



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 15, 2023 – 12:26 PM EDT

PDB ID : 8DH3
Title : T7 RNA polymerase elongation complex with unnatural base dPa
Authors : Oh, J.; Wang, D.
Deposited on : 2022-06-24
Resolution : 3.00 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
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (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

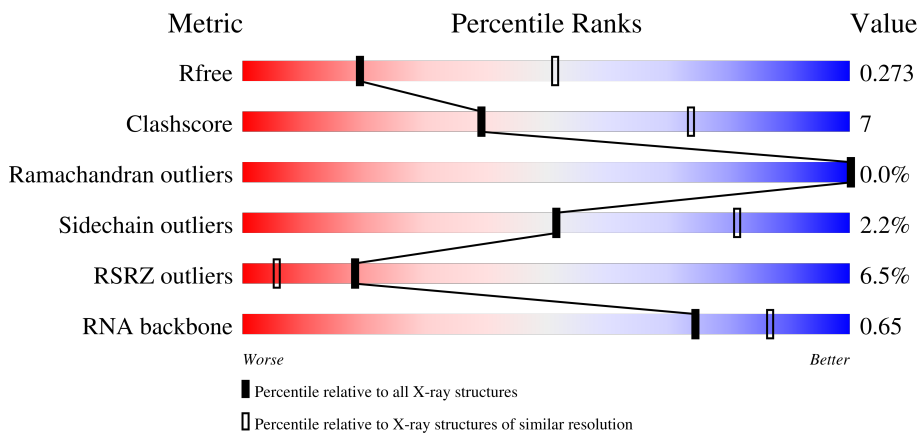
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 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	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)
RNA backbone	3102	1173 (3.30-2.70)

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 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	B	883	 79% 18%
1	E	883	 76% 17% 7%
1	I	883	 73% 21% 9%
1	M	883	 68% 19% 12%

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Mol	Chain	Length	Quality of chain
2	A	18	
2	F	18	
2	J	18	
2	N	18	
3	C	12	
3	G	12	
3	K	12	
3	O	12	
4	D	9	
4	H	9	
4	L	9	
4	P	9	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 28298 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 T7 RNA polymerase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	856	Total 6728	C 4284	N 1169	O 1239	S 36	0	0	0
1	E	825	Total 6472	C 4130	N 1119	O 1189	S 34	0	0	0
1	I	831	Total 6530	C 4163	N 1142	O 1190	S 35	0	0	0
1	M	775	Total 5912	C 3755	N 1037	O 1088	S 32	0	0	0

- Molecule 2 is a DNA chain called Template strand DNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	A	16	Total 325	C 155	N 60	O 94	P 16	0	0	0
2	F	17	Total 344	C 165	N 65	O 98	P 16	0	0	0
2	J	16	Total 325	C 155	N 60	O 94	P 16	0	0	0
2	N	17	Total 344	C 165	N 65	O 98	P 16	0	0	0

- Molecule 3 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	C	9	Total 194	C 86	N 35	O 64	P 9	0	0	0
3	G	8	Total 174	C 77	N 33	O 56	P 8	0	0	0
3	K	8	Total 174	C 77	N 33	O 56	P 8	0	0	0
3	O	8	Total 174	C 77	N 33	O 56	P 8	0	0	0

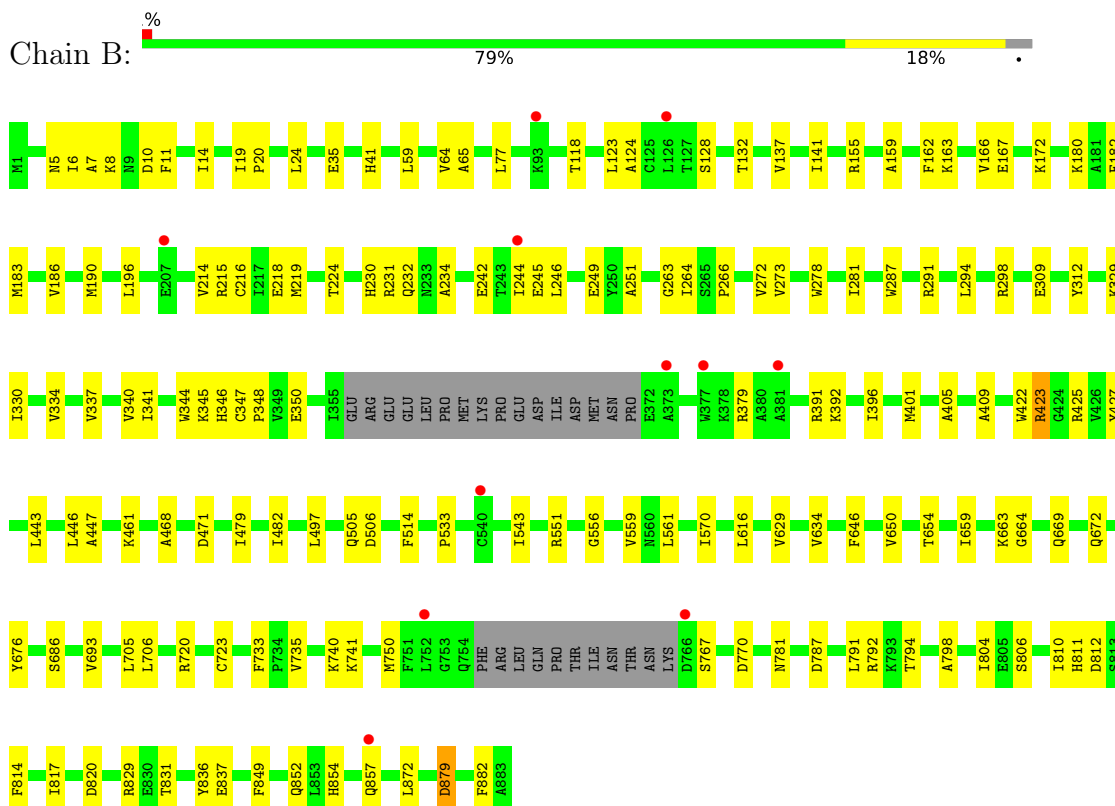
- Molecule 4 is a DNA chain called Non-template strand DNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
4	D	7	Total 141	68	22	44	7	0	0	0
4	H	8	Total 160	77	25	50	8	0	0	0
4	L	7	Total 141	68	22	44	7	0	0	0
4	P	8	Total 160	77	25	50	8	0	0	0

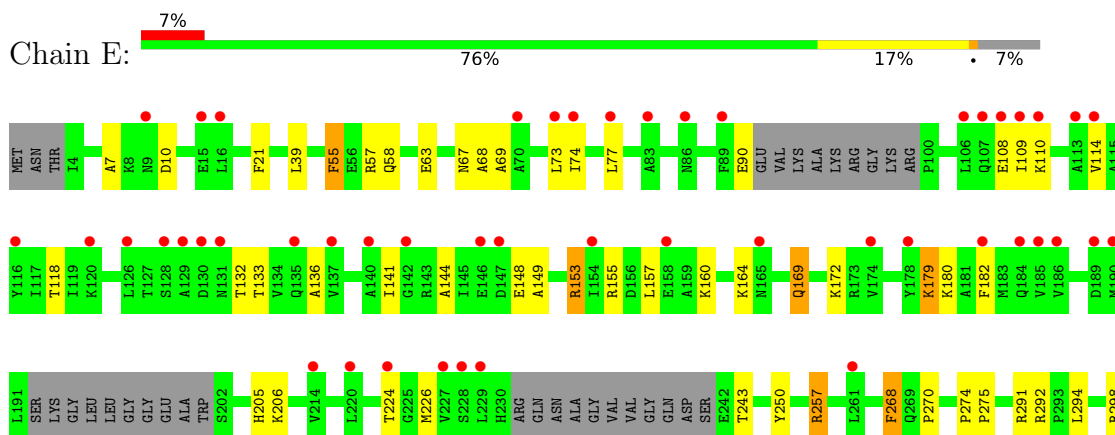
3 Residue-property plots

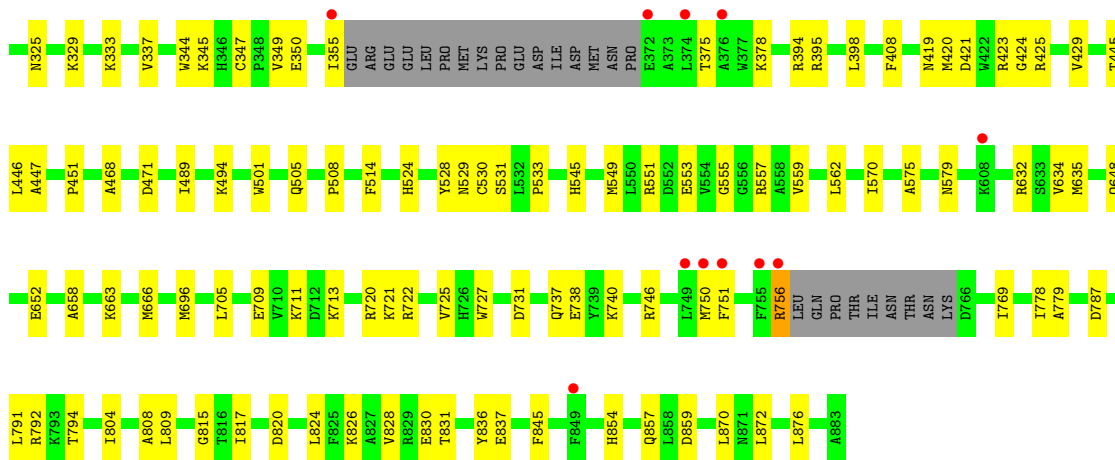
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

- Molecule 1: T7 RNA polymerase

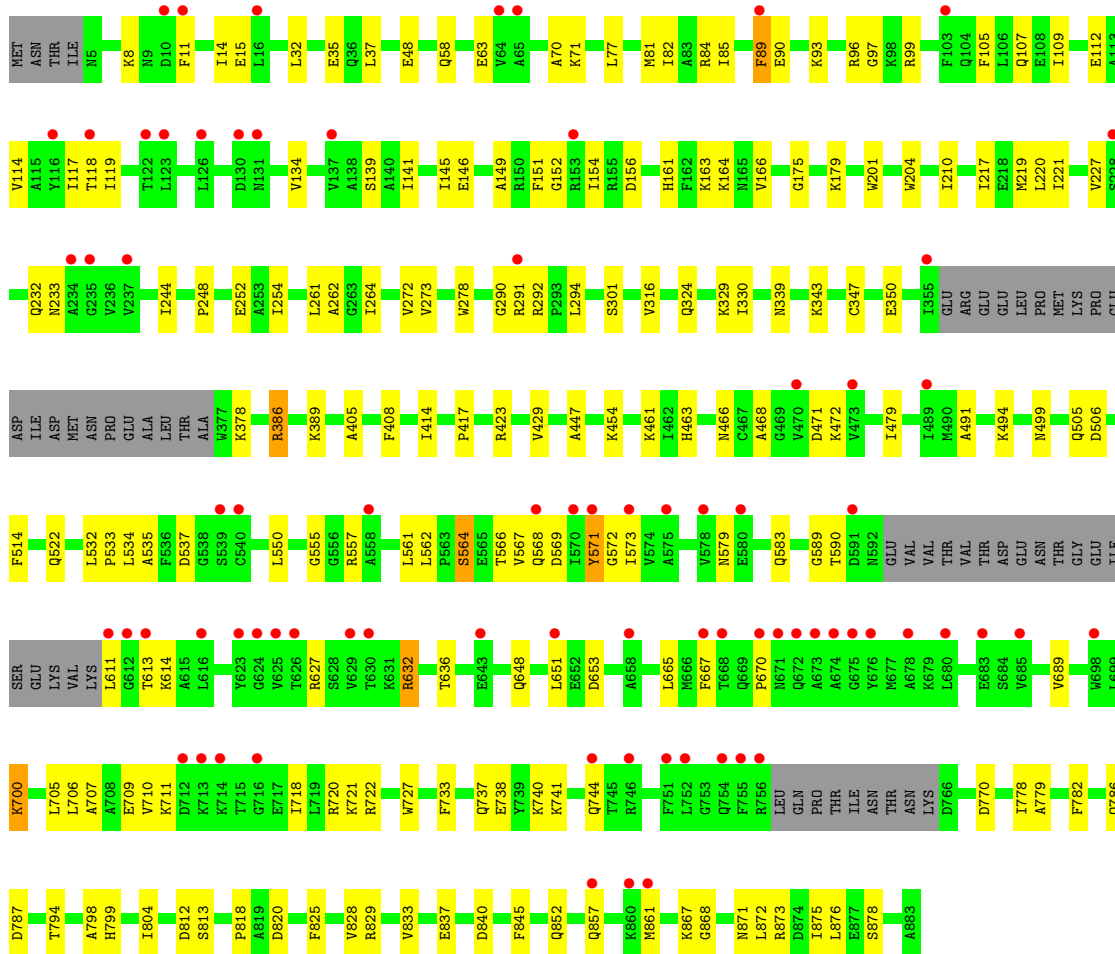


- Molecule 1: T7 RNA polymerase



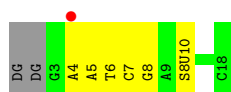


• Molecule 1: T7 RNA polymerase

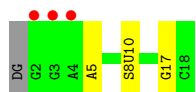
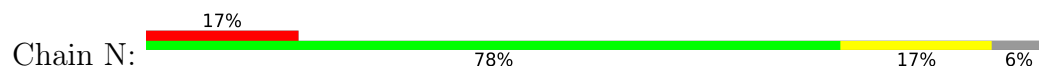


• Molecule 1: T7 RNA polymerase





- Molecule 2: Template strand DNA



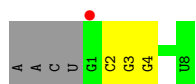
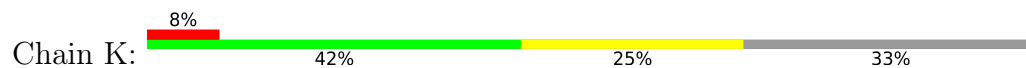
- Molecule 3: RNA



- Molecule 3: RNA



- Molecule 3: RNA



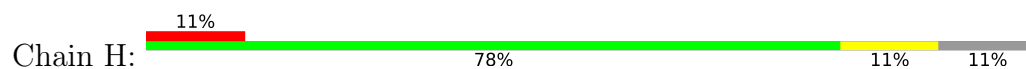
- Molecule 3: RNA

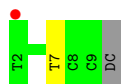


- Molecule 4: Non-template strand DNA



- Molecule 4: Non-template strand DNA





- Molecule 4: Non-template strand DNA



- Molecule 4: Non-template strand DNA



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	79.07Å 86.27Å 201.97Å 89.70° 86.01° 69.45°	Depositor
Resolution (Å)	47.98 – 3.00 47.98 – 3.00	Depositor EDS
% Data completeness (in resolution range)	98.3 (47.98-3.00) 98.3 (47.98-3.00)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.09 (at 3.01Å)	Xtrriage
Refinement program	PHENIX 1.19	Depositor
R, R_{free}	0.247 , 0.276 0.246 , 0.273	Depositor DCC
R_{free} test set	1850 reflections (1.88%)	wwPDB-VP
Wilson B-factor (Å ²)	90.7	Xtrriage
Anisotropy	0.126	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 81.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	28298	wwPDB-VP
Average B, all atoms (Å ²)	136.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.97% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: S8U

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	B	0.26	0/6878	0.49	1/9304 (0.0%)
1	E	0.26	0/6617	0.50	2/8952 (0.0%)
1	I	0.26	0/6679	0.50	0/9030
1	M	0.26	0/6039	0.50	1/8181 (0.0%)
2	A	0.53	0/343	0.89	0/524
2	F	0.50	0/365	0.87	0/559
2	J	0.47	0/343	0.84	0/524
2	N	0.50	0/365	0.90	0/559
3	C	0.18	0/216	0.75	0/335
3	G	0.17	0/194	0.73	0/301
3	K	0.16	0/194	0.73	0/301
3	O	0.21	0/194	0.83	0/301
4	D	0.52	0/156	1.07	0/238
4	H	0.48	0/177	1.06	0/270
4	L	0.52	0/156	1.08	0/238
4	P	0.47	0/177	1.07	0/270
All	All	0.28	0/29093	0.56	4/39887 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	M	787	ASP	CB-CG-OD1	6.18	123.86	118.30
1	B	787	ASP	CB-CG-OD1	6.18	123.86	118.30
1	E	787	ASP	CB-CG-OD1	6.06	123.76	118.30
1	E	39	LEU	CA-CB-CG	5.15	127.15	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	B	6728	0	6694	96	0
1	E	6472	0	6402	95	0
1	I	6530	0	6480	107	0
1	M	5912	0	5684	97	1
2	A	325	0	168	1	0
2	F	344	0	180	3	0
2	J	325	0	168	3	0
2	N	344	0	180	2	0
3	C	194	0	98	2	0
3	G	174	0	88	0	0
3	K	174	0	88	3	0
3	O	174	0	88	0	0
4	D	141	0	81	3	0
4	H	160	0	92	1	0
4	L	141	0	81	4	0
4	P	160	0	92	3	0
All	All	28298	0	26664	407	1

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 7.

All (407) 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:347:CYS:CB	1:E:350:GLU:HG3	1.80	1.12
1:E:347:CYS:HB3	1:E:350:GLU:HG3	1.28	1.11
1:E:347:CYS:SG	1:E:350:GLU:HG3	2.03	0.96
1:E:179:LYS:NZ	1:E:750:MET:SD	2.50	0.85
1:B:35:GLU:HG2	1:B:272:VAL:HG21	1.66	0.77
1:M:705:LEU:HD13	1:M:857:GLN:HB3	1.66	0.77
1:I:589:GLY:HA3	1:I:614:LYS:HB3	1.66	0.77
1:E:347:CYS:HB3	1:E:350:GLU:CG	2.11	0.76
1:E:837:GLU:HG3	1:E:872:LEU:HD12	1.67	0.75
1:I:118:THR:HA	1:I:141:ILE:HD12	1.69	0.75
1:M:435:GLN:HB3	1:M:810:ILE:HD13	1.70	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:347:CYS:HB2	1:I:350:GLU:HB2	1.71	0.70
1:M:72:PRO:HG3	1:M:257:ARG:HE	1.57	0.69
1:E:347:CYS:SG	1:E:350:GLU:CG	2.80	0.69
1:I:700:LYS:NZ	4:L:5:DA:OP1	2.28	0.66
1:M:32:LEU:HB3	1:M:273:VAL:HG12	1.76	0.66
1:I:571:TYR:HB2	1:I:627:ARG:HG3	1.77	0.66
1:B:172:LYS:HD2	3:C:3:G:H5''	1.77	0.66
1:M:316:VAL:HG21	1:M:733:PHE:HB2	1.77	0.66
1:M:478:ARG:HH12	1:M:882:PHE:HZ	1.44	0.66
1:I:386:ARG:NH2	3:K:4:G:OP1	2.29	0.65
1:I:134:VAL:HG22	1:I:244:ILE:HG12	1.77	0.65
1:B:159:ALA:HB1	1:B:162:PHE:HB3	1.78	0.65
1:M:705:LEU:O	1:M:720:ARG:NH2	2.31	0.65
1:I:316:VAL:HG11	1:I:733:PHE:HB2	1.79	0.64
1:I:738:GLU:HG2	1:I:740:LYS:HD3	1.77	0.64
1:B:837:GLU:HG3	1:B:872:LEU:HD12	1.79	0.64
1:M:647:ARG:HD2	1:M:675:GLY:HA2	1.80	0.63
1:B:10:ASP:HB3	1:B:291:ARG:HE	1.63	0.63
1:M:57:ARG:HH12	2:N:17:DG:H5''	1.62	0.63
1:E:468:ALA:HA	1:E:505:GLN:HB3	1.79	0.63
1:I:857:GLN:N	1:I:857:GLN:OE1	2.31	0.63
1:B:345:LYS:NZ	1:E:344:TRP:O	2.28	0.63
1:E:421:ASP:OD2	1:E:423:ARG:NH1	2.31	0.63
1:E:830:GLU:HG3	1:E:876:LEU:HD21	1.81	0.62
1:M:720:ARG:NH1	1:M:852:GLN:O	2.32	0.62
1:E:791:LEU:HD11	1:E:809:LEU:HB3	1.81	0.62
1:I:118:THR:HG22	1:I:141:ILE:HD11	1.82	0.61
1:E:746:ARG:HH22	1:E:756:ARG:HB2	1.66	0.61
1:M:833:VAL:HG23	1:M:872:LEU:HB3	1.82	0.61
1:B:19:ILE:HG23	1:B:20:PRO:HD3	1.82	0.61
1:B:854:HIS:HB3	1:B:857:GLN:HG3	1.82	0.61
1:I:15:GLU:HB2	1:I:37:LEU:HD23	1.82	0.61
1:B:155:ARG:HB2	1:B:163:LYS:HE3	1.83	0.61
1:E:722:ARG:HD3	1:E:769:ILE:HG12	1.83	0.61
1:M:347:CYS:HB3	1:M:350:GLU:HB2	1.83	0.60
1:M:574:VAL:HG23	1:M:684:SER:HB3	1.83	0.60
1:I:590:THR:HG22	1:I:613:THR:H	1.66	0.60
1:M:720:ARG:HH12	1:M:853:LEU:HA	1.67	0.60
1:B:425:ARG:NH2	3:C:8:U:O2'	2.35	0.59
1:B:159:ALA:O	1:B:163:LYS:N	2.33	0.59
1:B:24:LEU:HD11	1:B:273:VAL:HG21	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:669:GLN:OE1	1:B:672:GLN:NE2	2.36	0.59
1:B:379:ARG:HH12	1:B:659:ILE:HD11	1.68	0.59
1:E:118:THR:HG22	1:E:141:ILE:HD11	1.84	0.59
1:E:575:ALA:O	1:E:579:ASN:ND2	2.34	0.59
1:I:829:ARG:NH2	1:I:878:SER:O	2.36	0.58
1:M:704:LYS:NZ	1:M:775:GLU:OE1	2.35	0.58
1:M:738:GLU:HG2	1:M:740:LYS:HD3	1.84	0.58
1:B:215:ARG:NH1	1:B:218:GLU:OE1	2.37	0.58
1:B:706:LEU:HD21	1:B:849:PHE:HB2	1.86	0.58
1:E:10:ASP:HB2	1:E:291:ARG:HE	1.69	0.57
1:M:12:SER:HA	1:M:15:GLU:HG2	1.86	0.57
1:M:11:PHE:HD2	1:M:291:ARG:HH21	1.53	0.57
1:B:298:ARG:HH21	1:B:427:TYR:HB2	1.70	0.57
1:B:163:LYS:HA	1:B:166:VAL:HG22	1.86	0.57
1:B:817:ILE:HG13	1:B:820:ASP:HB2	1.87	0.57
1:I:798:ALA:HB1	1:I:804:ILE:HD12	1.86	0.57
1:I:706:LEU:O	1:I:720:ARG:NH2	2.38	0.56
1:B:810:ILE:O	1:B:812:ASP:N	2.38	0.56
1:E:108:GLU:HG3	1:E:109:ILE:HD12	1.86	0.56
1:E:298:ARG:HH21	1:E:419:ASN:HB3	1.70	0.56
1:I:220:LEU:HB3	1:I:227:VAL:HG21	1.86	0.56
1:I:278:TRP:HD1	1:I:324:GLN:HE22	1.52	0.56
1:B:329:LYS:HG2	1:B:447:ALA:HA	1.87	0.56
1:M:276:LYS:HE3	1:M:287:TRP:HA	1.86	0.56
1:B:77:LEU:HG	1:B:224:THR:HG21	1.88	0.56
1:I:294:LEU:HD21	1:I:429:VAL:HG11	1.87	0.56
1:M:118:THR:HB	1:M:220:LEU:HD11	1.87	0.56
1:E:791:LEU:HD21	1:E:809:LEU:HD13	1.88	0.56
1:E:375:THR:HA	1:E:378:LYS:HE3	1.87	0.56
1:E:524:HIS:HB2	1:E:528:TYR:HB2	1.87	0.56
1:I:81:MET:HE1	1:I:219:MET:HB3	1.88	0.55
1:I:389:LYS:HD2	3:K:4:G:H4'	1.88	0.55
1:I:35:GLU:HG2	1:I:272:VAL:HG21	1.87	0.55
1:I:837:GLU:HG3	1:I:872:LEU:HD12	1.88	0.55
1:M:550:LEU:HD22	1:M:691:ALA:HA	1.88	0.55
1:M:741:LYS:HB3	1:M:770:ASP:HB2	1.88	0.55
1:B:705:LEU:HD13	1:B:857:GLN:HB3	1.87	0.55
1:M:345:LYS:NZ	1:M:351:ASP:O	2.40	0.55
1:B:345:LYS:HD3	1:B:348:PRO:HA	1.89	0.55
1:I:564:SER:OG	1:I:566:THR:O	2.24	0.55
1:I:561:LEU:HD22	1:I:875:ILE:HG12	1.86	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:802:TYR:HE2	1:M:827:ALA:HB2	1.72	0.55
1:B:334:VAL:HG23	1:B:443:LEU:HD23	1.89	0.55
1:E:224:THR:HG22	1:E:226:MET:H	1.73	0.54
1:I:77:LEU:HD21	1:I:119:ILE:HG12	1.87	0.54
4:L:5:DA:H2''	4:L:6:DT:H5'	1.89	0.54
1:B:741:LYS:HB3	1:B:770:ASP:HB2	1.88	0.54
1:I:491:ALA:HA	1:I:494:LYS:HD2	1.90	0.54
1:B:64:VAL:HB	1:B:123:LEU:HD13	1.89	0.54
1:E:74:ILE:HA	1:E:77:LEU:HB2	1.89	0.54
1:B:468:ALA:HA	1:B:505:GLN:HG3	1.89	0.54
1:B:798:ALA:HB1	1:B:804:ILE:HD12	1.90	0.54
1:I:632:ARG:HH21	1:I:653:ASP:HB3	1.73	0.54
1:I:468:ALA:HA	1:I:505:GLN:HB3	1.88	0.53
1:M:698:TRP:HE3	1:M:699:LEU:HD12	1.73	0.53
1:I:710:VAL:HG21	1:I:857:GLN:HE21	1.73	0.53
1:B:733:PHE:HB2	1:B:792:ARG:HH12	1.72	0.53
1:I:232:GLN:HG3	1:I:233:ASN:HD22	1.73	0.53
1:I:161:HIS:HA	1:I:164:LYS:HD2	1.90	0.53
1:E:132:THR:HB	1:E:243:THR:HB	1.91	0.53
1:I:93:LYS:HA	1:I:99:ARG:HE	1.73	0.53
1:I:58:GLN:NE2	1:I:63:GLU:O	2.41	0.52
1:I:741:LYS:HB3	1:I:770:ASP:HB2	1.92	0.52
1:B:59:LEU:HD12	1:B:64:VAL:HG22	1.91	0.52
1:M:794:THR:HA	1:M:831:THR:HG21	1.90	0.52
1:B:461:LYS:HG2	1:B:482:ILE:HG21	1.91	0.52
1:B:720:ARG:HD3	1:B:854:HIS:HB2	1.90	0.52
1:I:557:ARG:HG2	1:I:562:LEU:HD13	1.91	0.52
1:I:114:VAL:O	1:I:118:THR:HG23	2.09	0.52
1:E:705:LEU:HD13	1:E:857:GLN:HB3	1.91	0.52
1:E:713:LYS:NZ	2:F:2:DG:N7	2.57	0.52
2:J:5:DA:H1'	2:J:6:DT:H5'	1.92	0.51
1:I:532:LEU:HD12	1:I:533:PRO:HD2	1.92	0.51
1:M:855:GLU:HA	1:M:858:LEU:HD23	1.92	0.51
1:E:709:GLU:OE1	1:E:711:LYS:NZ	2.41	0.51
1:M:524:HIS:HB2	1:M:528:TYR:HB2	1.92	0.51
1:I:11:PHE:HA	1:I:14:ILE:HG12	1.91	0.51
1:I:324:GLN:HG2	1:I:417:PRO:HA	1.91	0.51
1:I:718:ILE:HD13	1:I:721:LYS:HD3	1.93	0.51
1:E:738:GLU:HG2	1:E:740:LYS:HD3	1.92	0.51
1:M:421:ASP:OD1	1:M:423:ARG:NH1	2.32	0.51
1:M:709:GLU:HB3	1:M:722:ARG:HG2	1.91	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:632:ARG:HA	1:E:635:MET:HE2	1.92	0.51
1:E:68:ALA:O	1:E:257:ARG:NH2	2.43	0.51
1:I:97:GLY:O	1:I:99:ARG:NH1	2.44	0.51
1:M:720:ARG:HD2	1:M:721:LYS:O	2.11	0.51
1:B:246:LEU:HD22	1:B:251:ALA:HB2	1.92	0.51
1:E:109:ILE:HD11	1:E:149:ALA:HB2	1.92	0.51
1:B:471:ASP:N	1:B:471:ASP:OD2	2.44	0.50
1:B:5:ASN:HB3	1:B:8:LYS:HE3	1.92	0.50
1:E:148:GLU:OE2	1:E:155:ARG:NH1	2.42	0.50
1:E:794:THR:HG21	1:E:828:VAL:HG22	1.93	0.50
1:M:682:TRP:HA	1:M:685:VAL:HG22	1.93	0.50
1:M:402:LEU:O	1:M:406:ASN:ND2	2.44	0.50
1:M:459:TRP:HE1	1:M:822:ALA:HB2	1.76	0.50
1:E:57:ARG:HH22	2:F:17:DG:H5''	1.76	0.50
1:I:408:PHE:HB3	1:I:414:ILE:HG21	1.92	0.50
1:M:294:LEU:HD21	1:M:429:VAL:HG21	1.93	0.50
1:M:311:VAL:HG11	1:M:734:PRO:HG3	1.93	0.50
1:B:347:CYS:HB3	1:B:350:GLU:HB3	1.94	0.50
1:E:329:LYS:HG2	1:E:447:ALA:HA	1.93	0.50
1:E:808:ALA:HB3	1:E:815:GLY:HA3	1.93	0.50
1:I:32:LEU:HB3	1:I:273:VAL:HG12	1.94	0.50
1:I:217:ILE:HA	1:I:220:LEU:HB2	1.94	0.50
1:I:651:LEU:HD11	1:I:670:PRO:HB3	1.94	0.50
1:E:7:ALA:O	1:E:291:ARG:NH2	2.44	0.50
1:M:169:GLN:OE1	1:M:169:GLN:N	2.43	0.50
1:B:446:LEU:HG	1:B:533:PRO:HG3	1.93	0.50
1:I:707:ALA:O	1:I:722:ARG:NE	2.37	0.50
1:M:140:ALA:HA	1:M:143:ARG:HH11	1.77	0.50
1:M:465:ALA:HB1	1:M:470:VAL:HB	1.93	0.50
1:B:132:THR:OG1	1:B:244:ILE:O	2.30	0.49
1:B:159:ALA:HB2	1:B:190:MET:HE1	1.93	0.49
1:E:160:LYS:O	1:E:164:LYS:N	2.39	0.49
1:M:561:LEU:HB3	1:M:875:ILE:HG13	1.94	0.49
1:B:190:MET:HE2	1:B:196:LEU:HG	1.94	0.49
1:B:741:LYS:O	1:B:767:SER:OG	2.28	0.49
1:I:466:ASN:HA	1:I:471:ASP:HB3	1.93	0.49
1:E:55:PHE:HA	1:E:58:GLN:NE2	2.28	0.49
1:M:665:LEU:H	1:M:665:LEU:HD23	1.77	0.49
1:B:163:LYS:O	1:B:167:GLU:N	2.45	0.49
1:B:124:ALA:O	1:B:128:SER:OG	2.30	0.49
1:B:180:LYS:HB2	1:B:750:MET:HE1	1.93	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:555:GLY:HA2	1:I:689:VAL:HG22	1.95	0.49
1:B:10:ASP:O	1:B:291:ARG:NH2	2.39	0.49
1:M:268:PHE:HB3	1:M:430:SER:HA	1.94	0.49
1:E:73:LEU:HD21	1:E:250:TYR:HD1	1.78	0.48
1:E:144:ALA:HB1	1:E:751:PHE:HZ	1.76	0.48
1:B:791:LEU:HA	1:B:814:PHE:HE2	1.79	0.48
1:I:14:ILE:HD12	1:I:290:GLY:HA2	1.95	0.48
1:I:70:ALA:HA	1:I:254:ILE:HG22	1.95	0.48
1:I:109:ILE:HD11	1:I:149:ALA:HA	1.94	0.48
1:E:826:LYS:NZ	1:E:876:LEU:O	2.46	0.48
1:E:570:ILE:HG12	1:E:634:VAL:HG11	1.96	0.48
1:M:12:SER:O	1:M:16:LEU:HD13	2.13	0.48
1:B:543:ILE:HB	1:B:559:VAL:HG11	1.96	0.48
1:E:804:ILE:HG12	1:E:820:ASP:HB3	1.94	0.48
1:M:826:LYS:NZ	1:M:876:LEU:O	2.46	0.48
1:B:570:ILE:HG12	1:B:634:VAL:HG11	1.96	0.48
1:M:777:GLY:O	1:M:781:ASN:ND2	2.46	0.47
1:B:231:ARG:HG2	1:B:234:ALA:HB2	1.96	0.47
1:E:69:ALA:HA	1:E:257:ARG:HE	1.79	0.47
1:I:778:ILE:HD12	1:I:779:ALA:N	2.29	0.47
1:B:423:ARG:NH1	1:B:781:ASN:OD1	2.43	0.47
1:I:537:ASP:OD2	1:I:537:ASP:N	2.45	0.47
1:M:626:THR:HB	1:M:629:VAL:HG13	1.97	0.47
1:E:329:LYS:HG3	1:E:445:THR:HG23	1.96	0.47
1:B:6:ILE:HD13	1:B:263:GLY:HA3	1.95	0.47
1:E:349:VAL:HG11	1:E:508:PRO:HG3	1.96	0.47
1:I:8:LYS:HA	1:I:8:LYS:HD3	1.62	0.47
1:M:702:ALA:HA	1:M:861:MET:HE3	1.97	0.47
1:M:829:ARG:HH22	1:M:882:PHE:H	1.61	0.47
1:I:632:ARG:O	1:I:636:THR:OG1	2.23	0.47
1:I:665:LEU:HD23	1:I:665:LEU:H	1.79	0.47
1:I:794:THR:HG22	1:I:828:VAL:HA	1.96	0.47
1:I:90:GLU:HA	1:I:93:LYS:HG2	1.96	0.47
1:M:463:HIS:HB2	1:M:534:LEU:HG	1.97	0.47
1:M:558:ALA:HB1	1:M:570:ILE:HD13	1.97	0.47
1:M:574:VAL:HG13	1:M:630:THR:HG21	1.97	0.47
4:P:5:DA:H2''	4:P:6:DT:H2'	1.97	0.47
1:B:720:ARG:HH12	1:B:723:CYS:HB2	1.80	0.46
1:I:550:LEU:O	1:I:868:GLY:N	2.48	0.46
1:M:570:ILE:O	1:M:574:VAL:HG12	2.15	0.46
1:B:337:VAL:O	1:B:341:ILE:HG12	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:419:ASN:HB2	1:E:429:VAL:HG22	1.96	0.46
1:E:424:GLY:O	1:E:792:ARG:NH1	2.48	0.46
1:I:84:ARG:HG3	1:I:219:MET:HG2	1.97	0.46
1:M:543:ILE:HA	1:M:546:PHE:HB2	1.98	0.46
1:I:261:LEU:HA	1:I:264:ILE:HG12	1.97	0.46
1:E:494:LYS:HB2	1:E:494:LYS:HE3	1.77	0.46
1:E:531:SER:HA	1:E:817:ILE:HD12	1.98	0.46
1:M:648:GLN:NE2	1:M:652:GLU:OE2	2.41	0.46
1:M:548:ALA:O	1:M:551:ARG:NH1	2.49	0.46
1:M:700:LYS:HB2	1:M:700:LYS:HE3	1.69	0.46
1:E:658:ALA:HB1	1:E:663:LYS:HB3	1.97	0.46
1:M:43:SER:HB3	1:M:267:MET:O	2.15	0.46
1:I:217:ILE:O	1:I:221:ILE:HG13	2.16	0.46
1:B:330:ILE:HD12	1:B:405:ALA:HA	1.98	0.46
1:B:11:PHE:HZ	1:B:263:GLY:HA2	1.81	0.45
1:M:743:ILE:HD12	1:M:743:ILE:H	1.81	0.45
1:B:14:ILE:HD11	1:B:41:HIS:HA	1.98	0.45
4:P:8:DC:H1'	4:P:9:DC:H5'	1.98	0.45
1:E:419:ASN:OD1	1:E:420:MET:N	2.48	0.45
1:E:854:HIS:HB3	1:E:857:GLN:HG3	1.97	0.45
1:I:840:ASP:OD2	1:I:867:LYS:NZ	2.47	0.45
1:B:686:SER:HA	1:B:693:VAL:HG21	1.99	0.45
1:E:731:ASP:OD1	1:E:792:ARG:NE	2.43	0.45
1:E:268:PHE:CZ	1:E:294:LEU:HD21	2.52	0.45
1:I:89:PHE:HE1	1:I:107:GLN:HE22	1.65	0.45
1:I:329:LYS:HG2	1:I:447:ALA:HA	1.98	0.45
1:I:534:LEU:HD13	1:I:818:PRO:HG3	1.99	0.45
1:I:569:ASP:OD1	1:I:572:GLY:N	2.47	0.45
1:E:725:VAL:HG23	1:E:737:GLN:HB3	1.98	0.45
1:I:833:VAL:HG11	1:I:876:LEU:HD11	1.99	0.45
1:M:286:TYR:CZ	1:M:417:PRO:HG2	2.51	0.45
1:I:710:VAL:HG21	1:I:857:GLN:NE2	2.30	0.45
1:M:626:THR:HG22	1:M:628:SER:H	1.80	0.45
2:A:6:DT:H3	4:D:5:DA:H61	1.65	0.45
1:E:169:GLN:HA	1:E:172:LYS:HB2	1.99	0.44
1:E:446:LEU:HG	1:E:533:PRO:HG3	1.99	0.44
1:I:579:ASN:O	1:I:583:GLN:NE2	2.50	0.44
4:D:2:DT:H6	4:D:2:DT:H2'	1.64	0.44
1:B:556:GLY:O	1:B:561:LEU:N	2.47	0.44
1:I:139:SER:HB3	1:I:210:ILE:HG12	1.99	0.44
1:E:355:ILE:HD12	1:E:355:ILE:H	1.83	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:149:ALA:O	1:M:153:ARG:HG2	2.17	0.44
1:E:270:PRO:HD2	1:E:408:PHE:HE1	1.81	0.44
1:I:461:LYS:HZ2	1:I:479:ILE:HG23	1.82	0.44
1:M:808:ALA:O	1:M:815:GLY:N	2.50	0.44
1:B:214:VAL:O	1:B:218:GLU:HG3	2.17	0.44
1:I:871:ASN:OD1	1:I:873:ARG:HB2	2.17	0.44
2:N:5:DA:H61	4:P:6:DT:H3	1.66	0.44
1:E:133:THR:HG22	1:E:136:ALA:H	1.83	0.44
1:M:316:VAL:HG22	1:M:792:ARG:HE	1.83	0.44
1:M:741:LYS:O	1:M:767:SER:HB3	2.18	0.44
1:B:278:TRP:HH2	1:B:294:LEU:HB3	1.83	0.43
1:E:114:VAL:O	1:E:118:THR:HG23	2.17	0.43
1:E:350:GLU:OE1	1:E:394:ARG:NH2	2.51	0.43
1:E:551:ARG:NH2	1:E:836:TYR:O	2.51	0.43
1:B:663:LYS:HG3	1:B:664:GLY:H	1.83	0.43
1:E:545:HIS:O	1:E:549:MET:HG3	2.17	0.43
1:E:557:ARG:CZ	1:E:562:LEU:HD23	2.48	0.43
1:I:804:ILE:HG12	1:I:820:ASP:HB3	2.00	0.43
1:M:720:ARG:NH2	1:M:857:GLN:OE1	2.51	0.43
1:B:59:LEU:O	1:B:128:SER:HB3	2.18	0.43
1:B:166:VAL:HB	1:B:182:PHE:HZ	1.83	0.43
1:B:346:HIS:HB2	1:B:391:ARG:HH21	1.83	0.43
1:B:616:LEU:HD13	1:B:676:TYR:HB2	1.99	0.43
1:E:451:PRO:HA	1:E:529:ASN:HA	2.00	0.43
1:I:48:GLU:HA	1:I:262:ALA:HB1	2.00	0.43
1:I:463:HIS:HB2	1:I:534:LEU:HG	2.01	0.43
1:I:535:ALA:HB1	1:I:813:SER:OG	2.18	0.43
1:B:794:THR:HA	1:B:831:THR:HG21	1.99	0.43
1:M:816:THR:HB	1:M:824:LEU:HD13	2.00	0.43
1:B:551:ARG:NH2	1:B:836:TYR:O	2.51	0.43
1:E:421:ASP:OD1	1:E:424:GLY:N	2.50	0.43
1:E:471:ASP:OD2	1:E:471:ASP:N	2.51	0.43
4:L:4:DG:H2''	4:L:5:DA:H8	1.83	0.43
1:M:390:ALA:O	1:M:394:ARG:HG3	2.18	0.43
1:E:7:ALA:HB1	1:E:291:ARG:HH22	1.83	0.43
1:I:175:GLY:O	1:I:179:LYS:HG3	2.17	0.43
1:M:678:ALA:HA	1:M:681:ILE:HG12	2.01	0.43
1:B:392:LYS:HE2	1:B:396:ILE:HD13	1.99	0.43
1:M:773:LYS:HD2	1:M:773:LYS:HA	1.75	0.43
1:B:461:LYS:HE3	1:B:479:ILE:HD12	2.01	0.43
1:I:117:ILE:HG21	1:I:145:ILE:HG13	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:711:LYS:HB3	1:I:718:ILE:HA	2.00	0.43
1:M:71:LYS:HB2	1:M:71:LYS:HE2	1.77	0.43
1:E:395:ARG:HD2	1:E:398:LEU:HD23	2.01	0.43
1:E:489:ILE:HG13	1:E:501:TRP:HZ3	1.84	0.43
1:I:152:GLY:O	1:I:156:ASP:N	2.47	0.43
1:B:446:LEU:HD22	1:B:806:SER:HB3	2.00	0.42
1:M:48:GLU:HG2	1:M:262:ALA:HB1	2.01	0.42
1:B:350:GLU:OE1	1:B:391:ARG:NH2	2.53	0.42
1:I:857:GLN:O	1:I:861:MET:N	2.52	0.42
1:M:10:ASP:OD2	1:M:11:PHE:N	2.52	0.42
1:M:452:ILE:HG13	1:M:818:PRO:HB2	2.00	0.42
1:B:264:ILE:O	1:B:266:PRO:HD3	2.19	0.42
1:E:153:ARG:O	1:E:157:LEU:N	2.46	0.42
1:I:568:GLN:HB3	1:I:573:ILE:HD11	2.00	0.42
1:I:705:LEU:O	1:I:720:ARG:NH1	2.48	0.42
1:M:446:LEU:HD22	1:M:806:SER:HB3	2.01	0.42
1:B:281:ILE:HD12	1:B:309:GLU:HB3	2.01	0.42
1:B:829:ARG:HH22	1:B:882:PHE:H	1.66	0.42
1:I:81:MET:O	1:I:85:ILE:HG12	2.19	0.42
1:M:132:THR:OG1	1:M:244:ILE:O	2.38	0.42
1:M:163:LYS:HA	1:M:166:VAL:HG22	2.01	0.42
1:M:345:LYS:HZ1	1:M:352:ILE:HD13	1.84	0.42
1:E:58:GLN:HB2	1:E:63:GLU:HB2	2.01	0.42
1:E:696:MET:HG2	1:E:779:ALA:HB1	2.01	0.42
1:E:727:TRP:HB3	1:E:845:PHE:CD2	2.55	0.42
4:L:5:DA:H2'	4:L:6:DT:C6	2.55	0.42
1:E:824:LEU:O	1:E:828:VAL:HG23	2.19	0.42
1:I:8:LYS:NZ	1:I:291:ARG:HH22	2.17	0.42
2:J:4:DA:H2''	2:J:5:DA:H5'	2.01	0.42
1:M:416:PHE:CE1	1:M:434:PRO:HD3	2.55	0.42
1:B:215:ARG:HH21	1:B:219:MET:HG3	1.85	0.42
1:E:794:THR:HA	1:E:831:THR:HG21	2.02	0.42
1:I:706:LEU:HD11	1:I:852:GLN:HB2	2.01	0.42
1:M:556:GLY:O	1:M:561:LEU:N	2.48	0.42
1:M:879:ASP:OD2	1:M:879:ASP:N	2.52	0.42
1:B:629:VAL:HG13	1:B:654:THR:HG21	2.02	0.42
1:B:740:LYS:HB3	1:B:740:LYS:HE3	1.72	0.42
1:B:740:LYS:NZ	1:B:767:SER:H	2.18	0.42
1:E:705:LEU:O	1:E:720:ARG:NH2	2.53	0.42
2:F:4:DA:H61	4:H:7:DT:H3	1.68	0.42
1:M:651:LEU:HD12	1:M:670:PRO:HB2	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:801:LYS:HA	1:M:801:LYS:HD2	1.84	0.42
1:E:172:LYS:HD3	1:E:172:LYS:HA	1.70	0.42
1:E:423:ARG:NH2	1:E:425:ARG:HD2	2.35	0.42
1:I:248:PRO:O	1:I:252:GLU:HG2	2.20	0.42
1:B:646:PHE:O	1:B:650:VAL:HG22	2.20	0.41
1:E:709:GLU:HG3	1:E:722:ARG:HE	1.85	0.41
1:I:151:PHE:HA	1:I:154:ILE:HD12	2.02	0.41
1:I:163:LYS:HA	1:I:166:VAL:HG22	2.01	0.41
1:I:782:PHE:O	1:I:786:GLN:HG2	2.20	0.41
1:M:825:PHE:HZ	1:M:879:ASP:HA	1.84	0.41
1:M:859:ASP:OD1	1:M:860:LYS:N	2.53	0.41
1:B:24:LEU:HD13	1:B:287:TRP:CE2	2.55	0.41
1:B:422:TRP:O	1:B:735:VAL:HG23	2.19	0.41
1:E:274:PRO:HA	1:E:275:PRO:HD3	1.85	0.41
1:I:472:LYS:HD2	1:I:567:VAL:HG21	2.02	0.41
1:I:709:GLU:HG2	1:I:718:ILE:HG21	2.01	0.41
1:M:298:ARG:HE	1:M:419:ASN:ND2	2.18	0.41
1:M:706:LEU:HD11	1:M:849:PHE:HB2	2.01	0.41
1:E:555:GLY:O	1:E:559:VAL:HG22	2.20	0.41
1:E:722:ARG:NH1	1:E:769:ILE:O	2.53	0.41
1:B:7:ALA:HA	1:B:11:PHE:HB2	2.01	0.41
1:B:230:HIS:NE2	1:B:245:GLU:HB2	2.36	0.41
1:I:378:LYS:H	1:I:378:LYS:HD2	1.85	0.41
1:B:137:VAL:O	1:B:141:ILE:HG13	2.21	0.41
1:E:553:GLU:HA	1:E:870:LEU:HD12	2.03	0.41
1:E:737:GLN:HE22	1:E:778:ILE:HA	1.84	0.41
1:M:626:THR:O	1:M:629:VAL:HG22	2.20	0.41
1:M:699:LEU:HD23	1:M:778:ILE:HG13	2.02	0.41
1:M:727:TRP:HB3	1:M:845:PHE:CD2	2.56	0.41
1:B:190:MET:HE2	1:B:190:MET:HB3	1.75	0.41
1:E:648:GLN:O	1:E:652:GLU:HG3	2.20	0.41
1:I:105:PHE:HB3	1:I:204:TRP:CH2	2.56	0.41
1:M:553:GLU:HA	1:M:870:LEU:HB2	2.01	0.41
1:B:879:ASP:OD2	1:B:879:ASP:N	2.52	0.41
4:D:6:DT:H2''	4:D:7:DT:H5'	2.03	0.41
1:I:118:THR:HG22	1:I:141:ILE:CD1	2.48	0.41
1:M:304:ALA:HA	1:M:307:ARG:HG3	2.02	0.41
1:B:65:ALA:HB2	1:B:123:LEU:HD21	2.03	0.41
1:B:344:TRP:O	1:E:345:LYS:NZ	2.54	0.41
1:I:737:GLN:NE2	1:I:778:ILE:HG23	2.36	0.41
1:E:180:LYS:HD2	1:E:180:LYS:HA	1.88	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:330:ILE:HD13	1:I:405:ALA:HA	2.03	0.41
1:I:339:ASN:O	1:I:343:LYS:HG3	2.21	0.41
1:I:727:TRP:HB3	1:I:845:PHE:CD1	2.55	0.41
1:M:349:VAL:HG21	1:M:508:PRO:HG3	2.02	0.41
1:B:249:GLU:H	1:B:249:GLU:CD	2.24	0.41
1:E:58:GLN:HE22	1:E:67:ASN:ND2	2.18	0.41
1:I:82:ILE:HD13	1:I:112:GLU:HG3	2.03	0.41
1:I:71:LYS:HD2	1:I:71:LYS:HA	1.88	0.40
1:I:611:LEU:HD23	1:I:611:LEU:HA	1.98	0.40
1:M:331:ASN:N	1:M:443:LEU:O	2.49	0.40
1:M:740:LYS:HA	1:M:740:LYS:HD2	1.91	0.40
1:B:849:PHE:HA	1:B:852:GLN:HG3	2.02	0.40
1:B:330:ILE:HB	1:B:409:ALA:HA	2.03	0.40
1:I:343:LYS:HG3	1:I:343:LYS:HZ3	1.75	0.40
3:K:2:C:H2'	3:K:3:G:C8	2.56	0.40
1:M:275:PRO:HG2	1:M:324:GLN:HB3	2.02	0.40
1:B:340:VAL:HG21	1:B:497:LEU:HD11	2.02	0.40
1:M:175:GLY:O	1:M:179:LYS:HG2	2.22	0.40
1:M:448:LYS:HD2	1:M:448:LYS:HA	1.67	0.40
1:B:118:THR:HG21	1:B:216:CYS:HB3	2.03	0.40
1:B:183:MET:HA	1:B:186:VAL:HG12	2.04	0.40
1:B:829:ARG:NH2	1:B:882:PHE:H	2.20	0.40
1:E:110:LYS:H	1:E:110:LYS:HG3	1.71	0.40
1:E:333:LYS:O	1:E:337:VAL:HG23	2.22	0.40
1:I:146:GLU:HG3	1:I:201:TRP:HE1	1.85	0.40
1:I:561:LEU:HD23	1:I:561:LEU:HA	1.89	0.40
2:J:7:DC:H2''	2:J:8:DG:C8	2.57	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:31:ARG:NH2	1:M:90:GLU:O[1_655]	2.16	0.04

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	B	850/883 (96%)	834 (98%)	15 (2%)	1 (0%)	51	85
1	E	813/883 (92%)	798 (98%)	15 (2%)	0	100	100
1	I	823/883 (93%)	815 (99%)	8 (1%)	0	100	100
1	M	761/883 (86%)	750 (99%)	11 (1%)	0	100	100
All	All	3247/3532 (92%)	3197 (98%)	49 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	811	HIS

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	B	701/729 (96%)	693 (99%)	8 (1%)	73	90
1	E	670/729 (92%)	651 (97%)	19 (3%)	43	77
1	I	674/729 (92%)	652 (97%)	22 (3%)	38	73
1	M	582/729 (80%)	572 (98%)	10 (2%)	60	85
All	All	2627/2916 (90%)	2568 (98%)	59 (2%)	52	81

All (59) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	232	GLN
1	B	242	GLU
1	B	312	TYR
1	B	401	MET
1	B	423	ARG

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Mol	Chain	Res	Type
1	B	506	ASP
1	B	514	PHE
1	B	879	ASP
1	E	21	PHE
1	E	55	PHE
1	E	90	GLU
1	E	153	ARG
1	E	169	GLN
1	E	179	LYS
1	E	182	PHE
1	E	205	HIS
1	E	206	LYS
1	E	257	ARG
1	E	268	PHE
1	E	292	ARG
1	E	325	ASN
1	E	514	PHE
1	E	530	CYS
1	E	666	MET
1	E	721	LYS
1	E	756	ARG
1	E	859	ASP
1	I	89	PHE
1	I	96	ARG
1	I	292	ARG
1	I	301	SER
1	I	386	ARG
1	I	423	ARG
1	I	454	LYS
1	I	499	ASN
1	I	506	ASP
1	I	514	PHE
1	I	522	GLN
1	I	564	SER
1	I	571	TYR
1	I	632	ARG
1	I	648	GLN
1	I	667	PHE
1	I	700	LYS
1	I	744	GLN
1	I	787	ASP
1	I	799	HIS

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Mol	Chain	Res	Type
1	I	812	ASP
1	I	825	PHE
1	M	150	ARG
1	M	178	TYR
1	M	339	ASN
1	M	393	SER
1	M	431	MET
1	M	438	ASP
1	M	514	PHE
1	M	568	GLN
1	M	631	LYS
1	M	665	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	E	58	GLN
1	E	339	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	C	8/12 (66%)	0	0
3	G	7/12 (58%)	0	0
3	K	7/12 (58%)	0	0
3	O	7/12 (58%)	2 (28%)	0
All	All	29/48 (60%)	2 (6%)	0

All (2) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	O	2	C
3	O	3	G

There are no RNA pucker outliers to report.

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

4 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	S8U	F	10	2	15,19,20	4.36	7 (46%)	16,26,29	1.40	2 (12%)
2	S8U	A	10	2	15,19,20	4.39	7 (46%)	16,26,29	1.23	1 (6%)
2	S8U	J	10	2	15,19,20	4.37	7 (46%)	16,26,29	1.35	2 (12%)
2	S8U	N	10	2	15,19,20	4.37	7 (46%)	16,26,29	1.44	3 (18%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	S8U	F	10	2	-	0/3/23/24	0/2/2/2
2	S8U	A	10	2	-	3/3/23/24	0/2/2/2
2	S8U	J	10	2	-	3/3/23/24	0/2/2/2
2	S8U	N	10	2	-	0/3/23/24	0/2/2/2

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	10	S8U	C2'-C3'	-11.53	1.22	1.52
2	N	10	S8U	C2'-C3'	-11.37	1.22	1.52
2	J	10	S8U	C2'-C3'	-11.37	1.22	1.52
2	F	10	S8U	C2'-C3'	-11.34	1.22	1.52
2	F	10	S8U	O4'-C4'	-8.11	1.26	1.45
2	N	10	S8U	O4'-C4'	-8.09	1.26	1.45
2	J	10	S8U	O4'-C4'	-7.96	1.27	1.45
2	A	10	S8U	O4'-C4'	-7.92	1.27	1.45
2	A	10	S8U	C1'-N11	-5.23	1.33	1.49
2	F	10	S8U	C1'-N11	-5.21	1.33	1.49
2	N	10	S8U	C1'-N11	-5.20	1.34	1.49
2	A	10	S8U	C3'-C4'	5.16	1.67	1.53
2	J	10	S8U	C3'-C4'	5.02	1.66	1.53
2	N	10	S8U	C3'-C4'	4.99	1.66	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	10	S8U	C3'-C4'	4.94	1.66	1.53
2	J	10	S8U	C1'-N11	-4.91	1.34	1.49
2	J	10	S8U	O4'-C1'	4.31	1.52	1.42
2	A	10	S8U	O4'-C1'	4.16	1.51	1.42
2	N	10	S8U	O4'-C1'	4.11	1.51	1.42
2	F	10	S8U	O4'-C1'	4.10	1.51	1.42
2	J	10	S8U	O3'-C3'	3.26	1.50	1.43
2	A	10	S8U	O3'-C3'	3.05	1.49	1.43
2	F	10	S8U	O3'-C3'	3.01	1.49	1.43
2	N	10	S8U	O3'-C3'	2.96	1.49	1.43
2	J	10	S8U	O5'-C5'	-2.36	1.39	1.44
2	N	10	S8U	O5'-C5'	-2.21	1.39	1.44
2	F	10	S8U	O5'-C5'	-2.16	1.39	1.44
2	A	10	S8U	O5'-C5'	-2.13	1.39	1.44

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	N	10	S8U	C2'-C3'-C4'	2.96	108.93	102.76
2	J	10	S8U	O14-C13-C12	-2.91	120.04	124.17
2	F	10	S8U	C2'-C3'-C4'	2.91	108.82	102.76
2	J	10	S8U	C2'-C3'-C4'	2.41	107.78	102.76
2	F	10	S8U	O14-C13-C12	-2.40	120.77	124.17
2	A	10	S8U	O14-C13-C12	-2.40	120.77	124.17
2	N	10	S8U	C2'-C1'-N11	-2.37	108.80	114.27
2	N	10	S8U	O14-C13-C12	-2.37	120.81	124.17

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	10	S8U	O4'-C4'-C5'-O5'
2	J	10	S8U	C3'-C4'-C5'-O5'
2	J	10	S8U	O4'-C4'-C5'-O5'
2	A	10	S8U	C3'-C4'-C5'-O5'
2	J	10	S8U	C4'-C5'-O5'-P
2	A	10	S8U	C4'-C5'-O5'-P

There are no ring outliers.

No monomer is involved in short contacts.

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 [i](#)

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

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	B	856/883 (96%)	0.02	11 (1%) 77 51	46, 89, 172, 247	0
1	E	825/883 (93%)	0.28	59 (7%) 15 4	54, 100, 243, 301	0
1	I	831/883 (94%)	0.41	77 (9%) 8 3	70, 137, 216, 307	0
1	M	775/883 (87%)	0.42	66 (8%) 10 3	97, 155, 236, 309	0
2	A	15/18 (83%)	0.50	1 (6%) 17 5	65, 97, 305, 307	0
2	F	16/18 (88%)	0.11	0 100 100	97, 148, 228, 231	0
2	J	15/18 (83%)	0.69	1 (6%) 17 5	99, 128, 332, 358	0
2	N	16/18 (88%)	0.61	3 (18%) 1 0	110, 198, 390, 393	0
3	C	9/12 (75%)	1.23	1 (11%) 5 1	67, 77, 127, 185	0
3	G	8/12 (66%)	0.94	0 100 100	87, 106, 157, 158	0
3	K	8/12 (66%)	0.81	1 (12%) 3 1	96, 115, 163, 181	0
3	O	8/12 (66%)	0.65	1 (12%) 3 1	117, 142, 206, 219	0
4	D	7/9 (77%)	0.31	0 100 100	208, 254, 295, 309	0
4	H	8/9 (88%)	0.21	1 (12%) 3 1	221, 228, 281, 295	0
4	L	7/9 (77%)	0.46	0 100 100	271, 281, 301, 303	0
4	P	8/9 (88%)	0.47	1 (12%) 3 1	291, 298, 333, 336	0
All	All	3412/3688 (92%)	0.29	223 (6%) 18 5	46, 127, 233, 393	0

All (223) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	671	ASN	10.4
1	E	142	GLY	7.4
1	E	131	ASN	6.5
1	I	680	LEU	6.0
1	M	216	CYS	6.0

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Mol	Chain	Res	Type	RSRZ
1	I	629	VAL	5.8
1	I	625	VAL	5.8
1	I	670	PRO	5.5
1	E	106	LEU	5.5
1	I	668	THR	5.4
1	E	750	MET	5.2
1	E	74	ILE	5.1
1	I	672	GLN	5.1
1	M	121	THR	5.0
1	M	116	TYR	5.0
1	E	756	ARG	5.0
1	M	122	THR	4.8
1	E	113	ALA	4.7
1	M	154	ILE	4.6
1	E	372	GLU	4.6
1	E	749	LEU	4.6
1	E	755	PHE	4.5
1	I	623	TYR	4.5
1	B	857	GLN	4.4
1	I	570	ILE	4.4
1	M	130	ASP	4.3
1	E	224	THR	4.3
1	E	146	GLU	4.2
1	M	124	ALA	4.2
1	E	182	PHE	4.2
1	M	126	LEU	4.1
1	I	698	TRP	4.0
1	E	229	LEU	4.0
1	M	857	GLN	4.0
1	I	64	VAL	4.0
1	I	675	GLY	4.0
1	M	70	ALA	3.9
1	B	373	ALA	3.9
1	E	108	GLU	3.9
1	I	754	GLN	3.9
1	M	161	HIS	3.9
2	N	2	DG	3.8
1	M	117	ILE	3.8
1	E	126	LEU	3.8
1	E	374	LEU	3.8
1	I	651	LEU	3.8
1	M	85	ILE	3.8

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Mol	Chain	Res	Type	RSRZ
1	I	674	ALA	3.7
1	I	755	PHE	3.7
1	I	746	ARG	3.7
1	M	123	LEU	3.7
1	E	114	VAL	3.7
1	E	158	GLU	3.7
1	I	667	PHE	3.7
1	M	75	THR	3.6
1	M	250	TYR	3.6
1	M	667	PHE	3.5
1	E	135	GLN	3.5
1	E	16	LEU	3.5
1	M	163	LYS	3.4
1	I	624	GLY	3.3
1	E	107	GLN	3.3
1	E	110	LYS	3.3
1	E	186	VAL	3.3
1	I	235	GLY	3.3
1	I	578	VAL	3.2
1	I	712	ASP	3.2
1	E	73	LEU	3.2
1	I	685	VAL	3.2
1	I	126	LEU	3.2
1	I	857	GLN	3.2
1	E	15	GLU	3.2
1	M	173	ARG	3.1
1	M	120	LYS	3.1
1	I	153	ARG	3.1
1	I	673	ALA	3.1
1	I	630	THR	3.1
1	I	131	ASN	3.0
1	M	74	ILE	3.0
1	M	65	ALA	3.0
1	M	177	VAL	3.0
1	I	756	ARG	3.0
1	I	716	GLY	3.0
1	E	137	VAL	3.0
1	I	10	ASP	3.0
1	I	65	ALA	3.0
1	M	129	ALA	2.9
1	I	613	THR	2.9
3	O	8	U	2.9

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Mol	Chain	Res	Type	RSRZ
4	H	2	DT	2.9
1	E	109	ILE	2.9
1	M	655	ILE	2.9
1	M	148	GLU	2.9
1	E	178	TYR	2.9
1	I	683	GLU	2.9
1	I	16	LEU	2.9
1	E	220	LEU	2.9
1	E	751	PHE	2.9
1	M	73	LEU	2.8
1	E	608	LYS	2.8
1	M	55	PHE	2.8
1	I	713	LYS	2.8
2	J	4	DA	2.8
1	E	129	ALA	2.7
1	I	118	THR	2.7
1	I	612	GLY	2.7
1	M	149	ALA	2.7
1	M	30	GLU	2.7
1	M	16	LEU	2.7
1	I	103	PHE	2.7
1	M	135	GLN	2.7
1	I	626	THR	2.7
1	E	184	GLN	2.7
1	I	616	LEU	2.6
1	M	153	ARG	2.6
2	N	3	DG	2.6
1	I	575	ALA	2.6
1	M	807	PHE	2.6
1	I	539	SER	2.6
1	B	207	GLU	2.6
1	E	227	VAL	2.6
1	E	77	LEU	2.6
1	I	676	TYR	2.6
3	C	8	U	2.6
1	B	540	CYS	2.6
1	M	81	MET	2.6
1	I	860	LYS	2.6
1	I	89	PHE	2.6
1	I	234	ALA	2.6
1	I	678	ALA	2.6
1	E	83	ALA	2.6

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Mol	Chain	Res	Type	RSRZ
1	I	558	ALA	2.6
1	I	355	ILE	2.6
1	E	116	TYR	2.6
1	M	168	GLU	2.5
1	M	623	TYR	2.5
1	M	217	ILE	2.5
1	B	752	LEU	2.5
1	M	669	GLN	2.5
1	I	752	LEU	2.5
1	M	172	LYS	2.5
1	E	128	SER	2.5
1	I	470	VAL	2.4
1	I	611	LEU	2.4
1	I	571	TYR	2.4
1	E	86	ASN	2.4
1	E	189	ASP	2.4
4	P	9	DC	2.4
1	E	174	VAL	2.4
1	I	751	PHE	2.4
1	M	86	ASN	2.4
1	M	668	THR	2.4
1	M	816	THR	2.4
1	I	228	SER	2.4
1	M	11	PHE	2.4
1	M	877	GLU	2.4
1	E	165	ASN	2.4
1	E	355	ILE	2.4
1	E	185	VAL	2.4
1	I	714	LYS	2.4
2	N	4	DA	2.4
1	E	190	MET	2.4
1	E	70	ALA	2.4
1	I	744	GLN	2.4
1	M	625	VAL	2.3
1	E	130	ASP	2.3
1	B	126	LEU	2.3
1	M	875	ILE	2.3
1	I	568	GLN	2.3
1	E	228	SER	2.2
1	I	540	CYS	2.2
1	I	591	ASP	2.2
1	I	116	TYR	2.2

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Mol	Chain	Res	Type	RSRZ
1	M	619	GLN	2.2
1	M	162	PHE	2.2
1	I	137	VAL	2.2
1	I	473	VAL	2.2
2	A	4	DA	2.2
1	M	621	LEU	2.2
1	M	206	LYS	2.2
1	I	658	ALA	2.2
1	M	620	TRP	2.2
1	M	128	SER	2.2
1	M	670	PRO	2.2
1	E	120	LYS	2.2
1	M	219	MET	2.2
1	M	671	ASN	2.2
3	K	1	G	2.2
1	I	573	ILE	2.2
1	I	291	ARG	2.2
1	B	93	LYS	2.2
1	B	766	ASP	2.2
1	I	130	ASP	2.2
1	M	119	ILE	2.2
1	M	624	GLY	2.2
1	B	377	TRP	2.1
1	I	580	GLU	2.1
1	M	56	GLU	2.1
1	I	861	MET	2.1
1	M	803	GLY	2.1
1	E	376	ALA	2.1
1	M	538	GLY	2.1
1	E	849	PHE	2.1
1	I	11	PHE	2.1
1	I	237	VAL	2.1
1	E	261	LEU	2.1
1	E	89	PHE	2.1
1	B	244	ILE	2.1
1	E	9	ASN	2.1
1	I	123	LEU	2.1
1	M	24	LEU	2.1
1	M	616	LEU	2.1
1	B	381	ALA	2.1
1	I	643	GLU	2.1
1	E	214	VAL	2.1

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Mol	Chain	Res	Type	RSRZ
1	E	154	ILE	2.1
1	I	489	ILE	2.1
1	M	21	PHE	2.0
1	E	147	ASP	2.0
1	M	391	ARG	2.0
1	E	140	ALA	2.0
1	I	122	THR	2.0
1	M	647	ARG	2.0

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

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	S8U	N	10	18/19	0.87	0.27	119,144,161,170	0
2	S8U	F	10	18/19	0.89	0.26	105,116,135,147	0
2	S8U	J	10	18/19	0.92	0.30	126,150,175,183	0
2	S8U	A	10	18/19	0.94	0.24	71,90,110,124	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.