Full wwPDB X-ray Structure Validation Report (i)

Feb 3, 2024 – 07:04 PM EST

PDB ID	:	1MMF
Title	:	Crystal structure of substrate free form of glycerol dehydratase
Authors	:	Liao, D.I.; Dotson, G.; Turner, I.; Reiss, L.; Emptage, M.
Deposited on	:	2002-09-03
Resolution	:	2.50 Å(reported)

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

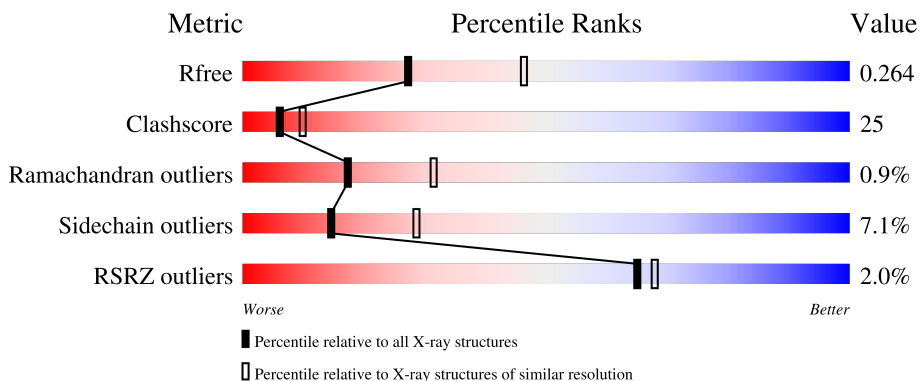|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.50 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.
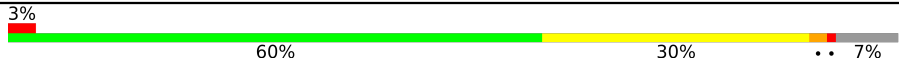
Metric	Percentile Ranks	Value
Rfree		0.264
Clashscore		25
Ramachandran outliers		0.9%
Sidechain outliers		7.1%
RSRZ outliers		2.0%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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

Mol	Chain	Length	Quality of chain
1	A	555	% 57% 38% · ·
1	L	555	% 63% 33% 5%
2	B	194	4% 47% 41% 5% 7%
2	E	194	2% 47% 44% · 5%
3	G	141	4% 62% 28% · 6%

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Mol	Chain	Length	Quality of chain
3	M	141	

3%

60% 30% 7%

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 13782 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 glycerol dehydrase alpha subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	552	Total 4220	C 2624	N 734	O 832	S 30	0	0	0
1	L	555	Total 4245	C 2639	N 737	O 839	S 30	0	0	0

- Molecule 2 is a protein called glycerol dehydrase beta subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	181	Total 1396	C 883	N 251	O 258	S 4	0	0	0
2	E	184	Total 1420	C 897	N 257	O 262	S 4	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1	VAL	MET	conflict	UNP O08505
E	1	VAL	MET	conflict	UNP O08505

- Molecule 3 is a protein called glycerol dehydrase gamma subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	G	132	Total 1059	C 662	N 198	O 197	S 2	0	0	0
3	M	131	Total 1051	C 658	N 197	O 194	S 2	0	0	0

- Molecule 4 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total 1	K 1	0	0

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W O R L D W I D E
wwPDB
PROTEIN DATA BANK

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	L	1	Total K		0	0
			1 1			

- Molecule 5 is COBALAMIN (three-letter code: B12) (formula: $C_{62}H_{89}CoN_{13}O_{14}P$).

B12
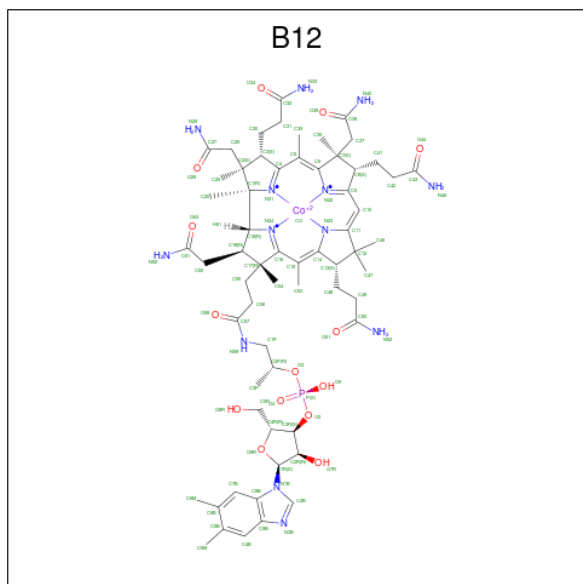
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
5	B	1	Total 91	C 62	Co 1	N 13	O 14	P 1	0	0
5	E	1	Total 91	C 62	Co 1	N 13	O 14	P 1	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	55	Total 55	O 55	0	0
6	B	17	Total 17	O 17	0	0
6	G	20	Total 20	O 20	0	0
6	L	71	Total 71	O 71	0	0
6	E	25	Total 25	O 25	0	0
6	M	19	Total 19	O 19	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: glycerol dehydrase alpha subunit

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E206 L210 E211 M214 R215 A221 E222 V226 E230 F233 D238 T239 P240 W241 A244 S248 S252 R253 M257 R258 Y259 L268 S272 E273 S274 K275 S276 M277 L278 E281 S282 R283 C284 I285 F286 I287 G299 A300 V301 S302 C303 I304 G305 M306 T307

P311 S312 G313 I314 V317 L318 A319 E320 I323 A324 S325 M326 L327 D328 L329 E330 V331 A332 A334 S333 N335 D336 Q337 T338 F339 S340 H341 R349 T350 L351 M352 Q353 M354 L355 P356 F360 I361 F362 S363 G364 Y365 S366 P369 D372 N373 G377 S378 N379 F380 D381 A382

F385 D386 I390 L391 Q392 M396 G399 G400 L401 T405 T409 R413 A417 R418 A419 V423 F424 L429 V437 E438 A439 A443 H444 N453 V454 V455 E456 D457 L458 S459 A460 V461 E462 E463 M464 M465 K466 R467 N468 L478 D485 I486 A487 S488 N489 I490

L491 R495 Q496 R497 D501 Y502 L503 Q504 T505 S506 Q512 F513 E514 V515 Y525 P528 R533 W539 K543 P546 E555

• Molecule 2: glycerol dehydrase beta subunit

Chain B:

VAL GLN GLN THR GLN ILE GLN PRO SER F11 T12 L13 K14 T15 R16 E17 G19 A23 D24 E25 R26 A27 D28 E29 V30 V31 I32 G33 V34 G35 K40 H44 T45 L46 I47 D48 M49 P50 I54 L55 L58 I59 E65 G66 L67 R70 V71 V72 R73 I74 L75 R76

V80 S81 F82 M83 A84 W85 D86 A87 A88 N89 L90 I97 G98 I99 Q100 S101 K102 G103 T104 T105 V106 I107 H108 Q109 R110 D111 L112 L113 P114 L115 E119 S122 Q123 A124 P125 L126 L127 T128 L129 E130 T131 Y132 R133 Q134 I135 G136 K137 N138 A139 A140 R141 R144 K145 E146 S147

V151 D156 Q157 M158 V159 R160 P161 K162 F163 M164 E174 V185 T186 L187 H188 I189 D190 L191 VAL ARG GLU

• Molecule 2: glycerol dehydrase beta subunit

Chain E:

VAL GLN GLN THR THR GLN ILE GLN PRO S10 F11 T12 L13 K14 T15 R16 E17 S22 A23 D24 E25 R26 A27 I32 G33 V34 A37 F38 D39 K40 H41 H44 T45 L46 I47 D48 M49 P50 H51 L55 K56 E57 L58 I59 A60 E63 E64 L67 H68 A69 R70 V71 V72

R73 I74 D79 V80 S81 N89 L90 Q100 S101 K102 I107 H108 Q109 R110 D111 L112 L113 P114 L115 L118 E119 L120 Q123 A124 P125 L126 L127 T128 L129 E130 T131 Y132 R133 Q134 I135 G136 K137 A140 R141 R144 K145 E146 D156 Q157 M158 V159 R160 P161 M164 A165

K166 A167 A168 L169 I172 T175 V178 V179 Q180 D181 V185 T186 L187 H188 I189 D190 L191 V192 R193 GLU

• Molecule 3: glycerol dehydrase gamma subunit

Chain G:

MET SER GLU GLU LYS THR MET ARG VAL GLN D10 Y11 P12 L13 A14 T15 R16 C17 P18 I21 L22 T23 P24 L29 T30 D31 I32 T33 L34 E35 K36 S39 V42 D46 V47 R48 I49 Y56 M64 Q65 V69 A77 E78 L79 I80 N92 A93 L94 F97 R98

S99 S100 E103 I107 L111 E112 H116 V119 E129 V130 Q133 R138 K139 G140 S141

• Molecule 3: glycerol dehydrase gamma subunit

Chain M:

3%

60%   30%   7%

MET SER GLU LYS THR MET ARG VAL GLN ASP Y11 P12 L13 A14 C17 P18 E19 H20 I21 L22 K27 P28 L29 T30 D31 E41 V47 R48 I49 S50 R51 Q52 Y56 Q57 A58 Q59 E62 Q63 M64 Q65 R66 A70 R74 E78 N92 R95 P96 F97 R98

E110 T114 A117 N120 F123 V124 E129 V130 Y131 Q132 Q133 R138 K139 G140 S141

4   Data and refinement statistics   ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	93.70Å 110.07Å 114.69Å 90.00° 107.64° 90.00°	Depositor
Resolution (Å)	30.00 – 2.50 28.82 – 2.50	Depositor EDS
% Data completeness (in resolution range)	(Not available) (30.00-2.50) 85.1 (28.82-2.50)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.90 (at 2.51Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.228 , 0.269 0.226 , 0.264	Depositor DCC
R_{free} test set	3316 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	30.2	Xtriage
Anisotropy	0.998	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 47.1	EDS
L-test for twinning[2]	$< |L| > = 0.59, < L^2 > = 0.45$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	13782	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.40% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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: K, B12

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	0.39	0/4283	0.65	0/5798
1	L	0.48	2/4308 (0.0%)	0.70	5/5831 (0.1%)
2	B	0.45	1/1423 (0.1%)	0.68	1/1928 (0.1%)
2	E	0.38	0/1447	0.68	0/1960
3	G	0.36	0/1079	0.62	0/1462
3	M	0.40	0/1071	0.62	0/1451
All	All	0.42	3/13611 (0.0%)	0.67	6/18430 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	L	0	1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	L	380	PHE	CE1-CZ	13.75	1.63	1.37
1	L	380	PHE	CE2-CZ	-5.96	1.26	1.37
2	B	111	ASP	N-CA	-5.03	1.36	1.46

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	274	SER	O-C-N	8.50	136.30	122.70
1	L	273	GLU	O-C-N	7.03	133.95	122.70
1	L	380	PHE	CZ-CE2-CD2	5.84	127.11	120.10
1	L	274	SER	CA-C-N	-5.63	104.82	117.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	110	ARG	C-N-CA	-5.33	108.37	121.70
1	L	273	GLU	CA-C-N	-5.31	105.52	117.20

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	L	380	PHE	Sidechain

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	4220	0	4171	243	0
1	L	4245	0	4195	176	0
2	B	1396	0	1418	97	0
2	E	1420	0	1445	107	0
3	G	1059	0	1061	34	0
3	M	1051	0	1057	46	0
4	A	1	0	0	0	0
4	L	1	0	0	0	0
5	B	91	0	88	5	0
5	E	91	0	87	11	0
6	A	55	0	0	1	0
6	B	17	0	0	1	0
6	E	25	0	0	1	0
6	G	20	0	0	0	0
6	L	71	0	0	3	0
6	M	19	0	0	4	0
All	All	13782	0	13522	666	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 25.

All (666) 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)
3:M:139:LYS:H	3:M:139:LYS:HD2	1.08	1.06
2:B:16:ARG:HE	2:B:16:ARG:HA	1.19	1.04
1:L:285:ILE:HD12	1:L:324:ALA:HA	1.39	1.02
1:L:272:SER:C	1:L:274:SER:H	1.44	1.01
1:A:285:ILE:HD13	1:A:324:ALA:HA	1.43	0.99
2:B:49:MET:HE3	2:B:54:ILE:HG12	1.43	0.98
2:E:89:ASN:ND2	2:E:110:ARG:HB2	1.78	0.97
3:G:24:PRO:HB3	3:G:80:ILE:HD11	1.42	0.97
1:A:147:ASN:HD21	1:A:151:ASN:H	1.13	0.93
1:A:1:MET:HG3	1:A:2:LYS:N	1.84	0.92
2:E:157:GLN:H	2:E:157:GLN:HE21	1.11	0.92
1:L:272:SER:O	1:L:274:SER:N	2.02	0.92
1:A:470:THR:HG22	1:A:472:LEU:H	1.32	0.92
1:L:272:SER:C	1:L:274:SER:N	2.19	0.90
1:A:1:MET:CG	1:A:2:LYS:H	1.82	0.89
3:G:139:LYS:HD2	3:G:140:GLY:H	1.38	0.89
1:A:511:ARG:HB3	1:A:511:ARG:HH21	1.35	0.89
1:A:1:MET:HG3	1:A:2:LYS:H	1.36	0.89
1:A:551:PRO:HG3	1:L:21:ILE:HB	1.53	0.89
3:G:78:GLU:CD	3:G:119:VAL:HG12	1.94	0.88
3:M:139:LYS:HD2	3:M:139:LYS:N	1.87	0.87
1:A:224:VAL:HG12	1:A:243:LYS:HD2	1.56	0.86
1:L:338:THR:H	2:E:160:ARG:HH21	1.24	0.85
1:L:239:THR:HG22	1:L:241:TRP:H	1.42	0.84
2:E:109:GLN:NE2	2:E:111:ASP:H	1.76	0.83
1:A:373:ASN:HD22	1:A:377:GLY:H	1.25	0.82
1:A:426:GLU:HG3	1:A:480:ARG:HH21	1.43	0.82
2:E:32:ILE:HG13	2:E:32:ILE:O	1.79	0.82
1:A:453:ASN:HD22	1:A:456:GLU:H	1.25	0.82
2:E:124:ALA:HA	2:E:127:LEU:HD23	1.63	0.81
1:A:373:ASN:HD21	1:A:375:PHE:HB2	1.47	0.80
1:A:453:ASN:ND2	1:A:456:GLU:H	1.79	0.80
2:E:60:ALA:O	2:E:64:GLU:HG3	1.80	0.80
2:E:160:ARG:HB3	2:E:161:PRO:HD3	1.63	0.80
1:A:373:ASN:ND2	1:A:377:GLY:H	1.79	0.80
1:A:405:THR:O	1:A:409:THR:HG22	1.82	0.79
3:G:78:GLU:OE2	3:G:119:VAL:HG12	1.83	0.79
2:E:157:GLN:H	2:E:157:GLN:NE2	1.80	0.78
2:E:46:LEU:HD21	2:E:167:ALA:HA	1.65	0.78
1:A:462:GLU:O	1:A:466:LYS:HD3	1.83	0.78
1:L:285:ILE:HD11	1:L:327:LEU:HD12	1.65	0.78
2:E:109:GLN:HE22	2:E:111:ASP:H	1.28	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:56:ARG:NH2	1:A:59:GLN:HB2	1.99	0.77
1:L:306:MET:HG2	2:E:164:MET:HE3	1.65	0.77
1:A:103:ILE:HD12	1:A:328:ASP:HB2	1.65	0.77
1:A:192:GLN:HE22	1:A:197:GLY:H	1.31	0.76
1:A:56:ARG:H	1:A:56:ARG:HH21	1.32	0.76
2:B:35:GLY:HA3	2:B:174:GLU:OE1	1.85	0.76
3:M:129:GLU:HG2	3:M:133:GLN:NE2	2.00	0.76
1:A:73:ASN:OD1	1:A:75:GLU:HG3	1.84	0.76
2:B:23:ALA:HA	2:B:90:LEU:HD12	1.67	0.76
1:A:351:LEU:HD12	1:A:354:MET:HE3	1.66	0.76
2:B:109:GLN:HG2	2:B:112:LEU:HD13	1.68	0.76
3:G:139:LYS:HD2	3:G:140:GLY:N	2.01	0.75
1:L:302:SER:HA	1:L:337:GLN:HG3	1.68	0.74
1:L:306:MET:HG2	2:E:164:MET:CE	2.17	0.73
2:B:80:VAL:HG22	2:B:106:VAL:HG12	1.70	0.73
2:E:175:THR:O	2:E:178:VAL:HG22	1.87	0.73
1:A:332:ALA:HA	1:A:360:PHE:HB2	1.70	0.73
1:A:6:ARG:HD3	1:L:444:HIS:ND1	2.03	0.72
1:L:466:LYS:N	1:L:466:LYS:HE3	2.04	0.72
1:A:302:SER:HA	1:A:337:GLN:HG3	1.70	0.72
1:A:522:ILE:H	1:A:522:ILE:HD12	1.53	0.72
2:E:89:ASN:HD22	2:E:110:ARG:HB2	1.55	0.71
1:A:337:GLN:HE21	1:A:337:GLN:HA	1.56	0.71
1:A:486:ILE:HD12	1:A:486:ILE:H	1.56	0.71
1:A:539:TRP:CE2	1:A:543:LYS:HD2	2.24	0.71
1:A:180:ALA:HB3	1:A:181:PRO:HD3	1.71	0.71
2:B:40:LYS:HD2	2:B:73:ARG:HH22	1.56	0.70
1:L:528:PRO:HA	1:L:533:ARG:NH2	2.06	0.70
2:E:32:ILE:HD11	2:E:55:LEU:HD21	1.73	0.70
1:A:92:LEU:HD21	1:A:102:ILE:HD13	1.72	0.70
1:A:373:ASN:ND2	1:A:375:PHE:H	1.88	0.70
2:B:128:THR:HG23	2:B:131:THR:H	1.54	0.70
1:L:405:THR:O	1:L:409:THR:HG23	1.91	0.70
1:A:368:VAL:CG2	1:A:369:PRO:HD2	2.21	0.70
3:G:138:ARG:HG2	3:G:139:LYS:HG3	1.73	0.69
1:L:180:ALA:HB3	1:L:181:PRO:HD3	1.74	0.69
2:E:168:ALA:O	2:E:172:ILE:HG13	1.92	0.69
1:A:273:GLU:O	1:A:275:LYS:HD2	1.92	0.69
1:A:405:THR:HG22	1:A:407:ALA:H	1.57	0.69
1:L:65:ARG:HH12	3:M:133:GLN:HE22	1.39	0.69
2:B:71:VAL:HG21	2:B:189:ILE:HD11	1.75	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:49:MET:HE3	2:B:54:ILE:CG1	2.22	0.69
1:A:92:LEU:CD2	1:A:102:ILE:HD13	2.23	0.69
2:B:124:ALA:HB3	2:B:125:PRO:HD3	1.73	0.69
3:G:92:ASN:O	3:G:98:ARG:HG3	1.91	0.69
1:A:368:VAL:HG22	1:A:369:PRO:HD2	1.74	0.68
1:L:239:THR:HG22	1:L:241:TRP:N	2.07	0.68
1:L:285:ILE:CD1	1:L:324:ALA:HA	2.19	0.68
1:A:99:ARG:O	1:A:103:ILE:HG12	1.93	0.68
1:A:409:THR:HG21	1:L:7:PHE:CE1	2.29	0.68
2:E:157:GLN:HE21	2:E:157:GLN:N	1.89	0.68
1:L:45:ASP:OD2	1:L:50:VAL:HG21	1.94	0.68
1:A:56:ARG:HH21	1:A:56:ARG:N	1.90	0.68
1:A:141:ASN:ND2	1:A:362:PHE:HB2	2.08	0.67
1:A:102:ILE:HD11	1:A:326:MET:HB2	1.77	0.67
2:E:81:SER:OG	5:E:602:B12:HM62	1.95	0.67
2:E:17:GLU:HG3	2:E:185:VAL:HG11	1.77	0.67
1:L:1:MET:O	1:L:2:LYS:HB2	1.95	0.66
3:M:14:ALA:O	3:M:18:PRO:HG3	1.96	0.66
1:A:17:GLN:HB2	1:A:341:HIS:CD2	2.31	0.66
1:A:56:ARG:H	1:A:56:ARG:HD3	1.60	0.66
2:B:32:ILE:HD11	2:B:71:VAL:HG22	1.77	0.66
2:E:72:VAL:HG12	2:E:73:ARG:N	2.11	0.66
2:E:13:LEU:HD21	2:E:59:ILE:HD12	1.78	0.65
1:A:141:ASN:HD21	1:A:362:PHE:HB2	1.59	0.65
1:A:486:ILE:HD12	1:A:486:ILE:N	2.10	0.65
1:A:77:THR:HG23	1:A:108:ALA:O	1.97	0.65
1:A:134:ARG:NH1	1:A:139:PRO:HG3	2.12	0.65
2:B:49:MET:CE	2:B:54:ILE:HG12	2.23	0.65
1:A:1:MET:CG	1:A:2:LYS:N	2.48	0.64
1:A:346:ARG:HB2	1:A:379:ASN:HD21	1.60	0.64
1:A:26:GLU:O	1:A:274:SER:HB3	1.97	0.64
1:A:337:GLN:NE2	2:B:160:ARG:HH22	1.95	0.64
1:L:201:GLN:NE2	6:L:1014:HOH:O	2.31	0.64
1:L:501:ASP:HB3	1:L:515:VAL:HG21	1.79	0.64
3:G:139:LYS:CD	3:G:140:GLY:H	2.08	0.63
1:A:159:ALA:HB1	1:A:170:GLN:HE22	1.63	0.63
2:E:156:ASP:HB3	2:E:159:VAL:HG23	1.79	0.63
2:B:47:ILE:HG23	2:B:47:ILE:O	1.97	0.63
1:A:539:TRP:NE1	1:A:543:LYS:HD2	2.13	0.63
1:A:18:ASP:OD1	1:A:341:HIS:HD2	1.82	0.63
1:A:56:ARG:CZ	1:A:59:GLN:HB2	2.29	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:83:MET:HE1	2:B:99:ILE:O	1.99	0.63
1:L:285:ILE:HD13	1:L:323:ILE:HG22	1.80	0.63
1:L:332:ALA:HA	1:L:360:PHE:HB2	1.80	0.63
1:A:330:GLU:OE2	1:A:506:SER:HA	1.99	0.62
1:L:18:ASP:OD1	1:L:341:HIS:HD2	1.82	0.62
1:A:300:ALA:HB2	1:A:307:THR:HG21	1.81	0.62
1:A:42:VAL:HG11	1:A:77:THR:HG22	1.80	0.62
5:E:602:B12:H531	5:E:602:B12:H552	1.82	0.62
3:M:129:GLU:HG2	3:M:133:GLN:HE21	1.63	0.62
3:M:11:TYR:N	3:M:12:PRO:CD	2.62	0.62
1:A:336:ASP:O	1:A:378:SER:HA	1.99	0.62
2:B:97:ILE:HD11	2:B:139:ALA:CB	2.29	0.61
1:L:239:THR:CG2	1:L:241:TRP:H	2.12	0.61
1:A:285:ILE:CD1	1:A:324:ALA:HA	2.27	0.61
2:B:156:ASP:HB3	2:B:159:VAL:HG23	1.83	0.61
2:B:109:GLN:CG	2:B:112:LEU:HD13	2.30	0.61
1:A:40:SER:HA	1:A:53:ASP:OD1	2.00	0.61
3:G:49:ILE:O	3:G:80:ILE:HD12	2.00	0.61
1:L:453:ASN:C	1:L:453:ASN:HD22	2.02	0.61
1:L:102:ILE:HD12	1:L:133:MET:HE2	1.83	0.61
3:M:48:ARG:HB3	6:M:148:HOH:O	2.01	0.61
1:A:285:ILE:HD11	1:A:327:LEU:CD2	2.30	0.61
1:A:491:LEU:O	1:A:495:ARG:HG3	2.01	0.60
2:E:109:GLN:HE22	2:E:111:ASP:N	1.99	0.60
1:A:426:GLU:CG	1:A:480:ARG:HH21	2.14	0.60
2:B:127:LEU:N	2:B:127:LEU:HD22	2.16	0.60
1:L:123:VAL:HG11	1:L:352:MET:SD	2.42	0.60
2:E:89:ASN:HD21	2:E:110:ARG:HB2	1.63	0.60
1:L:157:ALA:HB1	1:L:413:ARG:HD3	1.84	0.60
1:A:470:THR:HG22	1:A:472:LEU:N	2.11	0.60
1:L:87:GLU:O	1:L:91:MET:HG3	2.02	0.60
1:A:346:ARG:HB2	1:A:379:ASN:ND2	2.17	0.60
2:B:13:LEU:C	2:B:13:LEU:HD23	2.22	0.60
5:B:601:B12:H473	5:B:601:B12:H491	1.84	0.60
2:E:169:LEU:HA	2:E:172:ILE:HD12	1.82	0.60
3:M:13:LEU:HB3	3:M:21:ILE:HD11	1.83	0.60
2:B:67:LEU:HD11	2:B:144:ARG:HD2	1.83	0.60
1:A:537:GLU:CD	1:A:537:GLU:H	2.06	0.59
3:M:52:GLN:HB2	6:M:147:HOH:O	2.02	0.59
1:A:1:MET:O	1:A:2:LYS:HB3	2.03	0.59
1:A:437:VAL:O	1:A:441:THR:HG23	2.03	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:419:ALA:O	1:A:423:VAL:HG23	2.03	0.59
2:B:65:GLU:OE1	2:B:137:LYS:HE2	2.02	0.59
1:L:300:ALA:HB2	1:L:307:THR:HG21	1.83	0.59
1:L:528:PRO:HA	1:L:533:ARG:HH22	1.67	0.59
2:E:16:ARG:NH1	2:E:190:ASP:OD2	2.36	0.59
2:B:141:ARG:O	2:B:146:GLU:HB2	2.03	0.59
1:L:485:ASP:OD1	1:L:486:ILE:HG13	2.03	0.59
1:A:192:GLN:HE21	1:A:489:ASN:HB3	1.68	0.58
1:L:453:ASN:HD21	1:L:455:VAL:HB	1.69	0.58
1:L:330:GLU:OE2	1:L:506:SER:HA	2.03	0.58
5:B:601:B12:H531	5:B:601:B12:H552	1.85	0.58
1:A:470:THR:CG2	1:A:471:GLY:N	2.65	0.58
2:B:16:ARG:HA	2:B:16:ARG:NE	2.01	0.58
2:B:80:VAL:HG22	2:B:106:VAL:CG1	2.34	0.58
1:A:206:GLU:OE2	1:A:243:LYS:NZ	2.37	0.58
2:B:23:ALA:CA	2:B:90:LEU:HD12	2.33	0.58
1:A:164:ILE:HG23	1:A:404:VAL:HG11	1.84	0.57
1:L:26:GLU:O	1:L:274:SER:OG	2.14	0.57
2:E:123:GLN:HG2	5:E:602:B12:O58	2.04	0.57
3:M:70:ALA:O	3:M:74:ARG:HG2	2.04	0.57
2:E:180:GLN:CD	2:E:180:GLN:H	2.07	0.57
1:A:470:THR:HG22	1:A:471:GLY:N	2.19	0.57
1:A:237:ASP:CG	3:G:98:ARG:HH22	2.07	0.57
1:A:102:ILE:HD11	1:A:133:MET:HE2	1.86	0.57
1:A:341:HIS:CE1	2:B:162:LYS:NZ	2.72	0.57
1:L:501:ASP:CB	1:L:515:VAL:HG21	2.35	0.57
1:A:210:LEU:O	1:A:214:MET:HG3	2.04	0.57
2:B:72:VAL:HG12	2:B:73:ARG:N	2.18	0.57
2:B:74:ILE:HD12	2:B:74:ILE:N	2.19	0.57
1:L:126:MET:CE	1:L:319:ALA:HB2	2.34	0.57
1:L:128:MET:O	1:L:131:GLN:HG2	2.05	0.57
1:A:414:GLN:HA	1:A:441:THR:HG22	1.86	0.56
1:L:102:ILE:HD11	1:L:326:MET:HB2	1.87	0.56
3:M:74:ARG:NH2	6:M:151:HOH:O	2.19	0.56
1:A:519:VAL:O	1:A:522:ILE:HD11	2.04	0.56
2:B:16:ARG:HE	2:B:16:ARG:CA	2.02	0.56
2:B:67:LEU:HD13	2:B:140:ALA:HB1	1.87	0.56
1:L:98:SER:OG	1:L:101:GLU:HG3	2.06	0.56
1:L:334:ALA:O	1:L:335:ASN:HB2	2.05	0.56
1:L:334:ALA:HA	1:L:363:SER:OG	2.04	0.56
1:L:400:GLY:O	1:L:401:LEU:HD12	2.06	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:182:PHE:CD1	1:A:461:VAL:HG22	2.40	0.56
1:A:341:HIS:HE1	2:B:162:LYS:NZ	2.03	0.56
1:L:539:TRP:O	1:L:543:LYS:HG2	2.04	0.56
1:L:143:CYS:SG	1:L:170:GLN:HG2	2.45	0.56
2:E:79:ASP:OD1	2:E:81:SER:HB2	2.05	0.56
5:E:602:B12:H362	5:E:602:B12:H351	1.87	0.56
3:M:78:GLU:HB2	3:M:120:ASN:ND2	2.21	0.56
3:G:129:GLU:O	3:G:133:GLN:HG3	2.05	0.56
1:L:337:GLN:HB3	2:E:160:ARG:CZ	2.36	0.56
1:A:10:LEU:O	1:A:13:ARG:HB2	2.06	0.55
1:A:444:HIS:ND1	1:L:6:ARG:HD3	2.21	0.55
1:L:301:VAL:HG12	1:L:302:SER:N	2.22	0.55
2:B:84:ALA:HB2	2:B:106:VAL:HG13	1.87	0.55
2:E:72:VAL:CG1	2:E:73:ARG:N	2.70	0.55
2:E:37:ALA:HB1	2:E:41:HIS:HB2	1.89	0.55
2:E:16:ARG:NH1	2:E:190:ASP:CG	2.60	0.55
1:A:285:ILE:HD11	1:A:327:LEU:HD22	1.88	0.55
1:L:338:THR:N	2:E:160:ARG:HH21	2.00	0.55
1:A:256:LYS:NZ	1:A:507:ALA:O	2.36	0.55
1:A:395:LEU:HD23	1:L:314:ILE:HB	1.88	0.55
1:L:338:THR:H	2:E:160:ARG:NH2	1.99	0.55
1:A:56:ARG:HH22	1:A:59:GLN:HB2	1.71	0.55
1:A:147:ASN:HD22	1:A:147:ASN:C	2.10	0.55
1:L:172:THR:HG22	1:L:187:LEU:HD22	1.89	0.55
1:A:552:ASP:OD1	1:A:552:ASP:O	2.25	0.55
1:L:419:ALA:O	1:L:423:VAL:HG23	2.06	0.55
1:A:203:SER:HB3	6:A:1045:HOH:O	2.06	0.54
1:A:486:ILE:H	1:A:486:ILE:CD1	2.21	0.54
1:L:353:GLN:O	1:L:356:PRO:HD2	2.06	0.54
1:L:141:ASN:ND2	1:L:362:PHE:HB2	2.23	0.54
1:A:98:SER:OG	1:A:101:GLU:HG3	2.06	0.54
1:L:201:GLN:HE22	1:L:222:GLU:HB3	1.73	0.54
1:L:299:GLY:HA2	1:L:320:GLU:CD	2.28	0.54
1:A:467:ARG:HB3	1:A:469:ILE:HD13	1.88	0.54
2:B:80:VAL:CG2	2:B:106:VAL:HG12	2.37	0.54
1:L:313:GLY:O	1:L:317:VAL:HG23	2.07	0.54
2:B:33:GLY:HA3	2:B:74:ILE:CD1	2.38	0.54
2:B:160:ARG:HB3	2:B:161:PRO:HD3	1.89	0.54
1:L:285:ILE:CD1	1:L:323:ILE:HG22	2.38	0.54
2:E:32:ILE:HD11	2:E:71:VAL:HG22	1.89	0.54
2:B:29:GLU:OE1	2:B:70:ARG:NE	2.41	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:108:HIS:CD2	2:E:109:GLN:H	2.26	0.54
2:B:71:VAL:CG2	2:B:189:ILE:HD11	2.37	0.53
2:B:158:MET:C	2:B:161:PRO:HD2	2.28	0.53
1:L:304:ILE:HG23	1:L:339:PHE:HB3	1.91	0.53
2:E:38:PHE:CE1	2:E:51:HIS:HB3	2.42	0.53
2:B:32:ILE:CD1	2:B:71:VAL:HG22	2.38	0.53
5:B:601:B12:H362	5:B:601:B12:H351	1.90	0.53
1:L:222:GLU:HG3	1:L:258:ARG:HD2	1.90	0.53
1:L:239:THR:HG23	1:L:240:PRO:HD2	1.91	0.53
1:A:56:ARG:H	1:A:56:ARG:CD	2.22	0.53
1:L:6:ARG:HB2	1:L:6:ARG:HH11	1.73	0.53
1:A:102:ILE:HG13	1:A:103:ILE:N	2.22	0.53
2:E:73:ARG:HB2	2:E:187:LEU:HD11	1.90	0.53
2:E:127:LEU:HD22	2:E:127:LEU:N	2.23	0.53
1:A:283:ARG:O	1:A:287:ILE:HG13	2.08	0.53
1:L:466:LYS:HE3	1:L:466:LYS:CA	2.38	0.53
1:A:501:ASP:CB	1:A:515:VAL:HG21	2.39	0.53
1:L:61:ASP:HB2	1:L:230:GLU:OE2	2.09	0.53
1:L:90:ARG:HB3	1:L:90:ARG:NH1	2.23	0.53
1:A:282:SER:O	1:A:286:PHE:HD1	1.92	0.52
1:A:483:PHE:HB3	1:A:486:ILE:HD13	1.92	0.52
1:L:1:MET:HG2	1:L:2:LYS:O	2.09	0.52
1:A:143:CYS:HB3	1:A:167:PHE:CD1	2.44	0.52
1:A:368:VAL:HG22	1:A:369:PRO:CD	2.39	0.52
1:A:388:TYR:O	1:A:392:GLN:HG3	2.09	0.52
1:A:495:ARG:NH2	3:G:29:LEU:HG	2.25	0.52
1:A:317:VAL:HA	1:A:320:GLU:OE1	2.09	0.52
2:B:80:VAL:HB	2:B:100:GLN:HG3	1.90	0.52
1:A:421:GLN:HA	1:A:432:ILE:HD12	1.91	0.52
2:B:19:GLY:O	2:B:185:VAL:HG22	2.08	0.52
3:G:13:LEU:HG	3:G:56:TYR:CE2	2.45	0.52
3:G:100:SER:HB3	3:G:138:ARG:NH2	2.24	0.52
3:G:97:PHE:O	3:G:138:ARG:HA	2.09	0.52
1:A:133:MET:HE2	1:A:326:MET:HA	1.91	0.52
2:E:46:LEU:HG	2:E:102:LYS:HB2	1.91	0.52
1:A:42:VAL:HG11	1:A:81:MET:HG3	1.92	0.52
3:G:14:ALA:O	3:G:18:PRO:HB3	2.09	0.52
1:L:178:ARG:HB3	1:L:458:LEU:HD22	1.91	0.52
2:B:145:LYS:HE2	6:B:616:HOH:O	2.09	0.52
1:L:328:ASP:OD2	3:M:66:ARG:HD3	2.10	0.52
1:A:102:ILE:HG12	1:A:133:MET:HE1	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:414:GLN:HA	1:A:441:THR:CG2	2.41	0.51
1:L:49:ILE:HD12	1:L:68:ALA:O	2.09	0.51
1:L:491:LEU:O	1:L:495:ARG:HG3	2.10	0.51
2:B:40:LYS:HD2	2:B:73:ARG:NH2	2.23	0.51
1:L:337:GLN:NE2	2:E:160:ARG:HH12	2.08	0.51
2:E:112:LEU:HD11	2:E:118:LEU:HD13	1.92	0.51
3:M:59:GLN:O	3:M:63:GLN:HG3	2.10	0.51
1:L:92:LEU:CD1	1:L:102:ILE:HG13	2.41	0.51
1:A:237:ASP:OD1	3:G:98:ARG:NH2	2.43	0.51
1:L:253:ARG:HG3	3:M:48:ARG:NH1	2.24	0.51
2:B:130:GLU:O	2:B:133:ARG:HB3	2.11	0.51
1:L:102:ILE:HD11	1:L:106:THR:HG21	1.92	0.51
1:L:453:ASN:ND2	1:L:456:GLU:H	2.09	0.51
1:A:106:THR:O	1:A:109:ILE:HG12	2.11	0.51
2:E:34:VAL:HB	2:E:38:PHE:CB	2.41	0.51
3:M:11:TYR:O	3:M:12:PRO:C	2.49	0.51
1:L:210:LEU:O	1:L:214:MET:HG3	2.11	0.51
1:L:307:THR:O	1:L:313:GLY:HA3	2.11	0.51
1:L:465:MET:HB2	1:L:466:LYS:NZ	2.25	0.51
5:E:602:B12:H473	5:E:602:B12:H491	1.93	0.51
2:B:58:LEU:HD23	2:B:132:TYR:O	2.11	0.51
1:L:65:ARG:NH1	3:M:133:GLN:HE22	2.07	0.51
1:L:306:MET:N	2:E:164:MET:HE2	2.26	0.51
1:L:462:GLU:O	1:L:466:LYS:HD2	2.11	0.51
2:B:31:VAL:HG22	2:B:70:ARG:HG3	1.93	0.51
1:L:439:ALA:O	1:L:443:ALA:HB2	2.11	0.51
3:G:103:GLU:O	3:G:107:ILE:HG13	2.11	0.50
2:E:38:PHE:O	2:E:73:ARG:NH1	2.44	0.50
2:E:158:MET:C	2:E:161:PRO:HD2	2.32	0.50
2:E:15:THR:HB	2:E:39:ASP:OD2	2.11	0.50
1:A:426:GLU:HG3	1:A:480:ARG:NH2	2.19	0.50
2:E:127:LEU:HD12	2:E:131:THR:HG21	1.92	0.50
1:A:406:GLU:O	1:A:409:THR:HG23	2.10	0.50
2:B:44:HIS:HB2	2:B:48:ASP:HA	1.92	0.50
1:L:1:MET:O	1:L:2:LYS:CB	2.59	0.50
1:L:460:ALA:O	1:L:463:GLU:HB2	2.11	0.50
2:E:34:VAL:HB	2:E:38:PHE:HB3	1.93	0.50
2:E:89:ASN:ND2	2:E:110:ARG:CB	2.65	0.50
2:B:109:GLN:CD	2:B:111:ASP:H	2.14	0.50
1:A:257:MET:HE3	1:A:293:VAL:HG13	1.94	0.50
1:A:402:ARG:HD2	1:A:541:GLU:OE1	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:511:ARG:HB3	1:A:511:ARG:NH2	2.15	0.50
2:B:72:VAL:HG12	2:B:73:ARG:H	1.74	0.50
1:L:170:GLN:NE2	1:L:198:VAL:HG11	2.27	0.50
3:M:17:CYS:N	3:M:18:PRO:HD3	2.27	0.50
1:A:337:GLN:NE2	2:B:160:ARG:NH2	2.59	0.50
2:E:40:LYS:HD2	2:E:73:ARG:NH2	2.27	0.50
2:E:74:ILE:HD12	2:E:74:ILE:N	2.27	0.50
2:E:108:HIS:HD2	2:E:109:GLN:H	1.59	0.50
1:L:99:ARG:O	1:L:103:ILE:HG13	2.12	0.49
2:E:71:VAL:HG21	2:E:189:ILE:HD11	1.94	0.49
3:M:47:VAL:HG23	3:M:47:VAL:O	2.11	0.49
1:L:497:ARG:O	3:M:49:ILE:HB	2.12	0.49
1:A:102:ILE:HG12	1:A:133:MET:CE	2.42	0.49
1:A:174:VAL:HG12	1:A:183:ASN:OD1	2.12	0.49
1:A:334:ALA:O	1:A:335:ASN:HB2	2.11	0.49
3:M:51:ARG:HD2	3:M:52:GLN:N	2.27	0.49
1:A:507:ALA:HA	1:A:517:SER:HB3	1.93	0.49
1:L:382:ALA:HA	1:L:385:PHE:CE2	2.48	0.49
3:M:98:ARG:HG2	3:M:98:ARG:HH11	1.77	0.49
1:A:332:ALA:HB1	1:A:363:SER:HB2	1.94	0.49
1:A:373:ASN:ND2	1:A:375:PHE:N	2.60	0.49
1:L:73:ASN:C	1:L:73:ASN:HD22	2.16	0.49
1:A:42:VAL:CG1	1:A:81:MET:HG3	2.42	0.49
1:A:299:GLY:HA2	1:A:320:GLU:CD	2.33	0.49
1:A:511:ARG:HH21	1:A:511:ARG:CB	2.17	0.49
3:G:77:ALA:O	3:G:80:ILE:HG22	2.13	0.49
1:L:115:VAL:HG23	1:L:278:LEU:HD23	1.94	0.49
1:L:369:PRO:HG3	1:L:444:HIS:NE2	2.28	0.48
2:E:26:ARG:HH22	2:E:68:HIS:CE1	2.31	0.48
2:E:100:GLN:NE2	2:E:102:LYS:NZ	2.61	0.48
1:A:56:ARG:N	1:A:56:ARG:HD3	2.25	0.48
1:A:102:ILE:HD12	1:A:106:THR:HG21	1.94	0.48
1:A:398:ASP:C	1:A:398:ASP:OD1	2.52	0.48
2:E:124:ALA:HA	2:E:127:LEU:CD2	2.37	0.48
1:A:147:ASN:HD21	1:A:151:ASN:N	1.96	0.48
1:A:406:GLU:O	1:A:410:ILE:HG13	2.12	0.48
1:A:538:ARG:NH1	1:A:542:ILE:HG13	2.28	0.48
3:G:31:ASP:O	3:G:36:LYS:HD2	2.13	0.48
1:L:151:ASN:O	1:L:155:ILE:HG12	2.12	0.48
1:L:226:VAL:HG21	1:L:259:TYR:CD1	2.48	0.48
2:E:26:ARG:NH2	2:E:68:HIS:CE1	2.81	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:323:ILE:O	1:A:327:LEU:HB2	2.12	0.48
2:E:124:ALA:HB3	2:E:125:PRO:HD3	1.95	0.48
1:A:229:THR:OG1	1:A:232:VAL:HG23	2.13	0.48
2:B:24:ASP:HB2	2:B:70:ARG:NH1	2.29	0.48
1:A:15:VAL:HG22	1:L:390:ILE:HD13	1.95	0.48
1:L:355:LEU:HB2	1:L:356:PRO:HD3	1.96	0.48
1:A:285:ILE:HD12	1:A:329:LEU:HD12	1.96	0.48
1:L:77:THR:HG23	1:L:78:GLU:N	2.28	0.48
1:L:301:VAL:HG12	1:L:302:SER:H	1.79	0.48
1:L:306:MET:N	2:E:164:MET:CE	2.76	0.48
2:B:100:GLN:HE21	2:B:104:THR:HB	1.77	0.48
2:E:33:GLY:HA3	2:E:74:ILE:HD13	1.95	0.48
2:E:108:HIS:HE1	2:E:114:PRO:O	1.96	0.48
1:L:468:ASN:HB3	6:L:1059:HOH:O	2.12	0.48
2:B:106:VAL:HG23	2:B:119:GLU:O	2.14	0.48
3:G:23:THR:HB	3:G:24:PRO:HD2	1.95	0.48
1:L:304:ILE:CG2	1:L:339:PHE:HB3	2.44	0.48
1:L:333:SER:HB2	1:L:353:GLN:HG2	1.95	0.48
3:M:120:ASN:O	3:M:124:VAL:HG23	2.12	0.48
2:B:97:ILE:HD11	2:B:139:ALA:HB2	1.94	0.47
1:L:336:ASP:O	1:L:378:SER:HA	2.15	0.47
1:A:405:THR:HB	1:A:408:GLU:HG3	1.95	0.47
1:L:504:GLN:NE2	3:M:57:GLN:HB3	2.28	0.47
1:A:99:ARG:NH2	1:A:135:ALA:HA	2.28	0.47
2:E:45:THR:HG22	2:E:101:SER:O	2.13	0.47
1:A:409:THR:O	1:A:412:ILE:HG22	2.14	0.47
2:B:16:ARG:HB2	2:B:188:HIS:HB2	1.95	0.47
3:G:139:LYS:NZ	3:G:141:SER:OXT	2.47	0.47
1:L:34:SER:HB2	1:L:276:SER:HB3	1.96	0.47
2:E:51:HIS:HE1	2:E:101:SER:HB3	1.79	0.47
3:G:112:GLU:O	3:G:116:HIS:HA	2.15	0.47
3:G:139:LYS:CG	3:G:140:GLY:H	2.27	0.47
1:L:299:GLY:N	1:L:320:GLU:OE2	2.45	0.47
2:E:124:ALA:O	2:E:127:LEU:HD23	2.13	0.47
3:G:18:PRO:HA	3:G:21:ILE:HG13	1.97	0.47
2:E:107:ILE:HD11	2:E:135:ILE:HG23	1.96	0.47
1:A:93:VAL:HG23	1:A:128:MET:HG2	1.97	0.47
1:A:180:ALA:HB3	1:A:181:PRO:CD	2.44	0.47
1:A:199:LEU:HD23	1:A:493:MET:CE	2.44	0.47
1:A:301:VAL:HG12	1:A:302:SER:N	2.29	0.47
1:A:501:ASP:HB2	1:A:515:VAL:HG21	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:169:GLU:OE2	1:A:258:ARG:NH2	2.43	0.47
1:L:86:VAL:O	1:L:90:ARG:HG3	2.15	0.47
1:L:306:MET:HG2	2:E:164:MET:HE2	1.94	0.47
2:E:26:ARG:NH2	2:E:68:HIS:ND1	2.62	0.47
1:A:313:GLY:O	1:A:316:ALA:HB3	2.14	0.47
1:A:393:ARG:NH2	1:L:311:PRO:HD3	2.30	0.47
1:A:467:ARG:HB3	1:A:469:ILE:CD1	2.45	0.47
2:B:119:GLU:OE2	2:B:151:VAL:N	2.46	0.47
2:E:109:GLN:NE2	2:E:111:ASP:N	2.56	0.47
1:A:317:VAL:O	1:A:320:GLU:HG2	2.15	0.46
1:A:409:THR:O	1:A:413:ARG:HG3	2.15	0.46
1:A:400:GLY:O	1:A:401:LEU:HD23	2.15	0.46
1:A:453:ASN:ND2	1:A:456:GLU:HB2	2.30	0.46
2:B:46:LEU:HG	2:B:102:LYS:HB2	1.96	0.46
1:A:351:LEU:HD23	1:L:351:LEU:HD23	1.97	0.46
1:L:283:ARG:O	1:L:287:ILE:HG13	2.15	0.46
2:E:55:LEU:O	2:E:59:ILE:HG13	2.16	0.46
3:M:58:ALA:O	3:M:62:GLU:HG3	2.16	0.46
1:A:143:CYS:HB3	1:A:167:PHE:CE1	2.51	0.46
1:A:335:ASN:OD1	1:A:350:THR:HA	2.15	0.46
1:A:147:ASN:ND2	1:A:150:ASP:N	2.64	0.46
1:A:221:ALA:O	1:A:257:MET:HA	2.16	0.46
1:L:126:MET:HE1	1:L:319:ALA:HB2	1.97	0.46
1:L:377:GLY:O	2:E:160:ARG:NH2	2.49	0.46
2:E:67:LEU:N	2:E:67:LEU:HD12	2.31	0.46
1:A:381:ASP:OD1	1:A:381:ASP:C	2.52	0.46
1:A:422:ALA:HB1	1:A:481:SER:HB3	1.98	0.46
2:B:55:LEU:O	2:B:59:ILE:HG13	2.15	0.46
2:B:124:ALA:O	2:B:127:LEU:HD23	2.15	0.46
1:L:468:ASN:N	1:L:468:ASN:HD22	2.13	0.46
2:B:50:PRO:O	2:B:54:ILE:HG13	2.15	0.46
1:L:93:VAL:CG2	1:L:128:MET:HG2	2.46	0.46
3:M:30:THR:HG22	3:M:30:THR:O	2.15	0.46
1:A:102:ILE:O	1:A:106:THR:HG23	2.15	0.46
1:A:115:VAL:HG21	1:A:279:TYR:HA	1.97	0.46
1:A:294:GLN:NE2	1:A:294:GLN:C	2.69	0.46
1:A:417:ALA:CB	1:A:437:VAL:HG13	2.45	0.46
2:E:13:LEU:HG	2:E:189:ILE:HG23	1.98	0.46
1:A:42:VAL:HG22	1:A:43:LYS:N	2.30	0.46
2:E:131:THR:O	2:E:135:ILE:HG13	2.16	0.46
2:E:141:ARG:O	2:E:146:GLU:HB2	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:469:ILE:HA	1:A:473:ASP:OD2	2.16	0.45
3:G:78:GLU:OE1	3:G:119:VAL:HG12	2.15	0.45
1:L:123:VAL:HG13	1:L:318:LEU:CD2	2.45	0.45
1:L:221:ALA:O	1:L:257:MET:HA	2.15	0.45
2:E:102:LYS:HZ1	5:E:602:B12:H5R2	1.81	0.45
2:E:180:GLN:CD	2:E:180:GLN:N	2.70	0.45
1:A:341:HIS:CE1	2:B:162:LYS:HZ3	2.34	0.45
1:A:551:PRO:HG2	1:L:22:GLY:O	2.16	0.45
2:B:14:LYS:HG2	2:B:15:THR:H	1.81	0.45
1:A:281:GLU:OE2	1:A:281:GLU:HA	2.16	0.45
2:B:124:ALA:HA	2:B:127:LEU:HD23	1.99	0.45
1:L:201:GLN:NE2	1:L:222:GLU:HB3	2.31	0.45
3:M:20:HIS:O	3:M:22:LEU:HG	2.16	0.45
1:A:149:LYS:O	1:A:150:ASP:C	2.55	0.45
1:A:351:LEU:HD12	1:A:354:MET:CE	2.42	0.45
1:A:426:GLU:HG2	1:A:477:ALA:HA	1.99	0.45
1:L:418:ARG:HG3	1:L:437:VAL:HG11	1.99	0.45
3:M:110:GLU:O	3:M:114:THR:HB	2.17	0.45
2:B:89:ASN:OD1	2:B:110:ARG:HB2	2.17	0.45
2:B:127:LEU:N	2:B:127:LEU:CD2	2.79	0.45
1:L:195:ARG:O	1:L:198:VAL:HG23	2.17	0.45
3:M:78:GLU:HB2	3:M:120:ASN:HD22	1.80	0.45
1:L:100:GLU:CD	1:L:100:GLU:H	2.19	0.45
1:L:317:VAL:O	1:L:320:GLU:HG2	2.16	0.45
3:M:139:LYS:H	3:M:139:LYS:CD	1.95	0.45
1:A:46:ASN:O	1:A:48:LEU:HD12	2.17	0.45
1:A:56:ARG:HH22	1:A:59:GLN:CB	2.28	0.45
1:L:323:ILE:O	1:L:327:LEU:HB2	2.16	0.45
2:B:25:GLU:HA	2:B:25:GLU:OE1	2.15	0.45
2:B:32:ILE:HG22	2:B:97:ILE:HB	1.99	0.45
1:L:244:ALA:HB3	3:M:123:PHE:HZ	1.82	0.45
3:G:64:MET:O	3:G:65:GLN:HB2	2.17	0.45
5:E:602:B12:H5R1	5:E:602:B12:O51	2.17	0.45
2:B:109:GLN:OE1	2:B:110:ARG:N	2.50	0.44
1:L:248:SER:O	1:L:252:SER:HB3	2.17	0.44
1:L:366:SER:HB2	1:L:373:ASN:ND2	2.32	0.44
1:A:486:ILE:N	1:A:486:ILE:CD1	2.80	0.44
2:E:44:HIS:HA	2:E:49:MET:O	2.18	0.44
1:A:430:PRO:HA	1:A:431:PRO:HD2	1.88	0.44
1:L:299:GLY:O	1:L:300:ALA:HB3	2.16	0.44
1:L:525:TYR:HB2	6:L:1060:HOH:O	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:97:VAL:HG13	1:A:101:GLU:OE2	2.17	0.44
1:A:405:THR:HG22	1:A:407:ALA:N	2.29	0.44
1:A:522:ILE:HG22	1:A:523:ASN:O	2.18	0.44
2:B:29:GLU:CD	2:B:70:ARG:HE	2.20	0.44
1:L:366:SER:HB2	1:L:373:ASN:HD22	1.83	0.44
1:L:392:GLN:CD	1:L:399:GLY:H	2.17	0.44
1:L:465:MET:C	1:L:466:LYS:HE3	2.37	0.44
3:M:20:HIS:CE1	3:M:21:ILE:HG12	2.52	0.44
2:B:14:LYS:HG2	2:B:15:THR:N	2.33	0.44
1:A:94:ASP:OD2	1:L:96:HIS:NE2	2.51	0.44
1:L:112:ALA:HA	1:L:115:VAL:HG12	2.00	0.44
1:L:123:VAL:HG12	1:L:127:MET:CE	2.48	0.44
2:E:23:ALA:HA	2:E:90:LEU:HD12	2.00	0.44
1:L:123:VAL:HG12	1:L:127:MET:HE2	2.00	0.43
2:E:34:VAL:HG22	2:E:72:VAL:O	2.18	0.43
1:L:178:ARG:CB	1:L:458:LEU:HD22	2.47	0.43
1:L:400:GLY:O	1:L:401:LEU:CD1	2.65	0.43
2:E:11:PHE:HB3	2:E:192:VAL:O	2.18	0.43
2:E:46:LEU:CD2	2:E:166:LYS:HG2	2.48	0.43
3:M:92:ASN:O	3:M:98:ARG:HG3	2.18	0.43
1:A:263:THR:HG23	1:A:320:GLU:CD	2.38	0.43
1:L:281:GLU:HA	1:L:281:GLU:OE1	2.18	0.43
2:E:22:SER:O	2:E:70:ARG:NH2	2.52	0.43
2:E:120:LEU:CD2	5:E:602:B12:H311	2.48	0.43
1:A:92:LEU:HD21	1:A:102:ILE:CD1	2.43	0.43
1:A:368:VAL:HG23	1:A:369:PRO:HD2	1.99	0.43
1:L:42:VAL:HA	1:L:51:GLU:O	2.18	0.43
1:L:143:CYS:HB3	1:L:167:PHE:CD1	2.54	0.43
2:E:193:ARG:HG2	2:E:193:ARG:HH11	1.82	0.43
1:A:246:LEU:O	1:A:249:ALA:HB3	2.19	0.43
1:A:426:GLU:CG	1:A:480:ARG:NH2	2.81	0.43
1:L:285:ILE:HD12	1:L:324:ALA:CA	2.29	0.43
2:E:74:ILE:N	2:E:74:ILE:CD1	2.82	0.43
1:A:93:VAL:HG23	1:A:128:MET:CG	2.48	0.43
2:B:34:VAL:HG12	2:B:99:ILE:CG2	2.49	0.43
3:M:95:ARG:HB3	3:M:98:ARG:NH1	2.33	0.43
1:L:181:PRO:HB2	1:L:461:VAL:HG13	2.00	0.43
1:L:323:ILE:HA	1:L:326:MET:HG2	2.01	0.43
1:L:478:LEU:HB2	1:L:487:ALA:HB2	2.00	0.43
2:E:51:HIS:CE1	2:E:101:SER:HB3	2.54	0.43
1:A:199:LEU:HD23	1:A:493:MET:HE1	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:415:LYS:HE2	1:A:486:ILE:HD11	2.01	0.43
3:M:97:PHE:O	3:M:138:ARG:HA	2.18	0.43
1:A:147:ASN:C	1:A:147:ASN:ND2	2.72	0.43
1:A:180:ALA:O	1:A:181:PRO:C	2.56	0.43
2:E:44:HIS:HB3	2:E:48:ASP:HA	2.00	0.43
2:E:72:VAL:CG1	2:E:73:ARG:H	2.31	0.43
3:G:33:THR:HG22	3:G:34:LEU:N	2.33	0.43
1:L:43:LYS:HA	1:L:43:LYS:HD2	1.85	0.43
2:E:24:ASP:OD2	2:E:26:ARG:HB2	2.19	0.43
1:A:6:ARG:NH1	1:L:444:HIS:O	2.52	0.42
1:A:56:ARG:NH1	1:A:59:GLN:HB2	2.33	0.42
1:A:439:ALA:HB1	1:A:448:GLU:O	2.18	0.42
2:B:11:PHE:N	2:B:11:PHE:CD2	2.87	0.42
1:L:18:ASP:OD1	1:L:341:HIS:CD2	2.69	0.42
2:E:127:LEU:HD22	2:E:127:LEU:H	1.82	0.42
1:A:279:TYR:O	1:A:282:SER:HB3	2.19	0.42
1:A:522:ILE:HD12	1:A:522:ILE:N	2.27	0.42
2:B:33:GLY:HA3	2:B:74:ILE:HD13	2.00	0.42
1:A:6:ARG:HD3	1:L:444:HIS:CE1	2.53	0.42
2:B:84:ALA:CB	2:B:106:VAL:HG13	2.49	0.42
2:B:115:LEU:HD13	5:B:601:B12:H412	2.02	0.42
2:E:180:GLN:HB2	2:E:181:ASP:H	1.64	0.42
1:A:216:GLY:HA2	1:A:497:ARG:NH2	2.33	0.42
2:B:74:ILE:N	2:B:74:ILE:CD1	2.82	0.42
1:A:27:GLU:OE1	1:A:27:GLU:HA	2.19	0.42
1:A:149:LYS:C	1:A:151:ASN:N	2.70	0.42
1:L:303:CYS:HA	2:E:164:MET:CE	2.49	0.42
2:E:32:ILE:CD1	2:E:71:VAL:HG22	2.49	0.42
3:M:20:HIS:ND1	3:M:20:HIS:C	2.70	0.42
3:M:120:ASN:O	3:M:123:PHE:HB3	2.20	0.42
1:A:143:CYS:SG	1:A:170:GLN:HG2	2.59	0.42
1:A:178:ARG:CB	1:A:458:LEU:HD22	2.49	0.42
1:A:539:TRP:CD1	1:A:543:LYS:HD2	2.54	0.42
1:L:57:ARG:HG3	1:L:60:PHE:CD1	2.54	0.42
1:L:62:MET:HG2	3:M:130:VAL:CG1	2.50	0.42
1:L:424:PHE:CD2	1:L:429:LEU:HB2	2.54	0.42
1:A:61:ASP:H	1:A:64:ASP:HB2	1.85	0.42
1:A:501:ASP:HB3	1:A:515:VAL:HG21	2.01	0.42
2:B:16:ARG:HG3	2:B:190:ASP:OD1	2.20	0.42
2:B:35:GLY:N	2:B:83:MET:HE1	2.34	0.42
2:B:47:ILE:O	2:B:47:ILE:CG2	2.67	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:86:ASP:O	2:B:90:LEU:HB2	2.20	0.42
1:A:522:ILE:H	1:A:522:ILE:CD1	2.28	0.42
1:L:42:VAL:CG1	1:L:81:MET:HG3	2.49	0.42
1:L:57:ARG:HG3	1:L:60:PHE:CE1	2.55	0.42
1:A:178:ARG:HB2	1:A:458:LEU:HD22	2.02	0.42
1:A:192:GLN:NE2	1:A:196:PRO:HA	2.35	0.42
2:B:24:ASP:OD2	2:B:26:ARG:CB	2.68	0.42
3:G:11:TYR:CE1	3:G:12:PRO:HG3	2.54	0.42
1:L:239:THR:HG21	3:M:131:TYR:CE1	2.55	0.42
2:E:100:GLN:HE22	2:E:102:LYS:HZ1	1.68	0.42
1:A:206:GLU:HG3	1:A:246:LEU:HD21	2.02	0.41
1:A:268:LEU:HD12	1:A:268:LEU:O	2.20	0.41
1:A:439:ALA:O	1:A:443:ALA:HB2	2.20	0.41
1:L:106:THR:O	1:L:109:ILE:HG12	2.20	0.41
1:L:353:GLN:C	1:L:356:PRO:HD2	2.41	0.41
1:L:502:TYR:CD1	1:L:502:TYR:C	2.94	0.41
2:E:45:THR:HB	2:E:102:LYS:O	2.20	0.41
2:E:80:VAL:HB	2:E:100:GLN:CG	2.50	0.41
2:E:120:LEU:HD23	5:E:602:B12:H311	2.01	0.41
2:E:137:LYS:HE3	2:E:137:LYS:HB3	1.87	0.41
1:A:1:MET:O	1:A:2:LYS:CB	2.68	0.41
1:A:373:ASN:ND2	1:A:377:GLY:N	2.58	0.41
2:B:122:SER:HB2	5:B:601:B12:O7R	2.21	0.41
2:B:163:PHE:O	2:B:164:MET:C	2.59	0.41
1:L:396:MET:HE2	1:L:539:TRP:CE2	2.55	0.41
1:A:383:GLU:O	1:L:13:ARG:CZ	2.68	0.41
2:B:76:ARG:NE	2:B:86:ASP:OD2	2.50	0.41
3:G:31:ASP:O	3:G:33:THR:N	2.50	0.41
2:E:140:ALA:O	2:E:144:ARG:HG3	2.19	0.41
2:E:165:ALA:HB3	6:E:615:HOH:O	2.21	0.41
3:M:11:TYR:N	3:M:12:PRO:HD3	2.35	0.41
3:M:78:GLU:HB3	3:M:117:ALA:HA	2.02	0.41
1:A:34:SER:HB2	1:A:276:SER:HB3	2.03	0.41
1:L:300:ALA:HB1	1:L:304:ILE:HA	2.01	0.41
3:M:74:ARG:NH1	6:M:151:HOH:O	2.48	0.41
1:A:42:VAL:HG21	1:A:77:THR:HG21	2.03	0.41
1:A:56:ARG:NH2	1:A:56:ARG:H	2.07	0.41
1:A:93:VAL:CG2	1:A:128:MET:HG2	2.50	0.41
1:A:206:GLU:HG3	1:A:246:LEU:CD2	2.49	0.41
1:A:225:SER:O	1:A:243:LYS:HE3	2.21	0.41
2:B:24:ASP:O	2:B:25:GLU:OE1	2.39	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:57:GLU:HG3	2:E:129:LEU:HB3	2.02	0.41
5:E:602:B12:H91	5:E:602:B12:H291	1.86	0.41
1:A:92:LEU:HD23	1:A:102:ILE:HD13	1.99	0.41
2:B:131:THR:O	2:B:135:ILE:HG13	2.20	0.41
1:L:332:ALA:HB1	1:L:363:SER:HB3	2.02	0.41
1:L:457:ASP:O	1:L:461:VAL:HG23	2.20	0.41
3:M:138:ARG:O	3:M:139:LYS:C	2.57	0.41
1:A:147:ASN:HD22	1:A:149:LYS:N	2.18	0.41
1:A:229:THR:HG1	1:A:232:VAL:HG23	1.85	0.41
2:B:88:ALA:C	2:B:90:LEU:H	2.24	0.41
3:M:20:HIS:CE1	3:M:56:TYR:HE1	2.39	0.41
1:A:341:HIS:CE1	2:B:162:LYS:HZ1	2.37	0.41
1:A:478:LEU:HD13	1:A:486:ILE:HB	2.03	0.41
2:B:16:ARG:O	2:B:187:LEU:HA	2.21	0.41
1:L:62:MET:HE2	1:L:230:GLU:HG2	2.03	0.41
1:L:417:ALA:CB	1:L:437:VAL:HG13	2.51	0.41
1:A:89:ALA:O	1:A:92:LEU:HB2	2.21	0.41
1:A:121:MET:HA	1:A:125:GLU:OE2	2.21	0.41
1:A:237:ASP:CG	3:G:98:ARG:NH2	2.73	0.41
1:A:450:PRO:HA	1:A:451:PRO:HD3	1.88	0.41
2:B:67:LEU:N	2:B:67:LEU:HD12	2.36	0.41
1:A:13:ARG:HD3	1:A:13:ARG:HA	1.86	0.40
1:A:62:MET:HG2	3:G:130:VAL:CG1	2.51	0.40
1:A:512:GLN:HB2	1:A:514:GLU:OE2	2.20	0.40
2:B:109:GLN:O	2:B:109:GLN:HG3	2.21	0.40
3:G:46:ASP:O	3:G:48:ARG:N	2.52	0.40
1:L:36:PHE:HB2	1:L:274:SER:O	2.21	0.40
2:E:120:LEU:HD13	5:E:602:B12:HM63	2.03	0.40
1:A:50:VAL:O	1:A:50:VAL:HG22	2.22	0.40
1:A:62:MET:HG3	1:A:230:GLU:OE2	2.21	0.40
1:A:332:ALA:HB1	1:A:363:SER:CB	2.51	0.40
2:B:33:GLY:HA3	2:B:74:ILE:HD11	2.03	0.40
3:G:138:ARG:O	3:G:139:LYS:C	2.58	0.40
1:L:53:ASP:OD1	1:L:112:ALA:HB3	2.22	0.40
1:A:32:MET:O	1:A:33:ASP:C	2.60	0.40
1:A:170:GLN:HE21	1:A:187:LEU:HD11	1.85	0.40
1:A:259:TYR:CZ	1:A:293:VAL:HG21	2.56	0.40
2:B:16:ARG:CB	2:B:188:HIS:HB2	2.51	0.40
2:B:71:VAL:HG12	2:B:187:LEU:HD12	2.03	0.40
1:L:211:GLU:O	1:L:215:ARG:HG3	2.22	0.40
1:L:239:THR:HG23	1:L:240:PRO:CD	2.50	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:M:27:LYS:HA	3:M:28:PRO:HD3	1.94	0.40
1:A:301:VAL:HG12	1:A:302:SER:H	1.86	0.40
2:B:108:HIS:HE1	2:B:114:PRO:O	2.04	0.40
1:A:462:GLU:HG2	1:A:466:LYS:HE3	2.02	0.40
1:A:517:SER:C	1:A:519:VAL:H	2.24	0.40
1:L:49:ILE:HG13	1:L:74:VAL:HG12	2.04	0.40
1:L:486:ILE:HA	1:L:489:ASN:HD22	1.86	0.40
2:E:13:LEU:N	2:E:13:LEU:HD12	2.37	0.40
2:E:37:ALA:CB	2:E:41:HIS:HB2	2.50	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	550/555 (99%)	499 (91%)	47 (8%)	4 (1%)	22	39
1	L	553/555 (100%)	504 (91%)	45 (8%)	4 (1%)	22	39
2	B	179/194 (92%)	162 (90%)	16 (9%)	1 (1%)	25	43
2	E	182/194 (94%)	165 (91%)	16 (9%)	1 (0%)	29	48
3	G	130/141 (92%)	120 (92%)	5 (4%)	5 (4%)	3	4
3	M	129/141 (92%)	116 (90%)	12 (9%)	1 (1%)	19	35
All	All	1723/1780 (97%)	1566 (91%)	141 (8%)	16 (1%)	17	31

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	G	139	LYS
1	L	273	GLU
2	E	180	GLN

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Mol	Chain	Res	Type
1	A	364	GLY
1	L	178	ARG
3	M	139	LYS
1	A	178	ARG
2	B	40	LYS
1	L	364	GLY
1	A	33	ASP
3	G	14	ALA
1	A	301	VAL
1	L	301	VAL
3	G	32	ILE
3	G	47	VAL
3	G	140	GLY

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	450/453 (99%)	417 (93%)	33 (7%)	14	27
1	L	453/453 (100%)	416 (92%)	37 (8%)	11	22
2	B	150/163 (92%)	143 (95%)	7 (5%)	26	49
2	E	153/163 (94%)	142 (93%)	11 (7%)	14	28
3	G	111/120 (92%)	105 (95%)	6 (5%)	22	42
3	M	110/120 (92%)	102 (93%)	8 (7%)	14	27
All	All	1427/1472 (97%)	1325 (93%)	102 (7%)	14	28

All (102) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	6	ARG
1	A	51	GLU
1	A	56	ARG
1	A	75	GLU

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Mol	Chain	Res	Type
1	A	102	ILE
1	A	141	ASN
1	A	142	GLN
1	A	147	ASN
1	A	179	TYR
1	A	181	PRO
1	A	183	ASN
1	A	206	GLU
1	A	222	GLU
1	A	233	PHE
1	A	237	ASP
1	A	257	MET
1	A	285	ILE
1	A	294	GLN
1	A	337	GLN
1	A	338	THR
1	A	349	ARG
1	A	351	LEU
1	A	365	TYR
1	A	409	THR
1	A	435	GLU
1	A	453	ASN
1	A	485	ASP
1	A	502	TYR
1	A	511	ARG
1	A	512	GLN
1	A	514	GLU
1	A	526	GLN
2	B	11	PHE
2	B	15	THR
2	B	16	ARG
2	B	47	ILE
2	B	55	LEU
2	B	81	SER
2	B	109	GLN
3	G	13	LEU
3	G	16	ARG
3	G	64	MET
3	G	69	VAL
3	G	94	LEU
3	G	111	LEU
1	L	2	LYS

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Mol	Chain	Res	Type
1	L	3	ARG
1	L	6	ARG
1	L	13	ARG
1	L	51	GLU
1	L	59	GLN
1	L	73	ASN
1	L	76	ARG
1	L	92	LEU
1	L	93	VAL
1	L	100	GLU
1	L	102	ILE
1	L	141	ASN
1	L	179	TYR
1	L	185	LEU
1	L	199	LEU
1	L	201	GLN
1	L	206	GLU
1	L	233	PHE
1	L	238	ASP
1	L	239	THR
1	L	252	SER
1	L	268	LEU
1	L	285	ILE
1	L	327	LEU
1	L	349	ARG
1	L	372	ASP
1	L	386	ASP
1	L	409	THR
1	L	453	ASN
1	L	466	LYS
1	L	485	ASP
1	L	502	TYR
1	L	503	LEU
1	L	512	GLN
1	L	514	GLU
1	L	546	PRO
2	E	25	GLU
2	E	55	LEU
2	E	63	GLU
2	E	81	SER
2	E	101	SER
2	E	108	HIS

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Mol	Chain	Res	Type
2	E	115	LEU
2	E	118	LEU
2	E	133	ARG
2	E	134	GLN
2	E	157	GLN
3	M	20	HIS
3	M	31	ASP
3	M	41	GLU
3	M	51	ARG
3	M	64	MET
3	M	74	ARG
3	M	132	GLN
3	M	139	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (48) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	12	GLN
1	A	16	ASN
1	A	79	GLN
1	A	120	GLN
1	A	141	ASN
1	A	147	ASN
1	A	154	GLN
1	A	170	GLN
1	A	192	GLN
1	A	201	GLN
1	A	294	GLN
1	A	321	ASN
1	A	337	GLN
1	A	341	HIS
1	A	373	ASN
1	A	379	ASN
1	A	447	ASN
1	A	453	ASN
1	A	468	ASN
1	A	489	ASN
1	A	512	GLN
1	A	526	GLN
2	B	42	GLN
2	B	100	GLN
2	B	108	HIS

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Mol	Chain	Res	Type
3	G	59	GLN
1	L	46	ASN
1	L	59	GLN
1	L	141	ASN
1	L	201	GLN
1	L	337	GLN
1	L	341	HIS
1	L	453	ASN
1	L	468	ASN
1	L	489	ASN
1	L	504	GLN
1	L	512	GLN
1	L	544	ASN
2	E	89	ASN
2	E	100	GLN
2	E	108	HIS
2	E	109	GLN
2	E	134	GLN
2	E	157	GLN
3	M	59	GLN
3	M	120	ASN
3	M	132	GLN
3	M	133	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 for Mogul analysis.

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	#$|Z| > 2$
5	B12	B	601	-	90,101,101	1.63	20 (22%)	137,166,166	1.69	32 (23%)
5	B12	E	602	-	90,101,101	1.65	19 (21%)	137,166,166	1.71	30 (21%)

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
5	B12	B	601	-	-	11/52/223/223	0/3/11/11
5	B12	E	602	-	-	12/52/223/223	0/3/11/11

All (39) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	602	B12	C14-N23	6.28	1.43	1.35
5	B	601	B12	C14-N23	5.73	1.42	1.35
5	B	601	B12	O58-C57	3.85	1.31	1.23
5	E	602	B12	C3-C4	3.68	1.61	1.51
5	E	602	B12	C17-C18	3.39	1.61	1.54
5	B	601	B12	C41-C8	3.26	1.62	1.54
5	E	602	B12	O58-C57	3.22	1.29	1.23
5	B	601	B12	C7-C6	3.16	1.62	1.54
5	B	601	B12	C19-N24	3.11	1.54	1.48
5	B	601	B12	C17-C18	3.01	1.60	1.54
5	E	602	B12	C12-C11	2.86	1.57	1.52
5	E	602	B12	C7-C6	2.85	1.61	1.54
5	B	601	B12	C48-C49	2.81	1.61	1.52
5	E	602	B12	C30-C3	2.76	1.60	1.54
5	B	601	B12	C12-C11	2.65	1.56	1.52
5	B	601	B12	C46-C12	2.63	1.59	1.54
5	B	601	B12	C9-N22	2.61	1.37	1.30
5	B	601	B12	C7B-C6B	2.60	1.44	1.37
5	E	602	B12	O7R-C2R	-2.56	1.36	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	602	B12	C41-C8	2.53	1.60	1.54
5	E	602	B12	C11-N23	2.49	1.41	1.37
5	E	602	B12	C46-C12	2.48	1.59	1.54
5	B	601	B12	O7R-C2R	-2.40	1.37	1.43
5	B	601	B12	C6B-C5B	2.38	1.46	1.40
5	E	602	B12	C6B-C5B	2.38	1.46	1.40
5	E	602	B12	C19-N24	2.36	1.53	1.48
5	E	602	B12	C9-N22	2.35	1.36	1.30
5	E	602	B12	C53-C15	2.35	1.55	1.50
5	E	602	B12	C48-C49	2.31	1.60	1.52
5	B	601	B12	C30-C3	2.30	1.59	1.54
5	B	601	B12	C13-C14	2.27	1.56	1.52
5	E	602	B12	C13-C14	2.25	1.56	1.52
5	B	601	B12	C53-C15	2.22	1.55	1.50
5	E	602	B12	P-O5	-2.19	1.45	1.55
5	B	601	B12	C11-N23	2.16	1.41	1.37
5	B	601	B12	P-O5	-2.08	1.45	1.55
5	B	601	B12	C18-C19	2.07	1.58	1.53
5	E	602	B12	C54-C17	2.06	1.58	1.54
5	B	601	B12	C37-C38	2.02	1.58	1.51

All (62) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	601	B12	O58-C57-C56	-5.99	111.06	122.02
5	E	602	B12	O58-C57-C56	-5.90	111.22	122.02
5	E	602	B12	C30-C3-C4	4.88	120.97	109.63
5	B	601	B12	C26-C2-C1	4.61	117.19	110.01
5	B	601	B12	C47-C12-C46	-4.28	102.12	109.35
5	B	601	B12	C7B-C8B-C9B	-4.25	116.34	120.54
5	E	602	B12	O5-P-O2	4.23	123.46	106.78
5	B	601	B12	O5-P-O2	4.14	123.11	106.78
5	E	602	B12	C47-C12-C46	-4.02	102.55	109.35
5	E	602	B12	C7B-C8B-C9B	-3.99	116.60	120.54
5	B	601	B12	C2-C26-C27	3.57	125.27	115.22
5	E	602	B12	C20-C1-C19	-3.45	106.03	109.36
5	E	602	B12	C56-C57-N59	3.40	122.14	116.42
5	B	601	B12	C56-C57-N59	3.36	122.07	116.42
5	E	602	B12	C30-C3-C2	3.35	126.17	119.09
5	B	601	B12	C20-C1-C19	-3.10	106.36	109.36
5	E	602	B12	C2P-C1P-N59	3.08	117.48	112.93
5	B	601	B12	C3P-C2P-C1P	3.02	117.25	111.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	E	602	B12	C8-C9-C10	-2.91	117.03	123.32
5	E	602	B12	C2-C26-C27	2.84	123.21	115.22
5	B	601	B12	C4B-C9B-C8B	2.84	124.01	121.10
5	B	601	B12	C8-C9-C10	-2.83	117.22	123.32
5	E	602	B12	C26-C2-C1	2.73	114.27	110.01
5	B	601	B12	C25-C2-C1	-2.69	109.73	113.78
5	E	602	B12	C4B-C9B-C8B	2.65	123.82	121.10
5	E	602	B12	O44-C43-C42	-2.62	113.39	121.07
5	B	601	B12	O44-C43-C42	-2.61	113.41	121.07
5	E	602	B12	C2-C1-C19	2.57	122.65	118.60
5	B	601	B12	C49-C48-C13	2.48	121.89	114.73
5	B	601	B12	C2-C1-C19	2.45	122.47	118.60
5	E	602	B12	C37-C7-C8	-2.44	101.86	108.39
5	E	602	B12	O6R-C4R-C5R	-2.40	104.02	109.21
5	E	602	B12	C31-C30-C3	2.34	121.47	114.73
5	E	602	B12	C7-C37-C38	2.33	121.26	114.25
5	E	602	B12	C20-C1-N21	-2.30	106.50	110.27
5	B	601	B12	C7-C37-C38	2.29	121.14	114.25
5	B	601	B12	C25-C2-C26	-2.27	105.11	109.71
5	E	602	B12	C3P-C2P-C1P	2.27	115.80	111.39
5	E	602	B12	C15-C16-N24	-2.25	119.17	122.42
5	B	601	B12	C15-C16-N24	-2.23	119.20	122.42
5	B	601	B12	O6R-C4R-C5R	-2.22	104.41	109.21
5	E	602	B12	C19-C1-N21	2.20	104.41	102.16
5	B	601	B12	C2P-C1P-N59	2.19	116.17	112.93
5	B	601	B12	C48-C49-C50	2.18	119.98	112.59
5	B	601	B12	C42-C43-N45	2.17	123.27	116.51
5	E	602	B12	C25-C2-C1	-2.16	110.53	113.78
5	B	601	B12	C47-C12-C11	2.14	117.76	110.08
5	B	601	B12	C26-C2-C3	2.13	111.18	107.41
5	E	602	B12	C47-C12-C13	2.12	121.34	112.72
5	B	601	B12	C47-C12-C13	2.11	121.32	112.72
5	B	601	B12	C17-C18-C19	-2.09	99.17	102.36
5	E	602	B12	C36-C7-C37	2.06	114.20	110.80
5	B	601	B12	C8-C9-N22	2.05	114.86	110.77
5	B	601	B12	O58-C57-N59	2.04	126.87	123.01
5	B	601	B12	C20-C1-N21	-2.04	106.92	110.27
5	B	601	B12	C56-C55-C17	2.04	119.45	115.52
5	E	602	B12	C49-C48-C13	2.04	120.62	114.73
5	E	602	B12	C31-C32-N33	2.04	122.85	116.51
5	B	601	B12	C41-C8-C7	2.03	119.72	114.14
5	B	601	B12	C54-C17-C55	-2.01	105.93	109.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	E	602	B12	C1-C2-C3	2.01	104.16	101.60
5	E	602	B12	C42-C43-N45	2.00	122.75	116.51

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	601	B12	C12-C13-C48-C49
5	E	602	B12	C12-C13-C48-C49
5	B	601	B12	O6R-C4R-C5R-O8R
5	B	601	B12	C3R-C4R-C5R-O8R
5	E	602	B12	C8-C41-C42-C43
5	B	601	B12	C1-C2-C26-C27
5	B	601	B12	C25-C2-C26-C27
5	E	602	B12	C1-C2-C26-C27
5	E	602	B12	C25-C2-C26-C27
5	E	602	B12	C41-C42-C43-O44
5	B	601	B12	C17-C18-C60-C61
5	E	602	B12	C17-C18-C60-C61
5	E	602	B12	O6R-C4R-C5R-O8R
5	B	601	B12	C41-C42-C43-O44
5	E	602	B12	C3R-C4R-C5R-O8R
5	B	601	B12	C8-C41-C42-C43
5	E	602	B12	C41-C42-C43-N45
5	E	602	B12	C4-C3-C30-C31
5	B	601	B12	C19-C18-C60-C61
5	E	602	B12	C19-C18-C60-C61
5	B	601	B12	C41-C42-C43-N45
5	B	601	B12	C7-C37-C38-N40
5	E	602	B12	C7-C37-C38-N40

There are no ring outliers.

2 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	601	B12	5	0
5	E	602	B12	11	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 B12 B 601

Bond lengths

Bond angles

Torsions

Rings

Ligand B12 E 602

Bond lengths

Bond angles

Torsions

Rings
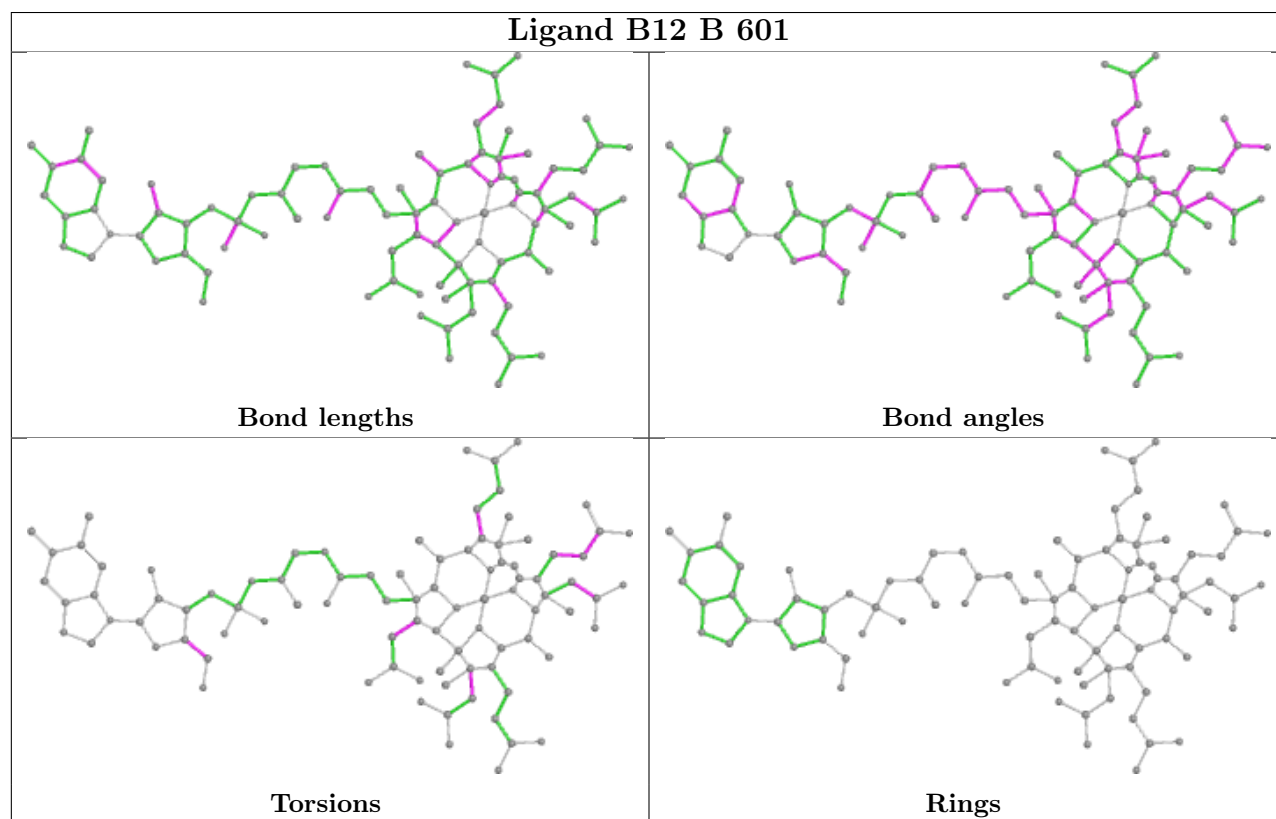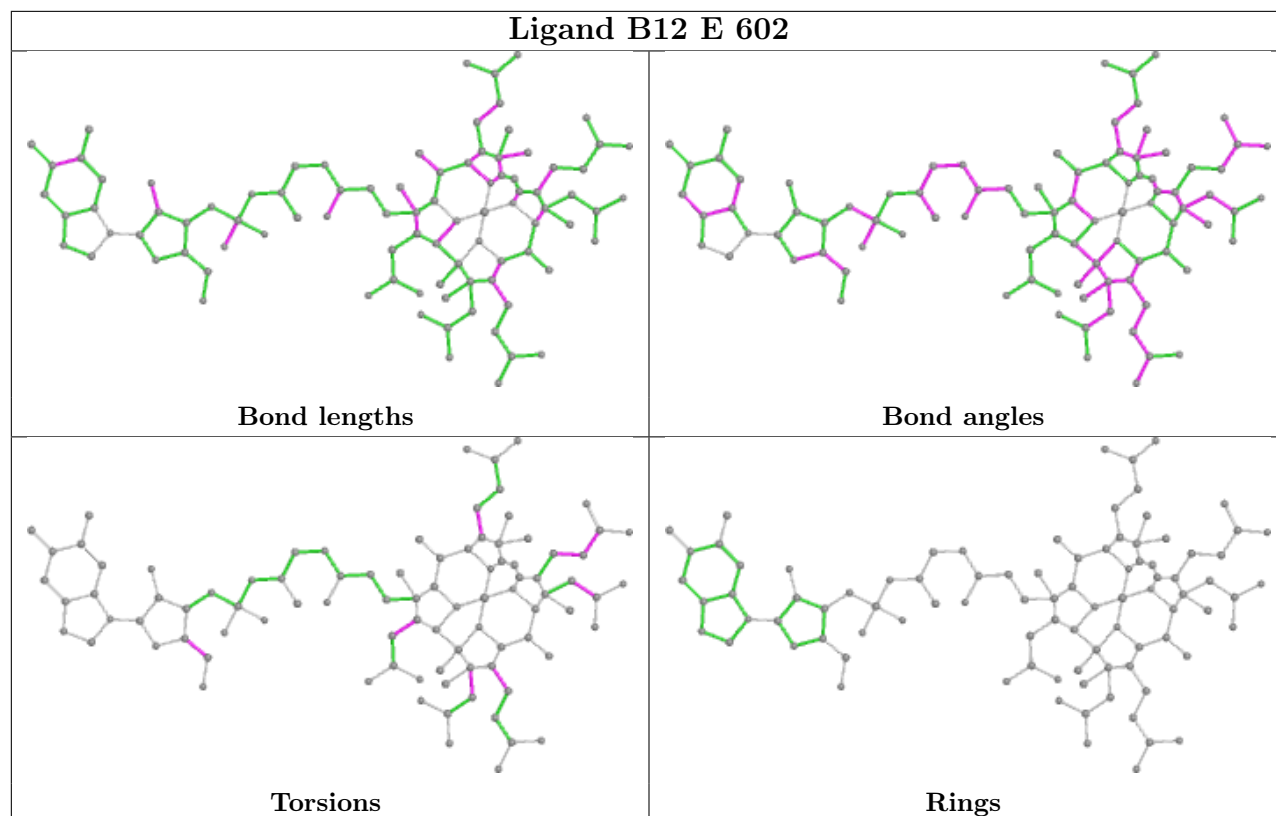
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	552/555 (99%)	-0.15	7 (1%)	77	79	24, 38, 55, 69	0
1	L	555/555 (100%)	-0.14	6 (1%)	80	82	21, 36, 54, 72	0
2	B	181/194 (93%)	0.25	8 (4%)	34	37	30, 48, 66, 77	0
2	E	184/194 (94%)	0.05	3 (1%)	72	74	32, 44, 61, 75	0
3	G	132/141 (93%)	-0.04	6 (4%)	33	36	31, 47, 66, 80	0
3	M	131/141 (92%)	-0.01	4 (3%)	49	52	28, 43, 67, 75	0
All	All	1735/1780 (97%)	-0.07	34 (1%)	65	68	21, 41, 60, 80	0

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	25	GLU	4.7
3	M	141	SER	4.5
1	L	1	MET	4.5
2	E	25	GLU	4.3
1	A	529	GLY	4.2
2	B	11	PHE	3.8
3	M	56	TYR	3.8
1	L	45	ASP	3.6
3	M	20	HIS	3.5
2	B	19	GLY	3.3
1	L	46	ASN	3.1
2	B	27	ALA	3.0
2	B	16	ARG	3.0
1	A	455	VAL	2.9
1	L	36	PHE	2.9
3	G	35	GLU	2.6
1	A	82	ARG	2.6
3	G	42	VAL	2.6
3	G	141	SER	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	46	ASN	2.6
1	A	537	GLU	2.6
1	A	48	LEU	2.4
1	A	1	MET	2.4
2	B	12	THR	2.4
3	M	139	LYS	2.4
1	L	188	LEU	2.3
3	G	139	LYS	2.3
3	G	39	SER	2.2
2	E	27	ALA	2.1
1	L	467	ARG	2.1
2	B	147	SER	2.1
2	B	23	ALA	2.0
2	E	80	VAL	2.0
3	G	140	GLY	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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(Å^2)	Q<0.9
5	B12	B	601	91/91	0.95	0.16	20,34,45,48	0
5	B12	E	602	91/91	0.95	0.15	22,31,38,46	0
4	K	A	1001	1/1	0.99	0.19	40,40,40,40	0
4	K	L	1002	1/1	0.99	0.07	34,34,34,34	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 B12 B 601:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
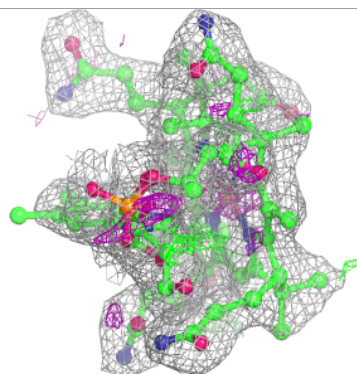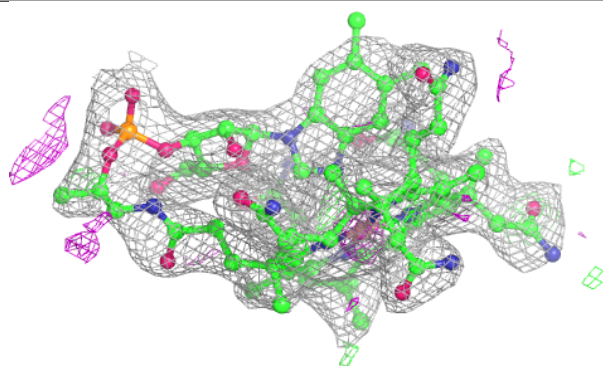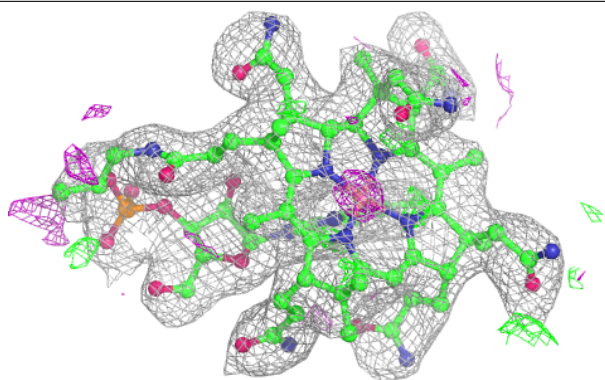
Electron density around B12 E 602:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
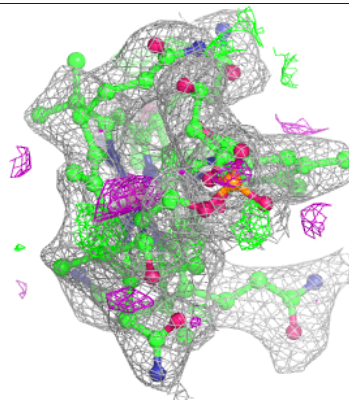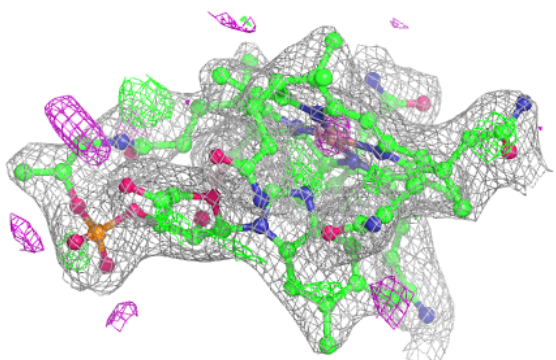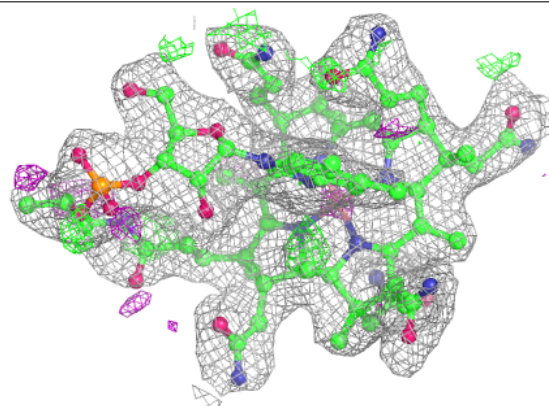
6.5 Other polymers (i)

There are no such residues in this entry.