



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 29, 2020 – 02:36 am BST

PDB ID : 3FK2  
Title : Crystal structure of the RhoGAP domain of human glucocorticoid receptor DNA-binding factor 1  
Authors : Nedyalkova, L.; Tong, Y.; Tempel, W.; Loppnau, P.; Arrowsmith, C.H.; Edwards, A.M.; Bountra, C.; Weigelt, J.; Bochkarev, A.; Park, H.; Structural Genomics Consortium (SGC)  
Deposited on : 2008-12-15  
Resolution : 2.80 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

<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
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

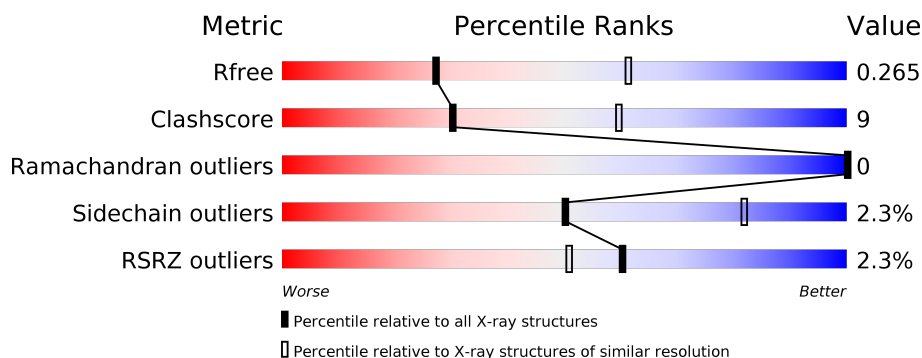
# 1 Overall quality at a glance

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	246	<div> <div>62%</div> <div>17%</div> <div>20%</div> </div>
1	B	246	<div>2%</div> <div>63%</div> <div>16%</div> <div>22%</div>

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	UNX	A	1	-	-	-	X
2	UNX	A	5	-	-	-	X
2	UNX	B	2	-	-	-	X
2	UNX	B	6	-	-	-	X
2	UNX	C	3	-	-	-	X
2	UNX	C	7	-	-	-	X
2	UNX	D	4	-	-	-	X
2	UNX	D	8	-	-	-	X

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 6165 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 Glucocorticoid receptor DNA-binding factor 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	196	Total	C	N	O	S	0	0	0
			1564	1011	254	290	9			
1	B	193	Total	C	N	O	S	0	0	0
			1538	996	250	283	9			
1	C	195	Total	C	N	O	S	0	0	0
			1525	989	247	280	9			
1	D	196	Total	C	N	O	S	0	0	0
			1530	990	247	284	9			

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1194	MET	-	EXPRESSION TAG	UNP Q9NRY4
A	1195	HIS	-	EXPRESSION TAG	UNP Q9NRY4
A	1196	HIS	-	EXPRESSION TAG	UNP Q9NRY4
A	1197	HIS	-	EXPRESSION TAG	UNP Q9NRY4
A	1198	HIS	-	EXPRESSION TAG	UNP Q9NRY4
A	1199	HIS	-	EXPRESSION TAG	UNP Q9NRY4
A	1200	HIS	-	EXPRESSION TAG	UNP Q9NRY4
A	1201	SER	-	EXPRESSION TAG	UNP Q9NRY4
A	1202	SER	-	EXPRESSION TAG	UNP Q9NRY4
A	1203	GLY	-	EXPRESSION TAG	UNP Q9NRY4
A	1204	ARG	-	EXPRESSION TAG	UNP Q9NRY4
A	1205	GLU	-	EXPRESSION TAG	UNP Q9NRY4
A	1206	ASN	-	EXPRESSION TAG	UNP Q9NRY4
A	1207	LEU	-	EXPRESSION TAG	UNP Q9NRY4
A	1208	TYR	-	EXPRESSION TAG	UNP Q9NRY4
A	1209	PHE	-	EXPRESSION TAG	UNP Q9NRY4
A	1210	GLN	-	EXPRESSION TAG	UNP Q9NRY4
A	1211	GLY	-	EXPRESSION TAG	UNP Q9NRY4
B	1194	MET	-	EXPRESSION TAG	UNP Q9NRY4
B	1195	HIS	-	EXPRESSION TAG	UNP Q9NRY4
B	1196	HIS	-	EXPRESSION TAG	UNP Q9NRY4

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1197	HIS	-	EXPRESSION TAG	UNP Q9NRY4
B	1198	HIS	-	EXPRESSION TAG	UNP Q9NRY4
B	1199	HIS	-	EXPRESSION TAG	UNP Q9NRY4
B	1200	HIS	-	EXPRESSION TAG	UNP Q9NRY4
B	1201	SER	-	EXPRESSION TAG	UNP Q9NRY4
B	1202	SER	-	EXPRESSION TAG	UNP Q9NRY4
B	1203	GLY	-	EXPRESSION TAG	UNP Q9NRY4
B	1204	ARG	-	EXPRESSION TAG	UNP Q9NRY4
B	1205	GLU	-	EXPRESSION TAG	UNP Q9NRY4
B	1206	ASN	-	EXPRESSION TAG	UNP Q9NRY4
B	1207	LEU	-	EXPRESSION TAG	UNP Q9NRY4
B	1208	TYR	-	EXPRESSION TAG	UNP Q9NRY4
B	1209	PHE	-	EXPRESSION TAG	UNP Q9NRY4
B	1210	GLN	-	EXPRESSION TAG	UNP Q9NRY4
B	1211	GLY	-	EXPRESSION TAG	UNP Q9NRY4
C	1194	MET	-	EXPRESSION TAG	UNP Q9NRY4
C	1195	HIS	-	EXPRESSION TAG	UNP Q9NRY4
C	1196	HIS	-	EXPRESSION TAG	UNP Q9NRY4
C	1197	HIS	-	EXPRESSION TAG	UNP Q9NRY4
C	1198	HIS	-	EXPRESSION TAG	UNP Q9NRY4
C	1199	HIS	-	EXPRESSION TAG	UNP Q9NRY4
C	1200	HIS	-	EXPRESSION TAG	UNP Q9NRY4
C	1201	SER	-	EXPRESSION TAG	UNP Q9NRY4
C	1202	SER	-	EXPRESSION TAG	UNP Q9NRY4
C	1203	GLY	-	EXPRESSION TAG	UNP Q9NRY4
C	1204	ARG	-	EXPRESSION TAG	UNP Q9NRY4
C	1205	GLU	-	EXPRESSION TAG	UNP Q9NRY4
C	1206	ASN	-	EXPRESSION TAG	UNP Q9NRY4
C	1207	LEU	-	EXPRESSION TAG	UNP Q9NRY4
C	1208	TYR	-	EXPRESSION TAG	UNP Q9NRY4
C	1209	PHE	-	EXPRESSION TAG	UNP Q9NRY4
C	1210	GLN	-	EXPRESSION TAG	UNP Q9NRY4
C	1211	GLY	-	EXPRESSION TAG	UNP Q9NRY4
D	1194	MET	-	EXPRESSION TAG	UNP Q9NRY4
D	1195	HIS	-	EXPRESSION TAG	UNP Q9NRY4
D	1196	HIS	-	EXPRESSION TAG	UNP Q9NRY4
D	1197	HIS	-	EXPRESSION TAG	UNP Q9NRY4
D	1198	HIS	-	EXPRESSION TAG	UNP Q9NRY4
D	1199	HIS	-	EXPRESSION TAG	UNP Q9NRY4
D	1200	HIS	-	EXPRESSION TAG	UNP Q9NRY4
D	1201	SER	-	EXPRESSION TAG	UNP Q9NRY4
D	1202	SER	-	EXPRESSION TAG	UNP Q9NRY4

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Chain	Residue	Modelled	Actual	Comment	Reference
D	1203	GLY	-	EXPRESSION TAG	UNP Q9NRY4
D	1204	ARG	-	EXPRESSION TAG	UNP Q9NRY4
D	1205	GLU	-	EXPRESSION TAG	UNP Q9NRY4
D	1206	ASN	-	EXPRESSION TAG	UNP Q9NRY4
D	1207	LEU	-	EXPRESSION TAG	UNP Q9NRY4
D	1208	TYR	-	EXPRESSION TAG	UNP Q9NRY4
D	1209	PHE	-	EXPRESSION TAG	UNP Q9NRY4
D	1210	GLN	-	EXPRESSION TAG	UNP Q9NRY4
D	1211	GLY	-	EXPRESSION TAG	UNP Q9NRY4

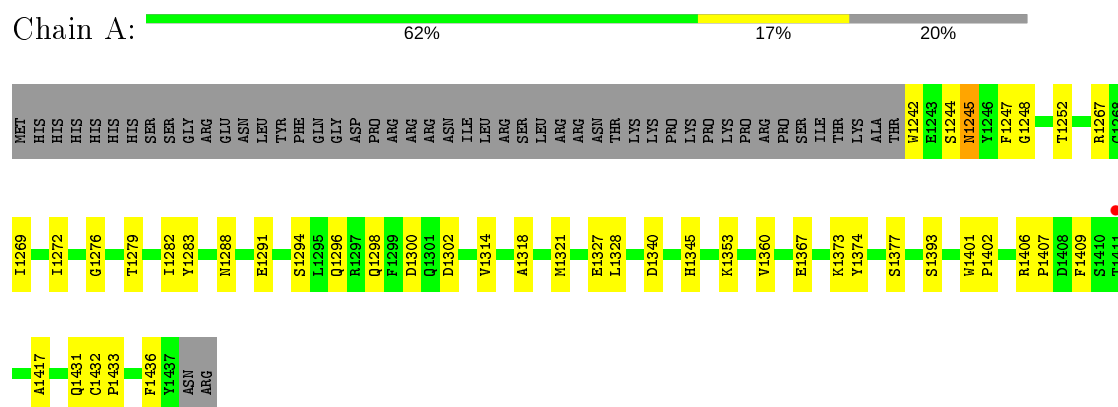
- Molecule 2 is UNKNOWN ATOM OR ION (three-letter code: UNX) (formula: X).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	2	Total X 2 2	0	0
2	A	2	Total X 2 2	0	0
2	D	2	Total X 2 2	0	0
2	C	2	Total X 2 2	0	0

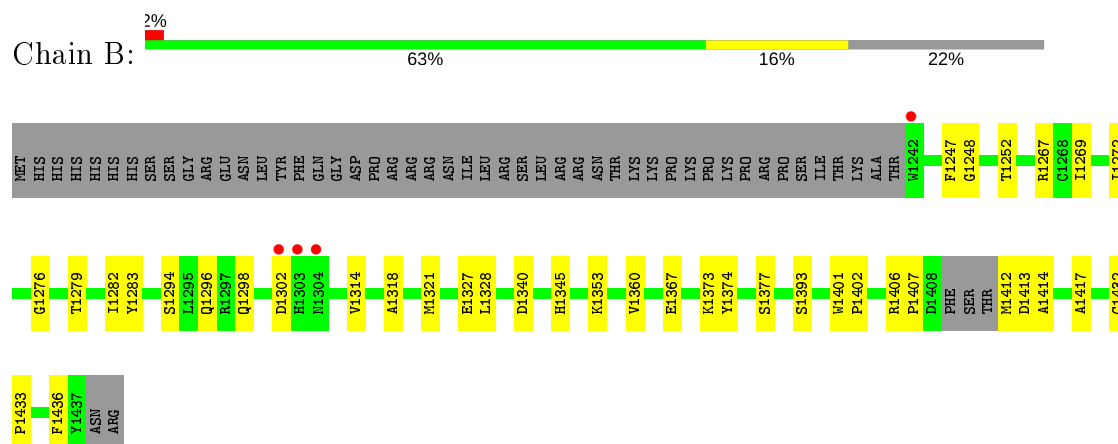
### 3 Residue-property plots [i](#)

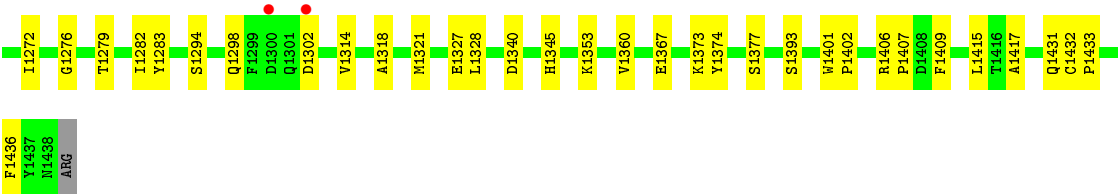
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are 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 ( $RSRZ > 2$ ). 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: Glucocorticoid receptor DNA-binding factor 1

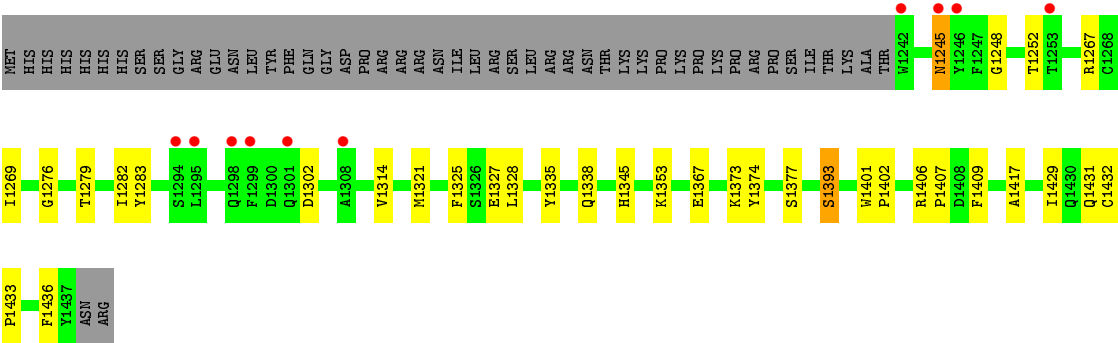


- Molecule 1: Glucocorticoid receptor DNA-binding factor 1





● Molecule 1: Glucocorticoid receptor DNA-binding factor 1





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	165.03Å 72.41Å 72.86Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	36.43 – 2.80 36.43 – 2.78	Depositor EDS
% Data completeness (in resolution range)	96.2 (36.43-2.80) 96.7 (36.43-2.78)	Depositor EDS
$R_{merge}$	0.16	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.98 (at 2.77Å)	Xtriage
Refinement program	PHENIX	Depositor
R, $R_{free}$	0.223 , 0.273 0.213 , 0.265	Depositor DCC
$R_{free}$ test set	1019 reflections (4.67%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	48.7	Xtriage
Anisotropy	0.145	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 44.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.047 for -h,l,k	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	6165	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 41.95 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.1917e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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: UNX

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	0.35	0/1605	0.48	0/2184
1	B	0.36	0/1577	0.49	0/2144
1	C	0.35	0/1564	0.49	0/2130
1	D	0.35	0/1569	0.49	0/2139
All	All	0.35	0/6315	0.49	0/8597

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	1564	0	1486	31	0
1	B	1538	0	1467	27	0
1	C	1525	0	1448	28	0
1	D	1530	0	1432	26	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
All	All	6165	0	5833	112	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 9.

The worst 5 of 112 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:D:1321:MET:HE2	1:D:1325:PHE:HE2	1.50	0.76
1:D:1401:TRP:HZ3	1:D:1407:PRO:HG2	1.58	0.69
1:C:1401:TRP:HZ3	1:C:1407:PRO:HG2	1.58	0.69
1:C:1252:THR:HG22	1:C:1367:GLU:HG2	1.75	0.68
1:D:1252:THR:HG22	1:D:1367:GLU:HG2	1.75	0.68

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	194/246 (79%)	190 (98%)	4 (2%)	0	100	100
1	B	189/246 (77%)	187 (99%)	2 (1%)	0	100	100
1	C	193/246 (78%)	188 (97%)	5 (3%)	0	100	100
1	D	194/246 (79%)	188 (97%)	6 (3%)	0	100	100
All	All	770/984 (78%)	753 (98%)	17 (2%)	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	169/230 (74%)	165 (98%)	4 (2%)	49	81
1	B	165/230 (72%)	162 (98%)	3 (2%)	59	86
1	C	162/230 (70%)	158 (98%)	4 (2%)	47	80
1	D	161/230 (70%)	157 (98%)	4 (2%)	47	80
All	All	657/920 (71%)	642 (98%)	15 (2%)	50	82

5 of 15 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	1393	SER
1	C	1245	ASN
1	D	1302	ASP
1	B	1377	SER
1	D	1245	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	1245	ASN
1	C	1369	HIS
1	D	1296	GLN
1	B	1431	GLN
1	D	1245	ASN

### 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 8 ligands modelled in this entry, 8 are unknown - 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	196/246 (79%)	-0.24	1 (0%) 91 88	24, 43, 73, 87	1 (0%)
1	B	193/246 (78%)	-0.24	4 (2%) 63 54	23, 42, 73, 83	1 (0%)
1	C	195/246 (79%)	-0.15	3 (1%) 73 68	24, 43, 76, 89	1 (0%)
1	D	196/246 (79%)	-0.09	10 (5%) 28 19	25, 44, 77, 90	1 (0%)
All	All	780/984 (79%)	-0.18	18 (2%) 60 51	23, 43, 76, 90	4 (0%)

The worst 5 of 18 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	1300	ASP	3.1
1	D	1295	LEU	2.9
1	B	1302	ASP	2.7
1	D	1308	ALA	2.5
1	B	1304	ASN	2.5

### 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( $\text{\AA}^2$ )	Q<0.9
2	UNX	B	2	1/1	-0.65	2.16	37,37,37,37	1
2	UNX	A	1	1/1	-0.03	2.58	38,38,38,38	1
2	UNX	C	3	1/1	0.06	2.92	38,38,38,38	1
2	UNX	D	4	1/1	0.09	2.35	39,39,39,39	1
2	UNX	C	7	1/1	0.39	1.01	29,29,29,29	1
2	UNX	B	6	1/1	0.39	1.05	28,28,28,28	1
2	UNX	D	8	1/1	0.39	0.55	28,28,28,28	1
2	UNX	A	5	1/1	0.73	0.73	27,27,27,27	1

## 6.5 Other polymers ⓘ

There are no such residues in this entry.