



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 10:49 pm GMT

PDB ID : 3AZI  
Title : Crystal Structure of Human Nucleosome Core Particle Containing H4K31Q mutation  
Authors : Iwasaki, W.; Tachiwana, H.; Kawaguchi, K.; Shibata, T.; Kagawa, W.; Kurumizaka, H.  
Deposited on : 2011-05-25  
Resolution : 2.70 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.9-1692
EDS	:	trunk28620
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	recalc28949

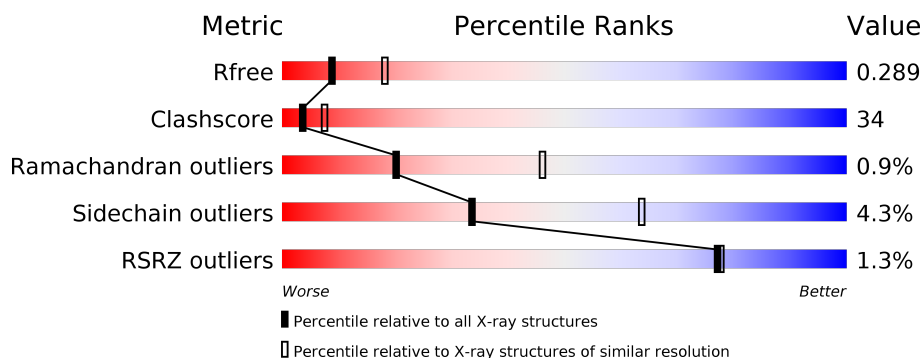
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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))
$R_{free}$	100719	2259 (2.70-2.70)
Clashscore	112137	2590 (2.70-2.70)
Ramachandran outliers	110173	2550 (2.70-2.70)
Sidechain outliers	110143	2550 (2.70-2.70)
RSRZ outliers	101464	2275 (2.70-2.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	139	<div> <div> <div></div> <div>44%</div> <div>24%</div> <div>•</div> <div>29%</div> </div> </div>
1	E	139	<div> <div> <div></div> <div>45%</div> <div>25%</div> <div>•</div> <div>29%</div> </div> </div>
2	B	106	<div> <div> <div></div> <div>42%</div> <div>29%</div> <div>•</div> <div>26%</div> </div> </div>
2	F	106	<div> <div> <div></div> <div>57%</div> <div>22%</div> <div>•</div> <div>21%</div> </div> </div>
3	C	133	<div> <div> <div></div> <div>54%</div> <div>23%</div> <div>•</div> <div>19%</div> </div> </div>
3	G	133	<div> <div> <div></div> <div>49%</div> <div>27%</div> <div>•</div> <div>22%</div> </div> </div>

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Mol	Chain	Length	Quality of chain
4	D	129	
4	H	129	
5	I	146	
5	J	146	

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
7	MN	E	1002	-	-	-	X

## 2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 12053 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 Histone H3.1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	98	Total	C	N	O	S	0	0	0
			807	508	156	139	4			
1	E	99	Total	C	N	O	S	0	0	0
			816	514	158	140	4			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	EXPRESSION TAG	UNP P68431
A	-2	SER	-	EXPRESSION TAG	UNP P68431
A	-1	HIS	-	EXPRESSION TAG	UNP P68431
E	-3	GLY	-	EXPRESSION TAG	UNP P68431
E	-2	SER	-	EXPRESSION TAG	UNP P68431
E	-1	HIS	-	EXPRESSION TAG	UNP P68431

- Molecule 2 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	78	Total	C	N	O	S	0	0	0
			619	390	120	108	1			
2	F	84	Total	C	N	O	S	0	0	0
			673	423	133	116	1			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-3	GLY	-	EXPRESSION TAG	UNP P62805
B	-2	SER	-	EXPRESSION TAG	UNP P62805
B	-1	HIS	-	EXPRESSION TAG	UNP P62805
B	31	GLN	LYS	ENGINEERED MUTATION	UNP P62805
F	-3	GLY	-	EXPRESSION TAG	UNP P62805
F	-2	SER	-	EXPRESSION TAG	UNP P62805

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Chain	Residue	Modelled	Actual	Comment	Reference
F	-1	HIS	-	EXPRESSION TAG	UNP P62805
F	31	GLN	LYS	ENGINEERED MUTATION	UNP P62805

- Molecule 3 is a protein called Histone H2A type 1-B/E.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	108	Total	C	N	O	0	0	0
			835	526	165	144			
3	G	104	Total	C	N	O	0	0	0
			805	508	157	140			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-3	GLY	-	EXPRESSION TAG	UNP P04908
C	-2	SER	-	EXPRESSION TAG	UNP P04908
C	-1	HIS	-	EXPRESSION TAG	UNP P04908
G	-3	GLY	-	EXPRESSION TAG	UNP P04908
G	-2	SER	-	EXPRESSION TAG	UNP P04908
G	-1	HIS	-	EXPRESSION TAG	UNP P04908

- Molecule 4 is a protein called Histone H2B type 1-J.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	95	Total	C	N	O	S	0	0	0
			745	468	136	139	2			
4	H	93	Total	C	N	O	S	0	0	0
			725	456	130	137	2			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-3	GLY	-	EXPRESSION TAG	UNP P06899
D	-2	SER	-	EXPRESSION TAG	UNP P06899
D	-1	HIS	-	EXPRESSION TAG	UNP P06899
H	-3	GLY	-	EXPRESSION TAG	UNP P06899
H	-2	SER	-	EXPRESSION TAG	UNP P06899
H	-1	HIS	-	EXPRESSION TAG	UNP P06899

- Molecule 5 is a DNA chain called 146-MER DNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	I	145	Total	C	N	O	P	0	0	0
			2970	1421	538	867	144			
5	J	145	Total	C	N	O	P	0	0	0
			2969	1421	535	869	144			

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	G	1	Total	Cl	0	0
			1	1		
6	A	1	Total	Cl	0	0
			1	1		
6	C	1	Total	Cl	0	0
			1	1		
6	E	1	Total	Cl	0	0
			1	1		

- Molecule 7 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	J	7	Total	Mn	0	0
			7	7		
7	I	5	Total	Mn	0	0
			5	5		
7	E	1	Total	Mn	0	0
			1	1		

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	6	Total	O	0	0
			6	6		
8	B	6	Total	O	0	0
			6	6		
8	C	11	Total	O	0	0
			11	11		
8	D	3	Total	O	0	0
			3	3		
8	E	18	Total	O	0	0
			18	18		
8	F	12	Total	O	0	0
			12	12		

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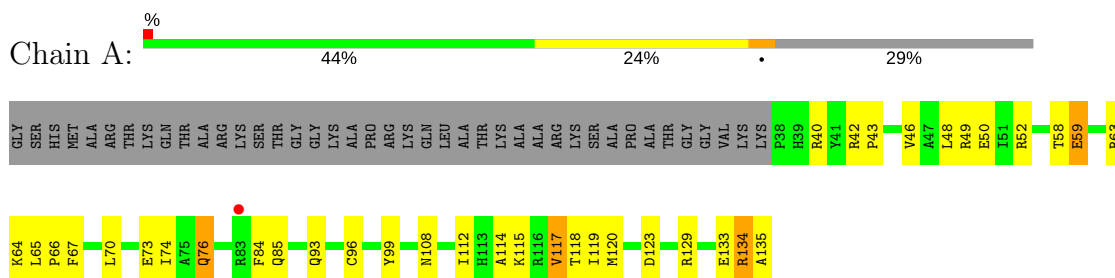
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	G	7	Total 7	O 7	0	0
8	H	2	Total 2	O 2	0	0
8	I	3	Total 3	O 3	0	0
8	J	4	Total 4	O 4	0	0

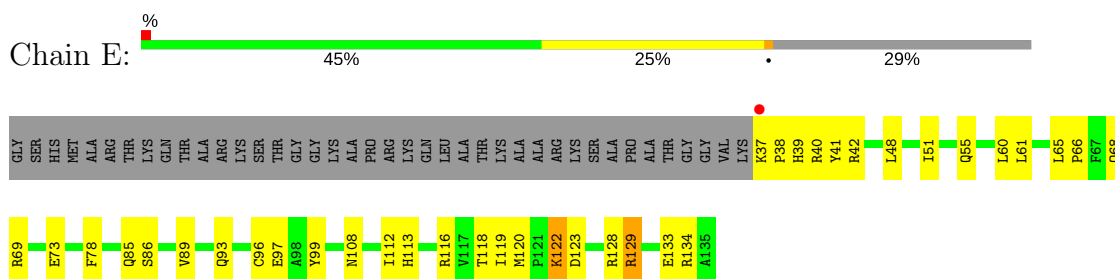
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

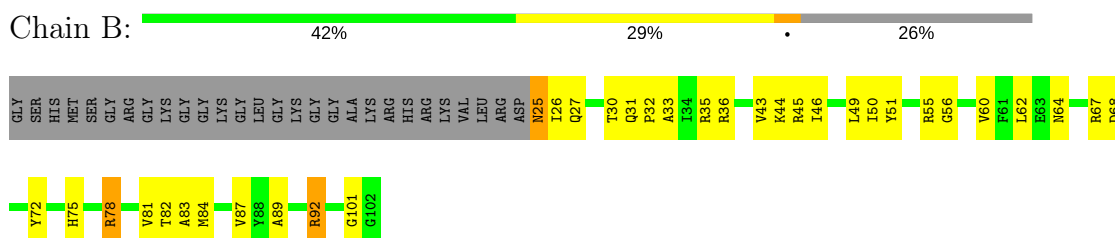
#### • Molecule 1: Histone H3.1



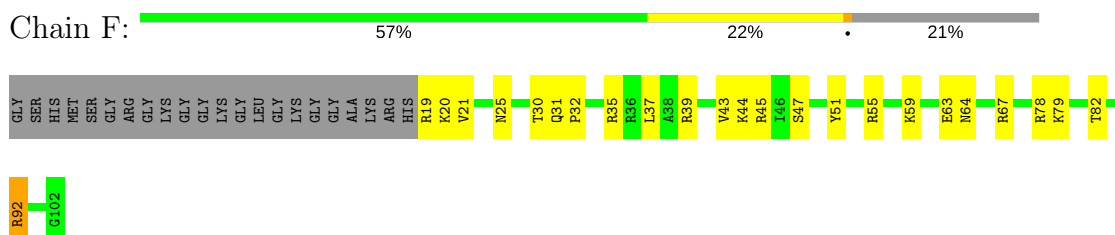
#### • Molecule 1: Histone H3.1



#### • Molecule 2: Histone H4



#### • Molecule 2: Histone H4





A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42	A43	A44	A45	A46	A47	A48	A49	A50	A51	A52	A53	A54	A55	A56	A57	A58	A59	A60	A61	A62	A63	A64	A65	A66	A67	A68	A69	A70	A71	A72	A73	A74	A75	A76	A77	A78	A79	A80	A81	A82	A83	A84	A85	A86	A87	A88	A89	A90	A91	A92	A93	A94	A95	A96	A97	A98	A99	A100	A101	A102	A103	A104	A105	A106	A107	A108	A109	A110	A111	A112	A113	A114	A115	A116	A117	A118	A119	A120	A121	A122	A123	A124	A125	A126	A127	A128	A129	A130	A131	A132	A133	A134	A135	A136	A137	A138	A139	A140	A141	A142	A143	A144	A145	A146	A147	A148	A149	A150	A151	A152	A153	A154	A155	A156	A157	A158	A159	A160	A161	A162	A163	A164	A165	A166	A167	A168	A169	A170	A171	A172	A173	A174	A175	A176	A177	A178	A179	A180	A181	A182	A183	A184	A185	A186	A187	A188	A189	A190	A191	A192	A193	A194	A195	A196	A197	A198	A199	A200	A201	A202	A203	A204	A205	A206	A207	A208	A209	A210	A211	A212	A213	A214	A215	A216	A217	A218	A219	A220	A221	A222	A223	A224	A225	A226	A227	A228	A229	A230	A231	A232	A233	A234	A235	A236	A237	A238	A239	A240	A241	A242	A243	A244	A245	A246	A247	A248	A249	A250	A251	A252	A253	A254	A255	A256	A257	A258	A259	A260	A261	A262	A263	A264	A265	A266	A267	A268	A269	A270	A271	A272	A273	A274	A275	A276	A277	A278	A279	A280	A281	A282	A283	A284	A285	A286	A287	A288	A289	A290	A291	A292	A293	A294	A295	A296	A297	A298	A299	A300	A301	A302	A303	A304	A305	A306	A307	A308	A309	A310	A311	A312	A313	A314	A315	A316	A317	A318	A319	A320	A321	A322	A323	A324	A325	A326	A327	A328	A329	A330	A331	A332	A333	A334	A335	A336	A337	A338	A339	A340	A341	A342	A343	A344	A345	A346	A347	A348	A349	A350	A351	A352	A353	A354	A355	A356	A357	A358	A359	A360	A361	A362	A363	A364	A365	A366	A367	A368	A369	A370	A371	A372	A373	A374	A375	A376	A377	A378	A379	A380	A381	A382	A383	A384	A385	A386	A387	A388	A389	A390	A391	A392	A393	A394	A395	A396	A397	A398	A399	A400	A401	A402	A403	A404	A405	A406	A407	A408	A409	A410	A411	A412	A413	A414	A415	A416	A417	A418	A419	A420	A421	A422	A423	A424	A425	A426	A427	A428	A429	A430	A431	A432	A433	A434	A435	A436	A437	A438	A439	A440	A441	A442	A443	A444	A445	A446	A447	A448	A449	A450	A451	A452	A453	A454	A455	A456	A457	A458	A459	A460	A461	A462	A463	A464	A465	A466	A467	A468	A469	A470	A471	A472	A473	A474	A475	A476	A477	A478	A479	A480	A481	A482	A483	A484	A485	A486	A487	A488	A489	A490	A491	A492	A493	A494	A495	A496	A497	A498	A499	A500	A501	A502	A503	A504	A505	A506	A507	A508	A509	A510	A511	A512	A513	A514	A515	A516	A517	A518	A519	A520	A521	A522	A523	A524	A525
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A127	A128	A129	A130	A131	A132	A133	A134	A135	A136	A137	A138	A139	A140	A141	A142	A143	A144	A145	DT
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● Molecule 5: 146-MER DNA



DA	T148	C149	A150	A151	T152	A153	T154	C155	C156	A157	C158	C159	T160	G161	C162	A163	G164	A165	T166	T167	C168	T169	A170	C171	C172	A173	A174	A175	A176	G177	T178	G179	T180	A181	T182	T183	T184	G185	G186	A187	A188	A189	C190	T191	G192	C193	T194	C195	C196	A197	T198	C199	A200	A201	A202	A203	G204	G205	C206
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A207	T208	G209	T210	T211	C212	A213	G214	C215	T216	G217	A218	A219	T220	T221	C222	A223	G224	C225	T226	G227	A228	A229	C230	A231	T232	G233	C234	C235	T236	T237	T238	T239	G240	A241	T242	G243	G244	A245	G246	C247	A248	G249	T250	T251	T252	C253	C254	A255	A256	A257	T258	A259	C260	A261	C262	T263	T264	T265	T266
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G267	G268	T269	A270	G271	A272	A273	T274	C275	T276	G277	C278	A279	G280	T281	T282	G283	G284	A285	T286	A287	T288	T289	G290	A291	T292
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## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	106.36Å 109.45Å 176.01Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.14 – 2.70 38.14 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.5 (38.14-2.70) 99.5 (38.14-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.08	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.00 (at 2.69Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, $R_{free}$	0.230 , 0.289 0.230 , 0.289	Depositor DCC
$R_{free}$ test set	2874 reflections (5.07%)	DCC
Wilson B-factor (Å <sup>2</sup> )	63.8	Xtriage
Anisotropy	0.605	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 78.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	0.033 for k,h,-l	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	12053	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	94.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.62% of the height of the origin peak. No significant pseudotranslation is detected.*

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

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MN, CL

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	0.43	0/819	0.63	0/1097
1	E	0.53	0/828	0.70	0/1109
2	B	0.41	0/626	0.67	0/838
2	F	0.51	0/680	0.74	0/909
3	C	0.44	0/845	0.65	0/1139
3	G	0.38	0/815	0.60	0/1100
4	D	0.47	0/756	0.71	1/1015 (0.1%)
4	H	0.44	0/736	0.64	0/990
5	I	0.39	0/3332	0.77	0/5141
5	J	0.38	0/3330	0.78	0/5138
All	All	0.42	0/12767	0.73	1/18476 (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
3	C	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	72	ARG	NE-CZ-NH2	5.09	122.84	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	57	TYR	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	807	0	844	54	0
1	E	816	0	856	44	0
2	B	619	0	654	35	0
2	F	673	0	717	24	0
3	C	835	0	897	53	0
3	G	805	0	861	54	0
4	D	745	0	771	47	0
4	H	725	0	745	39	0
5	I	2970	0	1640	249	0
5	J	2969	0	1641	268	0
6	A	1	0	0	0	0
6	C	1	0	0	0	0
6	E	1	0	0	1	0
6	G	1	0	0	0	0
7	E	1	0	0	0	0
7	I	5	0	0	0	0
7	J	7	0	0	0	0
8	A	6	0	0	0	0
8	B	6	0	0	1	0
8	C	11	0	0	2	0
8	D	3	0	0	0	0
8	E	18	0	0	1	0
8	F	12	0	0	0	0
8	G	7	0	0	1	0
8	H	2	0	0	0	0
8	I	3	0	0	1	0
8	J	4	0	0	0	0
All	All	12053	0	9626	744	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 34.

All (744) 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:E:134:ARG:HH11	1:E:134:ARG:HB3	1.04	1.16
5:I:55:DA:H2''	5:I:56:DA:H5'	1.27	1.14
5:J:185:DG:H2''	5:J:186:DG:H5''	1.24	1.14
5:J:188:DA:H2''	5:J:189:DA:H5'	1.23	1.13
5:I:136:DT:H2''	5:I:137:DG:H5''	1.14	1.09
5:J:152:DT:H2''	5:J:153:DA:H5''	1.30	1.09
5:I:71:DG:H2''	5:I:72:DA:H5''	1.27	1.07
5:J:285:DA:H2''	5:J:286:DT:H5'	1.37	1.07
5:J:214:DG:H2''	5:J:215:DC:H5''	1.31	1.06
5:I:9:DC:H2''	5:I:10:DC:H5''	1.36	1.05
5:I:31:DG:H2''	5:I:32:DT:H5''	1.34	1.04
5:J:190:DC:H2''	5:J:191:DT:H5'	1.40	1.03
5:I:128:DT:H2''	5:I:129:DC:H5''	1.42	1.02
5:J:181:DA:H2''	5:J:182:DT:H5''	1.42	1.02
5:I:91:DT:H2''	5:I:92:DT:H5'	1.43	1.01
1:E:134:ARG:NH1	1:E:134:ARG:HB3	1.76	1.00
5:J:286:DT:H4'	5:J:287:DA:OP1	1.58	1.00
5:I:52:DT:H2''	5:I:53:DC:H5'	1.42	0.99
5:J:182:DT:H2''	5:J:183:DT:H5'	1.40	0.99
5:J:264:DT:H2''	5:J:265:DT:H5'	1.44	0.98
5:I:72:DA:H2''	5:I:73:DA:H5'	1.42	0.96
5:J:168:DC:H2''	5:J:169:DT:H5''	1.46	0.96
5:I:62:DT:H2''	5:I:63:DG:H5'	1.44	0.96
5:J:179:DG:H2''	5:J:180:DT:H5''	1.47	0.95
5:J:281:DG:H2''	5:J:282:DT:H5'	1.49	0.94
5:J:170:DA:H2''	5:J:171:DC:H5''	1.51	0.93
5:J:152:DT:C2'	5:J:153:DA:H5''	1.99	0.93
5:J:185:DG:C2'	5:J:186:DG:H5''	1.99	0.93
5:J:273:DA:H2''	5:J:274:DT:H5'	1.51	0.93
3:C:84:GLN:HE22	3:C:88:ARG:HE	1.16	0.93
5:I:136:DT:C2'	5:I:137:DG:H5''	1.98	0.92
2:B:25:ASN:HD22	2:B:25:ASN:N	1.69	0.90
5:I:71:DG:C2'	5:I:72:DA:H5''	2.00	0.90
5:J:170:DA:H2''	5:J:171:DC:C5'	2.02	0.90
5:J:223:DA:H2''	5:J:224:DG:N7	1.86	0.90
5:I:98:DG:H2''	5:I:99:DA:N7	1.86	0.90
5:I:127:DA:H2''	5:I:128:DT:H5''	1.53	0.89
5:I:125:DG:N3	5:I:126:DA:N7	2.20	0.88
5:J:156:DC:H2''	5:J:157:DA:H5''	1.53	0.87
5:I:57:DA:H2''	5:I:58:DG:C8	2.08	0.87
5:J:166:DT:H2''	5:J:167:DT:H5''	1.56	0.87
4:H:36:SER:HB2	4:H:63:ASN:HD21	1.37	0.86

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:134:ARG:HH11	1:E:134:ARG:CB	1.87	0.86
3:G:17:ARG:HH21	3:G:28:GLY:HA2	1.41	0.85
1:E:119:ILE:HD13	2:F:43:VAL:HG11	1.55	0.85
5:I:31:DG:C2'	5:I:32:DT:H5''	2.06	0.85
5:J:179:DG:C2'	5:J:180:DT:H5''	2.06	0.84
5:J:190:DC:H2''	5:J:191:DT:C5'	2.06	0.84
5:I:135:DG:H1'	5:I:136:DT:H5''	1.60	0.84
5:I:9:DC:C2'	5:I:10:DC:H5''	2.05	0.84
3:C:39:TYR:HB3	4:D:78:SER:HB2	1.60	0.84
5:I:46:DG:H2''	5:I:47:DC:OP2	1.78	0.83
1:A:58:THR:HG21	3:G:81:ARG:HG2	1.61	0.83
5:J:246:DG:H1'	5:J:247:DC:H5''	1.60	0.83
3:G:24:GLN:HA	3:G:24:GLN:HE21	1.42	0.83
5:J:166:DT:H2''	5:J:167:DT:C5'	2.08	0.83
5:I:4:DA:H4'	5:I:5:DA:OP1	1.77	0.83
5:J:264:DT:H2''	5:J:265:DT:C5'	2.07	0.83
3:C:87:ILE:HD12	3:C:97:LEU:HD12	1.61	0.83
5:J:214:DG:C2'	5:J:215:DC:H5''	2.07	0.83
3:G:24:GLN:HA	3:G:24:GLN:NE2	1.93	0.82
5:J:270:DA:H2''	5:J:271:DG:O5'	1.78	0.82
5:I:139:DA:H2''	5:I:140:DT:H5'	1.61	0.82
5:I:126:DA:N1	5:I:127:DA:N6	2.28	0.82
5:J:251:DT:H2'	5:J:252:DT:H71	1.62	0.81
5:I:112:DT:C2	5:I:113:DA:N7	2.48	0.81
5:J:206:DC:H2''	5:J:207:DA:C8	2.16	0.81
1:E:37:LYS:NZ	5:J:291:DA:H4'	1.97	0.80
5:I:26:DC:H2''	5:I:27:DA:N7	1.96	0.80
5:I:128:DT:C2'	5:I:129:DC:H5''	2.11	0.80
5:J:181:DA:C2'	5:J:182:DT:H5''	2.12	0.80
5:I:47:DC:H2''	5:I:48:DT:H5''	1.65	0.79
5:I:127:DA:H2	5:I:128:DT:C2	1.99	0.79
2:F:92:ARG:HB3	2:F:92:ARG:NH1	1.96	0.79
5:J:189:DA:H2''	5:J:190:DC:O5'	1.82	0.79
5:J:260:DC:H2''	5:J:261:DA:H8	1.48	0.79
5:I:62:DT:H2''	5:I:63:DG:C5'	2.13	0.78
5:J:154:DT:H2''	5:J:155:DC:H5'	1.66	0.78
5:J:179:DG:H2''	5:J:180:DT:C5'	2.14	0.78
5:I:127:DA:H2''	5:I:128:DT:C5'	2.12	0.78
5:J:170:DA:C2'	5:J:171:DC:H5''	2.12	0.78
3:C:50:TYR:OH	4:D:95:GLN:HG3	1.83	0.78
5:J:198:DT:H2''	5:J:199:DC:H5'	1.63	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:45:DT:H2''	5:I:46:DG:C8	2.19	0.78
5:I:61:DA:H2''	5:I:62:DT:C5'	2.14	0.78
5:I:127:DA:N6	5:J:167:DT:H3	1.82	0.78
5:J:262:DC:H2''	5:J:263:DT:H5'	1.64	0.78
5:J:188:DA:H2''	5:J:189:DA:C5'	2.08	0.77
1:A:49:ARG:HD3	5:J:155:DC:OP1	1.84	0.77
5:J:230:DC:H2''	5:J:231:DA:H5'	1.67	0.77
5:J:276:DT:H2''	5:J:277:DG:N7	1.98	0.77
5:J:174:DA:N3	5:J:175:DA:N7	2.33	0.77
1:A:63:ARG:O	1:A:66:PRO:HD2	1.84	0.77
3:C:25:PHE:CZ	3:C:59:THR:HG21	2.19	0.76
5:I:83:DA:H2''	5:I:84:DC:C5'	2.15	0.76
5:I:83:DA:H2''	5:I:84:DC:H5'	1.65	0.76
2:B:64:ASN:HD22	2:B:67:ARG:HH12	1.30	0.76
5:I:128:DT:H2''	5:I:129:DC:C5'	2.15	0.76
5:J:273:DA:H2''	5:J:274:DT:C5'	2.15	0.76
1:E:122:LYS:HB2	6:E:1001:CL:CL	2.22	0.75
1:E:37:LYS:HB2	1:E:38:PRO:C	2.07	0.75
5:I:61:DA:H2''	5:I:62:DT:H5''	1.68	0.75
3:C:26:PRO:HD3	4:D:40:TYR:CD1	2.21	0.75
5:I:95:DA:H1'	5:I:96:DT:H5'	1.67	0.75
4:D:33:ARG:HD2	5:J:269:DT:H4'	1.68	0.74
5:J:286:DT:C4'	5:J:287:DA:OP1	2.35	0.74
1:A:64:LYS:NZ	1:A:64:LYS:HB2	2.03	0.74
5:I:26:DC:H2''	5:I:27:DA:C5	2.22	0.74
5:J:282:DT:H2''	5:J:283:DG:H5'	1.70	0.74
5:I:139:DA:H2''	5:I:140:DT:C5'	2.18	0.73
5:J:182:DT:H2''	5:J:183:DT:C5'	2.17	0.73
5:J:181:DA:H2''	5:J:182:DT:C5'	2.17	0.73
3:C:102:ILE:HG23	4:D:61:ILE:HD13	1.70	0.73
5:I:117:DT:H1'	5:I:118:DT:H5''	1.69	0.73
5:I:51:DA:H2''	5:I:52:DT:C5'	2.18	0.73
5:J:158:DC:H2''	5:J:159:DC:O5'	1.87	0.73
1:A:117:VAL:HG13	3:G:115:LEU:CD2	2.19	0.73
3:G:76:THR:O	4:H:52:THR:HG23	1.88	0.73
5:I:101:DC:H2''	5:I:102:DA:H5'	1.69	0.73
5:J:244:DG:H4'	5:J:245:DA:OP1	1.88	0.73
5:I:71:DG:H2''	5:I:72:DA:C5'	2.13	0.72
1:E:37:LYS:HZ2	5:J:291:DA:H4'	1.54	0.72
5:J:249:DG:H2''	5:J:250:DT:H5'	1.69	0.72
5:J:186:DG:H4'	5:J:187:DA:OP1	1.88	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:25:PHE:HZ	3:C:59:THR:HG21	1.52	0.72
5:J:203:DA:H2''	5:J:204:DG:OP2	1.90	0.71
5:J:290:DG:H2''	5:J:291:DA:OP2	1.89	0.71
4:H:36:SER:HB2	4:H:63:ASN:ND2	2.05	0.71
3:G:70:ALA:HA	3:G:82:HIS:CE1	2.26	0.71
5:I:125:DG:C4	5:I:126:DA:N7	2.59	0.71
1:E:69:ARG:NH2	5:I:90:DT:OP2	2.24	0.71
5:J:259:DA:H2''	5:J:260:DC:H5''	1.71	0.71
5:I:111:DA:H2''	5:I:112:DT:OP2	1.91	0.70
5:J:156:DC:C2'	5:J:157:DA:H5''	2.22	0.70
5:I:72:DA:H2''	5:I:73:DA:C5'	2.19	0.70
5:I:32:DT:H2''	5:I:33:DG:H5'	1.73	0.70
3:C:42:ARG:HG3	4:D:88:THR:HB	1.74	0.70
5:I:104:DT:H2''	5:I:105:DT:O5'	1.91	0.70
2:B:78:ARG:HH11	2:B:78:ARG:HB2	1.57	0.70
5:I:5:DA:H2''	5:I:6:DT:O5'	1.92	0.69
5:I:68:DG:H2''	5:I:69:DC:H5'	1.74	0.69
5:J:236:DT:H2''	5:J:237:DT:OP2	1.92	0.69
5:J:275:DC:H2'	5:J:276:DT:H71	1.74	0.69
2:F:59:LYS:O	2:F:63:GLU:HG3	1.92	0.69
2:B:30:THR:OG1	2:B:32:PRO:HG2	1.93	0.69
5:J:234:DC:H2''	5:J:235:DC:C5	2.27	0.69
5:I:132:DC:H2''	5:I:133:DA:H5'	1.75	0.69
3:G:76:THR:HG22	5:I:131:DG:P	2.33	0.69
5:I:43:DA:H1'	5:I:44:DC:H5''	1.74	0.68
5:J:168:DC:C2'	5:J:169:DT:H5''	2.22	0.68
5:J:260:DC:H2''	5:J:261:DA:C8	2.27	0.68
4:H:56:SER:HB2	5:J:166:DT:OP2	1.93	0.68
5:I:28:DA:H2''	5:I:29:DA:C8	2.28	0.68
5:I:22:DC:H1'	5:I:23:DT:H5''	1.75	0.68
3:G:47:ALA:HB3	3:G:48:PRO:HD3	1.76	0.68
5:I:106:DT:H2''	5:I:107:DC:H6	1.59	0.68
2:B:83:ALA:O	2:B:87:VAL:HG23	1.94	0.68
5:I:2:DT:H2''	5:I:3:DC:H5'	1.76	0.68
4:D:32:SER:OG	5:I:103:DG:H5''	1.94	0.68
5:I:124:DA:H1'	5:I:125:DG:H5''	1.75	0.68
5:J:153:DA:H1'	5:J:154:DT:H5''	1.75	0.67
5:J:192:DG:H2''	5:J:193:DC:H5'	1.74	0.67
1:A:48:LEU:O	1:A:52:ARG:HG3	1.94	0.67
4:H:37:TYR:O	4:H:41:VAL:HG23	1.95	0.67
5:I:132:DC:H2''	5:I:133:DA:C5'	2.23	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:ASN:O	1:A:112:ILE:HG12	1.94	0.67
5:I:89:DC:H2''	5:I:90:DT:H71	1.76	0.67
5:J:275:DC:H2'	5:J:276:DT:C7	2.25	0.67
3:G:76:THR:CG2	5:I:130:DT:H3'	2.24	0.67
5:I:133:DA:H2''	5:I:134:DG:H5'	1.77	0.67
5:J:174:DA:C5	5:J:175:DA:N6	2.62	0.66
5:J:283:DG:H1'	5:J:284:DG:C8	2.30	0.66
2:B:31:GLN:N	2:B:32:PRO:HD2	2.11	0.66
5:I:101:DC:H2''	5:I:102:DA:C5'	2.26	0.66
4:H:88:THR:HG22	5:J:186:DG:P	2.36	0.66
5:I:141:DA:H1'	5:I:142:DT:H5''	1.78	0.66
5:I:12:DC:H2''	5:I:13:DC:O5'	1.96	0.66
5:J:188:DA:C2'	5:J:189:DA:H5'	2.14	0.66
5:J:223:DA:H4'	5:J:224:DG:OP1	1.95	0.66
1:A:64:LYS:HB2	1:A:64:LYS:HZ3	1.60	0.65
5:I:101:DC:H1'	5:I:102:DA:H5''	1.78	0.65
5:I:94:DG:H2''	5:I:95:DA:H8	1.62	0.65
5:J:285:DA:H2''	5:J:286:DT:C5'	2.21	0.65
3:G:17:ARG:NH2	3:G:28:GLY:HA2	2.09	0.65
3:C:26:PRO:HD3	4:D:40:TYR:CE1	2.32	0.65
2:B:68:ASP:OD2	2:B:92:ARG:HD3	1.96	0.65
5:I:55:DA:H2''	5:I:56:DA:C5'	2.18	0.65
5:I:2:DT:C6	5:I:3:DC:H5	2.15	0.65
5:I:85:DA:H1'	5:I:86:DT:H5''	1.79	0.65
1:A:117:VAL:HG13	3:G:115:LEU:HD21	1.77	0.64
5:I:126:DA:C2	5:I:127:DA:C5	2.85	0.64
5:I:127:DA:C2'	5:I:128:DT:H5''	2.24	0.64
3:C:30:VAL:HG13	4:D:70:PHE:HE1	1.61	0.64
3:G:26:PRO:HD3	4:H:40:TYR:CD1	2.32	0.64
5:I:52:DT:C2'	5:I:53:DC:H5'	2.23	0.64
5:J:209:DG:H2''	5:J:210:DT:H5'	1.79	0.64
5:I:8:DT:H1'	5:I:9:DC:H5''	1.79	0.64
5:J:247:DC:H2''	5:J:248:DA:C8	2.33	0.64
1:A:117:VAL:HG12	1:A:117:VAL:O	1.96	0.64
1:A:67:PHE:CD2	1:A:93:GLN:HG3	2.32	0.64
3:G:76:THR:HG22	5:I:130:DT:H3'	1.80	0.64
5:I:127:DA:C2	5:I:128:DT:C2	2.84	0.64
5:I:136:DT:H2''	5:I:137:DG:C5'	2.08	0.64
2:B:78:ARG:HH11	2:B:78:ARG:CB	2.10	0.64
5:I:51:DA:H2''	5:I:52:DT:H5'	1.79	0.63
1:A:134:ARG:HB2	1:A:134:ARG:NH1	2.13	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:33:ARG:HG3	4:D:33:ARG:O	1.98	0.63
5:I:37:DT:H2''	5:I:38:DT:C7	2.29	0.63
1:A:134:ARG:CB	1:A:134:ARG:NH1	2.61	0.63
1:E:108:ASN:O	1:E:112:ILE:HG12	1.99	0.63
5:J:274:DT:H2''	5:J:275:DC:H5''	1.80	0.63
3:C:114:VAL:HG23	8:C:2010:HOH:O	1.97	0.63
5:I:127:DA:N6	5:J:167:DT:N3	2.46	0.63
3:C:84:GLN:HE22	3:C:88:ARG:NE	1.92	0.62
5:I:37:DT:H2''	5:I:38:DT:H71	1.80	0.62
4:H:88:THR:HG22	5:J:186:DG:OP2	2.00	0.62
5:I:103:DG:H2''	5:I:104:DT:C5'	2.29	0.62
3:G:43:VAL:O	5:I:111:DA:H3'	2.00	0.62
5:J:263:DT:H2''	5:J:264:DT:O5'	2.00	0.62
5:I:67:DA:C2	5:J:227:DG:N2	2.68	0.62
5:J:185:DG:H2''	5:J:186:DG:C5'	2.14	0.62
5:I:94:DG:H2''	5:I:95:DA:C8	2.35	0.62
5:J:208:DT:H2''	5:J:209:DG:H5'	1.82	0.62
4:D:88:THR:HG22	5:I:39:DG:OP1	1.99	0.61
5:J:151:DA:H2''	5:J:152:DT:O5'	2.00	0.61
5:J:225:DC:H2''	5:J:226:DT:H71	1.81	0.61
2:B:25:ASN:ND2	2:B:25:ASN:N	2.42	0.61
5:I:115:DA:H2''	5:I:116:DC:OP2	2.01	0.61
5:I:91:DT:H2''	5:I:92:DT:C5'	2.26	0.61
5:J:197:DA:H2''	5:J:198:DT:H5'	1.82	0.61
1:A:134:ARG:HH11	1:A:134:ARG:HB3	1.65	0.61
3:C:40:SER:HB3	4:D:89:ILE:HG13	1.82	0.61
5:J:152:DT:C3'	5:J:153:DA:H5''	2.30	0.61
5:J:153:DA:H2''	5:J:154:DT:C5'	2.31	0.61
4:H:41:VAL:HB	4:H:59:MET:HE3	1.82	0.61
5:J:282:DT:H1'	5:J:283:DG:H5''	1.83	0.61
5:I:130:DT:H2''	5:I:131:DG:H5''	1.82	0.60
5:I:8:DT:C2'	5:I:9:DC:H5''	2.31	0.60
3:G:29:ARG:NH1	4:H:36:SER:O	2.34	0.60
5:I:61:DA:H2''	5:I:62:DT:H5'	1.81	0.60
5:J:200:DA:H2''	5:J:201:DA:OP2	2.02	0.60
5:I:18:DG:H2''	5:I:19:DA:H8	1.67	0.60
5:I:42:DA:H2''	5:I:43:DA:C8	2.36	0.60
5:I:51:DA:H2''	5:I:52:DT:H5''	1.83	0.60
5:J:164:DG:H2''	5:J:165:DA:H5''	1.83	0.60
5:J:186:DG:H2''	5:J:187:DA:N7	2.16	0.60
5:J:155:DC:H2''	5:J:156:DC:OP2	2.02	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:280:DG:H1'	5:J:281:DG:H5''	1.84	0.60
5:I:26:DC:H2''	5:I:27:DA:C8	2.36	0.59
5:J:235:DC:H2''	5:J:236:DT:OP2	2.01	0.59
5:J:287:DA:H1'	5:J:288:DT:H5'	1.82	0.59
5:J:154:DT:C2'	5:J:155:DC:H5'	2.33	0.59
5:J:241:DA:H2''	5:J:242:DT:O5'	2.01	0.59
1:A:134:ARG:HH11	1:A:134:ARG:CB	2.16	0.59
5:I:92:DT:H2''	5:I:93:DT:H5'	1.85	0.59
5:I:38:DT:H1'	5:I:39:DG:H5'	1.85	0.59
5:J:175:DA:C2	5:J:176:DA:N6	2.71	0.59
5:I:41:DA:C4'	5:I:41:DA:OP1	2.50	0.59
5:J:217:DG:H1'	5:J:218:DA:H5'	1.84	0.59
5:J:244:DG:H1'	5:J:245:DA:C8	2.38	0.59
5:J:215:DC:H2''	5:J:216:DT:C6	2.38	0.58
5:I:10:DC:H2''	5:I:11:DA:C8	2.38	0.58
5:J:166:DT:C2'	5:J:167:DT:H5''	2.31	0.58
5:J:246:DG:H2''	5:J:247:DC:C5'	2.33	0.58
5:J:261:DA:H2''	5:J:262:DC:H5''	1.84	0.58
4:D:30:LYS:N	5:I:104:DT:OP1	2.36	0.58
5:J:183:DT:H1'	5:J:184:DT:H5'	1.84	0.58
1:A:42:ARG:HH21	5:I:68:DG:P	2.26	0.58
5:J:234:DC:H4'	5:J:235:DC:OP1	2.03	0.58
5:J:246:DG:H2''	5:J:247:DC:H5'	1.85	0.58
1:A:76:GLN:HA	1:A:76:GLN:HE21	1.68	0.58
4:D:92:ARG:HG2	4:D:92:ARG:HH11	1.69	0.57
5:I:4:DA:H2''	5:I:5:DA:C8	2.39	0.57
2:F:30:THR:OG1	2:F:32:PRO:HG2	2.04	0.57
3:G:67:GLY:HA3	4:H:49:HIS:CD2	2.39	0.57
5:I:124:DA:H2''	5:I:125:DG:H5''	1.85	0.57
2:F:64:ASN:HD22	2:F:64:ASN:N	2.02	0.57
3:C:51:LEU:HD13	4:D:73:ILE:HG21	1.87	0.57
5:I:53:DC:H1'	5:I:54:DA:C8	2.39	0.57
5:J:232:DT:H2''	5:J:233:DG:OP2	2.03	0.57
3:G:44:GLY:O	3:G:48:PRO:HD3	2.05	0.57
2:B:72:TYR:HE1	4:D:80:LEU:HD13	1.70	0.57
1:E:41:TYR:HA	5:J:290:DG:H5''	1.87	0.57
5:I:71:DG:C3'	5:I:72:DA:H5''	2.33	0.57
5:J:170:DA:H2''	5:J:171:DC:H5'	1.82	0.57
5:J:175:DA:H2''	5:J:176:DA:C8	2.40	0.56
3:C:79:ILE:HG12	3:C:82:HIS:CE1	2.39	0.56
1:A:96:CYS:SG	2:B:62:LEU:HD21	2.44	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:96:DT:H2''	5:I:97:DG:OP2	2.05	0.56
5:J:163:DA:H1'	5:J:164:DG:C5	2.41	0.56
5:J:177:DG:C2'	5:J:178:DT:H71	2.36	0.56
4:D:37:TYR:H	4:D:63:ASN:HD21	1.54	0.56
3:G:73:ASN:O	3:G:74:LYS:HB2	2.05	0.56
3:G:99:ARG:HD3	8:G:2003:HOH:O	2.04	0.56
5:I:113:DA:H2	5:I:114:DC:C2	2.23	0.56
5:I:18:DG:H2''	5:I:19:DA:O5'	2.06	0.56
5:I:103:DG:H2''	5:I:104:DT:H5'	1.86	0.56
5:I:90:DT:H1'	5:I:91:DT:H5''	1.87	0.56
5:J:186:DG:H2''	5:J:187:DA:C8	2.41	0.56
5:J:281:DG:H2''	5:J:282:DT:C5'	2.32	0.56
5:I:88:DC:H2''	5:I:89:DC:C6	2.41	0.56
3:G:83:LEU:O	3:G:87:ILE:HG12	2.05	0.56
5:J:214:DG:H2''	5:J:215:DC:C5'	2.20	0.56
5:J:220:DT:H2'	5:J:221:DT:H71	1.87	0.56
3:C:11:ARG:HH12	5:J:264:DT:H1'	1.71	0.56
3:C:62:ILE:C	3:C:62:ILE:HD12	2.26	0.56
5:I:124:DA:C2'	5:I:125:DG:H5''	2.35	0.56
5:J:166:DT:H2''	5:J:167:DT:O5'	2.06	0.56
5:J:174:DA:C6	5:J:175:DA:N6	2.74	0.56
3:G:42:ARG:CD	4:H:88:THR:HB	2.36	0.55
5:I:31:DG:C3'	5:I:32:DT:H5''	2.36	0.55
5:J:259:DA:C2'	5:J:260:DC:H5''	2.37	0.55
3:C:26:PRO:O	3:C:30:VAL:HG23	2.05	0.55
5:I:9:DC:C3'	5:I:10:DC:H5''	2.37	0.55
5:J:291:DA:H2''	5:J:292:DT:H5'	1.88	0.55
1:A:76:GLN:HA	1:A:76:GLN:NE2	2.22	0.55
1:A:123:ASP:OD1	1:E:113:HIS:CE1	2.59	0.55
3:C:81:ARG:NH2	3:C:107:VAL:O	2.40	0.55
4:D:31:ARG:HD3	5:J:270:DA:O3'	2.05	0.55
1:A:70:LEU:O	1:A:74:ILE:HG12	2.07	0.55
5:I:11:DA:H1'	5:I:12:DC:H5''	1.88	0.55
5:I:2:DT:H2''	5:I:3:DC:C5'	2.37	0.55
5:I:127:DA:H2	5:I:128:DT:N1	2.05	0.55
5:I:51:DA:C2'	5:I:52:DT:H5''	2.37	0.55
1:A:48:LEU:CD1	3:G:117:PRO:HD3	2.36	0.55
2:B:72:TYR:CE1	4:D:80:LEU:HD13	2.42	0.55
1:A:58:THR:CG2	3:G:81:ARG:HG2	2.36	0.55
5:I:18:DG:H2''	5:I:19:DA:C8	2.42	0.55
5:I:127:DA:H62	5:J:167:DT:H3	1.53	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:246:DG:C1'	5:J:247:DC:H5''	2.36	0.55
2:F:92:ARG:HH11	2:F:92:ARG:HB3	1.68	0.55
5:I:129:DC:H2''	5:I:130:DT:C5	2.42	0.55
5:J:195:DC:H1'	5:J:196:DC:C6	2.42	0.55
5:J:201:DA:H2''	5:J:202:DA:OP2	2.06	0.55
5:J:225:DC:H2''	5:J:226:DT:C7	2.35	0.55
5:I:6:DT:H2''	5:I:7:DA:C8	2.41	0.55
5:J:157:DA:H2''	5:J:158:DC:H5'	1.88	0.55
5:J:167:DT:H2''	5:J:168:DC:C6	2.42	0.55
1:E:69:ARG:HH22	5:I:90:DT:P	2.30	0.54
3:C:55:LEU:O	3:C:59:THR:HG22	2.07	0.54
3:C:84:GLN:HA	3:C:84:GLN:HE21	1.72	0.54
5:I:143:DT:H2''	5:I:144:DG:OP2	2.07	0.54
5:I:8:DT:H2''	5:I:9:DC:H5''	1.87	0.54
5:J:153:DA:C2'	5:J:154:DT:H5''	2.37	0.54
5:J:185:DG:C3'	5:J:186:DG:H5''	2.37	0.54
5:J:191:DT:H2''	5:J:192:DG:C8	2.42	0.54
3:C:55:LEU:O	3:C:59:THR:CG2	2.56	0.54
5:I:35:DA:C8	5:I:36:DT:H72	2.43	0.54
5:J:182:DT:H2'	5:J:183:DT:H72	1.89	0.54
5:J:237:DT:H1'	5:J:238:DT:H5''	1.90	0.54
5:J:288:DT:H1'	5:J:289:DT:H5'	1.88	0.54
1:A:134:ARG:HB2	1:A:134:ARG:CZ	2.37	0.54
5:I:126:DA:C2	5:I:127:DA:C6	2.96	0.54
5:J:262:DC:C2'	5:J:263:DT:H5'	2.35	0.54
2:F:79:LYS:HD3	5:I:100:DG:OP1	2.08	0.54
5:J:163:DA:H2''	5:J:164:DG:N7	2.23	0.54
5:I:82:DA:H1'	5:I:83:DA:H5''	1.89	0.54
3:G:77:ARG:HG2	5:I:131:DG:OP1	2.08	0.53
3:C:102:ILE:CG2	4:D:61:ILE:HD13	2.37	0.53
5:J:177:DG:H2''	5:J:178:DT:H71	1.90	0.53
1:A:117:VAL:CG1	1:A:117:VAL:O	2.56	0.53
5:I:67:DA:H2''	5:I:68:DG:O5'	2.09	0.53
5:I:8:DT:H2''	5:I:9:DC:C5'	2.38	0.53
5:J:230:DC:H2''	5:J:231:DA:C5'	2.37	0.53
2:F:31:GLN:N	2:F:32:PRO:HD2	2.24	0.53
1:A:48:LEU:HB3	1:A:52:ARG:HH12	1.72	0.53
5:I:113:DA:H2''	5:I:114:DC:O5'	2.08	0.53
5:J:193:DC:H2''	5:J:194:DT:H71	1.90	0.53
5:J:282:DT:H1'	5:J:283:DG:C5'	2.39	0.53
1:E:128:ARG:NH2	1:E:134:ARG:HD3	2.23	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:215:DC:H2''	5:J:216:DT:C5	2.44	0.53
5:J:219:DA:H2''	5:J:220:DT:H5'	1.91	0.53
5:I:113:DA:H2	5:I:114:DC:N3	2.06	0.52
3:G:76:THR:HG22	5:I:131:DG:OP2	2.08	0.52
5:I:55:DA:C2'	5:I:56:DA:H5'	2.18	0.52
5:J:193:DC:H4'	5:J:194:DT:OP1	2.09	0.52
1:A:65:LEU:HB3	1:A:66:PRO:HD3	1.92	0.52
4:D:92:ARG:HG2	4:D:92:ARG:NH1	2.24	0.52
5:I:94:DG:OP1	5:I:94:DG:H4'	2.09	0.52
5:J:153:DA:H2''	5:J:154:DT:H5''	1.91	0.52
5:J:198:DT:C2'	5:J:199:DC:H5'	2.34	0.52
5:J:271:DG:H2''	5:J:272:DA:C8	2.44	0.52
4:D:80:LEU:HD21	4:D:96:THR:HG21	1.90	0.52
1:E:116:ARG:NH1	1:E:118:THR:O	2.43	0.52
1:E:65:LEU:HB3	1:E:66:PRO:HD3	1.92	0.52
1:E:128:ARG:HD2	1:E:133:GLU:OE1	2.08	0.52
5:I:64:DT:H1'	5:I:65:DT:H5''	1.92	0.52
3:C:84:GLN:HG3	3:C:105:GLY:C	2.29	0.52
1:E:37:LYS:NZ	5:J:291:DA:C4'	2.72	0.52
8:E:2018:HOH:O	2:F:59:LYS:HE3	2.09	0.52
5:I:95:DA:H2''	5:I:96:DT:OP2	2.09	0.52
4:D:80:LEU:HD21	4:D:96:THR:CG2	2.40	0.52
5:I:130:DT:C2'	5:I:131:DG:H5''	2.40	0.52
5:J:170:DA:H1'	5:J:171:DC:H5''	1.91	0.52
4:H:33:ARG:HD3	5:J:174:DA:H4'	1.92	0.52
5:J:150:DA:H2''	5:J:151:DA:OP2	2.10	0.52
3:C:62:ILE:HD11	4:D:62:MET:SD	2.49	0.52
1:E:37:LYS:HZ1	5:J:291:DA:C4'	2.23	0.52
5:J:241:DA:H4'	5:J:241:DA:OP1	2.10	0.52
1:E:68:GLN:HG3	1:E:89:VAL:HG11	1.92	0.51
3:G:20:ARG:O	4:H:120:LYS:HG2	2.10	0.51
5:I:135:DG:H1'	5:I:136:DT:C5'	2.37	0.51
5:J:197:DA:H2''	5:J:198:DT:C5'	2.40	0.51
1:A:76:GLN:CA	1:A:76:GLN:HE21	2.22	0.51
3:G:40:SER:HB3	4:H:89:ILE:HG13	1.93	0.51
5:I:20:DT:H2''	5:I:21:DT:OP2	2.10	0.51
5:I:98:DG:H2''	5:I:99:DA:C8	2.44	0.51
5:J:156:DC:H2''	5:J:157:DA:C5'	2.33	0.51
5:J:220:DT:C2'	5:J:221:DT:H71	2.40	0.51
5:I:24:DA:H2''	5:I:25:DC:C6	2.45	0.51
5:I:5:DA:C2'	5:I:6:DT:O5'	2.57	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:174:DA:C2	5:J:175:DA:N7	2.79	0.51
3:G:42:ARG:HG3	4:H:88:THR:HB	1.91	0.51
5:I:2:DT:N1	5:I:3:DC:H5	2.08	0.51
2:B:89:ALA:O	2:B:92:ARG:HB2	2.09	0.51
3:C:40:SER:CB	4:D:89:ILE:HG13	2.39	0.51
1:E:61:LEU:HD12	2:F:37:LEU:HD23	1.92	0.51
1:E:118:THR:HA	2:F:45:ARG:HB3	1.92	0.51
5:J:169:DT:C4	5:J:170:DA:N6	2.78	0.51
5:J:218:DA:H1'	5:J:219:DA:C8	2.46	0.51
5:J:233:DG:H2''	5:J:234:DC:O5'	2.11	0.51
2:B:35:ARG:HG3	2:B:46:ILE:HD12	1.91	0.51
1:E:116:ARG:HH22	1:E:123:ASP:CG	2.14	0.51
3:G:118:LYS:O	3:G:118:LYS:HD2	2.11	0.51
5:I:135:DG:C1'	5:I:136:DT:H5''	2.38	0.51
5:J:205:DG:H1'	5:J:206:DC:H5''	1.91	0.51
5:I:83:DA:H2''	5:I:84:DC:H5''	1.91	0.51
5:J:161:DG:H2''	5:J:162:DC:OP2	2.10	0.51
5:J:215:DC:H2''	5:J:216:DT:H71	1.91	0.51
5:J:195:DC:H1'	5:J:196:DC:C5	2.46	0.51
5:J:284:DG:H2''	5:J:285:DA:O5'	2.11	0.51
5:J:215:DC:C2'	5:J:216:DT:H71	2.41	0.50
3:G:50:TYR:OH	4:H:111:VAL:HA	2.11	0.50
5:I:19:DA:H4'	5:I:19:DA:OP1	2.11	0.50
5:I:74:DT:H2'	5:I:75:DT:H71	1.92	0.50
5:I:126:DA:C2	5:I:127:DA:N7	2.80	0.50
5:I:41:DA:H2''	5:I:42:DA:H8	1.76	0.50
1:E:65:LEU:HD23	5:I:90:DT:OP2	2.12	0.50
5:I:113:DA:C2	5:I:114:DC:C4	2.99	0.50
5:I:33:DG:H2''	5:I:34:DT:O5'	2.11	0.50
5:I:11:DA:C6	5:J:283:DG:N2	2.79	0.50
3:C:31:HIS:NE2	3:C:35:ARG:NH1	2.58	0.50
3:G:81:ARG:O	3:G:85:LEU:HG	2.12	0.50
5:J:253:DC:H2''	5:J:254:DC:O5'	2.12	0.50
5:J:211:DT:H5'	5:J:211:DT:H6	1.76	0.50
3:G:71:ARG:O	3:G:74:LYS:N	2.40	0.50
5:I:61:DA:C2'	5:I:62:DT:H5''	2.40	0.50
5:J:205:DG:H2''	5:J:206:DC:H5''	1.93	0.50
1:A:63:ARG:HE	1:A:66:PRO:HG2	1.76	0.50
5:J:205:DG:C2'	5:J:206:DC:H5''	2.42	0.50
3:C:84:GLN:HA	3:C:84:GLN:NE2	2.27	0.50
5:I:111:DA:C2	5:I:112:DT:C2	3.00	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:36:SER:CB	4:H:63:ASN:HD21	2.15	0.49
5:J:205:DG:H2''	5:J:206:DC:C5'	2.41	0.49
1:A:40:ARG:HG3	1:A:40:ARG:HH11	1.77	0.49
1:A:46:VAL:HG21	5:J:229:DA:H3'	1.93	0.49
2:B:49:LEU:HB3	8:B:2004:HOH:O	2.11	0.49
1:E:41:TYR:OH	5:I:7:DA:H5'	2.11	0.49
4:H:76:GLU:HA	4:H:79:ARG:NH1	2.26	0.49
3:C:42:ARG:O	4:D:88:THR:HA	2.12	0.49
3:G:24:GLN:CA	3:G:24:GLN:HE21	2.13	0.49
5:J:223:DA:H2''	5:J:224:DG:C8	2.47	0.49
5:J:236:DT:H2''	5:J:237:DT:H72	1.94	0.49
5:I:8:DT:C1'	5:I:9:DC:H5''	2.42	0.49
5:J:153:DA:C1'	5:J:154:DT:H5''	2.41	0.49
3:C:29:ARG:NH2	4:D:36:SER:O	2.46	0.49
1:A:96:CYS:SG	2:B:62:LEU:CD2	3.01	0.49
3:G:45:ALA:O	3:G:48:PRO:HD2	2.12	0.49
5:I:110:DA:H2''	5:I:111:DA:OP2	2.13	0.49
5:J:175:DA:C2	5:J:176:DA:C6	3.01	0.49
3:G:50:TYR:OH	4:H:95:GLN:HG3	2.12	0.49
5:I:48:DT:H2''	5:I:49:DC:C6	2.48	0.49
3:C:62:ILE:HD13	3:C:83:LEU:CD2	2.43	0.48
5:I:105:DT:O4	5:J:187:DA:N6	2.46	0.48
5:I:57:DA:N6	5:J:235:DC:N4	2.61	0.48
5:J:170:DA:C1'	5:J:171:DC:H5''	2.42	0.48
1:A:84:PHE:CD1	2:B:81:VAL:HB	2.48	0.48
5:I:42:DA:H2''	5:I:43:DA:H8	1.77	0.48
5:I:43:DA:C1'	5:I:44:DC:H5''	2.43	0.48
5:I:108:DC:H2''	5:I:109:DA:C8	2.47	0.48
3:C:62:ILE:HD11	4:D:62:MET:HE2	1.96	0.48
5:I:124:DA:C1'	5:I:125:DG:H5''	2.42	0.48
2:B:46:ILE:O	5:J:227:DG:H3'	2.14	0.48
2:F:92:ARG:HB3	2:F:92:ARG:CZ	2.43	0.48
5:J:249:DG:H2'	5:J:250:DT:H71	1.95	0.48
5:I:1:DA:C2	5:I:2:DT:N3	2.82	0.48
5:I:28:DA:C2'	5:I:29:DA:C8	2.96	0.48
5:J:259:DA:H2''	5:J:260:DC:C5'	2.41	0.48
5:J:265:DT:H1'	5:J:266:DT:H5'	1.94	0.48
1:E:116:ARG:NH2	1:E:123:ASP:OD1	2.42	0.48
5:I:102:DA:H2''	5:I:103:DG:OP2	2.13	0.48
2:B:75:HIS:HD2	4:D:96:THR:OG1	1.97	0.48
5:I:103:DG:H1'	5:I:104:DT:H5''	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:123:ASP:OD1	1:E:113:HIS:HE1	1.97	0.47
1:A:99:TYR:OH	1:A:133:GLU:OE1	2.32	0.47
5:I:25:DC:OP1	5:I:25:DC:H4'	2.14	0.47
5:I:73:DA:H2''	5:I:74:DT:H5'	1.94	0.47
4:H:38:SER:O	4:H:59:MET:HE3	2.14	0.47
1:A:48:LEU:HB3	1:A:52:ARG:NH1	2.29	0.47
1:E:60:LEU:HD13	1:E:93:GLN:CD	2.34	0.47
5:I:137:DG:H2''	5:I:138:DG:C8	2.50	0.47
3:C:32:ARG:NH1	5:I:29:DA:OP1	2.43	0.47
1:A:48:LEU:HD21	2:B:44:LYS:HD2	1.95	0.47
2:B:51:TYR:O	2:B:55:ARG:HG3	2.15	0.47
5:I:91:DT:C2'	5:I:92:DT:H5'	2.28	0.47
5:J:206:DC:H2''	5:J:207:DA:H8	1.73	0.47
1:A:63:ARG:HB2	1:A:66:PRO:HG2	1.96	0.47
5:I:75:DT:H2''	5:I:76:DC:OP2	2.13	0.47
5:J:209:DG:C8	5:J:210:DT:H72	2.49	0.47
3:C:81:ARG:O	3:C:81:ARG:HG3	2.11	0.47
4:D:48:VAL:HG23	4:D:49:HIS:ND1	2.30	0.47
5:J:159:DC:H2''	5:J:160:DT:O5'	2.15	0.47
5:J:221:DT:H1'	5:J:222:DC:H5'	1.96	0.47
1:E:37:LYS:HZ1	5:J:291:DA:H4'	1.74	0.47
1:E:37:LYS:HE2	1:E:39:HIS:HA	1.97	0.47
5:I:43:DA:C2'	5:I:44:DC:H5''	2.44	0.47
5:I:127:DA:C1'	5:I:128:DT:H5''	2.45	0.47
5:I:83:DA:C2'	5:I:84:DC:H5''	2.45	0.47
2:F:78:ARG:NH1	2:F:82:THR:HG23	2.30	0.46
5:I:129:DC:H2''	5:I:130:DT:H72	1.97	0.46
5:I:53:DC:H4'	5:I:54:DA:OP1	2.15	0.46
5:J:203:DA:H1'	5:J:204:DG:H5'	1.97	0.46
5:J:264:DT:H2'	5:J:265:DT:H72	1.96	0.46
3:C:26:PRO:HD3	4:D:40:TYR:CG	2.48	0.46
5:I:88:DC:N4	5:J:204:DG:O6	2.49	0.46
3:C:42:ARG:CG	4:D:88:THR:HB	2.44	0.46
4:H:89:ILE:HG22	4:H:89:ILE:O	2.15	0.46
3:G:76:THR:HG21	5:I:130:DT:H3'	1.95	0.46
5:J:193:DC:H2''	5:J:194:DT:C7	2.45	0.46
5:I:49:DC:H2''	5:I:50:DC:OP2	2.15	0.46
5:J:235:DC:H2''	5:J:236:DT:H72	1.96	0.46
5:J:268:DG:H2''	5:J:269:DT:C6	2.49	0.46
5:I:125:DG:N2	5:J:169:DT:O2	2.49	0.46
5:J:209:DG:C2'	5:J:210:DT:H5'	2.44	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:209:DG:H2'	5:J:210:DT:H72	1.98	0.46
4:H:55:SER:OG	4:H:56:SER:N	2.49	0.46
5:J:251:DT:H2''	5:J:252:DT:O5'	2.15	0.46
1:E:120:MET:HG2	2:F:47:SER:HB2	1.98	0.46
5:I:41:DA:O4'	5:I:41:DA:OP1	2.33	0.46
1:A:120:MET:C	2:B:50:ILE:HD11	2.35	0.46
1:E:37:LYS:CE	1:E:39:HIS:HA	2.45	0.46
4:H:68:ASP:O	4:H:72:ARG:HG3	2.16	0.46
5:I:106:DT:H2''	5:I:107:DC:O5'	2.15	0.46
5:I:73:DA:H1'	5:I:74:DT:H5''	1.97	0.46
5:I:93:DT:H2''	5:I:94:DG:O5'	2.16	0.46
5:J:179:DG:C1'	5:J:180:DT:H5''	2.46	0.46
3:C:90:ASP:O	3:C:91:GLU:C	2.52	0.45
5:I:19:DA:H2'	5:I:20:DT:C6	2.51	0.45
5:J:173:DA:C2	5:J:174:DA:C2	3.04	0.45
5:J:175:DA:H2''	5:J:176:DA:O5'	2.16	0.45
5:J:251:DT:H2'	5:J:252:DT:C7	2.40	0.45
5:I:121:DG:H2''	5:I:122:DG:OP2	2.16	0.45
5:I:84:DC:C5	5:I:85:DA:N6	2.85	0.45
5:J:244:DG:C2	5:J:245:DA:C2	3.05	0.45
5:J:172:DC:H2''	5:J:173:DA:N7	2.31	0.45
1:A:63:ARG:C	1:A:66:PRO:HD2	2.37	0.45
5:I:10:DC:H1'	5:I:11:DA:N7	2.32	0.45
5:I:58:DG:H2''	5:I:59:DG:C8	2.50	0.45
5:J:148:DT:H2''	5:J:149:DC:H5'	1.98	0.45
1:E:73:GLU:OE1	2:F:25:ASN:HB2	2.16	0.45
4:H:106:LEU:HD12	4:H:106:LEU:HA	1.85	0.45
5:I:62:DT:C2'	5:I:63:DG:C5'	2.88	0.45
5:I:57:DA:H2''	5:I:58:DG:N7	2.29	0.45
3:G:15:LYS:HE2	5:J:178:DT:H5''	1.99	0.45
5:J:209:DG:H5'	5:J:209:DG:H8	1.81	0.45
5:J:284:DG:H2''	5:J:285:DA:H8	1.81	0.45
1:A:85:GLN:HG3	2:B:82:THR:HA	1.99	0.45
4:D:31:ARG:O	4:D:32:SER:HB2	2.17	0.45
5:I:131:DG:H2''	5:I:132:DC:C6	2.52	0.45
5:J:197:DA:H1'	5:J:198:DT:H5''	1.99	0.45
2:B:31:GLN:N	2:B:32:PRO:CD	2.78	0.45
3:G:67:GLY:O	3:G:70:ALA:N	2.49	0.45
4:H:102:LEU:HA	4:H:103:PRO:HD3	1.83	0.45
5:I:130:DT:H2''	5:I:131:DG:C5'	2.46	0.45
3:C:57:TYR:HB2	4:D:113:GLU:OE2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:78:SER:HA	4:H:89:ILE:HD11	1.99	0.45
5:I:34:DT:H2''	5:I:35:DA:H5'	1.99	0.45
5:J:152:DT:H2'	5:J:153:DA:C8	2.52	0.45
4:D:31:ARG:CG	5:J:270:DA:H4'	2.47	0.44
5:I:116:DC:H2'	5:I:117:DT:C7	2.46	0.44
3:C:102:ILE:HB	8:C:2008:HOH:O	2.16	0.44
2:F:51:TYR:O	2:F:55:ARG:HG3	2.17	0.44
3:G:26:PRO:HD3	4:H:40:TYR:CE1	2.52	0.44
5:I:34:DT:H2''	5:I:35:DA:H8	1.82	0.44
5:J:165:DA:C8	5:J:166:DT:H72	2.51	0.44
5:I:127:DA:H1'	5:I:128:DT:H5''	1.99	0.44
5:I:132:DC:H2''	5:I:133:DA:H5''	1.95	0.44
5:I:37:DT:H4'	5:I:38:DT:OP1	2.18	0.44
5:J:215:DC:C2'	5:J:216:DT:C7	2.96	0.44
5:J:243:DG:H2''	5:J:244:DG:OP2	2.17	0.44
1:A:50:GLU:OE2	2:B:35:ARG:NH2	2.50	0.44
2:B:56:GLY:O	2:B:60:VAL:HG23	2.18	0.44
3:G:73:ASN:O	3:G:73:ASN:ND2	2.50	0.44
5:J:260:DC:C2'	5:J:261:DA:C8	3.00	0.44
5:J:282:DT:C2'	5:J:283:DG:H5'	2.42	0.44
3:C:114:VAL:O	3:C:114:VAL:HG12	2.18	0.44
2:B:78:ARG:HB2	2:B:78:ARG:NH1	2.29	0.44
5:J:163:DA:H1'	5:J:164:DG:C4	2.52	0.44
2:B:75:HIS:CD2	4:D:96:THR:OG1	2.71	0.44
3:C:62:ILE:HD13	3:C:83:LEU:HD22	1.99	0.44
5:I:64:DT:H2''	5:I:65:DT:H5'	2.00	0.44
3:G:63:LEU:HD22	4:H:45:LEU:HD13	2.00	0.44
5:J:286:DT:H1'	5:J:287:DA:C8	2.53	0.44
1:A:46:VAL:O	1:A:49:ARG:HB3	2.18	0.43
4:D:90:THR:OG1	4:D:92:ARG:HB3	2.18	0.43
1:E:48:LEU:HD21	2:F:44:LYS:HD2	2.00	0.43
5:I:125:DG:N2	5:J:169:DT:C2	2.86	0.43
5:J:236:DT:C2'	5:J:237:DT:H72	2.48	0.43
5:J:270:DA:C2'	5:J:271:DG:O5'	2.60	0.43
3:C:84:GLN:HG3	3:C:105:GLY:HA3	2.00	0.43
5:I:116:DC:H2'	5:I:117:DT:H72	2.00	0.43
5:I:25:DC:H2''	5:I:26:DC:O5'	2.17	0.43
5:J:229:DA:H1'	5:J:230:DC:H5''	1.99	0.43
5:J:236:DT:H2''	5:J:237:DT:C7	2.48	0.43
5:J:246:DG:C2'	5:J:247:DC:H5''	2.48	0.43
5:J:262:DC:H1'	5:J:263:DT:C5'	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:94:DG:C6	5:I:95:DA:N6	2.86	0.43
5:J:235:DC:C2'	5:J:236:DT:H72	2.48	0.43
5:J:287:DA:C2	5:J:288:DT:C2	3.06	0.43
4:D:86:ARG:HD2	4:D:86:ARG:N	2.32	0.43
3:G:93:LEU:HD23	4:H:106:LEU:HD21	2.00	0.43
5:J:153:DA:H2''	5:J:154:DT:H5'	1.99	0.43
5:J:188:DA:C2'	5:J:189:DA:C5'	2.88	0.43
5:J:264:DT:H2''	5:J:265:DT:H5''	1.97	0.43
5:J:277:DG:H2''	5:J:278:DC:C5'	2.48	0.43
3:C:62:ILE:HD11	4:D:62:MET:CE	2.49	0.43
3:G:77:ARG:HG3	3:G:77:ARG:O	2.18	0.43
5:I:142:DT:H2''	5:I:143:DT:O5'	2.17	0.43
5:J:231:DA:H1'	5:J:232:DT:H5'	2.00	0.43
5:J:234:DC:H2''	5:J:235:DC:H5	1.82	0.43
3:C:84:GLN:CG	3:C:105:GLY:HA3	2.49	0.43
3:C:77:ARG:HA	4:D:53:GLY:O	2.18	0.43
5:I:28:DA:H2''	5:I:29:DA:H8	1.78	0.43
5:J:264:DT:C2'	5:J:265:DT:C5'	2.91	0.43
1:A:43:PRO:HA	5:J:229:DA:H5'	2.00	0.43
2:B:26:ILE:HG23	2:B:27:GLN:N	2.34	0.43
3:G:80:PRO:HB2	3:G:104:GLN:O	2.18	0.43
5:J:215:DC:H2''	5:J:216:DT:C7	2.47	0.43
3:C:31:HIS:CE1	3:C:35:ARG:NH1	2.87	0.43
1:E:39:HIS:ND1	1:E:40:ARG:N	2.66	0.43
1:E:97:GLU:HG2	2:F:37:LEU:HD21	1.99	0.43
5:J:211:DT:H2''	5:J:212:DC:O5'	2.19	0.43
5:J:255:DA:H2''	5:J:256:DA:OP2	2.19	0.43
1:A:119:ILE:HD13	2:B:43:VAL:HG21	2.00	0.42
1:E:85:GLN:O	1:E:86:SER:C	2.56	0.42
3:C:58:LEU:HD11	4:D:102:LEU:HD11	2.00	0.42
3:G:40:SER:CB	4:H:89:ILE:HG13	2.49	0.42
5:I:41:DA:C2'	5:I:42:DA:H8	2.32	0.42
5:J:208:DT:H2''	5:J:209:DG:H8	1.84	0.42
2:B:64:ASN:HA	2:B:67:ARG:NH1	2.34	0.42
3:G:37:GLY:HA3	3:G:39:TYR:CE2	2.54	0.42
5:J:211:DT:H5'	5:J:211:DT:C6	2.54	0.42
5:J:242:DT:H2''	5:J:243:DG:OP2	2.20	0.42
5:J:264:DT:H2'	5:J:265:DT:C7	2.48	0.42
3:C:84:GLN:HG3	3:C:105:GLY:CA	2.48	0.42
5:I:100:DG:H2'	5:I:100:DG:O5'	2.19	0.42
5:J:256:DA:H2''	5:J:257:DA:OP2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:274:DT:H1'	5:J:275:DC:O4'	2.20	0.42
3:G:26:PRO:HD3	4:H:40:TYR:CG	2.55	0.42
5:J:179:DG:H1'	5:J:180:DT:H5''	2.02	0.42
1:A:118:THR:HA	2:B:45:ARG:O	2.20	0.42
5:I:113:DA:C2	5:I:114:DC:N3	2.86	0.42
5:J:209:DG:H1'	5:J:210:DT:H5'	2.00	0.42
5:J:212:DC:H2''	5:J:213:DA:OP2	2.20	0.42
5:J:235:DC:H2''	5:J:236:DT:C7	2.50	0.42
4:D:106:LEU:HD12	4:D:106:LEU:HA	1.84	0.42
1:E:129:ARG:HG3	1:E:129:ARG:O	2.19	0.42
5:I:43:DA:H2''	5:I:44:DC:C5'	2.50	0.42
2:F:64:ASN:ND2	2:F:64:ASN:N	2.67	0.42
5:I:62:DT:H1'	5:I:63:DG:H5''	2.02	0.42
1:A:43:PRO:HA	5:J:229:DA:C5'	2.50	0.42
5:J:231:DA:H2''	5:J:232:DT:O5'	2.20	0.42
3:C:30:VAL:HG13	4:D:70:PHE:CE1	2.48	0.42
3:C:78:ILE:N	4:D:53:GLY:O	2.43	0.42
4:H:46:LYS:HD3	4:H:46:LYS:HA	1.51	0.42
5:I:54:DA:H2''	5:I:55:DA:O5'	2.19	0.42
3:C:11:ARG:HH12	5:J:264:DT:C1'	2.32	0.42
2:F:35:ARG:O	2:F:39:ARG:HG2	2.20	0.42
4:H:55:SER:HB3	4:H:58:ALA:HB3	2.02	0.42
5:I:114:DC:OP1	5:I:114:DC:H4'	2.20	0.42
5:I:123:DT:H2'	8:I:2002:HOH:O	2.19	0.42
5:J:217:DG:H2''	5:J:218:DA:H5'	2.01	0.42
4:D:84:ASN:O	4:D:86:ARG:HD2	2.19	0.41
5:I:74:DT:H2''	5:I:75:DT:O5'	2.19	0.41
5:J:238:DT:H6	5:J:238:DT:H5'	1.84	0.41
1:A:48:LEU:HD11	3:G:117:PRO:HD3	2.02	0.41
5:I:21:DT:H1'	5:I:22:DC:H5'	2.03	0.41
1:A:85:GLN:HA	5:I:49:DC:OP1	2.20	0.41
4:H:34:LYS:HB2	5:I:123:DT:OP1	2.21	0.41
3:G:77:ARG:NH1	5:I:130:DT:H4'	2.36	0.41
1:E:51:ILE:O	1:E:55:GLN:HG3	2.20	0.41
3:G:67:GLY:O	3:G:70:ALA:HB3	2.21	0.41
5:I:116:DC:C6	5:I:117:DT:H72	2.56	0.41
5:I:86:DT:C4	5:I:87:DG:C6	3.09	0.41
1:A:46:VAL:HG13	1:A:49:ARG:HE	1.86	0.41
4:D:54:ILE:HG23	4:D:54:ILE:O	2.20	0.41
1:E:60:LEU:HD13	1:E:93:GLN:CG	2.50	0.41
1:E:96:CYS:O	1:E:99:TYR:HB3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:89:DC:H2''	5:I:90:DT:C7	2.47	0.41
5:J:167:DT:H2''	5:J:168:DC:C5	2.55	0.41
5:J:199:DC:H2''	5:J:200:DA:C8	2.55	0.41
1:E:78:PHE:CE2	2:F:67:ARG:HB2	2.56	0.41
5:I:19:DA:H2''	5:I:20:DT:C5'	2.50	0.41
5:I:32:DT:C2'	5:I:33:DG:H5'	2.45	0.41
5:J:193:DC:H1'	5:J:194:DT:C5	2.56	0.41
5:J:196:DC:H2''	5:J:197:DA:OP2	2.20	0.41
1:A:134:ARG:O	1:A:135:ALA:OXT	2.38	0.41
1:A:59:GLU:O	1:A:59:GLU:OE2	2.39	0.41
2:F:19:ARG:HG2	2:F:20:LYS:N	2.36	0.41
2:F:31:GLN:O	2:F:32:PRO:C	2.59	0.41
5:I:106:DT:H2''	5:I:107:DC:C6	2.46	0.41
5:J:283:DG:H1'	5:J:284:DG:N7	2.36	0.41
1:E:108:ASN:HB2	2:F:43:VAL:HG22	2.03	0.41
1:E:42:ARG:HB3	5:J:215:DC:OP1	2.21	0.41
5:I:113:DA:C2	5:I:114:DC:C2	3.07	0.41
5:I:47:DC:N4	5:J:245:DA:C6	2.89	0.41
3:C:17:ARG:HA	3:C:20:ARG:HH11	1.86	0.41
3:G:42:ARG:CG	4:H:88:THR:HB	2.50	0.41
4:H:36:SER:OG	4:H:37:TYR:N	2.54	0.41
5:J:239:DT:H2''	5:J:240:DG:OP2	2.21	0.41
5:J:275:DC:H2'	5:J:276:DT:C5	2.55	0.41
2:B:33:ALA:HA	2:B:36:ARG:CZ	2.51	0.41
2:B:84:MET:SD	2:B:101:GLY:HA3	2.61	0.41
4:D:31:ARG:NE	4:D:31:ARG:HA	2.36	0.41
5:I:116:DC:C2'	5:I:117:DT:C7	2.99	0.41
5:I:91:DT:H6	5:I:91:DT:H5'	1.86	0.41
1:A:114:ALA:O	1:A:115:LYS:HB2	2.22	0.40
1:A:73:GLU:OE2	2:B:25:ASN:HB2	2.21	0.40
5:I:80:DT:H2''	5:I:81:DG:OP2	2.21	0.40
5:I:107:DC:OP1	5:I:107:DC:H4'	2.22	0.40
5:I:41:DA:H2''	5:I:42:DA:O5'	2.21	0.40
3:G:85:LEU:HD23	3:G:108:LEU:CD2	2.51	0.40
5:I:27:DA:H2''	5:I:28:DA:O5'	2.22	0.40
5:I:60:DC:H2''	5:I:61:DA:C8	2.56	0.40
5:J:195:DC:H2'	5:J:195:DC:O5'	2.22	0.40
3:G:108:LEU:HD23	3:G:108:LEU:HA	1.86	0.40
4:H:37:TYR:HA	4:H:40:TYR:HD2	1.86	0.40
4:H:80:LEU:HD11	4:H:96:THR:CG2	2.52	0.40
5:I:126:DA:C2	5:I:127:DA:N6	2.90	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:41:DA:H4'	5:I:41:DA:OP1	2.19	0.40
5:I:127:DA:C2	5:I:128:DT:N1	2.89	0.40
5:I:132:DC:C2'	5:I:133:DA:H5''	2.51	0.40
5:I:2:DT:C2	5:I:3:DC:C5	3.09	0.40
5:J:285:DA:C2'	5:J:286:DT:H5'	2.27	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	96/139 (69%)	87 (91%)	8 (8%)	1 (1%)	18	43
1	E	97/139 (70%)	89 (92%)	8 (8%)	0	100	100
2	B	76/106 (72%)	71 (93%)	5 (7%)	0	100	100
2	F	82/106 (77%)	79 (96%)	3 (4%)	0	100	100
3	C	106/133 (80%)	103 (97%)	3 (3%)	0	100	100
3	G	102/133 (77%)	89 (87%)	12 (12%)	1 (1%)	18	43
4	D	93/129 (72%)	85 (91%)	6 (6%)	2 (2%)	8	20
4	H	91/129 (70%)	81 (89%)	7 (8%)	3 (3%)	4	10
All	All	743/1014 (73%)	684 (92%)	52 (7%)	7 (1%)	20	46

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D	104	GLY
3	G	113	ALA
4	H	104	GLY
4	H	55	SER
4	D	50	PRO

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Mol	Chain	Res	Type
4	H	123	SER
1	A	117	VAL

### 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	85/113 (75%)	81 (95%)	4 (5%)	30	60
1	E	86/113 (76%)	84 (98%)	2 (2%)	56	84
2	B	63/81 (78%)	60 (95%)	3 (5%)	30	59
2	F	69/81 (85%)	67 (97%)	2 (3%)	48	77
3	C	85/102 (83%)	81 (95%)	4 (5%)	30	60
3	G	83/102 (81%)	80 (96%)	3 (4%)	40	70
4	D	81/107 (76%)	74 (91%)	7 (9%)	12	28
4	H	79/107 (74%)	77 (98%)	2 (2%)	53	82
All	All	631/806 (78%)	604 (96%)	27 (4%)	33	64

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	59	GLU
1	A	76	GLN
1	A	129	ARG
1	A	134	ARG
2	B	25	ASN
2	B	78	ARG
2	B	92	ARG
3	C	29	ARG
3	C	59	THR
3	C	81	ARG
3	C	84	GLN
4	D	33	ARG
4	D	34	LYS

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Mol	Chain	Res	Type
4	D	39	ILE
4	D	50	PRO
4	D	63	ASN
4	D	86	ARG
4	D	93	GLU
1	E	122	LYS
1	E	129	ARG
2	F	21	VAL
2	F	92	ARG
3	G	73	ASN
3	G	81	ARG
3	G	99	ARG
4	H	49	HIS
4	H	105	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	76	GLN
1	A	113	HIS
2	B	27	GLN
2	B	31	GLN
2	B	64	ASN
2	B	75	HIS
2	B	93	GLN
3	C	24	GLN
3	C	73	ASN
3	C	84	GLN
4	D	63	ASN
4	D	84	ASN
1	E	76	GLN
1	E	113	HIS
2	F	31	GLN
2	F	64	ASN
2	F	75	HIS
2	F	93	GLN
3	G	24	GLN
3	G	73	ASN
4	H	47	GLN
4	H	63	ASN
4	H	82	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

Of 17 ligands modelled in this entry, 17 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

### 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, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	98/139 (70%)	0.12	1 (1%) 82 82	36, 73, 99, 126	0
1	E	99/139 (71%)	0.02	1 (1%) 82 82	35, 53, 82, 118	0
2	B	78/106 (73%)	0.08	0 100 100	48, 67, 95, 110	0
2	F	84/106 (79%)	0.01	0 100 100	30, 48, 65, 95	0
3	C	108/133 (81%)	0.12	3 (2%) 53 54	33, 58, 93, 147	0
3	G	104/133 (78%)	0.02	1 (0%) 82 82	47, 66, 102, 119	0
4	D	95/129 (73%)	0.16	4 (4%) 37 35	29, 62, 94, 151	0
4	H	93/129 (72%)	-0.05	1 (1%) 80 81	43, 64, 108, 123	0
5	I	145/146 (99%)	0.00	2 (1%) 75 76	55, 129, 159, 173	0
5	J	145/146 (99%)	-0.04	1 (0%) 87 88	62, 126, 162, 171	0
All	All	1049/1306 (80%)	0.04	14 (1%) 77 78	29, 69, 149, 173	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	D	31	ARG	6.0
3	C	11	ARG	4.6
3	C	12	ALA	4.3
4	D	124	ALA	4.2
4	D	30	LYS	3.8
3	C	13	LYS	3.3
1	E	37	LYS	3.2
3	G	73	ASN	3.1
4	H	32	SER	2.8
5	J	161	DG	2.8
4	D	33	ARG	2.1
5	I	33	DG	2.0
1	A	83	ARG	2.0

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Mol	Chain	Res	Type	RSRZ
5	I	135	DG	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 carbohydrates in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
7	MN	E	1002	1/1	0.98	0.31	7.55	61,61,61,61	0
6	CL	G	1001	1/1	0.92	0.13	-1.40	81,81,81,81	0
6	CL	C	1001	1/1	0.98	0.07	-4.58	65,65,65,65	0
7	MN	J	1005	1/1	0.89	0.12	-	138,138,138,138	0
7	MN	I	1001	1/1	0.16	0.17	-	161,161,161,161	0
7	MN	I	1003	1/1	0.92	0.09	-	134,134,134,134	0
7	MN	I	1005	1/1	0.89	0.11	-	138,138,138,138	0
7	MN	J	1001	1/1	0.90	0.07	-	142,142,142,142	0
7	MN	J	1002	1/1	0.96	0.23	-	100,100,100,100	0
7	MN	I	1004	1/1	0.75	0.09	-	120,120,120,120	0
7	MN	J	1006	1/1	0.89	0.06	-	127,127,127,127	0
7	MN	J	1004	1/1	0.82	0.10	-	140,140,140,140	0
7	MN	J	1003	1/1	0.92	0.08	-	201,201,201,201	0
6	CL	E	1001	1/1	0.98	0.13	-	63,63,63,63	0
7	MN	I	1002	1/1	0.98	0.19	-	112,112,112,112	0
7	MN	J	1007	1/1	0.90	0.10	-	197,197,197,197	0
6	CL	A	1001	1/1	0.93	0.09	-	80,80,80,80	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.