

# wwPDB EM Validation Summary Report (i)

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PDB ID	:	6S1N
EMDB ID	:	EMD-10081
Title	:	Human polymerase delta holoenzyme Conformer 2
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Deposited on	:	2019-06-19
Resolution	:	4.86 Å(reported)

This is a wwPDB EM Validation Summary 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/EMValidationReportHelp with specific help available everywhere you see the (i) 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 (1)) were used in the production of this report:

EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

# 1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:  $ELECTRON\ MICROSCOPY$ 

The reported resolution of this entry is 4.86 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.



Matria	Whole archive	EM structures
Metric	$(\# {\rm Entries})$	$(\# {\rm Entries})$
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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

Mol	Chain	Length		Quality of chain								
1	А	1107		78%		13%	• 9%					
2	В	469		78%		13%	8%					
3	С	474	28%	•	70%							
4	D	137	36%	11% ••	52%							
5	Е	264		73%		22%	5%					
5	F	264		79%		15%	6%					
5	G	264		74%		20%	6%					
6	Р	25	40%		44%	8%	8%					
7	Т	38	26%	42%	•	29%						



# 2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 19726 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 polymerase delta catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	А	1010	Total 7926	C 5028	N 1405	0 1447	S 46	1	0

• Molecule 2 is a protein called DNA polymerase delta subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	В	431	Total 3304	C 2103	N 553	O 630	S 18	0	0

• Molecule 3 is a protein called DNA polymerase delta subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	С	143	Total 1130	C 715	N 196	0 214	${ m S}{ m 5}$	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
С	-7	MET	-	initiating methionine	UNP Q15054
С	-6	TRP	-	expression tag	UNP Q15054
С	-5	SER	-	expression tag	UNP Q15054
С	-4	HIS	-	expression tag	UNP Q15054
С	-3	PRO	-	expression tag	UNP Q15054
С	-2	GLN	-	expression tag	UNP Q15054
С	-1	PHE	-	expression tag	UNP Q15054
C	0	GLU	-	expression tag	UNP Q15054
С	1	LYS	-	expression tag	UNP Q15054

• Molecule 4 is a protein called DNA polymerase delta subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	66	Total 554	$\begin{array}{c} \mathrm{C} \\ 359 \end{array}$	N 97	0 94	$\frac{S}{4}$	0	0



Chain	Residue	Modelled	Actual	Comment	Reference
D	-29	MET	-	initiating methionine	UNP Q9HCU8
D	-28	HIS	-	expression tag	UNP Q9HCU8
D	-27	HIS	-	expression tag	UNP Q9HCU8
D	-26	HIS	-	expression tag	UNP Q9HCU8
D	-25	HIS	-	expression tag	UNP Q9HCU8
D	-24	HIS	-	expression tag	UNP Q9HCU8
D	-23	HIS	-	expression tag	UNP Q9HCU8
D	-22	SER	-	expression tag	UNP Q9HCU8
D	-21	ARG	-	expression tag	UNP Q9HCU8
D	-20	ALA	-	expression tag	UNP Q9HCU8
D	-19	TRP	-	expression tag	UNP Q9HCU8
D	-18	ARG	-	expression tag	UNP Q9HCU8
D	-17	HIS	-	expression tag	UNP Q9HCU8
D	-16	PRO	-	expression tag	UNP Q9HCU8
D	-15	GLN	-	expression tag	UNP Q9HCU8
D	-14	PHE	-	expression tag	UNP Q9HCU8
D	-13	GLY	-	expression tag	UNP Q9HCU8
D	-12	GLY	-	expression tag	UNP Q9HCU8
D	-11	HIS	-	expression tag	UNP Q9HCU8
D	-10	HIS	-	expression tag	UNP Q9HCU8
D	-9	HIS	-	expression tag	UNP Q9HCU8
D	-8	HIS	-	expression tag	UNP Q9HCU8
D	-7	HIS	-	expression tag	UNP Q9HCU8
D	-6	HIS	-	expression tag	UNP Q9HCU8
D	-5	GLU	-	expression tag	UNP Q9HCU8
D	-4	ASN	-	expression tag	UNP Q9HCU8
D	-3	LEU	-	expression tag	UNP Q9HCU8
D	-2	TYR	-	expression tag	UNP Q9HCU8
D	-1	PHE	-	expression tag	UNP Q9HCU8
D	0	GLN	-	expression tag	UNP Q9HCU8
D	1	SER	-	expression tag	UNP Q9HCU8

There are 31 discrepancies between the modelled and reference sequences:

• Molecule 5 is a protein called Proliferating cell nuclear antigen.

Mol	Chain	Residues	Atoms					AltConf	Trace
5 E	251	Total	С	Ν	0	$\mathbf{S}$	0	0	
		1924	1211	314	383	16	0	0	
5	F D	940	Total	С	Ν	0	S	0	0
D F	249	1913	1205	312	380	16	0	0	
5	С	240	Total	С	Ν	0	S	0	0
G	G	249	1913	1204	314	379	16	0	0



Chain	Residue	Modelled	Actual	Comment	Reference
Е	-2	GLY	-	expression tag	UNP P12004
Е	-1	PRO	-	expression tag	UNP P12004
Е	0	HIS	-	expression tag	UNP P12004
F	-2	GLY	-	expression tag	UNP P12004
F	-1	PRO	-	expression tag	UNP P12004
F	0	HIS	-	expression tag	UNP P12004
G	-2	GLY	-	expression tag	UNP P12004
G	-1	PRO	-	expression tag	UNP P12004
G	0	HIS	-	expression tag	UNP P12004

There are 9 discrepancies between the modelled and reference sequences:

• Molecule 6 is a DNA chain called DNA primer.

Mol	Chain	Residues	Atoms			AltConf	Trace		
6	Р	23	Total 469	C 225	N 84	0 137	Р 23	0	0

• Molecule 7 is a DNA chain called DNA template.

Mol	Chain	Residues	Atoms			AltConf	Trace		
7	Т	27	Total 555	C 266	N 100	0 162	Р 27	0	0

• Molecule 8 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
8	А	1	Total Zn 1 1	0

• Molecule 9 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula:  $Fe_4S_4$ ).





Mol	Chain	Residues	Atoms	AltConf
9	А	1	Total Fe S 8 4 4	0

• Molecule 10 is THYMIDINE-5'-TRIPHOSPHATE (three-letter code: TTP) (formula:  $C_{10}H_{17}N_2O_{14}P_3$ ).



Mol	Chain	Residues	Atoms			AltConf		
10	Т	1	Total 29	C 10	N 2	0 14	Р 3	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. 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. 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 polymerase delta catalytic subunit

 $\bullet$  Molecule 2: DNA polymerase delta subunit 2



• Molecule 3: DNA polymerase delta subunit 3



Chain C:	28% •	70%	6
MET TRP SER HIS PHE CLU CLU LYS A2 Y6	N35 K38 V59 L62 L62 V79	1103 9104 7104 7106 7106 7106 7104 7106 714 714 714 714 714 718 718 718 718 718 718 718 718 718 718	SER SER SER LYS LYS LYS LYS CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU
ASN CLU LEU THR THR ASN GLY CLY CLY ALA ALA	SER LYS CLN CLN CLN CLN CLN CLN CLY CLY CLY CLY CLY CLY	MET PHE SER ALA SER LYS ALA ALA ALA ALA CLYS CLN GLU GLU GLU	CLU THR THR THR THR CLU CLU CLU CLU ALA ALA ALA ALA ALA ALA ALA ALA ALA A
GLY LYS GLY GLY ASN MET MET ASN PHE PHE CLY CLY	ALA ALA MET ASN LYS PHE LYS ASN LSU ASN LEU SER GLU	GLN ALA VAL LYS CLU CLV GLU CLU CLU CLU CLU CLU CLU CLU CLU CLU C	VALA THR THR PRO PRO PRO PRO PRO ALA ALA ALA CLYS SER CLYS SER CLYS SER CLYS CLYS CLYS CLAN CLAN CLAN CLAN CLAN CLAN CLAN PRO PRO PRO PRO PRO PRO PRO PRO PRO PRO
PRO VAL LYS LYS VAL LYS GLN LYS CLU LYS ARG ARG ARG ARG	LYS ARG ARG ARLA ALA LEU SER ASP ASP ASP CLU CYS CLU CYS CHU	GLU ASN MET ARN LYS LYS LYS ARG ARG ARG ARG CFEU CFEU CFEU	ASPA ASPA SER SER SER CUU ASP PRO CUU ALA ALA ALA ALA ALA ALA ALA ALA ALA A
SER PRO PRO PRO PRO PRO PRO PRO CLEU CLU	VAL PRO LYS THR GLU PRO PRO PRO SER VAL VAL SER SER	SER SER GLY GLY GLU GLU GLU GLU ASN LYS ARG LYS ARG VAL LEU VAL	LYPS LYPS THR LEU ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP
CYS THR ASP ASP CLU GLU GLU GLU GLU CLU CLU CLU CLU CLU THR THR	SER VAL HIS ARG PRO PRO PRO PRO PRO VAL VAL LVS	GLU PRO ARG GLU GLU GLU GLU CYS GLY CYS CYS CYS GLY GLY GLY ALA	LEU LEU GLY ALA ALA ASN ASN ASN ANG GLN PHE PHE GLN CHIE CHIE CHIE CHIE CHIE CHIE CHIE CHIE
• Molecule 4: D	NA polymerase d	elta subunit 4	
Chain D:	36%	11%	52%
MET HIS HIS HIS HIS HIS HIS SER AIC AICA	HIS PRO PHE PHE CLY CLY HIS HIS HIS HIS HIS HIS CLU	ASN ASN TYR PHE CLEU CLEU CLEU CLEU CLEU CLEU CLEU CLE	TYR PRO VAL VAL VAL VAL VAL VAL VAL ARG ARG ARG ALA ALA ALA ALA ALA ALA ALA CUY CLY CLY CLY CLY CLY CLY CLY CLY CLY CL
GLU LEU CIX GLV GLU GLU PRO GLN ARG ASP CLU CIX CIX CIX CIX CIX CIX CIX CIX CIX CIX	E47 R50 D53 D53 C61 T62 R66 R66	R72 879 188 188 896 896 896 896 897 1101 1101 1101	
• Molecule 5: Pr	roliferating cell nu	clear antigen	
Chain E:	73	%	22% 5%
GLY PRO HIS HIS F2 F2 F1 F1 F1 F1 F1 F1 F1 F1 F1 F1 F1 F1 F1	038 147 056 056 187 187 188 188 188 188	V102 F103 E104 E104 E113 0113 0125 V136 V136 V137 V137 V137	P140 P140 L151 L151 L154 T154 T156 S161 C152 S161 C162 S160 S161 C162 S166 S166 S166 S166 S166 S176 S176 S176
VAL ASP LISI E191 E193 E193 V195 T195 T195 E198 E198 M199	N200 P201 P202 P202 A218 A218 A218 A218 A228 S223 T224 V225	1227 1227 1227 1227 233 2330 233 233 233 233 235 245 7245 7245	1244 1244 1244 1250 1251 1255 1255 1255 1255 1255 1255
• Molecule 5: Pr	roliferating cell nu	clear antigen	
Chain F:		79%	15% 6%
GLY PRO HIS HIS C R C C C C C C C C C C C C C C C C C	L16 L47 T51 T59 R64 L79 A82	187 187 187 187 187 180 180 100 113	0122 0125 1133 141 1151 1151 1151 1151 1153 1153
N179 1182 1182 1185 1185 1185 1185 1185 1185	E1 91 11 97 12 06 12 06 10 00 10 00 100 10000000000	238 245 228 2245 245 245 245 245 245 245 2410 2410 2410 2410 2410 2410 2410 2410	

• Molecule 5: Proliferating cell nuclear antigen



Chain G:		74%		20%	6%
GLY PRD HIS HIS R5 L6 L6 L12 L12	K14 V15 L16 E17 A26 A26 C27 S31 S31 G38	L47 V48 L50 L51 T51 T59 Y60 D63	M68 L72 L72 G83	186 187 188 188 188 188 188 198 102	E104 E104 Q105 S112 L118
L121 L121 V137 X138 S161 C162 A163 C162	ASN VAL VAL ASP CVS GLU GLU GLU F196 T196 T196	Q203 Q204 L205 L209 L212 P234	E238 C245 H246 L247 K248 Y249 Y250	P253 K254 1255 GLU GLU GLU GLV SER	
• Molecule 6:	DNA primer				
Chain P:	40%		44%	8%	8%
DA DG C3 C3 C3 C3 C3 C1 C10 T12	115 116 116 116 116 1172 123 123 123 123 123 123 123 123 123 12				
• Molecule 7:	DNA template				
Chain T:	26%	42%	•	29%	
DC DC DC DC DC DC DC DC DC	4 - 1 4 - 1 7 - 1	112 C13 C13 C13 C13 C13 C13 C19 C19 C19 C19 C19 C19 C19	DC TG		



# 4 Experimental information (i)

Property	Value	Source		
EM reconstruction method	SINGLE PARTICLE	Depositor		
Imposed symmetry	POINT, C1	Depositor		
Number of particles used	32282	Depositor		
Resolution determination method	FSC 0.143 CUT-OFF	Depositor		
CTF correction method	PHASE FLIPPING AND AMPLITUDE	Depositor		
	CORRECTION			
Microscope	FEI TITAN KRIOS	Depositor		
Voltage (kV)	300	Depositor		
Electron dose $(e^-/\text{\AA}^2)$	35	Depositor		
Minimum defocus (nm)	400	Depositor		
Maximum defocus (nm)	600	Depositor		
Magnification	ation 130000			
Image detector	Depositor			



# 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: ZN, DOC, TTP, SF4

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).

Mal	Mol Chain		ond lengths	Bond	angles
WIOI	Unam	RMSZ	# Z  > 5	RMSZ	# Z  > 5
1	А	0.39	0/8094	0.64	0/10971
2	В	0.41	0/3380	0.61	0/4604
3	С	0.36	0/1149	0.58	0/1553
4	D	0.42	0/574	0.69	0/783
5	Ε	0.31	0/1949	0.61	0/2632
5	F	0.35	0/1937	0.62	0/2614
5	G	0.32	0/1938	0.59	0/2617
6	Р	0.92	7/505~(1.4%)	1.08	0/777
7	Т	0.80	5/622 (0.8%)	1.01	0/958
All	All	0.42	12/20148~(0.1%)	0.66	0/27509

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	Р	20	DA	C1'-N9	-6.50	1.38	1.47
6	Р	9	DC	C1'-N1	6.10	1.57	1.49
6	Р	3	DC	C1'-N1	6.07	1.57	1.49
7	Т	19	DC	C1'-N1	5.49	1.56	1.49
6	Р	12	DT	C1'-N1	5.41	1.56	1.49

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



Mol	Chain	Non-H	${ m H}({ m model})$	H(added)	Clashes	Symm-Clashes
1	А	7926	0	7967	159	0
2	В	3304	0	3255	56	0
3	С	1130	0	1138	7	0
4	D	554	0	537	12	0
5	Е	1924	0	1930	32	0
5	F	1913	0	1922	25	0
5	G	1913	0	1928	32	0
6	Р	469	0	261	10	0
7	Т	555	0	307	67	0
8	А	1	0	0	0	0
9	А	8	0	0	1	0
10	Т	29	0	10	1	0
All	All	19726	0	19255	365	0

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.

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 9.

The worst 5 of 365 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)
7:T:4:DA:C2'	7:T:5:DT:H72	1.18	1.56
7:T:4:DA:H2"	7:T:5:DT:C5	1.41	1.51
7:T:4:DA:H2"	7:T:5:DT:C7	1.35	1.51
1:A:861:VAL:CG1	1:A:985:ARG:HD3	1.40	1.51
1:A:688:GLY:HA2	1:A:691:LEU:CD2	1.43	1.49

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 PDB entries followed by that with respect to all EM entries.

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	Perce	Percentiles		
1	А	1003/1107~(91%)	934 (93%)	65~(6%)	4 (0%)	34	72		
2	В	425/469~(91%)	392~(92%)	31~(7%)	2(0%)	29	68		
3	С	141/474~(30%)	131 (93%)	10 (7%)	0	100	100		
4	D	64/137~(47%)	49 (77%)	12 (19%)	3~(5%)	2	23		
5	Е	247/264~(94%)	239~(97%)	8 (3%)	0	100	100		
5	F	243/264~(92%)	237~(98%)	6 (2%)	0	100	100		
5	G	245/264~(93%)	229 (94%)	16 (6%)	0	100	100		
All	All	2368/2979~(80%)	2211 (93%)	148 (6%)	9 (0%)	38	72		

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	В	330	ASN
4	D	79	GLU
1	А	85	PRO
1	А	756	THR
1	А	1021	HIS

#### 5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent side chain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	Perce	$\mathbf{ntiles}$
1	А	857/944~(91%)	844 (98%)	13~(2%)	65	80
2	В	367/403~(91%)	362~(99%)	5 (1%)	67	81
3	С	125/413~(30%)	125~(100%)	0	100	100
4	D	59/120~(49%)	58~(98%)	1 (2%)	60	78
5	Ε	217/230~(94%)	217 (100%)	0	100	100
5	F	216/230~(94%)	215 (100%)	1 (0%)	88	93
5	G	217/230~(94%)	217 (100%)	0	100	100
All	All	2058/2570~(80%)	2038 (99%)	20 (1%)	77	86

5 of 20 residues with a non-rotameric sidechain are listed below:



Mol	Chain	Res	Type
2	В	180	ASP
2	В	330	ASN
5	F	153	HIS
4	D	79	GLU
1	А	1019	LEU

Sometimes side chains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such side chains are listed below:

Mol	Chain	Res	Type
2	В	330	ASN
5	F	65	ASN
5	G	246	HIS
5	G	108	GLN
5	Е	125	GLN

#### 5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is 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	Tuno	Chain	Dog	Link	Bond lengths			Bond angles		
	туре		nes		Counts	RMSZ	# Z >2	Counts	RMSZ	# Z  > 2
6	DOC	Р	25	7,6	16,19,20	0.92	0	20,26,29	1.32	1 (5%)

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
6	DOC	Р	25	$^{7,6}$	-	2/7/18/19	0/2/2/2

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
6	Р	25	DOC	C3'-C2'-C1'	2.92	106.15	102.78

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	Р	25	DOC	C3'-C4'-C5'-O5'
6	Р	25	DOC	O4'-C4'-C5'-O5'

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	Р	25	DOC	2	0

#### 5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry (i)

Of 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Dec	Link	Bond lengths			Bond angles		
WIOI	туре	Unam	nes		Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z >2
10	TTP	Т	101	-	26,30,30	4.25	14 (53%)	39,47,47	2.07	14 (35%)
9	SF4	А	1202	1	0,12,12	-	_	-	· · · · · · · · · · · · · · · · · · ·	



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
10	TTP	Т	101	-	-	3/22/34/34	0/2/2/2
9	SF4	А	1202	1	-	-	0/6/5/5

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	$\operatorname{Res}$	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	Т	101	TTP	C2'-C3'	-11.63	1.22	1.52
10	Т	101	TTP	C6-C5	8.25	1.48	1.34
10	Т	101	TTP	O4'-C4'	-7.88	1.27	1.45
10	Т	101	TTP	C2-N3	6.35	1.49	1.38
10	Т	101	TTP	C2-N1	6.07	1.48	1.38

The worst 5 of 14 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
10	Т	101	TTP	C4-N3-C2	-6.02	119.56	127.35
10	Т	101	TTP	C5-C4-N3	4.87	119.46	115.31
10	Т	101	TTP	N3-C2-N1	4.55	120.93	114.89
10	Т	101	TTP	O4-C4-C5	-3.78	120.52	124.90
10	Т	101	TTP	C6-C5-C4	2.77	120.34	118.03

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	Т	101	TTP	O4'-C4'-C5'-O5'
10	Т	101	TTP	C3'-C4'-C5'-O5'
10	Т	101	TTP	PA-O3A-PB-O1B

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	Т	101	TTP	1	0
9	А	1202	SF4	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,



bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



#### 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 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-10081. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections (i)

This section was not generated.

#### 6.2 Central slices (i)

This section was not generated.

#### 6.3 Largest variance slices (i)

This section was not generated.

#### 6.4 Orthogonal standard-deviation projections (False-color) (i)

This section was not generated.

#### 6.5 Orthogonal surface views (i)

This section was not generated.

#### 6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis (i)

This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution (i)

This section was not generated.

### 7.2 Volume estimate versus contour level (i)

This section was not generated.

### 7.3 Rotationally averaged power spectrum (i)

This section was not generated. The rotationally averaged power spectrum had issues being displayed.



# 8 Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.



# 9 Map-model fit (i)

This section was not generated.

