1:A:291:GLU:O	2.20	0.41
1:A:283:LEU:O	1:A:284:ARG:C	2.58	0.41
1:A:94:ILE:HD13	1:A:95:PRO:CD	2.50	0.41
1:A:122:GLU:CD	1:A:122:GLU:N	2.72	0.41
1:A:227:PHE:HB2	1:A:234:LEU:HD12	1.95	0.41
2:B:325:LEU:HD12	2:B:325:LEU:HA	1.85	0.41
2:B:325:LEU:HD12	2:B:343:GLN:HG3	2.03	0.41
1:A:46:LYS:O	1:A:147:ASN:HB3	2.21	0.41
1:A:98:ALA:HB2	1:A:349:LEU:O	2.21	0.41
2:B:37:ILE:O	2:B:37:ILE:CG2	2.68	0.41
1:A:40:GLU:O	1:A:43:LYS:HG2	2.21	0.41
1:A:65:LYS:HB3	1:A:72:ARG:NE	2.36	0.41
1:A:435:VAL:HA	2:B:290:THR:HG21	2.02	0.41
2:B:32:LYS:O	2:B:33:ALA:C	2.59	0.41
2:B:237:ASP:O	2:B:239:TRP:N	2.54	0.41
2:B:241:VAL:HG22	2:B:350:LYS:HA	2.02	0.41
2:B:319:TYR:O	2:B:321:PRO:HD3	2.21	0.41
2:B:368:LEU:HD23	2:B:368:LEU:HA	1.92	0.41
1:A:368:LEU:HD21	1:A:391:LEU:HD22	2.03	0.41
1:A:169:GLU:N	1:A:170:PRO:CD	2.84	0.40
1:A:492:GLU:HA	1:A:530:LYS:O	2.20	0.40
1:A:532:TYR:HE2	1:A:534:ALA:HB2	1.85	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:244:ILE:HG21	2:B:426:TRP:CE2	2.56	0.40
1:A:94:ILE:HD13	1:A:95:PRO:HD2	2.03	0.40
1:A:153:TRP:CZ3	1:A:155:GLY:HA3	2.56	0.40
1:A:207:GLN:HA	1:A:207:GLN:HE21	1.86	0.40
1:A:502:ALA:O	1:A:504:GLY:N	2.54	0.40
2:B:376:THR:HG23	2:B:387:PRO:HD2	2.03	0.40
1:A:27:THR:HG22	1:A:28:GLU:N	2.36	0.40
1:A:357:MET:O	1:A:359:GLY:N	2.55	0.40
2:B:50:ILE:HG21	2:B:145:GLN:HB3	2.03	0.40
2:B:72:ARG:HH21	2:B:409:THR:CG2	2.07	0.40
2:B:166:LYS:O	2:B:167:ILE:C	2.59	0.40
2:B:205:LEU:O	2:B:208:HIS:HB3	2.21	0.40
2:B:369:THR:HG22	2:B:398:TRP:CZ3	2.55	0.40
1:A:45:GLY:O	1:A:147:ASN:ND2	2.46	0.40
1:A:195:ILE:HG12	1:A:196:GLY:N	2.36	0.40
1:A:317:VAL:CG2	1:A:318:TYR:N	2.84	0.40
1:A:540:LYS:HB3	1:A:542:ILE:CD1	2.47	0.40
2:B:187:LEU:HD12	2:B:187:LEU:HA	1.97	0.40
1:A:232:TYR:N	1:A:232:TYR:CD1	2.89	0.40
1:A:327:ALA:HB3	1:A:389:PHE:CD2	2.57	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	540/543 (99%)	453 (84%)	69 (13%)	18 (3%)	<b>3</b>   <b>13</b>
2	B	397/440 (90%)	338 (85%)	41 (10%)	18 (4%)	<b>2</b>   <b>8</b>
All	All	937/983 (95%)	791 (84%)	110 (12%)	36 (4%)	<b>2</b>   <b>11</b>

All (36) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	68	SER
2	B	172	ARG
1	A	112	GLY
1	A	230	MET
1	A	491	LEU
2	B	44	GLU
2	B	103	ASN
2	B	141	GLY
2	B	167	ILE
2	B	174	GLN
1	A	18	GLY
1	A	139	THR
1	A	312	GLU
1	A	358	ARG
2	B	122	GLU
2	B	166	LYS
2	B	176	PRO
1	A	250	ASP
1	A	427	TYR
2	B	361	HIS
1	A	138	GLU
1	A	357	MET
1	A	418	ASN
2	B	162	SER
1	A	242	GLN
2	B	175	ASN
2	B	356	ARG
1	A	509	GLN
2	B	195	ILE
2	B	421	PRO
1	A	135	ILE
1	A	243	PRO
1	A	345	PRO
1	A	14	PRO
2	B	169	GLU
2	B	170	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	485/485 (100%)	443 (91%)	42 (9%)	8 27
2	B	366/400 (92%)	337 (92%)	29 (8%)	10 30
All	All	851/885 (96%)	780 (92%)	71 (8%)	9 28

All (71) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	29	GLU
1	A	42	GLU
1	A	88	TRP
1	A	91	GLN
1	A	94	ILE
1	A	107	THR
1	A	108	VAL
1	A	136	ASN
1	A	137	ASN
1	A	148	VAL
1	A	175	ASN
1	A	194	GLU
1	A	195	ILE
1	A	197	GLN
1	A	207	GLN
1	A	216	THR
1	A	234	LEU
1	A	250	ASP
1	A	279	LEU
1	A	283	LEU
1	A	295	LEU
1	A	296	THR
1	A	297	GLU
1	A	311	LYS
1	A	340	GLN
1	A	361	HIS
1	A	363	ASN
1	A	368	LEU
1	A	410	TRP
1	A	415	GLU
1	A	424	LYS
1	A	431	LYS
1	A	448	ARG
1	A	452	LEU

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Mol	Chain	Res	Type
1	A	465	LYS
1	A	473	THR
1	A	475	GLN
1	A	480	GLN
1	A	493	VAL
1	A	496	VAL
1	A	514	GLU
1	A	540	LYS
2	B	6	GLU
2	B	8	VAL
2	B	24	TRP
2	B	61	PHE
2	B	63	ILE
2	B	65	LYS
2	B	67	ASP
2	B	69	THR
2	B	71	TRP
2	B	85	GLN
2	B	87	PHE
2	B	92	LEU
2	B	94	ILE
2	B	100	LEU
2	B	109	LEU
2	B	123	ASP
2	B	161	GLN
2	B	164	MET
2	B	174	GLN
2	B	194	GLU
2	B	210	LEU
2	B	287	LYS
2	B	358	ARG
2	B	361	HIS
2	B	363	ASN
2	B	368	LEU
2	B	399	GLU
2	B	424	LYS
2	B	425	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	137	ASN

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Mol	Chain	Res	Type
1	A	161	GLN
1	A	332	GLN
1	A	475	GLN
1	A	480	GLN
1	A	519	ASN
2	B	57	ASN
2	B	85	GLN
2	B	151	GLN
2	B	174	GLN
2	B	175	ASN
2	B	207	GLN
2	B	242	GLN
2	B	361	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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	4,7,8	2.38	1 (25%)	1,8,10	8.02	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	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	280	CSD	OD1-SG	4.36	1.51	1.47

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	280	CSD	OD1-SG-CB	8.02	120.38	105.60

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.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides 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	EFZ	A	999	-	23,23,23	2.81	6 (26%)	36,36,36	1.54	2 (5%)

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	EFZ	A	999	-	-	0/10/32/32	0/3/3/3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	999	EFZ	C10-C9	8.24	1.71	1.45
3	A	999	EFZ	C12-C11	-5.62	1.28	1.48
3	A	999	EFZ	C7-C6	4.61	1.57	1.51
3	A	999	EFZ	C12-C10	-4.26	1.24	1.48
3	A	999	EFZ	C11-C10	-4.26	1.24	1.48
3	A	999	EFZ	C1-N	2.11	1.43	1.39

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	999	EFZ	C12-C10-C9	-5.64	105.79	119.09
3	A	999	EFZ	C11-C10-C9	-5.62	105.83	119.09

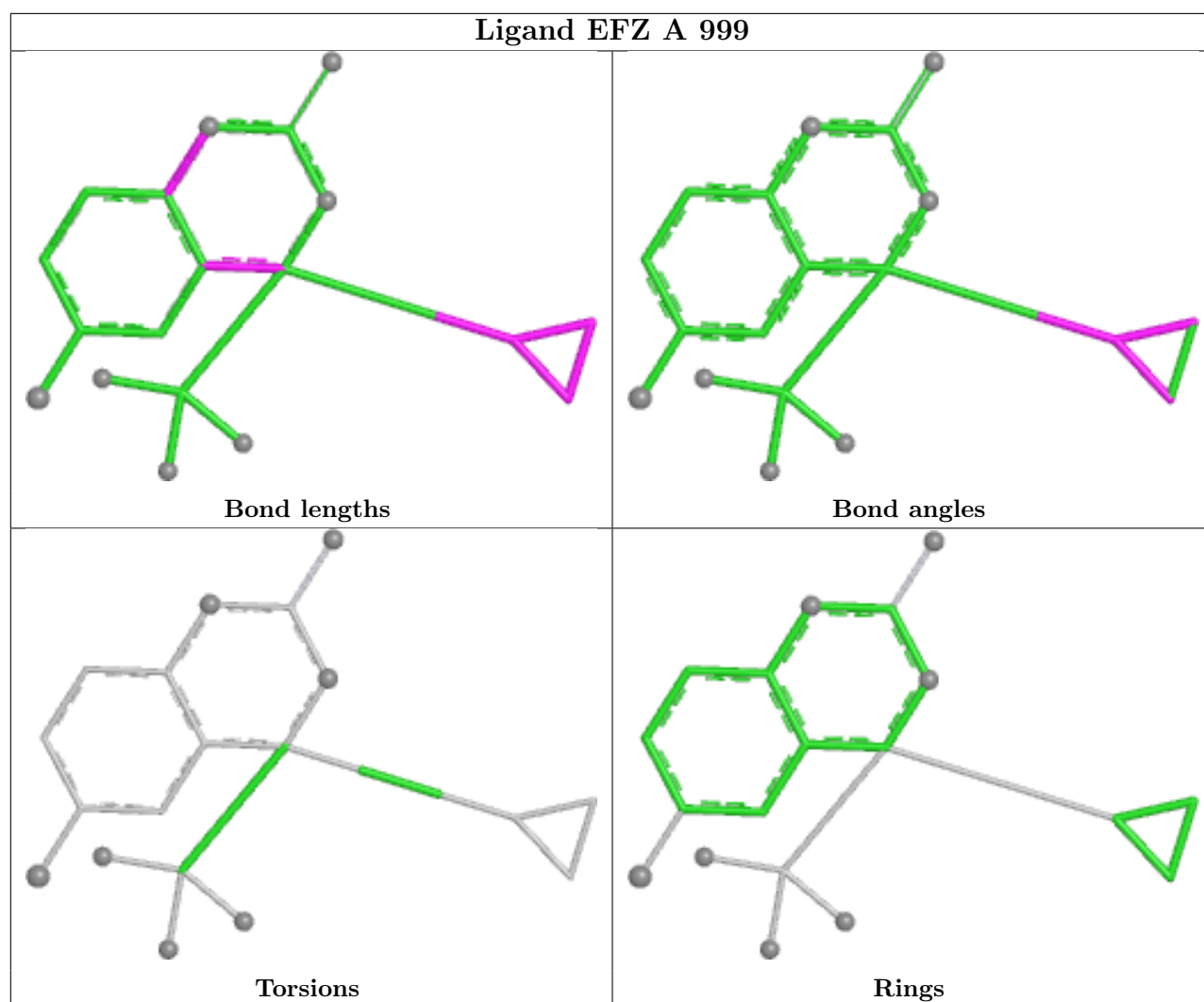
There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 than 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.



## 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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	542/543 (99%)	-0.33	4 (0%) 84 80	26, 79, 148, 150	0
2	B	403/440 (91%)	-0.44	1 (0%) 92 91	31, 72, 132, 150	0
All	All	945/983 (96%)	-0.38	5 (0%) 87 84	26, 76, 145, 150	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	426	TRP	3.2
1	A	90	VAL	2.3
1	A	58	THR	2.1
1	A	1	PRO	2.1
1	A	543	GLY	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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	CSD	A	280	8/9	0.92	0.09	73,76,84,90	0

### 6.3 Carbohydrates [i](#)

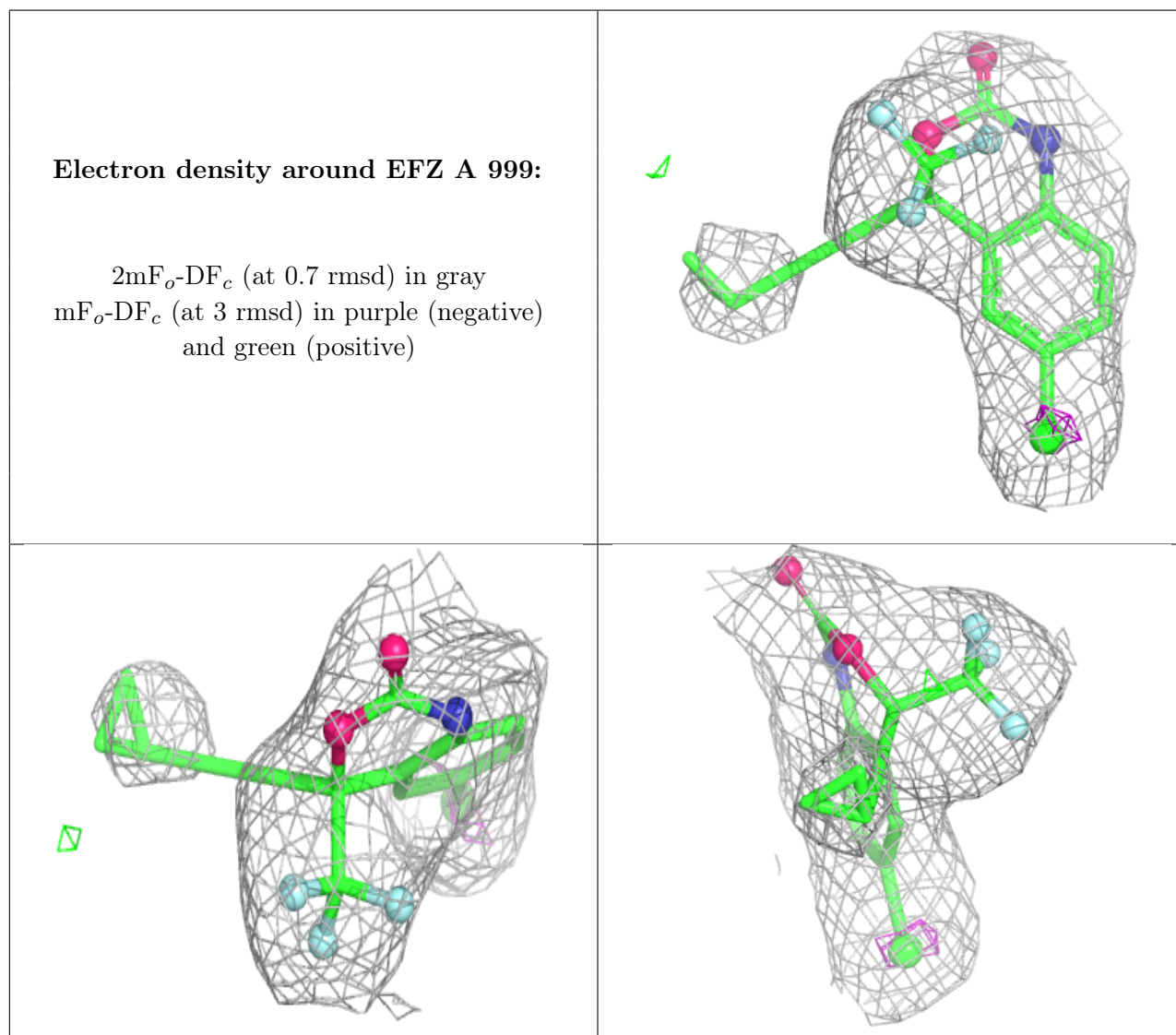
There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
3	EFZ	A	999	21/21	0.94	0.10	50,71,80,83	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.



## 6.5 Other polymers [i](#)

There are no such residues in this entry.