



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 10, 2023 – 03:58 AM EDT

PDB ID : 7MLI  
Title : Crystal structure of Thermus thermophilus reiterative transcription complex with 5nt oligo-C RNA  
Authors : Liu, Y.; Ebright, R.H.  
Deposited on : 2021-04-28  
Resolution : 3.60 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

<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>.

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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) : 1.13  
EDS : 2.35.1  
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) : 2.35.1

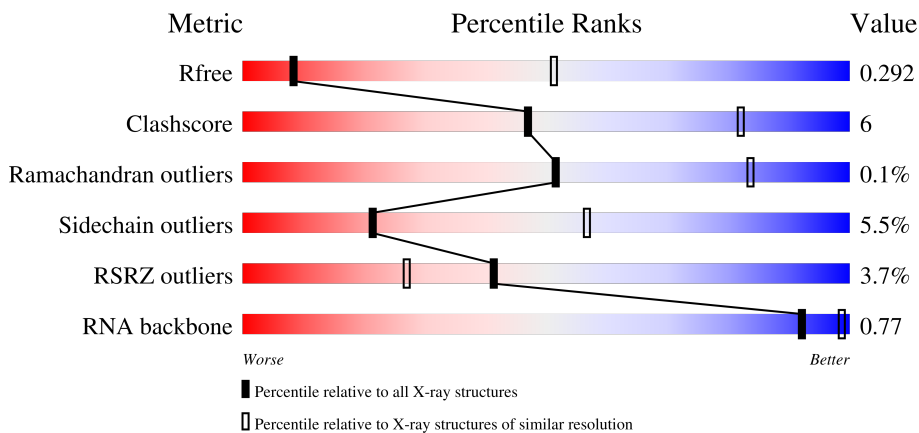
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.60 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.






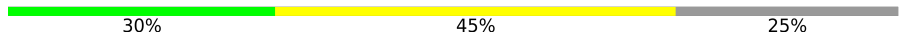

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1257 (3.70-3.50)
Clashscore	141614	1353 (3.70-3.50)
Ramachandran outliers	138981	1307 (3.70-3.50)
Sidechain outliers	138945	1307 (3.70-3.50)
RSRZ outliers	127900	1161 (3.70-3.50)
RNA backbone	3102	1017 (4.20-3.00)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	315	 4% 57% 15% 28%
1	B	315	 57% 12% 30%
2	C	1119	 4% 79% 18% ..
3	D	1524	 3% 79% 17% ..

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Mol	Chain	Length	Quality of chain
4	E	99	
5	F	443	
6	I	5	
7	G	20	
8	H	27	

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
9	MG	B	2001	-	-	-	X
9	MG	D	2004	-	-	-	X

## 2 Entry composition [i](#)

There are 10 unique types of molecules in this entry. The entry contains 28502 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 DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	226	Total	C	N	O	S	0	0	0
			1782	1138	310	332	2			
1	B	222	Total	C	N	O	S	0	0	0
			1750	1118	304	326	2			

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	C	1111	Total	C	N	O	S	0	0	0
			8770	5548	1564	1634	24			

- Molecule 3 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	D	1486	Total	C	N	O	S	0	0	0
			11738	7441	2067	2195	35			

- Molecule 4 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	E	94	Total	C	N	O	S	0	0	0
			761	486	132	139	4			

- Molecule 5 is a protein called RNA polymerase sigma factor SigA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	F	346	Total	C	N	O	S	0	0	0
			2807	1770	509	524	4			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	-19	MET	-	initiating methionine	UNP Q5SKW1
F	-18	GLY	-	expression tag	UNP Q5SKW1
F	-17	SER	-	expression tag	UNP Q5SKW1
F	-16	SER	-	expression tag	UNP Q5SKW1
F	-15	HIS	-	expression tag	UNP Q5SKW1
F	-14	HIS	-	expression tag	UNP Q5SKW1
F	-13	HIS	-	expression tag	UNP Q5SKW1
F	-12	HIS	-	expression tag	UNP Q5SKW1
F	-11	HIS	-	expression tag	UNP Q5SKW1
F	-10	HIS	-	expression tag	UNP Q5SKW1
F	-9	SER	-	expression tag	UNP Q5SKW1
F	-8	SER	-	expression tag	UNP Q5SKW1
F	-7	GLY	-	expression tag	UNP Q5SKW1
F	-6	LEU	-	expression tag	UNP Q5SKW1
F	-5	VAL	-	expression tag	UNP Q5SKW1
F	-4	PRO	-	expression tag	UNP Q5SKW1
F	-3	ARG	-	expression tag	UNP Q5SKW1
F	-2	GLY	-	expression tag	UNP Q5SKW1
F	-1	SER	-	expression tag	UNP Q5SKW1
F	0	HIS	-	expression tag	UNP Q5SKW1

- Molecule 6 is a RNA chain called RNA (5'-R(P\*CP\*CP\*CP\*CP\*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
6	I	5	100	45	15	35	5	0	0	0

- Molecule 7 is a DNA chain called DNA (5'-D(\*TP\*AP\*TP\*AP\*AP\*TP\*GP\*GP\*GP\*AP\*GP\*CP\*TP\*GP\*CP\*TP\*AP\*CP\*GP\*GP\*AP\*TP\*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
7	G	15	311	146	61	89	15	0	0	0

- Molecule 8 is a DNA chain called DNA (5'-D(P\*CP\*AP\*TP\*CP\*CP\*GP\*TP\*AP\*GP\*GP\*GP\*CP\*GP\*GP\*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
8	H	23	476	227	91	136	22	0	0	0

- Molecule 9 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	B	1	Total Mg 1 1	0	0
9	D	3	Total Mg 3 3	0	0
9	F	1	Total Mg 1 1	0	0

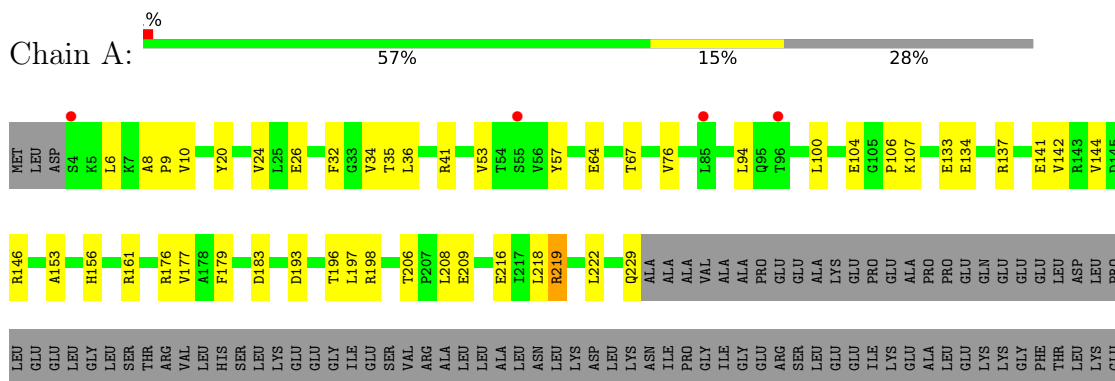
- Molecule 10 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	D	2	Total Zn 2 2	0	0

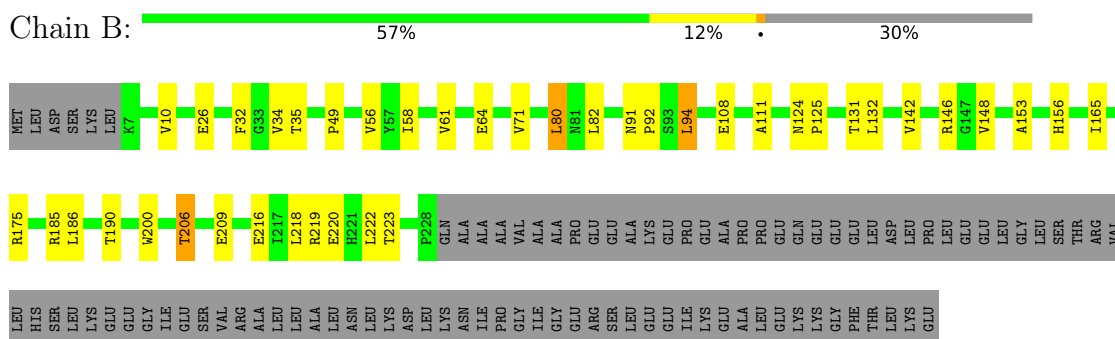
### 3 Residue-property plots i

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.

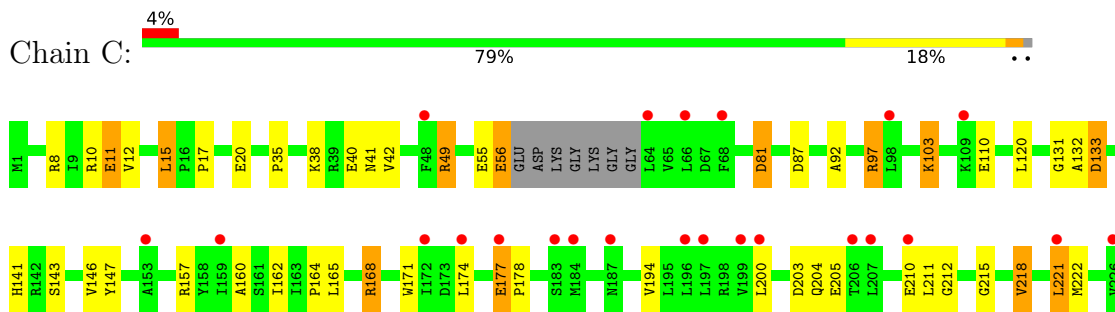
- Molecule 1: DNA-directed RNA polymerase subunit alpha



- Molecule 1: DNA-directed RNA polymerase subunit alpha

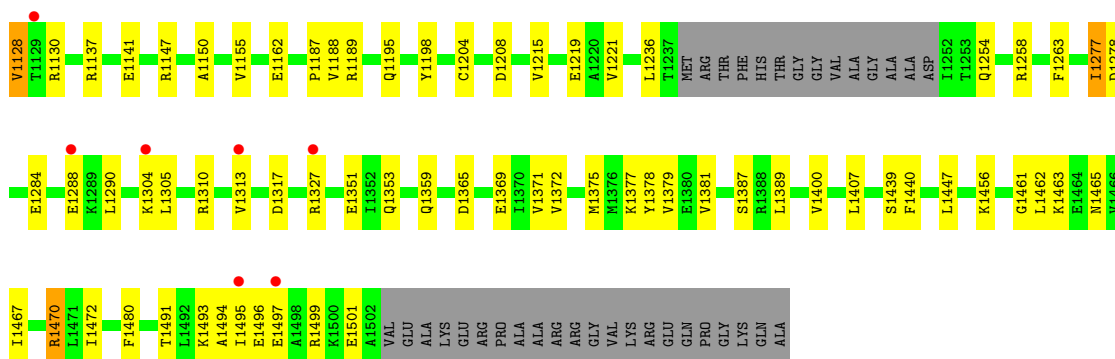


- Molecule 2: DNA-directed RNA polymerase subunit beta









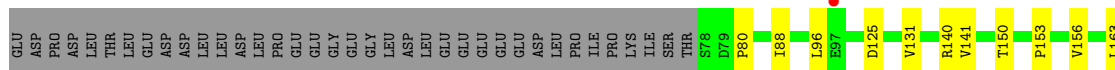
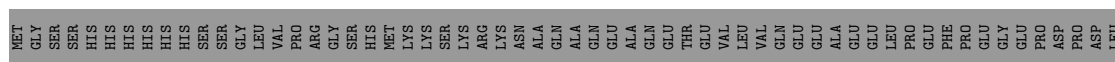
- Molecule 4: DNA-directed RNA polymerase subunit omega

Chain E: 80% 14% 5%



- Molecule 5: RNA polymerase sigma factor SigA

Chain F: 7% 62% 15% 22%



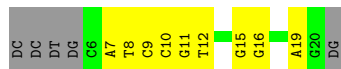
- Molecule 6: RNA (5'-R(P\*CP\*CP\*CP\*CP\*C)-3')

Chain I: 60% 40%



- Molecule 7: DNA (5'-D(\*TP\*AP\*TP\*AP\*AP\*TP\*GP\*GP\*GP\*AP\*GP\*CP\*TP\*GP\*CP\*TP\*AP\*CP\*GP\*GP\*AP\*TP\*G)-3')

Chain G: 30% 45% 25%



- Molecule 8: DNA (5'-D(P\*CP\*AP\*TP\*CP\*CP\*GP\*TP\*AP\*GP\*GP\*GP\*CP\*GP\*GP\*G)-3')

Chain H:  48% 37% 15%



## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	187.08Å 103.88Å 298.74Å 90.00° 97.95° 90.00°	Depositor
Resolution (Å)	45.96 – 3.60 49.31 – 3.60	Depositor EDS
% Data completeness (in resolution range)	96.9 (45.96-3.60) 97.5 (49.31-3.60)	Depositor EDS
$R_{merge}$	0.15	Depositor
$R_{sym}$	0.15	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.71 (at 3.57Å)	Xtrriage
Refinement program	PHENIX 1.19.2_4158, PHENIX 1.19.2_4158	Depositor
R, $R_{free}$	0.243 , 0.292 0.243 , 0.292	Depositor DCC
$R_{free}$ test set	2005 reflections (3.11%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	94.5	Xtrriage
Anisotropy	0.835	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , 91.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	28502	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	145.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.56% 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 [i](#)

### 5.1 Standard geometry [i](#)

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

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	0.25	0/1814	0.52	0/2466
1	B	0.25	0/1782	0.52	0/2424
2	C	0.25	0/8937	0.52	0/12087
3	D	0.25	0/11944	0.50	0/16149
4	E	0.24	0/775	0.46	0/1045
5	F	0.25	0/2852	0.50	0/3837
6	I	0.22	0/109	1.06	0/166
7	G	0.52	0/349	0.92	0/537
8	H	0.53	0/535	1.00	0/826
All	All	0.26	0/29097	0.53	0/39537

There are no bond length outliers.

There are no bond angle outliers.

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	A	1782	0	1834	26	0
1	B	1750	0	1797	22	0
2	C	8770	0	8874	120	0
3	D	11738	0	11971	152	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	E	761	0	778	15	0
5	F	2807	0	2882	45	0
6	I	100	0	55	5	0
7	G	311	0	168	10	0
8	H	476	0	261	12	0
9	B	1	0	0	0	0
9	D	3	0	0	0	0
9	F	1	0	0	0	0
10	D	2	0	0	0	0
All	All	28502	0	28620	353	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 6.

All (353) 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)
6:I:1:C:H42	7:G:19:DA:H61	1.24	0.82
2:C:773:LEU:HB2	5:F:375:LEU:HD11	1.65	0.79
3:D:1491:THR:HG21	4:E:89:MET:HG2	1.68	0.76
1:B:206:THR:HG22	1:B:209:GLU:H	1.50	0.75
3:D:61:GLY:O	3:D:64:LYS:NZ	2.22	0.72
3:D:238:PRO:HD3	3:D:318:ARG:HG3	1.73	0.71
2:C:1116:ALA:HB2	3:D:88:TYR:HB3	1.72	0.70
8:H:21:DA:H2''	8:H:22:DT:H5'	1.73	0.70
2:C:905:ILE:HG23	2:C:906:PHE:HD1	1.55	0.69
2:C:983:ILE:HG21	2:C:987:ILE:HD11	1.74	0.69
2:C:462:ASP:HB3	2:C:468:ARG:HD2	1.74	0.69
2:C:628:PHE:H	2:C:638:ASP:HB2	1.56	0.69
1:A:94:LEU:O	1:A:146:ARG:NH1	2.26	0.68
2:C:55:GLU:O	2:C:56:GLU:HB3	1.93	0.68
3:D:65:ARG:NH1	5:F:378:GLY:O	2.26	0.68
3:D:124:GLU:OE2	3:D:587:ARG:NH1	2.27	0.67
6:I:1:C:H42	7:G:19:DA:N6	1.93	0.67
3:D:1254:GLN:HB3	3:D:1258:ARG:HB2	1.78	0.66
2:C:343:GLN:HG3	2:C:385:PHE:HB2	1.78	0.66
3:D:1493:LYS:O	3:D:1497:GLU:HG2	1.96	0.65
2:C:711:GLU:HG2	2:C:822:VAL:HG22	1.78	0.65
2:C:428:ARG:NH2	2:C:447:ALA:O	2.30	0.65
3:D:520:LEU:O	3:D:525:ARG:NH1	2.30	0.65
3:D:266:GLU:HG3	3:D:314:PRO:HB3	1.79	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:260:GLU:OE1	3:D:273:ARG:NH1	2.30	0.64
5:F:365:GLU:HB2	5:F:404:ALA:HB2	1.80	0.64
1:A:179:PHE:HB3	1:A:197:LEU:HD23	1.79	0.64
1:A:106:PRO:HG3	1:A:134:GLU:HG2	1.80	0.64
2:C:1092:LEU:HD13	2:C:1099:VAL:HG21	1.80	0.64
2:C:17:PRO:HB2	2:C:20:GLU:HB3	1.79	0.63
5:F:397:ILE:HD12	5:F:400:ILE:HD11	1.81	0.63
2:C:766:GLU:HG3	3:D:64:LYS:HD2	1.79	0.63
2:C:92:ALA:HB2	2:C:120:LEU:HD11	1.81	0.63
2:C:49:ARG:CZ	2:C:49:ARG:HB3	2.28	0.62
3:D:1108:ARG:NH1	3:D:1198:TYR:O	2.31	0.62
7:G:15:DG:H2'	7:G:16:DG:C8	2.35	0.62
3:D:1100:ASP:OD1	3:D:1463:LYS:NZ	2.28	0.62
8:H:21:DA:H2'	8:H:22:DT:C6	2.36	0.61
3:D:218:LYS:HG2	3:D:338:GLU:HG2	1.81	0.60
2:C:936:VAL:HG11	2:C:959:PRO:HB2	1.83	0.60
1:A:222:LEU:HD21	1:B:218:LEU:HD23	1.84	0.60
2:C:521:PRO:HB3	3:D:1068:LEU:HD21	1.85	0.59
2:C:97:ARG:NH1	2:C:110:GLU:OE2	2.34	0.59
3:D:643:GLY:HA3	3:D:727:GLN:HB2	1.84	0.59
2:C:617:ASP:OD1	2:C:617:ASP:N	2.36	0.59
2:C:210:GLU:HB3	2:C:211:LEU:HD12	1.84	0.59
2:C:413:LEU:HD21	2:C:451:LEU:HD13	1.85	0.58
2:C:787:ASP:OD2	2:C:791:ARG:NH2	2.35	0.58
3:D:1101:VAL:HG13	3:D:1102:THR:HG23	1.86	0.58
5:F:400:ILE:HA	5:F:403:LYS:HG2	1.86	0.57
2:C:1019:GLN:HG2	2:C:1058:ASP:HB3	1.86	0.57
5:F:187:LEU:HD23	5:F:224:VAL:HG13	1.86	0.57
3:D:832:ARG:HD2	3:D:833:GLU:H	1.69	0.57
3:D:134:VAL:HG12	3:D:454:ALA:HB2	1.87	0.57
5:F:188:ILE:HD13	5:F:221:ILE:HG12	1.87	0.57
5:F:131:VAL:HG13	5:F:178:ARG:HD3	1.85	0.57
2:C:504:GLU:HG2	2:C:509:ALA:HB2	1.87	0.57
3:D:142:LEU:HB2	3:D:161:LEU:HD11	1.87	0.57
2:C:605:LYS:HB2	2:C:612:VAL:HB	1.87	0.57
3:D:1236:LEU:HA	3:D:1359:GLN:HG3	1.87	0.56
5:F:153:PRO:HA	5:F:156:VAL:HG22	1.86	0.56
5:F:361:LEU:HB3	5:F:365:GLU:HG3	1.86	0.56
1:B:91:ASN:HB3	1:B:94:LEU:HB2	1.88	0.56
3:D:841:TYR:HB2	3:D:864:VAL:HG22	1.87	0.56
3:D:1379:VAL:HG21	3:D:1400:VAL:HG11	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:397:GLU:HG3	2:C:631:SER:HB2	1.87	0.56
3:D:371:ILE:HG23	5:F:230:LYS:HD2	1.86	0.56
3:D:480:GLU:OE2	3:D:488:ARG:NH1	2.38	0.56
2:C:591:SER:O	2:C:593:ALA:N	2.28	0.56
8:H:12:DC:H2''	8:H:13:DT:H5'	1.87	0.56
5:F:236:SER:OG	8:H:5:DA:OP2	2.23	0.56
5:F:323:ASP:HB2	6:I:1:C:O4'	2.06	0.56
2:C:420:ARG:NH1	6:I:1:C:OP1	2.39	0.56
3:D:904:VAL:HG22	3:D:905:PRO:HD2	1.88	0.55
8:H:11:DG:H2''	8:H:12:DC:OP2	2.06	0.55
2:C:709:GLU:OE2	2:C:824:ARG:NH1	2.40	0.55
1:B:71:VAL:HG22	1:B:132:LEU:HG	1.89	0.55
2:C:259:GLY:HA2	2:C:263:ASP:HB2	1.89	0.54
3:D:959:GLU:N	3:D:959:GLU:OE1	2.39	0.54
2:C:177:GLU:HG3	2:C:178:PRO:HD2	1.88	0.54
3:D:809:PRO:HB3	3:D:839:LEU:HD13	1.89	0.54
2:C:577:PRO:HG2	2:C:580:MET:HG2	1.89	0.54
2:C:132:ALA:HB1	2:C:394:PHE:HE1	1.73	0.54
2:C:168:ARG:NH2	2:C:265:ARG:O	2.41	0.54
3:D:618:LEU:HG	3:D:1467:ILE:HG23	1.90	0.54
2:C:422:ARG:NH2	8:H:15:DC:OP1	2.41	0.53
3:D:242:LEU:HB3	3:D:311:LEU:HD12	1.90	0.53
3:D:1353:GLN:NE2	3:D:1365:ASP:OD1	2.36	0.53
2:C:802:ARG:HB2	2:C:826:TYR:HB2	1.88	0.53
3:D:939:PHE:O	3:D:943:THR:HG22	2.09	0.53
3:D:1461:GLY:O	3:D:1465:ASN:ND2	2.41	0.53
5:F:387:GLY:O	5:F:392:VAL:N	2.41	0.53
1:B:216:GLU:OE2	1:B:219:ARG:NH2	2.38	0.53
2:C:557:ARG:HG3	2:C:844:GLY:HA3	1.91	0.53
3:D:462:GLN:HB2	3:D:513:ILE:HG21	1.91	0.53
1:A:24:VAL:HG22	1:A:196:THR:HG23	1.89	0.53
3:D:1042:ARG:HB3	3:D:1057:VAL:HB	1.91	0.53
3:D:350:HIS:HE1	5:F:96:LEU:HD11	1.73	0.52
3:D:1491:THR:O	3:D:1495:ILE:HG13	2.09	0.52
5:F:193:ARG:HB3	8:H:7:DG:H5''	1.90	0.52
2:C:1115:LEU:HG	3:D:85:VAL:HG12	1.91	0.52
2:C:203:ASP:OD1	2:C:204:GLN:N	2.43	0.52
2:C:774:LEU:HD23	5:F:354:LEU:HD21	1.91	0.52
2:C:607:ASP:HB2	2:C:610:ARG:NH1	2.25	0.51
5:F:330:GLY:HA2	5:F:333:ILE:HD12	1.92	0.51
2:C:212:GLY:HA2	2:C:218:VAL:HG21	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:49:PRO:HA	1:B:148:VAL:HG12	1.92	0.51
3:D:41:ARG:HG3	3:D:48:ARG:HE	1.74	0.51
2:C:876:VAL:HB	3:D:949:ILE:HD12	1.92	0.51
2:C:194:VAL:HG22	2:C:221:LEU:HD23	1.92	0.51
2:C:774:LEU:HG	5:F:350:LEU:HD11	1.93	0.51
3:D:586:ARG:NH2	7:G:10:DC:OP1	2.43	0.51
3:D:996:TRP:CD2	3:D:1056:PRO:HG3	2.44	0.51
3:D:1480:PHE:O	4:E:18:ARG:NH2	2.43	0.51
5:F:364:ARG:HH11	5:F:364:ARG:HB3	1.75	0.51
1:A:20:TYR:OH	1:A:198:ARG:HD2	2.12	0.50
1:B:56:VAL:HG21	1:B:82:LEU:HD13	1.92	0.50
2:C:719:PRO:HB3	2:C:820:ARG:NE	2.26	0.50
3:D:171:LEU:HD22	3:D:390:PRO:HG2	1.93	0.50
1:B:56:VAL:HG22	1:B:142:VAL:HG12	1.94	0.50
3:D:1258:ARG:HH21	3:D:1351:GLU:HG2	1.75	0.50
1:A:206:THR:HG22	1:A:208:LEU:H	1.77	0.50
3:D:1046:GLN:OE1	3:D:1046:GLN:N	2.44	0.50
3:D:5:VAL:O	3:D:1470:ARG:NH2	2.41	0.50
2:C:221:LEU:HD11	2:C:307:LEU:HD21	1.93	0.50
5:F:397:ILE:HA	5:F:400:ILE:HG12	1.93	0.49
3:D:657:LEU:HG	3:D:661:MET:HE2	1.94	0.49
3:D:474:GLU:HG3	3:D:496:LEU:HD11	1.94	0.49
3:D:42:ASP:OD1	3:D:48:ARG:NH2	2.46	0.49
3:D:1068:LEU:O	3:D:1072:ILE:HG12	2.13	0.49
1:A:53:VAL:HG22	1:A:144:VAL:HG22	1.95	0.49
3:D:101:HIS:HB3	3:D:104:PHE:HD2	1.77	0.49
1:A:198:ARG:HD3	2:C:934:PHE:CZ	2.48	0.49
2:C:168:ARG:HD3	2:C:268:ASP:HB3	1.94	0.49
3:D:561:GLY:HA2	5:F:140:ARG:HH11	1.77	0.49
1:A:32:PHE:HA	1:A:35:THR:HB	1.95	0.49
5:F:237:THR:OG1	8:H:4:DA:H2'	2.13	0.49
3:D:897:TRP:CH2	3:D:902:LEU:HD22	2.48	0.49
3:D:1137:ARG:O	3:D:1141:GLU:HG3	2.13	0.49
3:D:520:LEU:HD23	3:D:525:ARG:HG2	1.94	0.48
1:B:80:LEU:HG	3:D:844:ALA:HA	1.95	0.48
1:A:64:GLU:HG2	1:A:76:VAL:HG22	1.95	0.48
2:C:593:ALA:HB1	2:C:659:PRO:HD2	1.95	0.48
3:D:273:ARG:HB3	3:D:278:PRO:HA	1.96	0.48
1:A:176:ARG:NH1	2:C:863:ASP:O	2.45	0.48
3:D:1150:ALA:HB3	3:D:1187:PRO:HB2	1.96	0.47
3:D:1000:THR:HG23	3:D:1036:ARG:HD2	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:G:9:DC:H1'	7:G:10:DC:H5'	1.95	0.47
7:G:11:DG:H2'	7:G:12:DT:C6	2.49	0.47
1:B:108:GLU:HG2	1:B:131:THR:HG22	1.97	0.47
3:D:475:LYS:O	3:D:479:GLU:HG2	2.14	0.47
1:B:124:ASN:OD1	1:B:124:ASN:N	2.48	0.47
2:C:81:ASP:OD1	2:C:81:ASP:N	2.40	0.47
2:C:395:LYS:HE2	2:C:403:SER:HB3	1.97	0.47
5:F:163:LEU:HD13	5:F:174:LEU:HD13	1.96	0.47
2:C:143:SER:O	2:C:147:TYR:OH	2.27	0.47
1:A:104:GLU:OE1	1:A:137:ARG:NH1	2.48	0.47
2:C:351:LEU:HD12	2:C:375:SER:HA	1.96	0.47
3:D:128:TYR:OH	3:D:579:ASP:OD2	2.24	0.47
3:D:1102:THR:HG21	3:D:1371:VAL:HG22	1.97	0.47
5:F:166:LEU:HD13	5:F:170:HIS:HB3	1.96	0.47
1:A:100:LEU:HD23	1:A:141:GLU:HG2	1.97	0.47
3:D:821:VAL:HG11	3:D:827:ILE:HD12	1.97	0.47
2:C:740:GLU:HB3	2:C:805:ARG:HH12	1.80	0.46
2:C:165:LEU:HB2	2:C:168:ARG:HG3	1.96	0.46
3:D:619:LEU:HD11	3:D:1439:SER:HB2	1.97	0.46
3:D:715:ALA:HB3	3:D:764:LEU:HA	1.96	0.46
1:B:32:PHE:HA	1:B:35:THR:HB	1.98	0.46
2:C:418:LEU:HD21	2:C:427:VAL:HG11	1.96	0.46
3:D:566:ILE:HD11	5:F:192:LEU:HD21	1.97	0.46
1:A:216:GLU:OE2	1:A:219:ARG:NH1	2.48	0.46
1:B:175:ARG:N	1:B:200:TRP:O	2.44	0.46
4:E:83:ASP:OD1	4:E:83:ASP:N	2.48	0.46
5:F:164:LYS:HA	5:F:171:LYS:HE3	1.98	0.46
3:D:356:PRO:HG2	3:D:359:ALA:HB2	1.98	0.46
3:D:17:LYS:HE3	3:D:17:LYS:HB2	1.71	0.46
5:F:364:ARG:HG2	5:F:390:PHE:CE1	2.52	0.45
2:C:684:PHE:HB3	3:D:633:VAL:HG21	1.97	0.45
2:C:942:GLU:HG2	2:C:945:ARG:HH21	1.81	0.45
3:D:1494:ALA:HB1	4:E:91:ARG:HH22	1.82	0.45
3:D:477:LEU:HB2	3:D:496:LEU:HD13	1.97	0.45
2:C:200:LEU:HD13	2:C:300:ASP:HB2	1.99	0.45
2:C:614:ARG:NH1	2:C:618:GLY:O	2.49	0.45
2:C:35:PRO:HG2	2:C:38:LYS:HD3	1.98	0.45
3:D:236:TYR:HD2	3:D:322:VAL:HG21	1.81	0.45
2:C:578:VAL:HG23	2:C:579:VAL:HG23	1.98	0.45
2:C:1031:ARG:HG2	7:G:16:DG:H5''	1.98	0.45
2:C:1037:VAL:HG13	2:C:1049:LEU:HD11	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:1263:PHE:HD1	3:D:1375:MET:HE2	1.82	0.45
5:F:188:ILE:HG12	5:F:224:VAL:HG21	1.98	0.45
2:C:1056:LYS:O	3:D:624:ASP:N	2.46	0.45
3:D:9:ARG:HB2	3:D:1456:LYS:HG2	1.99	0.45
3:D:114:THR:HG23	3:D:495:ARG:HG2	1.98	0.45
3:D:834:THR:OG1	3:D:835:SER:N	2.47	0.45
4:E:52:GLU:OE1	4:E:52:GLU:N	2.45	0.45
3:D:230:TRP:CZ2	3:D:232:GLU:HG2	2.52	0.45
1:A:41:ARG:HA	1:A:177:VAL:HG11	2.00	0.44
2:C:164:PRO:HD2	2:C:171:TRP:CD1	2.52	0.44
2:C:911:GLU:O	2:C:915:LYS:HG2	2.17	0.44
2:C:1009:SER:HB3	3:D:651:GLU:O	2.16	0.44
3:D:895:VAL:O	3:D:899:LEU:HG	2.17	0.44
3:D:1495:ILE:HG22	3:D:1499:ARG:HD2	1.99	0.44
5:F:375:LEU:HD12	5:F:375:LEU:H	1.81	0.44
1:A:107:LYS:HE3	1:A:107:LYS:HB2	1.80	0.44
2:C:627:ARG:NE	2:C:639:GLN:O	2.50	0.44
2:C:1083:GLU:OE1	2:C:1086:ARG:NH1	2.50	0.44
3:D:1377:LYS:HE3	3:D:1378:TYR:CZ	2.53	0.44
2:C:577:PRO:HB3	2:C:993:PHE:CG	2.53	0.44
2:C:846:LYS:NZ	6:I:5:C:OP1	2.34	0.44
3:D:191:LEU:HB3	3:D:393:ILE:HD12	2.00	0.44
3:D:314:PRO:HB2	3:D:317:VAL:HG12	1.98	0.44
3:D:983:LEU:HD13	3:D:988:ARG:HB2	1.99	0.44
3:D:230:TRP:CD1	3:D:331:VAL:HG21	2.53	0.44
3:D:787:LEU:HD21	3:D:947:ILE:HG21	1.98	0.44
3:D:192:ALA:HB3	3:D:195:VAL:HB	1.99	0.44
4:E:33:HIS:CE1	4:E:89:MET:HB3	2.53	0.44
8:H:20:DG:H2''	8:H:21:DA:C8	2.52	0.44
1:A:8:ALA:HA	1:A:9:PRO:HD3	1.85	0.44
2:C:704:HIS:CD2	2:C:831:ARG:HD2	2.52	0.44
3:D:689:ASP:O	3:D:693:GLU:HG3	2.17	0.44
1:A:10:VAL:HG22	1:A:26:GLU:O	2.18	0.44
1:A:36:LEU:HD23	1:A:36:LEU:HA	1.89	0.44
3:D:131:LYS:O	3:D:456:MET:HG2	2.17	0.44
3:D:1098:LEU:HA	3:D:1101:VAL:HG12	2.00	0.44
1:A:218:LEU:HG	1:B:222:LEU:HD11	1.98	0.44
1:B:92:PRO:O	1:B:146:ARG:NH1	2.45	0.44
2:C:1102:LEU:HB2	3:D:7:LYS:HB2	1.99	0.44
4:E:66:LYS:O	4:E:70:THR:HG23	2.18	0.44
4:E:88:GLU:OE1	4:E:91:ARG:NH2	2.43	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:1057:SER:OG	3:D:621:LYS:HD3	2.18	0.43
5:F:270:LYS:HG2	5:F:295:MET:HE1	1.99	0.43
5:F:372:ARG:HG2	5:F:386:VAL:HG21	2.00	0.43
1:A:183:ASP:HA	2:C:938:LYS:HE3	2.00	0.43
1:A:206:THR:HB	1:A:209:GLU:HG3	2.00	0.43
2:C:283:ILE:HD13	2:C:305:PRO:HG2	2.00	0.43
3:D:355:VAL:HG11	3:D:385:VAL:HG21	2.00	0.43
3:D:1277:ILE:HG22	3:D:1278:ASP:H	1.82	0.43
2:C:229:MET:HB2	2:C:233:GLU:HB2	2.00	0.43
2:C:1053:LEU:HA	3:D:621:LYS:HD2	2.00	0.43
3:D:248:PRO:HG3	3:D:308:LYS:HE3	2.00	0.43
3:D:34:TYR:CZ	3:D:35:ARG:HG3	2.53	0.43
2:C:1104:GLU:HB3	3:D:6:ARG:HG3	2.00	0.43
3:D:1495:ILE:HG12	4:E:88:GLU:CB	2.48	0.43
5:F:364:ARG:HB3	5:F:364:ARG:NH1	2.34	0.43
3:D:90:MET:SD	3:D:521:PRO:HD3	2.58	0.43
3:D:658:LEU:HA	3:D:661:MET:HE3	2.00	0.43
3:D:1462:LEU:HD22	3:D:1472:ILE:HB	2.00	0.43
1:B:64:GLU:HA	1:B:165:ILE:HD13	1.99	0.43
3:D:455:ARG:HB2	3:D:460:ALA:HB2	2.00	0.43
3:D:1099:VAL:O	3:D:1103:HIS:HB3	2.18	0.43
5:F:172:ARG:O	5:F:176:ILE:HG12	2.19	0.43
1:A:133:GLU:HG2	1:A:134:GLU:N	2.34	0.43
2:C:160:ALA:HB3	2:C:174:LEU:HB2	1.99	0.43
3:D:703:ASN:HB2	3:D:713:ILE:HG12	2.00	0.43
3:D:829:VAL:HG21	3:D:839:LEU:HD11	2.01	0.43
3:D:1189:ARG:HB3	3:D:1204:CYS:HA	1.99	0.43
2:C:12:VAL:HG21	2:C:472:ARG:HD3	2.01	0.43
2:C:211:LEU:HD11	2:C:304:LEU:HD11	2.00	0.42
3:D:1053:PHE:CZ	3:D:1072:ILE:HD12	2.54	0.42
3:D:1381:VAL:HG21	3:D:1389:LEU:HD23	2.00	0.42
4:E:46:PRO:HD2	4:E:63:TRP:CE2	2.53	0.42
2:C:40:GLU:O	2:C:42:VAL:N	2.49	0.42
2:C:922:PHE:CE2	2:C:964:LYS:HB2	2.55	0.42
2:C:535:SER:O	2:C:538:GLN:HG2	2.18	0.42
3:D:526:PRO:HB2	3:D:528:VAL:HG13	2.00	0.42
3:D:573:MET:SD	5:F:210:LEU:HB3	2.60	0.42
5:F:373:LYS:HA	5:F:373:LYS:HD3	1.68	0.42
2:C:87:ASP:HA	2:C:131:GLY:HA3	2.01	0.42
2:C:598:GLU:O	2:C:651:LYS:HG3	2.20	0.42
2:C:1092:LEU:HD21	3:D:1447:LEU:HD13	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:258:VAL:HG12	3:D:273:ARG:O	2.19	0.42
3:D:684:LYS:HE2	3:D:684:LYS:HB3	1.90	0.42
1:B:153:ALA:HA	1:B:156:HIS:NE2	2.34	0.42
3:D:14:SER:HB3	3:D:511:TRP:CE2	2.54	0.42
3:D:236:TYR:CD2	3:D:322:VAL:HG21	2.54	0.42
3:D:1047:LYS:HG2	3:D:1053:PHE:CZ	2.54	0.42
4:E:87:LYS:HA	4:E:87:LYS:HD3	1.56	0.42
3:D:231:VAL:O	3:D:236:TYR:OH	2.37	0.42
3:D:536:ALA:HA	5:F:315:VAL:O	2.20	0.42
3:D:563:PRO:HD2	3:D:566:ILE:HD12	2.01	0.42
5:F:80:PRO:HB2	5:F:210:LEU:HD11	2.00	0.42
5:F:201:LYS:NZ	5:F:244:ARG:HH12	2.17	0.42
2:C:772:ARG:NE	5:F:380:GLU:OE2	2.53	0.42
3:D:355:VAL:HG13	3:D:359:ALA:HB3	2.01	0.42
3:D:840:LYS:HE3	3:D:841:TYR:CZ	2.55	0.42
7:G:15:DG:H2'	7:G:16:DG:H8	1.83	0.42
3:D:960:LYS:NZ	3:D:1063:GLU:OE2	2.46	0.42
3:D:1126:ASP:OD1	3:D:1128:VAL:HG13	2.19	0.42
3:D:1208:ASP:HB2	3:D:1215:VAL:HA	2.02	0.42
5:F:278:LEU:HA	5:F:281:GLU:HG2	2.01	0.42
2:C:740:GLU:HB3	2:C:805:ARG:NH1	2.34	0.41
3:D:1387:SER:HB3	3:D:1407:LEU:HD11	2.02	0.41
7:G:7:DA:C8	7:G:8:DT:H72	2.55	0.41
2:C:258:TYR:O	2:C:263:ASP:N	2.53	0.41
2:C:540:PHE:HB3	2:C:544:THR:HB	2.03	0.41
3:D:889:ALA:HB1	3:D:930:LEU:HA	2.02	0.41
3:D:1494:ALA:HB3	4:E:92:LEU:HD11	2.02	0.41
5:F:193:ARG:NH1	8:H:7:DG:N7	2.67	0.41
1:B:58:ILE:HB	1:B:61:VAL:HB	2.03	0.41
1:B:111:ALA:HB3	1:B:125:PRO:HA	2.02	0.41
2:C:1070:ILE:CG2	3:D:655:PRO:HB2	2.50	0.41
2:C:146:VAL:HG22	2:C:162:ILE:HG12	2.02	0.41
2:C:437:ARG:NH2	2:C:491:GLU:OE1	2.48	0.41
3:D:26:VAL:HG11	3:D:44:LEU:HD23	2.02	0.41
3:D:508:ARG:HB2	3:D:511:TRP:CE2	2.55	0.41
3:D:654:LYS:O	3:D:658:LEU:HG	2.20	0.41
3:D:1040:GLY:O	3:D:1060:SER:HB3	2.20	0.41
3:D:1372:VAL:HA	3:D:1375:MET:HE3	2.01	0.41
1:A:153:ALA:HA	1:A:156:HIS:NE2	2.36	0.41
2:C:133:ASP:HB3	2:C:395:LYS:HD2	2.02	0.41
3:D:1084:THR:O	3:D:1088:THR:HG23	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:57:TYR:CD1	1:A:161:ARG:HD2	2.56	0.41
2:C:146:VAL:HG11	2:C:306:THR:HG22	2.01	0.41
2:C:247:PRO:HA	2:C:248:PRO:HD3	1.75	0.41
3:D:374:GLU:O	3:D:375:GLU:HB2	2.21	0.41
3:D:1147:ARG:NH2	3:D:1369:GLU:OE1	2.51	0.41
8:H:11:DG:H4'	8:H:12:DC:O5'	2.21	0.41
2:C:218:VAL:O	2:C:222:MET:HG2	2.20	0.41
2:C:524:VAL:HG13	2:C:528:GLU:HB2	2.03	0.41
3:D:1494:ALA:CB	4:E:92:LEU:HD11	2.51	0.41
3:D:1495:ILE:HG12	4:E:88:GLU:HG3	2.03	0.41
2:C:103:LYS:H	2:C:103:LYS:HG3	1.60	0.41
2:C:432:ARG:HA	3:D:1071:PHE:HE2	1.85	0.41
2:C:11:GLU:H	2:C:11:GLU:HG2	1.51	0.41
2:C:157:ARG:HA	2:C:157:ARG:HD3	1.84	0.41
2:C:351:LEU:HD11	2:C:373:VAL:HG13	2.03	0.41
2:C:370:ALA:O	5:F:280:GLN:NE2	2.42	0.41
2:C:605:LYS:HB3	2:C:610:ARG:NH1	2.35	0.41
2:C:773:LEU:HD23	5:F:354:LEU:HD22	2.02	0.41
2:C:974:LEU:HD12	2:C:974:LEU:HA	1.93	0.41
4:E:14:ASP:OD1	4:E:14:ASP:N	2.54	0.41
8:H:12:DC:C2'	8:H:13:DT:H5'	2.51	0.41
1:B:220:GLU:O	1:B:223:THR:OG1	2.24	0.41
2:C:324:ASP:HB3	2:C:327:HIS:HB2	2.02	0.41
2:C:874:LEU:HD23	3:D:1023:MET:SD	2.61	0.41
3:D:1003:VAL:HG21	3:D:1041:LEU:HG	2.03	0.41
3:D:1310:ARG:HD2	3:D:1327:ARG:HD2	2.03	0.41
7:G:7:DA:H2'	7:G:8:DT:C7	2.51	0.41
2:C:10:ARG:NH1	2:C:12:VAL:HG12	2.36	0.40
2:C:15:LEU:O	2:C:586:ARG:NH2	2.48	0.40
2:C:304:LEU:HB3	2:C:305:PRO:HD3	2.02	0.40
3:D:236:TYR:CZ	3:D:242:LEU:HD12	2.56	0.40
3:D:784:ASP:HB2	3:D:939:PHE:HE1	1.86	0.40
2:C:722:ILE:HD12	2:C:821:GLU:HG3	2.04	0.40
3:D:1463:LYS:HE2	3:D:1463:LYS:HB3	1.85	0.40
1:B:10:VAL:HG22	1:B:26:GLU:O	2.21	0.40
2:C:896:PHE:HB2	2:C:921:ALA:HB1	2.04	0.40
3:D:411:THR:HB	3:D:437:VAL:H	1.86	0.40
1:B:185:ARG:HB3	1:B:190:THR:HG23	2.03	0.40
3:D:438:ASP:OD2	3:D:441:ARG:NH1	2.52	0.40
2:C:404:LEU:O	2:C:408:ARG:HG3	2.21	0.40
3:D:486:ARG:H	3:D:486:ARG:HG3	1.53	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:F:393:THR:O	5:F:396:ARG:HB3	2.22	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	224/315 (71%)	222 (99%)	2 (1%)	0	100	100
1	B	220/315 (70%)	214 (97%)	6 (3%)	0	100	100
2	C	1107/1119 (99%)	1087 (98%)	17 (2%)	3 (0%)	41	75
3	D	1482/1524 (97%)	1456 (98%)	24 (2%)	2 (0%)	51	83
4	E	92/99 (93%)	91 (99%)	1 (1%)	0	100	100
5	F	344/443 (78%)	340 (99%)	4 (1%)	0	100	100
All	All	3469/3815 (91%)	3410 (98%)	54 (2%)	5 (0%)	51	83

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	C	592	LEU
2	C	41	ASN
3	D	1440	PHE
3	D	530	VAL
2	C	215	GLY

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	199/273 (73%)	192 (96%)	7 (4%)	36	68
1	B	195/273 (71%)	190 (97%)	5 (3%)	46	74
2	C	936/941 (100%)	875 (94%)	61 (6%)	17	51
3	D	1253/1279 (98%)	1181 (94%)	72 (6%)	20	55
4	E	83/88 (94%)	81 (98%)	2 (2%)	49	75
5	F	301/388 (78%)	284 (94%)	17 (6%)	21	56
All	All	2967/3242 (92%)	2803 (94%)	164 (6%)	21	57

All (164) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	LEU
1	A	34	VAL
1	A	67	THR
1	A	142	VAL
1	A	193	ASP
1	A	219	ARG
1	A	229	GLN
1	B	34	VAL
1	B	80	LEU
1	B	94	LEU
1	B	186	LEU
1	B	206	THR
2	C	8	ARG
2	C	11	GLU
2	C	15	LEU
2	C	49	ARG
2	C	56	GLU
2	C	81	ASP
2	C	97	ARG
2	C	103	LYS
2	C	133	ASP
2	C	141	HIS
2	C	168	ARG
2	C	177	GLU
2	C	205	GLU
2	C	218	VAL
2	C	221	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	C	232	GLU
2	C	251	ASP
2	C	274	ARG
2	C	331	ARG
2	C	342	ASP
2	C	358	ARG
2	C	372	LEU
2	C	403	SER
2	C	418	LEU
2	C	419	THR
2	C	427	VAL
2	C	434	HIS
2	C	464	LEU
2	C	480	THR
2	C	482	GLU
2	C	512	ARG
2	C	557	ARG
2	C	575	GLN
2	C	583	LEU
2	C	610	ARG
2	C	617	ASP
2	C	633	GLN
2	C	638	ASP
2	C	640	ARG
2	C	648	ARG
2	C	680	ASP
2	C	715	THR
2	C	771	GLU
2	C	774	LEU
2	C	775	ARG
2	C	786	LYS
2	C	807	ARG
2	C	808	ARG
2	C	813	VAL
2	C	815	LEU
2	C	820	ARG
2	C	830	LYS
2	C	928	LYS
2	C	939	ARG
2	C	952	LEU
2	C	968	LEU
2	C	978	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	C	1001	VAL
2	C	1057	SER
2	C	1058	ASP
2	C	1115	LEU
3	D	67	ARG
3	D	68	PHE
3	D	80	VAL
3	D	81	THR
3	D	135	LEU
3	D	141	ILE
3	D	155	ASP
3	D	161	LEU
3	D	191	LEU
3	D	198	ARG
3	D	200	ASP
3	D	230	TRP
3	D	231	VAL
3	D	256	GLU
3	D	270	LEU
3	D	275	GLU
3	D	276	ASP
3	D	312	ARG
3	D	331	VAL
3	D	362	GLU
3	D	372	ASP
3	D	411	THR
3	D	415	VAL
3	D	421	LEU
3	D	486	ARG
3	D	500	ARG
3	D	508	ARG
3	D	525	ARG
3	D	572	ARG
3	D	576	GLU
3	D	586	ARG
3	D	591	VAL
3	D	618	LEU
3	D	632	VAL
3	D	650	LEU
3	D	669	ASN
3	D	709	HIS
3	D	754	PHE

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	D	778	LEU
3	D	808	THR
3	D	817	GLU
3	D	832	ARG
3	D	864	VAL
3	D	867	ARG
3	D	894	LYS
3	D	904	VAL
3	D	907	GLU
3	D	943	THR
3	D	983	LEU
3	D	984	THR
3	D	1041	LEU
3	D	1062	ARG
3	D	1127	GLU
3	D	1128	VAL
3	D	1130	ARG
3	D	1155	VAL
3	D	1162	GLU
3	D	1188	VAL
3	D	1195	GLN
3	D	1219	GLU
3	D	1221	VAL
3	D	1277	ILE
3	D	1284	GLU
3	D	1288	GLU
3	D	1290	LEU
3	D	1304	LYS
3	D	1305	LEU
3	D	1313	VAL
3	D	1317	ASP
3	D	1470	ARG
3	D	1496	GLU
3	D	1501	GLU
4	E	50	THR
4	E	87	LYS
5	F	88	ILE
5	F	125	ASP
5	F	141	VAL
5	F	150	THR
5	F	172	ARG
5	F	186	HIS

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Mol	Chain	Res	Type
5	F	205	ARG
5	F	218	GLN
5	F	279	GLN
5	F	287	THR
5	F	310	ILE
5	F	364	ARG
5	F	377	ASP
5	F	396	ARG
5	F	417	LYS
5	F	420	ASP
5	F	422	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
2	C	552	HIS
3	D	350	HIS
3	D	1195	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
6	I	4/5 (80%)	0	0

There are no RNA backbone outliers to report.

There are no RNA pucker outliers to report.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 7 ligands modelled in this entry, 7 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	226/315 (71%)	-0.17	4 (1%) 68 53	96, 134, 162, 178	0
1	B	222/315 (70%)	-0.26	0 100 100	94, 136, 164, 189	0
2	C	1111/1119 (99%)	0.17	50 (4%) 33 21	81, 144, 201, 242	0
3	D	1486/1524 (97%)	0.09	47 (3%) 47 32	83, 136, 192, 219	1 (0%)
4	E	94/99 (94%)	-0.28	0 100 100	107, 153, 195, 205	0
5	F	346/443 (78%)	0.31	30 (8%) 10 6	100, 156, 221, 249	0
6	I	5/5 (100%)	0.16	0 100 100	127, 129, 149, 179	0
7	G	15/20 (75%)	-0.35	0 100 100	126, 160, 226, 230	0
8	H	23/27 (85%)	-0.44	0 100 100	135, 184, 236, 247	0
All	All	3528/3867 (91%)	0.08	131 (3%) 41 27	81, 140, 200, 249	1 (0%)

All (131) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	776	SER	11.0
5	F	397	ILE	8.8
5	F	404	ALA	8.0
2	C	300	ASP	7.6
5	F	381	HIS	7.5
2	C	777	ILE	7.5
5	F	401	GLU	7.2
5	F	400	ILE	6.3
5	F	393	THR	6.0
2	C	773	LEU	6.0
2	C	307	LEU	5.5
5	F	390	PHE	5.2
5	F	391	GLY	5.1
3	D	219	GLU	5.0
3	D	367	ILE	5.0

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Mol	Chain	Res	Type	RSRZ
3	D	295	GLY	4.9
5	F	403	LYS	4.8
5	F	386	VAL	4.7
2	C	251	ASP	4.6
2	C	254	VAL	4.6
3	D	305	ALA	4.5
5	F	327	SER	4.4
2	C	766	GLU	4.3
2	C	769	PRO	4.3
5	F	422	LEU	4.2
2	C	196	LEU	4.1
2	C	66	LEU	4.1
2	C	200	LEU	4.0
3	D	203	ALA	4.0
5	F	408	LEU	3.9
2	C	303	PHE	3.9
1	A	4	SER	3.8
3	D	322	VAL	3.7
2	C	174	LEU	3.7
5	F	396	ARG	3.6
2	C	299	LYS	3.6
3	D	337	LEU	3.4
2	C	48	PHE	3.4
2	C	311	PHE	3.4
3	D	306	GLU	3.4
2	C	207	LEU	3.3
5	F	389	PHE	3.3
2	C	297	GLU	3.3
2	C	306	THR	3.3
2	C	281	LEU	3.2
2	C	255	ALA	3.2
5	F	407	LYS	3.2
3	D	444	VAL	3.1
2	C	199	VAL	3.1
3	D	404	GLU	3.1
3	D	1495	ILE	3.1
3	D	371	ILE	3.1
5	F	418	LEU	3.0
5	F	421	PHE	3.0
3	D	1304	LYS	3.0
3	D	1288	GLU	3.0
3	D	314	PRO	3.0

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Mol	Chain	Res	Type	RSRZ
3	D	353	VAL	3.0
3	D	335	LEU	3.0
3	D	268	ALA	2.9
5	F	377	ASP	2.9
3	D	1497	GLU	2.9
3	D	289	THR	2.9
2	C	187	ASN	2.9
2	C	159	ILE	2.9
3	D	220	ARG	2.8
5	F	360	LYS	2.8
2	C	183	SER	2.8
2	C	206	THR	2.7
3	D	409	VAL	2.7
3	D	445	ARG	2.7
3	D	309	GLY	2.6
2	C	246	ASP	2.6
3	D	304	LEU	2.6
3	D	368	VAL	2.6
2	C	184	MET	2.6
3	D	43	GLY	2.6
3	D	421	LEU	2.6
1	A	96	THR	2.6
5	F	97	GLU	2.6
5	F	364	ARG	2.6
2	C	304	LEU	2.5
5	F	375	LEU	2.5
2	C	344	PHE	2.5
3	D	321	GLN	2.5
3	D	165	LYS	2.5
2	C	511	GLU	2.5
2	C	283	ILE	2.4
2	C	1084	SER	2.4
3	D	1129	THR	2.4
3	D	242	LEU	2.4
2	C	226	VAL	2.4
5	F	229	TYR	2.4
5	F	320	PRO	2.4
3	D	981	GLY	2.4
2	C	221	LEU	2.4
3	D	267	GLY	2.4
5	F	359	SER	2.4
2	C	197	LEU	2.4

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Mol	Chain	Res	Type	RSRZ
2	C	650	ARG	2.3
5	F	392	VAL	2.3
3	D	144	GLY	2.3
2	C	68	PHE	2.3
5	F	326	ASP	2.3
2	C	153	ALA	2.3
3	D	820	GLU	2.3
1	A	85	LEU	2.3
5	F	385	GLU	2.3
2	C	280	LYS	2.2
3	D	311	LEU	2.2
3	D	974	ILE	2.2
3	D	324	ALA	2.2
3	D	1313	VAL	2.2
5	F	371	LEU	2.2
3	D	1327	ARG	2.2
2	C	290	LEU	2.2
2	C	177	GLU	2.2
3	D	393	ILE	2.2
2	C	109	LYS	2.2
2	C	210	GLU	2.1
2	C	98	LEU	2.1
3	D	282	TYR	2.1
2	C	172	ILE	2.1
1	A	55	SER	2.1
2	C	340	MET	2.1
2	C	64	LEU	2.1
3	D	269	PHE	2.1
2	C	233	GLU	2.1
3	D	292	VAL	2.0
3	D	350	HIS	2.0
3	D	355	VAL	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.



## 6.4 Ligands [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, 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	B-factors(Å <sup>2</sup> )	Q<0.9
9	MG	B	2001	1/1	0.31	0.61	153,153,153,153	0
9	MG	D	2005	1/1	0.62	0.33	141,141,141,141	0
9	MG	D	2004	1/1	0.69	0.47	79,79,79,79	0
10	ZN	D	2002	1/1	0.87	0.05	179,179,179,179	0
9	MG	D	2003	1/1	0.94	0.32	87,87,87,87	0
9	MG	F	2001	1/1	0.95	0.05	133,133,133,133	0
10	ZN	D	2001	1/1	0.97	0.23	110,110,110,110	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.