



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 09:25 AM GMT

PDB ID : 3IDE  
Title : Structure of IPNV subviral particle  
Authors : Coulibaly, F.; Chevalier, C.; Delmas, B.; Rey, F.A.  
Deposited on : 2009-07-21  
Resolution : 3.35 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.  
We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

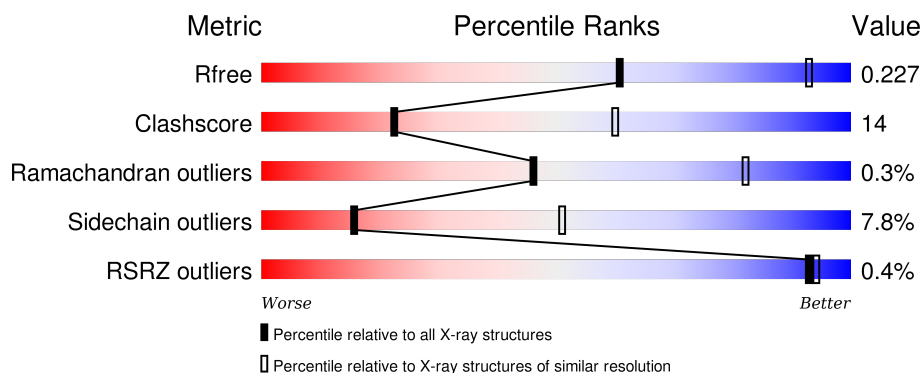
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.35 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))
$R_{free}$	91344	1005 (3.42-3.30)
Clashscore	102246	1076 (3.42-3.30)
Ramachandran outliers	100387	1059 (3.42-3.30)
Sidechain outliers	100360	1058 (3.42-3.30)
RSRZ outliers	91569	1010 (3.42-3.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	442	
1	B	442	
1	C	442	
1	D	442	
1	E	442	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 16072 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 Capsid protein VP2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	415	Total	C	N	O	S	0	0	0
			3208	2013	543	640	12			
1	B	416	Total	C	N	O	S	0	0	0
			3216	2019	544	641	12			
1	C	415	Total	C	N	O	S	0	0	0
			3208	2013	543	640	12			
1	D	416	Total	C	N	O	S	0	0	0
			3216	2019	544	641	12			
1	E	415	Total	C	N	O	S	0	0	0
			3208	2013	543	640	12			

- Molecule 2 is COBALT (II) ION (three-letter code: CO) (formula: Co).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Co	0	0
			1	1		
2	C	1	Total	Co	0	0
			1	1		
2	E	1	Total	Co	0	0
			1	1		

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

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

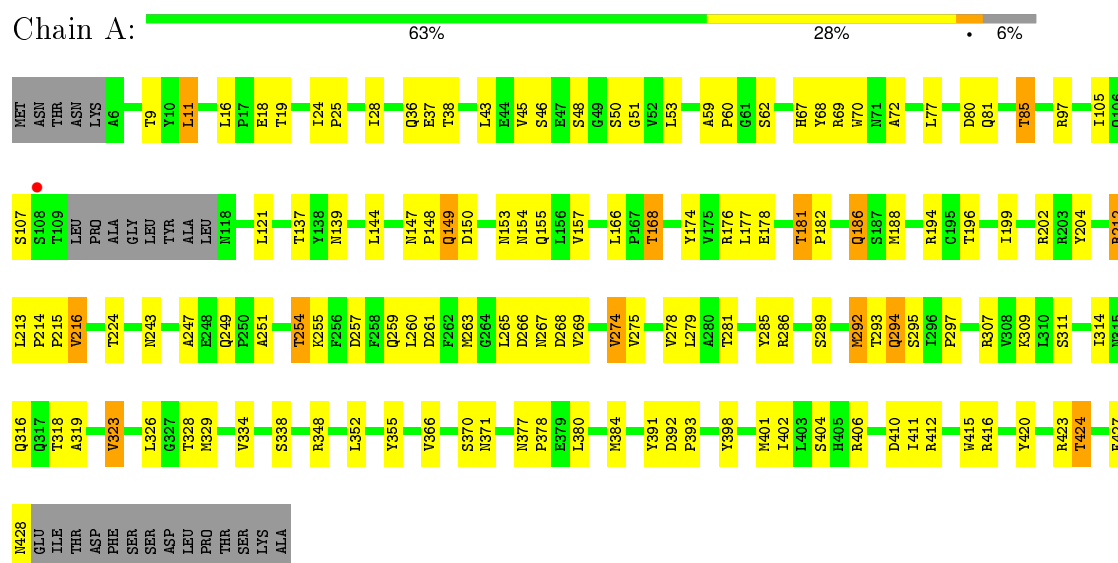
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total 2	O 2	0	0
4	B	2	Total 2	O 2	0	0
4	C	2	Total 2	O 2	0	0
4	D	2	Total 2	O 2	0	0
4	E	2	Total 2	O 2	0	0

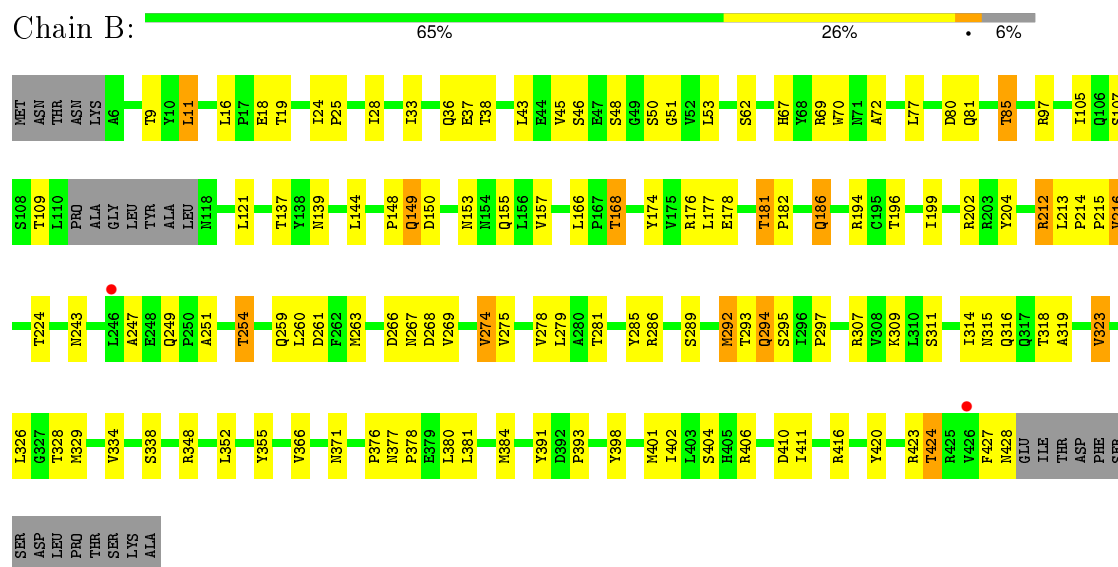
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

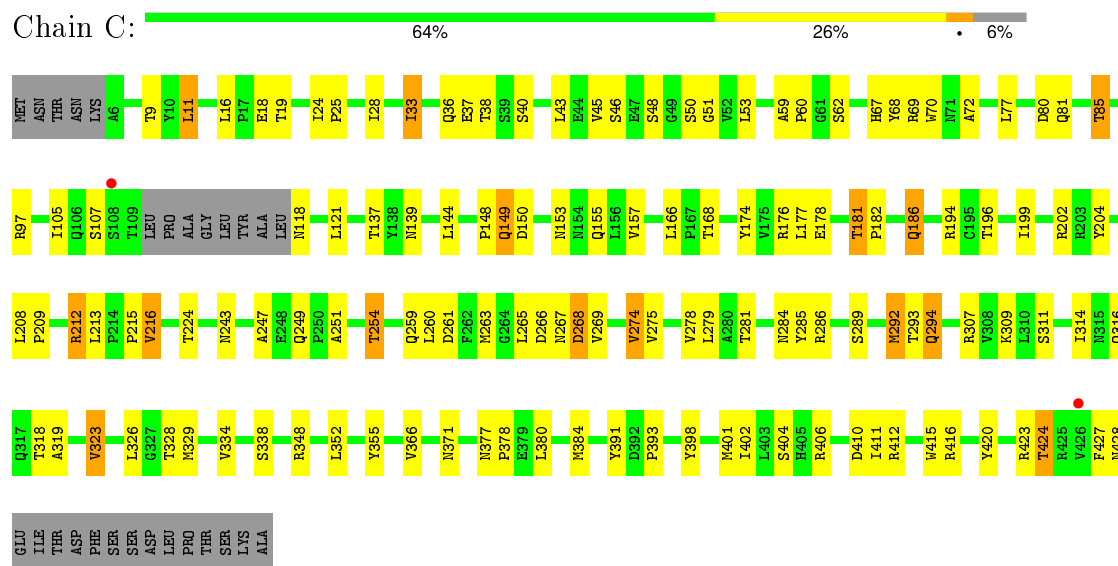
#### • Molecule 1: Capsid protein VP2



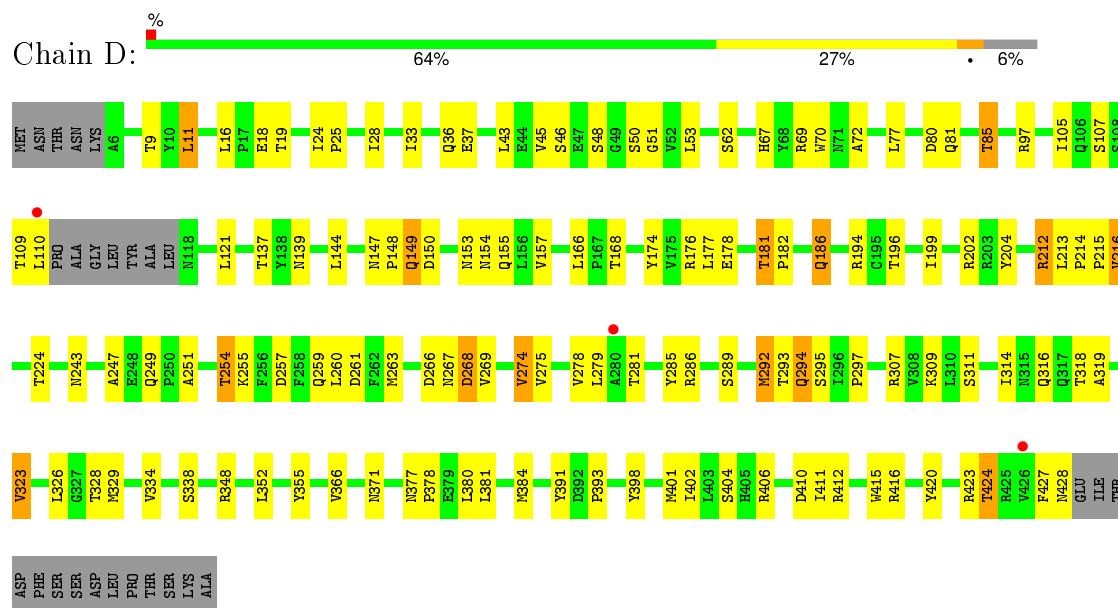
#### • Molecule 1: Capsid protein VP2



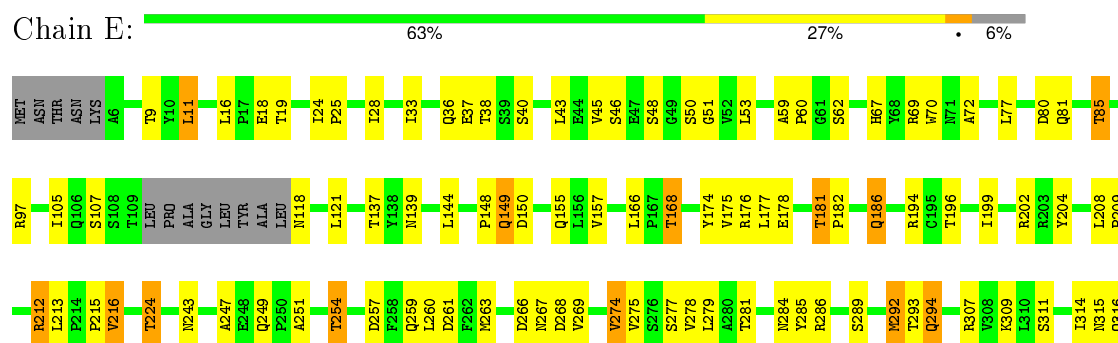
#### • Molecule 1: Capsid protein VP2



• Molecule 1: Capsid protein VP2



• Molecule 1: Capsid protein VP2



Q317		
T318		
A319		
V323		
L326		
G327		
T328		
M329		
V334		
S338		
E339		
M340		
R348		
L352		
Y355		
V366		
M371		
M377		
P378		
E379		
L380		
M384		
Y391		
D392		
P393		
Y398		
M401		
I402		
L403		
S404		
H405		
R406		
L409		
D410		
I411		
R412		
M415		
R416		
Y420		
R423		
T424		
R425		

Y426

F427

M428

GLU

ILE

THR

ASP

PHE

SER

SER

ASP

LEU

PRO

THR

SER

LYS

ALA

## 4 Data and refinement statistics

Property	Value	Source
Space group	I 2 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	303.43Å 303.43Å 303.43Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.75 – 3.35 29.75 – 3.35	Depositor EDS
% Data completeness (in resolution range)	98.6 (29.75-3.35) 98.6 (29.75-3.35)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.06 (at 3.39Å)	Xtriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, $R_{free}$	0.217 , 0.233 0.205 , 0.227	Depositor DCC
$R_{free}$ test set	1988 reflections (3.04%)	DCC
Wilson B-factor (Å <sup>2</sup> )	88.9	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.25 , 54.5	EDS
Estimated twinning fraction	0.000 for -l,-k,-h	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.55$ , $\langle L^2 \rangle = 0.39$	Xtriage
Outliers	1 of 65456 reflections (0.002%)	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	16072	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	99.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.23% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: CO, CL

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z  > 5$	RMSZ	# $ Z  > 5$
1	A	0.28	0/3268	0.50	0/4449
1	B	0.28	0/3276	0.50	0/4460
1	C	0.29	0/3268	0.51	0/4449
1	D	0.28	0/3276	0.50	0/4460
1	E	0.31	0/3268	0.52	0/4449
All	All	0.29	0/16356	0.51	0/22267

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	3208	0	3188	89	0
1	B	3216	0	3199	89	0
1	C	3208	0	3188	91	0
1	D	3216	0	3199	90	0
1	E	3208	0	3188	87	0
2	A	1	0	0	0	0
2	C	1	0	0	0	0
2	E	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	1	0	0	0	0
3	C	1	0	0	0	0
3	E	1	0	0	0	0
4	A	2	0	0	0	0
4	B	2	0	0	0	0
4	C	2	0	0	0	0
4	D	2	0	0	0	0
4	E	2	0	0	0	0
All	All	16072	0	15962	437	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 14.

The worst 5 of 437 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:410:ASP:HB3	1:E:423:ARG:HH22	1.18	1.07
1:B:410:ASP:HB3	1:B:423:ARG:HH22	1.17	1.07
1:A:410:ASP:HB3	1:A:423:ARG:HH22	1.17	1.05
1:D:410:ASP:HB3	1:D:423:ARG:HH22	1.17	1.05
1:C:410:ASP:HB3	1:C:423:ARG:HH22	1.17	1.01

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	411/442 (93%)	373 (91%)	37 (9%)	1 (0%)	52	86
1	B	412/442 (93%)	374 (91%)	37 (9%)	1 (0%)	52	86
1	C	411/442 (93%)	371 (90%)	39 (10%)	1 (0%)	52	86

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	412/442 (93%)	374 (91%)	37 (9%)	1 (0%)	52	86
1	E	411/442 (93%)	372 (90%)	37 (9%)	2 (0%)	34	74
All	All	2057/2210 (93%)	1864 (91%)	187 (9%)	6 (0%)	46	82

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	268	ASP
1	C	268	ASP
1	E	268	ASP
1	B	268	ASP
1	D	268	ASP

### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	362/385 (94%)	334 (92%)	28 (8%)	16	52
1	B	363/385 (94%)	336 (93%)	27 (7%)	17	53
1	C	362/385 (94%)	333 (92%)	29 (8%)	15	50
1	D	363/385 (94%)	335 (92%)	28 (8%)	16	52
1	E	362/385 (94%)	333 (92%)	29 (8%)	15	50
All	All	1812/1925 (94%)	1671 (92%)	141 (8%)	16	51

5 of 141 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	181	THR
1	C	294	GLN
1	E	278	VAL
1	C	194	ARG
1	C	268	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

Of 6 ligands modelled in this entry, 6 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 ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	415/442 (93%)	-0.33	1 (0%) 95 96	60, 104, 165, 191	0
1	B	416/442 (94%)	-0.36	2 (0%) 91 92	60, 101, 164, 212	0
1	C	415/442 (93%)	-0.43	2 (0%) 91 92	57, 86, 135, 177	0
1	D	416/442 (94%)	-0.30	3 (0%) 89 89	56, 104, 160, 209	0
1	E	415/442 (93%)	-0.52	1 (0%) 95 96	50, 78, 121, 159	0
All	All	2077/2210 (93%)	-0.39	9 (0%) 93 94	50, 93, 155, 212	0

The worst 5 of 9 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	246	LEU	2.7
1	E	426	VAL	2.6
1	C	108	SER	2.5
1	A	108	SER	2.4
1	D	426	VAL	2.4

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

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

### 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron

density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
3	CL	A	444	1/1	0.96	0.19	1.90	69,69,69,69	0
2	CO	A	443	1/1	0.96	0.07	-2.15	73,73,73,73	0
2	CO	C	443	1/1	0.98	0.04	-	61,61,61,61	1
3	CL	E	444	1/1	0.98	0.46	-	33,33,33,33	1
2	CO	E	443	1/1	0.99	0.03	-	54,54,54,54	1
3	CL	C	444	1/1	0.98	0.57	-	34,34,34,34	1

## 6.5 Other polymers

There are no such residues in this entry.