



# Full wwPDB X-ray Structure Validation Report ⓘ

May 14, 2020 – 03:08 pm BST

PDB ID : 3MLP  
Title : Early B-cell Factor 1 (Ebf1) bound to DNA  
Authors : Treiber, N.; Treiber, T.; Zocher, G.; Grosschedl, R.  
Deposited on : 2010-04-17  
Resolution : 2.80 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.

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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  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
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) : 2.11

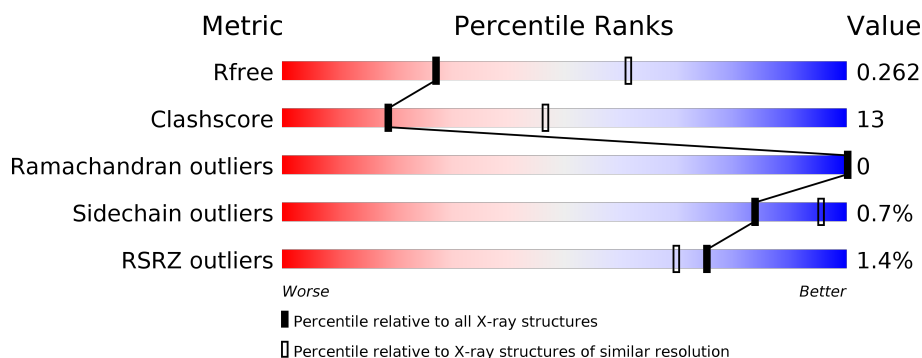
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.80 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria 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	402	<div> <div>%</div> <div> <div></div> <div>63%</div> <div>21%</div> <div>16%</div> </div> </div>
1	B	402	<div> <div>2%</div> <div> <div></div> <div>59%</div> <div>24%</div> <div>17%</div> </div> </div>
1	E	402	<div> <div>%</div> <div> <div></div> <div>56%</div> <div>19%</div> <div>25%</div> </div> </div>
1	F	402	<div> <div></div> <div> <div>56%</div> <div>18%</div> <div>26%</div> </div> </div>
2	C	22	<div> <div></div> <div> <div>36%</div> <div>50%</div> <div>14%</div> </div> </div>
2	D	22	<div> <div></div> <div> <div>32%</div> <div>50%</div> <div>18%</div> </div> </div>

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Mol	Chain	Length	Quality of chain
2	G	22	 68% 27% 5%
2	H	22	 32% 59% 9%

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11961 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 Transcription factor COE1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	337	Total	C	N	O	S	0	0	0
			2626	1653	475	482	16			
1	B	332	Total	C	N	O	S	0	0	0
			2591	1637	462	477	15			
1	E	303	Total	C	N	O	S	0	0	0
			2399	1511	435	438	15			
1	F	298	Total	C	N	O	S	0	0	0
			2334	1475	415	429	15			

There are 76 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	GLY	DELETION	UNP Q07802
A	?	-	THR	DELETION	UNP Q07802
A	?	-	PRO	DELETION	UNP Q07802
A	?	-	SER	DELETION	UNP Q07802
A	?	-	TYR	DELETION	UNP Q07802
A	?	-	LEU	DELETION	UNP Q07802
A	?	-	GLU	DELETION	UNP Q07802
A	252	ALA	HIS	ENGINEERED MUTATION	UNP Q07802
A	415	ALA	-	EXPRESSION TAG	UNP Q07802
A	416	ALA	-	EXPRESSION TAG	UNP Q07802
A	417	VAL	-	EXPRESSION TAG	UNP Q07802
A	418	LEU	-	EXPRESSION TAG	UNP Q07802
A	419	GLU	-	EXPRESSION TAG	UNP Q07802
A	420	HIS	-	EXPRESSION TAG	UNP Q07802
A	421	HIS	-	EXPRESSION TAG	UNP Q07802
A	422	HIS	-	EXPRESSION TAG	UNP Q07802
A	423	HIS	-	EXPRESSION TAG	UNP Q07802
A	424	HIS	-	EXPRESSION TAG	UNP Q07802
A	425	HIS	-	EXPRESSION TAG	UNP Q07802
B	?	-	GLY	DELETION	UNP Q07802
B	?	-	THR	DELETION	UNP Q07802

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Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	PRO	DELETION	UNP Q07802
B	?	-	SER	DELETION	UNP Q07802
B	?	-	TYR	DELETION	UNP Q07802
B	?	-	LEU	DELETION	UNP Q07802
B	?	-	GLU	DELETION	UNP Q07802
B	252	ALA	HIS	ENGINEERED MUTATION	UNP Q07802
B	415	ALA	-	EXPRESSION TAG	UNP Q07802
B	416	ALA	-	EXPRESSION TAG	UNP Q07802
B	417	VAL	-	EXPRESSION TAG	UNP Q07802
B	418	LEU	-	EXPRESSION TAG	UNP Q07802
B	419	GLU	-	EXPRESSION TAG	UNP Q07802
B	420	HIS	-	EXPRESSION TAG	UNP Q07802
B	421	HIS	-	EXPRESSION TAG	UNP Q07802
B	422	HIS	-	EXPRESSION TAG	UNP Q07802
B	423	HIS	-	EXPRESSION TAG	UNP Q07802
B	424	HIS	-	EXPRESSION TAG	UNP Q07802
B	425	HIS	-	EXPRESSION TAG	UNP Q07802
E	?	-	GLY	DELETION	UNP Q07802
E	?	-	THR	DELETION	UNP Q07802
E	?	-	PRO	DELETION	UNP Q07802
E	?	-	SER	DELETION	UNP Q07802
E	?	-	TYR	DELETION	UNP Q07802
E	?	-	LEU	DELETION	UNP Q07802
E	?	-	GLU	DELETION	UNP Q07802
E	252	ALA	HIS	ENGINEERED MUTATION	UNP Q07802
E	415	ALA	-	EXPRESSION TAG	UNP Q07802
E	416	ALA	-	EXPRESSION TAG	UNP Q07802
E	417	VAL	-	EXPRESSION TAG	UNP Q07802
E	418	LEU	-	EXPRESSION TAG	UNP Q07802
E	419	GLU	-	EXPRESSION TAG	UNP Q07802
E	420	HIS	-	EXPRESSION TAG	UNP Q07802
E	421	HIS	-	EXPRESSION TAG	UNP Q07802
E	422	HIS	-	EXPRESSION TAG	UNP Q07802
E	423	HIS	-	EXPRESSION TAG	UNP Q07802
E	424	HIS	-	EXPRESSION TAG	UNP Q07802
E	425	HIS	-	EXPRESSION TAG	UNP Q07802
F	?	-	GLY	DELETION	UNP Q07802
F	?	-	THR	DELETION	UNP Q07802
F	?	-	PRO	DELETION	UNP Q07802
F	?	-	SER	DELETION	UNP Q07802
F	?	-	TYR	DELETION	UNP Q07802
F	?	-	LEU	DELETION	UNP Q07802

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Chain	Residue	Modelled	Actual	Comment	Reference
F	?	-	GLU	DELETION	UNP Q07802
F	252	ALA	HIS	ENGINEERED MUTATION	UNP Q07802
F	415	ALA	-	EXPRESSION TAG	UNP Q07802
F	416	ALA	-	EXPRESSION TAG	UNP Q07802
F	417	VAL	-	EXPRESSION TAG	UNP Q07802
F	418	LEU	-	EXPRESSION TAG	UNP Q07802
F	419	GLU	-	EXPRESSION TAG	UNP Q07802
F	420	HIS	-	EXPRESSION TAG	UNP Q07802
F	421	HIS	-	EXPRESSION TAG	UNP Q07802
F	422	HIS	-	EXPRESSION TAG	UNP Q07802
F	423	HIS	-	EXPRESSION TAG	UNP Q07802
F	424	HIS	-	EXPRESSION TAG	UNP Q07802
F	425	HIS	-	EXPRESSION TAG	UNP Q07802

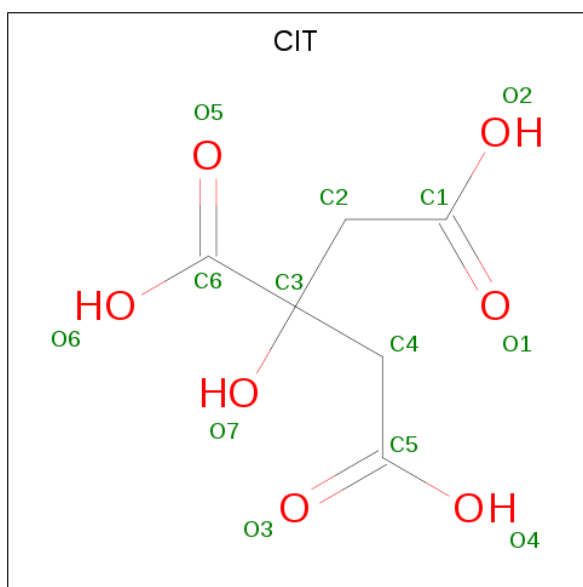
- Molecule 2 is a DNA chain called DNA (5'-D(\*CP\*TP\*TP\*TP\*AP\*TP\*TP\*CP\*CP\*CP\*AP\*TP\*GP\*GP\*GP\*AP\*AP\*TP\*AP\*AP\*AP\*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	22	Total	C	N	O	P	0	0	0
			448	216	81	130	21			
2	D	22	Total	C	N	O	P	0	0	0
			448	216	81	130	21			
2	G	22	Total	C	N	O	P	0	0	0
			448	216	81	130	21			
2	H	22	Total	C	N	O	P	0	0	0
			448	216	81	130	21			

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	Zn	0	0
			1	1		
3	A	1	Total	Zn	0	0
			1	1		
3	F	1	Total	Zn	0	0
			1	1		
3	E	1	Total	Zn	0	0
			1	1		

- Molecule 4 is CITRIC ACID (three-letter code: CIT) (formula: C<sub>6</sub>H<sub>8</sub>O<sub>7</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			13	6	7		
4	A	1	Total	C	O	0	0
			13	6	7		
4	B	1	Total	C	O	0	0
			13	6	7		
4	E	1	Total	C	O	0	0
			13	6	7		
4	F	1	Total	C	O	0	0
			13	6	7		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	36	Total	O	0	0
			36	36		
5	B	24	Total	O	0	0
			24	24		
5	C	3	Total	O	0	0
			3	3		
5	D	4	Total	O	0	0
			4	4		
5	E	34	Total	O	0	0
			34	34		
5	F	35	Total	O	0	0
			35	35		
5	G	8	Total	O	0	0
			8	8		

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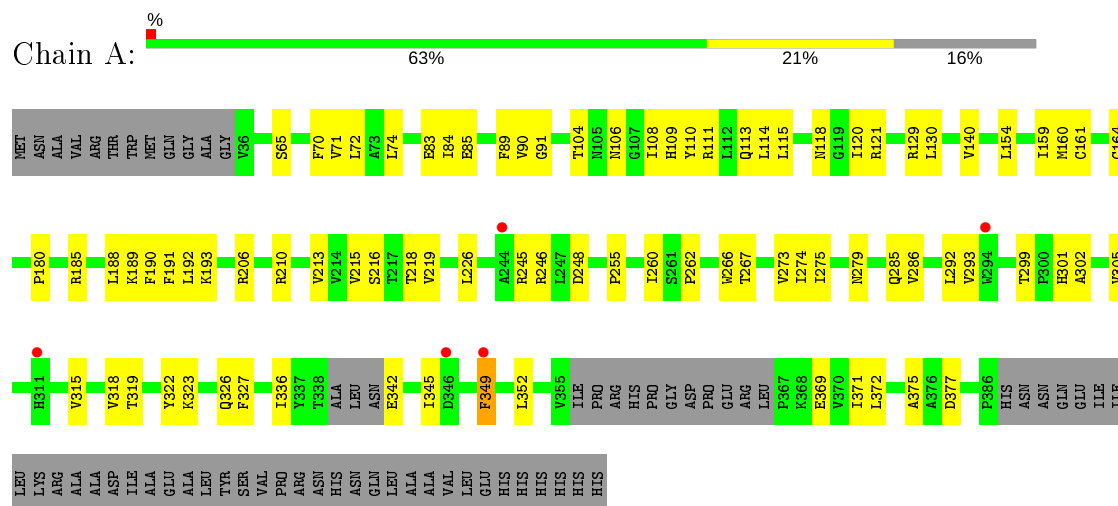
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	H	6	Total	O	0	0
			6	6		



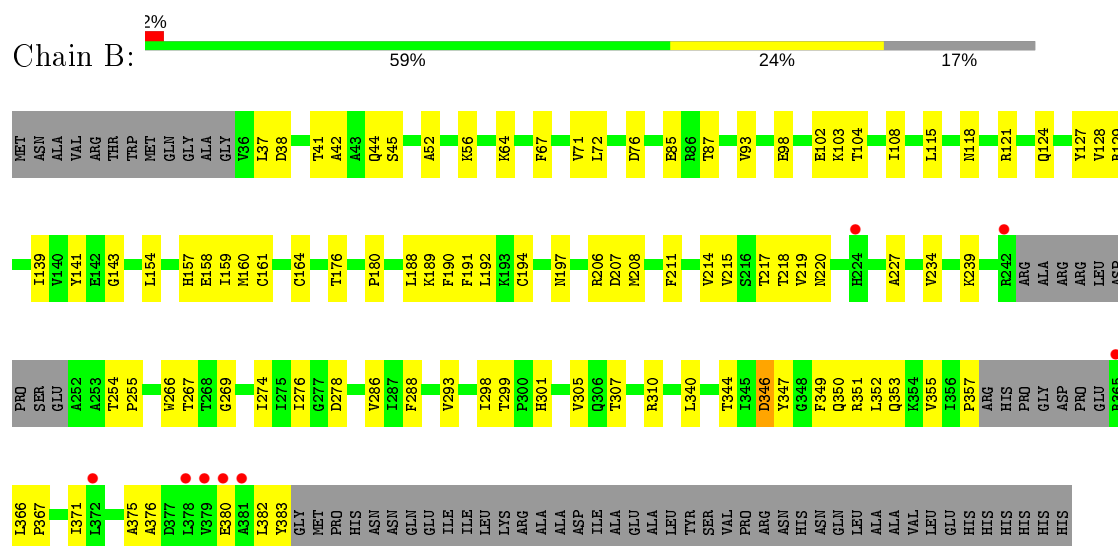
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $\text{RSRZ} > 2$ ). 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: Transcription factor COE1

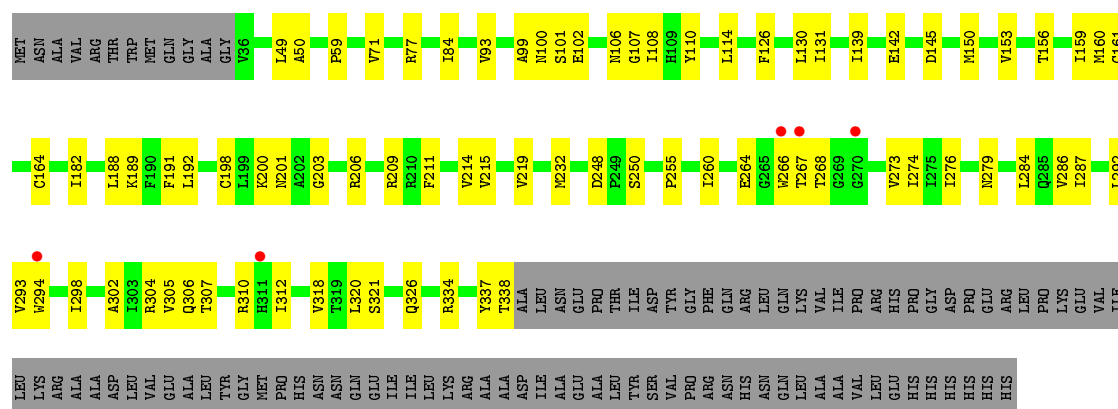


#### • Molecule 1: Transcription factor COE1

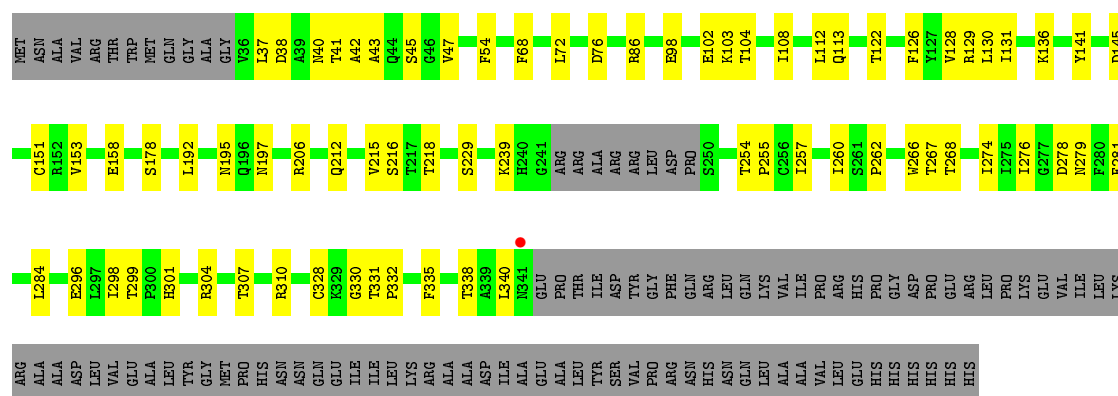


#### • Molecule 1: Transcription factor COE1

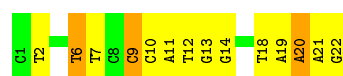




- Molecule 1: Transcription factor COE1



- Molecule 2: DNA (5'-D(\*CP\*TP\*TP\*TP\*AP\*TP\*TP\*CP\*CP\*CP\*AP\*TP\*GP\*GP\*GP\*AP\*AP\*TP\*AP\*AP\*AP\*G)-3')



- Molecule 2: DNA (5'-D(\*CP\*TP\*TP\*TP\*AP\*TP\*TP\*CP\*CP\*CP\*AP\*TP\*GP\*GP\*GP\*AP\*AP\*TP\*AP\*AP\*AP\*G)-3')



- Molecule 2: DNA (5'-D(\*CP\*TP\*TP\*TP\*AP\*TP\*TP\*CP\*CP\*CP\*AP\*TP\*GP\*GP\*GP\*AP\*AP\*TP\*AP\*AP\*AP\*G)-3')





- Molecule 2: DNA (5'-D(\*CP\*TP\*TP\*TP\*AP\*TP\*TP\*CP\*CP\*CP\*AP\*TP\*GP\*GP\*GP\*AP\*AP\*TP\*AP\*AP\*AP\*G)-3')

Chain H: 32% 59% 9%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	70.49 Å 78.69 Å 103.57 Å 88.99° 90.00° 77.81°	Depositor
Resolution (Å)	38.75 – 2.80 38.75 – 2.80	Depositor EDS
% Data completeness (in resolution range)	100.0 (38.75-2.80) 96.8 (38.75-2.80)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.09	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.01 (at 2.81 Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.204 , 0.264 0.204 , 0.262	Depositor DCC
$R_{free}$ test set	2592 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	47.2	Xtriage
Anisotropy	0.386	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 34.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	0.036 for -h,-k,l	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	11961	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.77% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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

## 5 Model quality ⓘ

### 5.1 Standard geometry ⓘ

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

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	0.49	0/2681	0.64	0/3626
1	B	0.48	0/2646	0.65	0/3583
1	E	0.53	0/2451	0.66	0/3314
1	F	0.52	0/2384	0.67	0/3226
2	C	0.97	0/502	1.77	13/773 (1.7%)
2	D	1.17	1/502 (0.2%)	1.84	16/773 (2.1%)
2	G	0.97	0/502	1.71	9/773 (1.2%)
2	H	1.01	1/502 (0.2%)	1.69	13/773 (1.7%)
All	All	0.62	2/12170 (0.0%)	0.96	51/16841 (0.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	6	DT	C3'-O3'	-6.87	1.35	1.44
2	H	12	DT	C3'-O3'	-6.05	1.36	1.44

All (51) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	18	DT	O4'-C4'-C3'	-9.72	100.17	106.00
2	D	6	DT	N3-C4-O4	9.02	125.31	119.90
2	H	7	DT	N3-C4-O4	8.95	125.27	119.90
2	G	6	DT	O4'-C4'-C3'	-8.89	100.66	106.00
2	D	6	DT	C5-C4-O4	-8.87	118.69	124.90
2	C	20	DA	O4'-C1'-N9	8.59	114.01	108.00
2	D	12	DT	N3-C4-O4	7.70	124.52	119.90
2	C	12	DT	N3-C4-O4	7.61	124.47	119.90
2	H	7	DT	C5-C4-O4	-7.54	119.62	124.90
2	C	12	DT	O4'-C1'-N1	7.44	113.21	108.00
2	H	2	DT	N3-C4-O4	7.34	124.31	119.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	17	DA	O4'-C4'-C3'	-7.32	101.57	104.50
2	C	18	DT	C1'-O4'-C4'	-7.31	102.79	110.10
2	H	19	DA	O4'-C1'-N9	7.16	113.01	108.00
2	D	12	DT	C5-C4-O4	-6.99	120.01	124.90
2	G	6	DT	C6-C5-C7	-6.87	118.78	122.90
2	H	8	DC	O4'-C1'-N1	6.79	112.75	108.00
2	D	17	DA	P-O3'-C3'	-6.61	111.76	119.70
2	H	2	DT	C5-C4-O4	-6.48	120.36	124.90
2	C	6	DT	O4'-C4'-C3'	-6.44	101.92	104.50
2	D	7	DT	N3-C4-O4	6.35	123.71	119.90
2	G	18	DT	O5'-P-OP2	-6.35	99.99	105.70
2	C	20	DA	C1'-O4'-C4'	-6.33	103.77	110.10
2	C	9	DC	N1-C2-O2	6.25	122.65	118.90
2	D	16	DA	O4'-C1'-N9	6.10	112.27	108.00
2	D	7	DT	C5-C4-O4	-6.10	120.63	124.90
2	G	21	DA	O4'-C1'-N9	6.01	112.21	108.00
2	C	13	DG	C4-C5-N7	5.99	113.20	110.80
2	D	17	DA	C1'-O4'-C4'	-5.87	104.23	110.10
2	G	18	DT	C1'-O4'-C4'	-5.85	104.25	110.10
2	C	18	DT	O4'-C1'-C2'	-5.85	101.22	105.90
2	G	3	DT	O4'-C1'-N1	5.81	112.06	108.00
2	C	2	DT	O4'-C1'-N1	5.77	112.04	108.00
2	H	12	DT	P-O3'-C3'	5.77	126.62	119.70
2	D	6	DT	O4'-C4'-C3'	-5.71	102.22	104.50
2	H	18	DT	C1'-O4'-C4'	-5.67	104.43	110.10
2	C	18	DT	O4'-C4'-C3'	-5.62	102.25	104.50
2	C	12	DT	C5-C4-O4	-5.58	121.00	124.90
2	D	21	DA	O4'-C1'-N9	5.56	111.89	108.00
2	H	17	DA	O4'-C1'-C2'	-5.54	101.47	105.90
2	H	11	DA	O4'-C1'-N9	-5.52	104.13	108.00
2	D	16	DA	P-O3'-C3'	5.51	126.32	119.70
2	G	6	DT	C4'-C3'-C2'	-5.48	98.17	103.10
2	H	3	DT	N3-C4-O4	5.47	123.18	119.90
2	G	15	DG	O4'-C1'-N9	5.39	111.77	108.00
2	D	14	DG	O4'-C1'-N9	5.29	111.71	108.00
2	G	12	DT	C5-C4-O4	-5.25	121.23	124.90
2	C	14	DG	P-O5'-C5'	-5.24	112.52	120.90
2	H	12	DT	O5'-P-OP2	-5.14	101.08	105.70
2	H	14	DG	O4'-C1'-N9	5.09	111.56	108.00
2	D	10	DC	O3'-P-O5'	-5.05	94.40	104.00

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2626	0	2563	75	0
1	B	2591	0	2527	78	0
1	E	2399	0	2378	72	0
1	F	2334	0	2296	57	0
2	C	448	0	251	8	0
2	D	448	0	251	7	0
2	G	448	0	251	2	0
2	H	448	0	251	8	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
4	A	26	0	10	5	0
4	B	13	0	5	3	0
4	E	13	0	5	0	0
4	F	13	0	5	1	0
5	A	36	0	0	1	0
5	B	24	0	0	1	0
5	C	3	0	0	0	0
5	D	4	0	0	1	0
5	E	34	0	0	0	0
5	F	35	0	0	0	0
5	G	8	0	0	0	0
5	H	6	0	0	1	0
All	All	11961	0	10793	295	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 13.

All (295) 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:B:64:LYS:NZ	1:B:197:ASN:OD1	1.87	1.08

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:287:ILE:CD1	1:E:292:LEU:HD23	1.94	0.97
1:A:260:ILE:HG22	1:A:260:ILE:O	1.64	0.95
1:E:287:ILE:HD12	1:E:292:LEU:HD23	1.58	0.85
1:A:299:THR:HG23	1:A:301:HIS:H	1.43	0.83
1:B:127:TYR:CE2	1:B:219:VAL:HG22	2.13	0.83
1:E:99:ALA:HB2	1:E:219:VAL:HG12	1.61	0.83
1:F:239:LYS:NZ	2:H:15:DG:N7	2.27	0.82
1:A:104:THR:HG22	1:A:140:VAL:HG22	1.62	0.81
1:A:74:LEU:HD12	1:A:84:ILE:HD11	1.62	0.79
1:B:64:LYS:HZ1	1:B:197:ASN:CG	1.85	0.79
1:A:206:ARG:NH1	2:C:21:DA:OP1	2.16	0.79
1:A:349:PHE:O	1:A:352:LEU:CB	2.32	0.77
1:E:99:ALA:O	1:E:102:GLU:HG3	1.84	0.77
1:B:191:PHE:C	1:B:192:LEU:HD12	2.05	0.77
1:E:59:PRO:O	1:E:232:MET:HG3	1.84	0.76
1:A:315:VAL:HG22	1:A:336:ILE:HG12	1.68	0.76
1:B:85:GLU:OE1	1:B:121:ARG:NH1	2.19	0.75
1:B:298:ILE:HG22	1:B:299:THR:HG23	1.69	0.74
1:F:108:ILE:HD12	1:F:192:LEU:HD22	1.68	0.73
1:A:90:VAL:HG12	4:A:3:CIT:O3	1.89	0.72
1:B:72:LEU:HD11	1:B:215:VAL:HG11	1.71	0.72
1:E:126:PHE:CZ	1:E:215:VAL:HG11	2.24	0.72
1:A:274:ILE:HD11	1:B:276:ILE:HD11	1.72	0.71
1:B:206:ARG:O	1:B:206:ARG:HG2	1.89	0.71
1:E:293:VAL:HG11	1:E:305:VAL:HG13	1.73	0.70
1:A:260:ILE:O	1:A:260:ILE:CG2	2.35	0.70
1:E:286:VAL:O	1:E:287:ILE:HD13	1.92	0.70
1:E:71:VAL:HG22	1:E:189:LYS:HG3	1.72	0.69
1:E:126:PHE:CZ	1:E:215:VAL:CG1	2.77	0.68
1:B:218:THR:HG22	1:B:220:ASN:H	1.58	0.68
1:B:176:THR:HG22	1:B:176:THR:O	1.94	0.68
1:F:98:GLU:OE1	1:F:102:GLU:O	2.10	0.68
1:A:299:THR:HG22	1:A:302:ALA:HB3	1.76	0.67
1:F:42:ALA:HB1	1:F:47:VAL:HG23	1.76	0.66
1:B:64:LYS:NZ	1:B:197:ASN:CG	2.45	0.66
4:A:3:CIT:O5	4:A:3:CIT:C1	2.43	0.66
1:B:124:GLN:OE1	1:B:217:THR:OG1	2.14	0.66
1:E:150:MET:SD	1:E:160:MET:HE1	2.37	0.65
1:A:130:LEU:CD2	1:A:213:VAL:HG22	2.27	0.64
1:A:274:ILE:CD1	1:B:276:ILE:HD11	2.28	0.63
1:B:239:LYS:NZ	2:D:15:DG:N7	2.41	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:50:ALA:HB2	1:E:77:ARG:HA	1.79	0.63
1:B:87:THR:CG2	1:B:180:PRO:HD2	2.29	0.63
1:A:118:ASN:OD1	1:A:120:ILE:HG22	1.99	0.63
1:B:129:ARG:O	1:B:214:VAL:HG12	1.98	0.62
1:A:216:SER:OG	1:A:218:THR:O	2.16	0.62
1:A:274:ILE:HG21	1:B:274:ILE:HD13	1.82	0.62
1:E:287:ILE:CD1	1:E:292:LEU:CD2	2.75	0.62
1:E:108:ILE:HD12	1:E:192:LEU:CD1	2.30	0.62
1:E:293:VAL:CG1	1:E:305:VAL:HG13	2.30	0.62
1:A:299:THR:HG23	1:A:301:HIS:N	2.14	0.61
1:B:344:THR:HG22	1:B:347:TYR:HB3	1.81	0.61
1:B:188:LEU:HD12	1:B:190:PHE:CE1	2.35	0.61
1:E:84:ILE:HD13	1:E:188:LEU:HG	1.83	0.61
1:E:274:ILE:HD12	1:F:274:ILE:CG1	2.30	0.61
1:A:245:ARG:HH21	1:A:246:ARG:NH2	1.99	0.61
1:A:104:THR:OG1	1:A:104:THR:O	2.18	0.60
1:F:296:GLU:OE1	1:F:304:ARG:NH1	2.30	0.60
1:F:255:PRO:HA	1:F:279:ASN:HB2	1.83	0.60
1:A:246:ARG:HD3	1:A:248:ASP:O	2.02	0.60
1:B:254:THR:HG22	1:B:255:PRO:O	2.02	0.60
1:A:129:ARG:NH1	1:A:219:VAL:O	2.35	0.59
1:E:274:ILE:HD12	1:F:274:ILE:HG12	1.85	0.59
1:F:103:LYS:O	1:F:103:LYS:HG2	2.01	0.59
1:B:274:ILE:N	1:B:274:ILE:HD12	2.17	0.59
2:H:9:DC:H2''	2:H:10:DC:O5'	2.02	0.59
1:B:108:ILE:HD12	1:B:192:LEU:CD2	2.33	0.58
1:B:376:ALA:O	1:B:380:GLU:N	2.35	0.58
1:B:188:LEU:CD1	1:B:190:PHE:CE1	2.87	0.58
1:E:142:GLU:OE1	1:E:200:LYS:HE2	2.03	0.58
1:A:159:ILE:HG23	1:A:160:MET:SD	2.44	0.57
1:A:108:ILE:HD13	1:A:192:LEU:HD11	1.84	0.57
1:A:260:ILE:CD1	1:A:318:VAL:HG21	2.34	0.57
1:A:72:LEU:HD11	1:A:215:VAL:HG11	1.85	0.57
1:F:68:PHE:CZ	1:F:192:LEU:HD11	2.39	0.57
1:F:267:THR:HB	1:F:310:ARG:O	2.06	0.56
1:E:293:VAL:HG11	1:E:305:VAL:CG1	2.34	0.56
1:E:131:ILE:HG23	1:E:214:VAL:HG21	1.88	0.56
1:E:139:ILE:HD12	1:E:211:PHE:CE1	2.40	0.56
1:F:72:LEU:HD11	1:F:215:VAL:HG11	1.88	0.56
1:B:127:TYR:CE2	1:B:219:VAL:CG2	2.87	0.56
1:B:98:GLU:OE2	1:B:103:LYS:N	2.39	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:194:CYS:SG	1:B:234:VAL:HG11	2.46	0.55
1:E:161:CYS:HB3	1:E:164:CYS:HB2	1.89	0.55
1:E:298:ILE:HD11	1:E:304:ARG:HB2	1.89	0.55
1:E:287:ILE:HD11	1:E:292:LEU:CD2	2.37	0.54
1:B:64:LYS:NZ	1:B:197:ASN:ND2	2.55	0.54
1:B:128:VAL:HG22	1:B:215:VAL:HG12	1.88	0.54
2:C:22:DG:H1	2:D:1:DC:H42	1.55	0.54
2:H:1:DC:H5"	5:H:145:HOH:O	2.07	0.54
1:A:108:ILE:CD1	1:A:154:LEU:HB3	2.38	0.54
1:B:266:TRP:CE3	1:B:340:LEU:HB2	2.43	0.54
2:H:9:DC:C2'	2:H:10:DC:O5'	2.56	0.54
1:F:254:THR:O	1:F:279:ASN:ND2	2.38	0.54
1:E:276:ILE:N	1:E:276:ILE:HD12	2.23	0.54
1:F:298:ILE:HG22	1:F:299:THR:HG23	1.89	0.54
1:E:273:VAL:HG23	1:E:307:THR:HG23	1.90	0.53
1:E:267:THR:O	1:E:310:ARG:O	2.27	0.53
1:A:299:THR:HG22	1:A:302:ALA:CB	2.38	0.53
1:A:260:ILE:HD13	1:A:318:VAL:HG21	1.91	0.53
1:E:191:PHE:O	1:E:192:LEU:HD13	2.09	0.53
1:F:145:ASP:OD2	1:F:195:ASN:ND2	2.27	0.53
2:D:20:DA:H2"	2:D:21:DA:C8	2.44	0.53
2:C:10:DC:H2"	2:C:11:DA:O5'	2.09	0.52
1:F:266:TRP:O	1:F:268:THR:O	2.28	0.52
1:A:108:ILE:HD11	1:A:154:LEU:HB3	1.92	0.51
1:A:275:ILE:HD11	1:A:286:VAL:HG11	1.93	0.51
1:E:99:ALA:HB2	1:E:219:VAL:CG1	2.36	0.51
1:B:267:THR:HB	1:B:310:ARG:O	2.10	0.51
1:F:103:LYS:CG	1:F:103:LYS:O	2.57	0.51
1:F:108:ILE:HD12	1:F:192:LEU:CD2	2.38	0.51
1:B:115:LEU:HD22	1:B:121:ARG:HH12	1.74	0.51
1:E:131:ILE:HD13	1:E:214:VAL:HG22	1.92	0.51
1:B:154:LEU:HD22	1:B:192:LEU:HD23	1.93	0.51
1:A:215:VAL:HG23	1:A:226:LEU:HB2	1.92	0.51
1:A:275:ILE:CD1	1:A:286:VAL:HG11	2.41	0.51
1:E:59:PRO:O	1:E:232:MET:CG	2.56	0.51
1:A:377:ASP:OD1	1:B:351:ARG:NH2	2.43	0.50
1:E:131:ILE:CG2	1:E:214:VAL:HG21	2.41	0.50
1:E:126:PHE:HZ	1:E:215:VAL:HG11	1.74	0.50
1:A:245:ARG:HG3	1:A:246:ARG:HG2	1.92	0.50
1:A:273:VAL:HG23	1:A:305:VAL:HB	1.93	0.50
1:B:347:TYR:HA	1:B:350:GLN:HB2	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:41:THR:O	1:F:45:SER:N	2.44	0.50
1:F:68:PHE:CZ	1:F:192:LEU:CD1	2.94	0.50
1:E:287:ILE:HD11	1:E:292:LEU:HD23	1.84	0.49
1:F:331:THR:O	1:F:331:THR:HG23	2.12	0.49
1:B:71:VAL:HG22	1:B:189:LYS:HG3	1.93	0.49
1:E:260:ILE:HD11	1:E:334:ARG:O	2.11	0.49
1:F:102:GLU:HB3	1:F:104:THR:HG23	1.93	0.49
1:B:37:LEU:HD23	1:B:42:ALA:HB2	1.94	0.49
1:E:131:ILE:HD13	1:E:214:VAL:CG2	2.42	0.49
1:F:158:GLU:HB2	1:F:178:SER:OG	2.13	0.49
1:F:257:ILE:HD12	1:F:328:CYS:SG	2.52	0.49
1:B:108:ILE:HD12	1:B:192:LEU:HD21	1.93	0.49
1:E:310:ARG:NH1	1:E:312:ILE:O	2.46	0.49
1:A:319:THR:HG23	1:A:327:PHE:O	2.12	0.49
2:D:3:DT:H73	5:D:144:HOH:O	2.12	0.49
1:B:139:ILE:HD12	1:B:211:PHE:CE1	2.48	0.49
1:B:349:PHE:O	1:B:353:GLN:HB2	2.13	0.48
1:E:337:TYR:O	1:E:338:THR:CB	2.61	0.48
1:A:108:ILE:HD13	1:A:192:LEU:CD1	2.43	0.48
1:B:382:LEU:O	1:B:383:TYR:HB2	2.13	0.48
2:C:9:DC:H2''	2:C:10:DC:O5'	2.13	0.48
1:B:188:LEU:HD12	1:B:190:PHE:HE1	1.75	0.48
2:D:17:DA:H2''	2:D:18:DT:O4'	2.13	0.48
1:E:71:VAL:HG22	1:E:189:LYS:CG	2.40	0.48
1:B:67:PHE:CE1	1:B:176:THR:HG21	2.49	0.48
1:A:191:PHE:C	1:A:192:LEU:HD22	2.34	0.48
1:A:255:PRO:HA	1:A:279:ASN:HB2	1.96	0.48
1:E:201:ASN:N	1:E:201:ASN:OD1	2.47	0.48
1:A:345:ILE:HG22	1:A:345:ILE:O	2.14	0.48
1:E:260:ILE:CD1	1:E:318:VAL:HG21	2.44	0.48
1:E:302:ALA:CB	1:F:276:ILE:HD13	2.43	0.48
1:B:158:GLU:HG2	1:B:164:CYS:SG	2.54	0.47
1:F:267:THR:N	1:F:338:THR:O	2.46	0.47
1:F:197:ASN:HD21	2:G:8:DC:P	2.36	0.47
4:A:1:CIT:O3	4:A:1:CIT:H21	2.13	0.47
1:F:122:THR:HG23	4:F:6:CIT:O3	2.14	0.47
1:E:110:TYR:OH	1:E:192:LEU:HD11	2.14	0.47
1:E:159:ILE:HG23	1:E:160:MET:HG3	1.96	0.47
1:B:207:ASP:OD1	1:B:208:MET:N	2.48	0.47
1:E:266:TRP:C	1:E:268:THR:H	2.18	0.47
1:E:126:PHE:CZ	1:E:215:VAL:HG13	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:212:GLN:NE2	1:F:229:SER:O	2.47	0.47
1:B:67:PHE:CD1	1:B:176:THR:HG21	2.50	0.47
1:E:284:LEU:HD21	1:E:320:LEU:HD13	1.97	0.47
1:F:267:THR:HG23	1:F:338:THR:O	2.15	0.47
1:A:115:LEU:HD13	1:A:121:ARG:HG3	1.97	0.47
1:B:366:LEU:CB	1:B:367:PRO:CD	2.92	0.47
1:F:216:SER:OG	1:F:218:THR:O	2.29	0.47
1:A:70:PHE:CE2	1:A:190:PHE:CD1	3.03	0.47
1:A:114:LEU:O	1:A:121:ARG:HA	2.15	0.46
1:E:93:VAL:HB	1:E:107:GLY:HA3	1.97	0.46
1:F:112:LEU:HD13	1:F:126:PHE:HB2	1.96	0.46
1:A:285:GLN:HB3	1:A:292:LEU:HD13	1.98	0.46
1:B:346:ASP:N	1:B:346:ASP:OD1	2.48	0.46
1:A:299:THR:HG21	5:B:1:HOH:O	2.15	0.46
1:B:159:ILE:HG23	1:B:160:MET:HG3	1.97	0.46
1:A:65:SER:O	1:A:193:LYS:HE2	2.15	0.46
1:B:278:ASP:HA	1:B:301:HIS:HD1	1.80	0.46
1:E:284:LEU:HD12	1:E:321:SER:O	2.15	0.46
1:B:87:THR:CG2	1:B:180:PRO:CD	2.94	0.46
1:E:286:VAL:C	1:E:287:ILE:HD13	2.36	0.46
1:A:322:TYR:CE2	1:A:323:LYS:HG3	2.51	0.46
1:A:266:TRP:CZ2	4:B:4:CIT:H22	2.51	0.46
1:F:274:ILE:HD13	1:F:304:ARG:HG3	1.98	0.45
1:B:118:ASN:N	1:B:118:ASN:OD1	2.43	0.45
1:E:71:VAL:HA	1:E:188:LEU:O	2.16	0.45
4:A:1:CIT:O3	4:A:1:CIT:C2	2.64	0.45
1:B:41:THR:O	1:B:44:GLN:HB3	2.17	0.45
1:F:278:ASP:HA	1:F:301:HIS:ND1	2.31	0.45
1:F:54:PHE:CZ	1:F:229:SER:HB3	2.51	0.45
1:A:85:GLU:OE1	1:A:113:GLN:NE2	2.50	0.45
1:B:52:ALA:O	1:B:227:ALA:HB2	2.16	0.45
1:B:42:ALA:O	1:B:45:SER:N	2.50	0.45
1:E:108:ILE:HD12	1:E:192:LEU:HD11	1.98	0.45
1:F:254:THR:HB	1:F:255:PRO:CD	2.47	0.45
1:E:293:VAL:HG12	1:E:294:TRP:N	2.31	0.45
1:A:104:THR:HG22	1:A:140:VAL:CG2	2.39	0.45
1:A:349:PHE:O	1:A:352:LEU:N	2.43	0.45
1:A:74:LEU:CD1	1:A:84:ILE:HD11	2.40	0.45
1:B:157:HIS:CE1	1:B:161:CYS:HB2	2.52	0.45
1:E:84:ILE:O	1:E:182:ILE:HD13	2.17	0.45
1:E:248:ASP:OD2	1:E:250:SER:OG	2.27	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:218:THR:HG22	1:B:220:ASN:N	2.28	0.44
1:F:76:ASP:OD1	1:F:76:ASP:C	2.55	0.44
1:A:319:THR:HG21	1:A:326:GLN:OE1	2.16	0.44
1:B:214:VAL:O	1:B:214:VAL:HG13	2.16	0.44
1:A:106:ASN:OD1	1:A:106:ASN:C	2.55	0.44
1:B:102:GLU:HB3	1:B:104:THR:HG23	1.99	0.44
1:F:130:LEU:HD12	1:F:153:VAL:CG1	2.48	0.44
1:F:307:THR:HG21	1:F:335:PHE:CZ	2.52	0.44
1:E:206:ARG:HD3	2:G:21:DA:OP1	2.18	0.44
1:F:112:LEU:N	1:F:112:LEU:HD12	2.32	0.44
1:E:108:ILE:HD12	1:E:192:LEU:HD12	1.99	0.44
2:C:19:DA:H2"	2:C:20:DA:C8	2.53	0.44
1:F:267:THR:HG23	1:F:338:THR:C	2.38	0.44
1:E:130:LEU:HD12	1:E:153:VAL:HG12	1.99	0.44
1:F:128:VAL:O	1:F:129:ARG:HG2	2.17	0.44
1:A:262:PRO:HD2	1:A:273:VAL:HA	2.00	0.44
1:A:292:LEU:HD12	1:A:293:VAL:N	2.33	0.44
1:A:71:VAL:HA	1:A:188:LEU:O	2.17	0.44
1:F:86:ARG:HD2	1:F:113:GLN:NE2	2.33	0.44
1:A:111:ARG:NH2	4:A:3:CIT:O5	2.51	0.44
1:A:104:THR:O	1:A:106:ASN:N	2.51	0.43
1:B:349:PHE:CB	4:B:4:CIT:H42	2.48	0.43
1:E:142:GLU:OE1	1:E:200:LYS:CE	2.66	0.43
1:F:37:LEU:HD23	1:F:37:LEU:N	2.33	0.43
1:F:38:ASP:N	1:F:38:ASP:OD1	2.51	0.43
1:B:286:VAL:HG11	1:B:305:VAL:HG11	2.01	0.43
1:E:131:ILE:HG23	1:E:214:VAL:CG2	2.48	0.43
1:B:67:PHE:CD1	1:B:176:THR:CG2	3.02	0.43
1:B:64:LYS:NZ	1:B:197:ASN:HD21	2.16	0.43
1:A:72:LEU:HD12	1:A:190:PHE:HE1	1.84	0.43
1:B:218:THR:HG22	1:B:219:VAL:N	2.32	0.43
1:F:141:TYR:CZ	1:F:151:CYS:HA	2.53	0.43
1:A:130:LEU:HD21	1:A:213:VAL:HG22	2.00	0.43
1:B:269:GLY:HA2	1:B:307:THR:HG22	2.01	0.43
1:B:56:LYS:HB2	1:B:71:VAL:HB	2.01	0.43
1:F:41:THR:O	1:F:45:SER:HB2	2.19	0.43
1:B:93:VAL:HG12	1:B:93:VAL:O	2.19	0.43
1:F:40:ASN:O	1:F:43:ALA:HB3	2.19	0.43
1:E:156:THR:O	1:E:159:ILE:HG22	2.19	0.42
1:E:130:LEU:HD12	1:E:153:VAL:CG1	2.50	0.42
1:B:349:PHE:HB3	4:B:4:CIT:H42	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:274:ILE:CD1	1:F:304:ARG:HG3	2.50	0.42
1:A:161:CYS:HB3	1:A:164:CYS:HB2	2.01	0.42
1:A:91:GLY:O	1:A:109:HIS:N	2.41	0.42
2:D:10:DC:H2''	2:D:11:DA:O5'	2.19	0.42
1:E:198:CYS:HB3	1:E:209:ARG:O	2.20	0.42
1:E:139:ILE:CD1	1:E:211:PHE:CD1	3.02	0.42
2:H:9:DC:H2'	2:H:10:DC:C6	2.54	0.42
1:B:355:VAL:O	1:B:357:PRO:HD3	2.20	0.41
1:B:76:ASP:OD1	1:B:76:ASP:C	2.58	0.41
1:A:84:ILE:CD1	1:A:188:LEU:HG	2.50	0.41
1:A:371:ILE:O	1:A:375:ALA:HB2	2.20	0.41
1:B:192:LEU:HD12	1:B:192:LEU:N	2.34	0.41
1:E:294:TRP:CE3	1:E:306:GLN:HG2	2.55	0.41
2:H:11:DA:C2	2:H:12:DT:C2	3.08	0.41
1:A:180:PRO:HB2	1:A:188:LEU:HD22	2.02	0.41
1:A:372:LEU:HA	1:A:375:ALA:HB3	2.02	0.41
1:F:42:ALA:HA	1:F:45:SER:HB3	2.01	0.41
1:B:38:ASP:OD1	1:B:38:ASP:C	2.59	0.41
2:C:20:DA:C6	2:C:21:DA:C6	3.08	0.41
1:E:49:LEU:HD21	1:E:114:LEU:HD13	2.01	0.41
1:F:260:ILE:HG22	1:F:262:PRO:O	2.21	0.41
1:A:267:THR:HG22	1:A:342:GLU:CB	2.51	0.41
1:B:141:TYR:CZ	1:B:143:GLY:HA3	2.56	0.41
1:A:110:TYR:OH	1:A:192:LEU:HD21	2.20	0.41
1:A:210:ARG:HD3	5:A:442:HOH:O	2.21	0.41
1:A:89:PHE:HE1	1:A:108:ILE:HG23	1.86	0.41
1:B:37:LEU:HD11	1:B:41:THR:HG21	2.03	0.41
1:F:68:PHE:CE1	1:F:192:LEU:HD12	2.55	0.41
2:C:22:DG:N2	2:D:2:DT:C2	2.89	0.41
2:C:6:DT:H2'	2:C:7:DT:C6	2.56	0.41
1:F:128:VAL:C	1:F:129:ARG:CG	2.90	0.41
1:F:131:ILE:HD12	1:F:136:LYS:HA	2.02	0.41
1:A:83:GLU:OE1	1:A:185:ARG:NE	2.54	0.40
1:E:203:GLY:O	2:H:6:DT:H1'	2.21	0.40
1:E:255:PRO:HB3	1:E:279:ASN:O	2.21	0.40
1:F:330:GLY:C	1:F:332:PRO:HD3	2.41	0.40
1:B:288:PHE:CD2	1:B:293:VAL:HG11	2.56	0.40
1:B:351:ARG:O	1:B:352:LEU:C	2.57	0.40
1:E:139:ILE:CD1	1:E:211:PHE:CE1	3.03	0.40
1:F:112:LEU:CD1	1:F:112:LEU:N	2.85	0.40
1:F:281:PHE:CZ	1:F:284:LEU:HD13	2.57	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:72:LEU:HD12	1:A:190:PHE:CE1	2.56	0.40
1:B:371:ILE:O	1:B:375:ALA:N	2.49	0.40
1:E:100:ASN:O	1:E:101:SER:OG	2.34	0.40
1:E:106:ASN:HB2	1:E:153:VAL:HG21	2.04	0.40
2:H:11:DA:H2'	2:H:12:DT:H71	2.03	0.40
1:A:84:ILE:HD12	1:A:188:LEU:HG	2.03	0.40
1:A:71:VAL:HG22	1:A:189:LYS:HG2	2.04	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	331/402 (82%)	306 (92%)	25 (8%)	0	100	100
1	B	326/402 (81%)	305 (94%)	21 (6%)	0	100	100
1	E	301/402 (75%)	284 (94%)	17 (6%)	0	100	100
1	F	294/402 (73%)	278 (95%)	16 (5%)	0	100	100
All	All	1252/1608 (78%)	1173 (94%)	79 (6%)	0	100	100

There are no Ramachandran outliers to report.

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	282/348 (81%)	280 (99%)	2 (1%)	84	95
1	B	279/348 (80%)	278 (100%)	1 (0%)	91	97
1	E	265/348 (76%)	262 (99%)	3 (1%)	73	92
1	F	256/348 (74%)	254 (99%)	2 (1%)	81	94
All	All	1082/1392 (78%)	1074 (99%)	8 (1%)	84	95

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	349	PHE
1	A	369	GLU
1	B	346	ASP
1	E	145	ASP
1	E	264	GLU
1	E	326	GLN
1	F	206	ARG
1	F	340	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	195	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 9 ligands modelled in this entry, 4 are monoatomic - leaving 5 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	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	CIT	B	4	-	3,12,12	1.43	1 (33%)	3,17,17	1.37	0
4	CIT	E	2	-	3,12,12	1.18	1 (33%)	3,17,17	0.97	0
4	CIT	F	6	-	3,12,12	1.36	0	3,17,17	3.28	3 (100%)
4	CIT	A	3	-	3,12,12	1.33	0	3,17,17	1.56	1 (33%)
4	CIT	A	1	-	3,12,12	1.44	1 (33%)	3,17,17	1.32	0

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
4	CIT	B	4	-	-	3/6/16/16	-
4	CIT	E	2	-	-	0/6/16/16	-
4	CIT	F	6	-	-	3/6/16/16	-
4	CIT	A	3	-	-	4/6/16/16	-
4	CIT	A	1	-	-	2/6/16/16	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	4	CIT	O7-C3	2.47	1.47	1.43
4	A	1	CIT	O7-C3	2.41	1.46	1.43
4	E	2	CIT	O7-C3	2.02	1.46	1.43

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	F	6	CIT	C4-C3-C2	3.69	119.20	109.33
4	F	6	CIT	C3-C4-C5	3.58	120.71	114.98
4	A	3	CIT	C3-C2-C1	-2.67	110.70	114.98
4	F	6	CIT	C3-C2-C1	2.40	118.83	114.98

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	4	CIT	C6-C3-C4-C5
4	F	6	CIT	C2-C3-C4-C5
4	F	6	CIT	C6-C3-C4-C5
4	A	3	CIT	C1-C2-C3-C6
4	F	6	CIT	O7-C3-C4-C5
4	A	3	CIT	C1-C2-C3-O7
4	B	4	CIT	O7-C3-C4-C5
4	B	4	CIT	C2-C3-C4-C5
4	A	1	CIT	C2-C3-C4-C5
4	A	1	CIT	O7-C3-C4-C5
4	A	3	CIT	C1-C2-C3-C4
4	A	3	CIT	O7-C3-C4-C5

There are no ring outliers.

4 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	4	CIT	3	0
4	F	6	CIT	1	0
4	A	3	CIT	3	0
4	A	1	CIT	2	0

## 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	337/402 (83%)	-0.34	5 (1%) 73 68	22, 49, 117, 155	0
1	B	332/402 (82%)	-0.32	8 (2%) 59 49	29, 48, 111, 158	0
1	E	303/402 (75%)	-0.40	5 (1%) 70 63	23, 44, 94, 140	0
1	F	298/402 (74%)	-0.49	1 (0%) 94 93	22, 44, 83, 127	0
2	C	22/22 (100%)	-0.84	0 100 100	26, 34, 59, 71	0
2	D	22/22 (100%)	-0.85	0 100 100	24, 38, 60, 88	0
2	G	22/22 (100%)	-0.89	0 100 100	24, 30, 58, 67	0
2	H	22/22 (100%)	-0.81	0 100 100	22, 33, 53, 76	0
All	All	1358/1696 (80%)	-0.41	19 (1%) 75 70	22, 46, 106, 158	0

All (19) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	379	VAL	3.6
1	B	378	LEU	3.5
1	E	311	HIS	3.2
1	E	266	TRP	3.2
1	B	365	ARG	2.7
1	A	311	HIS	2.6
1	A	346	ASP	2.6
1	B	242	ARG	2.6
1	B	381	ALA	2.6
1	B	224	HIS	2.5
1	F	341	ASN	2.4
1	E	294	TRP	2.3
1	A	244	ALA	2.3
1	B	380	GLU	2.2
1	A	349	PHE	2.2
1	E	270	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	294	TRP	2.1
1	B	372	LEU	2.1
1	E	267	THR	2.1

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

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

## 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. 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
4	CIT	F	6	13/13	0.81	0.20	52,59,62,63	0
4	CIT	B	4	13/13	0.88	0.19	61,68,71,71	0
4	CIT	A	3	13/13	0.91	0.13	56,63,66,68	0
4	CIT	A	1	13/13	0.93	0.13	42,46,50,51	0
4	CIT	E	2	13/13	0.94	0.11	53,56,60,60	0
3	ZN	B	501	1/1	0.99	0.10	38,38,38,38	0
3	ZN	E	501	1/1	1.00	0.10	38,38,38,38	0
3	ZN	F	501	1/1	1.00	0.09	32,32,32,32	0
3	ZN	A	501	1/1	1.00	0.06	43,43,43,43	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.