



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 22, 2023 – 01:07 PM JST

PDB ID : 7WGU  
Title : Crystal structure of metal-binding protein EfeO from Escherichia coli  
Authors : Nakatsuji, S.; Takase, R.; Mikami, B.; Hashimoto, W.  
Deposited on : 2021-12-29  
Resolution : 1.85 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
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) : 2.36

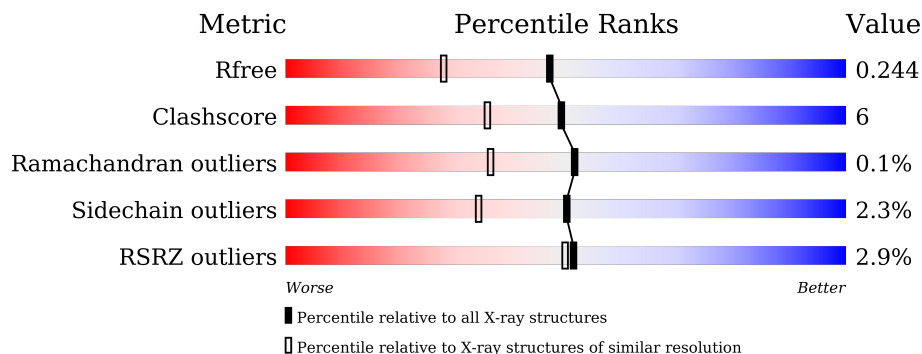
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.85 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	2469 (1.86-1.86)
Clashscore	141614	2625 (1.86-1.86)
Ramachandran outliers	138981	2592 (1.86-1.86)
Sidechain outliers	138945	2592 (1.86-1.86)
RSRZ outliers	127900	2436 (1.86-1.86)

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

Mol	Chain	Length	Quality of chain
1	A	358	
1	B	358	

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 6081 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 Iron uptake system protein EfeO.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	349	Total	C	N	O	S	0	13	0
			2767	1746	467	545	9			
1	B	348	Total	C	N	O	S	0	24	0
			2852	1800	473	570	9			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP A0A7T2JMH3
A	351	LEU	-	expression tag	UNP A0A7T2JMH3
A	352	GLU	-	expression tag	UNP A0A7T2JMH3
A	353	HIS	-	expression tag	UNP A0A7T2JMH3
A	354	HIS	-	expression tag	UNP A0A7T2JMH3
A	355	HIS	-	expression tag	UNP A0A7T2JMH3
A	356	HIS	-	expression tag	UNP A0A7T2JMH3
A	357	HIS	-	expression tag	UNP A0A7T2JMH3
A	358	HIS	-	expression tag	UNP A0A7T2JMH3
B	1	MET	-	initiating methionine	UNP A0A7T2JMH3
B	351	LEU	-	expression tag	UNP A0A7T2JMH3
B	352	GLU	-	expression tag	UNP A0A7T2JMH3
B	353	HIS	-	expression tag	UNP A0A7T2JMH3
B	354	HIS	-	expression tag	UNP A0A7T2JMH3
B	355	HIS	-	expression tag	UNP A0A7T2JMH3
B	356	HIS	-	expression tag	UNP A0A7T2JMH3
B	357	HIS	-	expression tag	UNP A0A7T2JMH3
B	358	HIS	-	expression tag	UNP A0A7T2JMH3

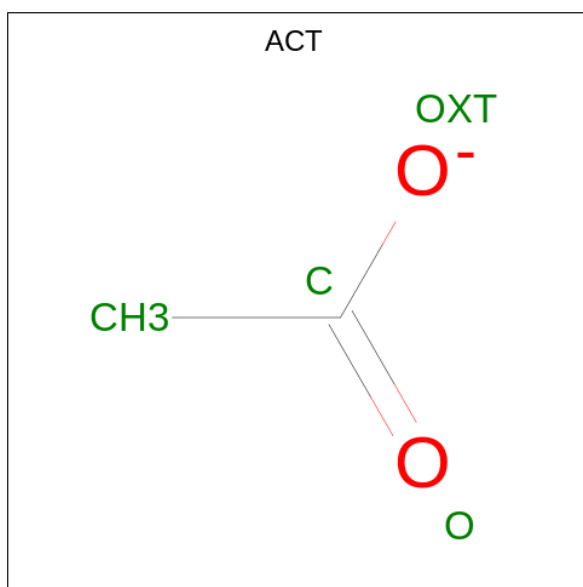
- Molecule 2 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0

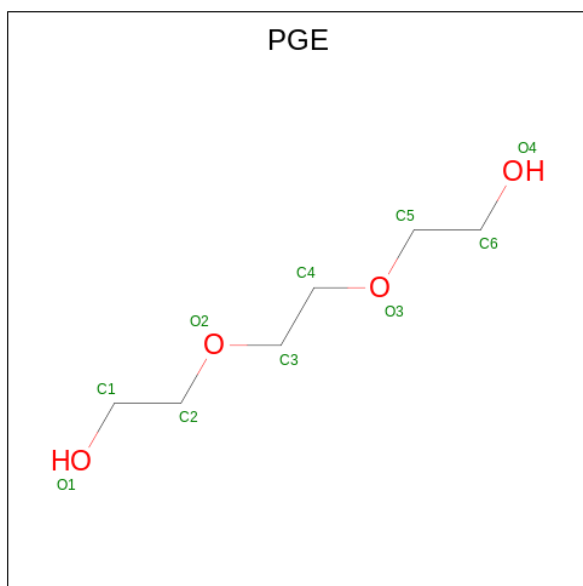
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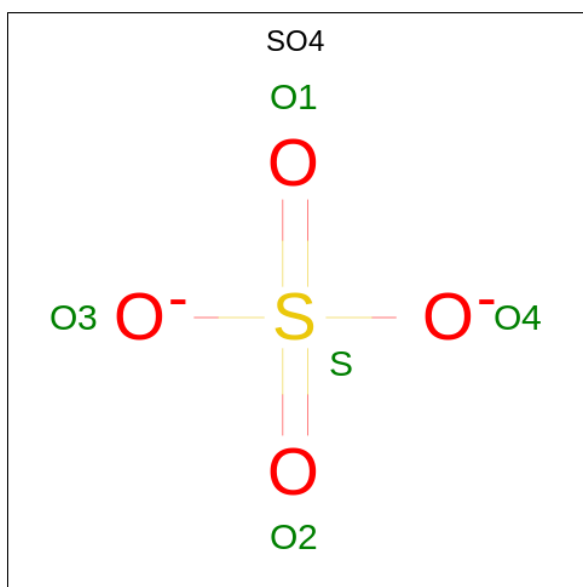
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		

- Molecule 4 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: C<sub>6</sub>H<sub>14</sub>O<sub>4</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			10	6	4		

- Molecule 5 is SULFATE ION (three-letter code: SO<sub>4</sub>) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total O S 5 4 1	0	0

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total Zn 1 1	0	0

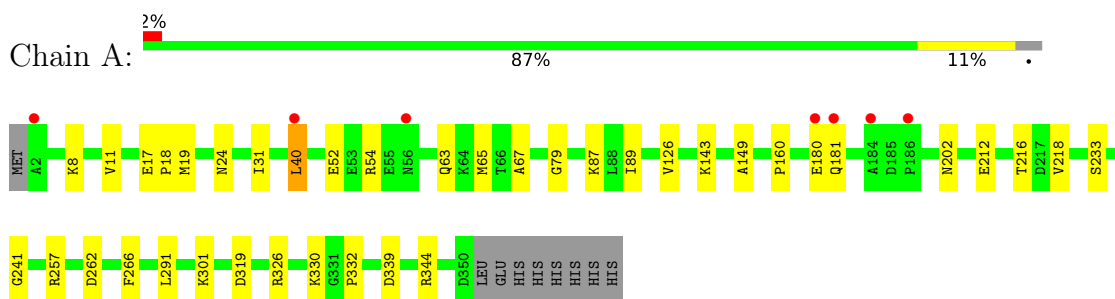
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	189	Total O 189 189	0	0
7	B	133	Total O 133 133	0	0

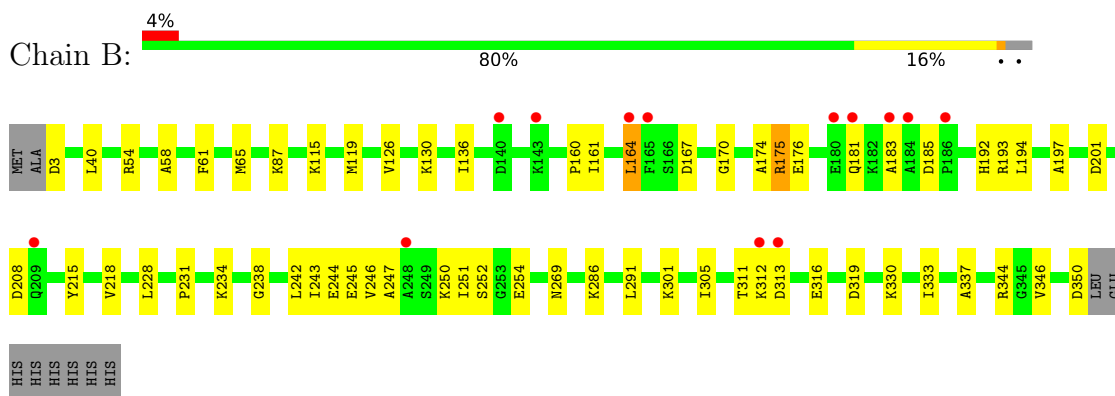
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Iron uptake system protein EfeO



- Molecule 1: Iron uptake system protein EfeO





## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	139.91Å 51.88Å 117.38Å 90.00° 112.44° 90.00°	Depositor
Resolution (Å)	48.15 – 1.85 48.15 – 1.85	Depositor EDS
% Data completeness (in resolution range)	97.7 (48.15-1.85) 97.8 (48.15-1.85)	Depositor EDS
$R_{merge}$	0.04	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.37 (at 1.84Å)	Xtrriage
Refinement program	PHENIX (1.18.2_3874: ???)	Depositor
R, $R_{free}$	0.199 , 0.244 0.200 , 0.244	Depositor DCC
$R_{free}$ test set	3282 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	32.4	Xtrriage
Anisotropy	0.384	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 55.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	6081	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.74% 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: SO4, PGE, ACT, ZN, EDO

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	0.40	0/2848	0.54	0/3849
1	B	0.33	0/2908	0.49	0/3934
All	All	0.37	0/5756	0.52	0/7783

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

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	2767	0	2799	27	0
1	B	2852	0	2847	41	0
2	A	60	0	90	7	0
2	B	60	0	90	4	0
3	A	4	0	3	0	0
4	A	10	0	14	2	0
5	A	5	0	0	0	0
6	B	1	0	0	0	0
7	A	189	0	0	3	0
7	B	133	0	0	3	0
All	All	6081	0	5843	69	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (69) 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:A:24:ASN:H	4:A:417:PGE:H6	1.31	0.95
1:A:202:ASN:HB2	2:A:409:EDO:H12	1.62	0.81
1:B:245[B]:GLU:HB3	1:B:250:LYS:HE3	1.63	0.80
1:B:247:ALA:HB2	1:B:333:ILE:HG22	1.77	0.66
1:B:301:LYS:HE3	1:B:305:ILE:HD11	1.80	0.64
1:B:208:ASP:HB2	2:B:406:EDO:H21	1.80	0.62
1:B:245[B]:GLU:O	1:B:250:LYS:HG3	2.01	0.60
1:A:54[B]:ARG:NH1	1:A:63:GLN:OE1	2.34	0.58
1:B:244[A]:GLU:OE1	2:B:413:EDO:O2	2.21	0.58
1:B:164[B]:LEU:HB3	1:B:228:LEU:HD21	1.85	0.56
1:B:160[B]:PRO:HD3	1:B:242[B]:LEU:HD22	1.88	0.56
1:B:175:ARG:HH12	1:B:254:GLU:CD	2.09	0.56
1:B:54:ARG:CZ	1:B:65:MET:HG3	2.36	0.55
1:A:233:SER:HB2	1:A:344[A]:ARG:HE	1.73	0.54
1:B:231:PRO:HG2	1:B:234:LYS:HD2	1.91	0.53
1:A:87:LYS:NZ	7:A:504:HOH:O	2.35	0.53
1:A:291:LEU:HD11	1:A:339:ASP:HB3	1.90	0.52
1:A:24:ASN:N	4:A:417:PGE:H6	2.13	0.52
1:B:161[A]:ILE:HA	1:B:164[A]:LEU:HD22	1.92	0.52
1:B:242[B]:LEU:HD23	1:B:269:ASN:O	2.10	0.51
1:B:160[B]:PRO:HG3	1:B:242[B]:LEU:HD22	1.92	0.51
1:A:126:VAL:HG22	1:A:218[B]:VAL:HG12	1.93	0.50
1:A:241:GLY:HA3	2:A:406:EDO:H21	1.94	0.49
1:A:160:PRO:HG3	2:A:406:EDO:H22	1.95	0.48
2:B:411:EDO:O2	7:B:501:HOH:O	2.20	0.48
1:A:11:VAL:HG11	1:A:40:LEU:HD11	1.95	0.48
1:A:149:ALA:HB3	2:A:405:EDO:H11	1.95	0.47
1:A:19:MET:H	2:A:413:EDO:H12	1.78	0.47
1:B:136:ILE:HD13	1:B:194:LEU:HD22	1.97	0.47
1:B:319:ASP:N	1:B:319:ASP:OD1	2.47	0.47
1:B:344:ARG:HH21	1:B:350:ASP:HA	1.80	0.46
1:A:40:LEU:HD11	1:A:79:GLY:HA2	1.96	0.46
1:A:301:LYS:HD3	1:A:332:PRO:HG3	1.97	0.46
1:B:245[A]:GLU:OE2	7:B:502:HOH:O	2.21	0.46
1:A:87:LYS:HD3	1:A:89:ILE:HD11	1.98	0.46
1:B:192:HIS:HE1	7:B:513:HOH:O	1.98	0.45
1:B:252:SER:OG	1:B:254:GLU:HG2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:87:LYS:HA	1:B:87:LYS:HD3	1.85	0.44
1:A:212:GLU:O	1:A:216:THR:HG23	2.17	0.44
1:A:19:MET:H	2:A:413:EDO:C1	2.30	0.44
1:B:160[B]:PRO:CG	1:B:242[B]:LEU:HD22	2.46	0.44
1:B:164[B]:LEU:HD21	1:B:234:LYS:HD2	2.00	0.43
1:A:301:LYS:HD3	1:A:332:PRO:CG	2.48	0.43
1:B:176:GLU:OE1	1:B:183:ALA:HB2	2.19	0.43
1:B:238[A]:GLY:O	2:B:405:EDO:H21	2.18	0.43
1:B:170:GLY:O	1:B:174:ALA:HB2	2.18	0.43
1:B:181:GLN:HB2	1:B:185:ASP:HB2	2.01	0.42
1:B:58:ALA:HB3	1:B:61:PHE:CD1	2.54	0.42
1:A:330:LYS:NZ	7:A:522:HOH:O	2.52	0.42
1:B:197:ALA:HA	1:B:201:ASP:HB2	2.02	0.42
1:B:126:VAL:HG22	1:B:218:VAL:HG12	2.01	0.42
1:A:52:GLU:HG3	1:A:67:ALA:HB1	2.01	0.42
1:B:115:LYS:O	1:B:119[A]:MET:HG2	2.20	0.42
1:B:311:THR:O	1:B:313:ASP:N	2.53	0.42
1:B:244[B]:GLU:HG3	1:B:337:ALA:HB1	2.01	0.42
1:B:183:ALA:O	1:B:193:ARG:NH2	2.51	0.41
1:B:242[B]:LEU:HD12	1:B:242[B]:LEU:HA	1.71	0.41
1:B:243[B]:ILE:O	1:B:246[B]:VAL:N	2.53	0.41
1:B:311:THR:HG21	1:B:316:GLU:HG2	2.02	0.41
1:A:8:LYS:HG2	1:A:31:ILE:HB	2.02	0.41
1:B:251:ILE:HG21	1:B:330:LYS:HD3	2.02	0.41
1:A:143:LYS:HE3	2:A:404:EDO:H12	2.03	0.41
1:A:326:ARG:NH1	7:A:507:HOH:O	2.37	0.41
1:A:17:GLU:HA	1:A:18:PRO:HA	1.97	0.41
1:A:54[A]:ARG:HA	1:A:54[A]:ARG:HD3	1.84	0.41
1:B:130:LYS:HB2	1:B:215:TYR:CE1	2.56	0.41
1:B:291:LEU:HD23	1:B:346:VAL:HG21	2.03	0.41
1:A:54[A]:ARG:HG3	1:A:65:MET:HB2	2.04	0.40
1:B:246[B]:VAL:HA	1:B:250:LYS:HB2	2.03	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	360/358 (101%)	355 (99%)	5 (1%)	0	100	100
1	B	370/358 (103%)	355 (96%)	14 (4%)	1 (0%)	41	26
All	All	730/716 (102%)	710 (97%)	19 (3%)	1 (0%)	51	36

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	312	LYS

### 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	297/294 (101%)	289 (97%)	8 (3%)	44	29
1	B	302/294 (103%)	295 (98%)	7 (2%)	50	34
All	All	599/588 (102%)	584 (98%)	15 (2%)	50	31

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	40	LEU
1	A	180	GLU
1	A	181	GLN
1	A	257	ARG
1	A	262	ASP
1	A	266	PHE
1	A	319[A]	ASP
1	A	319[B]	ASP
1	B	3	ASP
1	B	40	LEU
1	B	164[A]	LEU

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Mol	Chain	Res	Type
1	B	164[B]	LEU
1	B	167	ASP
1	B	175	ARG
1	B	286	LYS

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

### 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 monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

Of 34 ligands modelled in this entry, 1 is monoatomic - leaving 33 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	$\# Z  > 2$
2	EDO	B	402	-	3,3,3	0.54	0	2,2,2	0.37	0
2	EDO	B	411	-	3,3,3	0.46	0	2,2,2	0.27	0
2	EDO	A	412	-	3,3,3	0.57	0	2,2,2	0.16	0
2	EDO	A	404	-	3,3,3	0.49	0	2,2,2	0.35	0
2	EDO	B	409	-	3,3,3	0.48	0	2,2,2	0.28	0
2	EDO	A	409	-	3,3,3	0.47	0	2,2,2	0.34	0
2	EDO	A	415	-	3,3,3	0.42	0	2,2,2	0.64	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	EDO	B	408	-	3,3,3	0.47	0	2,2,2	0.22	0
4	PGE	A	417	-	9,9,9	0.36	0	8,8,8	0.37	0
2	EDO	B	406	-	3,3,3	0.46	0	2,2,2	0.35	0
2	EDO	A	410	-	3,3,3	0.49	0	2,2,2	0.29	0
2	EDO	B	405	-	3,3,3	0.45	0	2,2,2	0.42	0
2	EDO	B	414	-	3,3,3	0.52	0	2,2,2	0.27	0
2	EDO	A	413	-	3,3,3	0.57	0	2,2,2	0.15	0
2	EDO	B	412	-	3,3,3	0.44	0	2,2,2	0.41	0
5	SO4	A	418	-	4,4,4	0.12	0	6,6,6	0.29	0
2	EDO	A	407	-	3,3,3	0.48	0	2,2,2	0.30	0
2	EDO	B	403	-	3,3,3	0.51	0	2,2,2	0.14	0
2	EDO	A	411	-	3,3,3	0.51	0	2,2,2	0.25	0
2	EDO	B	416	-	3,3,3	0.47	0	2,2,2	0.32	0
2	EDO	A	403	-	3,3,3	0.49	0	2,2,2	0.24	0
2	EDO	A	401	-	3,3,3	0.49	0	2,2,2	0.37	0
2	EDO	A	402	-	3,3,3	0.48	0	2,2,2	0.25	0
2	EDO	B	415	-	3,3,3	0.53	0	2,2,2	0.24	0
2	EDO	B	404	-	3,3,3	0.48	0	2,2,2	0.30	0
2	EDO	A	405	-	3,3,3	0.48	0	2,2,2	0.44	0
3	ACT	A	416	-	3,3,3	1.34	0	3,3,3	1.32	0
2	EDO	B	410	-	3,3,3	0.46	0	2,2,2	0.37	0
2	EDO	A	406	-	3,3,3	0.43	0	2,2,2	0.25	0
2	EDO	B	413	-	3,3,3	0.44	0	2,2,2	0.36	0
2	EDO	A	414	-	3,3,3	0.47	0	2,2,2	0.32	0
2	EDO	B	407	-	3,3,3	0.57	0	2,2,2	0.13	0
2	EDO	A	408	-	3,3,3	0.49	0	2,2,2	0.23	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
2	EDO	B	402	-	-	1/1/1/1	-
2	EDO	B	411	-	-	0/1/1/1	-
2	EDO	A	412	-	-	1/1/1/1	-
2	EDO	A	404	-	-	1/1/1/1	-
2	EDO	B	409	-	-	0/1/1/1	-
2	EDO	A	409	-	-	1/1/1/1	-
2	EDO	A	415	-	-	1/1/1/1	-
2	EDO	B	408	-	-	0/1/1/1	-
4	PGE	A	417	-	-	1/7/7/7	-
2	EDO	B	406	-	-	1/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	EDO	A	410	-	-	0/1/1/1	-
2	EDO	B	405	-	-	1/1/1/1	-
2	EDO	B	414	-	-	0/1/1/1	-
2	EDO	A	413	-	-	1/1/1/1	-
2	EDO	B	412	-	-	1/1/1/1	-
2	EDO	A	407	-	-	1/1/1/1	-
2	EDO	B	403	-	-	0/1/1/1	-
2	EDO	A	411	-	-	0/1/1/1	-
2	EDO	B	416	-	-	0/1/1/1	-
2	EDO	A	403	-	-	0/1/1/1	-
2	EDO	A	401	-	-	0/1/1/1	-
2	EDO	A	402	-	-	0/1/1/1	-
2	EDO	B	415	-	-	0/1/1/1	-
2	EDO	B	404	-	-	1/1/1/1	-
2	EDO	A	405	-	-	0/1/1/1	-
2	EDO	B	410	-	-	1/1/1/1	-
2	EDO	A	406	-	-	1/1/1/1	-
2	EDO	B	413	-	-	1/1/1/1	-
2	EDO	A	414	-	-	0/1/1/1	-
2	EDO	B	407	-	-	1/1/1/1	-
2	EDO	A	408	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	417	PGE	O3-C5-C6-O4
2	B	402	EDO	O1-C1-C2-O2
2	B	404	EDO	O1-C1-C2-O2
2	B	413	EDO	O1-C1-C2-O2
2	A	413	EDO	O1-C1-C2-O2
2	A	406	EDO	O1-C1-C2-O2
2	A	412	EDO	O1-C1-C2-O2
2	B	410	EDO	O1-C1-C2-O2
2	B	412	EDO	O1-C1-C2-O2
2	A	407	EDO	O1-C1-C2-O2
2	B	405	EDO	O1-C1-C2-O2
2	A	409	EDO	O1-C1-C2-O2
2	B	407	EDO	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
2	A	404	EDO	O1-C1-C2-O2
2	B	406	EDO	O1-C1-C2-O2
2	A	415	EDO	O1-C1-C2-O2

There are no ring outliers.

10 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	411	EDO	1	0
2	A	404	EDO	1	0
2	A	409	EDO	1	0
4	A	417	PGE	2	0
2	B	406	EDO	1	0
2	B	405	EDO	1	0
2	A	413	EDO	2	0
2	A	405	EDO	1	0
2	A	406	EDO	2	0
2	B	413	EDO	1	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 [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	349/358 (97%)	-0.10	7 (2%) 65 64	18, 31, 54, 73	0
1	B	348/358 (97%)	0.23	13 (3%) 41 39	24, 40, 61, 92	0
All	All	697/716 (97%)	0.06	20 (2%) 51 50	18, 35, 59, 92	0

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	184	ALA	6.3
1	B	313	ASP	4.9
1	B	180	GLU	4.4
1	A	2	ALA	3.7
1	A	40	LEU	3.4
1	B	312	LYS	3.3
1	B	164[A]	LEU	3.3
1	A	181	GLN	2.9
1	B	183	ALA	2.8
1	B	186	PRO	2.7
1	B	184	ALA	2.5
1	B	181	GLN	2.5
1	A	180	GLU	2.4
1	B	248	ALA	2.3
1	A	56	ASN	2.3
1	B	209	GLN	2.2
1	A	186	PRO	2.2
1	B	165[A]	PHE	2.0
1	B	143	LYS	2.0
1	B	140	ASP	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

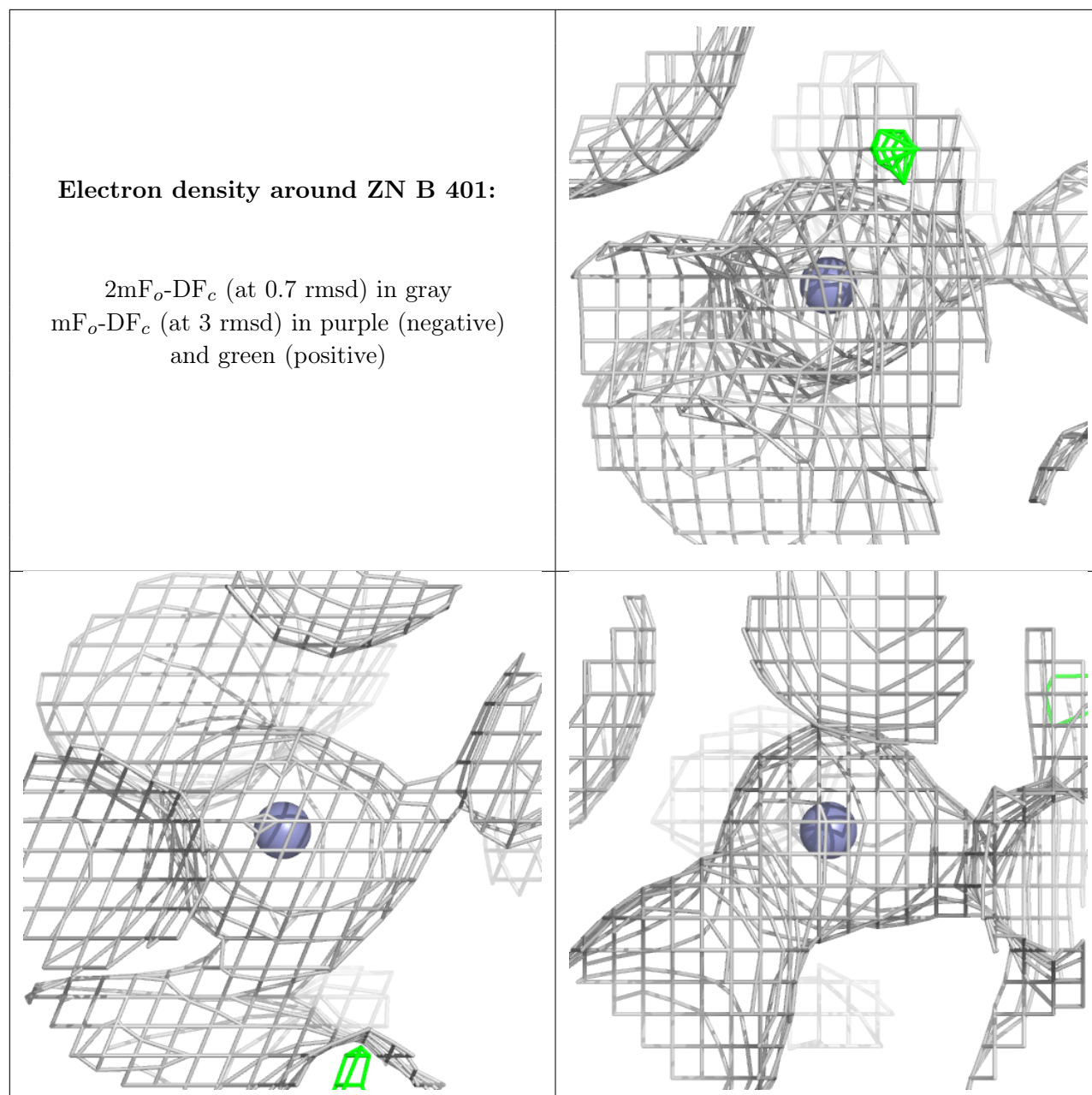
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	EDO	A	411	4/4	0.55	0.29	63,63,66,70	0
2	EDO	B	404	4/4	0.63	0.30	49,55,57,60	0
2	EDO	B	416	4/4	0.73	0.13	51,51,54,55	0
2	EDO	A	413	4/4	0.74	0.27	41,46,48,54	0
2	EDO	B	414	4/4	0.79	0.20	46,49,53,65	0
2	EDO	B	406	4/4	0.79	0.13	57,57,64,65	0
4	PGE	A	417	10/10	0.79	0.27	30,44,51,55	0
2	EDO	B	407	4/4	0.81	0.15	37,49,52,53	0
2	EDO	A	402	4/4	0.81	0.12	47,52,53,55	0
2	EDO	A	415	4/4	0.82	0.21	42,45,56,57	0
2	EDO	B	403	4/4	0.82	0.15	50,51,52,59	0
2	EDO	A	401	4/4	0.82	0.10	49,56,57,62	0
2	EDO	A	403	4/4	0.82	0.18	44,48,51,55	0
2	EDO	B	408	4/4	0.83	0.20	49,54,60,60	0
2	EDO	B	402	4/4	0.83	0.17	40,46,47,49	0
2	EDO	A	408	4/4	0.86	0.11	53,56,57,67	0
2	EDO	A	404	4/4	0.87	0.13	35,37,40,63	0
2	EDO	B	409	4/4	0.87	0.12	45,49,53,63	0
2	EDO	B	410	4/4	0.87	0.14	43,46,47,48	0
2	EDO	A	410	4/4	0.89	0.10	39,40,40,47	0
2	EDO	A	414	4/4	0.89	0.18	50,53,55,57	0
2	EDO	B	405	4/4	0.90	0.15	39,42,47,50	0
2	EDO	A	412	4/4	0.91	0.12	34,40,57,61	0
2	EDO	B	412	4/4	0.92	0.21	37,45,59,72	0
2	EDO	B	413	4/4	0.92	0.25	41,47,49,49	0
2	EDO	A	407	4/4	0.92	0.16	29,36,45,46	0
2	EDO	A	406	4/4	0.92	0.14	35,36,41,44	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	EDO	A	409	4/4	0.92	0.19	46,46,51,54	0
5	SO4	A	418	5/5	0.93	0.10	24,27,41,50	5
2	EDO	B	415	4/4	0.94	0.09	32,43,43,44	0
2	EDO	A	405	4/4	0.94	0.16	23,34,41,42	0
6	ZN	B	401	1/1	0.95	0.14	37,37,37,37	1
2	EDO	B	411	4/4	0.96	0.09	30,40,42,53	0
3	ACT	A	416	4/4	0.97	0.11	42,42,45,45	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



## 6.5 Other polymers [i](#)

There are no such residues in this entry.