



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 07:38 PM UTC

PDB ID : 1TL1 / pdb_00001tl1
Title : CRYSTAL STRUCTURE OF HIV-1 REVERSE TRANSCRIPTASE IN
COMPLEX WITH GW451211
Authors : Hopkins, A.L.; Ren, J.; Stuart, D.I.; Stammers, D.K.
Deposited on : 2004-06-09
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

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>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

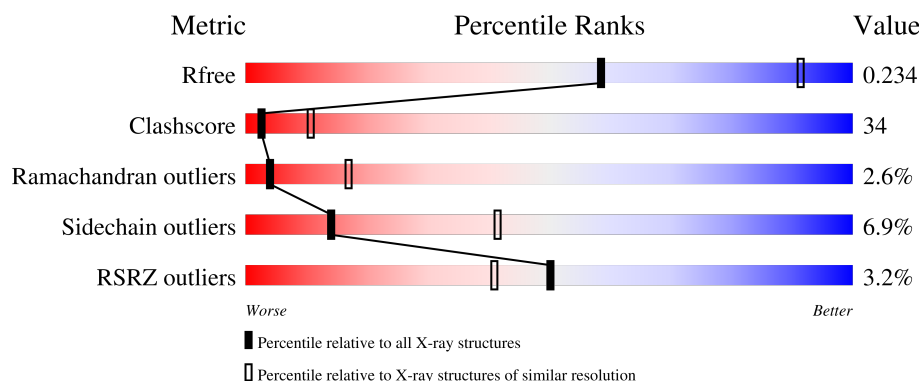
1 Overall quality at a glance

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))
R_{free}	180053	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (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 ≥ 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	560	
2	B	440	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 7604 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, Reverse transcriptase, Chain A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	517	Total	C	N	O	S	0	0	0
			4247	2754	701	784	8			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	280	CSD	CYS	modified residue	UNP P04585

- Molecule 2 is a protein called Pol polyprotein, Reverse transcriptase, Chain B.

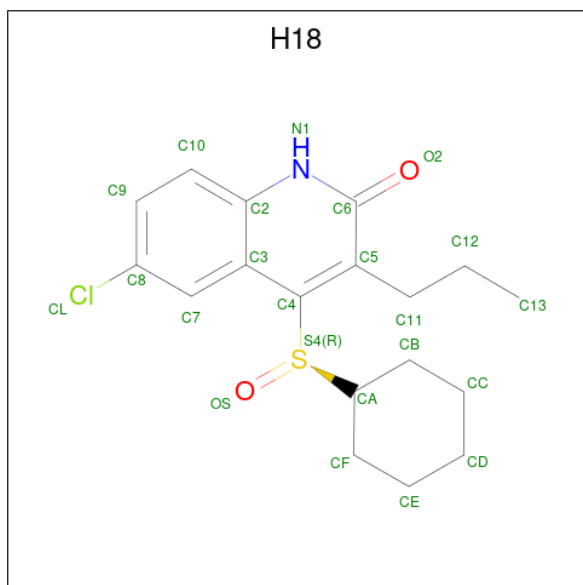
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	400	Total	C	N	O	S	0	0	0
			3319	2168	546	598	7			

- Molecule 3 is PHOSPHATE ION (CCD ID: PO4) (formula: O₄P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	P	0	0
			5	4	1		
3	A	1	Total	O	P	0	0
			5	4	1		
3	A	1	Total	O	P	0	0
			5	4	1		

- Molecule 4 is 6-CHLORO-4-(CYCLOHEXYLSULFINYL)-3-PROPYLQUINOLIN-2(1H)-ONE (CCD ID: H18) (formula: $C_{18}H_{22}ClNO_2S$).

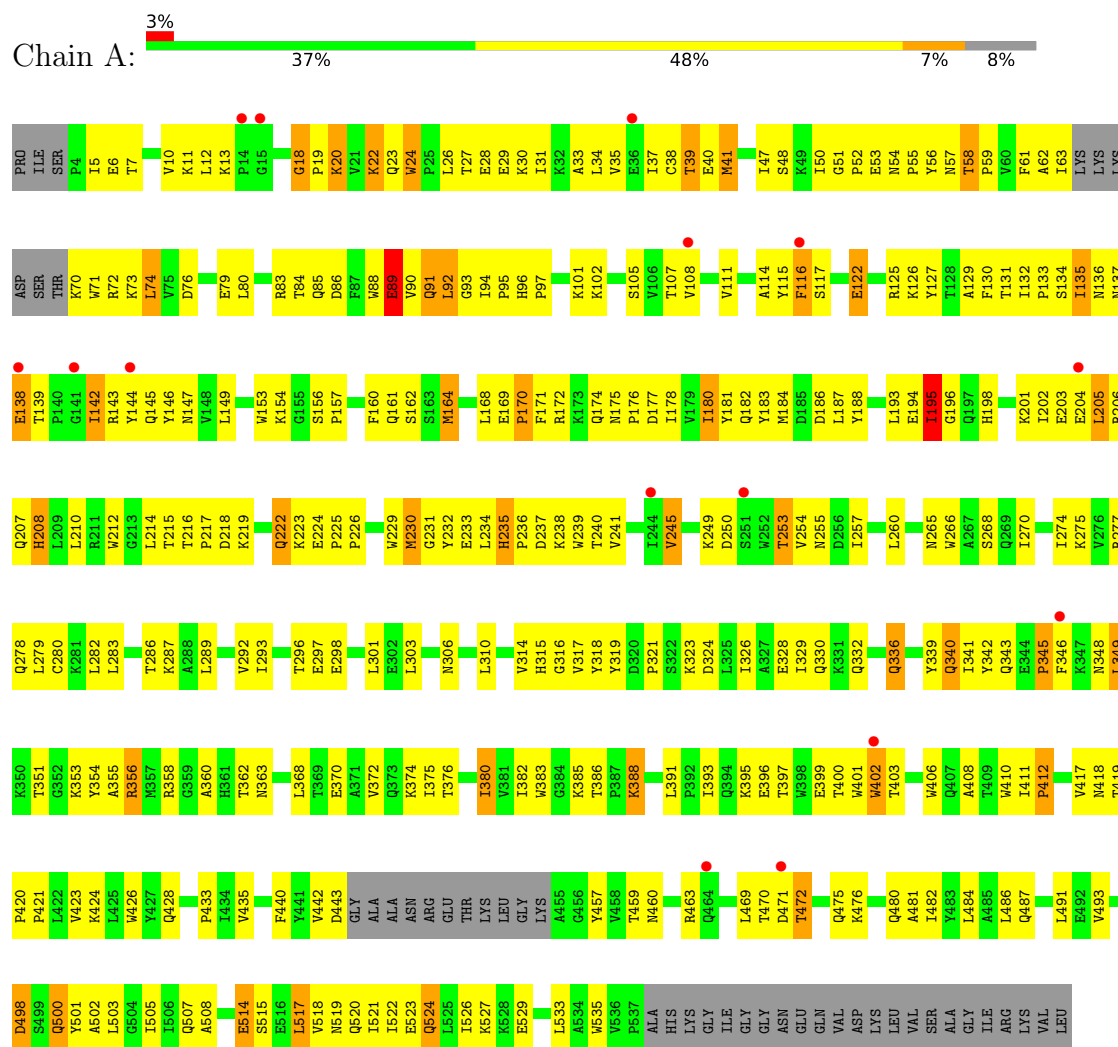


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	Cl	N	O	S	
			23	18	1	1	2	1	0
									0

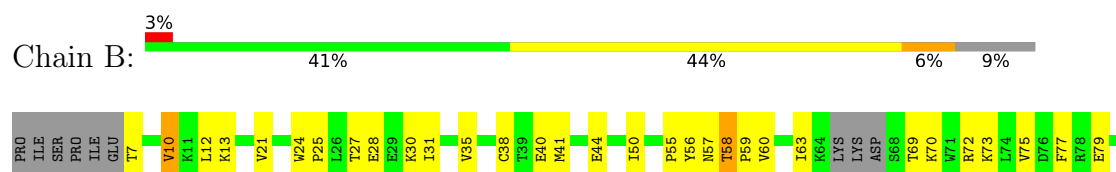
3 Residue-property plots

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, Reverse transcriptase, Chain A



• Molecule 2: Pol polyprotein, Reverse transcriptase, Chain B





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	137.50Å 115.30Å 65.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.91 – 2.90 24.91 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.2 (24.91-2.90) 99.1 (24.91-2.90)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.25 (at 2.89Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.221 , 0.281 0.217 , 0.234	Depositor DCC
R_{free} test set	1135 reflections (4.82%)	wwPDB-VP
Wilson B-factor (Å ²)	71.7	Xtriage
Anisotropy	0.197	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 95.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	7604	wwPDB-VP
Average B, all atoms (Å ²)	68.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.97% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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, H18, PO4

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	0.65	0/4352	1.09	22/5918 (0.4%)
2	B	0.63	0/3415	1.07	26/4639 (0.6%)
All	All	0.64	0/7767	1.08	48/10557 (0.5%)

There are no bond length outliers.

All (48) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	349	LEU	N-CA-C	-13.11	97.76	113.88
1	A	58	THR	CA-C-N	8.02	129.87	119.84
1	A	58	THR	C-N-CA	8.02	129.87	119.84
1	A	250	ASP	N-CA-C	-8.00	104.04	113.88
2	B	213	GLY	N-CA-C	7.59	121.64	110.63
1	A	204	GLU	N-CA-C	-7.41	101.37	112.04
1	A	500	GLN	N-CA-C	-6.65	104.11	111.82
2	B	429	LEU	N-CA-C	6.38	124.39	110.80
2	B	312	GLU	N-CA-C	6.23	115.47	108.25
1	A	147	ASN	N-CA-C	-6.12	105.76	113.72
1	A	235	HIS	N-CA-C	-6.10	102.41	110.40
2	B	209	LEU	N-CA-C	-6.06	104.97	112.90
2	B	303	LEU	N-CA-C	-6.00	104.64	111.07
2	B	69	THR	N-CA-C	-5.93	106.01	113.72
1	A	51	GLY	CA-C-N	5.88	126.29	119.47
1	A	51	GLY	C-N-CA	5.88	126.29	119.47
2	B	147	ASN	N-CA-C	-5.88	106.44	113.97
2	B	401	TRP	N-CA-C	5.83	121.31	113.72
2	B	132	ILE	N-CA-C	-5.80	102.28	107.56
1	A	88	TRP	N-CA-C	-5.80	98.45	110.80
1	A	388	LYS	N-CA-C	-5.76	99.80	108.96
1	A	234	LEU	N-CA-C	5.73	117.64	108.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	420	PRO	CA-C-N	5.66	125.77	119.32
2	B	420	PRO	C-N-CA	5.66	125.77	119.32
1	A	274	ILE	N-CA-C	-5.65	102.30	109.58
1	A	498	ASP	N-CA-C	-5.59	106.81	113.97
2	B	86	ASP	N-CA-C	-5.58	103.54	110.41
1	A	245	VAL	N-CA-C	5.54	115.93	108.17
1	A	138	GLU	N-CA-C	5.53	119.29	112.54
2	B	349	LEU	N-CA-C	-5.53	106.38	113.23
2	B	382	ILE	N-CA-C	5.51	116.16	110.82
2	B	233	GLU	N-CA-C	5.46	118.63	109.95
2	B	56	TYR	N-CA-C	5.45	117.91	110.55
1	A	22	LYS	N-CA-C	5.43	118.11	109.96
2	B	204	GLU	N-CA-C	-5.36	105.52	111.36
2	B	390	LYS	N-CA-C	-5.36	98.65	108.02
2	B	413	GLU	N-CA-C	-5.30	101.06	109.96
1	A	487	GLN	N-CA-C	5.29	117.46	111.11
2	B	365	VAL	N-CA-C	5.28	115.49	110.42
2	B	428	GLN	N-CA-C	5.20	121.88	110.80
2	B	240	THR	N-CA-C	5.18	116.95	108.76
1	A	524	GLN	N-CA-C	-5.17	105.54	111.07
1	A	180	ILE	N-CA-C	5.16	115.55	108.12
2	B	376	THR	N-CA-C	-5.10	105.37	111.03
2	B	400	THR	N-CA-C	5.08	117.93	111.69
2	B	58	THR	N-CA-C	-5.05	102.51	110.14
1	A	89	GLU	N-CA-C	5.04	117.03	110.43
2	B	123	ASP	N-CA-C	5.03	119.42	113.28

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	4247	0	4274	323	0
2	B	3319	0	3341	217	0
3	A	15	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	23	0	22	5	0
All	All	7604	0	7637	517	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 34.

All (517) 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:178:ILE:HD11	1:A:201:LYS:HG2	1.31	1.13
1:A:91:GLN:NE2	2:B:137:ASN:HB3	1.72	1.05
1:A:253:THR:HG22	1:A:255:ASN:H	1.17	1.02
2:B:261:VAL:HG13	2:B:276:VAL:HG11	1.43	1.00
2:B:63:ILE:HD11	2:B:72:ARG:HD3	1.44	0.99
2:B:227:PHE:HB3	2:B:231:GLY:HA2	1.46	0.95
2:B:332:GLN:HB3	2:B:428:GLN:NE2	1.80	0.95
2:B:266:TRP:O	2:B:269:GLN:HG2	1.69	0.92
1:A:91:GLN:HE21	2:B:137:ASN:HB3	1.34	0.88
1:A:70:LYS:HG3	1:A:71:TRP:H	1.38	0.85
2:B:169:GLU:O	2:B:173:LYS:HG3	1.75	0.85
1:A:253:THR:HG22	1:A:255:ASN:N	1.93	0.84
1:A:195:ILE:HD13	1:A:195:ILE:N	1.93	0.84
1:A:522:ILE:O	1:A:526:ILE:HG13	1.79	0.82
2:B:328:GLU:HG2	2:B:390:LYS:HD2	1.61	0.82
2:B:429:LEU:HD13	2:B:430:GLU:O	1.80	0.81
1:A:57:ASN:HA	1:A:129:ALA:O	1.79	0.81
1:A:469:LEU:HD21	1:A:480:GLN:HG3	1.60	0.81
1:A:225:PRO:HG2	1:A:236:PRO:HG3	1.60	0.81
2:B:332:GLN:HA	2:B:424:LYS:HE3	1.62	0.80
1:A:41:MET:HB2	1:A:47:ILE:HD11	1.64	0.80
1:A:206:ARG:HH22	1:A:218:ASP:HA	1.48	0.79
2:B:178:ILE:HD11	2:B:201:LYS:HG3	1.64	0.79
1:A:122:GLU:HA	1:A:125:ARG:HD2	1.63	0.79
1:A:319:TYR:OH	1:A:385:LYS:HE2	1.83	0.78
1:A:399:GLU:HG3	1:A:402:TRP:CE3	2.18	0.78
2:B:362:THR:HG22	2:B:366:LYS:HD3	1.65	0.78
2:B:295:LEU:H	2:B:295:LEU:HD12	1.49	0.77
1:A:122:GLU:HG3	1:A:125:ARG:NH1	1.99	0.77
2:B:420:PRO:O	2:B:423:VAL:HG12	1.86	0.76
1:A:28:GLU:OE1	1:A:135:ILE:HG22	1.86	0.75
1:A:178:ILE:CD1	1:A:201:LYS:HG2	2.12	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:107:THR:HG21	1:A:202:ILE:HG21	1.68	0.74
1:A:354:TYR:HD2	1:A:374:LYS:HD3	1.52	0.74
2:B:60:VAL:HG12	2:B:75:VAL:HG22	1.70	0.73
1:A:10:VAL:HG21	1:A:153:TRP:HH2	1.53	0.73
1:A:171:PHE:CE1	1:A:205:LEU:HA	2.24	0.73
1:A:412:PRO:HG3	2:B:401:TRP:HZ2	1.54	0.73
1:A:181:TYR:CE1	1:A:183:TYR:HB2	2.25	0.72
2:B:151:GLN:HB3	2:B:185:ASP:OD1	1.89	0.72
1:A:198:HIS:O	1:A:202:ILE:HG12	1.89	0.72
2:B:241:VAL:HG11	2:B:313:PRO:HG3	1.70	0.72
2:B:104:LYS:HB2	2:B:192:ASP:HA	1.71	0.72
2:B:201:LYS:HE3	2:B:201:LYS:HA	1.70	0.72
2:B:295:LEU:HD12	2:B:295:LEU:N	2.05	0.71
2:B:332:GLN:HG3	2:B:338:THR:HG23	1.72	0.70
1:A:500:GLN:HE21	2:B:422:LEU:HD12	1.56	0.70
1:A:174:GLN:C	1:A:176:PRO:HD3	2.15	0.70
2:B:169:GLU:N	2:B:170:PRO:HD2	2.06	0.70
1:A:134:SER:OG	1:A:139:THR:O	2.10	0.70
1:A:343:GLN:HG3	1:A:349:LEU:HD11	1.72	0.70
1:A:500:GLN:NE2	2:B:422:LEU:HD12	2.08	0.69
1:A:435:VAL:HG22	2:B:290:THR:HG21	1.72	0.69
1:A:442:VAL:HB	1:A:481:ALA:HB1	1.74	0.69
2:B:169:GLU:HG2	2:B:170:PRO:HD3	1.74	0.69
1:A:102:LYS:HG3	1:A:237:ASP:HA	1.75	0.69
1:A:342:TYR:HA	1:A:349:LEU:HD12	1.74	0.69
2:B:236:PRO:HA	2:B:239:TRP:CE2	2.27	0.69
2:B:298:GLU:CD	2:B:298:GLU:H	2.01	0.69
1:A:206:ARG:NH2	1:A:218:ASP:HA	2.08	0.68
1:A:79:GLU:OE2	1:A:83:ARG:NH1	2.26	0.68
1:A:206:ARG:CZ	1:A:217:PRO:O	2.42	0.68
1:A:412:PRO:HG3	2:B:401:TRP:CZ2	2.29	0.68
2:B:203:GLU:HG3	2:B:207:GLN:HE22	1.58	0.67
1:A:317:VAL:HG22	1:A:318:TYR:N	2.09	0.67
1:A:480:GLN:HG2	1:A:517:LEU:HD11	1.76	0.67
1:A:177:ASP:OD2	1:A:193:LEU:HD21	1.94	0.67
2:B:28:GLU:HB2	2:B:135:ILE:HD11	1.75	0.67
2:B:175:ASN:HD21	2:B:201:LYS:HZ2	1.41	0.67
1:A:417:VAL:O	1:A:417:VAL:HG13	1.95	0.66
2:B:236:PRO:HA	2:B:239:TRP:CD2	2.30	0.66
1:A:503:LEU:HD12	1:A:533:LEU:HD23	1.78	0.66
1:A:164:MET:O	1:A:168:LEU:HG	1.96	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:208:HIS:HD2	1:A:208:HIS:O	1.79	0.65
1:A:91:GLN:C	1:A:93:GLY:H	2.05	0.65
1:A:186:ASP:HB3	1:A:188:TYR:CE1	2.31	0.65
2:B:175:ASN:ND2	2:B:201:LYS:HZ2	1.94	0.65
1:A:54:ASN:ND2	1:A:126:LYS:HB2	2.12	0.65
1:A:72:ARG:HG2	1:A:73:LYS:N	2.11	0.65
1:A:174:GLN:HE21	1:A:174:GLN:HA	1.61	0.65
2:B:115:TYR:C	2:B:117:SER:H	2.05	0.65
2:B:242:GLN:HG2	2:B:353:LYS:HE3	1.78	0.65
2:B:202:ILE:HG21	2:B:227:PHE:HE1	1.61	0.64
2:B:203:GLU:HG3	2:B:207:GLN:NE2	2.12	0.64
2:B:227:PHE:HB3	2:B:231:GLY:CA	2.26	0.64
1:A:92:LEU:HD23	1:A:92:LEU:O	1.97	0.64
1:A:292:VAL:C	1:A:293:ILE:HD12	2.21	0.64
2:B:104:LYS:HD2	2:B:192:ASP:O	1.97	0.64
2:B:175:ASN:HD21	2:B:201:LYS:NZ	1.96	0.64
1:A:20:LYS:HD2	1:A:55:PRO:HB2	1.78	0.64
1:A:85:GLN:C	1:A:154:LYS:HZ3	2.05	0.64
1:A:107:THR:HB	1:A:202:ILE:HD12	1.79	0.64
1:A:108:VAL:HG13	1:A:223:LYS:HB2	1.80	0.64
2:B:27:THR:OG1	2:B:30:LYS:HG2	1.98	0.64
1:A:500:GLN:HE21	2:B:422:LEU:CD1	2.10	0.64
1:A:31:ILE:O	1:A:35:VAL:HG23	1.98	0.63
1:A:472:THR:OG1	1:A:476:LYS:HE3	1.98	0.63
2:B:173:LYS:O	2:B:176:PRO:HD3	1.99	0.63
1:A:363:ASN:ND2	1:A:401:TRP:CZ3	2.67	0.63
1:A:317:VAL:HG22	1:A:318:TYR:H	1.64	0.62
2:B:366:LYS:HG3	2:B:405:TYR:CD2	2.34	0.62
1:A:96:HIS:H	2:B:136:ASN:HD21	1.47	0.62
1:A:41:MET:HB2	1:A:47:ILE:CD1	2.28	0.62
1:A:238:LYS:HD2	1:A:315:HIS:CG	2.33	0.62
1:A:13:LYS:HE3	1:A:84:THR:O	1.99	0.62
2:B:365:VAL:HG11	2:B:401:TRP:HB2	1.80	0.62
1:A:195:ILE:N	1:A:195:ILE:CD1	2.63	0.62
1:A:475:GLN:HB3	1:A:501:TYR:CE2	2.34	0.62
2:B:168:LEU:C	2:B:170:PRO:HD2	2.24	0.62
1:A:12:LEU:HD11	1:A:127:TYR:CE1	2.34	0.62
1:A:279:LEU:HD23	1:A:282:LEU:HD11	1.82	0.62
1:A:523:GLU:O	1:A:527:LYS:HG2	1.99	0.61
1:A:174:GLN:HA	1:A:174:GLN:NE2	2.15	0.61
2:B:234:LEU:HD21	2:B:377:THR:CG2	2.30	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:62:ALA:C	1:A:63:ILE:HD12	2.26	0.61
1:A:417:VAL:O	1:A:419:THR:N	2.33	0.61
1:A:460:ASN:ND2	3:A:1301:PO4:O4	2.33	0.61
1:A:368:LEU:O	1:A:372:VAL:HG23	2.01	0.61
1:A:12:LEU:HD11	1:A:127:TYR:CZ	2.36	0.61
2:B:167:ILE:O	2:B:208:HIS:HE1	1.82	0.61
2:B:395:LYS:HG3	2:B:416:PHE:CE1	2.36	0.61
2:B:203:GLU:CG	2:B:207:GLN:HE22	2.14	0.60
1:A:86:ASP:HA	1:A:154:LYS:HZ1	1.67	0.60
2:B:241:VAL:O	2:B:243:PRO:HD3	2.02	0.60
1:A:507:GLN:HE22	2:B:421:PRO:HB3	1.67	0.60
2:B:85:GLN:O	2:B:85:GLN:HG3	2.01	0.60
1:A:476:LYS:HD2	1:A:476:LYS:O	2.02	0.60
1:A:171:PHE:HB2	1:A:208:HIS:CE1	2.37	0.60
1:A:101:LYS:HD2	1:A:101:LYS:N	2.16	0.59
1:A:403:THR:CG2	2:B:334:GLN:H	2.14	0.59
1:A:354:TYR:CD2	1:A:374:LYS:HD3	2.37	0.59
1:A:229:TRP:CE2	4:A:999:H18:HD1	2.37	0.59
1:A:399:GLU:HG3	1:A:402:TRP:CZ3	2.37	0.59
1:A:208:HIS:C	1:A:208:HIS:CD2	2.80	0.59
1:A:411:ILE:O	1:A:412:PRO:O	2.20	0.59
2:B:395:LYS:NZ	2:B:399:GLU:HG3	2.17	0.59
2:B:139:THR:HB	2:B:140:PRO:HD2	1.84	0.59
2:B:365:VAL:O	2:B:369:THR:HG23	2.03	0.58
1:A:10:VAL:HG12	1:A:11:LYS:N	2.18	0.58
1:A:172:ARG:NH1	1:A:180:ILE:HB	2.18	0.58
2:B:298:GLU:OE1	2:B:298:GLU:N	2.35	0.58
1:A:358:ARG:HD3	1:A:370:GLU:CD	2.29	0.58
2:B:261:VAL:HG13	2:B:276:VAL:CG1	2.24	0.58
2:B:170:PRO:HA	2:B:173:LYS:HZ3	1.67	0.58
2:B:295:LEU:H	2:B:295:LEU:CD1	2.15	0.58
1:A:89:GLU:OE1	1:A:89:GLU:HA	2.03	0.58
2:B:170:PRO:HA	2:B:173:LYS:NZ	2.19	0.58
2:B:28:GLU:CB	2:B:135:ILE:HD11	2.34	0.57
2:B:205:LEU:O	2:B:209:LEU:HG	2.03	0.57
2:B:274:ILE:HD11	2:B:310:LEU:HD21	1.85	0.57
1:A:233:GLU:HB3	1:A:240:THR:HG23	1.86	0.57
1:A:330:GLN:NE2	1:A:340:GLN:OE1	2.34	0.57
1:A:491:LEU:HD23	1:A:529:GLU:CG	2.34	0.57
2:B:234:LEU:HD21	2:B:377:THR:HG21	1.87	0.57
1:A:58:THR:HG23	1:A:76:ASP:O	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:195:ILE:HG13	2:B:199:ARG:HE	1.69	0.57
2:B:203:GLU:CD	2:B:207:GLN:HE22	2.11	0.57
1:A:34:LEU:HD13	1:A:132:ILE:HD12	1.86	0.57
1:A:329:ILE:HD11	1:A:375:ILE:HD12	1.87	0.57
2:B:282:LEU:HD21	2:B:296:THR:HG23	1.86	0.57
1:A:195:ILE:HD13	1:A:195:ILE:H	1.70	0.57
1:A:208:HIS:O	1:A:208:HIS:CD2	2.57	0.56
2:B:115:TYR:O	2:B:117:SER:N	2.37	0.56
1:A:107:THR:HG23	1:A:222:GLN:NE2	2.19	0.56
1:A:131:THR:HG23	1:A:143:ARG:HG2	1.86	0.56
1:A:231:GLY:O	1:A:266:TRP:HZ2	1.88	0.56
2:B:38:CYS:SG	2:B:73:LYS:HE2	2.46	0.56
2:B:58:THR:HG21	2:B:77:PHE:CD2	2.39	0.56
1:A:125:ARG:HG2	1:A:146:TYR:O	2.06	0.56
2:B:167:ILE:O	2:B:208:HIS:CE1	2.58	0.56
1:A:491:LEU:HD23	1:A:529:GLU:HG2	1.86	0.56
1:A:91:GLN:O	1:A:93:GLY:N	2.39	0.56
2:B:257:ILE:HG21	2:B:283:LEU:HD13	1.89	0.55
1:A:116:PHE:N	1:A:116:PHE:CD2	2.74	0.55
1:A:440:PHE:HZ	1:A:463:ARG:HH21	1.53	0.55
2:B:31:ILE:O	2:B:35:VAL:HG23	2.06	0.55
2:B:332:GLN:CG	2:B:338:THR:HG23	2.37	0.55
1:A:206:ARG:HH12	1:A:218:ASP:HA	1.71	0.55
1:A:376:THR:HG23	1:A:386:THR:HG22	1.89	0.55
1:A:27:THR:HG23	1:A:30:LYS:HB2	1.88	0.55
2:B:170:PRO:HG2	2:B:171:PHE:H	1.71	0.55
2:B:183:TYR:OH	2:B:386:THR:HG23	2.07	0.55
2:B:414:TRP:HD1	2:B:414:TRP:O	1.90	0.55
2:B:254:VAL:O	2:B:258:GLN:HG3	2.07	0.55
2:B:380:ILE:O	2:B:384:GLY:N	2.34	0.55
1:A:114:ALA:HB1	1:A:160:PHE:CE2	2.42	0.55
2:B:116:PHE:CE1	2:B:151:GLN:HG3	2.42	0.55
1:A:219:LYS:HD2	1:A:222:GLN:NE2	2.23	0.54
1:A:348:ASN:ND2	1:A:351:THR:CG2	2.71	0.54
2:B:169:GLU:HG2	2:B:170:PRO:CD	2.38	0.54
2:B:178:ILE:CD1	2:B:201:LYS:HD2	2.37	0.54
2:B:175:ASN:ND2	2:B:201:LYS:NZ	2.54	0.54
1:A:296:THR:HG22	1:A:297:GLU:N	2.21	0.54
1:A:58:THR:CG2	1:A:76:ASP:O	2.56	0.54
1:A:61:PHE:CE1	1:A:63:ILE:HD11	2.43	0.54
1:A:96:HIS:H	2:B:136:ASN:ND2	2.05	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:380:ILE:HD13	2:B:27:THR:HG22	1.90	0.54
1:A:171:PHE:HB2	1:A:208:HIS:ND1	2.23	0.54
1:A:340:GLN:HB3	1:A:351:THR:HG22	1.89	0.54
1:A:210:LEU:C	1:A:212:TRP:H	2.15	0.54
1:A:470:THR:O	1:A:471:ASP:HB2	2.08	0.54
2:B:227:PHE:CB	2:B:231:GLY:HA2	2.30	0.54
2:B:335:GLY:O	2:B:355:ALA:HA	2.08	0.54
1:A:340:GLN:CB	1:A:351:THR:HG22	2.37	0.53
1:A:94:ILE:HD13	1:A:230:MET:HE1	1.91	0.53
1:A:253:THR:CG2	1:A:254:VAL:N	2.70	0.53
2:B:277:ARG:O	2:B:281:LYS:HG3	2.08	0.53
2:B:201:LYS:HD3	2:B:201:LYS:O	2.08	0.53
1:A:26:LEU:HD12	1:A:133:PRO:CD	2.39	0.53
1:A:40:GLU:OE2	1:A:40:GLU:HA	2.08	0.53
1:A:376:THR:HG23	1:A:386:THR:CG2	2.39	0.53
1:A:29:GLU:HG2	1:A:29:GLU:O	2.09	0.53
1:A:115:TYR:O	1:A:149:LEU:HB2	2.09	0.53
2:B:175:ASN:N	2:B:176:PRO:HD3	2.22	0.53
1:A:358:ARG:NH2	2:B:394:GLN:HG2	2.24	0.53
2:B:203:GLU:OE2	2:B:207:GLN:NE2	2.40	0.53
1:A:86:ASP:HA	1:A:154:LYS:NZ	2.24	0.53
1:A:476:LYS:HD3	1:A:517:LEU:HD12	1.90	0.52
2:B:425:LEU:HD23	2:B:425:LEU:O	2.09	0.52
1:A:56:TYR:O	1:A:143:ARG:NH2	2.35	0.52
1:A:70:LYS:HG3	1:A:71:TRP:N	2.16	0.52
1:A:194:GLU:O	1:A:196:GLY:N	2.42	0.52
2:B:342:TYR:HB3	2:B:348:ASN:HA	1.90	0.52
1:A:469:LEU:HD21	1:A:480:GLN:CG	2.35	0.52
2:B:330:GLN:HB2	2:B:338:THR:OG1	2.09	0.52
2:B:79:GLU:O	2:B:83:ARG:HG3	2.09	0.52
1:A:236:PRO:HA	4:A:999:H18:H9	1.92	0.52
1:A:206:ARG:NH1	1:A:218:ASP:HA	2.25	0.52
1:A:268:SER:OG	1:A:353:LYS:HE2	2.09	0.52
2:B:175:ASN:O	2:B:178:ILE:HB	2.10	0.52
1:A:498:ASP:O	1:A:535:TRP:NE1	2.41	0.51
1:A:507:GLN:NE2	2:B:421:PRO:HB3	2.25	0.51
1:A:108:VAL:CG1	1:A:223:LYS:HB2	2.40	0.51
2:B:146:TYR:CD2	2:B:150:PRO:HB3	2.45	0.51
2:B:297:GLU:HA	2:B:300:GLU:HB2	1.91	0.51
2:B:125:ARG:HB3	2:B:145:GLN:HE21	1.75	0.51
1:A:382:ILE:O	2:B:136:ASN:HB2	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:7:THR:HG22	2:B:119:PRO:HG2	1.92	0.51
2:B:97:PRO:C	2:B:99:GLY:N	2.66	0.51
2:B:332:GLN:OE1	2:B:428:GLN:CD	2.53	0.51
2:B:264:LEU:HD13	2:B:306:ASN:HD22	1.75	0.51
1:A:515:SER:O	1:A:519:ASN:ND2	2.42	0.51
2:B:115:TYR:OH	2:B:157:PRO:HG3	2.11	0.51
1:A:225:PRO:HB3	1:A:236:PRO:HD3	1.92	0.51
2:B:97:PRO:C	2:B:99:GLY:H	2.18	0.51
2:B:306:ASN:O	2:B:310:LEU:HG	2.11	0.51
2:B:366:LYS:O	2:B:370:GLU:HG3	2.11	0.51
2:B:57:ASN:ND2	2:B:131:THR:OG1	2.43	0.50
2:B:174:GLN:C	2:B:176:PRO:HD3	2.36	0.50
2:B:282:LEU:HB3	2:B:293:ILE:HG21	1.93	0.50
1:A:19:PRO:HD3	1:A:80:LEU:HD13	1.93	0.50
1:A:408:ALA:HB1	2:B:364:ASP:HB3	1.93	0.50
1:A:169:GLU:HB3	1:A:170:PRO:HD3	1.94	0.50
1:A:328:GLU:O	1:A:339:TYR:HA	2.10	0.50
1:A:406:TRP:HH2	2:B:418:ASN:OD1	1.94	0.50
1:A:70:LYS:CG	1:A:71:TRP:H	2.17	0.50
2:B:146:TYR:CG	2:B:150:PRO:HB3	2.47	0.50
2:B:372:VAL:HG13	2:B:389:PHE:CZ	2.47	0.50
1:A:393:ILE:HD12	1:A:423:VAL:HG21	1.93	0.50
1:A:399:GLU:HA	1:A:402:TRP:HE3	1.76	0.50
2:B:107:THR:HB	2:B:202:ILE:HD11	1.94	0.50
1:A:260:LEU:HD23	1:A:279:LEU:HD13	1.94	0.50
2:B:393:ILE:HD11	2:B:397:THR:HG22	1.94	0.50
1:A:111:VAL:CG1	1:A:114:ALA:HB2	2.41	0.49
1:A:188:TYR:CD2	4:A:999:H18:HF1	2.47	0.49
1:A:319:TYR:O	1:A:321:PRO:HD3	2.12	0.49
1:A:476:LYS:CD	1:A:517:LEU:HD12	2.41	0.49
2:B:28:GLU:HB2	2:B:135:ILE:CD1	2.42	0.49
1:A:175:ASN:N	1:A:176:PRO:HD3	2.26	0.49
1:A:207:GLN:NE2	1:A:210:LEU:HD12	2.27	0.49
1:A:278:GLN:NE2	1:A:278:GLN:HA	2.27	0.49
1:A:54:ASN:O	1:A:143:ARG:NH2	2.43	0.49
2:B:239:TRP:CH2	2:B:378:GLU:HG2	2.47	0.49
2:B:331:LYS:HB2	2:B:337:TRP:CZ3	2.47	0.49
2:B:125:ARG:HB3	2:B:145:GLN:NE2	2.28	0.49
2:B:244:ILE:HD13	2:B:266:TRP:CZ3	2.48	0.49
2:B:178:ILE:HD11	2:B:201:LYS:CG	2.40	0.49
1:A:10:VAL:O	1:A:11:LYS:HG3	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:328:GLU:CG	2:B:390:LYS:HD2	2.36	0.49
2:B:372:VAL:HG13	2:B:389:PHE:CE2	2.48	0.49
1:A:229:TRP:O	1:A:232:TYR:HB2	2.13	0.49
1:A:277:ARG:HG3	1:A:277:ARG:HH11	1.78	0.49
2:B:278:GLN:NE2	2:B:298:GLU:HB2	2.28	0.49
2:B:423:VAL:O	2:B:427:TYR:HD2	1.96	0.49
1:A:164:MET:HE3	1:A:168:LEU:HD11	1.94	0.48
2:B:295:LEU:N	2:B:295:LEU:CD1	2.75	0.48
1:A:63:ILE:HD12	1:A:63:ILE:N	2.28	0.48
1:A:108:VAL:HG12	1:A:223:LYS:O	2.13	0.48
1:A:74:LEU:C	1:A:74:LEU:HD12	2.38	0.48
1:A:181:TYR:OH	1:A:183:TYR:HD2	1.95	0.48
2:B:136:ASN:O	2:B:138:GLU:HG3	2.14	0.48
2:B:178:ILE:HD12	2:B:201:LYS:HD2	1.95	0.48
1:A:10:VAL:HG21	1:A:153:TRP:CH2	2.43	0.48
1:A:500:GLN:O	1:A:503:LEU:HB3	2.12	0.48
1:A:131:THR:OG1	1:A:143:ARG:CD	2.62	0.48
1:A:194:GLU:O	1:A:195:ILE:C	2.57	0.48
1:A:399:GLU:HG3	1:A:402:TRP:HE3	1.75	0.48
2:B:319:TYR:HE2	2:B:325:LEU:HD13	1.78	0.48
2:B:208:HIS:HA	2:B:211:ARG:HD3	1.95	0.48
1:A:50:ILE:HD12	1:A:54:ASN:HB3	1.96	0.48
1:A:145:GLN:HG3	1:A:145:GLN:O	2.14	0.48
1:A:164:MET:HE1	1:A:187:LEU:HD21	1.96	0.48
2:B:201:LYS:HD3	2:B:201:LYS:C	2.38	0.48
1:A:231:GLY:O	1:A:266:TRP:CZ2	2.67	0.47
1:A:293:ILE:HD12	1:A:293:ILE:N	2.29	0.47
2:B:230:MET:C	2:B:232:TYR:N	2.72	0.47
2:B:368:LEU:O	2:B:372:VAL:HG23	2.14	0.47
1:A:23:GLN:NE2	1:A:26:LEU:HG	2.28	0.47
1:A:38:CYS:SG	1:A:73:LYS:HE3	2.54	0.47
1:A:420:PRO:HA	1:A:421:PRO:C	2.39	0.47
1:A:107:THR:HG21	1:A:202:ILE:CG2	2.41	0.47
1:A:255:ASN:HB2	1:A:289:LEU:O	2.15	0.47
1:A:210:LEU:C	1:A:212:TRP:N	2.71	0.47
1:A:241:VAL:HG22	1:A:270:ILE:HG21	1.95	0.47
2:B:10:VAL:HG21	2:B:153:TRP:HH2	1.79	0.47
1:A:130:PHE:CE2	1:A:144:TYR:HB2	2.50	0.47
1:A:225:PRO:CB	1:A:236:PRO:HD3	2.44	0.47
1:A:254:VAL:CG2	1:A:293:ILE:HD11	2.45	0.47
1:A:469:LEU:CD2	1:A:480:GLN:HG3	2.40	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:518:VAL:O	1:A:522:ILE:HG13	2.15	0.47
2:B:99:GLY:HA2	2:B:102:LYS:HE2	1.96	0.47
2:B:376:THR:O	2:B:377:THR:C	2.57	0.47
2:B:378:GLU:O	2:B:379:SER:C	2.58	0.47
1:A:136:ASN:OD1	1:A:139:THR:HG23	2.14	0.47
1:A:164:MET:HE1	1:A:168:LEU:HD21	1.95	0.47
2:B:57:ASN:HD22	2:B:143:ARG:NH1	2.12	0.47
2:B:108:VAL:HG12	2:B:228:LEU:HD12	1.96	0.47
2:B:355:ALA:O	2:B:356:ARG:C	2.57	0.47
2:B:369:THR:HG22	2:B:398:TRP:CZ3	2.49	0.47
1:A:283:LEU:C	1:A:286:THR:HG23	2.40	0.47
2:B:379:SER:HA	2:B:383:TRP:CE3	2.50	0.47
1:A:346:PHE:N	1:A:346:PHE:CD1	2.82	0.46
2:B:21:VAL:HB	2:B:59:PRO:HD3	1.97	0.46
1:A:207:GLN:CD	1:A:210:LEU:HD12	2.40	0.46
1:A:340:GLN:HA	1:A:351:THR:HA	1.96	0.46
2:B:189:VAL:HG11	2:B:202:ILE:HD13	1.97	0.46
1:A:238:LYS:NZ	1:A:315:HIS:CD2	2.83	0.46
1:A:324:ASP:CG	1:A:388:LYS:HE3	2.40	0.46
1:A:24:TRP:CZ3	1:A:61:PHE:HB3	2.51	0.46
1:A:164:MET:CE	1:A:168:LEU:HD11	2.45	0.46
1:A:393:ILE:HB	1:A:423:VAL:HG22	1.97	0.46
2:B:169:GLU:N	2:B:170:PRO:CD	2.76	0.46
2:B:195:ILE:HG23	2:B:196:GLY:N	2.31	0.46
1:A:348:ASN:ND2	1:A:351:THR:HG21	2.31	0.46
2:B:136:ASN:O	2:B:137:ASN:C	2.58	0.46
2:B:348:ASN:HD22	2:B:351:THR:CG2	2.29	0.46
1:A:117:SER:OG	1:A:214:LEU:HD23	2.16	0.46
1:A:224:GLU:HB3	1:A:225:PRO:HD2	1.96	0.46
1:A:457:TYR:CD1	1:A:457:TYR:C	2.94	0.46
2:B:24:TRP:CD1	2:B:25:PRO:HD2	2.51	0.46
1:A:86:ASP:CA	1:A:154:LYS:HZ1	2.27	0.46
1:A:408:ALA:HB2	2:B:337:TRP:HH2	1.80	0.46
2:B:393:ILE:HD11	2:B:397:THR:CG2	2.46	0.46
1:A:417:VAL:O	1:A:417:VAL:CG1	2.61	0.46
1:A:486:LEU:HD13	1:A:524:GLN:HB2	1.98	0.46
2:B:195:ILE:CG2	2:B:196:GLY:N	2.79	0.46
1:A:270:ILE:HG13	1:A:314:VAL:HG23	1.98	0.45
1:A:183:TYR:O	1:A:184:MET:HB2	2.17	0.45
1:A:206:ARG:CZ	1:A:218:ASP:HA	2.45	0.45
1:A:238:LYS:HD2	1:A:315:HIS:CD2	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:317:VAL:CG2	1:A:318:TYR:N	2.76	0.45
2:B:40:GLU:HG3	2:B:44:GLU:OE2	2.16	0.45
1:A:283:LEU:O	1:A:286:THR:HG23	2.15	0.45
1:A:235:HIS:O	4:A:999:H18:H9	2.16	0.45
1:A:501:TYR:CE1	1:A:505:ILE:HD11	2.51	0.45
1:A:18:GLY:HA3	1:A:56:TYR:CE1	2.52	0.45
1:A:28:GLU:OE1	1:A:135:ILE:CG2	2.61	0.45
1:A:306:ASN:O	1:A:310:LEU:HG	2.15	0.45
1:A:363:ASN:ND2	1:A:401:TRP:CH2	2.84	0.45
1:A:18:GLY:HA3	1:A:56:TYR:CD1	2.52	0.45
1:A:27:THR:O	1:A:30:LYS:N	2.48	0.45
1:A:424:LYS:NZ	1:A:426:TRP:CD2	2.79	0.45
1:A:53:GLU:O	1:A:55:PRO:HD3	2.16	0.45
1:A:401:TRP:HH2	1:A:508:ALA:O	2.00	0.45
1:A:482:ILE:HD12	1:A:502:ALA:HB1	1.99	0.45
1:A:27:THR:HG23	1:A:30:LYS:CB	2.46	0.45
1:A:95:PRO:HG3	2:B:137:ASN:O	2.17	0.44
4:A:999:H18:H7	4:A:999:H18:OS	2.17	0.44
2:B:108:VAL:HG22	2:B:188:TYR:CD2	2.52	0.44
2:B:264:LEU:HD13	2:B:306:ASN:ND2	2.32	0.44
2:B:115:TYR:C	2:B:117:SER:N	2.74	0.44
2:B:208:HIS:O	2:B:208:HIS:ND1	2.50	0.44
2:B:230:MET:C	2:B:232:TYR:H	2.24	0.44
1:A:40:GLU:OE2	1:A:40:GLU:CA	2.65	0.44
1:A:240:THR:OG1	1:A:241:VAL:N	2.50	0.44
1:A:395:LYS:O	1:A:399:GLU:HB2	2.17	0.44
1:A:222:GLN:HB3	1:A:223:LYS:H	1.69	0.44
1:A:410:TRP:CE3	2:B:363:ASN:HB2	2.53	0.44
2:B:182:GLN:HB2	2:B:187:LEU:CD1	2.47	0.44
1:A:142:ILE:HD12	1:A:144:TYR:OH	2.17	0.44
1:A:324:ASP:O	1:A:343:GLN:HG2	2.17	0.44
2:B:234:LEU:N	2:B:234:LEU:HD12	2.32	0.44
2:B:278:GLN:HB3	2:B:299:ALA:HA	2.00	0.44
1:A:34:LEU:HD13	1:A:132:ILE:CD1	2.47	0.44
2:B:369:THR:HG22	2:B:398:TRP:CH2	2.52	0.44
1:A:48:SER:O	1:A:50:ILE:HG23	2.16	0.44
1:A:91:GLN:C	1:A:93:GLY:N	2.71	0.44
1:A:332:GLN:HB3	1:A:336:GLN:HB3	2.00	0.44
1:A:393:ILE:HB	1:A:423:VAL:CG2	2.48	0.44
2:B:339:TYR:CD1	2:B:375:ILE:HD11	2.53	0.44
2:B:414:TRP:O	2:B:414:TRP:CD1	2.71	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:429:LEU:CD1	2:B:430:GLU:N	2.81	0.44
1:A:38:CYS:O	1:A:39:THR:C	2.59	0.44
1:A:406:TRP:CH2	2:B:418:ASN:HA	2.53	0.43
2:B:118:VAL:HG21	2:B:160:PHE:HD2	1.83	0.43
2:B:154:LYS:O	2:B:157:PRO:HD2	2.18	0.43
1:A:95:PRO:HG2	1:A:181:TYR:CE2	2.53	0.43
1:A:237:ASP:OD2	1:A:237:ASP:N	2.44	0.43
2:B:163:SER:O	2:B:167:ILE:HG13	2.18	0.43
1:A:296:THR:CG2	1:A:297:GLU:N	2.81	0.43
1:A:317:VAL:CG2	1:A:318:TYR:H	2.28	0.43
1:A:326:ILE:O	1:A:341:ILE:HA	2.19	0.43
1:A:360:ALA:HB1	1:A:514:GLU:OE1	2.18	0.43
1:A:401:TRP:CH2	1:A:508:ALA:O	2.71	0.43
2:B:228:LEU:HD23	2:B:228:LEU:HA	1.91	0.43
2:B:264:LEU:CD1	2:B:306:ASN:HD22	2.32	0.43
1:A:161:GLN:O	1:A:162:SER:C	2.62	0.43
1:A:171:PHE:C	1:A:171:PHE:CD2	2.96	0.43
1:A:218:ASP:O	1:A:222:GLN:HG3	2.18	0.43
1:A:253:THR:CG2	1:A:255:ASN:H	2.07	0.43
2:B:100:LEU:O	2:B:100:LEU:HD12	2.19	0.43
2:B:425:LEU:HD23	2:B:425:LEU:C	2.43	0.43
1:A:79:GLU:O	1:A:83:ARG:HG3	2.17	0.43
1:A:201:LYS:C	1:A:203:GLU:N	2.76	0.43
1:A:472:THR:CB	1:A:476:LYS:HE3	2.48	0.43
1:A:131:THR:OG1	1:A:143:ARG:HD3	2.18	0.43
1:A:225:PRO:HA	1:A:226:PRO:C	2.44	0.43
2:B:229:TRP:HA	2:B:229:TRP:CE3	2.53	0.43
1:A:111:VAL:HG12	1:A:114:ALA:HB2	1.99	0.43
2:B:150:PRO:HG2	2:B:153:TRP:HB2	2.01	0.43
1:A:253:THR:CG2	1:A:289:LEU:O	2.67	0.43
1:A:174:GLN:HE21	1:A:174:GLN:CA	2.27	0.43
1:A:226:PRO:HB3	1:A:235:HIS:CE1	2.54	0.43
1:A:277:ARG:HG3	1:A:277:ARG:NH1	2.33	0.43
2:B:50:ILE:CG2	2:B:145:GLN:HG2	2.49	0.43
1:A:177:ASP:OD1	1:A:177:ASP:N	2.48	0.42
1:A:520:GLN:HE21	1:A:520:GLN:HB2	1.57	0.42
2:B:98:ALA:O	2:B:101:LYS:HE3	2.19	0.42
1:A:23:GLN:NE2	1:A:24:TRP:O	2.41	0.42
1:A:52:PRO:O	1:A:53:GLU:C	2.62	0.42
1:A:206:ARG:HH12	1:A:219:LYS:N	2.17	0.42
1:A:265:ASN:N	1:A:265:ASN:HD22	2.17	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:296:THR:HG22	1:A:298:GLU:H	1.85	0.42
2:B:112:GLY:HA3	2:B:151:GLN:OE1	2.18	0.42
1:A:224:GLU:HB3	1:A:225:PRO:CD	2.49	0.42
1:A:433:PRO:HB3	2:B:289:LEU:HD23	2.01	0.42
1:A:239:TRP:NE1	1:A:316:GLY:HA3	2.35	0.42
2:B:316:GLY:HA2	2:B:318:TYR:CE2	2.54	0.42
2:B:104:LYS:CB	2:B:192:ASP:HA	2.46	0.42
2:B:182:GLN:HA	2:B:187:LEU:HD12	2.01	0.42
2:B:252:TRP:CZ3	2:B:260:LEU:HD22	2.54	0.42
1:A:503:LEU:HD22	1:A:535:TRP:HB2	2.01	0.42
2:B:12:LEU:O	2:B:13:LYS:C	2.62	0.42
1:A:131:THR:OG1	1:A:143:ARG:HD2	2.19	0.42
1:A:245:VAL:O	1:A:245:VAL:HG23	2.18	0.42
1:A:358:ARG:CZ	2:B:394:GLN:CD	2.92	0.42
2:B:98:ALA:O	2:B:101:LYS:HG2	2.19	0.42
2:B:301:LEU:O	2:B:304:ALA:HB3	2.19	0.42
1:A:402:TRP:CD1	1:A:402:TRP:C	2.97	0.42
2:B:160:PHE:O	2:B:160:PHE:CD1	2.73	0.42
1:A:63:ILE:HD13	1:A:74:LEU:HB3	2.00	0.41
1:A:233:GLU:HB3	1:A:240:THR:CG2	2.48	0.41
1:A:96:HIS:HA	1:A:97:PRO:HD2	1.83	0.41
1:A:257:ILE:HD13	1:A:282:LEU:HD13	2.02	0.41
2:B:429:LEU:HB2	2:B:430:GLU:H	1.38	0.41
1:A:156:SER:N	1:A:157:PRO:CD	2.83	0.41
1:A:174:GLN:O	1:A:176:PRO:HD3	2.20	0.41
1:A:355:ALA:O	1:A:356:ARG:C	2.63	0.41
1:A:391:LEU:HB2	1:A:393:ILE:HG22	2.02	0.41
1:A:486:LEU:CD1	1:A:521:ILE:HG23	2.50	0.41
1:A:10:VAL:CG1	1:A:11:LYS:N	2.82	0.41
1:A:115:TYR:N	1:A:115:TYR:CD2	2.89	0.41
2:B:173:LYS:O	2:B:176:PRO:CD	2.66	0.41
1:A:116:PHE:H	1:A:116:PHE:HD2	1.68	0.41
2:B:395:LYS:HZ3	2:B:399:GLU:CG	2.34	0.41
1:A:160:PHE:CE2	1:A:164:MET:HG2	2.55	0.41
1:A:282:LEU:HB3	1:A:293:ILE:HG21	2.02	0.41
2:B:269:GLN:CD	2:B:346:PHE:CZ	2.99	0.41
1:A:23:GLN:HE21	1:A:26:LEU:HG	1.86	0.41
1:A:324:ASP:O	1:A:343:GLN:HA	2.20	0.41
2:B:393:ILE:HG12	2:B:394:GLN:N	2.36	0.41
1:A:54:ASN:HD21	1:A:126:LYS:HB2	1.84	0.41
1:A:130:PHE:CZ	1:A:144:TYR:HB2	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:253:THR:HG22	1:A:254:VAL:N	2.36	0.41
2:B:41:MET:HE3	2:B:116:PHE:CE2	2.56	0.41
2:B:259:LYS:HE2	2:B:259:LYS:HB3	1.82	0.41
1:A:116:PHE:N	1:A:116:PHE:HD2	2.19	0.41
1:A:175:ASN:OD1	1:A:201:LYS:HE2	2.20	0.41
1:A:226:PRO:HB3	1:A:235:HIS:ND1	2.36	0.41
1:A:396:GLU:HG3	1:A:397:THR:N	2.36	0.41
1:A:426:TRP:H	1:A:426:TRP:CD1	2.39	0.41
1:A:440:PHE:CD2	1:A:459:THR:HG22	2.56	0.41
2:B:429:LEU:HD13	2:B:430:GLU:N	2.36	0.41
1:A:33:ALA:O	1:A:37:ILE:HG13	2.21	0.41
1:A:354:TYR:HD2	1:A:374:LYS:CD	2.26	0.41
1:A:362:THR:OG1	1:A:363:ASN:N	2.54	0.41
2:B:338:THR:HG21	2:B:427:TYR:O	2.20	0.41
2:B:340:GLN:CG	2:B:351:THR:HG22	2.51	0.41
1:A:22:LYS:HG2	1:A:23:GLN:N	2.36	0.40
1:A:84:THR:O	1:A:154:LYS:NZ	2.53	0.40
1:A:341:ILE:HG21	1:A:383:TRP:CH2	2.56	0.40
2:B:21:VAL:CG1	2:B:59:PRO:CG	2.99	0.40
2:B:41:MET:HE2	2:B:41:MET:HB3	1.94	0.40
1:A:164:MET:HE1	1:A:187:LEU:CD2	2.50	0.40
1:A:171:PHE:CE1	1:A:205:LEU:CA	3.01	0.40
1:A:195:ILE:HG12	1:A:196:GLY:H	1.85	0.40
1:A:207:GLN:NE2	1:A:207:GLN:HA	2.36	0.40
2:B:40:GLU:OE2	2:B:40:GLU:HA	2.21	0.40
2:B:269:GLN:OE1	2:B:346:PHE:CZ	2.75	0.40
1:A:393:ILE:HD12	1:A:423:VAL:CG2	2.51	0.40
2:B:317:VAL:O	2:B:317:VAL:HG12	2.21	0.40
1:A:27:THR:CG2	1:A:30:LYS:HG3	2.51	0.40
1:A:216:THR:HB	1:A:217:PRO:HD2	2.03	0.40
1:A:26:LEU:HD12	1:A:133:PRO:CG	2.52	0.40
1:A:85:GLN:C	1:A:154:LYS:NZ	2.77	0.40
2:B:208:HIS:ND1	2:B:208:HIS:C	2.78	0.40
2:B:396:GLU:H	2:B:396:GLU:CD	2.29	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	510/560 (91%)	449 (88%)	45 (9%)	16 (3%)	3	14
2	B	390/440 (89%)	349 (90%)	34 (9%)	7 (2%)	6	25
All	All	900/1000 (90%)	798 (89%)	79 (9%)	23 (3%)	4	17

All (23) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	90	VAL
1	A	195	ILE
1	A	222	GLN
1	A	412	PRO
2	B	116	PHE
2	B	428	GLN
1	A	18	GLY
1	A	402	TRP
1	A	418	ASN
2	B	122	GLU
2	B	167	ILE
1	A	137	ASN
1	A	230	MET
1	A	249	LYS
1	A	345	PRO
1	A	356	ARG
1	A	472	THR
2	B	85	GLN
2	B	170	PRO
1	A	91	GLN
1	A	92	LEU
2	B	166	LYS
1	A	170	PRO

5.3.2 Protein sidechains ⓘ

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	466/499 (93%)	427 (92%)	39 (8%)	10	31
2	B	365/400 (91%)	347 (95%)	18 (5%)	22	54
All	All	831/899 (92%)	774 (93%)	57 (7%)	14	41

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	ILE
1	A	6	GLU
1	A	7	THR
1	A	20	LYS
1	A	24	TRP
1	A	39	THR
1	A	41	MET
1	A	59	PRO
1	A	74	LEU
1	A	89	GLU
1	A	105	SER
1	A	116	PHE
1	A	122	GLU
1	A	135	ILE
1	A	138	GLU
1	A	142	ILE
1	A	164	MET
1	A	182	GLN
1	A	195	ILE
1	A	205	LEU
1	A	208	HIS
1	A	215	THR
1	A	253	THR
1	A	275	LYS
1	A	287	LYS
1	A	301	LEU
1	A	303	LEU

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Mol	Chain	Res	Type
1	A	323	LYS
1	A	336	GLN
1	A	340	GLN
1	A	345	PRO
1	A	380	ILE
1	A	400	THR
1	A	428	GLN
1	A	443	ASP
1	A	484	LEU
1	A	493	VAL
1	A	514	GLU
1	A	517	LEU
2	B	10	VAL
2	B	55	PRO
2	B	70	LYS
2	B	109	LEU
2	B	122	GLU
2	B	132	ILE
2	B	201	LYS
2	B	205	LEU
2	B	210	LEU
2	B	232	TYR
2	B	233	GLU
2	B	234	LEU
2	B	250	ASP
2	B	295	LEU
2	B	298	GLU
2	B	303	LEU
2	B	413	GLU
2	B	430	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	91	GLN
1	A	161	GLN
1	A	174	GLN
1	A	197	GLN
1	A	207	GLN
1	A	208	HIS
1	A	222	GLN
1	A	242	GLN

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Mol	Chain	Res	Type
1	A	265	ASN
1	A	278	GLN
1	A	315	HIS
1	A	336	GLN
1	A	348	ASN
1	A	475	GLN
1	A	480	GLN
1	A	500	GLN
1	A	507	GLN
1	A	520	GLN
2	B	57	ASN
2	B	137	ASN
2	B	147	ASN
2	B	175	ASN
2	B	182	GLN
2	B	207	GLN
2	B	235	HIS
2	B	278	GLN
2	B	336	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	4,7,8	1.09	0	1,8,10	7.63	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(°)	Ideal(°)
1	A	280	CSD	OD1-SG-CB	7.63	119.66	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](#)

4 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	PO4	A	1301	-	4,4,4	1.81	2 (50%)	6,6,6	0.46	0
3	PO4	A	1300	-	4,4,4	1.66	1 (25%)	6,6,6	0.45	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	PO4	A	1302	-	4,4,4	1.63	0	6,6,6	0.47	0
4	H18	A	999	-	22,25,25	3.50	13 (59%)	27,35,35	1.49	5 (18%)

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
4	H18	A	999	-	-	5/7/19/19	0/3/3/3

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	999	H18	C5-C4	6.90	1.44	1.35
4	A	999	H18	C6-N1	6.83	1.45	1.35
4	A	999	H18	CF-CA	6.50	1.61	1.52
4	A	999	H18	C6-C5	5.61	1.53	1.44
4	A	999	H18	C3-C2	4.68	1.48	1.41
4	A	999	H18	C7-C3	3.97	1.46	1.39
4	A	999	H18	O2-C6	3.43	1.30	1.23
4	A	999	H18	C7-C8	2.82	1.42	1.38
4	A	999	H18	C9-C8	2.68	1.43	1.38
4	A	999	H18	C10-C9	2.50	1.42	1.38
4	A	999	H18	C8-CL	-2.45	1.68	1.74
4	A	999	H18	CE-CF	2.38	1.59	1.53
4	A	999	H18	CB-CA	2.35	1.55	1.52
3	A	1301	PO4	P-O2	-2.07	1.48	1.54
3	A	1301	PO4	P-O4	-2.05	1.48	1.54
3	A	1300	PO4	P-O2	-2.01	1.48	1.54

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	999	H18	CE-CF-CA	3.58	117.26	110.62
4	A	999	H18	CD-CE-CF	2.67	116.90	111.42
4	A	999	H18	C12-C11-C5	-2.52	107.85	113.10
4	A	999	H18	C11-C5-C6	2.52	120.01	116.64
4	A	999	H18	CF-CA-CB	2.37	113.76	111.51

There are no chirality outliers.

All (5) torsion outliers are listed below:

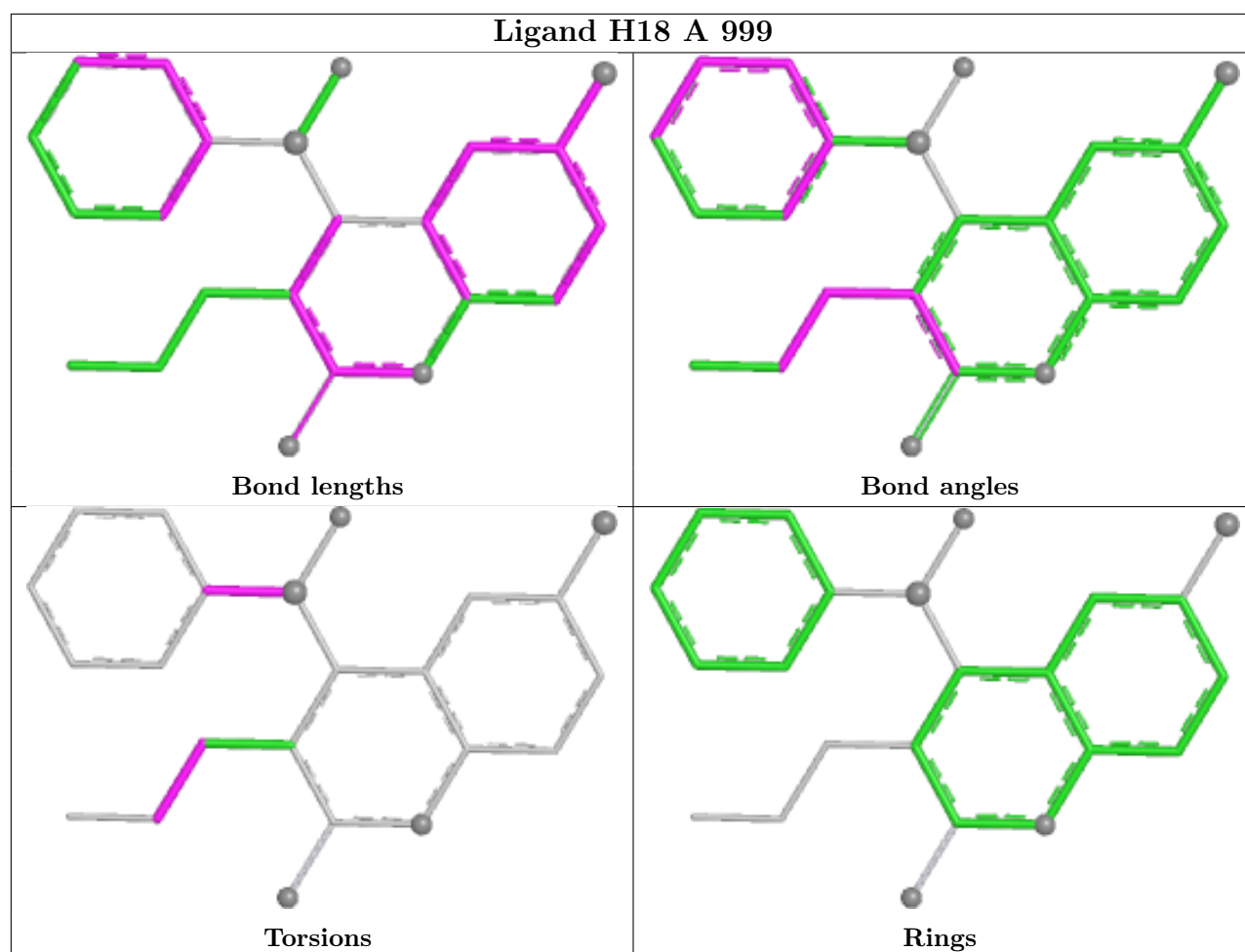
Mol	Chain	Res	Type	Atoms
4	A	999	H18	CB-CA-S4-C4
4	A	999	H18	CB-CA-S4-OS
4	A	999	H18	CF-CA-S4-C4
4	A	999	H18	CF-CA-S4-OS
4	A	999	H18	C5-C11-C12-C13

There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1301	PO4	1	0
4	A	999	H18	5	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 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 ⓘ

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, 95th 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	516/560 (92%)	0.17	15 (2%)	53	45	28, 65, 110, 139	0
2	B	400/440 (90%)	0.09	14 (3%)	47	38	28, 60, 117, 148	0
All	All	916/1000 (91%)	0.13	29 (3%)	50	41	28, 64, 113, 148	0

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	334	GLN	4.4
2	B	191	SER	3.8
2	B	117	SER	3.7
2	B	97	PRO	3.7
1	A	402	TRP	3.7
2	B	294	PRO	3.2
2	B	312	GLU	3.1
2	B	419	THR	3.1
2	B	229	TRP	3.0
1	A	346	PHE	3.0
1	A	251	SER	3.0
2	B	171	PHE	3.0
2	B	190	GLY	2.7
1	A	138	GLU	2.7
1	A	14	PRO	2.6
1	A	204	GLU	2.6
1	A	116	PHE	2.5
1	A	244	ILE	2.5
2	B	165	THR	2.4
2	B	238	LYS	2.3
1	A	36	GLU	2.3
1	A	144	TYR	2.2
1	A	108	VAL	2.2
1	A	141	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
2	B	333	GLY	2.1
2	B	426	TRP	2.1
1	A	464	GLN	2.1
1	A	471	ASP	2.1
1	A	15	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, 95th 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($\text{\AA}^2$)	Q<0.9
1	CSD	A	280	8/9	0.94	0.08	51,55,65,74	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

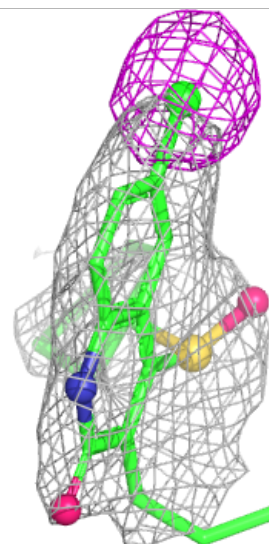
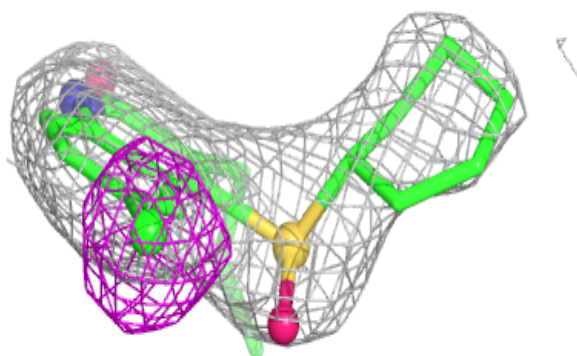
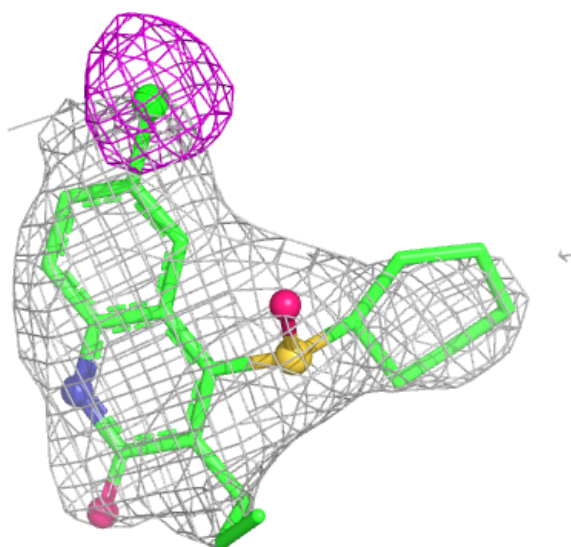
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	PO4	A	1300	5/5	0.58	0.12	137,140,144,146	0
3	PO4	A	1302	5/5	0.80	0.17	150,150,150,150	0
3	PO4	A	1301	5/5	0.81	0.15	123,124,129,131	0
4	H18	A	999	23/23	0.85	0.12	45,66,78,88	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 H18 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.