



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 17, 2023 – 08:13 am GMT

PDB ID : 4AEZ
Title : Crystal Structure of Mitotic Checkpoint Complex
Authors : Kulkarni, K.A.; Chao, W.C.H.; Zhang, Z.; Barford, D.
Deposited on : 2012-01-13
Resolution : 2.30 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 : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.36
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

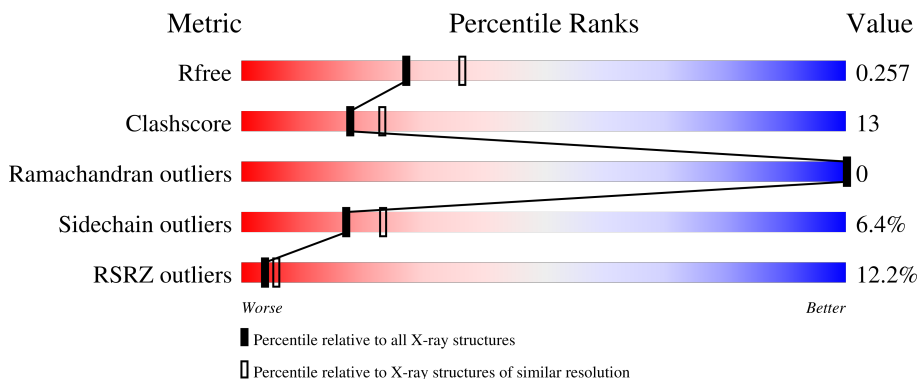
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	401	
1	D	401	
1	G	401	
2	B	203	
2	E	203	

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Mol	Chain	Length	Quality of chain
2	H	203	<p>23% 60% 28% 9%</p>
3	C	223	<p>2% 77% 19%</p>
3	F	223	<p>7% 66% 19% 12%</p>
3	I	223	<p>35% 44% 34% 9% 13%</p>

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 16896 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 WD REPEAT-CONTAINING PROTEIN SLP1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	326	Total	C	N	O	S	0	0	0
			2499	1565	445	483	6			
1	D	314	Total	C	N	O	S	0	0	0
			2406	1507	426	467	6			
1	G	317	Total	C	N	O	S	0	0	0
			2400	1502	425	467	6			

- Molecule 2 is a protein called MITOTIC SPINDLE CHECKPOINT COMPONENT MAD2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	180	Total	C	N	O	S	0	0	0
			1469	941	243	278	7			
2	E	175	Total	C	N	O	S	0	0	0
			1369	880	224	260	5			
2	H	185	Total	C	N	O	S	0	0	0
			1477	951	246	274	6			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	12	ALA	LEU	engineered mutation	UNP O14417
B	133	ALA	ARG	engineered mutation	UNP O14417
E	12	ALA	LEU	engineered mutation	UNP O14417
E	133	ALA	ARG	engineered mutation	UNP O14417
H	12	ALA	LEU	engineered mutation	UNP O14417
H	133	ALA	ARG	engineered mutation	UNP O14417

- Molecule 3 is a protein called MITOTIC SPINDLE CHECKPOINT COMPONENT MAD3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	215	Total	C	N	O	S	0	0	0
			1799	1142	313	339	5			

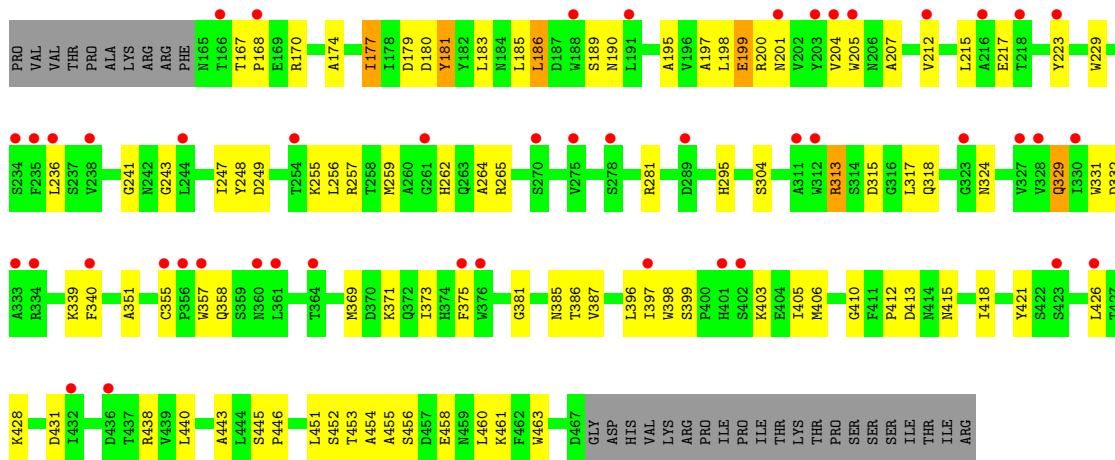
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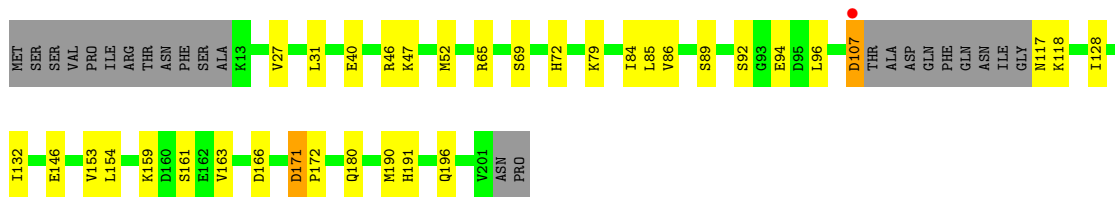
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	196	Total	C	N	O	S	0	0	0
			1585	1013	265	302	5			
3	I	193	Total	C	N	O	S	0	0	0
			1574	997	273	300	4			

- Molecule 4 is water.

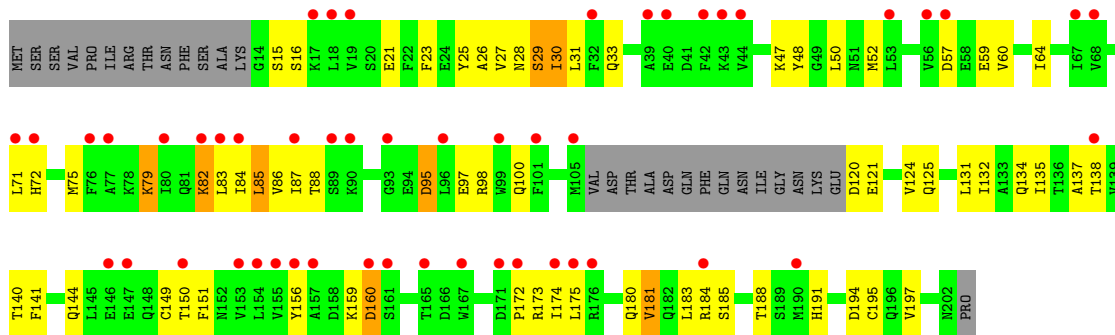
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	114	Total	O	0	0
			114	114		
4	B	33	Total	O	0	0
			33	33		
4	C	33	Total	O	0	0
			33	33		
4	D	61	Total	O	0	0
			61	61		
4	E	1	Total	O	0	0
			1	1		
4	F	48	Total	O	0	0
			48	48		
4	G	21	Total	O	0	0
			21	21		
4	H	6	Total	O	0	0
			6	6		
4	I	1	Total	O	0	0
			1	1		



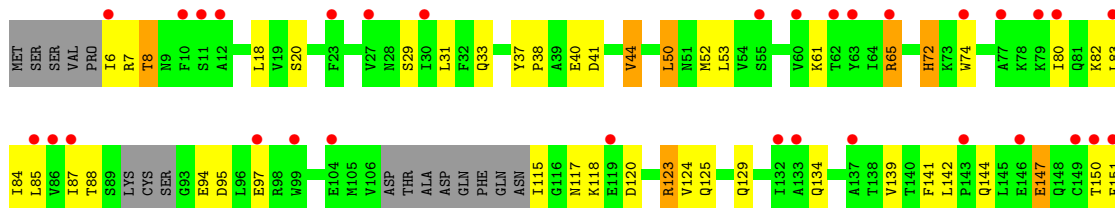
• Molecule 2: MITOTIC SPINDLE CHECKPOINT COMPONENT MAD2

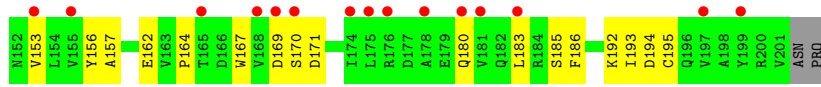


• Molecule 2: MITOTIC SPINDLE CHECKPOINT COMPONENT MAD2

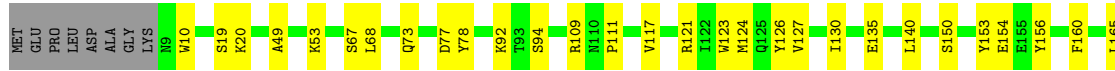
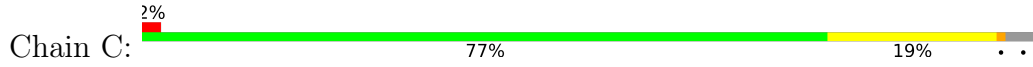


• Molecule 2: MITOTIC SPINDLE CHECKPOINT COMPONENT MAD2





● Molecule 3: MITOTIC SPINDLE CHECKPOINT COMPONENT MAD3

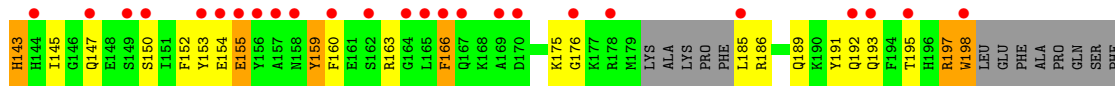
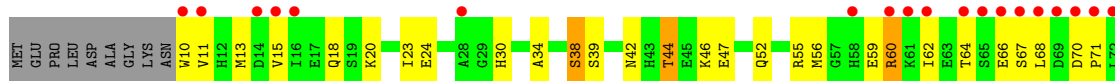


● Molecule 3: MITOTIC SPINDLE CHECKPOINT COMPONENT MAD3



THR

● Molecule 3: MITOTIC SPINDLE CHECKPOINT COMPONENT MAD3



SER
SER
ASN
THR
ASN
SER
SER
VAL
M214
P215
L216
S222
THR

4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	70.81Å 286.90Å 72.01Å 90.00° 119.04° 90.00°	Depositor
Resolution (Å)	62.96 – 2.30 62.96 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.8 (62.96-2.30) 99.8 (62.96-2.30)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.84 (at 2.29Å)	Xtrriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.221 , 0.267 0.211 , 0.257	Depositor DCC
R_{free} test set	1973 reflections (1.78%)	wwPDB-VP
Wilson B-factor (Å ²)	41.8	Xtrriage
Anisotropy	0.217	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 54.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.002 for -h-l,k,h 0.002 for l,k,-h-l 0.024 for h,-k,-h-l 0.022 for -h-l,-k,l 0.024 for l,-k,h	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	16896	wwPDB-VP
Average B, all atoms (Å ²)	60.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.14% 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

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	0.36	0/2559	0.54	0/3492
1	D	0.34	0/2465	0.56	0/3366
1	G	0.28	0/2458	0.49	0/3361
2	B	0.36	0/1494	0.50	0/2016
2	E	0.27	0/1394	0.43	0/1895
2	H	0.29	0/1502	0.46	0/2032
3	C	0.35	0/1847	0.46	0/2495
3	F	0.34	0/1625	0.48	0/2198
3	I	0.27	0/1614	0.44	0/2187
All	All	0.32	0/16958	0.50	0/23042

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
3	I	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	I	107	PHE	Peptide

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	2499	0	2393	33	0
1	D	2406	0	2290	46	0
1	G	2400	0	2269	76	0
2	B	1469	0	1476	23	0
2	E	1369	0	1312	83	0
2	H	1477	0	1462	48	0
3	C	1799	0	1718	27	0
3	F	1585	0	1472	41	0
3	I	1574	0	1434	88	0
4	A	114	0	0	3	0
4	B	33	0	0	0	0
4	C	33	0	0	0	0
4	D	61	0	0	3	0
4	E	1	0	0	0	0
4	F	48	0	0	0	0
4	G	21	0	0	0	0
4	H	6	0	0	0	0
4	I	1	0	0	0	0
All	All	16896	0	15826	436	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 13.

All (436) 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:466:TYR:O	1:A:467:ASP:HB3	1.49	1.08
3:C:222:SER:O	3:C:223:THR:HB	1.54	1.05
1:G:177:ILE:HD11	1:G:458:GLU:HA	1.42	0.99
1:D:164:PHE:HE1	1:D:432:ILE:HD11	1.25	0.97
3:I:122:ILE:HG22	3:I:126:TYR:CE1	2.01	0.95
3:I:123:TRP:HA	3:I:126:TYR:CD2	2.07	0.89
1:D:268:CYS:SG	1:D:308:CYS:O	2.31	0.88
3:I:118:ARG:O	3:I:122:ILE:HG13	1.75	0.86
3:I:109:ARG:HD3	3:I:110:ASN:H	1.41	0.85
3:I:133:PRO:O	3:I:136:LEU:HG	1.77	0.85
1:A:133:LYS:HE2	2:B:166:ASP:HA	1.59	0.84
1:D:164:PHE:CE1	1:D:432:ILE:HD11	2.10	0.84
3:I:198:TRP:H	3:I:198:TRP:HD1	1.26	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:50:LEU:HD11	2:H:129:GLN:HB3	1.61	0.81
2:E:87:ILE:CG2	2:E:97:GLU:HB3	2.11	0.80
3:I:127:VAL:HB	3:I:136:LEU:HD22	1.63	0.80
3:F:38:SER:O	3:F:41:ARG:HG2	1.81	0.79
3:F:220:PHE:HD1	3:F:221:GLU:N	1.80	0.78
2:E:172:PRO:HB2	2:E:174:ILE:HG13	1.64	0.77
2:E:50:LEU:HD12	2:E:52:MET:HE1	1.67	0.77
2:H:120:ASP:O	2:H:124:VAL:HG23	1.88	0.73
1:D:313:ARG:HG3	1:D:354:TRP:CD2	2.23	0.73
3:I:122:ILE:HG22	3:I:126:TYR:HE1	1.52	0.72
2:E:134:GLN:O	2:E:138:THR:HG23	1.88	0.72
2:E:87:ILE:HD12	2:E:150:THR:O	1.90	0.72
3:F:220:PHE:HD1	3:F:221:GLU:H	1.38	0.71
3:F:120:LEU:HD12	3:F:121:ARG:N	2.05	0.71
2:H:164:PRO:HB2	2:H:167:TRP:HD1	1.56	0.71
3:F:117:VAL:HA	3:F:120:LEU:HG	1.73	0.70
2:E:25:TYR:CE1	2:E:47:LYS:HD2	2.26	0.70
1:D:368:THR:HG22	1:D:369:MET:HE2	1.73	0.70
3:I:198:TRP:N	3:I:198:TRP:CD1	2.58	0.70
1:G:167:THR:HG23	1:G:168:PRO:HD2	1.73	0.70
1:A:313:ARG:HG3	1:A:354:TRP:CD2	2.26	0.70
3:I:56:MET:O	3:I:60:ARG:HD2	1.92	0.69
1:A:467:ASP:C	1:A:467:ASP:OD1	2.30	0.69
2:E:25:TYR:CZ	2:E:47:LYS:HD2	2.27	0.69
2:H:8:THR:HG23	2:H:117:ASN:HD21	1.57	0.69
1:G:180:ASP:HB3	1:G:183:LEU:HG	1.73	0.68
2:E:23:PHE:CE2	2:E:75:MET:HE3	2.28	0.68
1:G:177:ILE:HD11	1:G:458:GLU:CA	2.22	0.68
3:I:15:VAL:HG12	3:I:39:SER:HB2	1.76	0.68
2:E:138:THR:HA	2:E:141:PHE:CE2	2.27	0.67
2:H:125:GLN:O	2:H:129:GLN:HG2	1.94	0.67
1:D:413:ASP:HB3	1:D:415:ASN:OD1	1.95	0.67
1:D:369:MET:SD	2:E:140:THR:HG22	2.36	0.66
1:A:126:ASN:HD22	2:B:159:LYS:HG2	1.60	0.66
2:E:23:PHE:CD2	2:E:71:LEU:HD11	2.30	0.66
2:H:180:GLN:HB3	3:I:10:TRP:CZ3	2.31	0.65
2:E:121:GLU:O	2:E:125:GLN:HG2	1.97	0.65
1:G:177:ILE:HG23	1:G:198:LEU:CD2	2.27	0.65
1:D:415:ASN:ND2	1:D:431:ASP:OD1	2.29	0.65
3:C:174:GLN:O	3:C:178:ARG:HG3	1.96	0.64
1:A:126:ASN:O	2:B:159:LYS:HG2	1.97	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:181:VAL:HG13	2:E:197:VAL:HG13	1.78	0.64
1:A:126:ASN:O	1:A:126:ASN:ND2	2.30	0.64
3:C:199:LEU:O	3:C:203:PRO:HG3	1.98	0.64
2:E:88:THR:HG21	2:E:173:ARG:NH2	2.13	0.64
3:I:44:THR:HG22	3:I:47:GLU:HG3	1.80	0.63
3:I:97:VAL:HG13	3:I:98:THR:N	2.13	0.63
2:B:180:GLN:HB2	3:C:10:TRP:CZ3	2.34	0.62
2:E:87:ILE:HG22	2:E:97:GLU:HB3	1.80	0.62
2:E:120:ASP:O	2:E:124:VAL:HG23	2.00	0.62
3:C:182:LYS:HB3	3:C:183:PRO:HA	1.82	0.62
1:D:180:ASP:HB3	1:D:183:LEU:HG	1.80	0.61
3:I:78:TYR:O	3:I:82:THR:HG22	2.01	0.61
3:F:220:PHE:CD1	3:F:221:GLU:N	2.67	0.61
1:G:428:LYS:HD3	1:G:431:ASP:HB2	1.81	0.61
2:E:23:PHE:HE2	2:E:75:MET:HE3	1.65	0.61
2:E:82:LYS:HD3	2:E:100:GLN:OE1	2.01	0.61
1:G:177:ILE:CD1	1:G:458:GLU:HA	2.24	0.61
1:G:179:ASP:HB2	1:G:456:SER:CB	2.31	0.60
1:D:249:ASP:OD1	1:D:251:GLU:HG2	2.01	0.60
2:E:47:LYS:HD3	2:E:48:TYR:CE2	2.37	0.60
1:G:421:TYR:HD2	1:G:426:LEU:HD11	1.66	0.60
3:I:97:VAL:HG13	3:I:98:THR:H	1.66	0.60
3:I:66:GLU:OE1	3:I:66:GLU:N	2.34	0.60
3:C:185:LEU:HD12	3:C:186:ARG:H	1.66	0.60
1:G:249:ASP:HB2	1:G:256:LEU:HD11	1.83	0.60
2:E:26:ALA:O	2:E:30:ILE:HG23	2.02	0.60
1:D:410:GLY:HA2	1:D:438:ARG:HB3	1.84	0.59
1:G:179:ASP:HB2	1:G:456:SER:HB3	1.83	0.59
1:A:190:ASN:HA	1:A:446:PRO:HB3	1.84	0.59
2:E:82:LYS:HZ3	2:E:82:LYS:HB2	1.66	0.59
1:G:189:SER:HB3	1:G:229:TRP:CD2	2.37	0.59
1:A:406:MET:HG2	1:A:418:ILE:HG12	1.84	0.59
2:B:117:ASN:HB2	1:D:436:ASP:OD1	2.01	0.59
3:I:109:ARG:HD3	3:I:110:ASN:N	2.15	0.59
1:A:184:ASN:O	1:A:226:SER:HA	2.02	0.59
2:H:147:GLU:CD	2:H:147:GLU:H	2.05	0.59
2:B:118:LYS:NZ	1:D:433:PRO:O	2.29	0.58
3:F:127:VAL:HG23	3:F:136:LEU:HD13	1.86	0.58
2:E:79:LYS:HE3	2:E:79:LYS:HA	1.86	0.57
1:G:128:ARG:N	2:H:157:ALA:O	2.37	0.57
1:G:357:TRP:HZ3	1:G:399:SER:O	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:148:GLU:HG3	3:F:180:LYS:HB2	1.87	0.57
3:I:133:PRO:HA	3:I:136:LEU:HD23	1.86	0.57
2:E:47:LYS:NZ	2:E:48:TYR:OH	2.29	0.57
2:E:52:MET:HE3	2:E:132:ILE:HD13	1.87	0.57
1:D:268:CYS:SG	1:D:308:CYS:C	2.83	0.56
1:D:179:ASP:HB2	1:D:456:SER:HB3	1.86	0.56
3:I:90:GLU:HB2	3:I:129:TYR:HE2	1.70	0.56
2:E:85:LEU:HG	2:E:151:PHE:CZ	2.41	0.56
2:E:23:PHE:HD2	2:E:71:LEU:HD11	1.70	0.56
3:F:182:LYS:HA	3:F:183:PRO:C	2.25	0.56
2:H:8:THR:CG2	2:H:117:ASN:HD21	2.19	0.56
3:F:124:MET:O	3:F:127:VAL:HG12	2.05	0.56
1:G:397:ILE:HG23	1:G:406:MET:HB2	1.86	0.56
3:I:123:TRP:O	3:I:127:VAL:HG12	2.05	0.56
2:B:196:GLN:HB3	3:C:10:TRP:CZ3	2.41	0.55
3:F:105:ARG:O	3:F:108:VAL:HG22	2.06	0.55
3:I:150:SER:O	3:I:154:GLU:HG3	2.06	0.55
3:I:124:MET:SD	3:I:155:GLU:HG2	2.47	0.55
2:E:181:VAL:HG13	2:E:197:VAL:CG1	2.35	0.55
2:E:15:SER:OG	2:E:188:THR:HG21	2.06	0.55
3:I:141:ALA:HA	3:I:147:GLN:NE2	2.21	0.55
3:F:150:SER:O	3:F:154:GLU:HG3	2.06	0.55
3:I:79:ILE:HA	3:I:82:THR:CG2	2.37	0.55
2:E:52:MET:CE	2:E:132:ILE:HD13	2.37	0.55
1:G:445:SER:HB2	1:G:446:PRO:HD2	1.88	0.55
2:E:27:VAL:HG22	2:E:85:LEU:HD21	1.90	0.54
2:E:98:ARG:HH12	2:E:100:GLN:HE21	1.56	0.54
2:E:184:ARG:HG3	2:E:185:SER:N	2.22	0.54
3:I:185:LEU:O	3:I:189:GLN:HG3	2.08	0.54
1:G:243:GLY:O	1:G:262:HIS:HB2	2.06	0.54
1:G:324:ASN:OD1	3:I:20:LYS:HE2	2.07	0.54
3:I:24:GLU:O	3:I:30:HIS:NE2	2.32	0.54
2:B:47:LYS:HB3	2:B:52:MET:HG3	1.90	0.54
3:I:123:TRP:HA	3:I:126:TYR:CE2	2.43	0.54
3:I:153:TYR:CZ	3:I:176:GLY:HA2	2.42	0.54
1:G:177:ILE:HG23	1:G:198:LEU:HD23	1.88	0.54
1:G:243:GLY:HA2	1:G:264:ALA:O	2.08	0.54
3:I:191:TYR:O	3:I:195:THR:HG23	2.08	0.54
3:I:52:GLN:O	3:I:56:MET:HG2	2.08	0.54
1:G:412:PRO:HG2	1:G:413:ASP:OD1	2.07	0.53
2:H:141:PHE:HB3	3:I:23:ILE:HG21	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:172:VAL:HA	3:F:175:LYS:CE	2.38	0.53
3:I:123:TRP:O	3:I:127:VAL:CG1	2.56	0.53
1:G:281:ARG:HH21	3:I:18:GLN:HB3	1.72	0.53
2:E:131:LEU:C	2:E:131:LEU:HD23	2.29	0.53
3:I:109:ARG:C	3:I:111:PRO:HD3	2.30	0.53
3:I:133:PRO:HA	3:I:136:LEU:CD2	2.39	0.53
3:I:166:PHE:HB3	3:I:197:ARG:HD3	1.91	0.52
3:F:185:LEU:HD12	3:F:186:ARG:N	2.24	0.52
2:E:84:ILE:HD12	2:E:84:ILE:N	2.24	0.52
2:E:172:PRO:HB2	2:E:174:ILE:CG1	2.36	0.52
1:G:177:ILE:HG13	1:G:456:SER:HA	1.91	0.52
3:C:124:MET:O	3:C:127:VAL:HG12	2.09	0.52
1:D:288:HIS:HA	1:D:295:HIS:O	2.10	0.52
1:G:454:ALA:HB2	1:G:460:LEU:HD13	1.89	0.52
3:I:128:ASN:H	3:I:128:ASN:ND2	2.07	0.52
1:A:185:LEU:HD22	1:A:441:TYR:CZ	2.45	0.52
2:E:48:TYR:HD2	2:E:52:MET:HE3	1.73	0.52
2:E:160:ASP:OD1	2:E:160:ASP:N	2.43	0.52
2:H:50:LEU:HD11	2:H:129:GLN:CB	2.35	0.52
2:B:107:ASP:OD1	2:B:107:ASP:N	2.42	0.52
2:H:85:LEU:N	2:H:85:LEU:HD12	2.25	0.52
1:D:340:PHE:HE2	1:D:378:ALA:O	1.93	0.51
1:G:355:CYS:SG	1:G:358:GLN:HB2	2.50	0.51
1:G:369:MET:HE2	1:G:369:MET:HA	1.92	0.51
1:D:292:ILE:HG22	1:D:294:ASN:H	1.74	0.51
2:E:21:GLU:HG2	2:E:47:LYS:NZ	2.24	0.51
2:H:31:LEU:HD21	2:H:151:PHE:CZ	2.44	0.51
3:F:177:LYS:CD	3:F:191:TYR:HE2	2.24	0.51
2:E:57:ASP:HB3	2:E:60:VAL:CG1	2.40	0.51
2:H:164:PRO:HB2	2:H:167:TRP:CD1	2.42	0.51
1:A:313:ARG:HD3	1:A:318:GLN:HB2	1.93	0.51
3:F:126:TYR:CZ	3:F:130:ILE:HD11	2.46	0.51
3:I:134:VAL:O	3:I:138:SER:OG	2.26	0.51
1:G:259:MET:HB3	1:G:295:HIS:CD2	2.46	0.51
2:E:159:LYS:H	2:E:159:LYS:HD3	1.76	0.50
3:I:71:PRO:HB2	3:I:107:PHE:HZ	1.76	0.50
3:I:122:ILE:O	3:I:125:GLN:HB2	2.11	0.50
2:B:163:VAL:O	2:B:163:VAL:HG23	2.11	0.50
2:E:23:PHE:HE2	2:E:75:MET:CE	2.24	0.50
1:G:223:TYR:CE1	1:G:241:GLY:HA3	2.46	0.50
2:H:74:TRP:HB3	2:H:80:ILE:HB	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:292:ILE:HG22	1:D:293:ALA:N	2.27	0.50
2:E:30:ILE:HG13	2:E:31:LEU:N	2.27	0.50
2:H:38:PRO:O	2:H:41:ASP:HB2	2.11	0.50
2:H:180:GLN:HB3	3:I:10:TRP:CE3	2.46	0.50
1:D:345:HIS:HB2	4:D:2040:HOH:O	2.11	0.50
3:F:11:VAL:HG13	3:F:36:ALA:HB2	1.94	0.50
3:F:168:LYS:O	3:F:171:GLU:HB2	2.11	0.50
3:I:123:TRP:CD1	3:I:126:TYR:HD2	2.30	0.50
1:A:201:ASN:HA	1:A:216:ALA:O	2.12	0.49
2:B:89:SER:HB2	2:B:96:LEU:HD11	1.94	0.49
3:C:183:PRO:HB2	3:C:185:LEU:CD1	2.42	0.49
1:G:247:ILE:O	1:G:256:LEU:N	2.44	0.49
3:I:127:VAL:HB	3:I:136:LEU:CD2	2.39	0.49
3:I:106:GLU:HG3	3:I:107:PHE:CD1	2.46	0.49
3:C:182:LYS:HA	3:C:183:PRO:C	2.32	0.49
2:E:86:VAL:HG22	2:E:98:ARG:HG3	1.93	0.49
1:A:467:ASP:OD1	1:A:467:ASP:O	2.30	0.49
3:F:171:GLU:O	3:F:175:LYS:HG3	2.13	0.49
1:G:315:ASP:OD2	1:G:317:LEU:HD12	2.13	0.49
1:G:415:ASN:ND2	1:G:431:ASP:OD1	2.45	0.49
3:I:140:LEU:HD12	3:I:152:PHE:CE1	2.47	0.49
1:A:131:ALA:HB2	2:B:154:LEU:HD22	1.93	0.49
1:A:169:GLU:OE2	1:A:464:ARG:HD2	2.12	0.49
1:D:300:LEU:HD21	1:D:336:SER:HA	1.95	0.49
2:E:82:LYS:HE2	2:E:156:TYR:CD2	2.48	0.49
2:E:184:ARG:HG3	2:E:185:SER:H	1.78	0.49
1:G:313:ARG:HE	1:G:318:GLN:HB2	1.77	0.49
1:G:313:ARG:HH21	1:G:318:GLN:HG3	1.78	0.49
1:G:229:TRP:CD2	1:G:236:LEU:HD13	2.48	0.48
3:I:159:TYR:CE1	3:I:163:ARG:CZ	2.96	0.48
1:A:370:ASP:O	1:A:371:LYS:HB2	2.13	0.48
3:C:73:GLN:NE2	3:C:77:ASP:OD1	2.45	0.48
2:H:185:SER:HB3	2:H:194:ASP:HB3	1.94	0.48
2:E:88:THR:HG21	2:E:173:ARG:HH21	1.77	0.48
2:H:44:VAL:HA	2:H:52:MET:O	2.12	0.48
3:I:44:THR:HG22	3:I:47:GLU:H	1.78	0.48
2:E:23:PHE:HD2	2:E:71:LEU:HD21	1.78	0.48
2:E:159:LYS:H	2:E:159:LYS:CD	2.27	0.48
3:F:165:LEU:HD12	3:F:165:LEU:N	2.28	0.48
1:D:389:ALA:HB1	1:D:409:HIS:CE1	2.49	0.48
3:F:97:VAL:O	3:F:101:GLU:HG3	2.14	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:87:ILE:HB	2:H:97:GLU:HB3	1.96	0.48
2:E:16:SER:HB3	2:E:75:MET:HB3	1.96	0.47
2:E:50:LEU:CD1	2:E:52:MET:HE1	2.40	0.47
1:G:329:GLN:HG2	1:G:331:TRP:CZ2	2.49	0.47
2:H:18:LEU:C	2:H:18:LEU:HD23	2.34	0.47
2:E:87:ILE:HD11	2:E:149:CYS:CB	2.44	0.47
1:G:248:TYR:CE2	1:G:255:LYS:HB2	2.49	0.47
3:I:44:THR:HG23	3:I:46:LYS:H	1.79	0.47
3:C:222:SER:O	3:C:223:THR:CB	2.40	0.47
1:D:438:ARG:NH2	3:F:21:GLU:O	2.47	0.47
3:F:172:VAL:HG12	3:F:175:LYS:HE3	1.97	0.47
2:E:83:LEU:C	2:E:84:ILE:HD12	2.34	0.47
3:I:119:TYR:CE2	3:I:123:TRP:HZ3	2.31	0.47
1:A:196:VAL:HG11	3:I:216:LEU:HD11	1.97	0.47
2:B:190:MET:HG2	2:B:191:HIS:CE1	2.50	0.47
1:G:177:ILE:CD1	1:G:455:ALA:O	2.63	0.47
1:G:375:PHE:HB2	1:G:385:ASN:HB2	1.97	0.47
2:H:20:SER:OG	2:H:72:HIS:HA	2.15	0.47
3:I:68:LEU:HD11	3:I:71:PRO:HA	1.96	0.47
3:I:119:TYR:CE2	3:I:123:TRP:CZ3	3.02	0.47
2:H:183:LEU:HB2	2:H:195:CYS:O	2.14	0.47
1:G:215:LEU:HD23	1:G:236:LEU:HD23	1.95	0.47
2:B:27:VAL:O	2:B:31:LEU:HG	2.15	0.46
2:B:171:ASP:HB2	2:B:172:PRO:HD2	1.97	0.46
3:C:126:TYR:CZ	3:C:130:ILE:HD11	2.50	0.46
3:I:166:PHE:CB	3:I:197:ARG:HD3	2.45	0.46
2:B:85:LEU:HD23	2:B:85:LEU:C	2.36	0.46
1:G:177:ILE:CG2	1:G:198:LEU:HD23	2.46	0.46
3:I:111:PRO:O	3:I:114:LYS:HG2	2.15	0.46
3:C:160:PHE:HD1	3:C:165:LEU:HD12	1.81	0.46
3:F:168:LYS:HA	3:F:171:GLU:CD	2.36	0.46
2:E:29:SER:O	2:E:33:GLN:HG3	2.15	0.46
3:I:104:THR:OG1	3:I:126:TYR:CD2	2.63	0.46
1:A:466:TYR:O	1:A:467:ASP:CB	2.35	0.46
3:C:49:ALA:O	3:C:53:LYS:HD3	2.15	0.46
1:G:205:TRP:CZ3	1:G:207:ALA:HA	2.51	0.46
1:D:361:LEU:HD13	1:D:398:TRP:CH2	2.50	0.46
3:F:104:THR:O	3:F:108:VAL:HG13	2.16	0.46
1:A:263:GLN:NE2	4:A:2042:HOH:O	2.49	0.45
2:B:146:GLU:HG3	3:C:186:ARG:HH12	1.81	0.45
1:G:410:GLY:HA2	1:G:438:ARG:HG2	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:83:LEU:C	2:H:84:ILE:HD13	2.36	0.45
3:I:68:LEU:HD13	3:I:70:ASP:C	2.37	0.45
1:G:127:THR:HG23	2:H:156:TYR:HB3	1.98	0.45
2:E:30:ILE:HD11	2:E:151:PHE:CE1	2.52	0.45
3:F:185:LEU:HD12	3:F:186:ARG:H	1.81	0.45
1:D:243:GLY:O	1:D:262:HIS:HB2	2.17	0.45
1:D:420:SER:OG	1:D:427:THR:HB	2.16	0.45
2:H:87:ILE:HD12	2:H:97:GLU:HB3	1.98	0.45
3:I:101:GLU:OE1	3:I:102:ARG:HG3	2.16	0.45
3:I:106:GLU:HG3	3:I:107:PHE:CE1	2.52	0.45
1:A:180:ASP:HB3	1:A:183:LEU:HG	1.98	0.45
3:C:109:ARG:O	3:C:111:PRO:HD3	2.17	0.45
1:D:369:MET:CE	1:D:369:MET:HA	2.46	0.45
1:G:174:ALA:CB	1:G:177:ILE:HD13	2.47	0.45
3:I:97:VAL:CG1	3:I:98:THR:N	2.80	0.45
3:C:183:PRO:HB2	3:C:185:LEU:HD11	1.99	0.45
2:H:38:PRO:HB2	2:H:40:GLU:HG2	1.99	0.45
1:D:411:PHE:HA	1:D:412:PRO:HA	1.62	0.45
1:G:357:TRP:CZ3	1:G:399:SER:O	2.68	0.45
3:I:56:MET:HA	3:I:59:GLU:CG	2.47	0.45
3:F:120:LEU:HD13	3:F:151:ILE:HG21	1.98	0.44
3:F:148:GLU:OE2	3:F:180:LYS:CG	2.65	0.44
1:G:340:PHE:CE1	1:G:381:GLY:HA3	2.52	0.44
1:G:351:ALA:HB1	1:G:396:LEU:HG	1.99	0.44
2:H:170:SER:OG	2:H:171:ASP:N	2.50	0.44
2:H:192:LYS:C	2:H:193:ILE:HD12	2.37	0.44
2:B:84:ILE:HB	2:B:154:LEU:HB2	1.99	0.44
1:D:184:ASN:O	1:D:226:SER:HA	2.17	0.44
2:E:134:GLN:O	2:E:137:ALA:HB3	2.17	0.44
1:G:256:LEU:O	1:G:257:ARG:HB3	2.18	0.44
3:I:123:TRP:CD1	3:I:126:TYR:CD2	3.05	0.44
1:G:201:ASN:OD1	1:G:217:GLU:HG2	2.17	0.44
1:A:184:ASN:C	1:A:185:LEU:HD13	2.38	0.44
1:D:305:SER:HB2	4:D:2037:HOH:O	2.17	0.44
2:H:156:TYR:CD1	2:H:156:TYR:N	2.86	0.44
1:D:181:TYR:CZ	1:D:350:LYS:HB2	2.52	0.44
1:D:348:ALA:HB3	3:F:21:GLU:HG3	1.99	0.44
1:G:195:ALA:HB2	1:G:229:TRP:CZ2	2.52	0.44
2:H:120:ASP:O	2:H:123:ARG:HG3	2.18	0.44
3:I:62:ILE:HD11	3:I:75:TRP:CZ2	2.53	0.44
3:F:167:GLN:O	3:F:171:GLU:HG3	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:29:SER:O	2:H:33:GLN:HG3	2.17	0.44
3:F:117:VAL:HG23	3:F:120:LEU:HD11	2.00	0.44
1:G:398:TRP:CD2	1:G:405:ILE:HD12	2.52	0.44
1:G:421:TYR:CD2	1:G:426:LEU:HD11	2.49	0.44
2:H:82:LYS:HD2	2:H:156:TYR:CD2	2.52	0.44
3:I:34:ALA:O	3:I:38:SER:OG	2.34	0.44
3:C:168:LYS:HB3	3:C:168:LYS:HE3	1.74	0.44
1:D:287:HIS:O	1:D:296:GLN:HA	2.18	0.44
1:D:464:ARG:NH2	4:D:2060:HOH:O	2.49	0.44
2:E:86:VAL:HG13	2:E:95:ASP:HB3	2.00	0.44
2:E:159:LYS:HD3	2:E:159:LYS:N	2.32	0.44
1:G:126:ASN:N	1:G:126:ASN:HD22	2.16	0.43
1:G:387:VAL:CG1	1:G:426:LEU:HB2	2.47	0.43
2:E:180:GLN:HB3	3:F:10:TRP:CZ3	2.53	0.43
3:F:172:VAL:HA	3:F:175:LYS:HE3	2.00	0.43
2:E:87:ILE:HD11	2:E:149:CYS:HB2	2.01	0.43
2:E:180:GLN:HB3	3:F:10:TRP:CH2	2.53	0.43
3:C:153:TYR:OH	3:C:179:MET:HG3	2.18	0.43
1:D:228:LYS:HG3	1:D:269:LEU:O	2.18	0.43
1:A:131:ALA:HB2	2:B:154:LEU:CD2	2.48	0.43
1:A:185:LEU:HG	1:A:197:ALA:HB3	2.01	0.43
1:A:296:GLN:NE2	4:A:2039:HOH:O	2.42	0.43
1:G:451:LEU:O	1:G:463:TRP:HD1	2.01	0.43
3:I:104:THR:HG22	3:I:105:ARG:N	2.33	0.43
1:D:415:ASN:HB2	1:D:432:ILE:O	2.19	0.43
1:D:189:SER:HB3	1:D:229:TRP:CD2	2.54	0.43
2:E:84:ILE:HG12	2:E:98:ARG:NH2	2.33	0.43
3:I:55:ARG:O	3:I:59:GLU:HG2	2.18	0.43
1:D:340:PHE:CE2	1:D:378:ALA:O	2.71	0.43
2:E:137:ALA:HB3	3:F:13:MET:CE	2.49	0.43
3:F:111:PRO:HA	3:F:114:LYS:HD3	2.01	0.43
3:I:64:THR:HG22	3:I:67:SER:HB2	2.01	0.43
1:A:195:ALA:HB2	1:A:229:TRP:CZ2	2.54	0.43
3:C:176:GLY:HA2	3:C:179:MET:HB2	2.00	0.43
1:G:177:ILE:H	1:G:177:ILE:HG12	1.66	0.43
1:G:186:LEU:HD11	1:G:460:LEU:HD11	2.01	0.43
1:G:190:ASN:HA	1:G:446:PRO:HB3	2.01	0.43
2:H:88:THR:HG23	2:H:95:ASP:N	2.34	0.43
1:G:387:VAL:HG11	1:G:426:LEU:HB2	2.00	0.42
2:E:28:ASN:HD21	2:E:64:ILE:CD1	2.32	0.42
2:H:7:ARG:HB2	2:H:115:ILE:O	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:340:PHE:CE1	1:D:211:SER:HB2	2.55	0.42
1:D:179:ASP:HB2	1:D:456:SER:CB	2.50	0.42
1:G:443:ALA:O	1:G:451:LEU:HD12	2.19	0.42
3:I:97:VAL:CG1	3:I:98:THR:H	2.32	0.42
3:I:114:LYS:NZ	3:I:143:HIS:O	2.48	0.42
2:B:79:LYS:HB3	2:B:161:SER:OG	2.19	0.42
2:E:28:ASN:HD21	2:E:64:ILE:HD12	1.84	0.42
2:H:8:THR:O	2:H:8:THR:OG1	2.35	0.42
3:I:96:LEU:HD23	3:I:129:TYR:OH	2.19	0.42
3:I:155:GLU:OE1	3:I:155:GLU:HA	2.18	0.42
2:E:57:ASP:OD2	2:E:60:VAL:HG12	2.19	0.42
1:G:339:LYS:HG2	1:G:340:PHE:CD2	2.54	0.42
3:C:117:VAL:O	3:C:121:ARG:HG3	2.19	0.42
3:C:123:TRP:CD2	3:C:140:LEU:HD21	2.54	0.42
2:E:52:MET:HE3	2:E:132:ILE:CD1	2.49	0.42
3:I:90:GLU:CB	3:I:129:TYR:HE2	2.33	0.42
2:B:128:ILE:O	2:B:132:ILE:HG12	2.19	0.42
2:E:188:THR:N	2:E:191:HIS:O	2.53	0.42
3:F:215:PRO:O	3:F:216:LEU:HB2	2.19	0.42
1:G:205:TRP:CH2	1:G:207:ALA:HA	2.55	0.42
1:G:452:SER:HA	1:G:461:LYS:O	2.19	0.42
2:H:139:VAL:HA	2:H:142:LEU:HD12	2.01	0.42
2:H:162:GLU:O	2:H:164:PRO:HD3	2.19	0.42
1:G:453:THR:O	1:G:460:LEU:HD12	2.20	0.42
3:I:136:LEU:C	3:I:136:LEU:HD12	2.40	0.42
2:E:23:PHE:CD2	2:E:71:LEU:HD21	2.55	0.42
2:E:135:ILE:HA	2:E:138:THR:HG23	2.02	0.42
2:E:183:LEU:HB2	2:E:195:CYS:O	2.19	0.42
3:F:27:LYS:HE2	3:F:27:LYS:HB3	1.74	0.42
1:G:398:TRP:CE2	1:G:405:ILE:HD12	2.55	0.42
3:I:56:MET:O	3:I:59:GLU:HG3	2.19	0.42
1:G:181:TYR:HA	1:G:440:LEU:HD22	2.02	0.42
1:G:373:ILE:O	1:G:386:THR:HA	2.19	0.42
2:E:71:LEU:C	2:E:71:LEU:HD23	2.41	0.41
2:E:84:ILE:HG22	2:E:86:VAL:HG23	2.00	0.41
1:G:185:LEU:HD22	1:G:197:ALA:HB3	2.02	0.41
3:I:197:ARG:O	3:I:197:ARG:HG3	2.18	0.41
1:A:200:ARG:HD3	1:A:220:GLU:HA	2.01	0.41
1:D:406:MET:HG2	1:D:418:ILE:HG12	2.02	0.41
1:G:199:GLU:HB3	1:G:200:ARG:H	1.48	0.41
3:I:106:GLU:OE1	3:I:106:GLU:HA	2.19	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:185:LEU:HD13	1:A:185:LEU:N	2.36	0.41
1:D:313:ARG:HG3	1:D:354:TRP:CG	2.54	0.41
2:E:30:ILE:HG12	2:E:85:LEU:HD23	2.02	0.41
1:G:167:THR:HG23	1:G:168:PRO:CD	2.47	0.41
2:H:61:LYS:O	2:H:65:ARG:HD2	2.20	0.41
2:H:84:ILE:C	2:H:85:LEU:HD12	2.40	0.41
2:H:134:GLN:HB2	3:I:13:MET:HG2	2.02	0.41
1:D:375:PHE:CZ	1:D:426:LEU:HD21	2.55	0.41
1:D:387:VAL:HG11	1:D:426:LEU:HB2	2.03	0.41
3:I:122:ILE:HG22	3:I:126:TYR:CZ	2.52	0.41
2:E:95:ASP:HB2	2:E:175:LEU:HD21	2.02	0.41
2:H:61:LYS:O	2:H:65:ARG:HB2	2.20	0.41
3:I:136:LEU:O	3:I:140:LEU:HB2	2.20	0.41
3:I:189:GLN:O	3:I:193:GLN:HG3	2.19	0.41
3:C:123:TRP:CE2	3:C:140:LEU:HD21	2.56	0.41
1:D:220:GLU:H	1:D:220:GLU:HG3	1.60	0.41
2:E:21:GLU:HG2	2:E:47:LYS:HZ1	1.85	0.41
1:G:406:MET:HG2	1:G:418:ILE:HG12	2.03	0.41
2:H:156:TYR:N	2:H:156:TYR:HD1	2.18	0.41
3:I:107:PHE:HE1	3:I:109:ARG:NH1	2.19	0.41
3:I:192:GLN:O	3:I:195:THR:OG1	2.36	0.41
3:F:172:VAL:HA	3:F:175:LYS:HE2	2.02	0.41
1:A:133:LYS:HG3	1:A:134:LEU:HD23	2.02	0.41
1:A:290:VAL:O	1:A:290:VAL:HG12	2.20	0.41
2:B:180:GLN:HB2	3:C:10:TRP:CE3	2.55	0.41
2:E:21:GLU:CG	2:E:47:LYS:HZ1	2.33	0.41
2:E:137:ALA:HB3	3:F:13:MET:HE3	2.03	0.41
1:G:205:TRP:HD1	1:G:212:VAL:HG22	1.86	0.41
1:G:249:ASP:HB2	1:G:256:LEU:HD21	2.03	0.41
2:H:37:TYR:HB3	2:H:38:PRO:HD2	2.02	0.41
3:I:59:GLU:O	3:I:62:ILE:HG22	2.21	0.41
3:I:143:HIS:HB3	3:I:145:ILE:HG13	2.02	0.41
1:D:361:LEU:HD11	1:D:421:TYR:CZ	2.56	0.41
2:E:47:LYS:NZ	2:E:48:TYR:CZ	2.86	0.41
2:E:87:ILE:HD11	2:E:149:CYS:HB3	2.03	0.41
1:A:397:ILE:HD12	1:A:451:LEU:HD11	2.04	0.40
2:B:92:SER:OG	2:B:94:GLU:HG2	2.21	0.40
3:C:150:SER:O	3:C:154:GLU:HG3	2.21	0.40
2:E:85:LEU:HG	2:E:151:PHE:CE1	2.56	0.40
2:E:134:GLN:NE2	3:F:14:ASP:OD1	2.51	0.40
1:G:265:ARG:NH2	1:G:281:ARG:NH1	2.69	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:53:LEU:N	2:H:53:LEU:HD22	2.36	0.40
2:H:186:PHE:CD1	2:H:186:PHE:C	2.94	0.40
3:I:214:ASN:HA	3:I:215:PRO:HD2	1.90	0.40
2:E:87:ILE:CG2	2:E:97:GLU:CB	2.93	0.40
2:H:120:ASP:OD1	2:H:123:ARG:NE	2.49	0.40
1:A:272:ASN:HB2	1:A:312:TRP:CG	2.57	0.40
4:A:2068:HOH:O	3:C:20:LYS:NZ	2.53	0.40
1:G:332:ASP:OD1	1:G:339:LYS:HD2	2.21	0.40
3:I:134:VAL:HG12	3:I:135:GLU:N	2.36	0.40
2:E:59:GLU:N	2:E:59:GLU:OE1	2.55	0.40
1:G:357:TRP:CH2	1:G:403:LYS:HA	2.56	0.40
3:I:119:TYR:CD2	3:I:123:TRP:HZ3	2.39	0.40
2:H:144:GLN:O	2:H:144:GLN:HG3	2.21	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	322/401 (80%)	318 (99%)	4 (1%)	0	100	100
1	D	310/401 (77%)	303 (98%)	7 (2%)	0	100	100
1	G	313/401 (78%)	306 (98%)	7 (2%)	0	100	100
2	B	176/203 (87%)	176 (100%)	0	0	100	100
2	E	171/203 (84%)	169 (99%)	2 (1%)	0	100	100
2	H	179/203 (88%)	178 (99%)	1 (1%)	0	100	100
3	C	213/223 (96%)	213 (100%)	0	0	100	100
3	F	192/223 (86%)	191 (100%)	1 (0%)	0	100	100
3	I	187/223 (84%)	185 (99%)	2 (1%)	0	100	100
All	All	2063/2481 (83%)	2039 (99%)	24 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	269/340 (79%)	260 (97%)	9 (3%)	38	53
1	D	259/340 (76%)	248 (96%)	11 (4%)	30	42
1	G	255/340 (75%)	244 (96%)	11 (4%)	29	40
2	B	166/187 (89%)	157 (95%)	9 (5%)	22	30
2	E	145/187 (78%)	134 (92%)	11 (8%)	13	16
2	H	160/187 (86%)	147 (92%)	13 (8%)	11	15
3	C	196/203 (97%)	184 (94%)	12 (6%)	18	25
3	F	163/203 (80%)	154 (94%)	9 (6%)	21	30
3	I	162/203 (80%)	134 (83%)	28 (17%)	2	2
All	All	1775/2190 (81%)	1662 (94%)	113 (6%)	17	23

All (113) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	125	LEU
1	A	126	ASN
1	A	143	VAL
1	A	185	LEU
1	A	186	LEU
1	A	244	LEU
1	A	263	GLN
1	A	464	ARG
1	A	467	ASP
2	B	40	GLU
2	B	46	ARG
2	B	65	ARG
2	B	69	SER
2	B	72	HIS
2	B	86	VAL

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Mol	Chain	Res	Type
2	B	107	ASP
2	B	153	VAL
2	B	171	ASP
3	C	19	SER
3	C	67	SER
3	C	68	LEU
3	C	78	TYR
3	C	92	LYS
3	C	94	SER
3	C	135	GLU
3	C	156	TYR
3	C	184	PHE
3	C	185	LEU
3	C	191	TYR
3	C	223	THR
1	D	186	LEU
1	D	220	GLU
1	D	244	LEU
1	D	281	ARG
1	D	359	SER
1	D	361	LEU
1	D	371	LYS
1	D	397	ILE
1	D	416	LEU
1	D	431	ASP
1	D	464	ARG
2	E	29	SER
2	E	30	ILE
2	E	72	HIS
2	E	79	LYS
2	E	82	LYS
2	E	85	LEU
2	E	95	ASP
2	E	144	GLN
2	E	160	ASP
2	E	181	VAL
2	E	194	ASP
3	F	13	MET
3	F	19	SER
3	F	99	LEU
3	F	148	GLU
3	F	156	TYR

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Mol	Chain	Res	Type
3	F	185	LEU
3	F	191	TYR
3	F	220	PHE
3	F	221	GLU
1	G	126	ASN
1	G	170	ARG
1	G	177	ILE
1	G	181	TYR
1	G	186	LEU
1	G	199	GLU
1	G	204	VAL
1	G	304	SER
1	G	313	ARG
1	G	329	GLN
1	G	371	LYS
2	H	6	ILE
2	H	8	THR
2	H	44	VAL
2	H	50	LEU
2	H	65	ARG
2	H	72	HIS
2	H	94	GLU
2	H	118	LYS
2	H	123	ARG
2	H	147	GLU
2	H	150	THR
2	H	153	VAL
2	H	169	ASP
3	I	11	VAL
3	I	38	SER
3	I	42	ASN
3	I	44	THR
3	I	60	ARG
3	I	74	VAL
3	I	78	TYR
3	I	82	THR
3	I	101	GLU
3	I	104	THR
3	I	109	ARG
3	I	117	VAL
3	I	119	TYR
3	I	123	TRP

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Mol	Chain	Res	Type
3	I	128	ASN
3	I	131	ASP
3	I	132	GLU
3	I	138	SER
3	I	142	HIS
3	I	143	HIS
3	I	155	GLU
3	I	159	TYR
3	I	160	PHE
3	I	166	PHE
3	I	175	LYS
3	I	186	ARG
3	I	197	ARG
3	I	198	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	126	ASN
1	A	429	GLN
2	E	70	GLN
2	H	70	GLN
2	H	117	ASN
3	I	128	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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	326/401 (81%)	0.38	2 (0%) 89 92	17, 33, 64, 116	0
1	D	314/401 (78%)	0.51	11 (3%) 44 51	19, 42, 84, 116	0
1	G	317/401 (79%)	1.06	48 (15%) 2 3	43, 72, 103, 124	0
2	B	180/203 (88%)	0.33	1 (0%) 89 92	25, 44, 69, 109	0
2	E	175/203 (86%)	1.53	50 (28%) 0 0	40, 85, 127, 150	0
2	H	185/203 (91%)	1.36	47 (25%) 0 0	47, 70, 117, 139	0
3	C	215/223 (96%)	0.41	4 (1%) 66 73	19, 46, 80, 118	0
3	F	196/223 (87%)	0.62	15 (7%) 13 17	21, 53, 115, 149	0
3	I	193/223 (86%)	1.92	78 (40%) 0 0	40, 97, 133, 147	0
All	All	2101/2481 (84%)	0.85	256 (12%) 4 6	17, 56, 111, 150	0

All (256) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	151	PHE	9.3
2	E	153	VAL	8.4
3	I	117	VAL	7.9
3	I	158	ASN	7.8
3	I	141	ALA	7.8
2	E	155	VAL	7.4
3	I	115	ASP	7.0
3	I	134	VAL	6.9
3	I	103	CYS	6.9
3	I	107	PHE	6.9
3	F	165	LEU	6.7
2	H	87	ILE	6.5
3	I	69	ASP	6.4
3	I	133	PRO	6.3
1	D	131	ALA	5.8

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Mol	Chain	Res	Type	RSRZ
1	D	134	LEU	5.5
3	I	100	LEU	5.5
1	D	133	LYS	5.4
3	I	198	TRP	5.4
3	I	108	VAL	5.3
2	H	85	LEU	5.3
3	I	123	TRP	5.2
1	G	334	ARG	5.2
2	E	93	GLY	5.2
1	G	375	PHE	5.1
2	E	147	GLU	5.1
2	E	96	LEU	5.0
2	E	80	ILE	4.9
2	H	97	GLU	4.9
2	E	68	VAL	4.8
3	I	70	ASP	4.7
3	I	120	LEU	4.7
2	H	30	ILE	4.7
2	E	82	LYS	4.6
3	F	10	TRP	4.6
2	E	53	LEU	4.5
1	G	376	TRP	4.4
3	I	156	TYR	4.4
3	F	194	PHE	4.4
2	E	172	PRO	4.4
3	I	10	TRP	4.3
3	I	157	ALA	4.3
2	H	63	TYR	4.3
3	I	166	PHE	4.3
2	E	83	LEU	4.2
3	I	111	PRO	4.2
2	E	72	HIS	4.1
3	I	142	HIS	4.1
2	E	160	ASP	4.1
1	D	130	LEU	4.0
2	H	137	ALA	4.0
3	I	127	VAL	4.0
2	E	42	PHE	4.0
2	E	17	LYS	4.0
1	G	397	ILE	3.9
3	I	76	ILE	3.9
1	G	191	LEU	3.9

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Mol	Chain	Res	Type	RSRZ
3	I	126	TYR	3.9
3	F	163	ARG	3.9
2	H	146	GLU	3.8
1	D	136	ALA	3.8
3	I	58	HIS	3.8
2	E	77	ALA	3.8
1	G	261	GLY	3.7
3	I	97	VAL	3.7
3	I	150	SER	3.7
3	I	185	LEU	3.7
2	E	101	PHE	3.7
3	I	112	LEU	3.6
2	H	197	VAL	3.6
3	F	195	THR	3.6
3	I	15	VAL	3.6
3	F	183	PRO	3.6
1	G	423	SER	3.6
2	E	56	VAL	3.6
3	I	99	LEU	3.5
3	I	178	ARG	3.5
3	F	120	LEU	3.5
2	H	6	ILE	3.4
2	H	175	LEU	3.4
1	G	201	ASN	3.4
3	I	105	ARG	3.4
3	I	154	GLU	3.4
2	B	107	ASP	3.4
3	C	184	PHE	3.4
3	I	140	LEU	3.4
2	E	146	GLU	3.4
3	I	104	THR	3.4
2	H	83	LEU	3.4
1	D	137	PRO	3.4
3	I	155	GLU	3.3
1	G	357	TRP	3.3
2	H	150	THR	3.3
3	I	72	LEU	3.3
3	I	75	TRP	3.3
1	G	401	HIS	3.3
1	G	289	ASP	3.3
1	G	136	ALA	3.2
2	E	18	LEU	3.2

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Mol	Chain	Res	Type	RSRZ
3	I	147	GLN	3.2
3	I	162	SER	3.2
3	I	16	ILE	3.1
2	E	150	THR	3.1
2	H	174	ILE	3.1
3	I	106	GLU	3.1
1	G	356	PRO	3.1
2	E	43	LYS	3.1
2	H	149	CYS	3.1
3	I	153	TYR	3.1
1	G	244	LEU	3.1
3	I	68	LEU	3.0
2	H	143	PRO	3.0
3	I	62	ILE	3.0
3	I	160	PHE	3.0
2	E	87	ILE	3.0
2	H	10	PHE	3.0
2	H	80	ILE	3.0
3	C	200	GLU	3.0
2	E	156	TYR	3.0
2	E	175	LEU	2.9
2	H	62	THR	2.9
3	I	64	THR	2.9
2	H	55	SER	2.9
1	G	323	GLY	2.8
2	H	99	TRP	2.8
3	I	170	ASP	2.8
1	G	327	VAL	2.8
2	H	168	VAL	2.8
3	I	61	LYS	2.8
3	I	165	LEU	2.8
2	E	84	ILE	2.8
3	F	191	TYR	2.8
2	H	181	VAL	2.7
2	H	133	ALA	2.7
2	H	170	SER	2.7
2	H	155	VAL	2.7
3	F	184	PHE	2.7
1	G	205	TRP	2.7
3	I	66	GLU	2.7
3	I	28	ALA	2.7
3	C	209	ASN	2.7

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Mol	Chain	Res	Type	RSRZ
1	G	361	LEU	2.7
2	E	44	VAL	2.7
3	I	149	SER	2.7
1	G	311	ALA	2.7
2	H	86	VAL	2.7
1	G	216	ALA	2.6
1	G	235	PHE	2.6
3	I	91	THR	2.6
1	D	466	TYR	2.6
2	E	105	MET	2.6
2	H	77	ALA	2.6
1	G	364	THR	2.6
2	H	178	ALA	2.6
1	G	203	TYR	2.6
3	I	65	SER	2.5
2	E	76	PHE	2.5
3	I	164	GLY	2.5
2	E	184	ARG	2.5
3	I	144	HIS	2.5
1	G	328	VAL	2.5
1	G	254	THR	2.5
3	I	67	SER	2.5
1	D	268	CYS	2.5
1	G	436	ASP	2.5
1	G	312	TRP	2.5
2	E	99	TRP	2.5
3	I	176	GLY	2.5
1	G	234	SER	2.4
1	G	270	SER	2.4
3	I	113	TYR	2.4
1	D	132	PHE	2.4
1	G	204	VAL	2.4
3	I	138	SER	2.4
1	G	426	LEU	2.4
1	G	168	PRO	2.4
2	H	60	VAL	2.4
1	G	330	ILE	2.4
2	H	183	LEU	2.4
2	E	40	GLU	2.4
2	E	19	VAL	2.4
3	I	193	GLN	2.4
3	I	130	ILE	2.4

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Mol	Chain	Res	Type	RSRZ
2	H	153	VAL	2.4
3	F	172	VAL	2.4
3	I	11	VAL	2.4
2	E	157	ALA	2.3
3	F	169	ALA	2.3
3	C	189	GLN	2.3
3	I	73	GLN	2.3
1	G	360	ASN	2.3
3	I	124	MET	2.3
1	G	340	PHE	2.3
2	H	180	GLN	2.3
3	I	71	PRO	2.3
1	G	278	SER	2.3
2	H	79	LYS	2.3
2	H	11	SER	2.3
2	H	199	TYR	2.3
1	G	238	VAL	2.3
1	A	144	ASP	2.3
2	H	12	ALA	2.3
2	E	154	LEU	2.3
3	F	173	TYR	2.3
1	G	333	ALA	2.3
2	E	67	ILE	2.3
2	E	174	ILE	2.3
2	E	165	THR	2.2
1	G	402	SER	2.2
2	E	71	LEU	2.2
1	G	223	TYR	2.2
1	G	355	CYS	2.2
1	G	166	THR	2.2
3	I	167	GLN	2.2
1	G	212	VAL	2.2
1	G	188	TRP	2.2
2	E	39	ALA	2.2
1	A	125	LEU	2.2
2	E	176	ARG	2.2
3	I	119	TYR	2.2
2	H	104	GLU	2.2
1	D	341	THR	2.2
2	H	165	THR	2.2
1	G	236	LEU	2.2
2	E	161	SER	2.2

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Mol	Chain	Res	Type	RSRZ
2	E	32	PHE	2.1
3	I	14	ASP	2.1
3	I	136	LEU	2.1
3	F	158	ASN	2.1
1	D	387	VAL	2.1
3	F	180	LYS	2.1
2	E	89	SER	2.1
2	E	171	ASP	2.1
3	I	192	GLN	2.1
2	H	176	ARG	2.1
2	E	190	MET	2.1
1	G	218	THR	2.1
2	H	23	PHE	2.1
2	E	167	TRP	2.1
2	H	65	ARG	2.1
2	H	169	ASP	2.1
2	E	90	LYS	2.1
2	H	119	GLU	2.0
2	H	132	ILE	2.0
2	E	138	THR	2.0
3	I	195	THR	2.0
2	H	74	TRP	2.0
3	F	181	ALA	2.0
2	E	57	ASP	2.0
1	G	275	VAL	2.0
2	H	27	VAL	2.0
3	I	129	TYR	2.0
1	G	432	ILE	2.0
3	I	60	ARG	2.0
3	I	116	ASP	2.0
3	I	169	ALA	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.